127th Wing

Michigan Air National Guard

Selfridge Air National Guard Base, Michigan

ADAL FUEL CELL & CORROSION CONTROL, BLDG 154

Project No. VGLZ162323

Type B3 Final HEF Mod Submittal

Specifications

Volume 1 of 4

December 16, 2022

TETRA TECH

Mead & Hunt

Joint Venture with

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GEOTECHNICAL DATA

PART 1 GENERAL

1.1 GEOTECHNICAL DATA

This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information. This Document and its attachments are not part of the Contract Documents.

Because subsurface conditions indicated by the soil borings are a sampling in relation to the entire construction area, and for other reasons, the A/E, the A/E's consultants, and the firm reporting the subsurface conditions do not warranty the conditions below the depths of the borings or that the strata logged from the borings are necessarily typical of the entire site. Any party using the information described in the soil borings and geotechnical report shall accept full responsibility for its use.

A geotechnical investigation report for Project, prepared by Somat Engineering Incorporated, dated April 27, 2020, is appended to this Document.

a. The opinions expressed in this report are those of a geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by a geotechnical engineer.

b. Any party using information described in the geotechnical report shall make additional test borings and conduct other exploratory operations that may be required to determine the character of subsurface materials that may be encountered.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

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Infrastructure Consulting Engineers

4039 40th Street SE • Suite 4 • Grand Rapids • Michigan • 49512

REPORT ON GEOTECHNICAL INVESTIGATION

ADAL FUEL CELL AND CORROSION CONTROL
BUILDING 154 ADDITIONS
WATER RESERVOIR TANK AND PUMP HOUSE
SELFRIDGE AIR NATIONAL GUARD BASE
HARRISON TOWNSHIP, MICHIGAN

Prepared for:

Mead & Hunt
2440 Deming Way
Middleton, Wisconsin 53562

April 27, 2020
2019143A

April 27, 2020
2019143A

Mr. Jeremy Bluhm, PE
Mead & Hunt
2440 Deming Way
Middleton, Wisconsin 53562-1562

RE: Report on Geotechnical Investigation
Building 154 Additions, Water Reservoir and Pump House
Selfridge Air National Guard Base
Harrison Township, Michigan

Dear Mr. Bluhm:

We have completed the geotechnical investigation for the proposed ADAL Fuel Cell and Corrosion Control, Building 154 additions, Water Reservoir and Pump House, at the SANG Base located in Harrison Township, Michigan. This report presents the results of our observations, geotechnical recommendations and construction considerations.

The soil samples collected during our field investigation will be retained in our laboratory for 90 days from the date of this report, at which time these samples will be discarded unless otherwise directed by you.

It was a pleasure working with you on this project. If you have any questions regarding this report, please do not hesitate to contact us.

Sincerely,
Somat Engineering, Inc.

JD Hoksbergen, PE
Project Engineer

4039 40th Street SE, Suite 4, Grand Rapids, Michigan 49512 web: www.somateng.com phone: 616-575-9230 fax: 616-575-9236

Infrastructure Engineering Solutions

REPORT SUMMARY

A general summary of the report conclusions and recommendations is provided below:

1. This project consists of the design and construction of Building 154 additions and a water reservoir tank with associated pump house. Three soil borings were drilled to be used for the design of the additions and new structures. Two soil borings were drilled to a depth of 30 feet and the other soil boring was drilled to a depth of 60 feet below existing grade. The general soil profile encountered at this site included about 3 feet of fill soils overlying stiff to hard clays, extending to depths of about 10 feet below existing grade. Soft clay soils were encountered from 10 feet to about 30 feet below existing grade. Stiff to hard clays were encountered below the soft clays and extended to a depth of about 49 feet below existing grade. At about 49 feet and extending to the termination depth of boring TH-02, a hardpan material consist of hard sandy clay was encountered.

2. We understand the building additions and the pump house will be constructed as single story, at-grade structures with no below grade areas. The foundations will be supported on shallow foundations. Due to settlement concerns with soft clay soils encountered from about 10 to 30 feet below existing grades, the footings will need to be limited in load and size.

3. The water reservoir tank is proposed to be 66 feet in diameter and have a height of 25 feet. The tank will be constructed at-grade. Due to settlement concerns, deep foundations will be required to support the tank. Driven piles such as H-piles or steel pipe piles driven into the hardpan should provide suitable support for this structure, assuming the piles are driven into the existing hardpan soils.

4. As a part of this project, some existing pavement areas will need to be removed prior to construction to allow for the installation of new building footings and utility improvements. Some of the pavement cut areas will be located within driveways and parking lots and will need to be reconstructed. We understand new or reconstructed pavement will consist of both Portland cement concrete or asphaltic cement concrete.

5. The long term groundwater level is expected to be encountered at depths of about 10 to 12 feet below existing grade. Standard sump pit and pumping procedures should be adequate to control the groundwater within the excavations.

The summary presented above is general in nature and should not be considered apart from the entire text of the report with all the qualifications and considerations mentioned therein. Details of our findings and recommendations are discussed in the following sections and in the appendices of this report.

REPORT PREPARED BY:

JD Hoksbergen, P.E.
Project Engineer

REPORT REVIEWED BY:

Corey R. Hostetter, P.E., LEED AP
Senior Project Engineer

REPORT ON GEOTECHNICAL INVESTIGATION
ADAL FUEL CELL AND CORROSION CONTROL, BUILDING 154 ADDITIONS
WATER RESERVOIR TANK AND PUMP HOUSE
SELFRIDGE AIR NATIONAL GUARD BASE
HARRISON TOWNSHIP, MICHIGAN

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1.0 INTRODUCTION

1.1 GENERAL

Upon authorization from Mead & Hunt of Middleton, Wisconsin, Somat Engineering, Inc. (Somat) has conducted a geotechnical investigation for the proposed additions to Building 154, which houses the ADAL Fuel Cell and Corrosion Control Hangar, as well as the construction of a new reservoir tank and pump house within the Selfridge Air National Guard Base in Harrison Township, Michigan. This study was performed in accordance with Somat Proposal No. P180289, dated August 22, 2018 and Proposal No. P190251A, dated July 22, 2019.

The following sections of this report will provide our understanding of the project, a description of our field investigation, the results of the field and laboratory tests, the logs of test borings, our interpretation of subsoil and groundwater conditions, and recommendations related to the geotechnical aspects for design of new foundations and new pavement based on the soil and groundwater conditions disclosed by our field investigation.

1.2 PROJECT AND SITE INFORMATION

This project consists of the design and construction of additions to Building 154 and the construction of an adjacent water reservoir and pump house at the Selfridge Air National Guard Base (ANGB). The Selfridge ANGB is located at 44875 N. Jefferson Avenue in Harrison Township, Michigan.

The Selfridge ANGB is on the west shore of Lake Saint Clair and is bounded by I-94 to the west, the Clinton River to the south, and by William P. Rosso Highway to the north. Building 154 located on the east side of the base, south of Wilbur Wright Boulevard near the intersection with Jefferson Avenue, and north of the East Ramp.

The Building 154 additions and pump house building are proposed to consist of single-story, slab on grade structures, with no below-grade structures considered. The additions to Building 154 are proposed to be a low bay office and locker room and break area spaces, which will expand shop and administrative space for staff. Sections of pavement surrounding the existing building may need to be removed and replaced due to construction activities and utility installation. The water reservoir is to be constructed above grade and will be circular in shape with a diameter of about 66 feet and a height of 25 feet. A pump house will be needed to service the water reservoir tank, and may be constructed as a new building, or an existing building will be used to house the pump equipment.

2.0 SUBSURFACE INVESTIGATION

2.1 FIELD EXPLORATION

The field exploration program consisted of performing a total of three (3) soil borings, designated as TH-01, TH-02, and TH-03. Each of these soil borings were located near the footprint of the proposed additions. Soil borings TH-01 and TH-03 extended to 30 feet while TH-02 extended to 60 feet below existing grade.

The number and location of these soil borings were selected by M&H. The final boring locations were adjusted in the field to avoid conflict with any underground utilities. The final as-drilled boring locations were not surveyed and the coordinates presented on the soil boring logs are based on handheld GPS recordings, and measured offsets in the field. Ground surface elevations were estimated from the proposed soil boring location survey file provided by M&H. A soil boring location diagram is presented in Appendix A for reference.

2.1.1 Drilling Operations

The drilling operations were performed between December 17 and 19, 2019. A CME 850X ATV track mounted drill rig (#400472) was used to advance 3¼ inch (inside diameter) hollow stem auger to the termination depth of the soil borings.

Upon completion, all boreholes were backfilled with a cementitious grout to the ground surface elevation. Certificates are provided to us indicating each hammer's measured energy transfer ratio. For this project, the hammer efficiency is provided below:

Drill Rig (Serial No.)	***Hammer Energy Transfer Efficiency***	***Applicable Soil Borings***
#400472	93.20%	TH-01 / TH-02 / TH-03

2.1.2 Sampling

Soil samples were recovered from the soil borings using split-spoon sampling procedures in accordance with ASTM Standard D1586 ("Standard Method for Penetration Tests and Split Barrel Sampling of Soils"). Sampling was performed in the soil borings using a 24-inch-long split-spoon sampler at a 2.5-foot interval from the surface to 10 feet below grade where sample intervals were then collected at 5-foot intervals to the termination depth of each soil boring.

The samples obtained during drilling were sealed in glass jars in the field to protect the soil and maintain the soil's natural moisture content. All soil samples for the geotechnical investigation were transported to Somat's laboratory for further analysis and testing and will be retained in our laboratory for a period of 90 days from the date of this report, after which they will be discarded, unless we are notified otherwise.

2.1.3 Standard Penetration Test (SPT)

Soil samples collected during the drilling portion of the subsoil exploration were labeled with the soil boring designation and a unique sample number. Soil boring samples were obtained by Standard Penetration Tests in general accordance with ASTM D1586 procedures, whereby a conventional 2-inch O.D. split-spoon sampler is driven into the soil with a 140 pound hammer repeatedly dropped through a free-fall distance of 30 inches. The sampler is generally driven three successive 6-inch increments, with the blows for each 6-inch increment being recorded. The number of blows required to advance the sampler through 12 inches after an initial penetration of 6 inches, is termed the Standard Penetration Test resistance (N-value) and is presented graphically on the individual Logs of Test Borings. As added information, the number of blows for each 6-inch increment is also presented on the boring logs.

2.1.4 Groundwater Level Observation Procedures

Whenever possible, groundwater level observations were made during the drilling operations and immediately after completion of drilling, and are shown on the individual Logs of Test Borings. During drilling, the depth at which free water was observed, where drill cuttings became saturated or where saturated samples were collected, was indicated as the groundwater level during drilling. In granular, pervious soils, the indicated water levels are considered relatively reliable when solid-stem augers are used for drilling. However, in cohesive soils, groundwater observations are not necessarily indicative of the static water table due to the low permeability rates of the soils, and due to the sealing off of natural paths of groundwater flow during drilling operations.

It should be noted that seasonal variations and recent precipitation conditions may influence the level of the groundwater table significantly. Groundwater observation wells are generally used if precise groundwater table information is needed, however the installation of groundwater monitoring wells was not included in the scope of the investigation. Therefore, the discussion and recommendations provided within the report are based on our knowledge of the soil and groundwater conditions in this area, which should provide for a reasonable approximation of the groundwater level.

2.2 LABORATORY TESTING

All samples recovered from the borings were classified in accordance with the Unified Soil Classification System.

The results of the laboratory classification are included in Appendix B on the respective logs of test borings. All laboratory tests were performed in accordance with their applicable ASTM procedures.

2.3 LIMITATIONS

Our scope of our services was strictly geotechnical and did not include any environmental assessment, or investigation for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater or air, on, below or around this site. Any statement in this report or on the boring logs regarding odors, colors, unusual or suspicious contents or conditions are strictly for informational purposes. No further testing or investigation has been performed to specifically identify the content or source.

Further, Somat has made no observations or recommendations with regard to the presence or absence of mold or other biological contaminants (such as spores, fungi, bacteria, viruses and the byproducts of such organisms), now or in the future, on this site or within or on any structures to be constructed on this site. Any consideration with regard to the presence of mold, or the possibility of mold growth in or on the structure to be constructed on this site are not within Somat's scope of services on this project.

3.0 SUBSURFACE CONDITIONS

3.1 SOIL STRATIFICATION

Soil conditions encountered at the soil boring locations have been evaluated and are presented in the form of Logs of Test Borings. The Logs of Test Borings presented in Appendix B include approximate soil stratification with detailed soil descriptions and selected physical properties for each stratum encountered in the test borings. In addition to the observed subsoil stratigraphy, the boring logs present information relating to sample data, Standard Penetration Test results, groundwater level conditions observed in the boring, personnel involved, and other pertinent data. For information, and to aid in understanding the data as presented on the boring logs, General Notes defining nomenclature used in soil descriptions are presented immediately following the Logs of Test Borings in Appendix B. It should be noted that the Logs of Test Borings included with this report have been prepared on the basis of laboratory classifications and testing as well as field logs and observations of the soils encountered.

A generalized description of the soils encountered in the borings (TH-01 to TH-03), beginning at the existing ground surface, is provided below:

Surface Materials. Approximately 14 inches of topsoil was encountered at the surface of TH-01. 8 inches of Portland cement concrete was encountered at the surface of TH-02 and TH-03.

Fill Materials. Beneath the pavement, fill soils were encountered and extended to approximately 2 feet and 3 feet in soil borings TH-02 and TH-03, respectively. These fill soils consisted of mixed clay, silty sand, and crushed aggregate in TH-02. A slight foreign

odor was present in these fill soils. The fill soils encountered in TH-03 include a poorly graded fine sand with silt. Occasional layers of cinders were encountered in the TH-03 fill layer.

A foreign odor was observed in soils to a depth of about 2 feet below grade in TH-02.

Upper Clay. Below the fill soils, each of the soil borings generally encountered lean clay with varying amounts of sand and gravel. A stiff to hard lean clay was found to extend to a depth of about 10 to 12 feet below grade. In TH-03, the clays extending to 8 feet below grade were classified as possible fill soils.

A foreign odor was observed in these upper clay soils to a depth of about 12 feet in TH-01.

Very Soft Native Clay. Below the upper clay soils, very soft lean clay was encountered extending to about 28 to 30 feet below grade.

Deep Native Clay. Stiff to hard lean clays were encountered below the very soft clay soils in all three soil borings. Soil borings TH-01 and TH-03 were terminated in this layer at depths of 30 feet below grade. In soil boring TH-02, stiff to very stiff sandy clay soils extended to a depth of about 49 feet below grade.

Hardpan. In soil boring TH-02, hardpan material consisting of sandy lean clay was encountered beginning at a depth of 49 feet below grade and continued to the explored depth of the boring.

Please refer to the individual boring logs for the soil conditions at the specific boring locations. It is emphasized that the stratification lines shown on the Logs of Test Borings are approximate indications of change from one soil type to another at the locations of the boreholes. The actual transition from one stratum to the next may be gradual, and may vary within the area represented by the test boring.

3.2 GROUNDWATER LEVEL OBSERVATIONS

Groundwater was not encountered in the soil borings either during drilling operations or upon completion of drilling operations. Often, the color change from brown to gray can indicate the long term groundwater levels within cohesive soils. The change from brown to gray soils at this site, and our estimate of the long term groundwater level occurred at a depth of about 10 to 12 feet below existing grade (El. 569 to 566 feet±) in all three soil borings. Although not encountered at the time of our field investigation, perched groundwater conditions should be expected above the long term level, due to the significant presence of fines encountered within the soils on site.

It should be noted that the elevation of the natural groundwater table is likely to vary throughout the year depending on the amount of precipitation, runoff, evaporation and percolation in the area, as well as on the water level of surface water bodies in the vicinity, such as the Clinton River and Lake St. Clair, affecting the groundwater flow pattern.

4.0 ANALYSIS AND RECOMMENDATIONS

The overall project consists of the design and construction of new additions to the low bay office and locker room / break room area, surrounding pavement, as well as the installation of a water reservoir and pump house. As we understand, no below grade areas are proposed for any of these structures. We understand shallow spread or continuous strip foundations will be used to support the building additions as well as the pump house building. The reservoir tank will need to be supported on deep foundations.

As a part of this project, some existing pavement areas will need to be removed and replaced during construction. We understand both Portland cement concrete and asphaltic cement concrete pavement will be used.

4.1 FOUNDATION RECOMMENDATIONS

4.1.1 Shallow Foundations

We understand shallow foundations will be used to support the Building 154 additions, and the new pump house building (if the existing structure is not repurposed). As such, we expect shallow spread or continuous foundations to bear at standard frost depth (42 inches below final site grade). We do not anticipate any significant grade changes in this area (limited to within 1 foot±).

The bearing soils encountered in soil borings TH-01, TH-02 and TH-03 at a depth of 42 inches below existing grade were found to consist of hard to stiff clay, decreasing in strength with depth.

Soft clay soils were encountered at a depth of about 10 to 12 feet below existing grade and extended to depths of about 28 to 30 feet below existing grade. The soils in TH-03 were classified as possible fill to a depth of about 8 feet, likely associated with the construction of the existing building.

In general, we do not recommend constructing new foundations on undocumented fill soils. However, in boring TH-03, the possible fill was not found to contain any deleterious material. As such, these soils would be acceptable to leave in place, as long as they are properly prepared (described further in this report); however, careful observation should be made by a geotechnical engineer or qualified engineering inspector during construction to ensure the soils encountered at the foundation bearing elevation are similar to what was observed in boring TH-03, that there are not deeper fill soils, or buried debris/unsuitable soils at or beyond TH-03.

Care must be taken to protect and support the existing building foundations, so that they are not undermined or damaged.

The natural clay and possible clay fill soils are considered suitable for support of new foundations, given the discussion above. However, the deeper soft clay soils are susceptible to consolidation settlement, and shallow foundations need to be designed to prevent excessive settlement.
For shallow foundations bearing on these clay soils at conventional frost depth, we recommend a net allowable soil bearing pressure of 2,500 psf for square footings, and 2,000 psf for continuous (strip) footings be used for design. These values incorporate a factor of safety of 3. The design of the foundations must take into consideration the estimated settlement of the footings.

We have estimated the total settlement for both square and continuous foundations. Due to the settlement sensitive soils located below the bearing soils, the estimated settlement is highly dependent on the width of the footings. The table below shows the estimated settlement for various footing configurations.

Footing Type	***Assumed Footing Pressure***	***Estimated Settlement***
Square Footing 2 foot x 2 foot	2,500 psf	1.0 inches
Square Footing 3 foot x 3 foot	2,500 psf	1.5 inches
Square Footing 4 foot x 4 foot	2,500 psf	2.0 inches
Continuous Footing 1.5 foot wide	2,000 psf	1.5 inches
Continuous Footing 2 foot wide	2,000 psf	2.2 inches

Differential settlement is estimated as one-half of the total settlement.

Foundations should be situated a minimum of 3.5 feet below final site grade for frost concerns. Also, for frost heave considerations, the footing concrete should be cast in a vertical manner and should not be allowed to “mushroom out” near the top. Foundations should not be constructed on frozen subgrade soils. If foundation construction occurs during the winter, the foundations must be protected from frost by either embedment or proper insulation.

For bearing capacity and settlement considerations, isolated spread footing type foundations should be at least 24 inches wide, and continuous strip foundations should be at least 18 inches wide. For adjacent spread footings bearing at different elevations, we recommend a maximum line of slope between bottoms of footings to be 1V:1H.

Careful probing and visual observations should be made during construction to make sure foundations are not constructed on any organic soils, existing unsuitable fill, or unsuitable natural soils.

Based on our experience with soils within and nearby the Selfridge ANGB, it is possible some of the bearing soils have potential for shrinking and swelling. Although none of the soils at the proposed bearing depths at this Building 154 Additions project appeared to be "sensitive" clays, it is possible to still encounter such soils during construction. The deeper soft clay soils likely have a much higher shrink or swell potential. Unfortunately, there is no way to reliably determine the amount of distress which may occur as a result of the shrink/swell nature of the clay soils. Precautions should be taken to control the natural moisture content of these proposed clay subgrade soils. Changes in moisture content of ±5% could significantly impact the shrinking and swelling potential of the clay. For building foundations bearing on clay subgrade soils susceptible to shrinking and swelling, there is a concern for future foundation distress.

The potential for shrink/swell should be noted during design and construction, and conscious care should be taken to prevent significant moisture changes. This means protecting the foundation bearing soils from excessive drying or absorption of groundwater. Drainage of rain water/surface runoff should be directed away from the building, and a properly functioning perimeter foundation drainage system should be installed.

4.1.2 Deep Foundations

The proposed water reservoir tank will be constructed as an above grade tank with a diameter of 66 feet and a height of 25 feet. Although the foundation pressure is not expected to be very large (possibly under 2,000 psf), due to the large footprint of the tank as well as the soft soils encountered at the site, the tank will need to be supported on deep foundations as the resulting settlement will likely be intolerable. We recommend the tank be supported on driven piles: either H-Piles or cast-in-place, closed ended pipe piles (CIPs). Other options, such as drilled shafts, auger cast piles, or micropiles may also be feasible but will result in soil cuttings that would need to be disposed of. This could be cost prohibitive considering the history of contamination in these areas.

Driven piles are relatively easy and quick to install, with less site disturbance and clean up. These piles would also nearly eliminate the amount of total and differential settlement within the structure. Conversely, consideration should be given to the ground vibrations induced by the driving of the piles and any negative impact on surrounding structures and adjacent underground utilities (generally within about 25 feet of the pile driving operations).

In order for these piles to develop any significant capacity, they would need to be extended into the hard, sandy clay soils (hardpan) encountered at a depth of about 49 feet below existing grade. The piles are expected to develop significant side friction and end bearing resistance within the hardpan layers. We believe a 10 or 12 inch pile section would be most suitable for support of this structure (HP10x42 or HP12x53 or 12 inch diameter pipe piles), depending on the structural requirements. For HP pile sections manufactured from Grade 50 steel, we recommend a maximum allowable axial capacity of 120 kips and 180 kips for HP10x42 and HP12x53 piles, respectively. For pipe piles, the capacity will vary significantly with diameter and wall thickness. For ASTM A252 Grade 3 Steel, 10-inch or 12-inch diameter piles with a minimum wall thickness of 0.25 inches, we recommend a maximum allowable axial capacity of 100 kips and 160 kips, respectively. Larger pipe piles could be used; however, we would caution against larger H-Pile sections as with their increased bearing resistance and larger pile driving equipment, there is a possibility of piles extended deeper than expected as they cut into the hardpan soils.

The piles bearing within the hardpan will have more than sufficient capacity to support the vertical loads from this tank structure. A bearing depth of 55 feet below existing grade should be used for estimating pile quantities.

Preliminarily, we recommend an allowable lateral capacity of 10 kips be used for design of new vertical piles, based on our previous experience with lateral load tests for short term (transient) loading. Where the lateral load capacity of a vertical pile is used to resist design forces, then only transient forces, such as wind loading, should be applied to this lateral capacity. Sustained lateral loading should be resisted by the axial component of *battered* piles and not by the lateral load resistance of vertical piles.

Considering the *soil* conditions that the piles will be driven through, we do not anticipate issues with overstressing the piles during installation, provided proper inspection of each pile installation. Typically, the contractor is required to submit a wave equation analysis incorporating the pile driving system that is anticipated to be used on the project. The wave equation analysis demonstrates that the anticipated system is capable of developing the ultimate pile bearing capacity

without damaging the pile. However, since these piles will be driven to bear hardpan, the ultimate capacity will be achieved. The maximum compressive driving stress in the pile must not exceed 90% of the yield strength of the steel.

Also, based on our experience with driving piles down to hardpan, it is also possible that natural obstructions could be encountered above the top of the hardpan stratum. For piles where refusal is encountered at elevations above the estimated top of hardpan, the pile should be presumed to have stopped on a cobble, boulder or other material and should be evaluated to determine its load carrying capacity.

Based on the soil boring information, harder driving conditions could be anticipated through the hard clay and extremely dense granular soils. As such, protective cast steel point protectors should be used on all piles.

We recommend a minimum spacing of 5 pile diameters (center to center).

The pile capacity considerations discussed in this report are based on static analysis methods and experience with similar piles driven in the greater Detroit area. Local building codes may require a load test be performed for this project. If a load test is required, we would permit the use of quick test procedures for this site and proposed foundation system. However, since these piles will not be supporting large vertical loads, we do not believe a load test is necessary for this site and for the anticipated pile size and loading.

We do not anticipate any significant settlement of this water tank bearing on pile foundation systems. Elastic compression of the piles should be about ¼ inch. Settlement at the pile tip is negligible. Differential settlement between adjacent piles, spaced as indicated, should be negligible.

All pile driving should be performed under the full time monitoring of a qualified field engineer to verify the proper set has been obtained. Complete driving records should be kept for each pile.

Once the pile capacities have been achieved, based on a predetermined blow count or set, the piles should be cut off at the design top of pile elevation. We recommend the piles not be driven past the point where the design capacities are achieved due to potential damage resulting from overdriving. Piles damaged during driving should be replaced with new piles, installed as approved by the Engineer.

It is important to have an experienced pile contractor. The pile contractor should have at least five years experience in installing pile foundations and submit proof of at least three similar projects.

4.2 SEISMIC SITE CLASS RECOMMENDATION

In order to determine the seismic site classification in accordance with the current Michigan Building Code (MBC), the top 100 feet of the soil profile should be considered. Based on the surficial soils encountered in our geotechnical investigation and our general knowledge of the soils within the Harrison Township area, the soil profile at this site can be generally considered a “soft soil” profile. The moisture contents and the thickness of the soft clay soils at this site meet the criteria for a “soft soil” profile, and although Atterberg limit testing was not performed on the soft clay soils within the soil borings TH-01 through TH-03, testing was performed on similar materials at the nearby Hangar 3, 4, 5 projects where results indicate a PI of 20 or above. As such, this site can be classified as a Seismic Site Class E.

4.3 PAVEMENT AND SLAB-ON-GRADE RECOMMENDATIONS

As we understand, for the Building 154 additions and the proposed pump house, slab-on-grade construction will be used for the floor, with the slab consisting of a Portland cement concrete section. We anticipate a total pavement section including a granular base material will be about 12 inches thick.

As a part of this project, some existing pavement areas will need to be removed and replaced during construction. We understand that new pavement sections could consist of either an asphalt or concrete pavement. For subgrade analysis, we have generally assumed the new pavement section (including any base or subbase materials) will not be any thicker than about 18 inches.

4.3.1 Slab-on-Grade Recommendations

Based on the soil boring TH-01, TH-02 and TH-03, which were all drilled near the proposed building structures, we anticipate the slab subgrade soils will consist of natural clay soils, or mixed sand, clay and gravel fill soils. These soils are generally considered structurally suitable for support of the proposed slab-on-grade, considering they did not appear to contain debris or deleterious material.

However, due to the high fines content (clay soils), they are not considered highly permeable or free-draining. As such, these soils are also considered highly susceptible to frost action. The effects of frost heave are anticipated to be more significant in areas where water is not allowed to drain freely either due to subsoil conditions, site grades, or other factors. We expect the proposed pump house building may not be heated full-time and frost action could occur. As such, for the pump house building, we recommend removing a minimum of 12 inches of the clay or fill soils sand below the base of the slab and replacing it with a clean, granular engineered fill soil to reduce the potential for frost action.

Once rough grade has been achieved (prior to placement of fill or concrete), the exposed subgrade should be visually checked for the presence of organic matter and other unsuitable materials. If unsuitable or organic subgrade soils (organic content over 4 percent) are encountered at subgrade level during earthwork operations, these soils should be removed and replaced with properly compacted engineered fill.

Within any slab-on-grade subgrade areas, the top 12 inches of the *subgrade* should be compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D1557 (Modified Proctor) before placement of new fill or pavement.

It may be necessary in some of these areas to remove disturbed subgrade soils and replace them with a stabilization layer of engineered crushed aggregate fill. The thickness and extent of the required aggregate stabilization layer can be determined in the field by the site geotechnical engineer. We recommend a layer of MDOT 21AA material be used for this purpose, though other materials may also be acceptable. Again, where this aggregate is used to backfill undercuts, this

material should be compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D1557 (Modified Proctor). *It should be noted that if an open graded material is placed over a finer-grained material, a separator fabric (non-woven geotextile) should be placed between the two dissimilar layers.*

Once the subgrade has been properly compacted, the subgrade areas should also be thoroughly proofrolled before placement of new fill or pavement. The purpose of the proofrolling is to locate overly loose or soft areas as well as to uniformly compact the subgrade surface. Proofrolling should be performed using a fully-loaded, tandem axle dump truck, rubber-tired loader, or other suitable piece of pneumatic-tired construction equipment. Loose or soft areas revealed during compaction or during the proofrolling should either be suitably compacted (or aerated if necessary) or removed and replaced with properly compacted engineered fill.

For Portland cement concrete slab design, we recommend a modulus of subgrade reaction (k_v) of 150 pci be used for design of this slab. This recommended modulus of subgrade reaction assumes the soil conditions encountered in the borings are representative of the soil conditions within the proposed slab areas and that any improvement measures discussed above have been implemented. If during construction (within excavations below the existing pavement), the subgrade is found to vary from the expected soil conditions, we should be contacted so we may re-evaluate our modulus value.

These floor slabs will be situated above the long term groundwater level, therefore, we do not believe that an underfloor drainage system would be necessary.

4.3.2 Pavement Recommendations

The proposed pavement sections could consist of either an asphalt or concrete pavement. For subgrade analysis, we have generally assumed the new pavement section (including any base or subbase materials) will not be any thicker than about 18 inches.

Soil borings TH-02 and TH-03 were drilled within or near areas where new pavement is proposed to be constructed. Based on these soil borings, *after all the existing pavement or topsoil is removed*, at the estimated subgrade level of 18 inches, we expect the subgrade soils for the new pavement to consist of the natural clay soils, or the mixed clay and sand fill soils. These soils are considered to be suitable for support of a new pavement section, provided they are properly prepared. However, similar to the building slabs, these soils contain a significant amount of fines to where they are not considered free draining and could be susceptible to frost action. We recommend a minimum of 12 inches of the clay and fill soils be removed below the proposed subgrade level and be replaced with a "clean" granular engineered fill.

Again, once rough grade has been achieved (prior to placement of fill or concrete), the exposed subgrade should be visually checked for the presence of organic matter and other unsuitable materials. If unsuitable or organic subgrade soils (organic content over 4 percent) are encountered at subgrade level during earthwork operations, these soils should be removed and replaced with properly compacted engineered fill.

The top 12 inches of the *subgrade* should be compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D1557 (Modified Proctor) before placement of new fill or pavement. It may be necessary in some of these areas to remove disturbed subgrade soils and replace them with a stabilization layer of engineered crushed aggregate fill. The thickness and extent of the required aggregate stabilization layer can be determined in the field by the site geotechnical engineer. We recommend a layer of MDOT 21AA material be used for this purpose, though other materials may also be acceptable. Again, where this aggregate is used to backfill undercuts, this material should be compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D1557 (Modified Proctor). *It should be noted that if an open graded material is placed over a finer-grained material, a separator fabric (non-woven geotextile) should be placed between the two dissimilar layers.*

Once the subgrade has been properly compacted, the subgrade areas should also be thoroughly proofrolled before placement of new fill or pavement. The purpose of the proofrolling is to locate

overly loose or soft areas as well as to uniformly compact the subgrade surface. Proofrolling should be performed using a fully-loaded, tandem axle dump truck, rubber-tired loader, or other suitable piece of pneumatic-tired construction equipment. Loose or soft areas revealed during compaction or during the proofrolling should either be suitably compacted (or aerated if necessary) or removed and replaced with properly compacted granular engineered fill, to a maximum depth of 18 inches below the slab surface.

Site work performed during the wet spring and fall months may result in loose and unstable surface soils, which will make earthwork operations difficult. This may also require stabilization of the subgrade soils for placement of fill, aggregate base, or for support of paving equipment. This is especially a concern if the soils are wetter than encountered in the borings due to precipitation. Thus, site earthwork should preferably be performed during the typically drier May to August construction season, if possible. Further, construction traffic on the subgrade should be kept to a minimum as the material will become highly disturbed from the traffic and would require further undercutting. A provision and plan quantity for a geotextile fabric should be included if temporary stabilization is required.

4.3.3 Pavement Drainage Considerations

As noted in the previous sections, the existing subgrade soils generally consist natural clay soils or mixed sand and clay fill soils. These soils are considered highly susceptible to frost action. Any areas where water is not allowed to drain freely either due to subsoil conditions, site grades, or other factors, will have a detrimental effect on the pavement condition over time. A provision for finger drains wrapped in a fabric sock should be considered to enhance drainage conditions and to reduce the effects of frost heave. Alternately, consideration may be given to an open-graded base course separated from the subgrade by a woven geotextile (such as Mirafi 600x, Amoco 2006, Synthetic Industries Geotex 2X2, or equivalent) and connected to a system of drains. If there an existing drainage system in place, it should be altered to accommodate the new pavement configuration.

4.3.4 Pavement Design Considerations

The recommended design values provided below assume the soil conditions encountered in the borings are representative of the soil conditions within the proposed pavement construction areas, and also assume that any recommendations for improvements discussed in previous sections have been performed. If during construction, the subgrade is found to vary from the expected soil conditions, we should be contacted so we may re-evaluate our subgrade resilient modulus value.

For pavement design, based on our experience with similar soil conditions, we recommend the following coefficients of subgrade reactions (k_v), subgrade resilient moduli (M_R) and CBRs for the various types of soils at the anticipated subgrade level of about 18 inches below existing grade.

Soil Type	*Coefficient of Vertical Subgrade Reaction, (k_v)*	*Subgrade Resilient Moduli (M_R)*	*CBR*
Existing clay or fill soils	135 pci	5,800 psi	5
Granular Engineered fill	230 pci	12,400 psi	15

If the final grades are expected to differ from our assumptions, then the values presented above may require modifications.

For new bituminous pavements, final pavement elevations should be designed to provide positive surface drainage. The minimum surface slope of 1.5 percent is recommended. The pavement surface should be smooth, free of roller marks or depressions, and should not contain any irregularities which would pond or impede water flow.

All new Portland cement concrete pavements should be constructed in accordance with current MDOT construction specifications. The Portland cement concrete should be air-entrained and have a flexural strength of 650 psi and a compressive strength of 3,500 psi or greater. The length to width ratio of the joints should not exceed 1.25. Curing compound should be used for curing the concrete pavement.

The engineer preparing the final pavement design should consider other factors in addition to the CBR or subgrade modulus values. These factors may include, but are not limited to, adequate subgrade preparation, adequate placement of engineered fill and pavement layers, and surface and subsurface drainage. Somat's services related to pavement design and construction on this project were limited to preparing general guidelines for subgrade conditions and estimation of modulus values from the surficial soils encountered at the three soil boring locations, in addition to providing a recommend pavement section. The estimates were based on general guidelines found in the literature and our experience with similar soil conditions.

4.4 CONSTRUCTION CONSIDERATIONS

We anticipate excavations in the fill soils will be prone to caving and sloughing of the excavation sidewalls, especially in areas where the soil conditions are in a loose condition ('N' value of less than 10) or near existing utility trenches. Appropriate measures will be required to maintain the stability of excavation sidewalls. The required measures will depend on the depth and width of excavation and groundwater conditions at specific locations. In general, excavation walls should be sloped back to a stable angle in accordance with published MI-OSHA guidelines.

Care should be exercised when excavating near existing building foundations, pavement, utilities and other structures that are to remain, to protect them from damage. The contractor should be aware of the existing utility locations before excavating and be prepared to support or brace them, as required.

Considering the long term groundwater level at this site is anticipated to be situated between about 10 to 12 feet below existing grade, standard sump pit and pumping procedures should be adequate to control the groundwater within the excavations.

4.5 ENGINEERED FILL RECOMMENDATIONS

Any fill placed below proposed pavement areas and foundations should be an approved, engineered material, free of frozen soil, organics, or other deleterious material. Fill should not be placed on frozen subgrades.

Typical engineered fill materials include clean sand, gravel, or crushed aggregate, as well as well-graded mixtures of sand and gravel. A commonly used engineered fill would be consistent with the gradation of MDOT Class II granular soil. Any native clay, clayey sand and mixed sand and clay fill soils may require some drying/aeration in order to arrive at a suitable water content for compaction. Further, we do not recommend using mixtures of sand and clay as they cannot generally be reliably compacted.

All fill soils should be spread in level layers, not exceeding 9 inches in loose thickness, and should be compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D1557 (Modified Proctor). Any fill soils placed in greenbelt areas (i.e. will not support new pavement or foundations) should be compacted to a minimum of 90 percent of the maximum dry density as determined by ASTM D1557 (Modified Proctor).

5.0 GENERAL QUALIFICATIONS

All earthwork and below grade construction activities, including testing and observation of subgrades for foundations other structures, should be monitored by a qualified engineering inspector, under the direction of a qualified geotechnical engineer, to verify conditions are as presented in this report. Earthwork operations around the proposed project area and in the vicinity of existing structures should also be closely monitored.

This report and the attached Logs of Test Borings are instruments of service, which have been prepared in accordance with generally accepted soil and foundation engineering practices. We make no warranties either expressed or implied as to the professional advice included in this report.

The contents of this report have been prepared in order to aid in the evaluation of expected subsoil properties to assist the engineer in the design of *this* project at the site specified herein. The contents of this report should not be relied upon for other projects or purposes. In the event that any changes are made in the geotechnically related aspects of this project, however slight, the

conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed, and the conclusions of this report are modified in writing by our office.

Since the information obtained from the soil borings is specific to the exact test locations, soil and water conditions could be different from those occurring at other locations of the site. This report does not reflect variations which may occur between the soil borings. The nature and extent of these variations may not become evident until the time of construction. If significant variations become evident, it may be necessary for us to re-evaluate the recommendations provided in this report.

This report and the associated Logs of Test Borings should be made available to bidders prior to submitting their proposals and to the successful contractor and subcontractors for their information only, and to supply them with facts relative to the subsurface investigation, laboratory tests, etc.

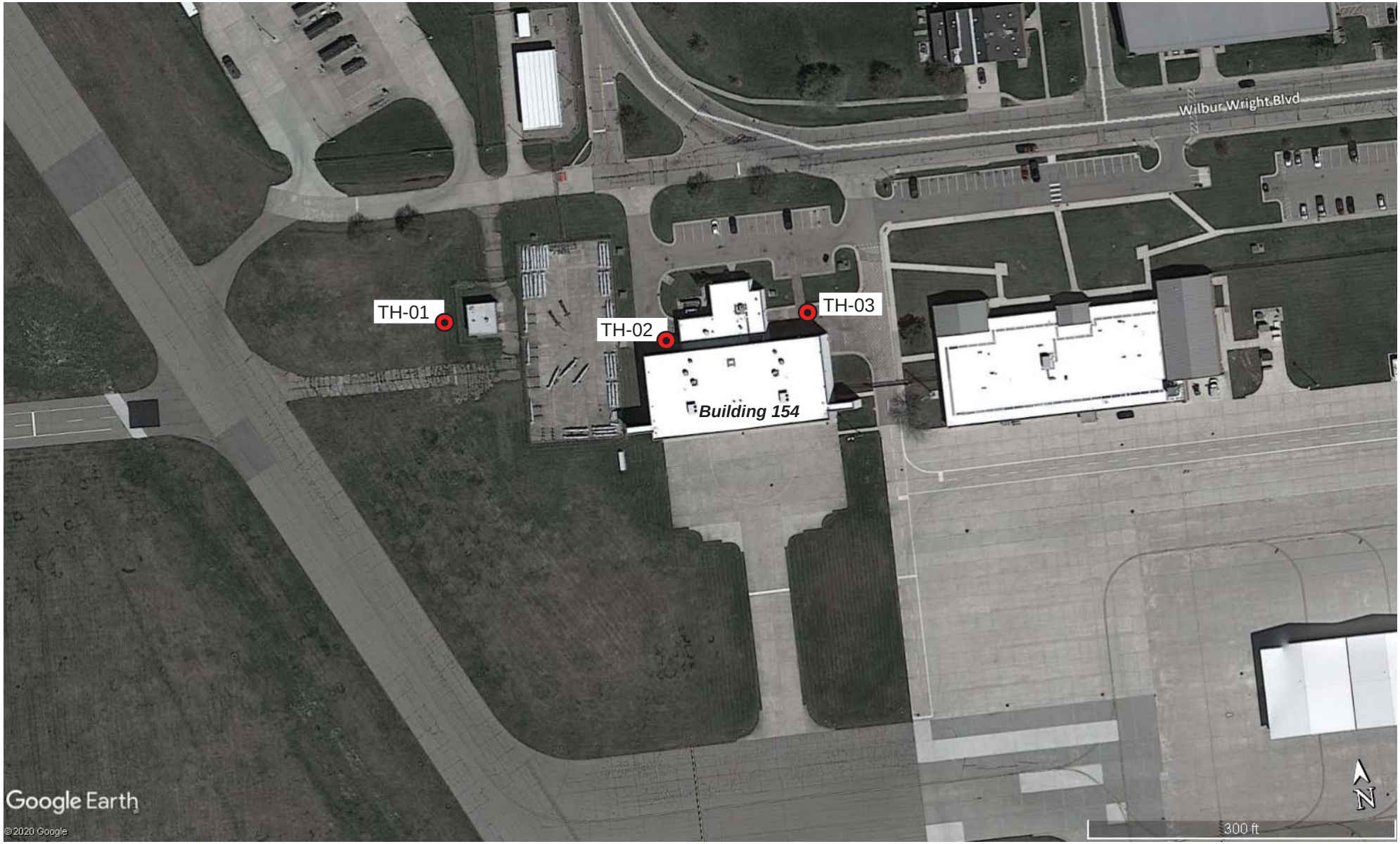
Somat is not responsible for failure to provide services that other project participants, apart from our client, have assigned to Somat either directly or indirectly. Somat is not responsible for failing to comply with the requirements of design manuals or other documents specified by other project participants that impart responsibilities to the geotechnical engineer without our knowledge and written consent. We are not liable for services related to this project that are not outlined in our scope of services, detailed in our project proposal.

The discussions and recommendations submitted in this report are based on the soil information contained in the Logs of Test Borings and test results appended to this report. We expect that the Logs of Test Borings included in this report along with our discussions and conclusions will assist you in the design of the proposed project. If you have any questions regarding this report, please contact us.

Please review the important information regarding geotechnical reports included in Appendix C.

APPENDIX A

SOIL BORING LOCATION DIAGRAM



Adapted from GoogleEarth satellite imagery

Drawing Scale as noted

Legend:

Approximate Soil Boring Locations

SOIL BORING LOCATION DIAGRAM

ADAL Fuel Cell and Corrosion Control - Building 154 Additions, and Water Reservoir and Pump House

Selfridge Air National Guard Base, Harrison Township, Michigan

Somat Project No.: *2019143A* *Date: 3/25/2020* *Page 1 of 1*

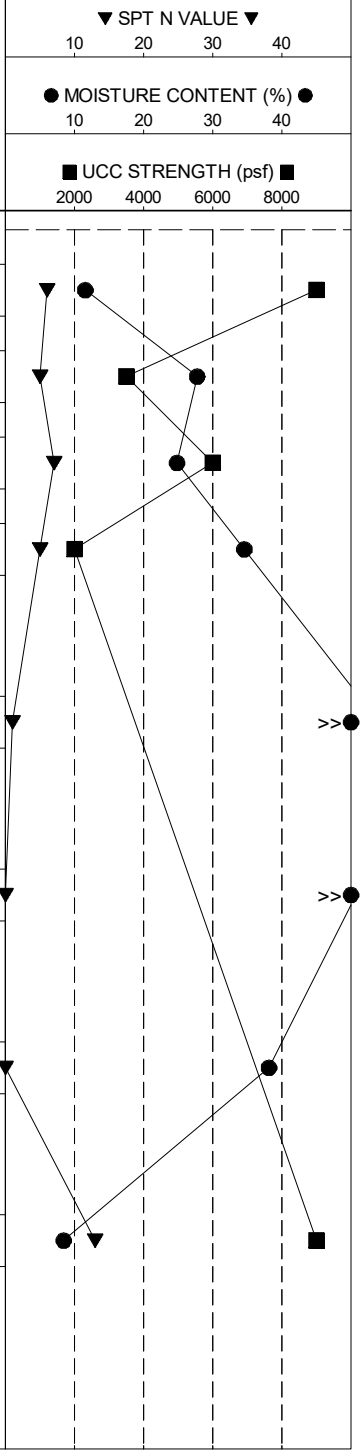
APPENDIX B

LOGS OF SOIL BORINGS AND GENERAL NOTES

PROJECT NO. 2019143A **DATE STARTED:** 12/17/2019 **DATE COMPLETED:** 12/17/2019 **LOG OF TEST BORING** **TH-01**

ELEVATION ft	LOG OF SOIL PROFILE	DEPTH (ft)
	Ground Surface Elevation 578.0 ft	0
576.8	Field Engineer reported 14 inches of sandy TOPSOIL	1.2
575.0	Hard LEAN CLAY with sand, trace gravel, brown (CL)	3.0
	NOTE: Slight foreign odor	
	Stiff to very stiff LEAN CLAY, trace sand, trace gravel, brown with pockets of dark brown above 5 ft. (CL)	5
570.0	NOTE: Slight foreign odor	8.0
	Stiff LEAN CLAY, trace sand, trace gravel, brown (CL)	10
566.0	NOTE: Slight foreign odor	12.0
	LEAN CLAY, trace sand, trace gravel, gray (CL)	15, 20, 25
548.7		29.3
548.0	Hard LEAN CLAY with sand, trace gravel, gray (CL)	30.0
	End of Boring at 30 feet	30, 35

SAMPLE NO.	SAMPLE RECOVERY (in)	NO. OF BLOWS FOR 6-inch DRIVE	N VALUE	SAMPLE TIP DEPTH (ft)	UNCONFINED COMP STRENGTH (psf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200
SS1	5	3-3-3	6	2.5	9000+*	11.6				
SS2	12	2-2-3	5	5.0	3500*	27.7				
SS3	14	2-3-4	7	7.5	6000*	24.8				
SS4	18	1-3-2	5	10.0	2000*	34.6				
SS5	18	0-1-0	1	15.0	<>	54.1				
SS6	18	0-0-0	0	20.0	<>	50.7				
SS7	18	0-0-0	0	25.0	<>	38.1				
SS8	14	1-2-11	13	30.0	9000+*	8.4				



GROUNDWATER READINGS
First Encountered: none
Upon Completion: none

BORING LOCATION INFORMATION
Latitude: 42.60878
Longitude: -82.825553

Coordinates/GSE determined by:
Measured offsets / Google Earth

KEY
Torvane
* Penetrometer
<> Disturbed Sample

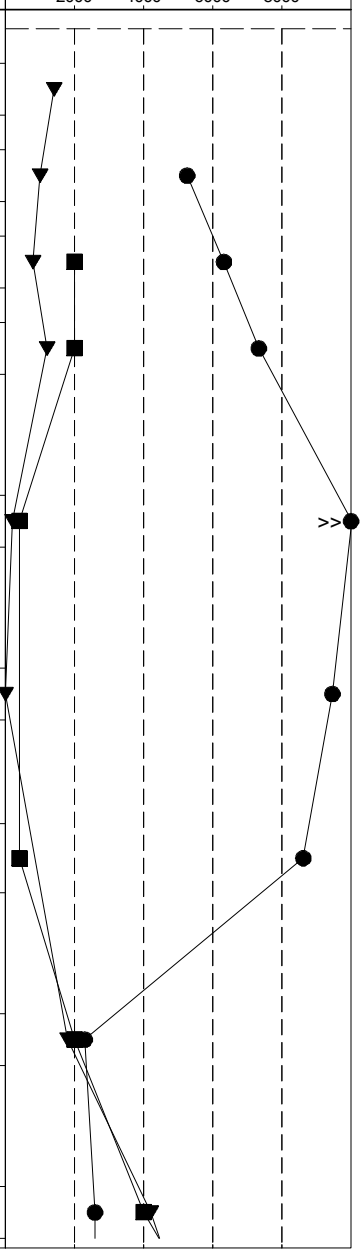
Drilling Company: DLZ
Drill Rig: CME 850X ATV (Rig 400472)
Logged By: S. Panetta
Drilling Method: 3 1/4 inch HSA
Method Notes: ----
Hammer Type: Automatic
Backfilled With: Grout
Checked By: ALOG
QA/QC By:
Remarks:

Somat Engineering, Inc.

ADAL Fuel Cell and Corrosion Control, Building 154 Additions, and Water Reservoir
Selfridge Air National Guard (SANG) Base
Harrison Township, Michigan

PROJECT NO. 2019143A **DATE STARTED:** 12/18/2019 **DATE COMPLETED:** 12/19/2019 **LOG OF TEST BORING** **TH-02**

ELEVATION ft	LOG OF SOIL PROFILE	DEPTH (ft)	SAMPLE NO.	SAMPLE RECOVERY (in)	NO. OF BLOWS FOR 6-inch DRIVE	N VALUE	SAMPLE TIP DEPTH (ft)	UNCONFINED COMP STRENGTH (psf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200
	Ground Surface Elevation 579 ft	0											
578.3	8 inches of PORTLAND CEMENT CONCRETE (0.7)												
578.2	(0.8)												
577.0	Field Engineer reported 2 inches of aggregate FILL (2.0)		SS1	4	4-3-4	7	2.5						
	FILL - Mixed clay, silty sand and crushed aggregate												
574.0	NOTE: Slight foreign odor detected (5.0)	5	SS2	4	1-2-3	5	5.0	<>	26.3				
	LEAN CLAY, trace sand, trace gravel, brown and dark gray (CL)		SS3	12	1-2-2	4	7.5	2000*	31.6				
569.0	Stiff LEAN CLAY, trace sand, trace gravel, mottled brown and gray (CL) (10.0)	10	SS4	18	2-3-3	6	10.0	2000*	36.7				
		15	SS5	18	0-1-0	1	15.0	400#	50.1				
	Very soft LEAN CLAY, trace sand, trace gravel, gray (CL)	20	SS6	18	0-0-0	0	20.0	<>	47.3				
		25	ST7	24			25.0	410	43.1	79			
550.5	(28.5)												
	Stiff to very stiff SANDY LEAN CLAY, trace gravel, gray (CL)	30	SS8	18	1-4-5	9	30.0	2000*	11.5				
		35	SS9	10	8-9-12	21	35.0	4000*	12.9				



GROUNDWATER READINGS
First Encountered: none
Upon Completion: n/a

BORING LOCATION INFORMATION
Latitude: 42.608653
Longitude: -82.824771

Coordinates/GSE determined by:
Measured offsets / Google Earth

KEY
Torvane
* Penetrometer
<> Disturbed Sample

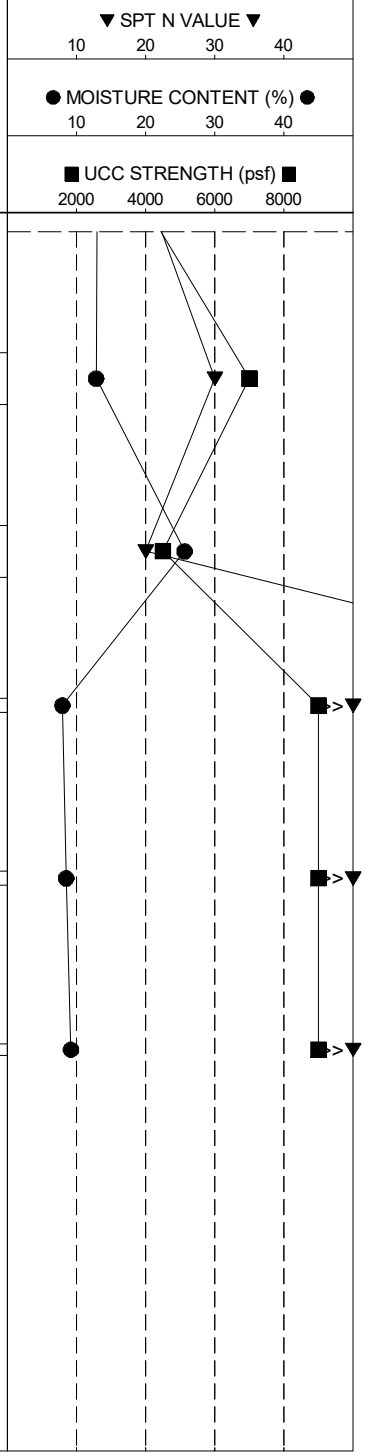
Drilling Company: DLZ
Drill Rig: CME 850X ATV (Rig 400472)
Logged By: S. Panetta
Drilling Method: 4 1/4 inch HSA/3 7/8 inch WR
Method Notes: ----
Hammer Type: Automatic
Backfilled With: Grout
Checked By: ALOG
QA/QC By:
Remarks:

Somat Engineering, Inc.

ADAL Fuel Cell and Corrosion Control, Building 154 Additions, and Water Reservoir
Selfridge Air National Guard (SANG) Base
Harrison Township, Michigan

PROJECT NO. 2019143A **DATE STARTED:** 12/18/2019 **DATE COMPLETED:** 12/19/2019 **LOG OF TEST BORING** **TH-02**

ELEVATION ft	LOG OF SOIL PROFILE	DEPTH (ft)	SAMPLE NO.	SAMPLE RECOVERY (in)	NO. OF BLOWS FOR 6-inch DRIVE	N VALUE	SAMPLE TIP DEPTH (ft)	UNCONFINED COMP STRENGTH (psf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200
	Ground Surface Elevation 579 ft												
	Stiff to very stiff SANDY LEAN CLAY, trace gravel, gray (CL)	35											
			SS10	12	8-12-18	30	40.0	7000*	12.8				
		40											
			SS11	12	5-8-12	20	45.0	4500*	25.6				
		45											
530.4	48.6		SS12	5	50/5"	50 +	48.9	9000*	7.9				
	Hard SANDY LEAN CLAY, occasional silt seams and fine sand seams, trace gravel, gray (CL) (Hardpan Material)	50											
			SS13	4	50/5"	50 +	53.9	9000*	8.5				
		55											
520.2	58.8		SS14	4	50/4"	50 +	58.8	9000*	9.2				
	End of Boring at 58.83 feet	60											
		65											
		70											



GROUNDWATER READINGS
First Encountered: none
Upon Completion: n/a

BORING LOCATION INFORMATION
Latitude: 42.608653
Longitude: -82.824771

Coordinates/GSE determined by:
Measured offsets / Google Earth

KEY
Torvane
* Penetrometer
<> Disturbed Sample

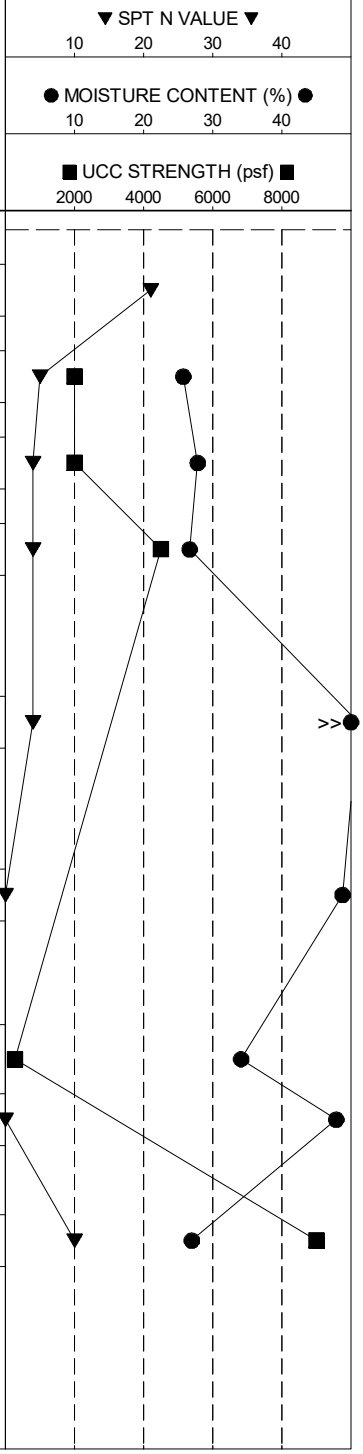
Drilling Company: DLZ
Drill Rig: CME 850X ATV (Rig 400472)
Logged By: S. Panetta
Drilling Method: 4 1/4 inch HSA/3 7/8 inch WR
Method Notes: ----
Hammer Type: Automatic
Backfilled With: Grout
Checked By: ALOG
QA/QC By:
Remarks:

Somat Engineering, Inc.

ADAL Fuel Cell and Corrosion Control, Building 154 Additions, and Water Reservoir
Selfridge Air National Guard (SANG) Base
Harrison Township, Michigan

PROJECT NO. 2019143A **DATE STARTED:** 12/17/2019 **DATE COMPLETED:** 12/17/2019 **LOG OF TEST BORING TH-03**

ELEVATION ft	LOG OF SOIL PROFILE	DEPTH (ft)	SAMPLE NO.	SAMPLE RECOVERY (in)	NO. OF BLOWS FOR 6-inch DRIVE	N VALUE	SAMPLE TIP DEPTH (ft)	UNCONFINED COMP STRENGTH (psf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200
	Ground Surface Elevation 577.8 ft	0											
577.1	8 inches of PORTLAND CEMENT CONCRETE (0.7)												
	FILL - Medium dense poorly graded fine sand with silt, few gravel, trace slag, occasional layers of black sand/possible cinders, brown, moist (SP-SM) (3.0)		SS1	5	6-9-12	21	2.5						
574.8			DP2		2-2-3	5	5.0	2000*	25.7				
	Stiff LEAN CLAY, trace sand, trace gravel, brown and dark gray (CL) (Possible Fill) (8.0)	5	SS3	5	1-2-2	4	7.5	2000*	27.8				
569.8			SS4	18	1-2-2	4	10.0	4500*	26.7				
567.8	NOTE: No recovery on split spoon attempt at 5 ft., spoon pushed to retrieve sample (10.0)	10											
	Very stiff LEAN CLAY, trace sand, trace gravel, brown with pockets of gray (CL)		SS5	18	1-2-2	4	15.0	<>	51.0				
		15											
	LEAN CLAY, trace sand, trace gravel, gray (CL)		SS6	18	0-0-0	0	20.0	<>	48.8				
		20											
			ST7	24			25.0	280	34.1	93			
		25											
			SS8	18	0-0-0	0	26.5	<>	47.9				
548.0			SS9	18	0-3-7	10	30.0	9000+*	27.0				
547.8	Hard LEAN CLAY with sand, trace gravel, gray (CL) (29.8, 30.0)	30											
	End of Boring at 30 feet	35											



GROUNDWATER READINGS
First Encountered: none
Upon Completion: none

BORING LOCATION INFORMATION
Latitude: 42.608673
Longitude: -82.824261

Coordinates/GSE determined by:
Measured offsets / Google Earth

KEY
Torvane
* Penetrometer
<> Disturbed Sample

Drilling Company: DLZ
Drill Rig: CME 850X ATV (Rig 400472)
Logged By: S. Panetta
Drilling Method: 3 1/4 inch HSA
Method Notes: ----
Hammer Type: Automatic
Backfilled With: Grout
Checked By: ALOG
QA/QC By:
Remarks:

Somat Engineering, Inc.

ADAL Fuel Cell and Corrosion Control, Building 154 Additions, and Water Reservoir
Selfridge Air National Guard (SANG) Base
Harrison Township, Michigan

GENERAL NOTES

Unified Soil Classification System (USCS)
ASTM D2488 (Modified)

DRILLING & SAMPLING SYMBOLS:

SS:	Split Spoon – 1 3/8" I.D., 2" O.D. (standard)
S :	Split Spoon – non-standard size, as noted
ST:	Thin-Walled Tube – 3" O.D., (unless otherwise noted)
LS:	Liner Sample
PA:	Power Auger
HA:	Hand Auger
AU:	Auger Sample
BS:	Bulk Sample
HSA:	Hollow Stem Auger
DP:	Direct Push
PS:	Piston Sample
PT:	Pitcher Sample
WS:	Wash Sample
RC:	Rock Core with diamond bit, NX size, (unless otherwise noted)
RB:	Rock Bit/Roller Bit
WR:	Wash Rotary
NR:	No Recovery
VS:	Vane Shear Test

Standard Penetration Test Resistance, N-Value: Sum of 2nd and 3rd 6-inch increments, in blows per foot of a 140-pound hammer falling 30 inches and driving an 18-inch to 30-inch long, 2-inch OD split spoon.

WATER LEVEL MEASUREMENT:
Water levels indicated on the boring logs are the levels measured in the borings at the times indicated. In pervious soils, the indicated levels may reflect the location of a groundwater table. In low permeability soils (clays and silts), the accurate determination of groundwater levels may not be possible with only short-term observations. Groundwater levels at times and locations other than when and where individual borings were performed could vary.

DESCRIPTIVE SOIL CLASSIFICATION:
Soil classification is based on the Unified Soil Classification (USC) System and ASTM Standards D-2487 and D-2488. Coarse-grained soils have more than 50% of their dry weight retained on a #200 sieve; they are described as: gravel or sand. Fine-grained soils have less than 50% of their dry weight retained on a #200 sieve; they are generally described as: clays, if they are plastic, and silts, if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their apparent in-place density and fine-grained soils on the basis of their apparent in-place density (silty soils) or consistency (clayey soils).

DESCRIPTORS OF MINOR CONSTITUENTS

Primary Constituent	Fine-Grained (Silt & Clay)	Coarse-Grained (Sand & Gravel)	
Descriptor of Other Constituents	Relative Portion of Coarse Grained Soils as a % of Dry Weight	Relative Portion of Fine Grained Soils as a % of Dry Weight	Relative Portion of Coarse Grained Soils as a % of Dry Weight
Trace	<5%	<5%	<5%
Few	≥5% - <15%	N/A	≥5% - <15%
With	≥15% - <30%	≥5% - 12%	≥15%
Modifier	≥30%	>12%	N/A

FINE-GRAINED SOILS / COARSE-GRAINED SOILS

Unconfined Compressive Strength Qu, psf	Consistency	N-Value	Apparent Density
< 500	Very Soft	0 – 4	Very Loose
500 - <1,000	Soft	5 – 9	Loose
1,000 - <2,000	Medium	10 – 29	Medium Dense
2,000 - <4,000	Stiff	30 – 49	Dense
4,000 - <8,000	Very Stiff	50 – 80	Very Dense
≥ 8,000	Hard	>80	Extremely Dense

DEFINITIONS OF PAVEMENT CONDITION

Condition		Description
Good	ACC	Very slight or no raveling, surface shows some traffic wear. Longitudinal cracks and Transverse cracks (open ¼ inch). No patching or very few patches in excellent condition.
	PCC	Moderate scaling in several locations. A few isolated surface spalls. Shallow reinforcement causing cracks. Several corner cracks, tight or well sealed. Open (¼ inch wide) longitudinal or transverse joints.
Fair	ACC	Severe surface raveling. Multiple longitudinal and transverse cracking with slight raveling. Longitudinal cracking in wheel path. Block cracking (over 50% of surface). Patching in fair condition. Slight rutting or distortions (½ inch deep or less).
	PCC	Severe polishing, scaling, map cracking, or spalling over 50% of the area. Joints and cracks show moderate to severe spalling. Pumping and faulting of joints (½ inch with fair ride). Several slabs have multiple transverse or meander cracks with moderate spalling.
Poor	ACC	Alligator cracking (over 25% of surface). Severe distortions (over 2 inches deep) Extensive patching in poor condition. Potholes.
	PCC	Extensive slab cracking, severely spalled and patched. Joints failed. Patching in very poor condition. Severe and extensive settlement or frost heaves.

DEFINITIONS OF STRUCTURAL AND DEPOSITIONAL FEATURES

Term	Definition
Parting	≤ 1/16 inch (1.6 mm) thick
Seam	> 1/16 inch (1.6 mm) → ½ inch (12.7 mm) thick
Layer	> ½ inch (12.7 mm) to ≤ 12 inches (305 mm) thick
Pocket	Small, erratic deposits of limited lateral extent
Lens	Lenticular deposit
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay
Varved	Alternating partings or seams (1 mm – 12 mm) of silt and/or clay and sometimes fine sand
Stratified	Alternating layers of varying material or color with layers ≥ 6 mm thick
Laminated	Alternating layers of varying material or color with layers < 6 mm thick
Fissured	Contains shears or separations along planes of weakness
Slickensided	Shear planes appear polished or glossy, sometimes striated
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Homogeneous	Same color and appearance throughout
Occasional	One or less per foot (305 mm) of thickness
Frequent	More than one per foot (305 mm) of thickness
Interbedded	Applied to strata of soil lying between or alternating with other strata of a different nature

GRAIN SIZE TERMINOLOGY

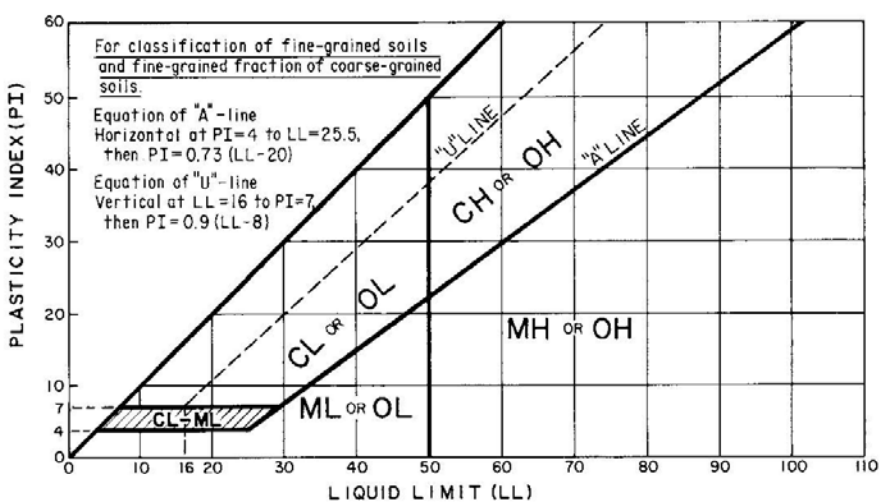
Major Component of Sample	Size Range
Boulders	≥ 12" (300 mm)
Cobbles	< 12" - 3" (300 mm – 75 mm)
Gravel - Coarse	< 3" - ¾" (75 mm – 19 mm)
Gravel – Fine	< ¾" - #4 (19 mm – 4.75 mm)
Sand – Coarse	< #4 - #10 (4.75 mm – 2 mm)
Sand – Medium	< #10 - #40 (2 mm - 0.425 mm)
Sand – Fine	< #40 - #200 (0.425 mm -0 .074 mm)
Silt	< 0.074 mm - 0.005 mm
Clay	<0 .005 mm

GENERAL NOTES

Unified Soil Classification System (USCS)
ASTM D2487

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]				Soil Classification	
				Group Symbol	Group Name [B]
COARSE-GRAINED More than 50 % retained on No. 200 sieve	**Gravels** (More than 50 % of coarse fraction retained on No. 4 sieve)	**Clean Gravels**	Cu ≥ 4 and 1 ≤ Cc ≤ 3[D]	GW	Well-graded gravel [E]
		(Less than 5% fines [C])	Cu < 4 and/or [Cc < 1 or Cc > 3][D]	GP	Poorly graded gravel [E]
		Gravels with Fines	Fines classify as ML or MH	GM	Silty gravel [E,F,G]
		(More than 12 % fines [C])	Fines classify as CL or CH	GC	Clayey gravel [E,F,G]
	Sands (50 % or more of coarse fraction passes No. 4 sieve)	**Clean Sands**	Cu ≥ 6 and 1 ≤ Cc ≤ 3 [D]	SW	Well-graded sand [I]
		(Less than 5 % fines [H])	Cu < 6 and/or [Cc < 1 or Cc > 3] [D]	SP	Poorly graded sand [I]
		Sands with Fines	Fines classify as ML or MH	SM	Silty sand [F,G,I]
		(More than 12 % fines [H])	Fines classify as CL or CH	SC	Clayey sand [F,G,I]
FINE-GRAINED SOILS 50 % or more passes the No. 200 sieve	**Silts and Clays** Liquid limit less than 50	**inorganic**	PI > 7 and plots on or above "A" line [J]	CL	Lean clay [K,L,M]
			PI < 4 or plots below "A" line [J]	ML	Silt [K,L,M]
		organic	(Liquid Limit - oven dried) / (Liquid Limit - not dried) < 0.75	OL	Organic clay [K,L,M,N]
					Organic silt [K,L,M,O]
	Silts and Clays Liquid limit more than 50	**inorganic**	PI plots on or above "A" line	CH	Fat clay [K,L,M]
			PI plots below "A" line	MH	Elastic silt [K,L,M]
		organic	(Liquid Limit - oven dried) / (Liquid Limit - not dried) < 0.75	OH	Organic clay [K,L,M,P]
					Organic silt [K,L,M,Q]
HIGHLY ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor			Pt	Peat

A Based on the material passing the 3-in. (75-mm) sieve.
B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
C Gravels with 5 to 12 % fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay
D $Cu = D_{60}/D_{10}$ $Cc = (D_{30})^2/(D_{10} \times D_{60})$
E If soil contains ≥15 % sand, add "with sand" to group name.
F If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
G If fines are organic, add "with organic fines" to group name.
H Sands with 5 to 12 % fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay
I If soil contains ≥15 % gravel, add "with gravel" to group name.
J If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.
K If soil contains 15 to <30 % plus No. 200, add "with sand" or "with gravel," whichever is predominant.
L If soil contains ≥30 % plus No. 200, predominantly sand, add "sandy" to group name.
M If soil contains ≥30 % plus No. 200, predominantly gravel, add "gravelly" to group name.
N PI ≥ 4 and plots on or above "A" line.
O PI < 4 or plots below "A" line.
P PI plots on or above "A" line.
Q PI plots below "A" line.



Order of Classification: 1) Consistency or Apparent Density, 2) Type of Soil, 3) Minor Soil Type(s), 4) Inclusions, 5) Layered Soils, 6) Color, 7) Water Content, 8) USCS Symbol, 9) Geological Name

APPENDIX C

GBA MESSAGE:
"IMPORTANT INFORMATION ABOUT THIS GEOTECHNICAL-ENGINEERING REPORT"

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

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SECTION 00 31 33

LAND USE AND SOIL CONTROL DOCUMENTATION

PART 1 GENERAL

1.1 LAND USE AND SOIL CONTROL DOCUMENTATION

The project site is located adjacent to previously identified contaminated soil areas at Selfridge ANGB. The movement of soil and groundwater on the project site is restricted. The following documentation is provided as part of the Procurement and Contracting Requirements for Project. The documentation provides information for Bidders' convenience and is intended to supplement rather than serve in lieu of Bidders' own investigations. The documentation is made available for Bidders' convenience and information. This Document and its attachments are not part of the Contract Documents.

Because the quantity and limits of contamination are unknown in relation to the entire construction area, the A/E and the A/E's consultants do not warranty the conditions below grade. Any party using the information presented in the documentation shall accept full responsibility for its use.

The follow documentation is appended to this Document:

a. Selfridge ANGB Soil Relocation Guidance Letter, 10-24-2018.

b. Selfridge ANGB Crock Wells and Groundwater Guidance memo, 05-03-2002.

c. IRP Site 7 No Further Action Decision Letter, 04-2003.

d. IRP Site 7 Land-use Control Closure Letter, 06-20-2003.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

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MICHIGAN AIR NATIONAL GUARD
HEADQUARTERS 127TH WING (ACC)
SELFRIDGE ANG BASE, MICHIGAN

24 October 2018

MEMORANDUM FOR 127 CES/CEN, 127 CES/CENE, 127 CES/CEO
127 CES/CEOHP, 127 CES/CEV

FROM: 127 CES/CC

SUBJECT: Soil Relocation Guidance for Selfridge Air National Guard Base

1. This document provides the soil relocation guidance for Selfridge Air National Guard Base (SANGB).

2. Background concentrations of metals in soils on SANGB exceed Michigan Department of Environmental Quality (MDEQ) Cleanup Criteria Requirements for Response Activity (Formerly the Part 201 Generic Cleanup Criteria and Screening Levels [Part 201]) for residential direct contact, groundwater surface water interface, and drinking water protection criteria, all soils relocated/removed from the installation must be sampled, characterized, and properly transported to a licensed disposal facility.

3. All soils relocation within the installation requires coordination with and approval from the SANGB Environmental Management Office. Soil relocation media restrictions due to historical contamination are active at the installation. SANGB site-specific soil background metal concentrations at the installation, which were coordinated and approved by the MDEQ, are attached.

4. This document supersedes the Soil Relocation Guidance for SANGB dated 28 September 2011. Should you require further information, please contact the Environmental Management Office, Jason Cabra at 586.239.5763.

ENDERBY.COREY.D.1260818003 Digitally signed by ENDERBY.COREY.D.1260818003 Date: 2018.10.25 13:45:49 -04'00'

COREY D. ENDERBY, P.E., Lt Col, MI ANG
Commander

Attachment: Background Metals for Soil and Groundwater, 127 Wing, Selfridge Air National Guard Base, MI

Cc: NGB/A7OR (Mr. James King)

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MICHIGAN AIR NATIONAL GUARD
HEADQUARTERS 127TH WING (ACC)
SELFRIDGE ANG BASE MICHIGAN

3 May 2002

MEMORANDUM FOR: Michigan Department of Environmental Quality
Waste Management Division
P.O. Box 30241
Lansing, MI 48909-7741

ATT: Mr. Peter Quackenbush

FROM: Selfridge Air National Guard
127WG/CEC
28700 Railroad Ave., Bldg 127
Selfridge ANG Base, MI 48045

SUBJECT: Potable Water and Crock Wells at Selfridge ANG Base.

1. There are no active domestic water or crock wells that are being used at Selfridge ANG Base. There are no plans to install any domestic water or crock wells for public use in the future.

2. As discussed in our IRP meeting dated 27 July 2000, all previously existing water wells have been closed. If you have any questions or need additional information, please call Moe Arif at (586) 307-6259.

For MAC A. Crawford, Maj., MI ANG
Assistant Base Civil Engineer

Cc: 127WG/CERR
ANG/CEVR
NAVFAC

MICHIGAN AIR NATIONAL GUARD
HEADQUARTERS 127TH WING (ACC)
SELFRIDGE ANG BASE MICHIGAN

08 August 2000

MEMORANDUM FOR: MICHIGAM DEPATMENT OF ENVIRONMENTAL QUALITY
Waste Management Division
P.O. Box 30241
Lansing, MI 48909-7741

ATT. Peter Quackenbush

FROM: Selfridge Air National Guard
127 WG/EM
40741 Schoolhouse Rd.
Selfridge ANG, MI 48045

MID 099 113 128

SUBJECT: Potable Water Wells at Selfridge ANG Base

1. There are no known active domestic water wells that are being used at Selfridge ANG Base. We have no plans to install any domestic water wells for public use in the future.

2. As discussed in our IRP meeting dated 27 July 00, all previously existing water wells have been closed. If you have any questions or need additional information, please call Moe Arif at (810) 307-5363.

MAC A. CRAWFORD, Maj., MI ANG
Assistant Base Civil Engineer

INSTALLATION RESTORATION PROGRAM

FINAL
NO FURTHER ACTION
DECISION DOCUMENT
SITE 7

127TH WING
SELFRIDGE AIR NATIONAL GUARD BASE
MICHIGAN AIR NATIONAL GUARD
MT. CLEMENS, MICHIGAN

Prepared For:

ANG/CEVR
Andrews AFB, Maryland

April 2003

MWH

INSTALLATION RESTORATION PROGRAM

FINAL
NO FURTHER ACTION DECISION DOCUMENT
SITE 7

127TH WING
SELFRIDGE AIR NATIONAL GUARD BASE
MICHIGAN AIR NATIONAL GUARD
MT. CLEMENS, MICHIGAN

Contract No. DAHA90-94-D-0013
Delivery Order No. 0096
MWH File No. 2101017.07

Prepared For:

ANG/CEVR
Andrews AFB, Maryland

Prepared By:

MWH Americas, Inc.

April 2003

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

LIST OF ACRONYMS

ANG	Air National Guard
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DD	Decision Document
DOD	Department of Defense
IRP	Installation Restoration Program
GSI	Groundwater Surface Water Interface
JP-4	jet propulsion fuel #4
MDEQ	Michigan Department of Environmental Quality
MIANG	Michigan Air National Guard
MSL	mean sea level
MWH	MWH Americas, Inc.
NPDES	National Pollutant Discharge Elimination System
OPTECH	Operational Technologies Corporation
RAP	Remedial Action Plan
SA	Site Assessment
SANGB	Selfridge Air National Guard Base
SWQD	Surface Water Quality Division
USAF	United States Air Force
VOC	volatile organic compound
Weston	Roy R. Weston, Inc.

1.0 INTRODUCTION

This Decision Document (DD) presents the rationale for the No Further Action decision proposed for Installation Restoration Program (IRP) Site 7 at the Michigan Air National Guard's (MIANG's) 127th Wing at Selfridge Air National Guard Base (SANGB) in Mt. Clemens, Michigan (Figure 1). This document is part of the United States Department of Defense's (DOD's) IRP. This work is being performed under Contract No. DAHA90-94-D-0013, Delivery Order No. 0096.

north

NOTES:

NOT TO SCALE

SITE LOCATION MAP DEVELOPED FROM THE FOLLOWING U.S.G.S. 7.5 MINUTE TOPOGRAPHIC QUADRANGLE MAPS: NEW HAVEN, MICHIGAN, DATED 1983; MOUNT CLEMENS EAST, MICHIGAN, DATED 1983, DELORME 3-D TOPOQUADS, 1999.

127TH WING
SELFRIDGE AIR NATIONAL GUARD BASE
MT. CLEMENS, MICHIGAN

INSTALLATION LOCATION MAP

FIGURE 1

MWH

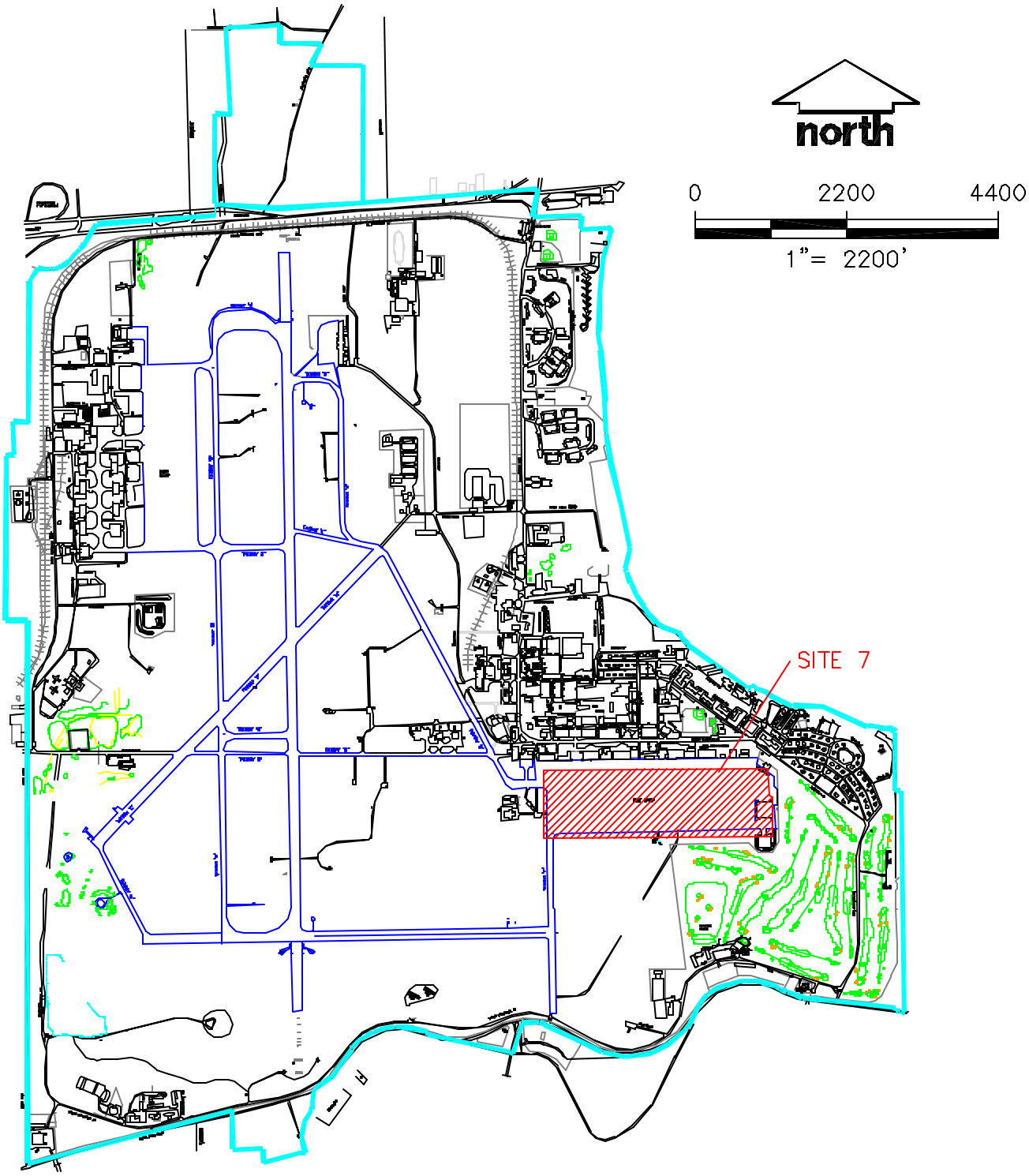
Drawn By & Date: STR 5/16/00 | Approved By & Date: | Revised By & Date: str 04/25/03 | Approved By & Date:

J:\Jobs\N\GEN\Old Contract DAHA90-94-D-0013\Federal\96\Gold\Decision Documents\Final DDs\FIG1.dwg Apr/25/03

2.0 SITE DESCRIPTION AND HISTORY

SANGB is located in Macomb County on the western shore of Lake St. Clair, two miles east of Mt. Clemens, Michigan (Figure 1). Major portions of SANGB's 3,700 acres are near the mean elevation of Lake St. Clair (approximately 575 feet above mean sea level [MSL]). The base has been operating since 1922 and has been leased to the MIANG from the United States Air Force (USAF) since 1971. Its primary purpose is to provide flight and ground support training for the 127th Wing, the MIANG, and reserve forces from all the services. The base currently employs approximately 2,200 civilians and 1,060 military personnel. The information in this section was obtained from the *Final Site Assessment (SA) Work Plan* (Montgomery Watson, November 2000).

IRP Site 7, referred to as the East Ramp Spill Site, is located on the southeast portion of the base (Figure 2). The ramp has been used from 1922 to present for aircraft parking, maintenance, and fueling. Approximately 6,000 gallons of jet propulsion fuel #4 (JP-4) were spilled at an unspecified location on the East Ramp prior to 1983.



LEGEND

SITE 7	EAST RAMP SPILL SITE
	BASE BOUNDARY
	BUILDING
	IRP SITE LOCATION

SOURCE:
MICHIGAN AIR NATIONAL GUARD BASE
COMPREHENSIVE PLAN BASE LAYOUT, 2002.

127TH WING
SELFRIDGE AIR NATIONAL GUARD BASE
MT. CLEMENS, MICHIGAN

SITE 7 LOCATION MAP

FIGURE 2

MWH

Drawn By & Date: atr 5/16/00 | Approved By & Date: cak 5/26/00 | Revised By & Date: 04/25/03 | Approved By & Date:

3.0 SUMMARY OF SITE ANALYSIS

3.1 PREVIOUS INVESTIGATIONS

In February 1986, Roy F. Weston, Inc. (Weston) completed a Phase II Stage 1 Investigation at Site 7. Soil and groundwater sampling was conducted to assess the nature and extent of contamination at the site. Methylene chloride, trichloroethylene, and 1,1,2-trichloroethane were found in the soil at concentrations exceeding the Michigan Department of Environmental Quality (MDEQ) Part 201 Criteria (Table 1). Chloroform and toluene were found in the soil at concentrations less than the MDEQ Part 201 Criteria. Trichloroethylene was found in the groundwater at concentrations exceeding the MDEQ Part 201 Criteria (Table 2). Petroleum hydrocarbons were found in the groundwater at Site 7. Currently, there is no MDEQ Part 201 Criteria for petroleum hydrocarbons. Sampling results and additional information are contained in the *Phase II Stage 1 Investigation Report* (Weston, February 1986).

In December 1996, Operational Technologies Corporation (OPTECH) completed a Phase II Stage 2 Investigation at Site 7. Soil, groundwater, and surface water sampling was conducted to assess the nature and extent of contamination at the site. No compounds were found at concentrations greater than the MDEQ Part 201 Criteria in soil samples collected during the Phase II Stage 2 Investigation. Petroleum hydrocarbons were found in the soil at Site 7. Currently, there is no MDEQ Part 201 Criteria for petroleum hydrocarbons. Chloride was found in the groundwater at a concentration exceeding the MDEQ Part 201 Criteria (Table 3). The elevated chloride concentrations found in groundwater sampled from two monitoring wells may be attributed to vehicular traffic tracking salt during de-wintering operations. Petroleum hydrocarbons were found in the groundwater at Site 7. Currently, there is no MDEQ Part 201 Criteria for petroleum hydrocarbons. Ethylbenzene, toluene, xylenes, and chloride were found in the surface water at a concentrations exceeding the MDEQ Part 201 Criteria during the dry-event sampling (Table 4). Surface water evaluation criteria was not received from the MDEQ Surface Water Quality Division (SWQD) as of the date of this report; therefore, the results were compared to the MDEQ Groundwater Surface Water Interface (GSI) Criteria as it is the most

TABLE 1

SITE 7
SOIL ANALYTICAL RESULTS
PHASE II STAGE 1 INVESTIGATION
FEBRUARY 1986
Page 1 of 2

Sample ID	Units	MDEQ Part 201 Industrial Drinking Water Protection Criteria	MDEQ Part 201 Groundwater Surface Water Interface Protection Criteria	MDEQ Part 201 Groundwater Contact Protection Criteria	MDEQ Part 201 Indoor Air Inhalation Criteria	MDEQ Part 201 Infinite Source Volatile Soil Inhalation Criteria	MDEQ Part 201 Industrial Direct Contact Criteria	W-1 7.5'	W-1 15.5'	W-1 25'	W-2 7.5'	W-2 15.5'	W-2 25'
ANALYTE													
Methylene Chloride	ug/kg	100	19,000	2.3E+06	2.4E+05	7.0E+05	2.3E+06	**1,500**	**1,500**	ND	**10**	**140**	ND
Trichloroethylene	ug/kg	100	4,000	5.0E+05	37,000	2.6E+05	5.0E+05	**880**	**3,600**	**1,700**	**550**	**1,400**	**300**
1,1,2-Trichloroethane	ug/kg	100	6,600	4.2E+05	24,000	57,000	9.2E+05	ND	ND	ND	ND	ND	ND

Notes:
Analytical data outlined denotes samples above MDEQ Part 201 Criteria (June, 2000)
Analytical data in bold denotes samples above analytical method reporting limits
ug/kg = micrograms per kilogram
MDEQ = Michigan Department of Environmental Quality
NA = criterion or value is not available
ND = not detected
' = feet below ground surface

TABLE 1

SITE 7
SOIL ANALYTICAL RESULTS
PHASE II STAGE 1 INVESTIGATION
FEBRUARY 1986

Sample ID	Units	MDEQ Part 201 Industrial Drinking Water Protection Criteria	MDEQ Part 201 Groundwater Surface Water Interface Protection Criteria	MDEQ Part 201 Groundwater Contact Protection Criteria	MDEQ Part 201 Indoor Air Inhalation Criteria	MDEQ Part 201 Infinite Source Volatile Soil Inhalation Criteria	MDEQ Part 201 Industrial Direct Contact Criteria	W-3 7.5'	W-3 15.5'	W-3 25'	W-4 7.5'	W-4 15.5'	W-4 15.5'
ANALYTE													
Methylene Chloride	ug/kg	100	19,000	2.3E+06	2.4E+05	7.0E+05	2.3E+06	ND	**1,200**	**1,800**	**15**	**62**	**26**
Trichloroethylene	ug/kg	100	4,000	5.0E+05	37,000	2.6E+05	5.0E+05	**150**	**6,600**	**6,800**	**280**	**107**	**4,000**
1,1,2-Trichloroethane	ug/kg	100	6,600	4.2E+05	24,000	57,000	9.2E+05	ND	**1,000**	ND	ND	**19**	ND

Notes:
Analytical data outlined denotes samples above MDEQ Part 201 Criteria (June, 2000)
Analytical data in bold denotes samples above analytical method reporting limits
ug/kg = micrograms per kilogram
MDEQ = Michigan Department of Environmental Quality
NA = criterion or value is not available
ND = not detected
' = feet below ground surface

TABLE 2

SITE 7
GROUNDWATER ANALYTICAL RESULTS
PHASE II STAGE 1 INVESTIGATION
FEBRUARY 1986
Page 1 of 1

Sample ID	Units	MDEQ Part 201 Industrial Drinking Water Criteria	MDEQ Part 201 Groundwater Surface Water Interface Criteria	MDEQ Part 201 Industrial Indoor Air Inhalation Criteria	MDEQ Part 201 Groundwater Contact Criteria	W-1	W-2	W-3	W-4
ANALYTE									
Trichloroethylene	ug/L	5.0	200	97,000	37,000	**9.0**	**4.9**	ND	ND

Notes:
Analytical data outlined denotes samples above MDEQ Part 201 Criteria (June, 2000)
Analytical data in bold denotes samples above analytical method reporting limits
ug/L = micrograms per liter
MDEQ = Michigan Department of Environmental Quality
ND = not detected

TABLE 3

SITE 7
GROUNDWATER ANALYTICAL RESULTS
PHASE II STAGE 2 INVESTIGATION
DECEMBER 1996
Page 1 of 2

Sample ID	Units	MDEQ Part 201 Industrial Drinking Water Criteria	MDEQ Part 201 Groundwater Surface Water Interface Criteria	MDEQ Part 201 Industrial Indoor Air Inhalation Criteria	MDEQ Part 201 Groundwater Contact Criteria	07-102-M001	07-103-M001	07-104-M001	07-136-M001	07-136-M101	07-138-M001	07-140-M001
ANALYTE												
Chloride	mg/L	250	125	NLV	ID	**553**	**129**	**32.3**	**105**	**94.6**	**52.2**	**62**

Notes:
Analytical data outlined denotes samples above MDEQ Part 201 Criteria (June, 2000)
Analytical data in bold denotes samples above analytical method reporting limits
mg/L = milligrams per liter
MDEQ = Michigan Department of Environmental Quality
NLV = hazardous substance is not likely to volatilize under most conditions
ID = inadequate data to develop criterion

TABLE 3

SITE 7
GROUNDWATER ANALYTICAL RESULTS
PHASE II STAGE 2 INVESTIGATION
DECEMBER 1996

Sample ID	Units	MDEQ Part 201 Industrial Drinking Water Criteria	MDEQ Part 201 Groundwater Surface Water Interface Criteria	MDEQ Part 201 Industrial Indoor Air Inhalation Criteria	MDEQ Part 201 Groundwater Contact Criteria	07-142-M001	07-237-M001	07-239-M001	07-241-M001	07-243-M001
ANALYTE										
Chloride	mg/L	250	125	NLV	ID	**2.5**	**63**	**103**	**500**	**126**

Notes:
Analytical data outlined denotes samples above MDEQ Part 201 Criteria (June, 2000)
Analytical data in bold denotes samples above analytical method reporting limits
mg/L = milligrams per liter
MDEQ = Michigan Department of Environmental Quality
NLV = hazardous substance is not likely to volatilize under most conditions
ID = inadequate data to develop criterion

TABLE 4

SITE 7
DRY-EVENT/WET-EVENT SURFACE WATER ANALYTICAL RESULTS
PHASE II STAGE 2 INVESTIGATION
DECEMBER 1996

Sample ID	Units	MDEQ Part 201 Groundwater Surface Water Interface Criteria	07-521-W001	07-522-W001	07-523-W001	07-524-W001	07-521-W002	07-522-W002	07-523-W002	07-524-W002
ANALYTE										
Chloride	mg/L	125	**45**	**90.4**	**56.6**	ND	**138**	**160**	**43.2**	**3.0**
Ethylbenzene	ug/L	18	ND	ND	ND	ND	**20**	ND	ND	ND
Toluene	ug/L	140	ND	ND	ND	ND	**178**	ND	ND	ND
Xylenes	ug/L	35	ND	ND	ND	ND	**38**	ND	ND	ND

Notes:
Surface water evaluation criteria was not received from the MDEQ SWQD as of the date of this report; therefore, the results were compared to the MDEQ GSI Criteria (June, 2000) as it is the most stringent
Analytical data outlined denotes samples above MDEQ Part 201 Criteria
Analytical data in bold denotes samples above analytical method reporting limits
mg/L = milligrams per liter
ug/L = micrograms per liter
MDEQ = Michigan Department of Environmental Quality
GSI = groundwater surface water interface
SWQD = Surface Water Quality Division
ND = not detected

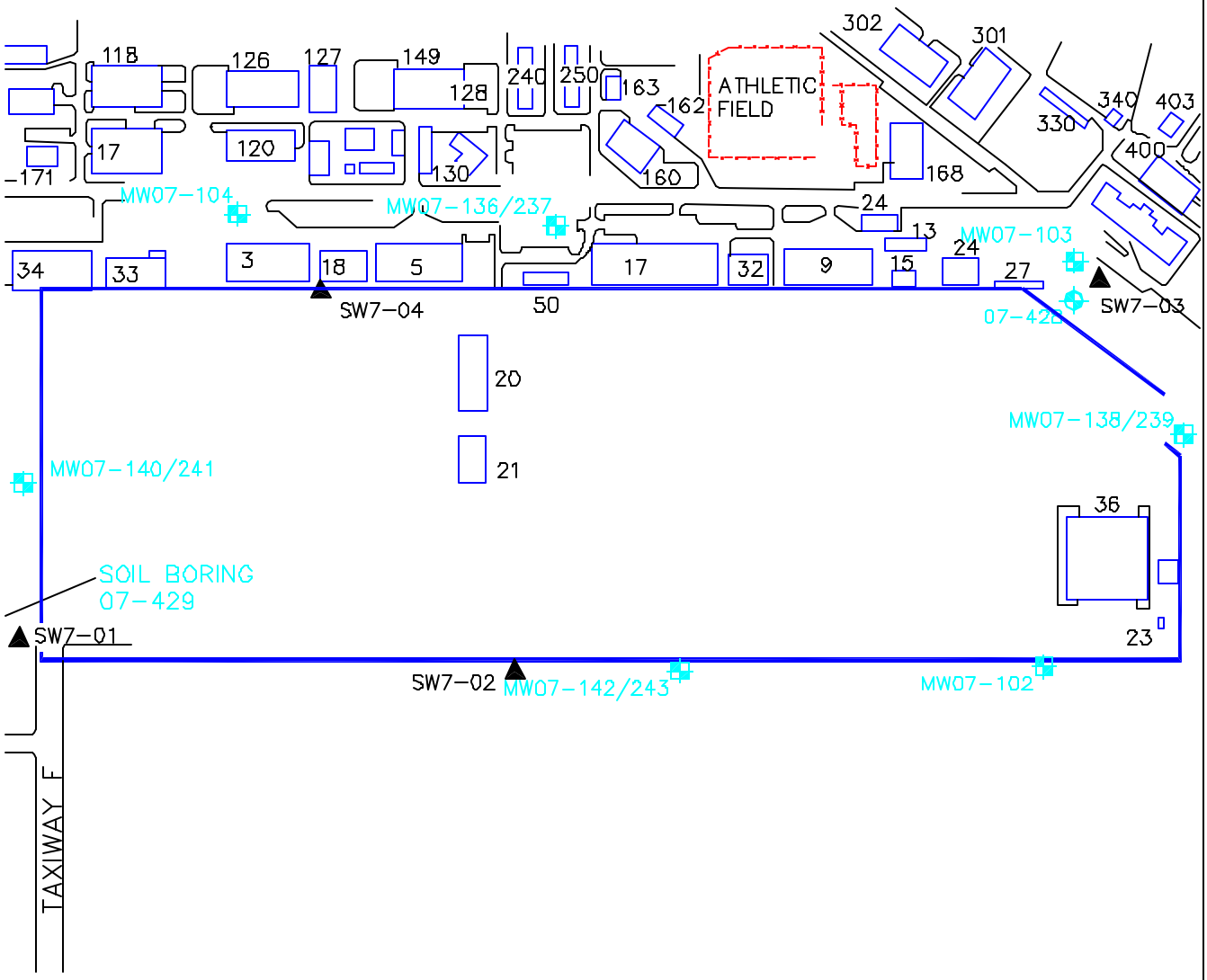
stringent. Sampling results and additional information are contained in the *Phase II Stage 2 Investigation Report* (OPTECH, December 1996).

3.2 SITE ASSESSMENT

In December 2000, MWH Americas, Inc. (MWH) performed an SA at Site 7. Four surface water samples were collected and analyzed for volatile organic compounds (VOCs). The surface water sample locations at Site 7 are shown in Figure 3. Additional information related to the field activities can be found in the *Final Site Assessment Report* (Montgomery Watson, November 2001).

3.2.1 Surface Water Sampling Results

The surface water sampling results for Site 7 are summarized in Table 5. Surface water evaluation criteria was not received from the MDEQ SWQD as of the date of this report; therefore, the results were compared to the MDEQ GSI Criteria as it is the most stringent. Only those compounds with concentrations greater than method detection limits are presented. No compounds detected in the surface water at Site 7 exceeded the MDEQ Part 201 Criteria during the December 2000 SA.



LEGEND:

▲ SURFACE WATER SAMPLE LOCATION

07-428 PREVIOUS SOIL BORING

MW07-103 EXISTING MONITORING WELL

—x—x—x— FENCE LINE

SITE BOUNDARY

1580 BUILDING AND NUMBER

0 500' 1000'

1"= 500'

north

SOURCE:
MICHIGAN AIR NATIONAL GUARD BASE
COMPREHENSIVE PLAN BASE LAYOUT, 1987.

127th WING
SELFRIDGE AIR NATIONAL GUARD BASE
MT. CLEMENS, MICHIGAN

SITE 7 SAMPLING LOCATIONS
SITE ASSESSMENT DECEMBER 2000

FIGURE 3

MWH

Drawn By & Date: STR 5/16/00 | Approved By & Date: | Revised By & Date: | 04/25/03 Approved By & Date:

TABLE 5

SITE 7
SURFACE WATER ANALYTICAL RESULTS
SITE ASSESSMENT
DECEMBER 2000
Page 1 of 1

Date Collected Sample ID	Units	MDEQ Part 201 Groundwater Surface Water Interface Criteria	11/27/00 SW7-01	11/27/2000 SW7-02	11/27/2000 SW7-02 DUP	11/27/2000 SW7-03	11/28/2000 SW7-04
VOCs (USEPA 8260B)							
Vinyl Chloride	ug/L	15	<0.5	<0.5	<0.5	<0.5	**1.0**
Acetone	ug/L	1,700	**3.0J**	**3.0J**	**4.0J**	**2.0J**	<2.0
Methylene Chloride	ug/L	940	<0.5	<0.5	<0.5	**0.7**	**0.5**
cis-1,2-Dichloroethene	ug/L	ID	<0.5	<0.5	<0.5	<0.5	**18**
Chloroform	ug/L	170	<0.5	<0.5	<0.5	<0.5	**1.0**
Trichloroethene	ug/L	200	<0.5	<0.5	<0.5	<0.5	**9.0**
Bromodichloromethane	ug/L	ID	<0.5	<0.5	<0.5	<0.5	**0.4J**
Chlorobenzene	ug/L	47	<0.5	<0.5	<0.5	<0.5	**0.9**
Bromobenzene	ug/L	50	<0.5J	<0.5J	<0.5J	<0.5J	<0.5J

Notes:
Only detected compounds are shown
Surface water evaluation criteria was not received from the MDEQ SWQD as of the date of this report; therefore, the results were compared to the MDEQ GSI Criteria (June, 2000) as it is the most stringent
Analytical data in bold denotes samples above analytical method reporting limits
Samples collected by Montgomery Watson
ug/L = micrograms per liter
MDEQ = Michigan Department of Environmental Quality
USEPA = United States Environmental Protection Agency
GSI = groundwater surface water interface
SWQD = Surface Water Quality Division
VOCs = volatile organic compounds
DUP = duplicate
J = estimated concentration
ID = inadequate data to develop criterion

JLB/SMM/CEK/
J:/jobs/NGB/216/96/SA Report/Final SA Report/Tables/Site 7

4.0 CONCLUSION

Methylene chloride, trichloroethylene, and 1,1,2-trichloroethane were found in the soil at Site 7 at concentrations exceeding the MDEQ Part 201 Criteria (June, 2000) during the February 1986 Phase II Stage 1 Investigation. Trichloroethylene was found in the groundwater at Site 7 at concentrations exceeding MDEQ Part 201 Criteria (June, 2000) during the February 1986 Phase II Stage 1 Investigation. Chloride was found in the groundwater at Site 7 at concentrations exceeding MDEQ Part 201 Criteria (June, 2000) during the December 1996 Phase II Stage 2 Investigation. Ethylbenzene, toluene, xylenes, and chloride were also found in the surface water at Site 7 at concentrations exceeding the MDEQ Part 201 Criteria (June, 2000) during the December 1996 Phase II Stage 2 Investigation. Petroleum hydrocarbons were found in the groundwater at Site 7. Currently, there is no MDEQ Part 201 Criteria for petroleum hydrocarbons.

No compounds were found in the surface water at Site 7 at concentrations exceeding the MDEQ Part 201 Criteria (June, 2000) during the December 2000 SA.

The MDEQ Part 201 GSI Criteria is not relevant at Site 7 based on the current site-specific hydrogeology and that the surface water in the ditches is controlled by a National Pollutant Discharge Elimination System (NPDES) permit. Based on this and the results of the December 2000 SA, no further action with respect to surface water is recommended at Site 7. In addition, no further action with respect to soil and groundwater is recommended at Site 7. Due to the depth of soil contamination (approximately 7.5 feet to 25 feet below ground surface [bgs]), tight clay matrix, and the concrete cap over the majority of the site, the potential for exposure to the soil contaminants appears to be limited. As stated in Section ES.5.7 of the Phase II Stage 2 Report (OpTech, 1996), “the stormwater collection system will prevent off-site migration of groundwater contaminants except from stormwater pump stations. Periodic monitoring of discharge from each of the five stormwater pump stations is recommended to determine if contaminants are migrating.” Based on this statement previously approved by the MDEQ, groundwater sampling was not required during the SA. In addition, due to the tight clay matrix,

groundwater migration appears to be limited and with the stormwater collection system, groundwater can be effectively monitored.

Because some compounds will remain at Site 7 with concentrations above the MDEQ generic residential cleanup standards, appropriate language will be agreed upon by the MDEQ and the Air National Guard (ANG) to notify future land owners.

5.0 DECISION

On the basis of the findings at the 127th Wing, IRP Site 7, there is no evidence of significant environmental contamination at the site. This site will be removed from further consideration in the IRP Process, and no further investigation will be conducted with regard to surface water at Site 7. In a letter dated October 7, 2002, the MDEQ gave concurrence with no further action at Site 7. A copy of the October 7, 2002 letter of transmittal from the MDEQ is provided in Appendix A.

Any IRP site that has contamination remaining above the Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, (Act 451) Generic Residential Soil or Groundwater Protection Criteria, must comply with Part 201, Section 324.20120c soil relocation requirements if soil is to be moved. These soils may also be subject to regulation pursuant to Part 111, Hazardous Waste Management, of Act 451, or other federal or state laws and regulations, and this must be determined prior to relocation of soils. The areas subject to Section 324.20120c must be identified in the Final Remedial Action Plan (RAP) to be completed upon transfer of SANGB property. In addition, the RAP will identify all IRP sites that have exceeded criteria for aesthetic characteristics and a Notice of Aesthetic Impact will be recorded at the Register of Deeds for the identified sites.

Pursuant to Part 201, Section 324.20120b(4), a restrictive covenant must be implemented "if a remedial action plan relies….on the cleanup criteria approved pursuant to Section 324.20120a(1)(f) to (j) or (2)…". The MDEQ recognizes that a restrictive covenant cannot be implemented by SANGB until there is a transfer of property pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 and the United States Code, Title 10, Subtitle A, Chapter 160, Section 2701(a). Therefore, this requirement must be stipulated in a legally enforceable agreement (i.e., Federal Facility Agreement) between the MDEQ and the DOD at the time of the implementation of a RAP.

NOT APPLICABLE

DAVID C. VAN GASBECK
Chief, Environmental Division
Civil Engineer Directorate

Date

--- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

Michigan Department of Environmental Quality

[ ] Concur

[ ] Non-Concur (Please provide reason)

SEE APPENDIX A

Signature Title Date

6.0 REFERENCES

Montgomery Watson, November 2000. *Final Site Assessment Work Plan. 127th Wing, Selfridge Air National Guard Base.*

Montgomery Watson, November 2001. *Final Site Assessment Report, 127th Wing, Selfridge Air National Guard Base.*

OPTECH, December 1996. *Phase II Stage 2 Investigation, 127th Fighter Wing, Michigan Air National Guard, Selfridge Air National Guard Base, Mt. Clemens, Michigan.*

Weston, February 1986. *IRP Phase II – Confirmation/Quantification Stage 1 Report for Selfridge Air National Guard Base.*

SMM/CEK/JJM
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APPENDIX A

MDEQ OCTOBER 7, 2002
LETTER OF TRANSMITTAL

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

JOHN ENGLER
GOVERNOR

RUSSELL J. HARDING
DIRECTOR

October 7, 2002

Mr. Russell M. Dyer, PG
Section Chief, Environmental Restoration
ANG/CEVR
3500 Fetchet Avenue
Andrews Air Force Base, Maryland 20762-2157

Dear Mr. Dyer:

SUBJECT: Draft No Further Action Decision Document – Installation Restoration Program (IRP) Sites 3, 5, 6, 7, 9, 12, 13, 15, 18, 19, 30, 31, 32, 35, 36 Selfridge Air National Guard Base (Selfridge) - MID 099 113 128

The Department of Environmental Quality (DEQ) has recently reorganized. The new Waste and Hazardous Materials Division (WHMD) incorporates most of the former Hazardous Waste Program Section from the Waste Management Division. All compliance, closure, and permitting activities will be conducted and coordinated through the new WHMD. Ms. Getschman and I have been reassigned to the new Remediation and Redevelopment Division (RRD) and Mr. David Slayton is assigned to the WHMD. We will coordinate with the WHMD to continue our work on the Selfridge Air National Guard project.

The MDEQ has reviewed the Draft No Further Action Decision Document – IRP Sites 3, 5, 6, 7, 9, 12, 13, 15, 18, 19, 30, 31, 32, 35, 36 dated May 2002, prepared by Montgomery Watson, and have the following comments.

1. **General Comment**
   a. Any IRP Site that has contamination remaining above the Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, (Act 451) Generic Residential Soil or Groundwater Protection criteria, must comply with Part 201, Section 324.20120c soil relocation requirements if soil is to be moved. These soils may also be subject to regulation pursuant to Part 111, Hazardous Waste Management, of Act 451, or other federal or state laws and regulations, and this must be determined prior to relocation of soils. The areas subject to Section 324.20120c must be identified in the Final Remedial Action Plan (RAP).

b. Pursuant to Part 201, Section 324.20120b(4), a restrictive covenant must be implemented "if a remedial action plan relies … on the cleanup criteria approved pursuant to Section 324.20120a(1)(f) to (j) or (2) …." The Department of Environmental Quality (DEQ) recognizes that a restrictive covenant cannot be implemented by Selfridge until there is a transfer of property pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and the United States Code, Title 10, Subtitle A, Chapter 160, Section 2701(a). Therefore, this requirement must be stipulated in a legally enforceable agreement (i.e. Federal Facility Agreement or Base Management Action Plan) between the Department of Environmental Quality (DEQ) and the Department of Defense at the time of the implementation of a RAP.

c. The Part 201 Generic Industrial Cleanup Criteria and Screening Levels (dated June 7, 2000) were used as site-specific cleanup levels pursuant to Part 201, Section 324.20120a(2). This is because Selfridge is zoned residential by Harrison Township and the land use is consistent with the industrial cleanup category.

d. All "No Further Action" decisions must be incorporated into the RAP.

e. Comment 1(a), 1(b) above must be incorporated into each "No Further Action Decision Document" as well as the individual comments listed below.

f. All IRP sites that have exceeded criteria for aesthetic characteristics must be identified in the RAP. The RAP must state that a Notice of Aesthetic Impact will be recorded at the Register of Deeds for the identified IRP sites that have exceeded criteria for aesthetic characteristics.

g. Aesthetic characteristics in soil must be considered when evaluating any impacts to groundwater. If contaminated soils have the potential to impact or are impacting groundwater, the soils need to be addressed.

h. Selfridge must comply with the due care regulations outlined in Part 201, Section 324.20107a for all areas that do not meet the Part 201 Generic Residential cleanup category.

2. **IRP Site 3**

a. The DEQ agrees with Selfridge that No Further Action is required at this IRP Site at this time.

b. The DEQ agrees that the Phase II, Stage II Investigation dated December 1996 states that cadmium, cobalt, manganese, and nickel exceed the soil site-specific background values and the Part 201 of Act 451, as amended soil Groundwater Surface Water Protection (GSIP) criteria.

c. The soil GSIP pathway is not relevant at this IRP Site at this time. This determination is based upon the current IRP site-specific hydrogeology and that the surface water in the ditches is controlled by a National Pollution Discharge Elimination System (NPDES) permit.

d. Section 3.1, Previous Investigations, must also state that petroleum hydrocarbons were detected in soil and groundwater samples. See comment 1(f) and (g) above regarding aesthetic impacts.

3. **IRP Site 5**

a. The DEQ agrees with Selfridge that No Further Action is required at this IRP Site at this time.

b. The DEQ agrees that the Phase II, Stage I Investigation (indicated groundwater contamination), the Phase II, Stage 2 Investigation (indicated groundwater and soil contamination), and the Site Assessment Investigation (indicated groundwater and soil contamination) show that metals and some volatile organic compounds exceed the soil or groundwater site-specific background values and the Part 201 soil or groundwater criteria for either the Industrial Drinking Water or GSI pathways. Surface water samples showed detections of cadmium and lead above the Part 201 Groundwater GSI criteria.

c. The soil GSIP and groundwater GSI pathways are not relevant at this IRP Site at this time**.** This determination is based upon the current IRP site-specific hydrogeology and that the surface water in the ditches is controlled by a NPDES permit.

d. Section 3.1, Previous Investigations, must also state that petroleum hydrocarbons were detected in soil and groundwater samples. See comment 1(f) and (g) above regarding aesthetic impacts.

e. Section 4.0, Conclusion: Contamination has been detected in historic reports outside of the boundary shown on the maps for this IRP Site. Notification of future owners must include all areas above Part 201 Generic Residential criteria.

4. **IRP Site 6**

a. The DEQ agrees with Selfridge that No Further Action is required at this IRP Site at this time.

b. The DEQ agrees that the Phase II, Stage I Investigation (indicated groundwater contamination), the Phase II, Stage 2 Investigation (indicated groundwater, soil, and surface water contamination), and the Site Assessment Investigation (indicated soil contamination) show that metals and bis(2-ethylhexyl)phthalate exceed the soil or groundwater site-specific background values and the Part 201 soil or groundwater criteria for either the Industrial Drinking Water or GSI pathways. Surface water samples showed

detections of arsenic, chromium, lead, and cadmium above the Part 201 Groundwater GSI critiera.

c. The soil GSIP and groundwater GSI pathways are not relevant at this IRP Site at this time. This determination is based upon the current IRP site-specific hydrogeology and that the surface water in the ditches is controlled by a NPDES permit.

d. Section 3.1, Previous Investigations, must also state that petroleum hydrocarbons were detected in soil samples. See comment 1(f) and (g) above regarding aesthetic impacts.

5. **IRP Site 7**

a. The DEQ agrees with Selfridge that No Further Action is required at this IRP Site at this time.

b. Sections 3.1 and 4.0: These sections must be modified to include chloroform, methylene chloride, toluene, and 1,1,1-trichloroethane as contaminants detected in the soils and total petroleum hydrocarbons detected in the groundwater during the Phase II, Stage I investigation. This information can be found on page 4-352 in the Stage II, Phase II report.

c. The DEQ agrees that the Phase II, Stage 2 Investigation (indicated groundwater and soil contamination) showed chloride exceeding the Part 201 groundwater Drinking Water and GSI criteria and total petroleum hydrocarbons present in the soils and groundwater. Surface water samples show detections of ethylbenzene, xylenes and toluene above the Part 201 Groundwater GSI criteria.

d. The soil GSIP and groundwater GSI pathways are not relevant at this IRP Site at this time. This determination is based upon the current IRP site-specific hydrogeology and that the surface water in the ditches is controlled by a NPDES permit.

e. Section 3.1, Previous Investigations, must also state that petroleum hydrocarbons were detected in soil and groundwater samples. See comment 1(f) and (g) above regarding aesthetic impacts.

6. **IRP Site 9**

a. The DEQ agrees with Selfridge that No Further Action is required at this IRP site at this time.

b. The DEQ agrees that the Site Assessment Investigation (indicated soil contamination) show that fluoranthene and phenanthene and selenium exceed the Part 201 soil GSIP criteria and bis(2-ethylhexyl)phthalate exceeds the Part 201 groundwater Drinking Water criteria.

c. The soil GSIP and groundwater GSI pathways are not relevant at this IRP site at this time. This determination is based upon the current IRP site-specific hydrogeology and that the surface water in the ditches is controlled by a NPDES permit.

7. **IRP Site 12**

a. The DEQ agrees with Selfridge that No Further Action is required at this IRP site at this time.

b. The Site Assessment Investigation shows that iron exceeds the Part 201 Drinking Water Risk Based-Criteria. The detection of 1,270 ug/L does not exceed the Health Based criteria provided in the Table in Footnote {E}. Since the iron exceedance is an aesthetic issue and the water at Selfridge is not being used for drinking water purposes, the DEQ has determined there is no risk to human health or the environment. See comment 1(f) and 1(g) above regarding aesthetic impacts to soil and groundwater.

8. **IRP Site 13**

a. The DEQ agrees with Selfridge that No Further Action is required at this IRP site at this time.

b. The Site Assessment Investigation shows that iron exceeds the Part 201 Drinking Water Risk Based-Criteria. The detection of 396 ug/L does not exceed the Health Based criteria provided in the Table in Footnote {E}. Since the iron exceedance is an aesthetic issue and the water at Selfridge is not being used for drinking water purposes, the DEQ has determined there is no risk to human health or the environment. See comment 1(f) and (g) above regarding aesthetic impacts.

c. Lead was detected in the Phase II, Stage II Investigation, but was not detected in the Site Assessment Investigation. Therefore, the DEQ considers this not a contaminant of concern at this time.

9. **IRP Site 15**

a. The DEQ agrees with Selfridge that No Further Action is required at this IRP site at this time.

b. The DEQ agrees that the Phase II, Stage 2 Investigation (indicated groundwater and soil contamination), and the Site Assessment Investigation (indicated groundwater contamination) shows that metals exceed the soil or groundwater site-specific background values and the Part 201 soil or groundwater criteria for either the Industrial Drinking Water or GSI pathways.

c. The soil GSIP and groundwater GSI pathways are not relevant at this IRP Site at this time. This determination is based upon the current IRP site-specific hydrogeology and that the surface water in the ditches is controlled by a NPDES permit.

10. **IRP Site 18**
    a. The DEQ agrees with Selfridge that No Further Action is required at this IRP Site at this time.

    b. Sections 3.1 and 4.0
    These sections should be modified to state that the Management Action Plan dated June 1999 shows that arsenic, cadmium, and copper exceed the Part 201 Soil Drinking Water criteria.

    c. The DEQ agrees that previous investigations show that metals exceed the soil or groundwater site-specific background values and the Part 201 soil or groundwater criteria for either the Industrial Drinking Water or GSI pathways. Sediment/soil samples detected arsenic and lead above the Part 201 Soil Industrial Drinking Water criteria. Sediment/soil samples show that copper, cadmium, arsenic, chromium, zinc, lead are above either the Part 201 Soil Drinking Water Protection criteria or the GSIP criteria.

    d. The soil GSIP and groundwater GSI pathways are not relevant at this IRP site at this time. This determination is based upon the current IRP site-specific hydrogeology and that the surface water in the ditches is controlled by a NPDES permit.

11. **IRP Site 19**
    a. The DEQ agrees with Selfridge that No Further Action is required at this IRP site at this time.

    b. The DEQ agrees that the Preliminary Assessment/Site Inspection Report shows that copper exceeds the site-specific background values and the Part 201 soil criteria for the GSIP pathway.

    c. The soil GSIP pathway is not relevant at this IRP site at this time. This determination is based upon the current IRP site-specific hydrogeology and that the surface water in the ditches is controlled by a NPDES permit.

    d. Section 3.1, Previous Investigations, must also state that petroleum hydrocarbons were detected in the soil. See comment 1(f) and (g) above regarding aesthetic impacts.

12. **IRP Site 30**
    a. The DEQ cannot give a No Further Action determination on this site until the following is resolved:
        i. there is an approval from the United States Environmental Protection Agency, Toxic Substances Control Act (TSCA) division, regarding the polychlorinated biphenyls (PCBs) detected at this site and Selfridge's request for a risk-based disposal approval.

ii. the DEQ has been informed as to whether or not soil excavation with off-site treatment and disposal will occur pursuant to Section 2.0 of this No Further Action document. If this activity is to be performed, the DEQ must be submitted a Final Report on excavation and confirmation sampling.
iii. until the corrective action for the former underground storage tanks at Building 1051 is planned and performed, since this could recontaminate IRP site 30.

b. The DEQ disagrees that "there is no evidence of contaminants in the soil above DEQ Part 201 Criteria." The Preliminary Assessment/Site Inspection shows that xylenes were detected above the Part 201 Soil GSIP criteria.

c. The concrete pad and fence must be maintained and reliable restrictions incorporated into a legally enforceable document (i.e. Base Management Action Plan or Federal Facilities Agreement). If the concrete pad and fencing are ever removed, Selfridge must: (1) notify the DEQ of the change in restrictions and land use at this area; (2) determine the applicability of the TSCA regulations at 40 CFR 761 for all PCB detections; and (3) conduct an investigation for PCBs.

13. **IRP Site 31**
The DEQ agrees with Selfridge that No Further Action is required at this IRP site at this time.

14. **IRP Site 32**
a. The DEQ agrees with Selfridge that No Further Action is required at this IRP site at this time.

b. The DEQ agrees that no PCBs were detected.

c. The DEQ does not agree that "there are no contaminants of concern in the soil at Site 32." The Preliminary Assessment/Site Inspection shows that fluoranthene exceeds the Part 201 Soil GSIP criteria and phenanthrene exceeds the Part 201 Soil GSIP and the Infinite Source Volatile Soil Inhalation Criteria.

d. The DEQ agrees with Selfridge's comments regarding the lead and the selenium detected in the groundwater.

e. The soil GSIP and groundwater GSI pathways are not relevant at this IRP site at this time. This determination is based upon the current IRP site-specific hydrogeology and that the surface water in the ditches is controlled by a NPDES permit.

15. Polychlorinated biphenyls was detected in a nearby ditch soil sample (C-001SN) to the west of IRP Site 32 as shown in the March 1997 Preliminary

Assessment/Site Inspection Report, Volume I. Selfridge must propose how this will be addressed.

16. **IRP Site 35**

a. The DEQ agrees with Selfridge that No Further Action is required at this IRP site at this time.

b. The DEQ does not agree that "there are no contaminants of concern in the soil at Site 35." The Preliminary Assessment/Site Inspection shows that copper (sediment sample) exceeds the Part 201 Soil GSIP criteria and copper, lead, and selenium (surface water sample) exceed the Part 201 Groundwater GSI criteria.

. The soil GSIP and groundwater GSI pathways are not relevant at this IRP Site at this time. This determination is based upon the current IRP site-specific hydrogeology and that the surface water in the ditches is controlled by a NPDES permit.

17. **IRP Site 36**

The DEQ agrees with Selfridge that No Further Action is required at this IRP Site at this time.

Please contact me if you have any questions.

Sincerely,

Peter Quackenbush
Senior Environmental Engineer
Hazardous Waste Corrective Action Unit
Remediation and Redevelopment Division
517-373-7397

cc: Ms. De Montgomery, DEQ/EPA Reporting
Mr. Steve Buda, DEQ
Ms. Sharleen Getschman, DEQ
Mr. David Slayton, DEQ
CA File

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

JENNIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

June 20, 2003

Mr. Russell M. Dyer, PG
Section Chief, Environmental Restoration
ANG/CEVR
3500 Fetchet Avenue
Andrews Air Force Base, MD 20762-2157

Dear Mr. Dyer:

SUBJECT: Final No Further Action Decision Documents (NFA DDs) for Installation Restoration Program (IRP) Sites 3, 6, 7, 9, 12, 13, 15, 19, 31, and 36; Selfridge Air National Guard (ANG) Base - MID 099 113 128

The Michigan Department of Environmental Quality (MDEQ), Waste and Hazardous Materials Division (WHMD), has reviewed the Final NFA DDs for IRP Sites 3, 6, 7, 9, 12, 13, 15, 19, 31, and 36 dated April 2003, prepared by Montgomery Watson. Based on that review, the MDEQ hereby approves, pursuant to the WHMD Corrective Action Order CAO-WMD-111-02-95, dated May 23,1995, the NFA DDs for IRP Sites 3, 6, 7, 9, 12, 13, 15, 19, 31, and 36, provided that the following clarifications, conditions, and restrictions are reliably maintained and remain in effect at these IRP sites:

Clarifications

1. These NFA DDs were evaluated by the ANG using the Part 201 Generic Industrial Cleanup Criteria and Screening Levels (dated June 2000) as site-specific cleanup levels pursuant to Section 324.20120a(2) of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451). The MDEQ conducted an evaluation of these sites using the criteria incorporated into the administrative rules for Part 201, dated December 22, 2002, and found that the pathways previously identified as impacted by contamination did not change. Therefore, the recommendations for these NFA DDs are still valid. However, the specific contaminants for each IRP Site must be evaluated using the most current applicable Part 201 Cleanup Criteria prior to any construction activity, soil relocation, or change in land use.

2. The MDEQ previously informed the ANG that pursuant to an evaluation of the internal drainage ditches by the MDEQ, Water Division, these ditches were not considered "surface waters of the state." The Part 201 Soil Criteria can be used to evaluate the sediment analytical results. to determine if any contamination above the Part 201 Residential Criteria is present in the soils. If contamination above the Part 201 Residential Criteria is present, the ANG must comply with Part 201, Section 324.20120c, and other applicable state or federal regulations if any soil will be relocated to or from these IRP Sites.

3. To clarify Section 5.0, paragraph 1, the MDEQ would consider any contamination above the Part 201 Generic Residential Criteria as significant environmental contamination.

Conditions and Restrictions

1. The ANG must incorporate the information in these NFA DDs regarding investigations, contamination, and conclusions into the Base Management Action Plan.

2. The ANG must use their most current internal standard operating procedures (SOPs) that have been reviewed and approved by MDEQ to address potential exposures associated with construction or disturbance of the soils/groundwater at these IRP sites based on the selected cleanup criteria for these NFA DDs. The SOPS include but are not limited to: (1) AF Form 332, Base Civil Engineering Work Request; (2) Environmental Work Order/Project/Dig Permit Review Checklist; (3) AF Form 813, Request for Environmental Impact Analysis; and (4) AF 103, Base Civil Engineering Work Clearance Request.

3. The specific contaminants for each IRP site must be evaluated using the most current applicable Part 201 Cleanup Criteria prior to any construction activity, soil relocation, or change in land use.

4. The ANG or the Department of Defense (DoD) must control access to the facility to prevent unacceptable exposures.

5. The ANG must place a permanent marker at IRP Site 6 to identify the location, nature, and extent of the soil and/or groundwater contamination. This marker must be maintained and remain in effect until this site is determined to be remediated below the Part 201 Residential Cleanup Criteria.

6. The ANG must comply with Part 201, Section 324.20120c, and other applicable state or federal regulations if any soil will be relocated to or from these IRP Sites.

7. Construction and use of groundwater wells and crock wells are prohibited.

8. The ANG or the DoD must annually certify compliance with all the conditions and restrictions associated with these NFA DDs. The certification must be submitted by January 1 of each year.

9. The ANG or the DoD must provide the MDEQ with notification pursuant to Part 111, Hazardous Waste Management, of Act 451, of any pending real estate transactions that would affect these IRP Sites.

10. The ANG or the DoD must fully and finally comply with all applicable state and federal cleanup requirements at the time of a transfer of property or Base closure.

11. The ANG or the DoD must maintain this IRP Site in a condition that is protective of public health, safety, welfare, or the environment.

12. Land use and exposure characteristics must remain consistent with the land use based cleanup criteria selected for these IRP Sites and specified within these NFA DDs.

13. These NFA DDs must be included in the site-wide remedial action plan or completion document that is required by state or federal regulations at the time of a transfer of property or Base closure.

Failure to comply with the above conditions and restrictions will render this approval null and void.

If you have any questions regarding this information, please contact Mr. Peter Quackenbush, Hazardous Waste and Radiological Protection Section, WHMD, at 517-373-7397.

Sincerely,

George W. Bruchmann, Chief
Waste and Hazardous Materials Division
517-373-9523

cc: Lieutenant Colonel Henry J. Thompson, Jr., ANG-Andrews AFB
Mr. David Praner, ANG-Andrews AFB
Mr. Mohammad Arif, Selfridge ANG Base
Mr. Jerome Mullett, Montgomery Watson
Ms. Liane Shekter Smith, MDEQ/CA File
Mr. Steve Buda, MDEQ
Ms. Delores Montgomery, MDEQ
Mr. David Slayton, MDEQ
Mr. Peter Quackenbush, MDEQ
Ms. Sharleen Getschman, MDEQ

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SECTION 01 00 00

GENERAL REQUIREMENTS

PART 1 GENERAL

1.1 SCOPE

The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complimentary, and what is required by one shall be as binding as if required by all. Performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the intended results. The Contractor will understand that the work herein described shall be complete in every detail, notwithstanding every item necessarily involved is not particularly mentioned and the Contractor shall be held to provide all labor and material for the entire work intended to be described..

The Contractor will be held responsible for all requirements described in the contract documents and all work including that of his Subcontractor, if any, shall be done in accordance with the contract documents. Failure to familiarize himself with their requirements will not relieve the Contractor of his responsibility to comply.

The organization of the specifications into divisions, sections, and articles, and the arrangement of the drawings shall not control the Contractor in dividing the work among Subcontractor or in establishing the extent of the work to be performed by any trade.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. Code (USC)

15 USC 2601	Toxic Substances Control Act
16 USC 469	Preservation of Historical and Archeological Data Threatened by Dam Construction or Alterations of Terrain
16 USC 470	National Historic Preservation Act
16 USC 1531	Endangered Species Act
33 USC 1251	Clean Water Act
42 USC	The Public Health and Welfare
42 USC 6901	Resource Conservation and Recovery Act
50 USC 797	Penalty for Violation of Security Regulations and Orders

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

MUTCD	(2015) Manual on Uniform Traffic Control Devices

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

10 CFR	Energy
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.146	Permit-required Confined Spaces
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.500	Fall Protection
40 CFR 190	Environmental Radiation Protection Standards for Nuclear Power
40 CFR 61	National Emission Standards for Hazardous Air Pollutants
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 173	Shippers - General Requirements for Shipments and Packagings
EO 12088	(1978) Federal Compliance with Pollution Control Standards

1.3 ENTRY/ACCESS TO SITE

Selfridge Air National Guard is a closed Base, pursuant to Sec 21, Internal Security Act of 1950, 50 USC 797 and, as such, only those persons granted permission may enter. It is, therefore, required that control be exercised over Contractor personnel while working on the Base. To maintain this control, a listing of all Contractor personnel who will be working under the contract, must be submitted to the Contracting Officer five working days prior to the start of work under the contract. The preferred method of providing this list is via email, to the contract administrator. The listing shall include, but not limited to: contract number, project number, employee name, and the estimated starting and ending date of each employee. Subsequent listings of all additions or deletions will be submitted as employees are hired or released.

During construction, the Contractor shall permit Government personnel access to the facilities within the work area. The Contractor shall provide protection to persons and property throughout the progress of the work.

In the event of a declared National Emergency the Contracting Officer may be required to stop work on this contract for security reasons. Contractor shall ensure the Contracting Officer has a current "Off Duty" contact name and telephone number at all times to facilitate notification.

The Contractor shall inform all personnel working under his jurisdiction (including sub-contractor and visiting supplier personnel) that access to areas outside of the immediate work area, excluding direct haul and access routes, is prohibited. Circulation of said personnel will be limited to official business only. Persons in violation of the above will be apprehended and appropriately disciplined.

1.4 INSPECTION OF SITE

The Contractor shall be responsible for the complete coordination and proper relation of the work of all trades. Reference Contract Clauses FAR 52.236-19, "Organization and Direction of Work."

It is expected that prospective bidders visit the premises and thoroughly familiarize themselves with the details of the work and working conditions. It is the responsibility of all bidders to have compared the premises and the site with the Specifications and Drawings, and to have satisfied themselves as to all conditions of the premises, the existing obstructions, the actual elevations, and any other conditions affecting the execution and completion of the work prior to submission of his proposal. Reference Contract Clause FAR 52.236-3, "Site Investigation and Conditions Affecting the Work."

No allowances or extra construction on behalf of any Contractor will be permitted subsequently by reason of error or oversight on the part of the sub-contractor, or on account of interferences by the activities of the Government or others. Reference Contract Clause FAR 52.236-3, "Site Investigation and Conditions Affecting the Work."

Carefully check the site where this project is to be erected and observe any overhead wires and equipment. Any such work shall be moved, replaced, or protected, as required, whether or not shown or specified.

All dimensions shown on the drawings are based on available information or existing drawings and, to the extent possible, accurately represent existing conditions; however, there may be some variance between existing conditions and contract drawings. The Contractor is responsible for verifying all dimensions and for reporting to the Contracting Officer any discrepancies that may affect performance of the work represented by contract drawings and specifications. Reference Contract Clause DFARS 252.236-7001 "Contract Drawings, Maps, and Specifications."

1.5 PERMITS AND TAXES

The Contractor shall procure all permits (unless otherwise noted below), licenses and approvals necessary for the execution of this Contract and performance of the Work, and shall provide evidence of such permits, licenses and approvals at the Pre-Construction meeting or before commencement of the Work.

The Contractor shall pay all Sales, Consumer, Use and other similar taxes required by the law assessed to or arising out of the construction of the Project.

1.6 CORRELATION OF DRAWINGS, SPECIFICATIONS AND CONTRACTS

The specifications, Contract and the accompanying Drawings are intended to describe and provide for a complete, new and usable facility. They are

intended to be cooperative and what is called for by one shall be as binding as if called for by all. The Contractor will understand that the work herein described shall be complete in every detail, not withstanding every item necessarily involved is not particularly mentioned, and the Contractor shall be held to provide all labor and material for the entire completion of the work intended to be described and shall not avail himself of any manifestly unintentional error or omission, should any exist. Should any error or inconsistency appear in the Drawings or Specifications, the Contractor, before proceeding with the work, shall make mention of same to the Contracting Officer for proper adjustment, and in no case shall he proceed with the work in uncertainty. Reference Contract Clause DFARS 252.236-7001, "Contract Drawings, Maps and Specifications."

1.7 REPORT OF ERROR AND DISCREPANCIES

The Contractor shall be responsible for the coordination and proper relation of all aspects of the work. The Contractor shall field verify all dimensions and promptly notify the Contracting Officer in writing of any discrepancies, prior to proceeding with any phase of the work. Where exact locations are not given for the positioning of equipment and devices, they shall be positioned to permit easy access for maintenance and for removal and replacement of component parts per manufacturer's recommendations and applicable codes.

The Contractor shall be responsible for any and all discrepancies in work due to failure to obtain dimensions and investigate conditions at the building before fabrication and installation.

The Contractor shall bear all costs in replacing all materials and labor due to not observing the above paragraph and such replaced materials shall meet the approval of the Contracting Officer.

Omissions from the drawings or specifications or the misdescription of details of work that are manifestly necessary to carry out the intent of the drawings and specifications, or that are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work. The Contractor shall perform such details as if fully and correctly set forth and described in the drawings and specifications.

Reference Contract Clauses FAR 52.236-21, "Specifications and Drawings for Construction." FAR 52.246-12 "Inspection of Construction," and DFARS 252.236-7001, "Contract Drawings, Maps and Specifications."

Any proposed changes to the specifications by the Contractor must be submitted in writing to the Contracting Officer for approval prior to implementation.

1.8 DIVISION OF WORK

The various divisions of the Specifications shall not be considered as negotiations of the material and labor involved. The arrangement and order of these divisions have been made for convenience only, and it is not the intent, nor shall it be so construed, a particular trade or subcontractor must perform that work included in any one division.

Any item mentioned under any division heading must be supplied even though it is not specified under the heading for the respective work, but is shown on the Drawings. No claims for extras arising out of real or alleged error in such arrangement or order of the various divisions will be given

consideration.

Reference Contract Clause FAR 52.236-21, "Specifications and Drawings for Construction."

1.9 METHOD OF CARRYING ON THE WORK

All work under the Contract shall be arranged and carried on in such a manner as to complete work in the least possible time. The Contractor shall consult with the Contracting Officer as to methods or sequence of carrying on the work. A definite program of work shall be arranged before starting. Reference Contract Clause FAR 52.236-15, "Schedules for Construction Contracts."

Activities in the vicinity of this project may be kept in full or partial operation during construction. The Contractor shall coordinate with the Contracting Officer and schedule construction activities. Reference Contract Clause FAR 52.236-8, "Other Contracts."

The Contractor shall be responsible for the coordination of his work with any other contractor in the area, making them aware of proposed work that may affect the work of their particular trade in process of performance. Reference Contract Clause FAR 52.236-8 "Other Contracts".

1.10 STANDARDS OF MANUFACTURE

All recognized regulatory/code standards shall be the latest published edition prior to the date of release for bid/proposal of the contract documents.

For purpose of establishing the standard of construction and the requirements to be met in the work of all divisions, the drawings and these specifications are based on the use of products hereinafter specified, adapted to the installation as required to meet the condition.

Where brand names are shown, these names are intended to describe a quality of product, and in no way are intended to limit products of equal quality. Therefore, products of other manufacturers may be employed for this work provided they are equivalent materials and construction meet all specification requirements, and are equally adaptable to the conditions as approved by the Contracting Officer. Reference Contract Clause FAR 52.236-5, "Materials and Workmanship." The contracting officer or his/her designated COR will consider un-named products when full information is provided showing the product meets or exceeds the level of quality and capability of the named product.

Where named products are followed by language such as "no substitutions," "no comparable products," or similar language, the product has been approved to be sole sourced and the contractor shall provide the named product.

1.11 MEANING OF APPROVED, DIRECTED, ETC.

"Approved", "Directed", "Required", "Applicable", or words of like or similar effect, when used in the specifications shall be interpreted to mean "Approved By", "Directed By", etc., the Contracting Officer unless otherwise specifically stipulated.

1.12 MISPLACED MATERIALS

Any material that is deposited elsewhere than areas designated as approved by the Contracting Officer shall be re-handled and deposited where directed. No payment will be made for re-handling such material. The Contracting Officer will notify Contractor of any noncompliance with the foregoing provisions.

1.13 COMPLIANCE WITH CODES AND REGULATIONS

All work shall be done in accordance with the applicable codes and/or ordinances in force at the time of construction. It is the Contractor's responsibility to insure that where EPA, EGLE or other such regulations control the removal, handling, installation or disposal of materials, they shall be strictly adhered to whether or not specifically referenced in the construction documents.

Contractor shall have data sheets available at the site on any materials used to comply with OSHA and EPA. Reference Contract Clause FAR 52.223-3, "Hazardous Material Identification and Material Safety Data."

1.14 MATERIAL TESTING BY NATIONAL LABORATORIES

Electrical materials and equipment shall be new and bear the UL label or be listed in UL Electrical Construction Materials Directory or Electrical Appliance and Utilization Equipment Directory, wherever standards have been established by the agency.

The Contractor shall submit proof that the material or equipment, which he proposes to furnish under this specification, conforms to the standards of Underwriters' Laboratories. The label of Underwriters Laboratories (UL) shall be accepted as conforming to this requirement.

In lieu of the label, the Contractor may submit a written certification from any recognized testing agency, adequately equipped and competent to perform such services, that the material or equipment has been tested and conforms to the standards, including the methods of testing used.

1.15 PROGRESS SCHEDULE

Also see Section 01 32 01.00 10 PROJECT SCHEDULE.

The Contractor shall prepare a work progress schedule required for completion of each of the various divisions of work. The schedule shall be submitted to the Contracting Officer, in the number of copies as directed prior to start of construction. Reference Contract Clause FAR 52.236-15, "Schedules for Construction Contracts." Contractor shall also submit a schedule of values (SOV). Asphalt to have its own "schedule of values" item. Construction Contracts in excess of $1 million will also be submitted on Microsoft Project (latest version). This schedule shall include a line item for rough inspections by government personnel as outlined in the various sections of the specifications or on the plans. A rough inspection is required on all installed systems prior to sealing off or closing in a wall, pipe chase, suspended ceiling system etc. These systems include but not limited to: domestic and heating water lines, communication and electric runs, all insulation material to be covered by other material (GWB, wood panel etc), duct runs, ceiling suspension systems, raised flooring, fire detection/protection /suppression systems etc. A second or finish inspection will be conducted after these systems are "hidden" to

insure the quality of the finished product. The finish inspection does not constitute the final project inspection accomplished at project completion. The Contractor shall request these inspections, through the C.O. at least 5 work days prior to the desired inspection date.
Text

1.16 SAFETY ASSURANCE

Also see "Safety Assurance" include herein to the contract.

Compliance with Regulations. All work including the handling of hazardous materials or the disturbance or dismantling of structures containing hazardous materials shall comply with the applicable requirements of 29 CFR 1910/29 CFR 1926. Work involving the disturbance or dismantling of asbestos or asbestos-containing materials; the demolition of structures containing asbestos; and/or disposal and removal of asbestos, shall also comply with the requirement of 40 CFR 61, Subparts A and B. All work shall comply with applicable state and municipal safety and health requirements. Where there is a conflict between applicable regulations, the most stringent shall apply.

Contractor Responsibility. The Contractor shall assume full responsibility and liability for compliance with all applicable regulations pertaining to the health and safety of personnel during the execution of work. The Government nor the Architect-Engineer shall not be held liable for any action on the part of the Contractor, his employees or Subcontractor, which result in illness, injury or death.

Crawl spaces, attics and underground manholes are to be treated as confined space entry. Contractor must follow 29 CFR 1910.146 and use Air Force Form 1024 when making an entry. NOTE: A confined space does not include areas above suspended acoustical tile ceiling.

Where an employee can fall more than 6 feet, a fall protection system must be used; 29 CFR 1926.500 stipulates where this occurs and the different types of fall arrest systems.

When the Contractor is working in buildings that are occupied by Government personnel, the Contractor must provide Material Safety Data Sheets (MSDS) to the Contracting Officer before they begin the work.

All references to protection of the site and adjacent buildings when trenching, shall include protection of all employees also.

Inspections, Tests and Reports. The required inspections, tests and reports made by the Contractor, Subcontractor, specially trained technicians, equipment manufacturers and other as required, shall be at the Contractor's expense.

Materials and Equipment. Special facilities, devices, equipment, clothing and similar items used by the Contractor in the execution of work shall comply with applicable regulations.

Traffic Control Devices. The Contractor shall comply with the recommendations contained in Part 6 of MUTCD to ensure proper warnings to motorists and adequate traffic control. The Contractor shall provide all warning lights, barricades and other traffic control devices and signs.

1.17 INSPECTIONS AND TESTS

Also see Section 01 45 35 SPECIAL INSPECTIONS.

Inspections and tests are for the sole benefit of the Government and shall not relieve the Contractor of the responsibility of providing quality control measures to ensure that the work strictly complies with the contract requirements. No inspection or test by the Government shall be construed as constituting or implying acceptance. Reference Contract Clause FAR 52.246-12, "Inspection of Construction."

1.18 QUALITY CONTROL/TESTS

Also see Section 01 45 00.00 10 QUALITY CONTROL.

Where work is specified to be in conformity with Standard Specifications of the American Society for Testing Materials (ATSM), or with Federal specifications or with specifications of well known recognized technical and trade organizations, but no tests are specifically stipulated in connection herewith, the Contractor shall furnish and pay for any tests or certifications required by the Contracting Officer to show that the proposed materials meet with the applicable requirements.

The Contractor shall submit a written certification from any recognized testing agency, adequately equipped and competent to perform such services, that the material or equipment has been tested and conforms to the standards, including the methods of testing used.

Wherever testing or analysis of material is required, such testing unless otherwise noted will be made at the Contractor's expense.

Subsequent testing of those materials which fail to meet specifications will be accomplished by the Contractor at no cost to the Government.

Contractor Quality Control (CQC) Program: The Contractor shall provide and maintain an effective quality control program in accordance with the contract. Within ten (10) days of the award of the contract, the Contractor shall provide three (3) copies of the project CQC plan to the Contracting Officer. This document, as a minimum, shall include name and address of the independent testing agency and the responsible principal with the firm; a summary of QC tests required by the specification and to be provided by the testing agency; and typical daily reports forms to be used for this project. The plan shall also indicate organizational procedures to immediately notify the Contracting Officer or his/her representative of test results in noncompliance with the specification and recommendations on correction. The testing agency must be an independent company and not owned or partially owned by the Contractor or any relation or employee of the Contractor.

Samples used for testing shall be selected as specified for the various tests elsewhere in the specifications but in every case the method of selecting samples and the location for selection shall be as approved by the Contracting Officer.

Tests shall be made in accordance with the specified testing procedures and/or methods and otherwise as required to provide compliance with all contract requirements. Tests shall be made by independent, commercial testing laboratories approved in writing by the Contracting Officer.

Results of all tests shall be recorded on certified test reports of the commercial testing laboratories. Reports shall include a statement that the materials tested do or do not meet the requirements of the Contract specifications. Six copies of all reports shall be forwarded directly to the Contracting Officer for approval within five (5) days of the actual performance of the test. The testing agency shall immediately notify (verbally) the Contracting Officer of any tests, which indicate failure to meet the contract requirements.

Any item, for which test reports show failure to meet all Contract requirements, shall be retested as often as required to show full compliance with Contract requirements at the Contractor's expense.

Contractor will provide an emergencies plan, with Contractors to accomplish the repairs in the event of utility and/or communications emergencies.

1.19 WARRANTY

In addition to the specific guarantees required by the specifications for certain portions of the work to be performed under this Contract, the Contractor shall furnish a written warranty for all of the work to be performed under this Contract, against defects in materials or workmanship for a period of one (1) year from the date of final acceptance of the completed work by the Government.

All work including workmanship, material, and equipment (other than Government furnished equipment) shall be warranted for the full period of standard manufacturer's warranty, but in no case shall be warranted for a period of less than one (1) year upon notice from the Contracting Officer of any failure during this warranty period, the part or parts shall be replaced promptly with new parts by and at the expense of the Contractor. Whenever the manufacturer of a piece of equipment supplied by the Contractor customarily provides a warranty covering the equipment, the Contractor shall promptly turn over such to the Contracting Officer.

Upon completion, the Contractor shall provide the Contracting Officer with maintenance, repair and operating instructions and parts lists for each piece of installed equipment.

Reference Contract Clause FAR 52.246-12, "Inspection of Construction" and FAR 52.246-21, "Warranty of Construction."

1.20 CUTTING AND REPAIRING

Also see Section 01 73 00 EXECUTION.

Unless otherwise specified hereinafter, the Contractor shall do all necessary cutting, drilling, fitting and patching of work and corresponding work that may be required to make several parts come together and fit it to receive, or be received, by work of other trades shown upon, or reasonably implied, by the Drawings and Specifications for the completed project. Reference Contract Clause FAR 52.246-12, "Inspection of Construction."

The Contractor shall be held responsible for all cutting, replacement, and repairing of work that is due to faulty workmanship and which is not specifically covered by specifications for trades which are affected. He will also be held responsible for providing, without extra cost to the Government, any small incidental items which are not specifically mentioned in trade specifications, but which are necessary to complete the work in

accordance with the drawings, and under the general understanding that the work, when completed, shall be a finished and workmanlike job. Reference Contract Clause FAR 52.236-5, "Material and Workmanship" and FAR 52.246-12, "Inspection of Construction."

1.21 SITE CLEAN UP

The Contractor shall maintain the construction site in as clean and orderly condition as possible. All refuse and/or salvage material shall be gathered and disposed of periodically to maintain the site in this condition. All roadways, taxiways and ramp areas within the work area, or used by the Contractor, shall be swept and vacuumed to assure safe operation of aircraft. The cleaning operation shall be accomplished with self-propelled sweepers equipped with pick-up devices. The method of cleaning and equipment employed shall be subject to the approval of the Contracting Officer.

During and after periods of rain, this construction site may have areas of standing surface water. Dewatering techniques are a Contractor's option; however, the Contracting Officer shall approve the method prior to start of work. All dewatering work required to complete the project is the Contractor's responsibility.

Following completion of the work, the Contractor shall clean the entire area from any debris and/or excess of misplaced material due to his operation and obtain Contracting Officer's approval of this finished work. Text

1.22 LAYOUT AND GRADES

All lines and grade work not presently established at the site shall be laid out by the Contractor in accordance with the drawings and specifications. The Contractor shall maintain all established boundaries and benchmarks and replace as directed any which are destroyed or disturbed. Reference Contract Clause FAR 52.236-17, "Layout of Work."

The Contractor shall engage a Professional Engineer or Registered Land Surveyor, licensed to practice in the State of Michigan, to properly establish all locations, grades, elevations, dimensions, joints, etc., necessary to the proper location of all items of work included in this Contract. All such items shall be established in relation to the benchmark and control points noted on the drawings.

Prior to acceptance of the facility and at such times as directed by the Contracting Officer, the Contractor shall thoroughly clean all exposed surfaces of the building where work under this contract was completed.

All protective coatings, except lacquers, shall be removed from finish surfaces and the finish surfaces shall be washed and cleaned. Contractor shall be held responsible for all damaged materials, and at completion, shall replace, at his own expense, all such damaged materials.

Reference Contract Clause FAR 52.236-21, "Cleaning Up," and FAR 52.246-12, "Inspection of Construction."

1.23 REFUSE, SALVAGE, WASTE DISPOSAL AND DIVERSION TRACKING

All refuse, debris, soil and construction waste shall be legally disposed of off base at the Contractor's expense. Accumulations of refuse and soil

on the site will not be permitted.

All salvage property removed and not reinstalled under this contract shall be offered to the Government and if not accepted by the Contracting Officer, shall be properly disposed of at Contractor's expense.

Non-Hazardous Solid Waste must be diverted to recycling, through appropriate means available to the Contractor, if such diversion is less than or equal to the equivalent cost of landfill or incineration.

All excess soil from the project shall be disposed of at a licensed facility permitted for the waste being disposed. The contractor is responsible for all disposal costs. No soil will be permitted to be stock piled on site unless it will be immediately reused as backfill in the project. Stock piles are not allowed to remain for the duration of the project. All excess soil shall be immediately removed from the site by the contractor.

In accordance with the Deputy Undersecretary of Defense DOD Pollution Prevention Measure of Merit (Mom) Memorandum, HQ USAF/ILLEV, 6 August 1998, a Solid Waste Disposal and Diversion Tracking form must be submitted at the end of each quarter during the contract. Each quarter ends on March 31, June 30, September 30, and December 31.

Prior to contract close out the Contractor must supply a report including the following:

1. Amount (in tons) of non-hazardous solid waste, AND construction and demolition debris, that is composted, mulched, recycled, reused, donated or otherwise diverted from a disposal facility.

2. Amount (in tons) of solid waste transferred to any disposal facility.

1.24 STORAGE

No secure storage space will be provided by the Government. The Government will not be responsible for property belonging to, or under the present control of the Contractor. The Contractor is to protect his materials. An unsecured, open area will be designated by the Contracting Officer for storage of construction equipment and materials during the period covered by this contract. Reference Contract Clause FAR 52.236-10, "Operations and Storage Areas."

Contractor shall construct such temporary sheds as he may require for the use of his workmen and as required for tool cribs and storage of all work under this Contract. Temporary sheds shall be confined to the space assigned by the Contracting Officer. Sheds shall be of approved construction and wood floors, lighting and heat shall be provided in all parts used by workmen. Exterior of sheds shall be painted, all parts maintained in good condition throughout the life of the Contract, and at completion, all parts shall be removed and the premises cleaned up. Reference Contract Clauses FAR 52.236-10, "Operations and Storage Areas" and FAR 52.236-12, "Cleaning Up."

1.25 TEMPORARY FIELD OFFICES

Also see Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

As soon as practicable after award of Contract, and until final completion

of the work, Contractor shall provide, maintain and later remove a suitable temporary office(s) for his own use.

The Contractor is reminded that smoking in buildings on a Government facility is prohibited. Contractors must provide a smoking area for employees away from the main entrance of a building. Use of tobacco products outside of the designated tobacco use area is prohibited.

All field offices shall be painted on the exterior, maintained in good repair, provided with adequate heating, lighting and maintained in a clean and sanitary condition at all times. Reference Contract Clause FAR 52.236-10, "Operations and Storage Areas."

1.26 TELEPHONE AND COMMUNICATIONS SECURITY MONITORING

Also see Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

All communications with DOD organizations are subject to communications security (COMSEC) review. Contractor personnel will be aware telephone communications networks are continually subject to intercept by unfriendly intelligence organizations. The DOD has authorized the military departments to conduct COMSEC monitoring and recording of telephone calls originating from, or terminating at, DOD organizations. Therefore, civilian Contractor personnel are advised any time they place a call to, or receive a call from, an USAF organization, they are subject to COMSEC procedures. The Contractor will assume the responsibility for ensuring wide and frequent dissemination of the above information to all employees dealing with DOD information.

1.27 UTILITIES

Also see Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

The Contracting Officer has determined that Government-operated utilities are adequate and will be furnished to the Contractor without charge where existing outlets are available. The Contractor may use reasonable amounts of specified utilities for this construction operation without charge. The Contractor is responsible for installing temporary service outlets, as necessary. Any expense incurred to gain access to these utilities (temporary tap-ins, etc.) shall be the responsibility of the Contractor and all utilities shall be returned to their original configurations at the end of the contracts. No alterations to existing utilities shall be accomplished without the written permission of the Contracting Officer.

Contractor shall be responsible for gas charges for the building during construction. The Government will forward the monthly gas bill from Consumers Energy for B154 to the Contractor until Substantial Completion.

1. Contractor shall notify Government at least three (3) days prior to mobilization for gas meter reading. On day of mobilization the Government will read the meter and provide a copy of the reading to the Contractor.

2. Contractor shall notify Government at least three (3) days prior to Substantial Completion for gas meter reading. On day of Substantial Completion the Government will read the meter and provide a copy of the reading to the Contractor.

1.28 UTILITY INTERRUPTIONS

All utility shutdowns require the prior approval of the Contracting Officer. As soon as actual shutdown date is known, the Contractor shall notify the Contracting Officer in writing requesting approval at least eight (8) work days prior to requested shutdown.

1.29 EXCAVATING PERMIT

Contractor is required to secure an excavating permit from the COR before proceeding with any exterior on-site excavating or digging. The COR must have four (4) working days' notice from the Contractor prior to permit being secured.

Contractor is responsible to contact Digger's Hotline. Call 811 or (800) 482-7171.

1.30 WEATHER PROTECTION AND TEMPORARY HEATING

The Contractor shall provide and maintain weather protection as may be required to properly protect all parts of the structure from damage during construction.

The Contractor shall not use the facility's permanent heating system during construction. Any temporary heating shall be at the expense of the Contractor and included in the construction bid price.

The installation of any new HVAC systems shall be delivered new with clean air ducts and filters. Filters will be installed at the time of system installation and replaced within 5 days of pre-final inspection.

1.31 BLOCKING OFF STREETS

At least seven (7) days prior to the blocking of any street, the Contractor shall advise the COR of his intentions, identifying the location and the estimated time of closure. No more than one street shall be closed at any time.

1.32 ARCHEOLOGICAL, PALEONTOLOGICAL AND ENDANGERED SPECIES FINDS

Any archeological finds (evidence of human occupation) or paleontological finds (evidence of prehistoric plant or animal life) are to be reported to the Contracting Officer immediately and continue work in other areas without interruption. Protect native endangered flora and fauna and notify Contracting Officer of any construction activities that might threaten endangered species or their habitats.

1.33 DAMAGES, REPAIRS

All damages by the Contractor's operations shall be repaired, or replaced, at the Contractor's expense, as directed by the Contracting Officer. Any Government property damaged as a result of the work, materials, or operations of the Contractor shall be restored at no additional expense to the Government.

All existing sidewalks, curbs, and pavement disturbed, broken or removed or otherwise damaged by the Contractor during performance of the work under this contract shall be replaced by the Contractor at his own expense. Replaced sidewalks, curbs, and pavements shall be smooth, shall blend into

the existing work, and shall not present depressions or humps.

Reference Contract Clause FAR 52.236-9, "Protection of Existing Vegetation, Structures, Equipment, Utilities and Improvements."

1.34 MAINTENANCE OF TRAFFIC AND SAFETY

The Contractor shall comply with all applicable Federal, State, Local, DOD, National Guard Bureau, and Air Force regulations pertaining to safety, traffic control, and fire prevention.

The Contractor, his employees, and Subcontractors shall become familiar with and obey the regulations of the installation including fire, traffic, safety and security regulations while on the military installation. Those driving motor vehicles shall observe and obey all speed limits posted throughout the installation. Personnel should not enter restricted areas unless required to do so and only upon prior approval. All contractor employees and Subcontractors shall carry proper personal identification with them at all times.

Where possible, the Contractor and his work shall not interfere with the normal operations of traffic, particularly emergency vehicles and equipment. Contractor is responsible for safety on the Project Site.

Barricades and signage shall be in accordance with the Phasing Plan which also includes the haul routes contained in the plan set.

The Contractor shall construct and use only established haul routes. When materials are transported in prosecution of the work, vehicles shall not be loaded beyond the loading limit established by Federal, State, or Local Law or regulation. When it is necessary to cross curbing, sidewalks, or existing roadways protection against damage shall be provided by the Contractor. The Contractor shall observe all Frost Laws.

The Contractor shall provide for the free and unobstructed movement of vehicles entering and leaving areas of the Base with respect to his own operations and the operations of all his Subcontractors.

With respect to his own operations, and those of all his Subcontractor, the Contractor shall provide marking, lighting, and other acceptable means of identifying personnel, equipment, vehicles, storage areas, and any work or condition that may be hazardous to vehicles, fire-rescue equipment, or maintenance vehicles at the Base.

Contractor's equipment shall be conspicuously marked for identification and parked or placed within approved areas only, out of the way of driveways, emergency access roads, and traffic. The contractor shall ensure that all parts of the facility where work is being performed are adequately protected. The contractor shall comply with all security regulations imposed by the base commander against vandalism and theft.

The Contractor shall furnish, erect, and maintain weighted barricades, warning signs, and other traffic control devices, as required, to maintain traffic and insure the safety of the public and the Contractor's equipment. The Contractor shall make his own estimate of all labor, materials, equipment, and coincidental necessary for providing the maintenance of public and military vehicular traffic.

The Contractor shall furnish, erect, and maintain artificial lighting when

night work is required. Artificial lighting shall be sufficient quantity to illuminate the entire area when the work is occurring and not adversely impact the operations of the Base. The Contractor shall submit an artificial lighting plan to the COR minimum 7 calendar days prior to anticipated implementation. Artificial lighting, if required, shall be erected and functioning a minimum of 2 hours prior to dusk and shall remain a minimum 2 hours after dawn. Artificial lighting shall be lowered when not in use.

1.35 SPECIAL CONDITIONS

Any Contractor's equipment that causes or generates electro-magnetic disturbances or interference shall be removed from service until properly repaired. The Contracting Officer may also require repositioning or removal of the equipment from the Base.

The Contractor shall be responsible for the coordination of his work with base communications personnel, who may be working in the area and making them aware of proposed work that may affect the work of their particular trade in process of performance.

1.36 COMMERCIALLY OWNED/OPERATED RADIOACTIVE SOURCES

When using radioactive sources for soil compaction tests the operator shall comply with the following requirements. Prior to bringing the radiation generator to the site the Contractor shall provide the Contracting Officer with the following information/documentation for review and approval:

1. A copy of the Radioactive Source Permit with operational use conditions/restrictions with expiration date or a Certification of Exemption from licensure from the Nuclear Regulatory Commission (NRC) or Agreement State (AS).

2. A current list of trained and qualified employees that will be using the radioactive source.

3. The name of the Permit Radiation Safety Officer (PRSO), emergency contact telephone number, and current address for each source used on site.

4. Operating instruction(s)/technical order(s) for the equipment that contains the radioactive source.

5. Designated storage location of the radioactive source if it remains on site overnight.

6. Proposed marking of the storage location if it exceeds 2mR/hr as measured at the surface of the storage container.

7. A copy of the company Radiation Safety Program.

8. Emergency Response Plan in case of an emergency for a lost or damaged source and/or over exposure incident/injury.

9. Provide the portion of their contract that identifies the location(s) of where the source will be used, for how long, and for what type use.

After approval is received for use of the specific radiation generator, the Contractor shall:

1. Meet proper Department of Transportation (DOT) and NRC shipping criteria to include properly filled out shipping manifest(s), container marking/labels, and placards on the vehicle as needed when transporting the source onto and around base. His documents shall also allow him to remove the source from the base also when needed. The source and the activity shall dictate which DOT and NRC regulations and CFR's are applicable.

   a. These include, but not limited to 10 CFR parts 19, 20, 21, 30, 33, 34, & 71 for the permit and operation itself; 29 CFR 1910,1096 for occupational safety and health activities when using the instrument; 40 CFR 190 for environmental protection activities; 49 CFR 172 & 49 CFR 173 for transporting the instrument, and if the source is lost or stolen 10 CFR parts 30, 40, 50, 70, 73 & 150.

2. Limit authorized use of radioluminesent signs and markers to areas with low occupancy and where electrical power is not available except at prohibitive cost.

The Contractor shall not:

1. Buy radioactive materials or accept radioactive materials from the Government inventory without approval from the Contracting Officer.

2. Buy or use radium without Contracting Officer approval.

3. Buy radio luminescent signs and markers solely for energy conservation in general administrative, industrial, and housing applications.

The Contracting Officer reserves the right to inspect work sites and terminate/suspend any operation involving a radioactive source deemed to be unsafe IAW applicable laws, rules and federal regulations.

1.37 HAZARDOUS MATERIAL USAGE

The Contractor shall establish a hazardous material (HM) storage and distribution system when HM is to be used. All HM required to support the contract shall be reported using SANGB Form 23, CONTRACTOR HAZARDOUS MATERIAL IDENTIFICATION, attached at the end of this section. Additional HM needed by the Contractor shall be identified to the Contracting Officer's Representative.

The Contractor planning to use HM for the work must register with the appropriate entity as directed by the Contracting Officer, prior to start of work in order to support the installation's compliance with Executive Order 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements.

The contractor shall register all hazardous materials brought on Base with the Base HMP a minimum of 2 weeks prior to the hazardous material arriving on Base. The contractor shall provide all material safety data sheets (MSDS) for each hazardous material at time of registration.

The Contractor shall maintain Contractor HM Identification Form for HM on the job site for inspection/verification.

Contracting Officer's Representative will verify that the HM identified is the only HM in use on the job site.

1.38 ENERGY AND WATER EFFICIENCY AND RENEWABLE ENERGY

The Government's policy is to acquire supplies and services that promote energy and water efficiency, advance the use of renewable energy products, and help foster markets for emerging technologies.

The Contractor shall include the provisions of energy-using products for construction, renovation, or maintenance of a public building by acquiring energy-using products designated by the Department of Energy's Federal Energy Management Program (FEMP).

1.39 SECURITY REQUIREMENTS

The Contractor shall comply with all security regulations imposed by the agency occupying the space where work is to be performed. Any necessary security clearances shall be obtained prior to commencement of work.

The Contractor shall ensure that all parts of the facility where work is being performed are adequately protected against vandalism and theft.

1.40 POLLUTION ABATEMENT

All work shall be performed in a manner minimizing pollution of air, water and land as required.

Transporting materials to or from the site shall be accomplished in a manner preventing materials or particles from becoming airborne. Earth materials shall be wetted or otherwise protected. Gravel, sand and concrete shall be contained within vehicles to prevent spillage. Tarpaulins must be fastened over load before entering surrounding streets. Removal of any materials dropped or blown off vehicles shall be the responsibility of the Contractor.

Burning of any material is strictly prohibited.

Stream beds, lakes, drainage ways, sanitary and storm sewers, etc., shall not be polluted by fuels, oils, bitumen, acids or other harmful materials. Grading shall be accomplished to prevent surface drainage from the construction site containing harmful amounts of sediment from draining onto adjacent areas.

Flushing on concrete trucks is restricted to the location specifically designed for this purpose by the Contracting Officer's Representative.

Excess mortar, plaster or drywall materials shall not be disposed of on Government property. Water utilized for plastering or drywall equipment shall be disposed of in accordance with the instructions of the COR, and under no circumstances shall water be disposed of in areas which are planted or scheduled to be planted.

1.41 WORK BY GOVERNMENT

The Government reserves the right to undertake performance by Government forces, for the same type or similar work as contracted herein, as the Government deems necessary or desirable, and to do so will not breach or otherwise violate this contract.

1.42 REGULATIONS

The Contractor shall comply with all applicable Federal, State, Local, DOD, National Guard Bureau, Army and Air Force regulations pertaining to safety, traffic control and fire prevention.

The Contractor, his employees, and his Subcontractors are subject to, and shall abide by and comply with, all relevant statutes, ordinances, laws and regulations of the United States (including Executive Orders of the President) and any State (or other public authority now or hereafter in force). The Contractor agrees to observe and comply with all applicable state and federal requirements regarding social security, workman's compensation, unemployment insurance and any other matters concerning employment applicable to the performance of this contract or rules, regulations, directions and order not inconsistent herewith as may from time to time be issued by the Government. The unilateral act of any governmental body against any employee of the Contractor for the violation of a state or federal law or regulation shall not excuse the Contractor from full compliance with the terms and conditions of this contract.

The Contractor, his employees, and Subcontractor shall become familiar with and obey the regulations of the installation including fire, traffic, safety and security regulations while on the military installation. Those driving motor vehicles shall observe and obey all speed limits posted throughout the installation. Personnel should not enter restricted areas unless required to do so and only upon prior approval. All contractor employees and Subcontractor shall carry proper personal identification with them at all times.

Contractor's equipment shall be conspicuously marked for identification and parked or placed within approved areas only, out of the way of driveways, emergency access roads, and traffic. The contractor shall ensure that all parts of the facility where work is being performed are adequately protected. The contractor shall comply with all security regulations imposed by the post commander against vandalism and theft.

1.43 ENVIRONMENTAL IMPACT

All waste materials generated by any work under the contract performed on a government installation shall be handled, transported, stored, and disposed of by the contractor and by his Subcontractor at any time in accordance with all applicable Federal, state, or local laws, ordinances, regulations, court orders, or other types of rulings having the effect of the law, including, but not limited to EO 12088, as amended (33 USC 1251 ET SEQ); the Clean Air Act as amended (42 USC Sec. 1857 ET SEQ); the Endangered Species Act, as amended (16 USC 1531, ET SEQ); the Toxic Substances Control Act, as amended (15 USC 2601, ET SEQ); the National Historic Preservation Act, as amended (16 USC 470, ET SEQ); the Solid Waste Disposal Act, Resource Conservation and Recovery Act (RCRA), as amended (42 USC 6901 ET SEQ); and the Archaeological and Historic Preservation Act, as amended (16 USC 469, ET SEQ). Should the United States Government be held liable for any neglect or improper actions by the contractor or any subcontractor regarding removal or disposal of any hazardous waste, the contractor shall reimburse the government for all such liability.

All hazardous waste materials generated as part of the construction project must be disposed of by the U.S. Government. Per Section 1.37 above, any materials which could generate a hazardous waste stream will be reviewed by the Government prior to contractor use.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

-- End of Section --

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Sponsor EDIPI or DOD#:	**Phone Number:**	**586-239-4994**

Last Name	First Name	Middle	Jr/Sr	Date of Birth	Driver's License or State/Federal Id	State of issue	Gender	Race	Nationality	Company	Location on Base	Begin Date	End Date	Time Frame	Days of the Week	vetted

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TITLE: VGLZ162323
JOB NAME: ADAL FUEL CELL & CORROSION CONTROL, BLDG 154
LOCATION: Selfridge ANGB, Michigan
CONTRACT NO:
CONTRACTOR:

SUBMITTAL REGISTER

									CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					
	(a)	(b)	(c)	(d)			(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
Line	Activity #	Transmittal #	Specification Section	SD #	Submittal Description	Item Submitted	Paragraph #	Classification: GOVT or A/E Reviewer	Submit	Approval Needed By	Material Needed By	Action Code	Date Of Action	Date FWD to APPR / Auth Date RCD From CONTR	Date FWD To Other Revwr	Date RCD From Other Reviewer	Action Code	Date Of Action	Mailed To CONTR/ Date RCD From APPR Authority	Remarks
1			01 00 10	3	Product Data	AFFIRMATIVE PROCUREMENT REPORTING FORM	1.1	G												
2			01 00 10	3	Product Data	AFFIRMATIVE PROCUREMENT REPORTING FORM	1.1	G												
3			01 00 10	11	Closeout Submittals	AFFIRMATIVE PROCUREMENT REPORTING FORM	1.1	G												
4			01 00 10	11	Closeout Submittals	AFFIRMATIVE PROCUREMENT REPORTING FORM	1.1	G												
5			01 11 00	1	Preconstruction Submittals	Salvage Plan	1.6	G												
6			01 14 00	1	Preconstruction Submittals	List of Contact Personnel	1.3.1.1	G												
7			01 30 00	1	Preconstruction Submittals	View Location Map	1.4	G												
8			01 30 00	1	Preconstruction Submittals	Progress and Completion Pictures	1.5	G												
9			01 30 00	4	Samples	Color Boards	1.3	G												
10			01 31 00	1	Preconstruction Submittals	Subcontract List	1.4.3.1	G												
11			01 31 00	1	Preconstruction Submittals	Key Personnel Names	1.4.3.2	G												
12			01 32 01.00 10	1	Preconstruction Submittals	Preliminary Project Schedule	3.4.1	G												
13			01 32 01.00 10	1	Preconstruction Submittals	Initial Project Schedule	3.4.2	G												
14			01 32 01.00 10	1	Preconstruction Submittals	Periodic Schedule Update	3.6.2	G												
15			01 33 00	1	Preconstruction Submittals	Submittal Register	1.7	G												
16			01 33 29	1	Preconstruction Submittals	Preliminary High Performance and Sustainable Building Checklist	1.5.3.1	G												
17			01 33 29	1	Preconstruction Submittals	Sustainability Action Plan	1.4.1	G												
18			01 33 29	1	Preconstruction Submittals	Preliminary Sustainability eNotebook	1.5.3.1	G												
19			01 33 29	11	Closeout Submittals	Final High Performance and Sustainable Building Checklist	1.5.3.1	G												
20			01 33 29	11	Closeout Submittals	Final Sustainability eNotebook	1.5.3.1	G												
21			01 33 29	11	Closeout Submittals	Amended Final Sustainability eNotebook	1.5.3.1	G												
22			01 33 29	11	Closeout Submittals	Amended Final High Performance and Sustainable Building Checklist	1.5.3.1	G												
23			01 35 26	1	Preconstruction Submittals	Accident Prevention Plan (APP)	1.7	G												
24			01 35 26	6	Test Reports	Monthly Exposure Reports	1.4													
25			01 35 26	6	Test Reports	Notifications and Reports	1.12													
26			01 35 26	6	Test Reports	Accident Reports	1.12.2	G												
27			01 35 26	6	Test Reports	LHE Inspection Reports	1.12.3													
28			01 35 26	7	Certificates	Crane Operators/Riggers	1.6.1.4													
29			01 35 26	7	Certificates	Standard Lift Plan	1.7.2.2	G												
30			01 35 26	7	Certificates	Critical Lift Plan	1.7.2.3	G												
31			01 35 26	7	Certificates	Activity Hazard Analysis (AHA)	1.8													
32			01 35 26	7	Certificates	Confined Space Entry Permit	1.9.1													
33			01 35 26	7	Certificates	Hot Work Permit	1.9.1													
34			01 35 26	7	Certificates	Certificate of Compliance	1.12.4													
35			01 35 26	7	Certificates	License Certificates	1.14													
36			01 35 26	7	Certificates	Radiography Operation Planning Work Sheet	1.14.1	G												

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37			01 35 26	7	Certificates	Portable Gauge Operations Planning Worksheet	1.14.1	G												
38			01 45 00.00 10	1	Preconstruction Submittals	Contractor Quality Control (CQC) Plan	3.2	G												
39			01 45 00.00 10	6	Test Reports	Verification Statement	3.9.2													
40			01 45 35	6	Test Reports	Daily Reports	3.1.2													
41			01 45 35	6	Test Reports	Biweekly Reports	3.1.1													
42			01 45 35	7	Certificates	Steel Joist Institute Membership	2.1													
43			01 45 35	7	Certificates	Certificate of Compliance	2.1													
44			01 45 35	7	Certificates	Special Inspector	1.5	G												
45			01 50 00	1	Preconstruction Submittals	Construction Site Plan	1.3	G												
46			01 50 00	1	Preconstruction Submittals	Traffic Control Plan	3.4.1	G												
47			01 50 00	1	Preconstruction Submittals	Contractor Temporary Network Cybersecurity Compliance Statements	1.6.5	G												
48			01 50 00	7	Certificates	Backflow Tester	1.4.1													
49			01 50 00	7	Certificates	Backflow Preventers	1.4													
50			01 57 19	1	Preconstruction Submittals	Preconstruction Survey	1.5.1													
51			01 57 19	1	Preconstruction Submittals	Solid Waste Management Permit	1.9	G												
52			01 57 19	1	Preconstruction Submittals	Regulatory Notifications	1.5.2	G												
53			01 57 19	1	Preconstruction Submittals	Environmental Protection Plan	1.6	G												
54			01 57 19	1	Preconstruction Submittals	Dirt and Dust Control Plan	1.6.9.1	G												
55			01 57 19	1	Preconstruction Submittals	Employee Training Records	1.5.5	G												
56			01 57 19	1	Preconstruction Submittals	Environmental Manager Qualifications	1.5.4	G												
57			01 57 19	6	Test Reports	Monthly Solid Waste Disposal Report	1.9.1	G												
58			01 57 19	7	Certificates	Employee Training Records	1.5.5	G												
59			01 57 19	11	Closeout Submittals	Waste Determination Documentation	3.7.1	G												
60			01 57 19	11	Closeout Submittals	Disposal Documentation for Hazardous and Regulated Waste	3.7.3.6	G												
61			01 57 19	11	Closeout Submittals	Assembled Employee Training Records	1.5.5	G												
62			01 57 19	11	Closeout Submittals	Solid Waste Management Permit	1.9	G												
63			01 57 19	11	Closeout Submittals	Project Solid Waste Disposal Documentation Report	3.7.2.1	G												
64			01 57 19	11	Closeout Submittals	Hazardous Waste/Debris Management	3.7.3.1	G												
65			01 57 19	11	Closeout Submittals	Regulatory Notifications	1.5.2	G												
66			01 57 19	11	Closeout Submittals	Sales Documentation	3.7.2.1	G												
67			01 73 00	7	Certificates	Certificate Of Survey	3.3.2													
68			01 74 19	1	Preconstruction Submittals	Construction Waste Management Plan	1.7	G												
69			01 74 19	6	Test Reports	Quarterly Reports	1.9.2													
70			01 74 19	6	Test Reports	Annual Report	1.9.3													
71			01 74 19	11	Closeout Submittals	Final Construction Waste Diversion Report	1.1	S												

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72			01 78 00	3	Product Data	Warranty Management Plan	1.5.1													
73			01 78 00	3	Product Data	Spare Parts Data	1.4													
74			01 78 00	8	Manufacturer's Instructions	Instructions	1.5.1													
75			01 78 00	10	Operation and Maintenance Data	Operation and Maintenance Manuals	3.2	G												
76			01 78 00	11	Closeout Submittals	As-Built Drawings	3.1	G												
77			01 78 00	11	Closeout Submittals	As-Built Record of Equipment and Materials	1.5.1													
78			01 78 00	11	Closeout Submittals	Certification of EPA Designated Items	2.1	G												
79			01 78 23	10	Operation and Maintenance Data	Training Plan	3.1.1	G												
80			01 78 23	10	Operation and Maintenance Data	Training Outline	3.1.3	G												
81			01 78 23	10	Operation and Maintenance Data	Training Content	3.1.2	G												
82			01 78 23	11	Closeout Submittals	Training Video Recording	3.1.4	G												
83			01 78 23	11	Closeout Submittals	Validation of Training Completion	3.1.6	G												
84			01 79 00	7	Certificates	Instructor Qualifications	1.3.1													
85			01 79 00	7	Certificates	Evaluation	1.7.6													
86			01 79 00	10	Operation and Maintenance Data	Instruction Program	1.5.1													
87			01 79 00	10	Operation and Maintenance Data	Attendance Record	1.7.5													
88			01 79 00	10	Operation and Maintenance Data	Demonstration And Training Video Recordings	1.8													
89			01 91 00.15 10	1	Preconstruction Submittals	Commissioning Firm	1.7	G												
90			01 91 00.15 10	1	Preconstruction Submittals	Lead Commissioning Specialist	1.7.1	G												
91			01 91 00.15 10	6	Test Reports	Interim Construction Phase Commissioning Plan	3.1.2.1	G												
92			01 91 00.15 10	6	Test Reports	Final Construction Phase Commissioning Plan	3.1.2.2	G												
93			01 91 00.15 10	6	Test Reports	Pre-Functional Checklists	3.1.4.2	G												
94			01 91 00.15 10	6	Test Reports	Issues Log	1.9													
95			01 91 00.15 10	6	Test Reports	Commissioning Report	3.2	G												
96			01 91 00.15 10	7	Certificates	Certificate of Readiness	1.1	G												
97			01 91 00.15 10	10	Operation and Maintenance Data	Training Plan	3.1.5	G												
98			01 91 00.15 10	10	Operation and Maintenance Data	Training Attendance Rosters	3.1.5	G												
99			01 91 00.15 10	10	Operation and Maintenance Data	Systems Manual	3.1.6	G												
100			01 91 00.15 10	11	Closeout Submittals	Final Commissioning Report	3.2	S												
101			01 91 00.15 10	11	Closeout Submittals	Final Construction Phase Commissioning Plan	3.1.2.2	S												
102			02 41 00	1	Preconstruction Submittals	Existing Conditions	1.1													
103			02 41 00	7	Certificates	Notification	1.6	G												
104			02 82 00	3	Product Data	Amended Water	1.2.2	G												
105			02 82 00	3	Product Data	Safety Data Sheets (SDS) for All Materials	1.3.9	G												

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106			02 82 00	3	Product Data	Encapsulants	2.1	G												
107			02 82 00	3	Product Data	Respirators	3.1.2.1	G												
108			02 82 00	3	Product Data	Local Exhaust Equipment	3.1.7	G												
109			02 82 00	3	Product Data	Pressure Differential Automatic Recording Instrument	3.1.7	G												
110			02 82 00	3	Product Data	Vacuums	3.1.8	G												
111			02 82 00	6	Test Reports	Air Sampling Results	1.5.5	G												
112			02 82 00	6	Test Reports	Pressure Differential Recordings for Local Exhaust System	1.5.6	G												
113			02 82 00	6	Test Reports	Clearance Sampling	3.2.13.5	G												
114			02 82 00	6	Test Reports	Asbestos Disposal Quantity Report	3.3.3.2	G												
115			02 82 00	7	Certificates	Employee Training	1.3.4	G												
116			02 82 00	7	Certificates	Notifications	1.3.5	G												
117			02 82 00	7	Certificates	Respiratory Protection Program	1.3.7	G												
118			02 82 00	7	Certificates	Asbestos Hazard Abatement Plan	1.3.10	G												
119			02 82 00	7	Certificates	Testing Laboratory	1.3.11	G												
120			02 82 00	7	Certificates	Landfill Approval	1.3.12	G												
121			02 82 00	7	Certificates	Delivery Tickets	1.3.12	G												
122			02 82 00	7	Certificates	Waste Shipment Records	1.3.12	G												
123			02 82 00	7	Certificates	Transporter Certification	1.3.13	G												
124			02 82 00	7	Certificates	Medical Certification	1.3.14	G												
125			02 82 00	7	Certificates	Private Qualified Person Documentation	1.5.1	G												
126			02 82 00	7	Certificates	Designated Competent Person	1.5.2	G												
127			02 82 00	7	Certificates	Worker's License	1.5.3	G												
128			02 82 00	7	Certificates	Contractor's License	1.5.4	G												
129			02 82 00	7	Certificates	Federal, State or Local Citations on Previous Projects	1.5.7	G												
130			02 82 00	7	Certificates	Encapsulants	2.1	G												
131			02 82 00	7	Certificates	Equipment Used to Contain Airborne Asbestos Fibers	3.1	G												
132			02 82 00	7	Certificates	Water Filtration Equipment	3.1.3.3	G												
133			02 82 00	7	Certificates	Vacuums	3.1.8	G												
134			02 82 00	7	Certificates	Ventilation Systems	3.1.8	G												
135			02 82 00	11	Closeout Submittals	Permits	1.3.5	G												
136			02 82 00	11	Closeout Submittals	Notifications	1.3.5	G												
137			02 82 00	11	Closeout Submittals	Respirator Program Records	1.3.7.1	G												
138			02 82 00	11	Closeout Submittals	Rental Equipment	1.7.1	G												
139			02 83 00	1	Preconstruction Submittals	Competent Person	1.5.1.1	G												
140			02 83 00	1	Preconstruction Submittals	Training Certification	1.5.1.2	G												
141			02 83 00	1	Preconstruction Submittals	Occupational and Environmental Assessment Data Report	1.5.2.3	G												
142			02 83 00	1	Preconstruction Submittals	Medical Examinations	1.5.2.4	G												
143			02 83 00	1	Preconstruction Submittals	Lead, Cadmium, Chromium Waste Management Plan	1.5.2.8	G												
144			02 83 00	1	Preconstruction Submittals	Licenses, Permits and Notifications	1.5.4	G												
145			02 83 00	1	Preconstruction Submittals	Occupant Protection Plan	1.5.5	G												

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146			02 83 00	1	Preconstruction Submittals	Lead, Cadmium, Chromium Compliance Plan	1.5.2.2	G												
147			02 83 00	1	Preconstruction Submittals	Lead, Cadmium, Chromium Compliance Plan	3.1.1.6	G												
148			02 83 00	1	Preconstruction Submittals	Written Evidence of TSD Approval	3.5.2.1	G												
149			02 83 00	3	Product Data	Respirators	1.6.1	G												
150			02 83 00	3	Product Data	Vacuum Filters	1.6.4	G												
151			02 83 00	3	Product Data	Negative Air Pressure System	1.6.7	G												
152			02 83 00	3	Product Data	Materials and Equipment	2.1	G												
153			02 83 00	3	Product Data	Expendable Supplies	2.1.1	G												
154			02 83 00	3	Product Data	Local Exhaust Equipment	3.1.1.5	G												
155			02 83 00	3	Product Data	Pressure Differential Automatic Recording Instrument	3.1.1.5	G												
156			02 83 00	3	Product Data	Pressure Differential Log	3.1.1.6	G												
157			02 83 00	6	Test Reports	Sampling and Analysis	1.3.3	G												
158			02 83 00	6	Test Reports	Occupational and Environmental Assessment Data Report	1.5.2.3	G												
159			02 83 00	6	Test Reports	Sampling Results	1.5.2.3	G												
160			02 83 00	6	Test Reports	Pressure Differential Recordings For Local Exhaust System	1.5.3	G												
161			02 83 00	7	Certificates	Testing Laboratory	1.5.1.3	G												
162			02 83 00	7	Certificates	Clearance Certification	3.5.1.1	G												
163			02 83 00	11	Closeout Submittals	Hazardous Waste Manifest	3.5.2.1	G												
164			02 83 00	11	Closeout Submittals	Turn-In Documents or Weight Tickets	3.5.2.1	G												
165			02 84 16	7	Certificates	Qualifications of CIH	1.8.1	G												
166			02 84 16	7	Certificates	Training Certification	1.8.1	G												
167			02 84 16	7	Certificates	PCB and Lamp Removal Work Plan	1.8.2	G												
168			02 84 16	7	Certificates	PCB and Lamp Disposal Plan	1.8.3	G												
169			02 84 16	11	Closeout Submittals	Transporter Certification	3.5.2	G												
170			02 84 16	11	Closeout Submittals	Certification of Decontamination	3.2.4													
171			02 84 16	11	Closeout Submittals	Certificate of Disposal and/or recycling	3.5.2.1													
172			03 30 00	2	Shop Drawings	Reinforcing Steel	1.6.2.1	G												
173			03 30 00	3	Product Data	Joint Sealants	2.4.5													
174			03 30 00	3	Product Data	Joint Filler	2.4.4													
175			03 30 00	3	Product Data	Cementitious Materials	2.3.1													
176			03 30 00	3	Product Data	Vapor Retarder	2.4.6													
177			03 30 00	3	Product Data	Reinforcement	2.6													
178			03 30 00	3	Product Data	Liquid Chemical Floor Hardeners and Sealers	2.4.3.1													
179			03 30 00	3	Product Data	Admixtures	2.3.4													
180			03 30 00	3	Product Data	Biodegradable Form Release Agent	2.2.2													
181			03 30 00	3	Product Data	Nonshrink Grout	2.4.2													
182			03 30 00	3	Product Data	Crystalline Waterproofing	2.5.1													
183			03 30 00	5	Design Data	Concrete Mix Design	1.6.1.1	G												
184			03 30 00	6	Test Reports	Concrete Mix Design	1.6.1.1	G												

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185			03 30 00	6	Test Reports	Fly Ash	1.6.3.1													
186			03 30 00	6	Test Reports	Pozzolan	1.6.3.1													
187			03 30 00	6	Test Reports	Slag Cement	1.6.3.2													
188			03 30 00	6	Test Reports	Aggregates	1.6.3.3													
189			03 30 00	6	Test Reports	Compressive Strength Tests	3.13.2.3	G												
190			03 30 00	6	Test Reports	Slump Tests	3.13.2.1													
191			04 20 00	2	Shop Drawings	Cut CMU	3.3.5.1	G												
192			04 20 00	2	Shop Drawings	Detail Drawings	3.4.1.1	G												
193			04 20 00	3	Product Data	Hot Weather Procedures	1.5.1	G												
194			04 20 00	3	Product Data	Cold Weather Procedures	1.5.2	G												
195			04 20 00	3	Product Data	Clay or Shale Brick	2.2.2	G												
196			04 20 00	3	Product Data	Cement	2.2.3.2.1	G												
197			04 20 00	3	Product Data	Cementitious Materials	2.4.1.1	G												
198			04 20 00	3	Product Data	Insulation	2.6.8	G												
199			04 20 00	4	Samples	Mock-Up Panel	1.3.1.1	G												
200			04 20 00	4	Samples	Clay or Shale Brick	2.2.2	G												
201			04 20 00	4	Samples	Concrete Masonry Units (CMU)	2.2.3.2	G												
202			04 20 00	4	Samples	Admixtures for Masonry Mortar	2.4.1.4	G												
203			04 20 00	4	Samples	Anchors, Ties, and Bar Positioners	2.6.2	G												
204			04 20 00	4	Samples	Joint Reinforcement	2.6.3	G												
205			04 20 00	4	Samples	Clay Masonry Expansion-Joint Materials	2.6.6	G												
206			04 20 00	4	Samples	Insulation	2.6.8	G												
207			04 20 00	5	Design Data	Masonry Compressive Strength	2.1.2	G												
208			04 20 00	5	Design Data	Fire-Rated Concrete Masonry Units	2.2.3.3													
209			04 20 00	5	Design Data	Bracing Calculations	3.2.5	G												
210			04 20 00	6	Test Reports	Efflorescence Test	2.2.2.1.3													
211			04 20 00	6	Test Reports	Fire-Rated Concrete Masonry Units	2.2.3.3													
212			04 20 00	6	Test Reports	Prism Tests	3.6.1.1													
213			04 20 00	6	Test Reports	Single-Wythe Masonry Wall Water Penetration Test	3.6.1.2													
214			04 20 00	7	Certificates	Special Masonry Inspector Qualifications	1.3.2													
215			04 20 00	7	Certificates	Clay or Shale Brick	2.2.2													
216			04 20 00	7	Certificates	Concrete Masonry Units (CMU)	2.2.3.2													
217			04 20 00	7	Certificates	Cementitious Materials	2.4.1.1													
218			04 20 00	7	Certificates	Admixtures for Masonry Mortar	2.4.1.4													
219			04 20 00	7	Certificates	Admixtures for Grout	2.4.2.2													
220			04 20 00	7	Certificates	Anchors, Ties, and Bar Positioners	2.6.2													
221			04 20 00	7	Certificates	Joint Reinforcement	2.6.3													
222			04 20 00	7	Certificates	Insulation	2.6.8													
223			04 20 00	7	Certificates	Insulation	2.6.8													
224			04 20 00	8	Manufacturer's Instructions	Admixtures for Masonry Mortar	2.4.1.4													
225			04 20 00	8	Manufacturer's Instructions	Admixtures for Grout	2.4.2.2													
226			04 20 00	11	Closeout Submittals	Recycled Content	2.2.3.2.2	S												

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227			05 12 00	2	Shop Drawings	Fabrication Drawings	1.4.1	G												
228			05 12 00	3	Product Data	Shop Primer	2.6.2													
229			05 12 00	3	Product Data	Welding Electrodes and Rods	2.4.1													
230			05 12 00	3	Product Data	Direct Tension Indicator Washers	2.3.2.3													
231			05 12 00	3	Product Data	Non-Shrink Grout	2.4.2													
232			05 12 00	3	Product Data	Tension Control Bolts	2.3.3													
233			05 12 00	3	Product Data	Recycled Content for Structural Steel	2.2.1													
234			05 12 00	3	Product Data	Recycled Content for Structural Steel Tubing	2.2.2													
235			05 12 00	3	Product Data	Recycled Content for Steel Pipe	2.2.3													
236			05 12 00	6	Test Reports	Class B Coating	2.6.2													
237			05 12 00	6	Test Reports	Bolts, Nuts, and Washers	2.3													
238			05 12 00	6	Test Reports	Direct Tension Indicator Washer Inspection Reports	3.7.2.1													
239			05 12 00	6	Test Reports	Bolt Testing Reports	3.7.3.1													
240			05 12 00	7	Certificates	Steel	2.2													
241			05 12 00	7	Certificates	Bolts, Nuts, and Washers	2.3													
242			05 12 00	7	Certificates	Galvanizing	2.5													
243			05 12 00	7	Certificates	AISC Structural Steel Fabricator Quality Certification	1.3													
244			05 12 00	7	Certificates	AISC Structural Steel Erector Quality Certification	1.3													
245			05 12 00	7	Certificates	Welding Procedures and Qualifications	1.4.2.1													
246			05 12 00	7	Certificates	Certified Welding Inspector	3.7.1.1													
247			05 12 00	7	Certificates	Welding Procedure Specifications (WPS)	3.4													
248			05 21 00	2	Shop Drawings	Steel Joist Framing	1.3.1	G												
249			05 21 00	3	Product Data	Recycled Content Of Steel Products	2.3	G												
250			05 21 00	5	Design Data	Design Calculations	2.2	G												
251			05 30 00	2	Shop Drawings	Fabrication Drawings	1.3.5	G												
252			05 30 00	3	Product Data	Accessories	2.2													
253			05 30 00	3	Product Data	Deck Units	2.1													
254			05 30 00	3	Product Data	Touch-Up Paint	2.1.4													
255			05 30 00	3	Product Data	Welding Equipment	1.3.3													
256			05 30 00	3	Product Data	Welding Rods and Accessories	1.3.3													
257			05 30 00	3	Product Data	Recycled Content of Steel Products	2.1	S												
258			05 30 00	5	Design Data	Deck Units	2.1	G												
259			05 30 00	7	Certificates	Powder-Actuated Tool Operator	1.3.2													
260			05 30 00	7	Certificates	Welder Qualifications	1.3.3													
261			05 30 00	7	Certificates	Welding Procedures	1.3.3													
262			05 30 00	7	Certificates	Fire Safety	1.3.4.1													
263			05 30 00	7	Certificates	Wind Storm Resistance	1.3.4.2													
264			05 30 00	7	Certificates	Manufacturer's Certificate	1.3.1													
265			05 40 00	2	Shop Drawings	Framing Components	1.6.1	G												
266			05 40 00	3	Product Data	Studs, Joists	2.1													

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267			05 40 00	3	Product Data	Recycled Content of Steel Products	2.1	S												
268			05 40 00	5	Design Data	Metal Framing Calculations	1.6.2	G												
269			05 40 00	7	Certificates	Load-Bearing Cold-Formed Metal Framing	1.4													
270			05 40 00	7	Certificates	Welds	3.1.1													
271			05 50 13	2	Shop Drawings	Bollards	2.5	G												
272			05 50 13	2	Shop Drawings	Metal Railings	2.4	G												
273			05 50 13	2	Shop Drawings	Angles and Plates	2.6	G												
274			05 50 13	2	Shop Drawings	Recycled Content	2.1													
275			05 51 33	2	Shop Drawings	Ladders	2.3													
276			05 51 33	2	Shop Drawings	Ship's Ladder	2.3.3													
277			05 51 33	3	Product Data	Ladders	2.3													
278			05 51 33	3	Product Data	Ship's Ladder	2.3.3													
279			05 51 33	3	Product Data	Ladder Safety Devices	2.3.2													
280			05 51 33	7	Certificates	Fabricator Certification for Ladder Assembly	1.3													
281			05 51 33	7	Certificates	Fabricator Certification for Ships Ladder Assembly	1.3													
282			06 10 00	2	Shop Drawings	Nailing Strips	2.2.1	G												
283			06 10 00	3	Product Data	Fire-retardant Treatment	1.8													
284			06 10 00	3	Product Data	Adhesives	2.4.2													
285			06 10 00	6	Test Reports	Preservative-treated	1.4.3													
286			06 10 00	7	Certificates	Certificates of Grade	1.9.1													
287			06 10 00	7	Certificates	Preservative Treatment	1.7													
288			06 10 00	7	Certificates	Indoor Air Quality for Aerosol Adhesives	2.4.2	S												
289			06 10 00	7	Certificates	Indoor Air Quality for Non-aerosol Adhesives	2.4.2	S												
290			06 41 16.00 10	2	Shop Drawings	Shop Drawings	2.9													
291			06 41 16.00 10	2	Shop Drawings	Installation	3.1													
292			06 41 16.00 10	3	Product Data	Wood Materials	2.1													
293			06 41 16.00 10	3	Product Data	Finish Schedule	2.9.7.3													
294			06 41 16.00 10	4	Samples	Plastic Laminates	2.3													
295			06 41 16.00 10	4	Samples	Cabinet Hardware	2.6													
296			06 41 16.00 10	7	Certificates	Quality Assurance	1.5													
297			06 41 16.00 10	7	Certificates	Laminate Clad Casework	3.1													
298			06 61 16	2	Shop Drawings	Installation	3.1	G												
299			06 61 16	3	Product Data	Solid Polymer Material	2.1													
300			06 61 16	3	Product Data	Qualifications	1.5.1													
301			06 61 16	3	Product Data	Fabrications	2.3													
302			06 61 16	3	Product Data	Indoor air quality for solid surface seam and sealant products	2.2.4	S												
303			06 61 16	4	Samples	Material	2.1	G												
304			06 61 16	4	Samples	Counter and Vanity Tops	2.3.5	G												
305			06 61 16	6	Test Reports	Solid Polymer Material	2.1													
306			06 61 16	7	Certificates	Fabrications	2.3													

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307			06 61 16	7	Certificates	Qualifications	1.5.1													
308			06 61 16	7	Certificates	Indoor Air Quality for solid surface fabrication products	2.1	S												
309			06 61 16	10	Operation and Maintenance Data	Clean-up	3.2													
310			07 12 00	3	Product Data	Manufacturer's Standard Details	1.3	G												
311			07 12 00	3	Product Data	Protection Board	2.7	G												
312			07 12 00	3	Product Data	Prefabricated Laminated Asphalt Waterproofing	2.8	G												
313			07 12 00	3	Product Data	Membrane Fabric	2.4	G												
314			07 12 00	7	Certificates	Membrane Fabric	2.4	G												
315			07 12 00	7	Certificates	Protection Board	2.7	G												
316			07 12 00	7	Certificates	Prefabricated Laminated Asphalt Waterproofing	2.8	G												
317			07 12 00	7	Certificates	Certificates of Compliance	2.1.1	G												
318			07 12 00	7	Certificates	Certificates of Compliance	2.1.2	G												
319			07 12 00	11	Closeout Submittals	Certificates of Compliance	2.1.1	S												
320			07 12 00	11	Closeout Submittals	Certificates of Compliance	2.1.2	S												
321			07 12 00	11	Closeout Submittals	Volatile Organic Compounds (VOC) Contents	2.1.1	S												
322			07 12 00	11	Closeout Submittals	Recycled Content	2.1.2	S												
323			07 21 13	3	Product Data	Manufacturer's Standard Details	1.3	G												
324			07 21 13	3	Product Data	Block or Board Insulation	2.1	G												
325			07 21 13	3	Product Data	Vapor Retarder	2.3	G												
326			07 21 13	3	Product Data	Pressure Sensitive Tape	2.4	G												
327			07 21 13	3	Product Data	Protection Board or Coatings	1.4	G												
328			07 21 13	3	Product Data	Accessories	2.6	G												
329			07 21 13	3	Product Data	Recycled Content for Block or Board Insulation	2.1.5	S												
330			07 21 13	7	Certificates	Block or Board Insulation	2.1	G												
331			07 21 13	7	Certificates	Vapor Retarder	2.3	G												
332			07 21 13	7	Certificates	Protection Board or Coating	2.5	G												
333			07 21 13	7	Certificates	Protection Board or Coating	3.4.5	G												
334			07 21 13	7	Certificates	Special Warranties	1.7	G												
335			07 21 13	7	Certificates	Special Warranties	1.7	G												
336			07 21 13	7	Certificates	Indoor Air Quality For Block Or Board Insulation	2.1.6	S												
337			07 21 13	8	Manufacturer's Instructions	Block or Board Insulation	2.1													
338			07 21 13	8	Manufacturer's Instructions	Adhesive	2.6.1													
339			07 21 16	3	Product Data	Blanket Insulation	2.1													
340			07 21 16	3	Product Data	Recycled Content for Insulation Materials	2.1.2	S												
341			07 21 16	3	Product Data	Sill Sealer Insulation	2.2													
342			07 21 16	3	Product Data	Vapor Retarder	2.4													
343			07 21 16	3	Product Data	Pressure Sensitive Tape	2.5													
344			07 21 16	3	Product Data	Accessories	2.6													

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345			07 21 16	7	Certificates	Indoor Air Quality for Insulation Materials	2.1.4	S												
346			07 21 16	7	Certificates	Indoor Air Quality for Adhesives	2.6.1	S												
347			07 21 16	8	Manufacturer's Instructions	Insulation	3.3.1													
348			07 27 10.00 10	2	Shop Drawings	Air Barrier System Shop Drawings	2.1	G												
349			07 27 10.00 10	3	Product Data	Air Barrier System Product Data	2.1	G												
350			07 27 10.00 10	4	Samples	Material Samples For Air Barrier System	2.1	G												
351			07 27 10.00 10	6	Test Reports	Testing and Inspection	3.1.2	G												
352			07 27 19.01	1	Preconstruction Submittals	Qualifications of Manufacturer	1.8.1	G												
353			07 27 19.01	1	Preconstruction Submittals	Qualifications of Installer	1.8.2	G												
354			07 27 19.01	2	Shop Drawings	Self-adhering Air Barrier	1.4	G												
355			07 27 19.01	3	Product Data	Self-adhering Air Barrier	1.4	G												
356			07 27 19.01	3	Product Data	Primers, Adhesives, and Mastics	2.2	G												
357			07 27 19.01	3	Product Data	Safety Data Sheets	1.4.2	G												
358			07 27 19.01	4	Samples	Self-adhering Air Barrier	1.4	G												
359			07 27 19.01	6	Test Reports	Field Peel Adhesion Test	1.6	G												
360			07 27 19.01	6	Test Reports	Flame Propagation of Wall Assemblies	1.4.4	G												
361			07 27 19.01	6	Test Reports	Flame Spread and Smoke Developed Index Ratings	1.4.4	G												
362			07 27 19.01	6	Test Reports	Site Inspections and Testing	3.4.1	G												
363			07 27 19.01	7	Certificates	Self-adhering Air Barrier	1.4	G												
364			07 27 19.01	8	Manufacturer's Instructions	Self-adhering Air Barrier	1.4	G												
365			07 27 19.01	8	Manufacturer's Instructions	Primers, Adhesives, and Mastics	2.2	G												
366			07 27 26	1	Preconstruction Submittals	Qualifications of Manufacturer	1.9.1	G												
367			07 27 26	1	Preconstruction Submittals	Qualifications of Installer	1.9.2	G												
368			07 27 26	2	Shop Drawings	Fluid-Applied Membrane Air Barrier	1.4	G												
369			07 27 26	3	Product Data	Fluid-Applied Membrane Air Barrier	1.4	G												
370			07 27 26	3	Product Data	Primers, Adhesives, and Mastics	2.2	G												
371			07 27 26	3	Product Data	Reinforcement	2.4	G												
372			07 27 26	3	Product Data	Safety Data Sheets	1.4.2	G												
373			07 27 26	4	Samples	Mockup	1.4.3	G												
374			07 27 26	6	Test Reports	Capillary Moisture Test	1.6	G												
375			07 27 26	6	Test Reports	Field Peel Adhesion Test	1.4.4	G												
376			07 27 26	6	Test Reports	Flame Propagation of Wall Assemblies	1.4.4	G												
377			07 27 26	6	Test Reports	Flame Spread and Smoke Developed Index Ratings	1.4.4	G												
378			07 27 26	6	Test Reports	Site Inspections	3.4.1	G												
379			07 27 26	7	Certificates	Fluid-Applied Membrane Air Barrier	1.4	G												
380			07 27 26	7	Certificates	Qualifications of Manufacturer	1.9.1	G												
381			07 27 26	7	Certificates	Qualifications of Installer	1.9.2	G												
382			07 27 26	8	Manufacturer's Instructions	Fluid-Applied Membrane Air Barrier	1.4	G												
383			07 27 26	8	Manufacturer's Instructions	Primers, Adhesives, and Mastics	2.2	G												
384			07 42 13	1	Preconstruction Submittals	Qualification of Manufacturer	1.5.3	G												

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385			07 42 13	1	Preconstruction Submittals	Qualification of Installation Contractor	1.5.4	G												
386			07 42 13	1	Preconstruction Submittals	Warranty	1.8	G												
387			07 42 13	2	Shop Drawings	Installation Drawings	1.5.1.1	G												
388			07 42 13	3	Product Data	Recycled Content;	2.1													
389			07 42 13	3	Product Data	Wall Panels	2.2.1													
390			07 42 13	3	Product Data	Closure Materials	1.5.5													
391			07 42 13	3	Product Data	Pressure Sensitive Tape	2.5.4.4													
392			07 42 13	3	Product Data	Sealants and Caulking	2.5.4.1													
393			07 42 13	3	Product Data	Galvanizing Repair Paint	1.5.3.1													
394			07 42 13	3	Product Data	Enamel Repair Paint	1.5.3.1													
395			07 42 13	3	Product Data	Accessories	1.5.5													
396			07 42 13	3	Product Data	Accessories	2.5													
397			07 42 13	4	Samples	Wall Panels	2.2.1	G												
398			07 42 13	4	Samples	Fasteners	1.5.3.1	G												
399			07 42 13	4	Samples	Metal Closure Strips	2.5.3	G												
400			07 42 13	5	Design Data	Wind load design analysis	1.5.1.2	G												
401			07 42 13	6	Test Reports	Leakage Tests	3.7.2	G												
402			07 42 13	6	Test Reports	Wind Load Tests	1.3.2	G												
403			07 42 13	7	Certificates	Coil Stock	1.5.3.1	G												
404			07 42 13	7	Certificates	Fasteners	1.5.3.1	G												
405			07 42 13	7	Certificates	Galvanizing Repair Paint	1.5.3.1	G												
406			07 42 13	7	Certificates	Enamel Repair Paint	1.5.3.1	G												
407			07 42 13	8	Manufacturer's Instructions	Installation	3.3	G												
408			07 42 13	9	Manufacturer's Field Reports	Manufacturer's Field Reports	3.8.1	G												
409			07 42 13	11	Closeout Submittals	Warranty	1.8	G												
410			07 42 13	11	Closeout Submittals	Maintenance Instructions	1.5.6	G												
411			07 42 13	11	Closeout Submittals	20 year 'No Dollar Limit' warranty for labor and material	1.8.1													
412			07 54 19	2	Shop Drawings	Detail Drawings	1.6	G												
413			07 54 19	2	Shop Drawings	Roof Plan	1.6	G												
414			07 54 19	3	Product Data	PVC Roofing Membrane	3.3.2	G												
415			07 54 19	3	Product Data	Energy Star Label for roof membrane	2.1.2	S												
416			07 54 19	3	Product Data	Bonding Adhesive	2.1.4													
417			07 54 19	3	Product Data	Flashing	1.5.5													
418			07 54 19	3	Product Data	Flashing	3.3.2.2													
419			07 54 19	3	Product Data	Membrane Fasteners and Plates	2.1.7													
420			07 54 19	3	Product Data	Roof Insulation	2.1.9													
421			07 54 19	3	Product Data	Information Card	2.1.1													
422			07 54 19	7	Certificates	Qualification of Manufacturer	1.5.1													
423			07 54 19	7	Certificates	Qualifications of Applicator	1.5.2													
424			07 54 19	7	Certificates	Qualification of Engineer of Record	1.5.4													
425			07 54 19	7	Certificates	Minimum Polymer Thickness	2.1.1													
426			07 54 19	7	Certificates	Minimum Polymer Thickness	2.1.6													

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427			07 54 19	7	Certificates	Sample	1.1	G												
428			07 54 19	8	Manufacturer's Instructions	Application Method	3.3	G												
429			07 54 19	8	Manufacturer's Instructions	Membrane Flashing	2.1.6	G												
430			07 54 19	8	Manufacturer's Instructions	Membrane Flashing	3.4.2	G												
431			07 54 19	8	Manufacturer's Instructions	Auxiliary Fasteners	2.1.7.2													
432			07 54 19	8	Manufacturer's Instructions	Cold Weather	1.8	G												
433			07 54 19	11	Closeout Submittals	Warranty	1.1	G												
434			07 54 19	11	Closeout Submittals	Information Card	2.1.1	G												
435			07 54 19	11	Closeout Submittals	Instructions to Government Personnel	3.1	G												
436			07 60 00	2	Shop Drawings	Exposed Sheet Metal	2.2.1	G												
437			07 60 00	2	Shop Drawings	Gutters	3.1.14	G												
438			07 60 00	2	Shop Drawings	Downspouts	3.1.15	G												
439			07 60 00	2	Shop Drawings	Expansion Joints	3.1.21	G												
440			07 60 00	2	Shop Drawings	Gravel Stops and fascia	2.2.1	G												
441			07 60 00	2	Shop Drawings	Splash Pans	3.1.19	G												
442			07 60 00	2	Shop Drawings	Flashing for Roof Drains	3.1.16	G												
443			07 60 00	2	Shop Drawings	Base Flashing	3.1.8	G												
444			07 60 00	2	Shop Drawings	Counterflashing	3.1.9	G												
445			07 60 00	2	Shop Drawings	Flashing at Roof Penetrations and Equipment Supports	3.1.22	G												
446			07 60 00	2	Shop Drawings	Reglets	2.2.8	G												
447			07 60 00	2	Shop Drawings	Scuppers	3.1.17	G												
448			07 60 00	2	Shop Drawings	Copings	3.1.25	G												
449			07 60 00	2	Shop Drawings	Drip Edges	3.1.13	G												
450			07 60 00	2	Shop Drawings	Conductor Heads	3.1.18	G												
451			07 60 00	2	Shop Drawings	Recycled Content	2.1	S												
452			07 60 00	4	Samples	Finish Samples	1.4.2	G												
453			07 60 00	8	Manufacturer's Instructions	Instructions for Installation	1.4.3	G												
454			07 60 00	8	Manufacturer's Instructions	Quality Control Plan	3.5	G												
455			07 60 00	10	Operation and Maintenance Data	Cleaning and Maintenance	1.4.3	G												
456			07 84 00	2	Shop Drawings	Firestopping System	2.1	G												
457			07 84 00	3	Product Data	Firestopping Materials	2.2	G												
458			07 84 00	7	Certificates	Firestopping Materials	2.2													
459			07 84 00	7	Certificates	Installer Qualifications	1.5.1	G												
460			07 92 00	3	Product Data	Sealants	2.1	G												
461			07 92 00	3	Product Data	Primers	2.2	G												
462			07 92 00	3	Product Data	Bond Breakers	2.3	G												
463			07 92 00	3	Product Data	Backstops	2.4	G												
464			07 92 00	3	Product Data	Field Adhesion	3.1	G												
465			07 92 00	7	Certificates	Indoor Air Quality For Interior Sealants	2.1.1	S												
466			07 92 00	7	Certificates	Indoor Air Quality For Interior Floor Joint Sealants	2.1.3	S												

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467			07 92 00	7	Certificates	Indoor Air Quality For Interior Acoustical Sealants	2.1.4	S												
468			07 92 00	7	Certificates	Indoor Air Quality For Interior Caulking	2.5	S												
469			08 11 13	2	Shop Drawings	Doors	2.1	G												
470			08 11 13	2	Shop Drawings	Doors	2.1	G												
471			08 11 13	2	Shop Drawings	Recycled Content for Steel Door Product	2.1	S												
472			08 11 13	2	Shop Drawings	Frames	2.5	G												
473			08 11 13	2	Shop Drawings	Frames	2.5	G												
474			08 11 13	2	Shop Drawings	Recycled Content for Steel Frame Product	2.5	S												
475			08 11 13	2	Shop Drawings	Accessories	2.3													
476			08 11 13	2	Shop Drawings	Weatherstripping	2.7													
477			08 11 13	3	Product Data	Doors	2.1	G												
478			08 11 13	3	Product Data	Frames	2.5	G												
479			08 11 13	3	Product Data	Accessories	2.3													
480			08 31 00	2	Shop Drawings	Access Doors And Panels	1.3	G												
481			08 31 00	3	Product Data	Access Doors And Panels	1.3	G												
482			08 31 00	3	Product Data	Hardware	1.3.2	G												
483			08 31 00	3	Product Data	Accessories	2.2.6	G												
484			08 31 00	3	Product Data	Recycled Content	2.1	S												
485			08 31 00	4	Samples	Finishes	2.5	G												
486			08 34 16.20	1	Preconstruction Submittals	Manufacturer's Qualifications	1.4.1	G												
487			08 34 16.20	1	Preconstruction Submittals	Installer's Qualifications	1.4.2	G												
488			08 34 16.20	2	Shop Drawings	Door Design	1.3.1	G												
489			08 34 16.20	3	Product Data	Electric Operator	2.3													
490			08 34 16.20	3	Product Data	Doors	2.2	G												
491			08 34 16.20	3	Product Data	Controls	2.3.2	G												
492			08 34 16.20	3	Product Data	Door Fabric	2.1.7	G												
493			08 34 16.20	5	Design Data	Calculations	1.3.2.1	G												
494			08 34 16.20	5	Design Data	Load Diagrams	1.3.4	G												
495			08 34 16.20	6	Test Reports	Door Fabric	2.1.7	G												
496			08 34 16.20	6	Test Reports	Door Fabric	2.1.7	G												
497			08 34 16.20	7	Certificates	Manufacturer's Qualifications	1.4.1	G												
498			08 34 16.20	7	Certificates	Installers Qualifications	1.4.2	G												
499			08 34 16.20	7	Certificates	Welding Procedures and Qualifications	1.5	G												
500			08 34 16.20	9	Manufacturer's Field Reports	Acceptance Testing Procedure	3.3	G												
501			08 34 16.20	10	Operation and Maintenance Data	Door Operation	2.9.1	G												
502			08 34 16.20	10	Operation and Maintenance Data	Emergency and Routine Preventative Maintenance Plan	1.4.3.1	G												
503			08 34 16.20	11	Closeout Submittals	Acceptance Testing Procedure	3.3	G												
504			08 34 16.20	11	Closeout Submittals	Warranty	1.4.3	G												
505			08 36 13	2	Shop Drawings	Doors	2.2	G												

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506			08 36 13	3	Product Data	Doors	2.2	G												
507			08 36 13	3	Product Data	Electric Operators	2.6	G												
508			08 36 13	8	Manufacturer's Instructions	Doors	2.2													
509			08 36 13	10	Operation and Maintenance Data	Doors	2.2	G												
510			08 51 13	2	Shop Drawings	Windows	2.1	G												
511			08 51 13	2	Shop Drawings	Fabrication Drawings	1.7													
512			08 51 13	3	Product Data	Windows	2.1	G												
513			08 51 13	3	Product Data	Hardware	2.2.7.1	G												
514			08 51 13	3	Product Data	Fasteners	2.2.2	G												
515			08 51 13	3	Product Data	Window Performance	1.8	G												
516			08 51 13	3	Product Data	Mullions	2.4	G												
517			08 51 13	3	Product Data	Weatherstripping	2.1.4	G												
518			08 51 13	3	Product Data	Accessories	2.2.7	G												
519			08 51 13	3	Product Data	Adhesives	2.2.3													
520			08 51 13	3	Product Data	Thermal Performance	1.8.5	G												
521			08 51 13	4	Samples	Finish Sample	1.3.4.1													
522			08 51 13	5	Design Data	Structural Calculations for Deflection	2.1	G												
523			08 51 13	5	Design Data	Design Analysis	1.3.5	G												
524			08 51 13	6	Test Reports	Minimum Condensation Resistance Factor	1.3.6													
525			08 51 13	7	Certificates	Engineer's Qualifications	1.3.3													
526			08 51 13	10	Operation and Maintenance Data	Windows	2.1	G												
527			08 51 13	10	Operation and Maintenance Data	Plastic Identification	1.5													
528			08 71 00	2	Shop Drawings	Manufacturer's Detail Drawings	1.3	G												
529			08 71 00	2	Shop Drawings	Verification of Existing Conditions	1.3	G												
530			08 71 00	2	Shop Drawings	Hardware Schedule	1.5	G												
531			08 71 00	2	Shop Drawings	Keying System	2.3.6	G												
532			08 71 00	3	Product Data	Hardware Items	2.3	G												
533			08 71 00	8	Manufacturer's Instructions	Installation	3.1													
534			08 71 00	10	Operation and Maintenance Data	Hardware Schedule	1.5	G												
535			08 81 00	3	Product Data	Insulating Glass	2.2													
536			08 81 00	3	Product Data	Glazing Accessories	1.3													
537			08 81 00	3	Product Data	Sealants	2.3.3.1													
538			08 81 00	4	Samples	Insulating Glass	2.2													
539			08 81 00	4	Samples	Glazing Compound	2.3.2													
540			08 81 00	4	Samples	Sealing Tapes	2.3.5													
541			08 81 00	7	Certificates	Insulating Glass	2.2													
542			08 81 00	8	Manufacturer's Instructions	Setting and Sealing Materials	2.3													
543			08 81 00	8	Manufacturer's Instructions	Glass Setting	3.2													
544			08 81 00	11	Closeout Submittals	Insulated Glass Units	1.7.1													
545			08 91 00	2	Shop Drawings	Wall louvers	1.4													

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546			08 91 00	2	Shop Drawings	Wall louvers	1.5													
547			08 91 00	3	Product Data	Metal Wall Louvers	2.2													
548			08 91 00	4	Samples	Wall louvers	1.4	G												
549			08 91 00	4	Samples	Wall louvers	1.5	G												
550			08 91 00	4	Samples	Door louvers	1.5	G												
551			09 29 00	3	Product Data	Cementitious Backer Units	2.1.4													
552			09 29 00	3	Product Data	Glass Mat Water-Resistant Gypsum Tile Backing Board	2.1.3													
553			09 29 00	3	Product Data	Water-Resistant Gypsum Backing Board	2.1.2													
554			09 29 00	3	Product Data	Accessories	2.1.8													
555			09 29 00	3	Product Data	Gypsum Board	2.1.1													
556			09 29 00	3	Product Data	VOC Content of Joint Compound	2.1.5	S												
557			09 29 00	7	Certificates	Asbestos Free Materials	2.1	G												
558			09 29 00	7	Certificates	Indoor Air Quality for Gypsum Board	2.1.1	S												
559			09 29 00	7	Certificates	Indoor Air Quality for Non-aerosol Adhesives	2.1.7	S												
560			09 29 00	7	Certificates	Indoor Air Quality for Aerosol Adhesives	2.1.7	S												
561			09 30 10	2	Shop Drawings	Detail Drawings	3.2	G												
562			09 30 10	3	Product Data	Porcelain Tile	2.1.1	G												
563			09 30 10	3	Product Data	Glazed Wall Tile	2.1.2	G												
564			09 30 10	3	Product Data	Mortar, Grout, and Adhesive	2.2	G												
565			09 30 10	4	Samples	Tile	2.1	G												
566			09 30 10	4	Samples	Accessories	2.1	G												
567			09 30 10	4	Samples	Transition Strips	2.1	G												
568			09 30 10	4	Samples	Transition Strips	2.3	G												
569			09 30 10	4	Samples	Grout	2.2.3	G												
570			09 30 10	7	Certificates	Indoor Air Quality for Adhesives	2.2													
571			09 30 10	7	Certificates	Indoor Air Quality for Sealants	2.2.4													
572			09 30 10	8	Manufacturer's Instructions	Maintenance Instructions	3.7													
573			09 30 10	10	Operation and Maintenance Data	Installation	3.2	G												
574			09 51 00	2	Shop Drawings	Approved Detail Drawings	2.1	G												
575			09 51 00	3	Product Data	Recycled Content for Type III Ceiling Tiles	2.2.1.1	S												
576			09 51 00	4	Samples	Acoustical Units	2.2	G												
577			09 51 00	4	Samples	Acoustical Ceiling Tiles	2.2.1.1	G												
578			09 51 00	6	Test Reports	Ceiling Attenuation Class and Test	2.1.1	G												
579			09 51 00	7	Certificates	Indoor Air Quality for Type III Ceiling Tiles	2.2.1.1	S												
580			09 65 00	2	Shop Drawings	Resilient Flooring and Accessories	2.6	G												
581			09 65 00	3	Product Data	Resilient Flooring and Accessories	2.6	G												
582			09 65 00	3	Product Data	Adhesives	2.2													
583			09 65 00	4	Samples	Resilient Flooring and Accessories	2.6	G												
584			09 65 00	6	Test Reports	Moisture, Alkalinity and Bond Tests	3.3	G												

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585			09 65 00	7	Certificates	Indoor Air Quality for Adhesives	2.2	S												
586			09 65 00	8	Manufacturer's Instructions	Surface Preparation	3.2	G												
587			09 65 00	8	Manufacturer's Instructions	Installation	3.1	G												
588			09 65 00	10	Operation and Maintenance Data	Resilient Flooring and Accessories	2.6	G												
589			09 67 23.13	2	Shop Drawings	Installation Drawings	2.1	G												
590			09 67 23.13	3	Product Data	Manufacturer's Catalog Data for each system	1.3.2													
591			09 67 23.13	4	Samples	Mockups	1.6.1	G												
592			09 67 23.13	4	Samples	Hangar-Grade Resinous Floor	2.2													
593			09 67 23.13	4	Samples	Ergonomic Resinous Floor	2.3													
594			09 67 23.13	4	Samples	Heavy Duty Resinous Floor	2.4													
595			09 67 23.13	4	Samples	Electro-Static Dissipative Resinous Floor	2.5													
596			09 67 23.13	4	Samples	Electro-Static Dissipative Hangar-Grade Resinous Floor	2.6													
597			09 67 23.13	5	Design Data	Design Mix Data for each system	1.3.3													
598			09 67 23.13	7	Certificates	Listing of Product Installations	1.6.2													
599			09 67 23.13	7	Certificates	Referenced Standards Certificates	1.6													
600			09 67 23.13	11	Closeout Submittals	Warranty	1.8	G												
601			09 90 00	3	Product Data	Coating	2.1	G												
602			09 90 00	4	Samples	Color	1.9	G												
603			09 90 00	4	Samples	Textured Wall Coating System	1.4.2	G												
604			09 90 00	7	Certificates	Qualification Testing	1.4.1.2													
605			09 90 00	7	Certificates	Indoor Air Quality for Paints and Primers	2.1													
606			09 90 00	7	Certificates	Indoor Air Quality for Consolidated Latex Paints	2.1													
607			09 90 00	8	Manufacturer's Instructions	Application Instructions	3.2.1													
608			09 90 00	8	Manufacturer's Instructions	Mixing	3.6.2													
609			09 90 00	8	Manufacturer's Instructions	Manufacturer's Safety Data Sheets	1.7.2													
610			09 90 00	10	Operation and Maintenance Data	Coatings	2.1	G												
611			10 14 00.20	2	Shop Drawings	Detail Drawings	1.3.2	G												
612			10 14 00.20	3	Product Data	Installation	3.1	G												
613			10 14 00.20	3	Product Data	Warranty	1.5	G												
614			10 14 00.20	4	Samples	Interior Signage	1.3.1	G												
615			10 14 00.20	10	Operation and Maintenance Data	Approved Manufacturer's Instructions	3.1	G												
616			10 14 00.20	10	Operation and Maintenance Data	Protection and Cleaning	3.1.2	G												
617			10 21 13	2	Shop Drawings	Fabrication Drawings	2.1													
618			10 21 13	2	Shop Drawings	Installation Drawings	3.2	G												
619			10 21 13	3	Product Data	Cleaning and Maintenance Instructions	2.1													
620			10 21 13	3	Product Data	Colors And Finishes	2.7													
621			10 21 13	3	Product Data	Anchoring Devices and Fasteners	2.2.2													

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622			10 21 13	3	Product Data	Hardware and Fittings	2.2.4													
623			10 21 13	3	Product Data	Brackets	2.2.3													
624			10 21 13	3	Product Data	Door Hardware	2.2.5													
625			10 21 13	3	Product Data	Pilaster Shoes	2.5													
626			10 21 13	3	Product Data	Finishes	2.2.4.2	G												
627			10 21 13	3	Product Data	Recycled content for plastic, solidHDPE partitions and screens	2.3	S												
628			10 21 13	4	Samples	Colors and Finishes	2.7	G												
629			10 21 13	4	Samples	Hardware and Fittings	2.2.4													
630			10 21 13	4	Samples	Anchoring Devices and Fasteners	2.2.2													
631			10 21 13	7	Certificates	Warranty	1.5													
632			10 26 40	1	Preconstruction Submittals	Manufacturer's Qualifications	1.6.1	G												
633			10 26 40	1	Preconstruction Submittals	Installer's Qualifications	1.6.2	G												
634			10 26 40	3	Product Data	Product Data	1.6.3	G												
635			10 26 40	5	Design Data	DELEGATED-DESIGN SUBMITTAL	1.7	G												
636			10 26 40	10	Operation and Maintenance Data	Operation and Maintenance Data	1.6.4													
637			10 26 40	11	Closeout Submittals	As-Built Drawings	1.6.5													
638			10 28 13	3	Product Data	Finishes	2.1.2	G												
639			10 28 13	3	Product Data	Accessory Items	2.2	G												
640			10 28 13	3	Product Data	Recycled content for stainless steel toilet accessories	2.1	S												
641			10 28 13	4	Samples	Finishes	2.1.2	G												
642			10 28 13	4	Samples	Accessory Items	2.2													
643			10 28 13	7	Certificates	Accessory Items	2.2													
644			10 51 13	2	Shop Drawings	Types	2.1	G												
645			10 51 13	2	Shop Drawings	Location	1.4	G												
646			10 51 13	2	Shop Drawings	Installation	3.1													
647			10 51 13	2	Shop Drawings	Numbering system	3.2													
648			10 51 13	3	Product Data	Material	2.2													
649			10 51 13	3	Product Data	Locking Devices	2.3.1													
650			10 51 13	3	Product Data	Handles	2.3.3													
651			10 51 13	3	Product Data	components	2.3													
652			10 51 13	3	Product Data	Assembly	3.1													
653			10 51 13	4	Samples	Color	2.2.2	G												
654			12 21 00	2	Shop Drawings	Installation	3.2													
655			12 21 00	3	Product Data	Window Blinds	2.1	G												
656			12 21 00	4	Samples	Window Blinds	2.1	G												
657			12 21 00	10	Operation and Maintenance Data	Window Blinds	2.1	G												
658			12 48 13	3	Product Data	Adhesives and Concrete Primers	2.1.2	G												
659			12 48 13	4	Samples	Manufacturer's Instructions	3.2													
660			12 48 13	10	Operation and Maintenance Data	Operation And Maintenance Data	1.3													
661			21 13 13	1	Preconstruction Submittals	Qualified Fire Protection Engineer (QFPE)	1.2.3	G												

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662			21 13 13	1	Preconstruction Submittals	Sprinkler System Designer	1.4.2.1	G												
663			21 13 13	1	Preconstruction Submittals	Sprinkler System Installer	1.4.2.2	G												
664			21 13 13	2	Shop Drawings	Shop Drawing	1.4.1.1	G												
665			21 13 13	3	Product Data	Pipe	2.2.1	G												
666			21 13 13	3	Product Data	Fittings	2.3.1.2	G												
667			21 13 13	3	Product Data	Valves	2.3.4	G												
668			21 13 13	3	Product Data	Riser Check Valves	2.3.5	G												
669			21 13 13	3	Product Data	Relief Valves	2.7.5	G												
670			21 13 13	3	Product Data	Sprinklers	2.6	G												
671			21 13 13	3	Product Data	Pipe Hangers and Supports	2.3.3	G												
672			21 13 13	3	Product Data	Sprinkler Alarm Switch	2.4.1	G												
673			21 13 13	3	Product Data	Valve Supervisory (Tamper) Switch	2.4.2	G												
674			21 13 13	3	Product Data	Fire Department Connection	2.5	G												
675			21 13 13	3	Product Data	Air Vent	2.7.6	G												
676			21 13 13	3	Product Data	Nameplates	2.1.2	G												
677			21 13 13	5	Design Data	Hydraulic Calculations	1.2.1.2	G												
678			21 13 13	6	Test Reports	Test Procedures	3.7.1	G												
679			21 13 13	7	Certificates	Verification of Compliant Installation	3.7.2.1	G												
680			21 13 13	7	Certificates	Request for Government Final Test	3.7.2.2	G												
681			21 13 13	10	Operation and Maintenance Data	Operating and Maintenance (O&M) Instructions	3.9	G												
682			21 13 13	10	Operation and Maintenance Data	Spare Parts	1.6	G												
683			21 13 13	11	Closeout Submittals	As-built drawings	3.9													
684			21 30 00	1	Preconstruction Submittals	Fire Pump Installation Related Submittals	1.3													
685			21 30 00	2	Shop Drawings	Installation Drawings	3.3.1	G												
686			21 30 00	2	Shop Drawings	As-Built Drawings	3.11.2	G												
687			21 30 00	2	Shop Drawings	Pump Room	3.3.2	G												
688			21 30 00	3	Product Data	Catalog Data	2.1	G												
689			21 30 00	3	Product Data	Spare Parts	1.6													
690			21 30 00	3	Product Data	Preliminary Tests	3.9.2													
691			21 30 00	3	Product Data	Field Tests	3.9	G												
692			21 30 00	3	Product Data	Manufacturer's Representative	1.7.6	G												
693			21 30 00	3	Product Data	Field Training	3.11.1	G												
694			21 30 00	3	Product Data	Final Acceptance Test	3.9.3													
695			21 30 00	5	Design Data	Surge Arrestor Calculations	2.14	G												
696			21 30 00	6	Test Reports	Preliminary Tests	3.9.2													
697			21 30 00	6	Test Reports	Final Acceptance Test	3.9.3													
698			21 30 00	7	Certificates	Fire Protection Specialist	1.7.1													
699			21 30 00	7	Certificates	Qualifications of Welders	1.7.2													
700			21 30 00	7	Certificates	Qualifications of Installer	1.7.3													
701			21 30 00	7	Certificates	Preliminary Test Certification	1.7.4													
702			21 30 00	7	Certificates	Final Test Certification	1.7.5													

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703			21 30 00	10	Operation and Maintenance Data	Operating and Maintenance Instructions	3.11.1	G												
704			21 30 00	10	Operation and Maintenance Data	Flow Meter	2.13													
705			22 00 00	3	Product Data	Fixtures	2.4													
706			22 00 00	3	Product Data	Flush Valve Water Closets	2.4.2													
707			22 00 00	3	Product Data	WaterSense Label for Flush Valve Water Closet	2.4.2	S												
708			22 00 00	3	Product Data	Flush Valve Urinals	2.4.3													
709			22 00 00	3	Product Data	WaterSense Label for Urinal	2.4.3	S												
710			22 00 00	3	Product Data	Countertop Lavatories	2.4.4													
711			22 00 00	3	Product Data	Kitchen Sinks	2.4.5													
712			22 00 00	3	Product Data	Drinking-Water Coolers	2.4.6	G												
713			22 00 00	3	Product Data	Energy Star Label for Electric Water Cooler	2.4.6	S												
714			22 00 00	3	Product Data	Energy Star Label for Wheelchair Electric Water Cooler	2.4.7	S												
715			22 00 00	3	Product Data	Shower Pan	2.7													
716			22 00 00	3	Product Data	WaterSense Label for Showerhead	2.6.2	S												
717			22 00 00	3	Product Data	Water Heaters	2.9	G												
718			22 00 00	3	Product Data	Energy Star Label for Gas Instantaneous Water Heater	2.9.1	S												
719			22 00 00	3	Product Data	Pumps	2.1	G												
720			22 00 00	3	Product Data	Backflow Prevention Assemblies	3.9.1.1	G												
721			22 00 00	3	Product Data	Air Dryer	2.12.1	G												
722			22 00 00	3	Product Data	Shower Faucets	2.6.2	G												
723			22 00 00	3	Product Data	Welding	1.5.1													
724			22 00 00	3	Product Data	Vibration-Absorbing Features	3.4	G												
725			22 00 00	3	Product Data	Plumbing System	3.9.1													
726			22 00 00	6	Test Reports	Tests, Flushing and Disinfection	3.9													
727			22 00 00	6	Test Reports	Test of Backflow Prevention Assemblies	3.9.1.1	G												
728			22 00 00	7	Certificates	Materials and Equipment	1.3													
729			22 00 00	7	Certificates	Bolts	2.1.1													
730			22 00 00	10	Operation and Maintenance Data	Plumbing System	3.9.1	G												
731			22 05 48.00 20	3	Product Data	Isolators	2.3													
732			22 05 48.00 20	3	Product Data	Flexible Connectors	2.6													
733			22 05 48.00 20	3	Product Data	Inertia Bases	2.5													
734			22 05 48.00 20	3	Product Data	Machinery Bases	2.4													
735			22 05 48.00 20	3	Product Data	Machinery Foundations and Subbases	3.1.6													
736			22 05 48.00 20	6	Test Reports	Equipment Vibration Tests	3.2.2.1													
737			22 05 48.00 20	8	Manufacturer's Instructions	Vibration and Noise Isolation Components	3.1.1													
738			22 07 19.00 40	2	Shop Drawings	Installation Drawings	3.1	G												
739			22 07 19.00 40	3	Product Data	Adhesives	2.3	G												
740			22 07 19.00 40	3	Product Data	Insulating Cement	2.3	G												

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741			22 07 19.00 40	3	Product Data	Insulation Materials	2.3	G												
742			22 07 19.00 40	3	Product Data	Jacketing	2.3	G												
743			22 07 19.00 40	3	Product Data	Tape	2.3	G												
744			22 07 19.00 40	8	Manufacturer's Instructions	Installation Manual	3.1	G												
745			22 07 19.00 40	11	Closeout Submittals	Record Drawings	3.4													
746			22 07 19.00 40	11	Closeout Submittals	Adhesives	2.3	S												
747			22 07 19.00 40	11	Closeout Submittals	Insulation Materials	2.3	S												
748			22 07 19.00 40	11	Closeout Submittals	Recycled Materials	1.3.1	S												
749			23 05 15	1	Preconstruction Submittals	Material, Equipment, and Fixture Lists	1.2													
750			23 05 15	2	Shop Drawings	Record Drawings	1.2	G												
751			23 05 15	2	Shop Drawings	Connection Diagrams	1.2													
752			23 05 15	2	Shop Drawings	Coordination Drawings	1.2													
753			23 05 15	2	Shop Drawings	Fabrication Drawings	1.2													
754			23 05 15	2	Shop Drawings	Installation Drawings	3.1													
755			23 05 15	3	Product Data	Pipe and Fittings	2.1	G												
756			23 05 15	3	Product Data	Piping Specialties	2.2	G												
757			23 05 15	3	Product Data	Valves	2.3	G												
758			23 05 15	3	Product Data	Miscellaneous Materials	2.4													
759			23 05 15	3	Product Data	Supporting Elements	2.5													
760			23 05 15	3	Product Data	Equipment Foundation Data	1.2													
761			23 05 15	4	Samples	Manufacturer's Standard Color Charts	1.2													
762			23 05 15	5	Design Data	Pipe and Fittings	2.1													
763			23 05 15	5	Design Data	Piping Specialties	2.2													
764			23 05 15	5	Design Data	Valves	2.3													
765			23 05 15	6	Test Reports	Hydrostatic Tests	3.1	G												
766			23 05 15	6	Test Reports	Air Tests	3.1	G												
767			23 05 15	6	Test Reports	Valve-Operating Tests	3.1	G												
768			23 05 15	6	Test Reports	Drainage Tests	3.1	G												
769			23 05 15	6	Test Reports	Pneumatic Tests	3.1													
770			23 05 15	6	Test Reports	Non-Destructive Electric Tests	3.1													
771			23 05 15	6	Test Reports	System Operation Tests	3.1	G												
772			23 05 15	7	Certificates	Record of Satisfactory Field Operation	1.4.2	G												
773			23 05 15	7	Certificates	List of Qualified Permanent Service Organizations	1.4.3													
774			23 05 15	7	Certificates	Listing of Product Installations	1.2													
775			23 05 15	7	Certificates	Records of Existing Conditions	1.2	G												
776			23 05 15	7	Certificates	Surface Resistance	3.1													
777			23 05 15	7	Certificates	Shear and Tensile Strengths	3.1													
778			23 05 15	7	Certificates	Temperature Ratings	3.1													
779			23 05 15	7	Certificates	Bending Tests	3.1													
780			23 05 15	7	Certificates	Flattening Tests	3.1													
781			23 05 15	7	Certificates	Transverse Guided Weld Bend Tests	3.1													

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782			23 05 15	10	Operation and Maintenance Data	Operation and Maintenance Manuals	3.1	G												
783			23 05 48.00 40	2	Shop Drawings	Installation Drawings	1.2													
784			23 05 48.00 40	2	Shop Drawings	Outline Drawings	1.2													
785			23 05 48.00 40	3	Product Data	Equipment and Performance Data	1.2	G												
786			23 05 48.00 40	6	Test Reports	Type of Isolator	2.4	G												
787			23 05 48.00 40	6	Test Reports	Type of Base	2.4	G												
788			23 05 48.00 40	6	Test Reports	Allowable Deflection	2.4	G												
789			23 05 48.00 40	6	Test Reports	Measured Deflection	2.4	G												
790			23 05 48.19	2	Shop Drawings	Coupling and Bracing	3.1													
791			23 05 48.19	2	Shop Drawings	Equipment Restraint	2.1													
792			23 05 48.19	3	Product Data	Coupling and Bracing	3.1													
793			23 05 48.19	3	Product Data	Equipment Restraint	2.1													
794			23 05 48.19	3	Product Data	Anchor Bolts	3.3													
795			23 05 48.19	3	Product Data	Vibration Isolators	2.1.2													
796			23 05 48.19	6	Test Reports	Anchor Bolts	3.3													
797			23 05 93	2	Shop Drawings	TAB Schematic Drawings and Report Forms	1.3.3													
798			23 05 93	3	Product Data	Equipment and Performance Data	1.3	G												
799			23 05 93	6	Test Reports	Completed Pre-Final DALT Report	3.3.5													
800			23 05 93	6	Test Reports	Certified Final DALT Report	3.3.8	G												
801			23 05 93	7	Certificates	Independent TAB Agency and Personnel Qualifications	1.5.1	G												
802			23 07 00	3	Product Data	Pipe Insulation Systems	2.3	G												
803			23 07 00	3	Product Data	Pipe Insulation Systems	3.2	G												
804			23 07 00	3	Product Data	Duct Insulation Systems	3.3	G												
805			23 07 00	3	Product Data	Equipment Insulation Systems	3.4	G												
806			23 07 00	7	Certificates	Indoor air quality for adhesives	2.2.1	S												
807			23 07 00	8	Manufacturer's Instructions	Pipe Insulation Systems	2.3	G												
808			23 07 00	8	Manufacturer's Instructions	Pipe Insulation Systems	3.2	G												
809			23 07 00	8	Manufacturer's Instructions	Duct Insulation Systems	3.3	G												
810			23 07 00	8	Manufacturer's Instructions	Equipment Insulation Systems	3.4	G												
811			23 09 00	2	Shop Drawings	DDC Contractor Design Drawings	3.3	G												
812			23 09 00	2	Shop Drawings	Draft As-Built Drawings	3.3	G												
813			23 09 00	2	Shop Drawings	Final As-Built Drawings	3.3	G												
814			23 09 00	3	Product Data	Programming Software	1.8.3	G												
815			23 09 00	3	Product Data	Controller Application Programs	1.8.4	G												
816			23 09 00	3	Product Data	Configuration Software	1.8.1	G												
817			23 09 00	3	Product Data	Controller Configuration Settings	1.8.2	G												
818			23 09 00	3	Product Data	Manufacturer's Product Data	2.2	G												
819			23 09 00	5	Design Data	Boiler Plant Gateway Request	1.9													
820			23 09 00	6	Test Reports	Existing Conditions Report	3.1.1													
821			23 09 00	6	Test Reports	Start-Up Testing Report	3.5.2	G												
822			23 09 00	6	Test Reports	PVT Procedures	3.6.1	G												

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823			23 09 00	6	Test Reports	PVT Report	3.6.3	G												
824			23 09 00	6	Test Reports	Pre-Construction Quality Control (QC) Checklist	1.10.1	G												
825			23 09 00	6	Test Reports	Post-Construction Quality Control (QC) Checklist	1.10.2	G												
826			23 09 00	10	Operation and Maintenance Data	Operation and Maintenance (O&M) Instructions	3.7	G												
827			23 09 00	10	Operation and Maintenance Data	Training Documentation	3.9.1	G												
828			23 09 00	11	Closeout Submittals	Enclosure Keys	2.5	G												
829			23 09 00	11	Closeout Submittals	Password Summary Report	3.2.6.1	G												
830			23 09 00	11	Closeout Submittals	Closeout Quality Control (QC) Checklist	1.10.3	G												
831			23 11 20	2	Shop Drawings	Gas Piping System	1.5.2	G												
832			23 11 20	2	Shop Drawings	Gas Piping System	2.2	G												
833			23 11 20	2	Shop Drawings	Gas Piping System	3.3	G												
834			23 11 20	3	Product Data	Gas Equipment Connectors	1.5.2													
835			23 11 20	3	Product Data	Gas Piping System	1.5.2													
836			23 11 20	3	Product Data	Gas Piping System	2.2													
837			23 11 20	3	Product Data	Gas Piping System	3.3													
838			23 11 20	3	Product Data	Pipe Coating Materials	2.1													
839			23 11 20	3	Product Data	Pressure Regulators	2.6													
840			23 11 20	3	Product Data	Risers	2.4													
841			23 11 20	3	Product Data	Transition Fittings	2.2.7													
842			23 11 20	3	Product Data	Valves	2.3													
843			23 11 20	3	Product Data	Warning and Identification Tape	2.2.3													
844			23 11 20	6	Test Reports	Testing	3.18													
845			23 11 20	6	Test Reports	Pressure Tests	3.18.1	G												
846			23 11 20	6	Test Reports	Test with Gas	3.18.2	G												
847			23 11 20	7	Certificates	Welders Procedures and Qualifications	1.5.1													
848			23 11 20	7	Certificates	Assigned Number, Letter, or Symbol	1.5.1													
849			23 11 20	8	Manufacturer's Instructions	Pipe Coating Materials	2.1													
850			23 11 20	10	Operation and Maintenance Data	Gas Facility System and Equipment Operation	1.3.1	G												
851			23 11 20	10	Operation and Maintenance Data	Gas Facility System Maintenance	1.3.2	G												
852			23 11 20	10	Operation and Maintenance Data	Gas Facility Equipment Maintenance	1.3.3	G												
853			23 21 23	2	Shop Drawings	System Coordination	2.1.2													
854			23 21 23	3	Product Data	Instructions	2.2.2	G												
855			23 21 23	3	Product Data	Equipment Data	2.2.5	G												
856			23 21 23	3	Product Data	Training Period	3.5.2													
857			23 21 23	6	Test Reports	Factory Tests	2.8													
858			23 21 23	6	Test Reports	Field Quality Control	3.3													
859			23 21 23	7	Certificates	Manufacturer's Representative	1.3.1													
860			23 21 23	10	Operation and Maintenance Data	Operation and Maintenance Manuals	3.5.1	G												

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861			23 21 23	10	Operation and Maintenance Data	Training	3.5.2	G												
862			23 30 00	2	Shop Drawings	Detail Drawings	1.4.4	G												
863			23 30 00	3	Product Data	Insulated Nonmetallic Flexible Duct Runouts	2.8.1.1													
864			23 30 00	3	Product Data	Duct Connectors	2.8.1.1													
865			23 30 00	3	Product Data	Duct Access Doors	2.8.2	G												
866			23 30 00	3	Product Data	Fire Dampers	2.8.3													
867			23 30 00	3	Product Data	Manual Balancing Dampers	2.8.4	G												
868			23 30 00	3	Product Data	Acoustical Duct Liner	2.8.7.1													
869			23 30 00	3	Product Data	Diffusers	2.8.8.1													
870			23 30 00	3	Product Data	Registers and Grilles	2.8.8.2													
871			23 30 00	3	Product Data	Louvers	2.8.9													
872			23 30 00	3	Product Data	Air Vents, Penthouses, and Goosenecks	2.8.10													
873			23 30 00	3	Product Data	Centrifugal Fans	2.9.1.1													
874			23 30 00	3	Product Data	In-Line Centrifugal Fans	2.9.1.2													
875			23 30 00	3	Product Data	Panel Type Power Wall Ventilators	2.9.1.3													
876			23 30 00	3	Product Data	Centrifugal Type Power Wall Ventilators	2.9.1.4													
877			23 30 00	3	Product Data	Centrifugal Type Power Roof Ventilators	2.9.1.5													
878			23 30 00	3	Product Data	Destratification Fans	2.9.1.6													
879			23 30 00	3	Product Data	Rooftop Air Handling Units	2.1	G												
880			23 30 00	3	Product Data	Variable Volume, Single Duct Terminal Units	2.11.1.1	G												
881			23 30 00	3	Product Data	Reheat Units	2.11.1.2	G												
882			23 30 00	3	Product Data	Energy Recovery Devices	2.12	G												
883			23 30 00	3	Product Data	Test Procedures	1.4.5													
884			23 30 00	3	Product Data	Diagrams	1.2.1.2	G												
885			23 30 00	3	Product Data	Indoor Air Quality for Duct Sealants	2.8.1	S												
886			23 30 00	6	Test Reports	Performance Tests	3.12	G												
887			23 30 00	6	Test Reports	Damper Acceptance Test	3.1	G												
888			23 30 00	7	Certificates	Ozone Depleting Substances Technician Certification	1.4.3													
889			23 30 00	8	Manufacturer's Instructions	Manufacturer's Installation Instructions	3.2													
890			23 30 00	8	Manufacturer's Instructions	Operation and Maintenance Training	3.14.2													
891			23 30 00	10	Operation and Maintenance Data	Operation and Maintenance Manuals	3.14.1	G												
892			23 30 00	10	Operation and Maintenance Data	Fire Dampers	2.8.3	G												
893			23 30 00	10	Operation and Maintenance Data	Manual Balancing Dampers	2.8.4	G												
894			23 30 00	10	Operation and Maintenance Data	Centrifugal Fans	2.9.1.1	G												
895			23 30 00	10	Operation and Maintenance Data	In-Line Centrifugal Fans	2.9.1.2	G												

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896			23 30 00	10	Operation and Maintenance Data	Panel Type Power Wall Ventilators	2.9.1.3	G												
897			23 30 00	10	Operation and Maintenance Data	Centrifugal Type Power Wall Ventilators	2.9.1.4	G												
898			23 30 00	10	Operation and Maintenance Data	Centrifugal Type Power Roof Ventilators	2.9.1.5	G												
899			23 30 00	10	Operation and Maintenance Data	Rooftop Air Handling Units	2.1	G												
900			23 30 00	10	Operation and Maintenance Data	Variable Volume, Single Duct Terminal Units	2.11.1.1	G												
901			23 30 00	10	Operation and Maintenance Data	Energy Recovery Devices	2.12	G												
902			23 30 00	11	Closeout Submittals	Indoor Air Quality During Construction	3.13	S												
903			23 52 00	2	Shop Drawings	Detail Drawings	1.5													
904			23 52 00	3	Product Data	Materials and Equipment	2.1.1													
905			23 52 00	3	Product Data	Spare Parts	1.5													
906			23 52 00	3	Product Data	Water Treatment System	2.12													
907			23 52 00	3	Product Data	Boiler Water Treatment	2.12													
908			23 52 00	3	Product Data	Heating System Tests	3.7													
909			23 52 00	3	Product Data	Fuel System Tests	3.1													
910			23 52 00	3	Product Data	Unit Heaters	2.5													
911			23 52 00	3	Product Data	Qualifications	3.7													
912			23 52 00	3	Product Data	Field Instructions	3.9													
913			23 52 00	3	Product Data	Tests	3.3													
914			23 52 00	6	Test Reports	Heating System Tests	3.7													
915			23 52 00	6	Test Reports	Fuel System Tests	3.1													
916			23 52 00	6	Test Reports	Water Treatment Testing	3.7.1													
917			23 52 00	10	Operation and Maintenance Data	Operation and Maintenance Instructions	3.9	G												
918			23 52 00	10	Operation and Maintenance Data	Water Treatment System	2.12	G												
919			23 52 00	11	Closeout Submittals	Indoor Air Quality During Construction	3.8.2	S												
920			23 80 20.00 10	2	Shop Drawings	Detail Drawings	1.3													
921			23 80 20.00 10	2	Shop Drawings	Installation	3.2													
922			23 80 20.00 10	3	Product Data	Spare Parts	1.5													
923			23 80 20.00 10	6	Test Reports	Testing, Adjusting, and Balancing	3.4													
924			23 80 20.00 10	10	Operation and Maintenance Data	Operation and Maintenance Instructions	3.3													
925			23 82 46.00 40	2	Shop Drawings	Fabrication Drawings	1.2													
926			23 82 46.00 40	3	Product Data	Performance Data	2.1	G												
927			23 82 46.00 40	3	Product Data	Electric Unit Heaters	2.1	G												
928			23 82 46.00 40	3	Product Data	Heating Element	2.2.1	G												
929			23 82 46.00 40	3	Product Data	Controls	2.2.2	G												
930			23 82 46.00 40	3	Product Data	Casings	3.1.1	G												
931			23 82 46.00 40	3	Product Data	Propellers and Motors	2.2.3	G												
932			23 82 46.00 40	8	Manufacturer's Instructions	Manufacturer's Instructions	1.2													

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933			25 05 11	1	Preconstruction Submittals	Wireless Communication Request	3.1.5.3	G												
934			25 05 11	1	Preconstruction Submittals	Multiple IP Connection Device Request	3.8	G												
935			25 05 11	1	Preconstruction Submittals	Contractor Computer Cybersecurity Compliance Statements	1.9.1.4	G												
936			25 05 11	1	Preconstruction Submittals	Contractor Temporary Network Cybersecurity Compliance Statements	1.9.6	G												
937			25 05 11	2	Shop Drawings	User Interface Banner Schedule	3.1.3.1	G												
938			25 05 11	2	Shop Drawings	Network Communication Report	1.7.2	G												
939			25 05 11	2	Shop Drawings	Cybersecurity Riser Diagram	1.7.5	G												
940			25 05 11	2	Shop Drawings	Control System Inventory Report	1.7.3	G												
941			25 05 11	2	Shop Drawings	Cybersecurity Interconnection Schedule	1.7.1	G												
942			25 05 11	3	Product Data	Control System Cybersecurity Documentation	1.7.6	G												
943			25 05 11	6	Test Reports	Wireless Communication Test Report	3.1.5.4	G												
944			25 05 11	7	Certificates	Software Licenses	1.8	G												
945			25 05 11	11	Closeout Submittals	Password Summary Report	3.5.2.2.5	G												
946			25 05 11	11	Closeout Submittals	Software Recovery And Reconstitution Images	1.7.4	G												
947			25 05 11	11	Closeout Submittals	Device Audit Record Upload Software	3.2.2.1	G												
948			25 08 10	1	Preconstruction Submittals	Factory Test	3.4	G												
949			25 08 10	6	Test Reports	UMCS and Building Level DDC Testing Sequence	3.1													
950			25 08 10	6	Test Reports	Performance Verification Test	3.6	G												
951			25 08 10	6	Test Reports	Endurance Testing	3.7													
952			25 10 10	2	Shop Drawings	UMCS Contractor Design Drawings	3.2.2													
953			25 10 10	2	Shop Drawings	Draft As-Built Drawings	3.2.3													
954			25 10 10	2	Shop Drawings	Final As-Built Drawings	3.2.3													
955			25 10 10	3	Product Data	Product Data Sheets	2.1.5													
956			25 10 10	3	Product Data	Computer Software	2.4													
957			25 10 10	3	Product Data	Enclosure Keys	2.5.1													
958			25 10 10	5	Design Data	UMCS IP Network Bandwidth Usage Estimate	3.2.1													
959			25 10 10	6	Test Reports	Pre-Construction QC Checklist	1.6													
960			25 10 10	6	Test Reports	Post-Construction QC Checklist	1.6													
961			25 10 10	6	Test Reports	Existing Conditions Report	3.1													
962			25 10 10	6	Test Reports	Start-Up and Start-Up Testing Report	3.6	G												
963			25 10 10	6	Test Reports	PVT Phase I Procedures	3.7.1													
964			25 10 10	6	Test Reports	PVT Phase I Report	3.7.2	G												
965			25 10 10	6	Test Reports	PVT Phase II Report	3.7.3	G												
966			25 10 10	10	Operation and Maintenance Data	Operation and Maintenance (O&M) Instructions	1.7													
967			25 10 10	10	Operation and Maintenance Data	Preventive Maintenance Work Plan	3.8.6.1													

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968			25 10 10	10	Operation and Maintenance Data	Basic Training Documentation	3.9.1													
969			25 10 10	10	Operation and Maintenance Data	Advanced Training Documentation	3.9.1													
970			25 10 10	10	Operation and Maintenance Data	Refresher Training Documentation	3.9.1													
971			25 10 10	11	Closeout Submittals	Closeout QC Checklist	1.6													
972			26 05 00.00 40	2	Shop Drawings	Marking Strips	3.2.10.1	G												
973			26 05 00.00 40	3	Product Data	Conduits and Raceways	2.1.1	G												
974			26 05 00.00 40	3	Product Data	Wire and Cable	2.2.1	G												
975			26 05 00.00 40	3	Product Data	Splices and Connectors	3.2.9	G												
976			26 05 00.00 40	3	Product Data	Switches	2.2.3	G												
977			26 05 00.00 40	3	Product Data	Receptacles	2.2.5	G												
978			26 05 00.00 40	3	Product Data	Outlet Boxes, Pull Boxes and Junction Boxes	2.1.4	G												
979			26 05 00.00 40	3	Product Data	Circuit Breakers	2.1.5.1	G												
980			26 05 00.00 40	3	Product Data	Panelboards	2.1.5	G												
981			26 05 00.00 40	3	Product Data	Dry-Type Distribution Transformers	2.1.6	G												
982			26 05 00.00 40	3	Product Data	Device Plates	2.2.2	G												
983			26 05 00.00 40	6	Test Reports	Continuity Test	3.6	G												
984			26 05 00.00 40	6	Test Reports	Phase-Rotation Tests	3.6	G												
985			26 05 00.00 40	6	Test Reports	Insulation Resistance Test	3.6	G												
986			26 05 00.00 40	6	Test Reports	600-Volt Wiring Test	3.6	G												
987			26 05 00.00 40	6	Test Reports	Transformer Tests	3.6	G												
988			26 05 00.00 40	6	Test Reports	Ground-Fault Receptacle Test	3.6	G												
989			26 05 00.00 40	6	Test Reports	Insulation-Resistance Test	3.6	G												
990			26 05 00.00 40	8	Manufacturer's Instructions	Manufacturer's Instructions	3.1													
991			26 05 13.00 40	1	Preconstruction Submittals	List of Splices and Terminations to be Installed by Splicer/Terminator	1.3.1	G												
992			26 05 13.00 40	2	Shop Drawings	Pulling Plan	3.2.1	G												
993			26 05 13.00 40	3	Product Data	Single-Conductor Shielded Cables	2.2.1	G												
994			26 05 13.00 40	3	Product Data	Single-Conductor Nonshielded Cables	2.2.2	G												
995			26 05 13.00 40	3	Product Data	Cable Supports and Fittings	2.2.4	G												
996			26 05 13.00 40	3	Product Data	Polyethylene Cable Tags	2.2.5	G												
997			26 05 13.00 40	3	Product Data	Polyethylene Cable Tags	2.2.5	G												
998			26 05 13.00 40	3	Product Data	Fireproof Tape	2.2.6	G												
999			26 05 13.00 40	3	Product Data	Terminations	2.2.3	G												
1000			26 05 13.00 40	6	Test Reports	Field Testing	3.3	G												
1001			26 05 13.00 40	6	Test Reports	Qualification Test Reports	2.4.1	G												
1002			26 05 13.00 40	6	Test Reports	Radiographic Tests	3.3	G												
1003			26 05 13.00 40	7	Certificates	Splicer/Terminator Certifications	1.5.2	G												
1004			26 05 13.00 40	8	Manufacturer's Instructions	Medium-Voltage Power Cables	3.4	G												
1005			26 05 13.00 40	8	Manufacturer's Instructions	Terminations	2.2.3	G												
1006			26 05 26.00 40	3	Product Data	Ground Rods	2.1.1	G												
1007			26 05 26.00 40	3	Product Data	Ground Wires	2.1.2	G												

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1008			26 05 26.00 40	3	Product Data	Connectors and Fasteners	2.1.3	G												
1009			26 05 26.00 40	3	Product Data	Test Wells	2.1.4	G												
1010			26 05 26.00 40	3	Product Data	Conductive Corrosion Inhibiting Compounds	2.1.5	G												
1011			26 05 26.00 40	3	Product Data	Ground Buses	2.1.6	G												
1012			26 05 26.00 40	6	Test Reports	Bond Resistance Test	3.2.1	G												
1013			26 05 26.00 40	6	Test Reports	Ground Resistance Tests	3.2.2	G												
1014			26 05 26.00 40	6	Test Reports	Ground Isolation Test	3.2.3	G												
1015			26 05 26.00 40	6	Test Reports	Equipment Continuity Test	3.2.4	G												
1016			26 05 26.00 40	7	Certificates	Ground Resistance Test Equipment	1.3.3	G												
1017			26 05 26.00 40	7	Certificates	Micro-Ohmmeter Test Equipment	1.3.4	G												
1018			26 05 26.00 40	11	Closeout Submittals	Record Drawings	3.3													
1019			26 08 00	6	Test Reports	Acceptance tests and inspections	3.1	G												
1020			26 08 00	7	Certificates	Qualifications	1.4.1	G												
1021			26 08 00	7	Certificates	Acceptance test and inspections procedure	1.4.3	G												
1022			26 09 23.00 40	2	Shop Drawings	Lighting System Drawings	2.1	G												
1023			26 09 23.00 40	3	Product Data	Installation Instructions	3.1	G												
1024			26 09 23.00 40	3	Product Data	Light Level Sensor	2.2.2	G												
1025			26 09 23.00 40	3	Product Data	Lighting Contactor	2.2.3	G												
1026			26 09 23.00 40	3	Product Data	Photocell Switch	2.2.4	G												
1027			26 09 23.00 40	6	Test Reports	System Operation Tests	3.3													
1028			26 09 23.00 40	10	Operation and Maintenance Data	Lighting Control System, Data Package 5	3.4													
1029			26 12 19.00 40	2	Shop Drawings	Pad-Mounted Transformer Drawings	1.4.1	G												
1030			26 12 19.00 40	3	Product Data	Pad-Mounted Transformers	2.1.1													
1031			26 12 19.00 40	6	Test Reports	Acceptance Checks And Tests	3.3.1													
1032			26 12 19.00 40	9	Manufacturer's Field Reports	Design Tests	2.3.2													
1033			26 12 19.00 40	9	Manufacturer's Field Reports	Routine and Other Tests	2.3.3													
1034			26 12 19.00 40	10	Operation and Maintenance Data	Transformer(s)	1.5.1													
1035			26 12 19.00 40	11	Closeout Submittals	Transformer Test Schedule	2.3.1													
1036			26 12 19.00 40	11	Closeout Submittals	Warranty	1.6													
1037			26 20 00	2	Shop Drawings	Panelboards	2.14	G												
1038			26 20 00	2	Shop Drawings	Transformers	2.17	G												
1039			26 20 00	2	Shop Drawings	Cable Trays	2.4	G												
1040			26 20 00	2	Shop Drawings	Wireways	2.29	G												
1041			26 20 00	2	Shop Drawings	Marking Strips	3.1.11.1	G												
1042			26 20 00	3	Product Data	Receptacles	2.13	G												
1043			26 20 00	3	Product Data	Circuit Breakers	2.14.3	G												
1044			26 20 00	3	Product Data	Switches	2.11	G												
1045			26 20 00	3	Product Data	Transformers	2.17	G												
1046			26 20 00	3	Product Data	Enclosed Circuit Breakers	2.15	G												
1047			26 20 00	3	Product Data	Motor Controllers	2.19	G												

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1048			26 20 00	3	Product Data	Manual Motor Starters	2.2	G												
1049			26 20 00	3	Product Data	Grounding Busbar	2.23.3	G												
1050			26 20 00	3	Product Data	Surge Protective Devices	2.3	G												
1051			26 20 00	6	Test Reports	600-volt Wiring Test	3.5.2	G												
1052			26 20 00	6	Test Reports	Grounding System Test	3.5.5	G												
1053			26 20 00	6	Test Reports	Transformer Tests	3.5.3	G												
1054			26 20 00	6	Test Reports	Ground-fault Receptacle Test	3.5.4	G												
1055			26 20 00	7	Certificates	Fuses	2.12	G												
1056			26 20 00	9	Manufacturer's Field Reports	Transformer Factory Tests	2.32.1													
1057			26 24 13	2	Shop Drawings	Switchboard Drawings	1.5.2	G												
1058			26 24 13	3	Product Data	Switchboard	2.2	G												
1059			26 24 13	6	Test Reports	Switchboard Design Tests	2.5.2	G												
1060			26 24 13	6	Test Reports	Switchboard Production Tests	2.5.3	G												
1061			26 24 13	6	Test Reports	Acceptance Checks and Tests	3.5.1	G												
1062			26 24 13	10	Operation and Maintenance Data	Switchboard Operation and Maintenance	1.6.1	G												
1063			26 24 13	11	Closeout Submittals	Assembled Operation and Maintenance Manuals	1.6.2	G												
1064			26 24 13	11	Closeout Submittals	Equipment Test Schedule	2.5.1	G												
1065			26 24 13	11	Closeout Submittals	Request for Settings	3.5	G												
1066			26 24 13	11	Closeout Submittals	Service Entrance Available Fault Current Label	2.7	G												
1067			26 24 16.00 40	3	Product Data	Panelboards	2.1	G												
1068			26 24 16.00 40	6	Test Reports	Acceptance Tests	3.2	G												
1069			26 24 16.00 40	8	Manufacturer's Instructions	Manufacturer's Instructions	3.3													
1070			26 27 13.10 30	3	Product Data	Power Meters	2.1	G												
1071			26 27 13.10 30	3	Product Data	Current	2.1.3	G												
1072			26 27 13.10 30	3	Product Data	Potential Transformer	2.1.2	G												
1073			26 27 13.10 30	3	Product Data	Communications Module	2.2.2	G												
1074			26 27 13.10 30	3	Product Data	Protocol Modules	1.6.1	G												
1075			26 27 13.10 30	3	Product Data	Data Recorder	1.6.2	G												
1076			26 27 13.10 30	3	Product Data	Modem	1.6.2	G												
1077			26 27 13.10 30	6	Test Reports	Acceptance Checks and Tests	3.2.1	G												
1078			26 27 13.10 30	10	Operation and Maintenance Data	Power Meters	2.1	G												
1079			26 27 13.10 30	10	Operation and Maintenance Data	Communications Module	2.2.2	G												
1080			26 27 13.10 30	10	Operation and Maintenance Data	Protocol Modules	1.6.1	G												
1081			26 27 13.10 30	10	Operation and Maintenance Data	Data Recorder	1.6.2	G												
1082			26 27 13.10 30	10	Operation and Maintenance Data	Modem	1.6.2	G												
1083			26 27 13.10 30	11	Closeout Submittals	System Function Verification	3.2.2	G												
1084			26 28 01.00 10	3	Product Data	Fault Current Analysis	2.9													
1085			26 28 01.00 10	3	Product Data	Protective Device Coordination Study	2.9													

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1086			26 28 01.00 10	3	Product Data	Equipment	2.1													
1087			26 28 01.00 10	3	Product Data	System Coordinator	1.4.1													
1088			26 28 01.00 10	3	Product Data	Installation	3.2													
1089			26 28 01.00 10	6	Test Reports	Field Testing	3.3													
1090			26 28 01.00 10	7	Certificates	Devices and Equipment	1.6													
1091			26 29 23	2	Shop Drawings	Schematic Diagrams	1.5.1	G												
1092			26 29 23	2	Shop Drawings	Interconnecting Diagrams	1.5.2	G												
1093			26 29 23	2	Shop Drawings	Installation Drawings	1.5.3	G												
1094			26 29 23	2	Shop Drawings	As-Built Drawings	1.5.3	G												
1095			26 29 23	3	Product Data	Adjustable Speed Drives	2.1	G												
1096			26 29 23	3	Product Data	Wires and Cables	2.3													
1097			26 29 23	3	Product Data	Equipment Schedule	1.5.4													
1098			26 29 23	6	Test Reports	ASD Test	3.3.1													
1099			26 29 23	6	Test Reports	Performance Verification Tests	3.3.2													
1100			26 29 23	6	Test Reports	Endurance Test	3.3.3													
1101			26 29 23	8	Manufacturer's Instructions	Installation instructions	1.5.5													
1102			26 29 23	9	Manufacturer's Field Reports	ASD Test Plan	2.5.1	G												
1103			26 29 23	9	Manufacturer's Field Reports	Standard Products	1.5.6													
1104			26 29 23	10	Operation and Maintenance Data	Adjustable Speed Drives	2.1													
1105			26 32 15.00	2	Shop Drawings	Engine-Generator Set and Auxiliary Equipment	2.1.1	G												
1106			26 32 15.00	2	Shop Drawings	Auxiliary Systems	1.4.8	G												
1107			26 32 15.00	2	Shop Drawings	Detailed Drawings	1.4.7	G												
1108			26 32 15.00	2	Shop Drawings	Acceptance	3.17	G												
1109			26 32 15.00	3	Product Data	Harmonic Requirements	2.1.8	G												
1110			26 32 15.00	3	Product Data	Engine-Generator Set Efficiencies	2.1.1	G												
1111			26 32 15.00	3	Product Data	Emissions	2.12	G												
1112			26 32 15.00	3	Product Data	filters	2.7.2	G												
1113			26 32 15.00	3	Product Data	special tools	2.14	G												
1114			26 32 15.00	3	Product Data	Remote Alarm Annunciator	2.13.4	G												
1115			26 32 15.00	3	Product Data	Engine-Generator Parameter Schedule	2.1.1													
1116			26 32 15.00	3	Product Data	Heat Exchanger	2.8.2													
1117			26 32 15.00	3	Product Data	Generator	2.15													
1118			26 32 15.00	3	Product Data	Manufacturer's Catalog	2.5													
1119			26 32 15.00	3	Product Data	Spare Parts	1.7.2													
1120			26 32 15.00	3	Product Data	Onsite Training	3.12													
1121			26 32 15.00	3	Product Data	Vibration-Isolation	2.1.7													
1122			26 32 15.00	3	Product Data	Posted Data and Instructions	3.16	G												
1123			26 32 15.00	3	Product Data	Instructions	3.6.7.1	G												
1124			26 32 15.00	3	Product Data	Experience	1.4.5													
1125			26 32 15.00	3	Product Data	Field Engineer	1.4.6													
1126			26 32 15.00	3	Product Data	General Installation	3.2													
1127			26 32 15.00	3	Product Data	Exciter	2.16													

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1128			26 32 15.00	5	Design Data	Performance Criteria	2.15													
1129			26 32 15.00	5	Design Data	Sound Limitations	2.9	G												
1130			26 32 15.00	5	Design Data	Integral Main Fuel Storage Tank	2.6.4													
1131			26 32 15.00	5	Design Data	Power Factor	3.6.1.2													
1132			26 32 15.00	5	Design Data	Heat Exchanger	2.8.2													
1133			26 32 15.00	5	Design Data	Time-Delay on Alarms	2.19.5													
1134			26 32 15.00	5	Design Data	Cooling System	2.8													
1135			26 32 15.00	5	Design Data	Vibration Isolation	2.1.7													
1136			26 32 15.00	5	Design Data	Battery Charger	2.13.3.2													
1137			26 32 15.00	5	Design Data	Capacity Calculations for Engine-Generator Set	2.1.1	G												
1138			26 32 15.00	5	Design Data	Brake Mean Effective Pressure (BMEP) Calculations	2.1.1	G												
1139			26 32 15.00	5	Design Data	Torsional Vibration Stress Analysis Computations	2.1.1	G												
1140			26 32 15.00	5	Design Data	Capacity Calculations for Batteries	2.1.1	G												
1141			26 32 15.00	5	Design Data	Turbocharger Load Calculations	2.1.1	G												
1142			26 32 15.00	6	Test Reports	Performance Tests	3.6.9													
1143			26 32 15.00	6	Test Reports	Factory Inspection and Tests	2.28													
1144			26 32 15.00	6	Test Reports	Factory Tests	2.28.2													
1145			26 32 15.00	6	Test Reports	Onsite Inspection and Tests	3.6	G												
1146			26 32 15.00	6	Test Reports	Acceptance Checks and Tests	3.9.1	G												
1147			26 32 15.00	6	Test Reports	Functional Acceptance Tests	3.10.2	G												
1148			26 32 15.00	6	Test Reports	Maintenance Procedures	3.12	G												
1149			26 32 15.00	6	Test Reports	Operation and Maintenance Manuals	3.12	G												
1150			26 32 15.00	6	Test Reports	Inspections	3.6.3	G												
1151			26 32 15.00	6	Test Reports	Functional Acceptance Test Procedure	3.9.5	G												
1152			26 32 15.00	7	Certificates	Cooling System	2.8													
1153			26 32 15.00	7	Certificates	Vibration Isolation	2.1.7													
1154			26 32 15.00	7	Certificates	Prototype Test	2.28.2													
1155			26 32 15.00	7	Certificates	Reliability and Durability	2.1.5													
1156			26 32 15.00	7	Certificates	Fuel System Certification	1.4.10	G												
1157			26 32 15.00	7	Certificates	Start-Up Engineer	3.8	G												
1158			26 32 15.00	7	Certificates	Instructor's Qualification Resume	3.11.1	G												
1159			26 32 15.00	7	Certificates	Engine Emission Limits	2.1.2.1	G												
1160			26 32 15.00	7	Certificates	Sound Limitations	2.9													
1161			26 32 15.00	7	Certificates	Site Visit	3.1													
1162			26 32 15.00	7	Certificates	Current Balance	2.15.1													
1163			26 32 15.00	7	Certificates	Materials and Equipment	2.4													
1164			26 32 15.00	7	Certificates	Factory Inspection and Tests	2.28													
1165			26 32 15.00	7	Certificates	Engine Tests	3.6.4	G												
1166			26 32 15.00	7	Certificates	Generator Tests	3.6.5	G												
1167			26 32 15.00	7	Certificates	Assembled Engine-Generator Set Tests	3.6.6	G												

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1168			26 32 15.00	10	Operation and Maintenance Data	Preliminary Assembled Operation and Maintenance Manuals	3.9.4	G												
1169			26 32 15.00	10	Operation and Maintenance Data	Posted Data and Instructions	3.16	G												
1170			26 32 15.00	10	Operation and Maintenance Data	Training Plan	3.11.2	G												
1171			26 36 23	2	Shop Drawings	Automatic Transfer Switch Drawings	1.4.2	G												
1172			26 36 23	3	Product Data	Automatic Transfer Switches	2.1	G												
1173			26 36 23	3	Product Data	REMOTE ANNUNCIATOR AND CONTROL SYSTEM PANEL	2.3	G												
1174			26 36 23	6	Test Reports	Acceptance Checks and Tests	3.3.1	G												
1175			26 36 23	6	Test Reports	Functional Acceptance Tests	3.3.2	G												
1176			26 36 23	6	Test Reports	Factory Testing	2.4	G												
1177			26 36 23	6	Test Reports	Factory Test Reports	2.4.2	G												
1178			26 36 23	7	Certificates	Proof of Listing	1.4.1	G												
1179			26 36 23	10	Operation and Maintenance Data	Operation and Maintenance Manual	1.3	G												
1180			26 41 00	2	Shop Drawings	Overall lightning protection system	1.4.1.1	G												
1181			26 41 00	2	Shop Drawings	Each major component	1.4.1.2	G												
1182			26 41 00	6	Test Reports	Lightning Protection and Grounding System Test Plan	1.4.3	G												
1183			26 41 00	6	Test Reports	Lightning Protection and Grounding System Test	3.5.1	G												
1184			26 41 00	7	Certificates	Lightning Protection System Installers Documentation	1.2.3	G												
1185			26 41 00	7	Certificates	Component UL Listed and Labeled	1.4.2	G												
1186			26 41 00	7	Certificates	Lightning protection system inspection certificate	1.4.4	G												
1187			26 41 00	7	Certificates	Roof manufacturer's warranty	3.1.1	G												
1188			26 51 00	2	Shop Drawings	Luminaire Drawings	1.5.1	G												
1189			26 51 00	2	Shop Drawings	Occupancy/Vacancy Sensor Coverage Layout	1.5.8	G												
1190			26 51 00	2	Shop Drawings	Lighting Control System One-Line Diagram	1.7.2	G												
1191			26 51 00	2	Shop Drawings	Sequence of Operation for Lighting Control System	2.5.1	G												
1192			26 51 00	3	Product Data	Luminaires	2.2	G												
1193			26 51 00	3	Product Data	Light Sources	2.3	G												
1194			26 51 00	3	Product Data	LED Drivers	2.4	G												
1195			26 51 00	3	Product Data	Luminaire Warranty	1.6.1	G												
1196			26 51 00	3	Product Data	Lighting Controls Warranty	1.6.2	G												
1197			26 51 00	3	Product Data	Local Area Controller	2.5.1.1.1	G												
1198			26 51 00	3	Product Data	Lighting Control Panel	2.5.1.2.1	G												
1199			26 51 00	3	Product Data	Gateway	2.5.1.2.2	G												
1200			26 51 00	3	Product Data	Lighting Contactor	2.5.1.2.3	G												
1201			26 51 00	3	Product Data	Switches	2.5.2.1	G												
1202			26 51 00	3	Product Data	Wall Box Dimmers	2.5.2.2	G												
1203			26 51 00	3	Product Data	Scene Wallstations	2.5.2.3	G												

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1204			26 51 00	3	Product Data	Occupancy/Vacancy Sensors	2.5.2.4	G												
1205			26 51 00	3	Product Data	Photosensors	2.5.2.5	G												
1206			26 51 00	3	Product Data	Power Packs	2.5.2.4.6	G												
1207			26 51 00	3	Product Data	Power Hook Luminaire Hangers	2.7.4	G												
1208			26 51 00	3	Product Data	Mini Inverters	2.6.5	G												
1209			26 51 00	3	Product Data	Exit Signs	2.6.1	G												
1210			26 51 00	3	Product Data	Emergency Drivers	2.6.3	G												
1211			26 51 00	5	Design Data	Luminaire Design Data	1.5.2	G												
1212			26 51 00	6	Test Reports	IES LM-79 Test Report	1.5.3	G												
1213			26 51 00	6	Test Reports	IES LM-80 Test Report	1.5.4	G												
1214			26 51 00	6	Test Reports	IES TM-21 Test Report	1.5.5	G												
1215			26 51 00	6	Test Reports	IES TM-30 Test Report	1.5.6	G												
1216			26 51 00	6	Test Reports	Occupancy/Vacancy Sensor Verification Test	3.2.1.1	G												
1217			26 51 00	6	Test Reports	Photosensor Verification Test	3.2.1.1	G												
1218			26 51 00	7	Certificates	LED Driver and Dimming Switch Compatibility Certificate	1.5.7	G												
1219			26 51 00	10	Operation and Maintenance Data	Lighting System	1.7.1	G												
1220			26 51 00	10	Operation and Maintenance Data	Lighting Control System	1.7.2	G												
1221			26 51 00	10	Operation and Maintenance Data	Maintenance Staff Training Plan	3.3.2.1	G												
1222			26 51 00	10	Operation and Maintenance Data	End-User Training Plan	3.3.2.2	G												
1223			27 10 00	2	Shop Drawings	Telecommunications drawings	1.6.1.1	G												
1224			27 10 00	2	Shop Drawings	Telecommunications Space Drawings	1.6.1.2	G												
1225			27 10 00	3	Product Data	Telecommunications cabling	2.3	G												
1226			27 10 00	3	Product Data	Patch panels	2.4.5	G												
1227			27 10 00	3	Product Data	Telecommunications outlet/connector assemblies	2.5	G												
1228			27 10 00	3	Product Data	Equipment support frame	2.4.2	G												
1229			27 10 00	3	Product Data	Connector blocks	2.4.3	G												
1230			27 10 00	3	Product Data	Spare Parts	1.10.3	G												
1231			27 10 00	6	Test Reports	Telecommunications cabling testing	3.5.1	G												
1232			27 10 00	7	Certificates	Telecommunications Contractor	1.6.2.1	G												
1233			27 10 00	7	Certificates	Key Personnel	1.6.2.2	G												
1234			27 10 00	7	Certificates	Manufacturer Qualifications	1.6.2.3	G												
1235			27 10 00	7	Certificates	Test plan	1.6.3	G												
1236			27 10 00	9	Manufacturer's Field Reports	Factory reel tests	2.10.1	G												
1237			27 10 00	10	Operation and Maintenance Data	Telecommunications cabling and pathway system	1.10.1	G												
1238			27 10 00	11	Closeout Submittals	Record Documentation	1.10.2	G												
1239			27 51 16	1	Preconstruction Submittals	Qualifications	1.7	G												
1240			27 51 16	2	Shop Drawings	Detail Drawings	2.1.3	G												
1241			27 51 16	2	Shop Drawings	System Layout	1.2.1	G												

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1242			27 51 16	3	Product Data	Spare Parts	1.9													
1243			27 51 16	5	Design Data	Design Analysis and Calculations	1.5.7	G												
1244			27 51 16	6	Test Reports	Approved Test Procedures	3.5	G												
1245			27 51 16	6	Test Reports	Acceptance Tests	3.5													
1246			27 51 16	6	Test Reports	Accreditation	1.6	G												
1247			27 51 16	7	Certificates	Components	2.2													
1248			27 51 16	10	Operation and Maintenance Data	Paging System	2.1	G												
1249			28 31 76	1	Preconstruction Submittals	Qualified Fire Protection Engineer (QFPE)	1.3.2	G												
1250			28 31 76	1	Preconstruction Submittals	Fire alarm system designer	1.9.2.1	G												
1251			28 31 76	1	Preconstruction Submittals	Supervisor	1.9.2.2	G												
1252			28 31 76	1	Preconstruction Submittals	Technician	1.9.2.3	G												
1253			28 31 76	1	Preconstruction Submittals	Installer	1.9.2.4	G												
1254			28 31 76	1	Preconstruction Submittals	Test Technician	1.9.2.5	G												
1255			28 31 76	1	Preconstruction Submittals	Fire Alarm System Site-Specific Software Acknowledgement	1.7	G												
1256			28 31 76	2	Shop Drawings	Nameplates	1.9.1.3	G												
1257			28 31 76	2	Shop Drawings	Instructions	2.2.4	G												
1258			28 31 76	2	Shop Drawings	Wiring Diagrams	1.9.1.4	G												
1259			28 31 76	2	Shop Drawings	System Layout	1.9.1.5	G												
1260			28 31 76	2	Shop Drawings	Notification Appliances	1.9.1.6	G												
1261			28 31 76	2	Shop Drawings	Initiating devices	1.9.1.7	G												
1262			28 31 76	2	Shop Drawings	Amplifiers	1.9.1.8	G												
1263			28 31 76	2	Shop Drawings	Battery Power	1.9.1.9	G												
1264			28 31 76	2	Shop Drawings	Voltage Drop Calculations	1.9.1.10	G												
1265			28 31 76	3	Product Data	Fire Alarm and Mass Notification Control Unit (FMCU)	2.3	G												
1266			28 31 76	3	Product Data	Local Operating Console (LOC)	1.4.3	G												
1267			28 31 76	3	Product Data	Amplifiers	1.9.1.8	G												
1268			28 31 76	3	Product Data	Tone Generators	2.5	G												
1269			28 31 76	3	Product Data	Digitalized voice generators	2.5	G												
1270			28 31 76	3	Product Data	LCD Annunciator	2.6.1	G												
1271			28 31 76	3	Product Data	Manual Stations	2.7	G												
1272			28 31 76	3	Product Data	Smoke Detectors	2.8	G												
1273			28 31 76	3	Product Data	Duct Smoke Detectors	2.8.2	G												
1274			28 31 76	3	Product Data	Triple Infrared (IR) Flame Detectors	2.22	G												
1275			28 31 76	3	Product Data	Releasing Service Fire Alarm Control Unit	2.21.1	G												
1276			28 31 76	3	Product Data	Addressable Interface Devices	2.9	G												
1277			28 31 76	3	Product Data	Addressable Control Modules	2.1	G												
1278			28 31 76	3	Product Data	Isolation Modules	2.11	G												
1279			28 31 76	3	Product Data	Notification Appliances	1.9.1.6	G												
1280			28 31 76	3	Product Data	Textual Display Signs	2.12.4	G												
1281			28 31 76	3	Product Data	Batteries	2.14.1	G												
1282			28 31 76	3	Product Data	Battery Chargers	2.14.2	G												

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1283			28 31 76	3	Product Data	Supplemental Notification Appliance Circuit Panels	2.14.1.1	G												
1284			28 31 76	3	Product Data	Auxiliary Power Supply Panels	2.14.1.1	G												
1285			28 31 76	3	Product Data	Surge Protective Devices	2.15	G												
1286			28 31 76	3	Product Data	Alarm Wiring	2.15	G												
1287			28 31 76	3	Product Data	Back Boxes and Conduit	3.3.4	G												
1288			28 31 76	3	Product Data	Ceiling Bridges	3.2.8	G												
1289			28 31 76	3	Product Data	Terminal Cabinets	3.3.2	G												
1290			28 31 76	3	Product Data	Radio Transmitter and Interface Panels	2.17.1	G												
1291			28 31 76	3	Product Data	Environmental Enclosures or Guards	2.19	G												
1292			28 31 76	3	Product Data	Knox Box	2.2	G												
1293			28 31 76	3	Product Data	Document Storage Cabinet	3.11.3	G												
1294			28 31 76	6	Test Reports	Test Procedures	3.7.1	G												
1295			28 31 76	7	Certificates	Verification of Compliant Installation	3.7.2.1	G												
1296			28 31 76	7	Certificates	Request for Government Final Test	3.7.2.2	G												
1297			28 31 76	10	Operation and Maintenance Data	Operation and Maintenance (O&M) Instructions	3.9	G												
1298			28 31 76	10	Operation and Maintenance Data	Instruction of Government Employees	3.1	G												
1299			28 31 76	11	Closeout Submittals	As-Built Drawings	1.9.1.13													
1300			28 31 76	11	Closeout Submittals	Spare Parts	1.11.1													
1301			31 00 00	1	Preconstruction Submittals	Shoring	3.5	G												
1302			31 00 00	1	Preconstruction Submittals	Dewatering Work Plan	1.4.3	G												
1303			31 00 00	3	Product Data	Utilization of Excavated Materials	3.9	G												
1304			31 00 00	3	Product Data	Rock Excavation	1.4.1.2													
1305			31 00 00	3	Product Data	Opening of any Excavation or Borrow Pit	3.4													
1306			31 00 00	6	Test Reports	Testing	3.16													
1307			31 00 00	6	Test Reports	Borrow Site Testing	2.1													
1308			31 00 00	7	Certificates	Testing	3.16													
1309			31 62 16.16	1	Preconstruction Submittals	Installation Procedures	1.7.4	G												
1310			31 62 16.16	1	Preconstruction Submittals	Contractor's Geotechnical Consultant	1.7.2	G												
1311			31 62 16.16	1	Preconstruction Submittals	Testing Agency Qualification	3.3.3	G												
1312			31 62 16.16	2	Shop Drawings	Pile splices	2.1.3.1	G												
1313			31 62 16.16	2	Shop Drawings	Pile placement	3.2.2	G												
1314			31 62 16.16	3	Product Data	Pile Driving Equipment	1.7.4	G												
1315			31 62 16.16	3	Product Data	Pile Driving Records	3.2.1	G												
1316			31 62 16.16	3	Product Data	Delivery, Storage, and Handling	1.6	G												
1317			31 62 16.16	5	Design Data	Wave Equation Analysis	3.1.1													
1318			31 62 16.16	5	Design Data	Quantities List	3.1.2	G												
1319			31 62 16.16	6	Test Reports	Dynamic Pile Analysis	3.3.1.1	G												
1320			31 62 16.16	6	Test Reports	Pile Performance Report	3.3.1.4													
1321			31 62 16.16	7	Certificates	Pile Material Certificates of Compliance	2.1.1	G												

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1322			31 62 16.16	7	Certificates	Pile Splices	2.1.3.1	G												
1323			31 62 16.16	11	Closeout Submittals	Pile Driving Records	3.2.1													
1324			32 01 19.61	3	Product Data	Sealants	2.1													
1325			32 01 19.61	3	Product Data	Manufacturer's Recommendations	3.5.2													
1326			32 01 19.61	4	Samples	Sealants	2.1													
1327			32 01 19.61	4	Samples	Blocking Media/Backup Materials	2.3.1													
1328			32 01 19.61	4	Samples	Backer Rod	3.3.4.1													
1329			32 01 19.61	4	Samples	Bond Breaking Tapes	2.3.2													
1330			32 01 19.61	7	Certificates	Equipment List	3.1													
1331			32 01 19.61	8	Manufacturer's Instructions	Sealants	2.1													
1332			32 11 23	3	Product Data	Plant, Equipment, and Tools	1.4													
1333			32 11 23	6	Test Reports	Initial Tests	2.3.1	G												
1334			32 11 23	6	Test Reports	In-Place Tests	3.12.1	G												
1335			32 12 13	6	Test Reports	Sampling and Testing	3.7													
1336			32 12 16.16	2	Shop Drawings	Placement Plan	2.1	G												
1337			32 12 16.16	3	Product Data	Diamond Grinding Plan	2.1.6	G												
1338			32 12 16.16	3	Product Data	Mix Design	2.4	G												
1339			32 12 16.16	3	Product Data	Contractor Quality Control	3.1	G												
1340			32 12 16.16	4	Samples	Asphalt Cement Binder	2.3													
1341			32 12 16.16	6	Test Reports	Aggregates	2.2	G												
1342			32 12 16.16	6	Test Reports	QC Monitoring	3.1.3.9													
1343			32 12 16.16	7	Certificates	Asphalt Cement Binder	2.3	G												
1344			32 12 16.16	7	Certificates	Laboratory Accreditation and Validation	1.3.11													
1345			32 13 13.06	3	Product Data	Curing Materials	2.1.6	G												
1346			32 13 13.06	3	Product Data	Admixtures	2.1.4	G												
1347			32 13 13.06	3	Product Data	Dowel	2.1.5.1	G												
1348			32 13 13.06	3	Product Data	Reinforcement	2.1.5.4	G												
1349			32 13 13.06	5	Design Data	Mix Design	2.3	G												
1350			32 13 13.06	6	Test Reports	Aggregate	2.1.3	G												
1351			32 13 13.06	6	Test Reports	Concrete Slump Tests	3.7.2	G												
1352			32 13 13.06	6	Test Reports	Air Content Tests	3.7.4	G												
1353			32 13 13.06	6	Test Reports	Flexural Strength Tests	3.7.3	G												
1354			32 13 13.06	6	Test Reports	Cementitious Materials	2.1.1	G												
1355			32 13 13.06	7	Certificates	Ready-mixed Concrete Plant	1.6.1	G												
1356			32 13 13.06	7	Certificates	Batch Tickets	1.6.4	G												
1357			32 13 13.06	7	Certificates	Cementitious Materials	2.1.1	G												
1358			32 13 14.13	3	Product Data	Dowels	2.9.1	G												
1359			32 13 14.13	3	Product Data	Dowel Bar Assemblies	2.9.2	G												
1360			32 13 14.13	3	Product Data	Equipment	2.11													
1361			32 13 14.13	3	Product Data	Proposed Techniques	3.1.2	G												
1362			32 13 14.13	5	Design Data	Preliminary Proposed Proportioning	2.13.2	G												
1363			32 13 14.13	5	Design Data	Proportioning Studies	2.13.2	G												

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1364			32 13 14.13	6	Test Reports	Batch Plant Manufacturer's Inspection Report	1.4.1	G												
1365			32 13 14.13	6	Test Reports	Slipform Paver Manufacturer's Inspection Report	1.4.1	G												
1366			32 13 14.13	6	Test Reports	Sampling and Testing	2.1.4.1	G												
1367			32 13 14.13	6	Test Reports	Mixer Performance (Uniformity) Testing	2.11.1.3	G												
1368			32 13 14.13	6	Test Reports	Repair Recommendations Plan	3.9.1	G												
1369			32 13 14.13	7	Certificates	Contractor Quality Control Staff	1.4.1	G												
1370			32 13 14.13	7	Certificates	Laboratory Accreditation and Validation	1.4.3													
1371			32 13 14.13	7	Certificates	Commercial Laboratory	1.4.3.3	G												
1372			32 13 14.13	7	Certificates	NRMCA Certificate of Conformance	2.11													
1373			32 15 00	3	Product Data	Plant, Equipment, and Tools	1.4	G												
1374			32 15 00	6	Test Reports	Initial Tests	2.3.1	G												
1375			32 15 00	6	Test Reports	In-Place Tests	3.10.1	G												
1376			32 16 19	3	Product Data	Concrete	2.1													
1377			32 16 19	3	Product Data	Biodegradable Form Release Agent	2.6.5													
1378			32 16 19	3	Product Data	Biodegradable Form Release Agent	3.2													
1379			32 16 19	6	Test Reports	Field Quality Control	3.8													
1380			32 17 23	3	Product Data	Surface Preparation Equipment List	2.1.1.1	G												
1381			32 17 23	3	Product Data	Application Equipment List	2.1.2	G												
1382			32 17 23	3	Product Data	Exterior Surface Preparation	3.2													
1383			32 17 23	3	Product Data	Safety Data Sheets	1.3.1	G												
1384			32 17 23	3	Product Data	Waterborne Paint	2.2.1	G												
1385			32 17 23	6	Test Reports	Waterborne Paint	2.2.1	G												
1386			32 17 23	7	Certificates	Qualifications	1.3.2	G												
1387			32 17 23	7	Certificates	Waterborne Paint	2.2.1													
1388			32 17 23	7	Certificates	Volatile Organic Compound	1.3.1													
1389			32 17 23	8	Manufacturer's Instructions	Waterborne Paint	2.2.1	G												
1390			32 31 13	2	Shop Drawings	Fence Assembly	2.1	G												
1391			32 31 13	2	Shop Drawings	Location of Gate, Corner, End, and Pull Posts	3.2.1.1	G												
1392			32 31 13	2	Shop Drawings	Gate Assembly	2.1	G												
1393			32 31 13	2	Shop Drawings	Gate Hardware and Accessories	2.2.14	G												
1394			32 31 13	2	Shop Drawings	Erection/Installation Drawings	Part 3	G												
1395			32 31 13	3	Product Data	Fence Assembly	2.1	G												
1396			32 31 13	3	Product Data	Gate Assembly	2.1	G												
1397			32 31 13	3	Product Data	Gate Hardware and Accessories	2.2.14	G												
1398			32 31 13	3	Product Data	Zinc Coating	2.3.1	G												
1399			32 31 13	3	Product Data	Fabric	2.2.1	G												
1400			32 31 13	3	Product Data	Stretcher Bars	2.2.9	G												
1401			32 31 13	3	Product Data	Concrete	2.3.3	G												
1402			32 31 13	4	Samples	Fabric	2.2.1	G												
1403			32 31 13	4	Samples	Posts	2.2.2	G												

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1404			32 31 13	4	Samples	Braces	2.2.2	G												
1405			32 31 13	4	Samples	Line Posts	2.2.3	G												
1406			32 31 13	4	Samples	Sleeves	2.2.5	G												
1407			32 31 13	4	Samples	Top Rail	2.2.6	G												
1408			32 31 13	4	Samples	Tension Wire	2.3.2	G												
1409			32 31 13	4	Samples	Stretcher Bars	2.2.9	G												
1410			32 31 13	4	Samples	Gate Posts	2.2.12	G												
1411			32 31 13	4	Samples	Gate Hardware and Accessories	2.2.14	G												
1412			32 31 13	4	Samples	Padlocks	2.2.17	G												
1413			32 31 13	4	Samples	Wire Ties	2.2.16	G												
1414			32 31 13	7	Certificates	Certificates of Compliance	1.3.1													
1415			32 31 13	8	Manufacturer's Instructions	Fence Assembly	2.1													
1416			32 31 13	8	Manufacturer's Instructions	Gate Assembly	2.1													
1417			32 31 13	8	Manufacturer's Instructions	Hardware Assembly	2.1													
1418			32 31 13	8	Manufacturer's Instructions	Accessories	2.1													
1419			32 31 13	11	Closeout Submittals	Recycled Material Content	3.3	S												
1420			32 92 23	3	Product Data	Fertilizer	2.4													
1421			32 92 23	6	Test Reports	Topsoil composition tests	2.2.3													
1422			32 92 23	7	Certificates	sods	2.1													
1423			33 05 23.13	1	Preconstruction Submittals	Qualifications	1.3.1	G												
1424			33 05 23.13	1	Preconstruction Submittals	Horizontal Directional Drilling Plan	1.3.3	G												
1425			33 05 23.13	3	Product Data	Pipe	2.2.1	G												
1426			33 05 23.13	3	Product Data	Drilling Fluids	2.2.2	G												
1427			33 05 23.13	3	Product Data	Additives	2.2.3	G												
1428			33 05 23.13	3	Product Data	Tracer Wire	2.2.4	G												
1429			33 05 23.13	6	Test Reports	Soil Test Data	3.1													
1430			33 05 23.13	7	Certificates	Drill Rod	2.1.1													
1431			33 05 23.13	7	Certificates	Fusion Technician Qualifications	1.3.4													
1432			33 05 23.13	11	Closeout Submittals	Record Drawings	3.4													
1433			33 05 23.13	11	Closeout Submittals	Complete Work Logs of Guided Directional Drill Operations	3.4													
1434			33 11 00	1	Preconstruction Submittals	Connections	3.1.1	G												
1435			33 11 00	3	Product Data	Pipe, Fittings, Joints and Couplings	2.1.1	G												
1436			33 11 00	3	Product Data	Valves	2.1.2	G												
1437			33 11 00	3	Product Data	Valve Boxes	2.1.2.4	G												
1438			33 11 00	3	Product Data	Fire Hydrants	2.1.3.1	G												
1439			33 11 00	3	Product Data	Pipe Restraint	2.2.1	G												
1440			33 11 00	3	Product Data	Disinfection Procedures	3.2.2	G												
1441			33 11 00	6	Test Reports	Bacteriological Samples	3.3.1.4	G												
1442			33 11 00	6	Test Reports	Backflow Preventer Tests	3.3.1.5	G												
1443			33 11 00	6	Test Reports	Hydrostatic Sewer Test	3.2.1.1.6													
1444			33 11 00	6	Test Reports	Leakage Test	3.3.1.3													
1445			33 11 00	6	Test Reports	Hydrostatic Test	3.3.1.1													
1446			33 11 00	7	Certificates	Pipe, Fittings, Joints and Couplings	2.1.1													

TITLE:	VGLZ162323
JOB NAME:	ADAL FUEL CELL & CORROSION CONTROL, BLDG 154
LOCATION:	Selfridge ANGB, Michigan
CONTRACT NO:	
CONTRACTOR:	

SUBMITTAL REGISTER

									CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					
	(a)	(b)	(c)	(d)			(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
Line	Activity #	Transmittal #	Specification Section	SD #	Submittal Description	Item Submitted	Paragraph #	Classification: GOVT or A/E Reviewer	Submit	Approval Needed By	Material Needed By	Action Code	Date Of Action	Date FWD to APPR / Auth Date RCD From CONTR	Date FWD To Other Revwr	Date RCD From Other Reviewer	Action Code	Date Of Action	Mailed To CONTR/ Date RCD From APPR Authority	Remarks
1447			33 11 00	7	Certificates	Lining	2.1.1.1.1													
1448			33 11 00	7	Certificates	Valves	2.1.2													
1449			33 11 00	7	Certificates	Fire Hydrants	2.1.3.1													
1450			33 11 00	8	Manufacturer's Instructions	Ductile Iron Piping	2.1.1.1													
1451			33 11 00	8	Manufacturer's Instructions	Copper Pipe For Service Lines	2.1.1.2													
1452			33 16 15	2	Shop Drawings	Tank Installation	3.7	G												
1453			33 16 15	3	Product Data	System Description	2.1													
1454			33 16 15	3	Product Data	Foundations	3.2													
1455			33 16 15	3	Product Data	Process Control Panel	2.3.1													
1456			33 16 15	6	Test Reports	Tank Installation	3.7													
1457			33 16 15	6	Test Reports	Testing of Valves and Piping	3.8.2													
1458			33 16 15	7	Certificates	System Description	2.1													
1459			33 16 15	7	Certificates	Foundations	3.2													
1460			33 30 00	1	Preconstruction Submittals	Contractor's License	1.3.1	G												
1461			33 30 00	2	Shop Drawings	Installation Drawings	3.1.1	G												
1462			33 30 00	3	Product Data	Manholes	2.2.5													
1463			33 30 00	3	Product Data	Frames, Covers, and Gratings	2.2.7													
1464			33 30 00	3	Product Data	Gravity Pipe	2.2.1													
1465			33 30 00	6	Test Reports	Deflection Testing	3.3.1.2													
1466			33 30 00	7	Certificates	Portland Cement	2.2.3													
1467			33 30 00	7	Certificates	Gaskets	2.2.1.1													
1468			33 56 10	2	Shop Drawings	Grounding and Bonding	2.1.1													
1469			33 56 10	3	Product Data	Underground Storage Tank	2.4	G												
1470			33 56 10	3	Product Data	Tank Protective Coatings	2.5	G												
1471			33 56 10	3	Product Data	Atmospheric Vent	2.6.5.1	G												
1472			33 56 10	6	Test Reports	Underground Storage Tank Tightness Tests	3.2.1	G												
1473			33 56 10	6	Test Reports	Tank Manufacturer's Tests	3.2.2													
1474			33 56 10	6	Test Reports	Tank Fill Tests	3.4													
1475			33 56 10	6	Test Reports	Tank Inspection Reports	3.2.3	G												
1476			33 56 10	7	Certificates	Contractor Qualifications	1.4.1	G												
1477			33 56 10	7	Certificates	Manufacturer's Certification	1.4.1	G												
1478			33 56 10	7	Certificates	Licensed Personnel	1.4.2.1													
1479			33 56 10	7	Certificates	Demonstrations	3.3													
1480			33 56 10	7	Certificates	STI SP001 Inspector's Certification	3.2.3	G												
1481			33 56 10	8	Manufacturer's Instructions	Underground Storage Tank	2.4													
1482			33 56 10	10	Operation and Maintenance Data	Underground Storage Tank	2.4	G												
1483			33 61 13.19	2	Shop Drawings	Detail Drawings	1.3.1	G												
1484			33 61 13.19	3	Product Data	Support of the Equipment	2.1													
1485			33 61 13.19	3	Product Data	Piping and Fittings	2.4													
1486			33 61 13.19	3	Product Data	Valves	2.5													
1487			33 61 13.19	10	Operation and Maintenance Data	Valve Manholes and Accessories	3.5	G												

TITLE:	VGLZ162323
JOB NAME:	ADAL FUEL CELL & CORROSION CONTROL, BLDG 154
LOCATION:	Selfridge ANGB, Michigan
CONTRACT NO:	
CONTRACTOR:	

SUBMITTAL REGISTER

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Line	Activity #	Transmittal #	Specification Section	SD #	Submittal Description	Item Submitted	Paragraph #	Classification: GOVT or A/E Reviewer	Submit	Approval Needed By	Material Needed By	Action Code	Date Of Action	Date FWD to APPR / Auth Date RCD From CONTR	Date FWD To Other Revwr	Date RCD From Other Reviewer	Action Code	Date Of Action	Mailed To CONTR/ Date RCD From APPR Authority	Remarks
1488			33 61 13.19	10	Operation and Maintenance Data	Data Package 2	3.5.1	G												
1489			33 71 02	2	Shop Drawings	Aluminum conductors	2.2.1	G												
1490			33 71 02	2	Shop Drawings	Precast underground structures	1.5.1	G												
1491			33 71 02	3	Product Data	Medium voltage cable	2.5	G												
1492			33 71 02	3	Product Data	Medium voltage cable joints	2.7	G												
1493			33 71 02	3	Product Data	Medium voltage cable terminations	2.6	G												
1494			33 71 02	3	Product Data	Precast concrete structures	2.13.1.1	G												
1495			33 71 02	3	Product Data	Sealing Material	2.13.1.4													
1496			33 71 02	3	Product Data	Pulling-In Irons	3.4.2													
1497			33 71 02	3	Product Data	Handhole frames and covers	2.13.2	G												
1498			33 71 02	3	Product Data	Composite/fiberglass handholes	2.13.3	G												
1499			33 71 02	3	Product Data	Cable supports	2.14	G												
1500			33 71 02	6	Test Reports	Medium voltage cable qualification and production tests	2.17.2	G												
1501			33 71 02	6	Test Reports	Field Acceptance Checks and Tests	3.17.1	G												
1502			33 71 02	6	Test Reports	Arc-proofing test	2.17.1	G												
1503			33 71 02	7	Certificates	Cable splicer/terminator	1.5.2	G												
1504			33 71 02	7	Certificates	Cable Installer Qualifications	1.5.3	G												
1505			33 82 00	2	Shop Drawings	Telecommunications Outside Plant	1.6.1.1	G												
1506			33 82 00	2	Shop Drawings	Telecommunications Entrance Facility Drawings	1.6.1.2	G												
1507			33 82 00	3	Product Data	Wire and cable	2.8	G												
1508			33 82 00	3	Product Data	Cable splices, and connectors	2.4	G												
1509			33 82 00	3	Product Data	Closures	2.3	G												
1510			33 82 00	3	Product Data	Building protector assemblies	2.2.1	G												
1511			33 82 00	3	Product Data	Protector modules	2.2.2	G												
1512			33 82 00	3	Product Data	Spare Parts	1.8.2	G												
1513			33 82 00	6	Test Reports	Pre-installation tests	3.4.1	G												
1514			33 82 00	6	Test Reports	Acceptance tests	3.4.2	G												
1515			33 82 00	6	Test Reports	Outside Plant Test Plan	1.6.3	G												
1516			33 82 00	7	Certificates	Telecommunications Contractor	1.6.2.1	G												
1517			33 82 00	7	Certificates	Key Personnel	1.6.2.2	G												
1518			33 82 00	7	Certificates	Manufacturer's Qualifications	1.6.2.3	G												
1519			33 82 00	8	Manufacturer's Instructions	Building protector assembly installation	2.2.1	G												
1520			33 82 00	8	Manufacturer's Instructions	Cable tensions	3.1.7.1	G												
1521			33 82 00	9	Manufacturer's Field Reports	Factory Reel Test Data	2.14.1	G												
1522			33 82 00	10	Operation and Maintenance Data	Telecommunications outside plant (OSP)	1.6.1.1	G												
1523			33 82 00	11	Closeout Submittals	Record Documentation	1.8.1	G												
1524			40 60 00	2	Shop Drawings	Contractor Design Drawings	3.5.2	G												
1525			40 60 00	3	Product Data	Control Drawings	3.5													
1526			40 60 00	3	Product Data	Sensors and Meters	2.4													
1527			40 60 00	3	Product Data	Performance Verification Test (PVT)	3.6.2													
1528			40 60 00	3	Product Data	Factory Test Procedure	2.7.2													

TITLE:	VGLZ162323
JOB NAME:	ADAL FUEL CELL & CORROSION CONTROL, BLDG 154
LOCATION:	Selfridge ANGB, Michigan
CONTRACT NO:	
CONTRACTOR:	

SUBMITTAL REGISTER

									CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					
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Line	Activity #	Transmittal #	Specification Section	SD #	Submittal Description	Item Submitted	Paragraph #	Classification: GOVT or A/E Reviewer	Submit	Approval Needed By	Material Needed By	Action Code	Date Of Action	Date FWD to APPR / Auth Date RCD From CONTR	Date FWD To Other Revwr	Date RCD From Other Reviewer	Action Code	Date Of Action	Mailed To CONTR/ Date RCD From APPR Authority	Remarks
1529			40 60 00	6	Test Reports	Factory Test Report	2.7.3													
1530			40 60 00	6	Test Reports	Testing, Adjusting and Commissioning	3.6.1													
1531			40 60 00	6	Test Reports	Performance Verification Test(PVT)	3.6.2													
1532			40 60 00	6	Test Reports	Endurance Test	3.6.3													
1533			40 60 00	7	Certificates	Control and Sensor Wiring	3.4.2.2													
1534			40 60 00	7	Certificates	Ground Rods	3.6.1													
1535			40 60 00	7	Certificates	Wiring	3.2.1													
1536			40 60 00	7	Certificates	Installation	3.2.1													
1537			40 60 00	10	Operation and Maintenance Data	Training Manual	3.7	G												
1538			40 60 00	10	Operation and Maintenance Data	Control System	2.1	G												
1539			40 60 00	11	Closeout Submittals	Final As-Built Drawings	3.5.2.1	G												
1540			46 25 14	2	Shop Drawings	Separator	1.2.2	G												
1541			46 25 14	2	Shop Drawings	Accessory equipment	2.5	G												
1542			46 25 14	5	Design Data	Separator	1.2.2	G												
1543			46 25 14	5	Design Data	Accessory equipment	2.5	G												
1544			46 25 14	6	Test Reports	Shop hydrostatic test	2.6.1	G												
1545			46 25 14	6	Test Reports	Inspection	3.1													
1546			46 25 14	6	Test Reports	Field hydrostatic test	3.3.1													
1547			46 25 14	6	Test Reports	Preoperational test	3.3.2													
1548			46 25 14	6	Test Reports	In-service test	3.3.3													
1549			46 25 14	7	Certificates	Separator corrosion protection	2.1.2	G												
1550			46 25 14	8	Manufacturer's Instructions	Separator system	3.2	G												
1551			46 25 14	10	Operation and Maintenance Data	Separator system	3.2	G												

MATERIAL APPROVAL SUBMITTAL

(See Instructions on Reverse)

Form Approved
OMB No 9000-0062
Expires May 31, 2005

TO: *(Contracting Officer)*	**FROM:** *(Contractor)*	DATE *(YYYYMMDD)*
CONTRACT NUMBER	SUBMISSION NUMBER	SUBMITTAL ☐ NEW ☐ RESUBMITTAL
PREVIOUS SUBMISSION NUMBER	PROJECT NUMBER	

TO BE COMPLETED BY CONTRACTOR			FOR GOVERNMENT USE ONLY			
ITEM NO.	SPECIFICATION SECTION/ PARA NO./DRAWING NO.	DESCRIPTION OF MATERIAL *(Include Type, Model Number, Catalog Number, Mfg., etc.)*	AP-PROVED	DISAP-PROVED	SEE REVERSE	INITIAL
			☐	☐	☐	
			☐	☐	☐	
			☐	☐	☐	
			☐	☐	☐	
			☐	☐	☐	
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			☐	☐	☐	
			☐	☐	☐	
			☐	☐	☐	
			☐	☐	☐	

BY COMPLETING THIS FORM, THE UNDERSIGNED CONTRACTOR CERTIFIES THAT THE MATERIAL COMPLIES WITH ALL SPECIFICATIONS OF SUBJECT CONTRACT.

DATE *(YYYYMMDD)*	TYPE OR PRINT NAME AND TITLE	SIGNATURE

FOR GOVERNMENT USE ONLY

TO: *(Base Civil Engineering Officer)*

For Evaluation and Action

DATE *(YYYYMMDD)*	TYPE OR PRINT NAME AND GRADE	SIGNATURE

TO: *(AF Contracting Office)*

RECOMMEND ☐ APPROVAL ☐ DISAPPROVAL AS INDICATED ABOVE AND SUBJECT TO ANY APPLICABLE COMMENTS ON THE REVERSE

DATE *(YYYYMMDD)*	TYPE OR PRINT NAME AND GRADE	SIGNATURE

TO: *(Contractor)*

☐ APPROVED ☐ DISAPROVED AS INDICATED ABOVE AND SUBJECT TO ANY APPLICABLE COMMENTS ON THE REVERSE SIDE. REQUEST RESUBMITTAL ON DISAPPROVED ITEMS WITHIN _____ DAYS OF DATE SHOWN BELOW.

DATE *(YYYYMMDD)*	TYPE OR PRINT NAME AND GRADE	SIGNATURE

COMMENTS
(Number to correspond with applicable Item Number on reverse)

INSTRUCTIONS TO CONTRACTORS

1. The term "material" is defined as articles, supplies, raw materials, equipment, parts, components, and end items that are to be incorporated into the work required by the contract.

2. This form is to be used by contractors for submitting Shop Drawings, Equipment Data, Manufacturer's Literature and Certificates and samples of Materials to the Government for approval in accordance with the provisions of this contract. Unless otherwise specified, it is to be prepared in 4 copies, signed, and provided to the contracting officer with appropriate attachments.

3. Item(s) to be approved will be clearly tabbed or identified. Data pertaining to item(s) to be approved will be clearly identified or tabbed, particularly where documents are voluminous, in order to properly evaluate the materials or articles to be incorporated in the work. Each attachment will be numbered to correspond with the item number shown on the face of this form.

4. Requests submitted shall be numbered consecutively, by contract, in the space entitled "Submission No.". This number, in addition to the Contract No., will be used to identify each Material Approval Submittal. Resubmissions will be indicated in the appropriate block and the insertion of previous submission number and data in addition to a new submission number. A single submission should be used for all work of a section of the specifications, but in NO instance should the submission include work for more than one (1) contract. Submittals requiring priority handling will be submitted by separate submittal using the form and so marked across the face of the form.

5. This Material Approval Submittal is not valid unless it is signed by the contracting officer. This approval is required as called for by the contracting officer under the terms of this contract.

ATTACHMENT 4

REQUEST FOR INFORMATION

(Contractor Company Name)

RFI No.: _____

To:

Project No. and Title:

Contract No:

From:
Office Location:

Phone:

Fax:

Date Submitted: **RFIStarted**

Response Requested By:

INFORMATION REQUESTED

Specification Section #'s:

Drawing No.:

Description of Information Requested:

By_____

RESPONSE

RFIAnswer

By: _____ _____

Date

Cc:

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CONTRACT PROGRESS SCHEDULE
(See Contractor's Instructions on Reverse)

Form Approved
OMB NO. 0704-0188

1. CONTRACT NO.		8. PROJECT TITLE	10. APPROVAL RECOMMENDED BY:	
			DATE SIGNED	INSTALLATIONS ENGINEERS'S SIGNATURE
2. STARTING DATE				
3. COMPLETION DATE		9. SUBMITTED BY:		
4. PURCHASE REQUEST NO.		DATE SIGNED / CONTRACTOR'S NAME (Last, First, Middle Init (Street, City, State, Zip Code) / CONTRACTOR'S SIGNATURE	11. APPROVED BY:	
5. PROJECT NO.			DATE SIGNED	CONTRACTING OFFICER'S SIGNATURE
6. ACTUAL STARTING DATE				
7. ACTUAL COMPETION DATE				

LINE NO.	WORK ELEMENTS	%														
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1																
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19																
20																

AF Form 3064 JUN 90 ***PREVIOUS EDITION IS OBSOLETE***

INSTRUCTIONS TO CONTRACTORS

1. Prepare four copies of AF Form 3064, in accordance with these instructions and submit to the Contracting Officer at the time stated in the contract or as established by the Contracting Officer.

2. Blocks 1, 2, and 3. Enter the contract number, starting date, and completion date as shown on the contract.

3. Block 8. Enter the title of the project as shown on the contract.

4. Block 9. Enter name and address of your firm. The four copies submitted to the Contracting Officer shall be dated and signed by the Contractor or an authorized representative of the firm.

5. Column A - Line Items. This column numbers the project's major elements of work.

6. Column B - Major elements of work. Major elements of work such as excavation, concrete work, carpentry, engineering, installation of communication electronic facilities, etc., shall be shown in Column B in logical sequence and in sufficient detail to identify the element. Contract closeout documents constitute 5% of the total project cost and shall be reflected as the final major element of work.

7. Column C - Percentages. The corresponding percentage for each listed work element to complete the job shall be shown opposite each work element in Column C. For example: if 3 work elements are indicated, excavation, concrete work, and backfill, and it is estimated that excavation is 50% of the total job, concrete 30%, and backfill 15%, these percentages must be shown opposite each element, along with the required closeout documents work element for 5%. The total of all percentages shall equal 100%.

8. Columns D through Q - Periodic Progress. Columns D through Q shall be used to show planned periodic progress, i.e. weekly, bi-weekly, monthly, etc., as required by the Contracting Officer, during the performance period of the contract. Only the top half of the space for each Line Item under these columns shall be used by the Contractor. Using the example from above, with an 8 week performance period, with 10% excavation work to be completed the 1st week and 20% each week thereafter until excavation is complete, 10 would be shown in the upper half of Line 1 under Column D, 20 under Column E, and 20 under Column F for a total of 50%. Continue this process for the remaining work elements. If the contract extends beyond the original period of performance, additional copies of AF Form 3064, denoting the appropriate alterations, shall be spliced onto the original form as a continuation of the performance record.

9. The TOTAL amount of work planned at intervals as shown in Columns D through Q shall be totaled and entered in the top half of the space (under the appropriate column) for the Line No. immediately below the last denoted work element. Continuing the example from above, the totals for Columns D through F would equal 10, 20, 20, and so forth for the remaining work elements. The total shall equal 100%.

10. Graph the planned work progress by plotting, using a broken or dotted line showing the cumulative total progress for planned intervals.

11. In the event the contract is modified by the Contracting Officer under the terms of the contract, changing the progress of work as originally scheduled, adding or deleting work, or changing the original completion date, a revised progress schedule shall be prepared and submitted to the Contracting Officer for approval. In preparing the revised schedule, the amount of work completed shall be considered, together with the revised completion date as set forth in the contract modification. Considering these factors, the work under the contract shall be rescheduled over the revised total performance period in the same manner that the original schedule was prepared. The revised completion date shall be entered in Block 3, and labeled (ex: First Revised Schedule) immediately beneath the form title. Time of submission of the revised schedule will be determined by the Contracting Officer.

12. At such intervals as may be established by the Contracting Officer, the Contractor shall submit to the Contracting Officer AF Form 3065, "Contract Progress Report," indicating the percentage of work accomplished for each work element during the established reporting period. Accurate reports are of the utmost importance to the Contractor and to the Government, since the percentage of completion, or progress, reported is used in administration of the contract and shall be used in connection with approval of progress payments under the contract. Care should be taken to plan the work in such manner that it can be accomplished as stated in this schedule. If for any reason it becomes known that any part of the progress under this contract will be delayed, this fact should be reported to the Contracting Officer immediately.

C0NTRACT PROGRESS REPORT

OMA No. 9000-0068
Expires

CONTRACTOR	ADDRESS

REPORT NO.	PERIOD COVERED FROM: TO:	PROJECT NO.	CONTACT NO.	COMPLETION DATE

LINE NO.	WORK ELEMENT	% OF TOTAL JOB	% COMPLETED THIS PERIOD	% COMPLETED CUMULATIVE
	TOTAL	0.00	0.00	0.00

REMARKS

At the Contracting Officer's discretion and according to the payments clause of the contract, the information provided on this form may be used for computing progress payments.

PROGRESS OR COMPLETION CERTIFICATE

I hereby certify that the contractor has completed the indicated percentage of the contract per contract specifications.

SUBMITTED BY OR FOR

☐ CONTRACTOR ☐ BASE CIVIL ENGINEER

TYPE OR PRINT NAME AND TITLE	SIGNATURE	DATE

REVIEWED BY OR FOR CONTRACTING OFFICER

TYPE OR PRINT NAME AND TITLE	SIGNATURE	DATE

PREVIOUS EDITION IS OBSOLETE

AF FORM 3065, 19960401 (EF-V3)

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SPARE MATERIAL/ PARTS LISTING

Line Item (a)	Spec Section (b)	Spare Materials/Parts Description (c)	Contractor to Provide (d)	Date Contractor Delivered (e)	Quantity Delivered (f)
1	08705-7 Para 2.21	Key Cabinet	A. Size to permit minimum 50% expansion of system. Note:See attached E-mail from Ed Wamboldt dated 15-Jul-05		
2	08705-7 Para 2.22	Finish Hardware	A. Provide extra locks, closers, and latches to Owner for maintenance purposes. 1. Provide one of each function and type B. Provide six (6) sets of lock tools.		
3	09310-2 Para 1.07	Glazed Wall Tile	Contractor to supply extra 2% of each tile used in marked cartons.		
4	09320-2 Para 1.07	Ceramic Mosaic Floor Tile	Contractor to supply extra 2% of total of each tile used in marked cartons.		
5	09335-2 Para 1.07	Paver Floor Tile	Contractor to supply 2% of total quantity of each tile and trim units used in marked cartons.		
6	09510-2 Para 1.07	Acoustic Ceiling Systems	Contractor to supply extra 2% of each acoustic tile or panel and suspension system installed. Package with protective covering for storage and identify with appropriate labels.		
7	09680-3 Para 1.08	Carpet	Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents. 1. Carpet: Before installation begins, furnish quantity of full-width units equal to 5% of amount installed. 2. Resilient Accessories: Furnish not less than 3 linear feet for each 150 linear m (500 linear feet) or fraction thereof, of each type, color pattern, and size of resilient accessory installed.		

SPARE MATERIAL/ PARTS LISTING

Line Item (a)	Spec Section (b)	Spare Materials/Parts Description (c)	Contractor to Provide (d)	Date Contractor Delivered (e)	Quantity Delivered (f)
8	09950 Para 1.06	Wall Coverings	1. Furnish extra materials from same production run as wall covering installed. Package materials with protective covering and identify with labels describing contents. 2. Furnish quantity of full-size rolls equal to 10% amount installed.		
9	12511-2 Para 1.06	Horizontal Louver Blinds	Furnish extra materials described below that match products installed, are packed with protective covering for storage, and are identified with labels clearly describing contents. 1. Horizontal Louver Blinds: Before installation begins, furnish quantity of full-size units equal to 5% of amount of each size installed.		
10	15562-2 Para 1.07	Indirect-Fired Packaged H & V Units	Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. 1. Filters: One (1) set of each filter type for ea unit 2. Fan Belts: One set for each unit.		
11	15732 Para 1.07	Rooftop Air Conditioners	Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. 1. Fan Belts: One (1) set for each belt-drive fan 2. Filters: One (1) set of each filter type for ea unit		
12	15763-2 Para 1.06	Fan Coil Units	Furnish extra materials described below that match the products installed and that are packaged with protective covering for storage and identified with labels for each filter installed. 1. Fan Coil Unit Filters: Furnish two (2) spare filters for each filter installed.		

SELFRIDGE ANGB, MICHIGAN

PROJECT NO. TITLE:

CONTRACT NO.:

REQUIRED EXTENDED MANUFACTURER WARRANTIES (OVER THE STANDARD ONE YEAR WARRANTY PERIOD)

	Spec Section (b)	Warranty Description (c)	Limits of Warranty (d)	Warranty Years (e)	Certificate Number/ Serial No (f).	Warranty Expiration Date (g)	Manufacturer's Name (h)
ES (OV	07411	Metal Roof Panels Spec Page 07411-4	Special Warranty - Manufacturer's standard form in which mfgr agrees to repair or replace components of metal roof panel assemblies that fail in material or workmanship within the specified warranty period: 1. Failures include, but are not limited to: a. Structural Failures, including rupturing, cracking, or puncturing b. Deterioration of metals, metal finishes, & other materials beyond normal weathering	2			
2	07411	Metal Roof Panels Spec Page 07411-4	Panel Finishes Special Warranty. Mfgr's standard form in which mfgr agrees to repair finish or replace metal roof panels that show evidence of deterioration of factory-applied finishes wihtin specified warranty period: 1. Fluoropolymer Finish: Deterioration includes, but is not limited to: a. Color fading more than 5 Hunter units when tesed according to ASTM D2244.	20			
3	07411 Cont'd	Metal Roof Panels	b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214. c. Cracking, checking, peeling, or failure of paint to adhere to bare metal	20			
4	7411	Metal Roof Panels Spec Page 07411-4	Weathertightness Special Warranty for Standing-Seam Metal Roof Panels. Mfgr's standard form in which mfgr agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks.	20			

SELFRIDGE ANGB, MICHIGAN

PROJECT NO. TITLE:

CONTRACT NO.:

REQUIRED EXTENDED MANUFACTURER WARRANTIES (OVER THE STANDARD ONE YEAR WARRANTY PERIOD)

Line Item (a)	Spec Section (b)	Warranty Description (c)	Limits of Guarantees/ Warranty (d)	Warranty Years (e)	Certificate Number/ Serial No (f).	Warranty Expiration Date (g)	Manufacturer's Name (h)
5	07552	SBS Modified Bituminous Membrane Roofing Spec Page 07552-4	Special warranty includes roofing membrane, base flashings, roofing membrane, accessories, roof insulation, fasteners, cover boards, walkway products and other components of roofing system. Failure includes roof leaks. Roofing Installer's warranty, signed by Installer, covering all components of roofing system such as roofing membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products	20 2			
6	07722	Roof Scuttle Spec Page 07722-1 -	Roof Scuttle(s) shall be guaranteed by the manufacturer for proper operation and against defects in workmanship and materials.	5			
7	08210	Wood Doors Spec Page 08210-1 -	Solid Core Interior Doors: Submit two copies of written guarantee on door mfgr's standard form signed by mfgr, installer, and Contractor	Life of Original Installation Guarantee			

1. Prior to submitting the extended warranties to the Government for review and acceptance, the Contractor is to ensure that all the extended warranties have been registered with the manufacturer and that the manufacturer's warranty registration number is listed on each warranty.
2. Contractor is also responsible for ensuring that the manufacturer's company name, street address, and telephone number is listed on each extended warranty.
3. Columns (f), (g), and (h) on this form must be completed by the Contractor and accompany the warranties when they are submitted for review and acceptance.
4. All extended warranties and this completed Extended Warranty Listing are to be submitted in a binder to the Architect-Engineer Designing Firm prior to submitting.

TRANSFER AND ACCEPTANCE OF DoD REAL PROPERTY

Form Approved
OMB No. 0704-0188

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE ABOVE ORGANIZATION.

1. FROM *(Organization Name)*

2. DATE PREPARED *(YYYYMMDD)*

3. PROJECT/JOB NUMBER

4. SERIAL NUMBER

5. TO *(Organization - Installation Code and Name)*
1480
Selfridge Air National Guard Base - 127th CES/CE
28890 Selfridge Ave., Bldg. 124
Harrison Township, MI 48045

6. RPSUID/SITENAME/ INSTCODE/INSTNAME
VGLZ

7. CONTRACT NUMBER(S)

7a. PLACED-IN-SERVICE DATE *(YYYYMMDD)*

8. TRANSACTION DETAILS

a. METHOD *(X all that apply)*
- [ ] ACQUISITION BY CONSTRUCTION
- [ ] TRANSFER BETWEEN SERVICES
- [X] CAPITAL IMPROVEMENT
- [ ] INVENTORY ADJUSTMENT

b. WHEN/EVENT *(X one)*
- [X] TOTAL ASSET PLACED-IN-SERVICE
- [ ] PARTIAL ASSET PLACED-IN-SERVICE

c. TYPE *(X one)*
- [ ] DRAFT
- [ ] FINAL
- [X] INTERIM

9. ITEM NO.	10a. FACILITY NO.	10b. RPUID	11. CATEGORY CODE	12. CATCODE DESCRIPTION	13. TYPE CODE	14. SUST. CODE	AREA 15. PRIMARY UM	AREA 16. PRIMARY UM QUANTITY	OTHER 17. SECONDARY UM	OTHER 18. SECONDARY UM QUANTITY	19. COST	20. FUND SOURCE	21. FUND ORG	22. INTER-EST CODE	23. ITEM REMARKS
										TOTAL					

24. STATEMENT OF COMPLETION. The facilities listed hereon are in accordance with maps, drawings, and specifications and change orders approved by the authorized representative of the using agency except for the deficiencies listed on the reverse side.

a. TRANSFERRED BY *(Typed Name and Signature)*

b. DATE SIGNED *(YYYYMMDD)*

c. TITLE *(Area Engr./Base Engr./DPW/Construction Agent)*

25a. ACCEPTED BY *(Typed Name and Signature)*
STEPHEN J. WARD

b. DATE SIGNED *(YYYYMMDD)*

c. TITLE *(DPW/RPAO)*
COL NGB
USPFO-MI

26. PROPERTY VOUCHER NUMBER

27. CONSTRUCTION DEFICIENCIES *(Attach blank sheet for continuations)*	28. PROJECT REMARKS *(Attach blank sheet for continuations)*

INSTRUCTIONS

GENERAL. This form has been designed and issued for use in connection with the transfer of military real property between the military departments and to or from other government agencies. It supersedes ENG Forms 290 and 290B (formerly used by the Army and Air Force) and NAVDOCKS Form 2317 (formerly used by the Navy).

Existing instructions issued by the military departments relative to the preparation of DD Form 1354 are applicable to this revised form to the extent that the various items and columns on the superseded forms have been retained. The military departments may promulgate additional instructions, as appropriate.

For detailed instructions on how to fill out this form, please refer to Unified Facilities Criteria (UFC) 1-300-08, dated 16 April 2009 or later.

SPECIFIC DATA ITEMS.

1. From. Name of the transferring agency.

2. Date Prepared. Date of actual preparation. Enter all dates in YYYYMMDD format (Example: March 31, 2010 = 20100331).

3. Project/Job Number. Project number on a DD Form 1391 or Individual Job Order Number.

4. Serial Number. Sequential serial number assigned by the preparing organization (e.g., 2010-0001).

5. To. Name and address of the receiving installation, activity, and Service of the Real Property Accountable Officer (RPAO).

6. RPSUID/SITENAME/INSTCODE/INSTNAME. Site Unique Identifier and name or installation code and name where the constructed facility is located.

7. Contract Number(s). Contract number(s) for this project.

7a. Placed-In-Service Date. RPA Placed In Service Date. This is the date the asset is actually placed-in-service.

8. Transaction Details.
a. Method of Transaction. Mark (X) as many boxes as apply.
b. When/Event. When or event causing preparation of DD Form 1354. X only one box.
c. Type. Draft, interim, or final DD Form 1354. X only one box.

9. Item Number. Use a separate item number for each facility, no item number for additional usages.

10a. Facility Number. Assigned in accordance with the Installation/Base Master Numbering Plan.

10b. RPUID. Identified in Real Property Inventory.

11. Category Code. The category code describes the facility usage.

12. Catcode Description. The category code name which describes the facility usage.

13. Type. Type of construction: P for Permanent; S for Semi- permanent; T for Temporary.

14. Sustainability Code. Reports whether or not an asset meets the sustainability guidelines set forth in Section 2(g) of Executive Order 13514. Valid values are: 1 (asset meets the guidelines); 2 (asset does not meet the guidelines); 3 (asset not evaluated); 4 (asset not subject to guidelines).

15. Area: UM 1. Area unit of measure; use the unit of measure associated with the category code selected in 11.

16. Total Quantity UM 1. The total area for the measure identified in Item 15. Use negative numbers for demolition.

17. Other: UM 2. Unit of Measure 2 is the capacity or other measurement unit (e.g., LF, MB, EA, etc.).

18. Total Quantity UM 2. The total capacity/other for the measure identified in Item 17.

19. Cost. Cost for each facility; for capital improvements to existing facilities, show amount of increase only. If there is no increase for the capital improvement, enter N/A.

20. Fund Source. Enter the Fund Source Code for this item.

21. Funding Organization. Enter the code for the organization responsible for acquiring this facility.

22. Interest Code. Enter the code that reflects government interest or ownership in the facility.

23. Item Remarks. Remarks pertaining only to the item number identified in Item 9; show cost sharing.

24. Statement of Completion. Typed name, signature, title, and date of signature by the responsible transferring individual or agent.

25. Accepted By. Typed name, signature, title, and date of signature by the RPAO or accepting official.

26. Property Voucher Number. Next sequential number assigned by the RPAO in voucher register.

27. Construction Deficiencies. List construction deficiencies in project during contractor turnover inspection.

28. Project Remarks. Project level remarks and continuation of blocks.

REAL PROPERTY INSTALLED COST WORKSHEET INSTRUCTIONS:

This worksheet is being provided to you, the Contractor, as a tool to be used by the Real Property Office as a means of determining which improvements must be capitalized into the Real Property Records following the completion of your project.

Page 2 contains the most vital information concerning new construction projects. New construction can include construction of a new building, an addition, demolition, rehabilitation of a facility, installation or upgrade of a utility, heating or cooling plant, fire system, parking lot, drive or sidewalk and others (see listing attached). Specialty areas must be identified and their cost broken out to determine plant replacement value (PRV) which will ultimately aid the base in calculating operations and maintenance (O&M) funds to maintain an operational status. These items are listed separately on pages 3, 4 & 5.

All areas may not apply to your contract due to the nature of the project. Please complete the information that pertains to your project and write n/a (not applicable) or strike through the areas that do not apply. If in doubt, please consult your Contract Administrator, the Project Engineer or Real Property.

The Real Property office may ask for your assistance in completing a Real Property Installed (RPIE) checklist which is not provided here, but assists that office in identifying and tracking other components of a facility which regulation requests they have an accounting of.

Please note the differing units of measure required on pages 3, 4 & 5. Please provide a corresponding cost associated with that improvement.

REAL PROPERTY INSTALLED COST WORKSHEET

BLDG. # 117 **CONTRACT # W9133L-16-D-0009-P00001**
PROJECT # VGLZ: 172117

CONTRACT AMOUNT: $

PROJECT NAME:

ADDRESS:

CONTRACTOR:

CONTACT : **PHONE:**

CONTRACTING OFFICER: **PHONE:**

ENGINEER: **PHONE:**

1. **General Building Data.**

Exterior Dimensions: ……. SF: …… (Main Bldg)

……..…… SF: …… (Wings)

……..……... SF:..…… (Offsets)

No. of Stories: …….. COST $

Dimensions of Covered Walkways/Corridors: ….…….

Type of Construction: ……..……..

Floors: ……

Foundation: ……

Exterior Walls: ……..……

Roof: ……

Utilities: Water (type and size of pipe): …….

Gas (type and size of pipe): ……

Electric (phase, voltage, wire): ……..……..

Other Utility (type, capacity, etc.): ……..

2. Installed Systems & Plants

Category	Nomenclature	Unit of Measure	Quantity	Cost
- Fire Protection				
880-211	Closed Head Auto Sprinklers	SF/HD	……	....
880-212	Open Head Deluge System	SF/HD	……	....
880-216	Pre-action Sprinkler System	SF/HD	……	....
880-217	AFFF PA Sprinkler System	SF/HD	……	….
880-218	Hi-expansion Foam System	EA	……	....
880-221	Auto Fire Protection System	SF/EA	……	….
880-222	Manual Fire Alarm System	EA	……	….
880-231	CO2 Fire System	EA	……	....
880-232	Foam Fire System	EA	……	....
880-233	Other Fire System	EA	……	....
880-234	Halon 1301 Fire System	EA	……	....
880-235	Dry Chemical System	EA	……	....
880-236	Foam System	EA	……	....
-Security				
872-841	Security Alarm System	EA	……	....
- Installed Plants				
890-124	A/C From Central Plant	SF	……	....
890-126	A/C Window Units	SF/TN	……	....
890-125	A/C Plant < 5 Tons	SF/TN	……	....
890-121	A/C Plant 5 to 25 Tons	TN	……	….
890-122	A/C Plant 25-100 Tons	TN	……	....
890-123	A/C Plant Over 100 Tons	TN	……	….
821-115	Heating Plant 750-3500 MB	MB	……	….
821-116	Heating Plant Over 3500 MB	MB	……	….
811-147	Emergency Power Generator	KW	……	....
124-xxx	Fuel Tank for Htg/Generator	GA	……	....
		(Type of Fuel: ……)		

3. Related Facilities		**Unit of Measure**	**Quantity**	**Cost**
116-xxx	Pads (type: ……..)	SY	……	....
411-xxx	Large Storage Tanks	BL	……	....
812-223	Primary Elec Distr – Overhead (includes: Transformers, Power Poles, other related equipment, KVA)	LF	……	....
812-224	Secondary Elec Distr – Overhead	LF	……	....
812-225	Primary Elec Distr – U/G (includes: Transformers & related equipment)	LF	……	….
812-226	Secondary Elec Distr – U/G	LF	……	….
812-926	Exterior Area Lighting (Street/Parking Lights)	EA	……	....
824-464	Gas Mains	LF	……	….
831-169	Sewage Septic Tank	KG	……	....
832-255	Industrial Waste Mains	LF	……	....
832-266	Sanitary Sewer Mains	LF	……	….
841-161	Water Supply Mains	LF	……	….
842-245	Water Distribution Mains	LF	……	....
843-315	Fire Hydrants	EA	……	....
851-143	Curbs & Gutters	LF	……	….
851-145	Driveway	SY	……	….
851-147	Road	SY/LF	……	....
852-262	Vehicle Parking	SY	……	....
852-289	Sidewalk	SY	……	….
871-183	Storm Drains	LF	……	….
872-247	Security Fence	LF	……	....
872-248	Interior Fence	LF	……	....
890-144	Compressed Air Distribution	LF	……	....
890-158	Load/Unload Platform	SF	……	....
890-187	Utility Vault	SF	……	….
890-272	EMCS Field Equipment	EA	……	....
890-273	EMCS Data Links	LF	……	....
135-583	Telephone Duct	LF	……	….
135-586	Telephone Pole	LF	……	....

PROJECT NO. TITLE:

CONTRACT NO:

O AND M DATA LISTING

Line Item (a)	Spec Section (b)	Item Description (c)	Contractor to Provide (d)	Contractor Input Data to Binder (e)	Binder Item # (f)
1	06010-10 Para 3.5	Boiler.	Operation and maintenance manual.	Yes	1
2					
3					
4					
5					
6					
7					

PROJECT NO. TITLE:

CONTRACT NO:
O AND M DATA LISTING

Line Item (a)				Date Contractor Delivered (e)	Quantity Delivered (f)
8					
9					
10					
11					
12					

Contractor Hazardous Material Identification

Part I

To be completed by Contractor prior to start date and shall be maintained on the job site.

Project Name: _____ Date: _____

Contractor Company: _____

Proposed Work Term: _____ **to** _____

Contractor Point of Contact: _____

Phone: _____

HM to be Used: MFG. / Product	M.S.D.S. Attached	QTY Used	Disposal Procedures	Comments

NOTE: This form is to be submitted to the HMPT for initial construction. All Hazardous Material (HM) used thereafter will be identified to Contracting Officer representative and tracked by the HMPT. See Part II for contractor closeout procedures. HMPT phone number is (586) 307-6104.

HMPT Tracking Signatures

CEV: _____ **SGPB:** _____

HMPT: _____ **CEF:** _____

Contractor Hazardous Material Identification

Part II

Closeout Procedures

Project Name:

HM to be used: MFG/Product	Used/Unused Material Removed from Selfridge	Comments

Contractors will accompany Base Environmental on closeout inspection to ensure all used / unused HM was removed from the Base.

Date: _____

Closeout Signatures:

CEV: _____

Contracting Officers Representatve: _____

Contractor: _____

Solid Waste Disposal and Diversion Tracking

This tracking form is to assist the base in reporting solid waste metrics required to be submitted quarterly to the Deputy Undersecretary of Defense IAW DoD Pollution Prevention Measure of Merit (Mom) Memorandum, HQ USAF/IILEV, 6 August 1998. This form must be submitted at the end of each quarter during the contract.

- Amount (in tons) of non-hazardous solid waste, including construction and demolition debris, that is composted, mulched, recycled, reused, donated or otherwise diverted from a disposal facility.
- Amount (in tons) of solid waste (including construction and demolition debris) transferred to a disposal facility.

Submit completed forms to 127WG/CEV, Bldg 127, 28700 Railroad Ave, Selfridge MI, 48035 Attn: Solid Waste Tracking Manager. If you have any questions completing this form please contact CEV at (586) 307-5741

Project: _____

Contractor: _____
(Print)

Government Inspector: _____
(Print)

Contract Period: _____
(Quarter disposal/recycling was accomplished)

Approximate Amount (in tons) of solid waste (including construction and demolition debris) transferred to a disposal facility.

Land filled (Tons) _____

Incinerated (Tons) _____

Disposal Facility_____ POC _____ Phone_____%___

Disposal Facility_____ POC _____ Phone_____%___

Disposal Facility_____ POC _____ Phone_____%___

Approximate Amount (in tons) of non-hazardous solid waste, including construction and demolition debris, that is composted, mulched, recycled, reused, donated or otherwise diverted from a disposal facility.

(Tons) _____

Diversion Facility_____ POC _____Phone_____%___

Diversion Facility_____POC_____Phone_____%___

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SECTION 01 00 10

AFFIRMATIVE PROCUREMENT

PART 1 GENERAL

1.1 AFFIRMATIVE PROCUREMENT & POLLUTION PREVENTION

Affirmative Procurement is a mandatory component of the Air Force pollution prevention program. The AF Installation Pollution Prevention Program Guide includes this goal for Affirmative Procurement: "100 percent of all products purchased each year in each of U.S. EPA's 'Guideline Item' categories shall contain recovered materials meeting U.S. EPA's Guideline Criteria." This document contains guidelines for implementing the RCRA, EO, DOD, and Air Force requirements.

For all product submittals made on this project that are a U.S. EPA designated item (as described later in this specification), the contractor must either submit documentation certifying that the submitted product meets the minimum recycled content requirement listed in the AFFIRMATIVE PROCUREMENT REPORTING FORM or the contractor must submit the "Affirmative Procurement Determination Form" indicating and explaining the applicable exemption. This submittal requirement is in addition to the submittal requirements indicated in each product's specification.

Prior to project close-out, the contractor shall complete and submit the AFFIRMATIVE PROCUREMENT REPORTING FORM.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. Code (USC)

5 USC 102	Military Departments
5 USC 105	Executive Agency
42 USC 13102	Definitions
42 USC 6962	Federal Procurement

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 247	Comprehensive Procurement Guideline for Products Containing Recovered Materials
EO 13693	(2015)Planning for Federal Sustainability in the Next Decade

1.3 AUTHORITY AND REFERENCES

The Resource Conservation and Recovery Act (RCRA), Section 6002 of 42 USC 6962

Executive Order 13693, Planning for Federal Sustainability in the Next Decade (EO 13693).

40 CFR 247, Comprehensive Procurement Guideline for Products containing Recovered Material.

Federal Acquisition Regulations (FAR)

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

AFFIRMATIVE PROCUREMENT REPORTING FORM Report; G

SD-11 Closeout Submittals

AFFIRMATIVE PROCUREMENT REPORTING FORM; G

1.5 DEFINITIONS

AFFIRMATIVE PROCUREMENT: The purchase of environmentally preferable products manufactured from recycled and reclaimed materials.

ACQUISITION: The acquiring by contract with appropriated funds for supplies or services (including construction) by and for the use of the Federal Government through purchase or lease, whether the supplies or services are already in existence or must be created, developed, demonstrated, and evaluated. Acquisition begins at the point when agency needs are established and includes the description of requirements to satisfy agency needs, solicitation and selection of sources, award of contracts, contract financing, contract performance, contract administration, and those technical and management functions directly related to the process of fulfilling agency needs by contract.

CONTRACTOR: The prime Contractor, Sub-contractor, material suppliers, and equipment suppliers who provide the products that will be used in the construction of this project.

ENVIRONMENTALLY PREFERABLE: Products or services having a lesser or reduced effect on human health and the environment when compared to competing products or services, serving the same purpose. This comparison may consider raw materials acquisition, production, manufacturing, packing, distribution, reuse, operation, maintenance, or product or service disposal. (EO 13693)

EPA DESIGNATED ITEM: An item that is or can be made with recovered material; that is listed by the Environmental Protection Agency (EPA) in a procurement guideline (40 CFR 247); and for which EPA has advised purchasing recommendations in a related Recovered materials Advisory Notice (RMAN). (FAR 23.402)

EXECUTIVE AGENT OR AGENCY: An executive agency as defined in 5 USC 105. For

the purpose of this order, military departments, as defined in 5 USC 102 are covered under the auspices of the Department of Defense.

FORM: The Affirmative Procurement Reporting Form found at the end of this section.

POLLUTION PREVENTION: Source reduction as defined in the Pollution Prevention Act of 1990 (42 USC 13102), and other practices that reduce or eliminate the creation of pollutants through (a) increased efficiency in the use of raw materials, energy, water, or other resources; or (b) protection of natural resources by conservation.

POSTCONSUMER MATERIAL: A material or finished product that has served its intended use and has been discarded for disposal or recovery, having completed its life as a consumer item. "Post consumer material" is a part of the broader category of "recovered material".

PROCUREMENT: The purchase and providing of products to be used in the construction of this project.

PRODUCT: Materials and equipment that will be used in the construction of this project.

RECOVERED MATERIALS: Waste materials and by-products which have been recovered or diverted from solid waste, but such term does not include those materials and by-products generated from, and commonly reused within, an original manufacturing process. (EO 13693 and FAR 23.402)

RECYCLABILITY: The ability of a product or material to be recovered from or otherwise diverted from the solid waste stream for the purpose of recycling. (EO 13693)

RECYCLING: The series of activities, including collection, separation, and processing by which products or other materials are recovered from the solid waste steam for use in form of raw materials in the manufacture of new products other than fuel for producing heat or power by combustion. (EO 13693)

RECYCLED MATERIAL: A material utilized in place of raw or virgin material in product manufacturing consisting of materials derived from postconsumer waste, industrial scrap, material derived from agricultural wastes, and other items, all of which can be used in new product manufacturer.

RECYCLED PRODUCT: A recycled product is one made completely or partially from waste materials or by-products recovered or diverted from the solid waste stream.

SOLID WASTE: Garbage, refuse, sludge and other discarded materials including those from industrial, commercial, and agricultural operations, and from community activities. This excludes solids or dissolved materials in domestic sewage or other significant pollutants in water resources, such as silt, dissolved or suspended solids in industrial waste water effluents, dissolved materials in irrigation return flow, etc.

SPECIFICATION(S): A clear and accurate description of the technical requirements for materials, products, or services including the minimum requirement for materials' quality and construction and any equipment necessary for an acceptable product. In general, specifications are in the form of written descriptions, drawings, prints, commercial designations,

industry standards, and other descriptive references.

UNREASONABLE PRICE: If the cost of the recycled content product exceeds the cost of a non-recycled item, the Air Force considers the cost to be unreasonable.

VERIFICATION: Procedures used by procuring agencies to confirm both vendor estimates and certifications of the percentages of recovered materials contained in the products supplied to them or to be used in the performance of a contract.

WASTE PREVENTION: Any change in the design, manufacturing, purchase, or use of materials or products (including packaging) to reduce their amount or toxicity before they are discarded. Waste prevention also refers to the reuse of products or materials.

WASTE REDUCTION: Preventing or decreasing the amount of waste being generated through waste prevention, recycling, or purchasing recycled and environmentally preferable products.

1.6 APPLICABILITY

These procedures apply to Contractors employed in the construction of government projects. Please direct all questions regarding the plan to the Contracting Officer.

1.7 EXEMPTIONS

1.7.1 EPA Recommendations

The U.S. EPA's recommends minimum recycled content levels are mandatory for procurements of those items listed in the AFFIRMATIVE PROCUREMENT REPORTING FORM, unless one of the following exemptions applies. RCRA provides the following exemptions from the requirement to purchase EPA-designated items:

1. The product is not available from a sufficient number of sources to maintain a satisfactory level of competition (i.e., available from two or more sources).

2. The product is not available within a reasonable period of time.

3. The product does not meet the performance standards in applicable specifications or fails to meet reasonable performance standards of the procuring agency.

4. The product is not available at a reasonable price. For Air Force purposes, "unreasonable price" is defined as follows: If the price of the recycled-content product exceeds the cost of a non-recycled item, then the price is considered unreasonable.

1.7.2 Contractor Responsibility

The Contractor is responsible for completion of the Form with respect to the work and products being provided. The Prime Contractor is responsible for insuring that all sub-Contractors comply with this order. Each Contractor shall provide written documentation to support his/her decision not to acquire items meeting the minimum content levels. This documentation shall be forwarded to the Contracting Officer for review and approval. In the event the documentation fails to support the Contractor's

findings, the Contracting Officer's Representative shall return the documentation to the Contractor citing the reason(s) for disapproval. The Contractor shall resubmit and address the deficiencies. Contractor is cautioned not to proceed with acquiring non-compliant materials until the Contracting Officer's approval is received.

1.8 U.S. EPA DESIGNATED ITEMS

The 54 U.S. EPA-designated items are listed below. Not all of these materials may be required in the construction of this project. Please refer to the drawings and specifications. The attached AFFIRMATIVE PROCUREMENT REPORTING FORM shall be used to demonstrate compliance with the stated procurement requirements.

PAPER PRODUCTS

1. All paper and paper products, excluding building and construction paper grades.

VEHICULAR PRODUCTS

2. Lubricating oils containing re-refined oil, including engine lubricating oils, hydraulic fluids, and gear oils, but excluding marine and aviation oils.
3. Tires, excluding airplane tires.
4. Reclaimed engine coolants, excluding coolants used in non-vehicular applications

CONSTRUCTION PRODUCTS

5. Building insulation products.
6. Structural fiberboard products for applications other than building insulation.
7. Laminated paperboard products for applications other than building insulation.
8. Cement and concrete, including products such as pipe and block, containing fly ash.
9. Cement and concrete, including concrete products such as pipe and block, containing ground-granulated blast furnace (GGBF) slag.
10. Carpet made of polyester fiber for use in low- and medium-wear applications.
11. Floor tiles containing recovered rubber or plastic.
12. Patio blocks containing recovered rubber or plastic.
25. Shower and restroom dividers/partitions containing recovered steel or plastic.
26. Reprocessed and consolidated latex paint for specific uses.
37. Carpet cushion.
38. Flowable fill.
39. Railroad grade crossing surfaces.

TRANSPORTATION PRODUCTS

13. Traffic barricades used in controlling or restricting vehicular traffic.
14. Traffic cones used in controlling or restricting vehicular traffic.
27. Parking stops.
28. Channelizers used as temporary traffic control devices.
29. Delineators used as temporary traffic control devices.
30. Flexible delineators used as temporary traffic control devices.

PARK AND RECREATION PRODUCTS

15. Playground surfaces containing recovered rubber or plastic.
16. Running tracks containing recovered rubber or plastic.
31. Plastic fencing.
40. Park benches and picnic tables.
41. Playground equipment.

LANDSCAPING PRODUCTS

17. Hydraulic mulch products containing recovered paper or recovered wood.
18. Compost made from yard trimmings, leaves, and/or grass clippings.
32. Garden and soaker hoses containing recovered rubber or plastic.
33. Lawn and garden edging containing recovered rubber or plastic.
42. Food waste compost.
43. Plastic lumber landscaping timbers and posts.

NON-PAPER OFFICE PRODUCTS

19. Office recycling containers.
20. Office waste receptacles.
16. Plastic desktop accessories.
22. Toner cartridges.
23. Binders.
24. Plastic trash bags.
34. Printer ribbons (re-inked ribbons or re-inking equipment/service for ribbons).
35. Plastic envelops.
44. Solid plastic binders.
45. Plastic clipboards.
46. Plastic file folders.
47. Plastic clip portfolios.
48. Plastic presentation folders.

MISCELLANEOUS PRODUCTS

36. Pallets
49. Sorbents.
50. Industrial drums.
51. Awards and plaques.
52. Mats.
53. Signage, including sign supports and posts.
54. Manual-grade strapping.

1.9 INTENT

The intent of this section is to increase the awareness of all Contractors as to the availability of products manufactured from, or that contain recycled materials, thereby increasing the use of these products in the construction of this project.

The various sections of the specifications contain references to products to be used in the construction of this project. The listed product may or may not be manufactured from or contain recycled materials. Therefore, all Contractors, Sub-contractor, equipment suppliers, and material suppliers are responsible for compliance with this specification. Recycled products shall be used wherever possible subject to the exemptions as per the

paragraph entitled EXEMPTIONS. Substitution of recycled materials or recycled products for specified products are subject to the provisions of the paragraph entitled Exemptions.

1.10 RECYCLED OR RECOVERED PRODUCTS

All construction materials to be used in this project, unless on existing exemption list, are to be identified on the Form at the end of this section.

1.11 QUALITY ASSURANCE

Companies specializing in the manufacture of products that comply with the requirements of this section shall have a minimum of three (3) years documented experience.

PART 2 PRODUCTS

2.1 PARTIAL LIST OF PRODUCT SOURCES & INFORMATION

The following is a partial list of companies that manufacturer products using recycled materials. This partial list is presented to establish a standard of quality and does not infer that other manufacturers do not qualify. All products intended for use on this project, whether listed below or not, shall be submitted to the Contracting Officer's Representative in accordance with specification Section 01 33 00 SUBMITTAL PROCEDURES.

GENERAL DATA

1. GreenSpec Binder, Environmental Building News, www.ebuild.com
2. Certified Forest Products Council, www.cerifiedwood.org/
3. Wiley Series in Sustainable Design, www.wiley.com/
4. The Carpet and Rug Institute, www.carpet-rug.com/
5. Information, McGraw-Hill, dialogue@mcgraw-hill.com
6. Florida Directory of Recycled Product Vendors, ww.2.dep.state.fl.us/waste/programs/rbac/downloads/rbac_dir.pd
7. Oikos Green Building Source, News, searchable products data base, library, www.oikos.com
8. Green Design Network, News, publications, databases, www.greendesign.net
9. Green Works Recycled Content7 Product Guide, detailed vendors directory, www.metrokc.gov/greenworks/recycontent.htm

DIVISION 3 - CONCRETE

1. GranCem, granulated blast-furnace slag, www.grancem.com/
2. Syndesis, cement-based, pre-cast product workable with wood tools, www.syndesisinc.com/

DIVISION 4 - MASONRY

1. Heble Building Systems, autoclaved aerated concrete blocks, www.heble.com/
2. Ytong Florida Ltd., autoclaved aerated concrete blocks, www.ytong-usa.com/

DIVISION 6 - CARPENTRY

1. Avonite, solid surfacing, www.avonite.com/

2. Chemical Specialties, wood treatment, www.treatedwood.com/
3. Homasote Company, structural fiberboard, www.homasote.com/
4. Isoboard, fiberboard composed of straw fibers and non-toxic resins, www.isoboard.com/
5. TrusJoist Mac Millan, engineered wood products, www.homasote.com/

DIVISION 7 - THERMAL & MOSITURE PROTECTION

1. Duro-Last Roofing, recycled PVC walkway pads, 1-800-248-0280
2. Johns Manville, Insulation products, www.jm.com/
3. Majestic Skylines, rubber-based slate-look roofing for steep roofs, www.majesticskylines.com/
4. Owens-Corning, insulation products, www.owenscorning.com/

DIVISION 8 - DOORS & WINDOWS

1. Marvin Window & Door, windows, some meeting "Energy Star Label", www.marvin.com/
2. Pella, energy efficient windows, www/pella.com/

DIVISION 9 - FINISHES

1. Armstrong World Industries, Inc.-Flooring Systems, www.armstrong-floors.com/
2. Armstrong World Industries, Inc.-Ceiling Systems, www.ceilings.com/
3. Benjamin Moore & Co., VOC free acrylic interior latex paint, www.benjaminmoore.com/
4. CanFibre Group Ltd., all-green medium-density fiberboard, www.canfibre.com
5. Chemrex Inc., low-e interior paint, www.chemrex.com/
6. Collins & Aikman Floor coverings, carpet with 100 percent post-consumer backing, www.powerbond.com/
7. DesignTex, Inc., polyester panel fabric made from 100 percent PET fiber, www.dtex.com/
8. Dodge-Regupol, Inc., 100 percent recycled rubber-flooring, www.regupol.com/
9. Eco-sensitive modular tile, vinyl tile with 100 percent recycled carpet-backing, www.powerbond.com/
10. Environmental Stone Products, stone manufactured from 100 percent recycled glass, www.environmentalstone.com/
11. Glidden: residential interior latex paints 100 percent free of VOC, www.icipaintstores.com/
12. Homasote Inc., sound barrier, www.homasote.com/
13. Isoboard Enterprises, Inc. panel made from wheat straw and non-toxic resins, 1-503-242-7345
14. Marley-Flexco Co., flooring made from 95 percent recycled truck and bus tires, www.marleyflexco.com/
15. The Mat Factory, Inc., interlocking roll-up tiles made from 100 percent postconsumer tire rubber and PVC plastic from electric cable covers, 1-949-645-3122
16. Permafirm Pad Co., carpet pads made from almost 100 percent recycled content, 1-800-344-6977
17. Sherwin Williams, VOC compliant paints and enamels, www.sherwin.com/
18. SierraPine Limited, formaldehyde-free particleboard and medium density fiberboard containing recycled/recovered wood fiber, www.sierrapine.com/
19. Summittville Tiles, impervious porcelain tiles using feldspar tailings, www.summitville.com/

20. Tectum, natural-fiber acoustical ceiling and wall panels, www.tectum.com/
21. Tiles with natural fibers, tiles made of a bio-alloy material and natural fibers, www.maderatile.com
22. USG Interiors, Inc., synthetic gypsum board, www.usg.com/
23. Decorative Architectural Tiles, floor, counter & wall tile made from 100 percent percent postconsumer glass, 1-808-8857812
24. Forbo, linoleum flooring utilizing renewable resources, www.forbo.com/

DIVISION 10 - SPECIALTIES

1. The Access Store, modular ramping system made from 100 percent recycled rubber, www.accessstoe.com/
2. BP Solar, photovoltaic modules and systems, www.bp.com/bpsolar/index
3. Mecho Shade Systems, interior shadecloths, www.mechoshade.com/
4. R Control, structural insulated panel (SIP), www.mechoshade.com/

DIVISION 12 - FURNISHINGS

1. Guilford of Maine, fabric from 100 percent recycled materials, www.terratex.com/
2. Phenix Biocomposites, tabletops made from soy based products free of petrochemicals, 1-800-324-8187
3. Safe Solutions, LLC, furniture manufactured from waste wood, 1-970-247-3333

DIVISION 14 - CONVEYING SYSTEMS

1. Montgomery KONE, AC girlies elevators, www.montgomery-kone.com/

DIVISION 26 - ELECTRICAL

1. Advance Transformer Company, linear reactor ballast, www.advancetransformer.com/
2. Artemide Inc., energy efficient cold-cathode lighting, www.artemide.com/
3. Edison Price Lighting, track mounted metal-halide PAR 30 &38 lamps, 1-212-521-6995
4. Leviton Manufacturing Corporation, Inc., occupancy sensors, www.leviton.com/
5. Phillips Lighting, energy efficient compact fluorescent lamps, www.phillips.com/lighting
6. Osram Sylvania, mercury-free lamps and energy efficient fluorescent lamps, www.osramsylvania.com/
7. Sensor Switch, lighting control occupancy sensors, www.sensorswitch.com/
8. Venture Lighting, pulse-start high performance lamp-ballast system, www.venturelighting.com/

PART 3 EXECUTION

3.1 INSTALLATION

All products shall be installed per manufacturer's instructions.

3.2 SUPPLEMENTS

The supplemental sheets listed below and following the section are part of

this specification.

Affirmative Procurement Reporting Form

Affirmative Procurement Determination Form

-- End of Section --

ATTACHMENT 1
AFFIRMATIVE PROCUREMENT REPORTING FORM

(PER EXECUTIVE ORDER 13101)

PROJECT NUMBER:
BLDG NUMBER:
PROJECT MANAGER:
PROJECT INSPECTOR:
CONTRACTOR:

This form is to be completed by the Prime Contractor and submitted to the Contracting Officer. Items exempted by the Government are listed in the exemption column with a G preceding the applicable exemption number. Items approved by the Contracting Officer shall list only the applicable exemption number in the column. All approved exemptions (forms only) shall be affixed to the final submission provided to the Contracting Officer.

RECYCLED OR RECOVERED PRODUCT	TOTAL RECOVERED MATERIALS CONTENT (RMC) (%)	ACTUAL RMC (%)	QUANTITY USED/UI	EXEMPT 1,2,3,4
Rock Wool Insulation	75%			
Fiberglass Insulation	20-25%			
Cellulose loose fill/Spray-on Insulation	75%			
Perlite Composition Board Insulation	23%			
Plastic Rigid Foam Insulation	9%			
Plastic Foam In Place Insulation	5%			
Plastic Foam, Glass Fiber Reinforced Insulation	6%			
Phenolic Rigid Foam Insulation	5%			
Structural Fiber Board	80-100%			
Laminated Paper Board	100%			
Cement/Concrete (FlyAsh)	SEE SPEC[1]			
High Fly Ash Flowable Fills	95%			
Low Fly Ash Content Flowable Fill	6-14%			
Carpet (PET)	25-100%			
Bonded polyurethane Carpet Cushion	15-50%			
Jute Carpet Cushion	40%			
Synthetic fibers Carpet Cushion	100%			
Rubber Carpet Cushion	60-90%			
Rubber Plastic Patio Blocks	90-100%			
Rubber or Plastic Floor Tile	90-100%			
Steel Restroom Divider/Partition	16%			
Plastic Restroom Divider/Partition	20-100%			

RECYCLED OR RECOVERED PRODUCT	TOTAL RECOVERED MATERIALS CONTENT (RMC) (%)	ACTUAL RMC (%)	QUANTITY USED/UI	EXEMPT 1,2,3,4
Concrete Railroad Crossing	15-20%			
Rubber Railroad Crossing	85-95%			
Steel Railroad Crossing	25-30% BOF/100% EAF[2]			
Traffic cones made from PVC, LDPE, crumb rubber	50-100%			
Traffic Barricades (Type I and II only) made from HDPE, LDPE, PET, steel, fiberglass	100%			
Channelizers, Plastic	25-95%			
Channelizers, rubber base	100%			
Delineators, plastic	25-90%			
Delineators, rubber base	100%			
Delineators, steel base	25-50%			
Flexible plastic delineators	25-85%			
Parking Stops, Plastic or Rubber	100%			
Parking Stops, Concrete containing coal fly ash	20-40%			
Parking Stops, Concrete containing Ground-Granulated Blast Furnace Slag	25-70%			
Playground Surfaces, including rubber or plastic	90-100%			
Plastic Fencing for use to control snow, drifting sand, or as a safety barrier	90-100%			
Running Tracks. Including rubber or plastic	90-100%			
Plastic Park benches and Picnic Tables	100 %			
Plastic composite Park benches and Picnic Tables	100%			
Aluminum Park benches and Picnic Tables	25%			
Concrete Park benches and Picnic Tables	15-40%			
Steel Park benches and Picnic Tables	25-30 % BOF/100% EAF			
Plastics Playground Equipment	100%			
Plastic Composites Playground Equipment	95-100%			
Steel Playground Equipment	25-30 % BOF/100% EAF			
Aluminum Playground Equipment	25%			
Garden hose, rubber or plastic	60-65% post-consumer materials			
Soaker hose, rubber or plastic	60-70% post-consumer materials			
Lawn/garden edging, plastic or rubber	30-100%			

RECYCLED OR RECOVERED PRODUCT		TOTAL RECOVERED MATERIALS CONTENT (RMC) (%)	ACTUAL RMC (%)	QUANTITY USED/UI	EXEMPT 1,2,3,4
Paper-based hydraulic mulch		100%			
Wood-based hydraulic mulch		100%			
Compost Purchase or use compost made from yard trimmings, leaves, grass clippings, and food waste		100%			
HDPE lumber timbers and posts		75-100%			
Mixed plastics/Sawdust lumber timbers and posts		100%			
HDPE/Fiberglass lumber timbers and posts		95%			
Other mixed resins lumber timbers and posts		95-100%			
Latex Paint; white, off-white or pastel colors		20%			
Latex Paint; gray, brown, earth-tones, other dark colors		50-99%			
Consolidated Latex Paint (when color and performance don't matter).		100%			
Plastic Non-road Signs		80-100%			
Aluminum Signs		25%			
Plastic Sign Posts and Supports		80-100%			
Steel Sign Posts and Supports		25-30 % BOF/100% EAF			
Awards and Plaques	Glass	75-100			
	Wood	100%			
	Paper	40-100			
	Plastic and Plastic/ Wood Composite	50-100			

Footnotes:

1. Cement:
   ASTM C 595, "Standard Specification for Blended Hydraulic Cements"
   ASTM C 150, "Standard Specification for Portland Cement"
   AASHTO M 240, "Blended Hydraulic Cements"
   Concrete:
   ASTM C 618, "Standard Specification for Fly-Ash and Raw or Calcined Natural Pozzolans
   for Use as a Mineral Admixture in Portland Cement Concrete"
   ASTM C 311, "Standard Methods of Sampling and Testing Fly-Ash and Natural Pozzolans
   for Use as a Mineral Admixture in Portland Concrete Cement"
   ASTM C 989, "Ground-Granulated Blast Furnace Slag for Use in Concrete Mortars"
   AASHTO M 302, "Ground-Granulated Blast Furnace Slag for Use in Concrete and Mortars"

American Concrete Institute Standard Practice ACI 226.R1, "Ground-Granulated Blast
Furnace Slag as a Cementitious Constituent in Concrete"

2. Designated items can be made from steel manufactured in either a Basic Oxygen Furnace (BOF) or an Electric Arc Furnace (EAF).

The following exemptions may apply to the non-procurement of recycled/recovered content materials:

1. The product does not meet appropriate performance standards.
2. The product is not available within a reasonable timeframe.
3. The product is not available competitively (from two or more sources).
4. The product is only available at an unreasonable price (compared with a comparable nonrecycled content product).

CERTIFICATION

I hereby certify the Statement of Work/Specifications for the requisition/procurement of all materials listed on this form comply with EPA standards for recycled/recovered materials content.

Contractor _____ Contract Inspector _____

Use the following form to request an exemption.

ATTACHMENT 2
AFFIRMATIVE PROCUREMENT DETERMINATION FORM

The following EPA designated guideline item is included in the specifications for project number VGLZ 172027, however compliance with the EPA standards is not achievable.

Item:

This form must be completed by Contractors and approved by the COR for construction projects. This requirement applies when EPA's CPC guidelines cannot be met and one of the following exemptions apply. Note this form is only required when acquisition of EPA designated products is above the micro-purchase threshold. (FAR 23.405(c)) ($2,500)

I have determined that the EPA guidelines were considered and determined inapplicable, based on the following:

_____ Item is not available within a reasonable period of time. (Need date: _____ Date available: _____)

_____ Item fails to meet a performance standard in the specifications.
Specifically,
_____
_____
_____
_____
_____
_____
_____

_____ Item is not available from two (2) or more sources.

Market research was performed by calling ____ (number) vendors, but only _____ (Enter vendor name or NA (Not Applicable/Not Available) was able to supply the item. Provide a list of vendors contacted including POCs and phone numbers, whenever this exemption is used.

_____ Item was only available at an unreasonable price (i.e., recycled item cost more than non-recycled item).

Price of recycled item: _____

Price of non-recycled item: _____

This determination is made in accordance with FAR 23.404(b).

Contractor _____
_____
Contractor's Representative Date

Construction_____
_____
CE Project Manager Date

_____
_____
Contracting Officer Date

Forward a copy of all completed Affirmative Procurement Determination forms to the _____.

SECTION 01 11 00

SUMMARY OF WORK

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals
Salvage Plan; G

1.2 WORK COVERED BY CONTRACT DOCUMENTS

1.2.1 Project Description

The work includes the following and incidental related work.

BUILDING 154

This project will provide a renovation to the facility, with small additions to the office area to provide enhanced support areas/offices. The administration and support areas, including office spaces, break room, toilet and locker rooms, workshops, and utility rooms are reconfigured with full-height, non-load bearing CMU partitions separating the shop spaces and support areas. Full height wall tile shall be applied to the toilet/locker/shower rooms. Remaining walls will have paint or epoxy finishes. Flooring will include carpeted offices, rubber tiles in the break area, tile floors in the toilet and locker rooms, and epoxy in the corridors and shop spaces. Existing storefront openings, entries, and windows are to be replaced. The additions will match the existing building and consist of insulated metal panel above a concrete masonry and brick wall base.

The hangar bay work will be completed in two phases. The first phase will renovate the east bay while maintaining operability of the west bay, with the second phase renovating the west bay after the east bay is operational. The hangar floor will require a new epoxy floor system. New door fabric and electrical service and controls upgrades for the hangar doors are included to allow for door operation by emergency generator as well as fire department operation by key on the outside of the building. New fall protection systems will be provided over the aircraft locations in each bay.

The exterior work for this project will include the demolition of the existing concrete containment area, Jet Fuel JP-8 equipment, landscape, asphalt and concrete pavement, and utilities, including sanitary sewer, water main, storm sewer, and electrical equipment. Site improvements include modifications to the existing parking lots, new sidewalks, and site paving and restoration to accommodate site utility work. Utility improvements include relocated sanitary sewer lines, relocated storm sewer

mains, fire hydrants, and fire protection water mains. The salvaged Jet Fuel tank will be relocated on the site. A new oil-water separator will replace the existing system located near the northeast corner of the existing system.

Replacement of mechanical, plumbing, wastewater, electrical, and technology systems shall be provided to maintain sustainable systems, increase energy efficiency, and modernization:

PLUMBING: The domestic water service will be split off from the fire suppression service. New domestic water piping and fixtures will be provided. A new water meter, booster pump, instantaneous water heaters, and ancillary equipment will be provided. A high capacity tankless water heater will be provided for the aircraft wash water. Sanitary underground sewers will remain, though an existing fuel interceptor will be replaced with a new oil-water separator. New fixtures will be installed, and above ground sanitary piping will be replaced in the building. Portions of existing storm drain piping in the administration area of the building will be relocated to accommodate the new floor plans. Soil or groundwater generated from excavations will require analytical testing (characterization) and proper disposal at a selected location on Base. The existing tool compressed air piping in the building will be modified and will use the existing air compressor with a new air drier and filter. The existing breathing air compressor and system will be reused with minor piping modifications.

FIRE PROTECTION: The existing fire suppression system will be demolished and replaced with a new wet pipe sprinkler system throughout the building, inccluding the hangar bays. A new fully addressable fire alarm system, including detection and notification will replace the existing alarm system, and be combined with mass notification.

HVAC/MECHANICAL: The existing administration and service area HVAC system will be demolished and replaced by two new gas-fired high-efficiency condensing boilers and pumps to serve heating coils and terminal heating devices.

The air handling system is a single duct variable volume rooftop unit with natural gas heat, and hot water reheat air terminal (VAV) boxes. The air handling unit will include an exhaust fan, total energy heat recovery wheel, filters, gas-fired heat exchanger, DX cooling coil, and supply fan. The existing hangar bay systems will be reused. New direct digital control (DDC) equipment will connect all mechanical equipment to the existing Base-wide Automated Logic Corporation (ALC) energy management and control system (EMCS).

ELECTRICAL: This project will replace the existing obsolete electrical power distribution and lighting infrastructure for the aircraft hangar, administrative areas, and shop spaces with new equipment and systems. Fuel cell repair facility electrical conditions will be brought up to current code requirements. Facility lighting will be upgraded to energy-efficient LED fixtures.

TELECOMMUNICATIONS/SECURITY: The existing Telecommunications cabling infrastructure will be replaced with new. The existing Telecommunications rack-mounted equipment was recently updated and will be removed, stored, and reinstalled during the construction process.

BUILDING 158

A new water storage and fire pump house will be included as part of this project. The water storage tank will be located to the east of Building 158. A 10-inch distribution line will extend east from the pump station to the hangars down the flight line. Water main stubs with gate valves will be provided for each individual building. Building 158 will be renovated to house the pumping equipment. Interior finishes and non-load bearing walls will be demolished. Existing walls will be painted. Existing door openings will be closed off to match existing wall systems, or replaced with new doors. A small addition will be constructed to house the electrical equipment needed for the building.

Limited upgrades will be provided to the utility systems in Building 158:

PLUMBING: Domestic cold water with meter for hose bibs and wall hydrants, and sanitary and vent piping with floor drains will be provided.

HVAC: HVAC work includes a gas-fired unit heater and a thermostatically operated sidewall exhaust and intake louver.

ELECTRICAL: Building 158 will have existing electrical power distribution and lighting demolished. The new electrical distribution system will serve fire pumps in Building 158, with a standby diesel generator to serve the fire pumps and ancillary building systems. Lighting will be upgraded to energy-efficient LED fixtures.

TELECOMMUNICATIONS: A fiber service in addition to the existing copper service will be provided to the building. New telecommunications demarcation equipment, rack, and distribution equipment are included.

1.2.2 Location

The work is located at the Selfridge Air National Guard Base, approximately as indicated. The exact location will be shown by the Contracting Officer.

1.3 OCCUPANCY OF PREMISES

Building(s) will be occupied during performance of work under this Contract.

Before work is started, arrange with the Contracting Officer a sequence of procedure, means of access, space for storage of materials and equipment, and use of approaches, corridors, and stairways.

1.4 EXISTING WORK

In addition to FAR 52.236-9 Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements:

a. Remove or alter existing work in such a manner as to prevent injury or damage to any portions of the existing work which remain.

b. Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as approved by the Contracting Officer. At the completion of operations, existing work must be in a condition equal to or better than that which existed before new work started.

1.5 LOCATION OF UNDERGROUND UTILITIES

Obtain digging permits prior to start of excavation, and comply with Installation requirements for locating and marking underground utilities. Contact local utility locating service a minimum of 48 hours prior to excavating, to mark utilities, and within sufficient time required if work occurs on a Monday or after a Holiday. Verify existing utility locations indicated on contract drawings, within area of work.

Identify and mark all other utilities not managed and located by the local utility companies. Coordinate with the Installation to mark any installation-owned utilities. Verify elevations before installing new work closer than nearest manhole or other structure at which an adjustment in grade can be made.

1.5.1 Notification Prior to Excavation

Notify the Contracting Officer at least 15 days prior to starting excavation work.

1.6 SALVAGE MATERIAL AND EQUIPMENT

Items designated by the Contracting Officer to be salvaged remain the property of the Government. Segregate, itemize, deliver and off-load the salvaged property at the Government designated storage area located on the Installation.

Provide a salvage plan, listing material and equipment to be salvaged, and their storage location. Maintain property control records for material or equipment designated as salvage. Use a system of property control that is approved by the Contracting Officer. Store and protect salvaged materials and equipment until disposition by the Contracting Officer.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 14 00

WORK RESTRICTIONS

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

List of Contact Personnel; G

1.2 CONTRACTOR ACCESS AND USE OF PREMISES

1.2.1 Activity Regulations

Ensure that Contractor personnel employed on the Activity become familiar with and obey Activity regulations including safety, fire, traffic and security regulations. Keep within the limits of the work and avenues of ingress and egress. Wear hard hats in designated areas. Do not enter any restricted areas unless required to do so and until cleared for such entry. Mark Contractor equipment for identification.

1.2.1.1 Subcontractors and Personnel Contacts

Provide a list of contact personnel of the Contractor and subcontractors including addresses and telephone numbers for use in the event of an emergency. As changes occur and additional information becomes available, correct and change the information contained in previous lists.

1.2.1.2 No Smoking Policy

Smoking is prohibited within and outside of all buildings on installation, except in designated smoking areas. This applies to existing buildings, buildings under construction and buildings under renovation. Discarding tobacco materials other than into designated tobacco receptacles is considered littering and is subject to fines. The Contracting Officer will identify designated smoking areas.

1.2.2 Working Hours

Regular working hours must consist of a period agreed to by the Contracting Officer's Representative, between 6:30 a.m. and 6:00 p.m., Monday through Friday, excluding Government holidays.

1.2.3 Work Outside Regular Hours

Work outside regular working hours requires Contracting Officer's Representativeapproval. Make application 15 calendar days prior to such work to allow arrangements to be made by the Government for inspecting the

work in progress, giving the specific dates, hours, location, type of work to be performed, contract number and project title. Based on the justification provided, the Contracting Officer's Representative may approve work outside regular hours. During periods of darkness, the different parts of the work must be lighted in a manner approved by the Contracting Officer's Representative.

1.2.4 Utility Cutovers and Interruptions

a. Provide 15 days advance notice when making utility cutovers and interruptions. Conform to procedures required in paragraph WORK OUTSIDE REGULAR HOURS.

b. Ensure that new utility lines are complete, except for the connection, before interrupting existing service.

c. Interruption to water, sanitary sewer, storm sewer, telephone service, electric service, air conditioning, heating, fire alarm, compressed air, and fire protection are considered utility cutovers pursuant to the paragraph WORK OUTSIDE REGULAR HOURS.

1.3 SECURITY REQUIREMENTS

Contract Clause FAR 52.204-2 Security Requirements and Alternate II and the following apply:

1. All contractor personnel working on site will be required to submit to background screening and must obtain a contractor ID badge prior to coming on Base. Current forms will be provided after award of the contract.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 CONTRACT COST BREAKDOWN

The Contractor must furnish within 30 days after the date of Notice to Proceed, and prior to the submission of its first partial payment estimate, a breakdown of its single job pay item or items which will be reviewed by the Contracting Officer as to propriety of distribution of the total cost to the various accounts. Any unbalanced items as between early and late payment items or other discrepancies will be revised by the Contracting Officer to agree with a reasonable cost of the work included in the various items. This Contract cost breakdown will then be utilized as the basis for progress payments to the Contractor.

1.2 CONTRACTOR'S INVOICE AND CONTRACT PERFORMANCE STATEMENT

1.2.1 Content of Invoice

Requests for payment will be processed in accordance with the Contract Clause FAR 52.232-27 Prompt Payment for Construction Contracts and FAR 52.232-5 Payments Under Fixed-Price Construction Contracts. Invoices not completed in accordance with contract requirements will be returned to the Contractor for correction of the deficiencies. The requests for payment shall include the documents listed below.

a. The Contractor's invoice, showing in summary form, the basis for arriving at the amount of the invoice.

b. Monthly Work-hour report.

c. Updated Construction Progress Schedule and tabular reports required by the contract.

d. Contractor Safety Self Evaluation Checklist.

e. Updated submittal register.

f. Solid Waste Disposal Report.

g. Certified payrolls.

h. Other supporting documents as requested.

1.2.2 Submission of Invoices

If DFARS Clause 252.232-7006 Wide Area WorkFlow Payment Instructions is included in the Contract, provide the documents listed in above paragraph CONTENT OF INVOICE in their entirety as attachments in Wide Area Work Flow (WAWF) for each invoice submitted. The maximum size of each WAWF attachment is two megabytes, but there are no limits on the number of attachments. If a document cannot be attached in WAWF due to system or size restriction, provide it as instructed by the Contracting Officer.

1.2.3 Final Invoice

a. A final invoice must be accompanied by the certification required by DFARS 252.247.7023 Transportation of Supplies by Sea, and the Contractor's Final Release. If the Contractor is incorporated, the Final Release must contain the corporate seal. An officer of the corporation must sign and the corporate secretary must certify the Final Release.

b. For final invoices being submitted via WAWF, the original Contractor's Final Release Form and required certification of Transportation of Supplies by Sea must be provided directly to the respective Contracting Officer prior to submission of the final invoice. Once receipt of the original Final Release Form and required certification of Transportation of Supplies by Sea has been confirmed by the Contracting Officer, the Contractor must then submit final invoice and attach a copy of the Final Release Form and required certification of Transportation of Supplies by Sea in WAWF.

c. Final invoices not accompanied by the Contractor's Final Release and required certification of Transportation of Supplies by Sea will be considered incomplete and will be returned to the Contractor.

1.3 PAYMENTS TO THE CONTRACTOR

Payments will be made on submission of itemized requests by the Contractor which comply with the requirements of this section, and will be subject to reduction for overpayments or increase for underpayments made on previous payments to the Contractor.

1.3.1 Obligation of Government Payments

The obligation of the Government to make payments required under the provisions of this Contract will, at the discretion of the Contracting Officer, be subject to reductions and suspensions permitted under the FAR and agency regulations including the following in accordance with FAR FAR 32.103 Progress Payments Under Construction Contracts:

a. Reasonable deductions due to defects in material or workmanship;

b. Claims which the Government may have against the Contractor under or in connection with this Contract;

c. Unless otherwise adjusted, repayment to the Government upon demand for overpayments made to the Contractor; and

d. Failure to maintain accurate "as-built" or record drawings in accordance with FAR 52.236.21.

1.3.2 Payment for Onsite and Offsite Materials

Progress payments may be made to the Contractor for materials delivered on the site, for materials stored off construction sites, or materials that are in transit to the construction sites under the following conditions:

a. FAR 52.232-5(b) Payments Under Fixed Price Construction Contracts.

b. Materials delivered on the site but not installed, including completed preparatory work, and off-site materials to be considered for progress

payment must be major high cost, long lead, special order, or specialty items, not susceptible to deterioration or physical damage in storage or in transit to the construction site. Examples of materials acceptable for payment consideration include, but are not limited to, structural steel, non-magnetic steel, non-magnetic aggregate, equipment, machinery, large pipe and fittings, precast/prestressed concrete products, plastic lumber (e.g., fender piles/curbs), and high-voltage electrical cable. Materials not acceptable for payment include consumable materials such as nails, fasteners, conduits, gypsum board, glass, insulation, and wall coverings.

c. Materials to be considered for progress payment prior to installation must be specifically and separately identified in the Contractor's estimates of work submitted for the Contracting Officer's approval. Requests for progress payment consideration for such items must be supported by documents establishing their value and that the title requirements of the clause at FAR 52.232-5 Payments Under Fixed-Price Construction Contracts have been met.

d. Materials are adequately insured and protected from theft and exposure.

e. Provide a written consent from the surety company with each payment request for offsite materials.

f. Materials to be considered for progress payments prior to installation must be stored either in Hawaii, Guam, Puerto Rico, or the Continental United States. Other locations are subject to written approval by the Contracting Officer.

g. Materials in transit to the job site or storage site are not acceptable for payment.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

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SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

View Location Map; G

Progress and Completion Pictures; G

SD-04 Samples

Color Boards; G

1.3 COLOR BOARDS FOR AIR FORCE PROJECTS

Submit five sets of color boards within 90 calendar days after Contract Award. Each set of boards must include samples of colors and finishes of interior surfaces, such as walls, floors, and ceilings. Present the samples on 8 by 10-1/2 inches boards (modules) with a maximum spread of 24 by 31-1/2 inches for foldouts. Design modules to fit in a standard loose-leaf, three-ring binder. Where special finishes such as architectural concrete, carpet, or prefinished textured metal panels are required, submit samples not less than 12 inches square with the board. If more space is needed, more than one board per set may be submitted. Certify that the color samples have been reviewed in detail, and that the color samples are in strict accordance with contract drawings and specifications, except as may be otherwise explicitly stated. Submittal of color samples does not relieve the Contractor of the responsibility to submit samples required elsewhere herein.

1.4 VIEW LOCATION MAP

Submit, prior to or with the first digital photograph submittals, a sketch or drawing indicating the required photographic locations. Update as

required if the locations are moved.

1.5 PROGRESS AND COMPLETION PICTURES

Photographically document site conditions prior to start of construction operations. Provide monthly, and within one month of the completion of work, digital photographs, 1600x1200x24 bit true color minimum resolution in JPEG file format showing the sequence and progress of work. Take a minimum of 20 digital photographs each week throughout the entire project from a minimum of ten views from points located by the Contracting Officer. Submit with the monthly invoice two sets of digital photographs, each set on a separate compact disc (CD) or data versatile disc (DVD), cumulative of all photos to date. Indicate photographs demonstrating environmental procedures. Provide photographs for each month in a separate monthly directory and name each file to indicate its location on the view location sketch. Also provide the view location sketch on the CD or DVD as a digital file. Include a date designator in file names. Cross reference submittals in the appropriate daily report. Photographs provided are for unrestricted use by the Government.

1.6 MINIMUM INSURANCE REQUIREMENTS

Provide the minimum insurance coverage required by FAR 28.307-2 Liability, during the entire period of performance under this contract. Provide other insurance coverage as required by law.

1.7 SUPERVISION

1.7.1 Minimum Communication Requirements

Have at least one qualified superintendent, or competent alternate, capable of reading, writing, and conversing fluently in the English language, on the job-site at all times during the performance of contract work. In addition, if a Quality Control (QC) representative is required on the contract, then that individual must also have fluent English communication skills.

1.7.2 Superintendent Qualifications

The project superintendent must have a minimum of 10 years experience in construction with at least 5 of those years as a superintendent on projects similar in size and complexity. The individual must be familiar with the requirements of EM 385-1-1 and have experience in the areas of hazard identification and safety compliance. The individual must be capable of interpreting a critical path schedule and construction drawings. The qualification requirements for the alternate superintendent are the same as for the project superintendent. The Contracting Officer may request proof of the superintendent's qualifications at any point in the project if the performance of the superintendent is in question.

For routine projects where the superintendent is permitted to also serve as the Quality Control (QC) Manager as established in Section 01 45 00.00 10 QUALITY CONTROL, the superintendent must have qualifications in accordance with that section.

1.7.2.1 Duties

The project superintendent is primarily responsible for managing and coordinating day-to-day production and schedule adherence on the project.

The superintendent or qualified alternative must be on-site at all times during the performance of this contract until the work is completed and accepted.

1.7.3 Non-Compliance Actions

The Project Superintendent is subject to removal by the Contracting Officer for non-compliance with requirements specified in the contract and for failure to manage the project to insure timely completion. Furthermore, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders is acceptable as the subject of claim for extension of time for excess costs or damages by the Contractor.

1.8 PRECONSTRUCTION

After award of the contract but prior to commencement of any work at the site, meet with the Contracting Officer to discuss and develop a mutual understanding relative to the administration of the value engineering and safety program, preparation of the schedule of prices or earned value report, shop drawings, and other submittals, scheduling programming, prosecution of the work, and clear expectations of the "Interim DD Form 1354" Submittal. Major subcontractors who will engage in the work must also attend.

1.9 PARTNERING

To most effectively accomplish this contract, the Government requires the formation of a cohesive partnership within the Project Team whose members are from the Government, the Contractor and their Subcontractors. Key personnel from the Supported Command, the End User (who will occupy the facility), the Government Design and Construction team and Subject Matter Experts, the Installation, the Contractor and Subcontractors, and the Designer of Record will be invited to participate in the Partnering process. The Partnership will draw on the strength of each organization in an effort to achieve a project that is without any safety mishaps, conforms to the Contract, and stays within budget and on schedule.

The Contracting Officer will provide Information on the Partnering Process and a list of key and optional personnel who should attend the Partnering meeting.

1.9.1 Informal Partnering

The Contracting Officer will organize the Partnering Sessions with key personnel of the project team, including Contractor personnel and Government personnel.

The Initial Partnering session should be a part of the Pre-Construction Meeting. Partnering sessions will be held at a location agreed to by the Contracting Officer and the Contractor (typically a conference room provided by the office or the Contractor). The Initial Informal Partnering Session will be conducted and facilitated using electronic media (a video and accompanying forms) provided by the Contracting Officer. The Partners will determine the frequency of the follow-on sessions, at no more than 3 to six month intervals.

1.10 ELECTRONIC MAIL (E-MAIL) ADDRESS

Establish and maintain electronic mail (e-mail) capability along with the capability to open various electronic attachments as text files, pdf files, and other similar formats. Within 10 days after contract award, provide the Contracting Officer a single (only one) e-mail address for electronic communications from the Contracting Officer related to this contract including, but not limited to contract documents, invoice information, request for proposals, and other correspondence. The Contracting Officer may also use email to notify the Contractor of base access conditions when emergency conditions warrant, such as hurricanes or terrorist threats. Multiple email addresses are not allowed.

It is the Contractor's responsibility to make timely distribution of all Contracting Officer initiated e-mail with its own organization including field office(s). Promptly notify the Contracting Officer, in writing, of any changes to this email address.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 SUMMARY

Section includes administrative provisions for coordinating construction operations on Project, including, but not limited to, the following:

1. General coordination procedures.
2. Coordination drawings.
3. RFIs.
4. Digital project management procedures.
5. Web-based Project management software package.
6. Project meetings.

1.2 DEFINITIONS

BIM: Building Information Modeling.

RFI: Request for Information. Request from Government or Contractor seeking information required by or clarifications of the Contract Documents.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Subcontract List; G

Key Personnel Names; G

1.4 GENERAL COORDINATION PROCEDURES

1.4.1 Coordination

Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results, where installation of one part of the Work depends on installation of other components, before or after its own installation.

2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.

3. Make adequate provisions to accommodate items scheduled for later installation.

1.4.2 Administrative Procedures

Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.4.3 Personnel Lists

1.4.3.1 Subcontract List

Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

a .Name, address, telephone number, and email address of entity performing subcontract or supplying products.

b. Number and title of related Specification Section(s) covered by subcontract.

c. Drawing number and detail references, as appropriate, covered by subcontract.

1.4.3.2 Key Personnel Names

Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses, cellular telephone numbers, and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

a. Post copies of list in Project meeting room, in temporary field office, and in prominent location in built facility. Keep list current at all times.

1.5 COORDINATION DRAWINGS

1.5.1 Coordination Drawings, General

Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of

products and materials fabricated or installed by more than one entity.

1.5.1.1 Content

Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.

b. Coordinate the addition of trade-specific information to coordination drawings in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.

c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.

d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.

e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.

f. Indicate required installation sequences.

g. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Government indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

1.5.2 Coordination Drawing Organization

Organize coordination drawings as follows:

1.5.2.1 Floor Plans and Reflected Ceiling Plans

Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.

1.5.2.2 Plenum Space

Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.

1.5.2.3 Mechanical Rooms

Provide coordination drawings for mechanical rooms, showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and

electrical equipment.

1.5.2.4 Structural Penetrations

Indicate penetrations and openings required for all disciplines.

1.5.2.5 Slab Edge and Embedded Items

Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.

1.5.2.6 Mechanical and Plumbing Work

Show the following:

a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.

b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.

c. Fire-rated enclosures around ductwork.

1.5.2.7 Electrical Work

Show the following:

a. Runs of vertical and horizontal conduit 1-1/4 inches (32 mm) in diameter and larger.

b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.

c. Panel board, switchboard, switchgear, transformer, busway, generator, and motor-control center locations.

d. Location of pull boxes and junction boxes, dimensioned from column center lines.

1.5.2.8 Fire-Protection System

Show the following:

a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.

1.5.2.9 Review

Contracting Officer will review coordination drawings to confirm that, in general, the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Government determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Government will so inform Contractor, who shall make suitable modifications and resubmit.

1.5.3 Coordination Digital Data Files

Prepare coordination digital data files according to the following requirements:

1.5.3.1 File Submittal Format

Submit or post coordination drawing files using PDF format.

1.6 REQUEST FOR INFORMATION (RFI)

1.6.1 General

Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

a. Government will return without response those RFIs submitted by other entities controlled by Contractor.

b. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.

1.6.2 Content of the RFI

Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.

2. Government's Project number.

3. Date.

4. Name of Contractor.

5. RFI number, numbered sequentially.

6. RFI subject.

7. Specification Section number and title and related paragraphs, as appropriate.

8. Drawing number and detail references, as appropriate.

9. Field dimensions and conditions, as appropriate.

10. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.

11. Contractor's signature.

12. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on

attached sketches.

1.6.3 RFI Forms

Form bound in Project Manual.

a. Attachments shall be electronic files in PDF format.

1.6.4 Government's Action

Government will review each RFI, determine action required, and respond. Allow seven days for Government's response for each RFI. RFIs received by Government after 1:00 p.m. will be considered as received the following working day.

a. The following Contractor-generated RFIs will be returned without action:

1. Requests for approval of submittals.
2. Requests for approval of substitutions.
3. Requests for approval of Contractor's means and methods.
4. Requests for coordination information already indicated in the Contract Documents.
5. Requests for adjustments in the Contract Time or the Contract Sum.
6. Requests for interpretation of Government's actions on submittals.
7. Incomplete RFIs or inaccurately prepared RFIs.

b. Government's action may include a request for additional information, in which case Government's time for response will date from time of receipt by Government of additional information.

1.6.5 RFI Log

Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log with each pay application and at other times when requested. Include the following:

1. Project name.
2. Name and address of Contractor.
3. RFI number, including RFIs that were returned without action or withdrawn.
4. RFI description.
5. Date the RFI was submitted.
6. Date response was received.

1.6.6 On Receipt of Government's Action

On receipt of Government's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Government within seven days if Contractor disagrees with response.

1.7 PROJECT MEETINGS

1.7.1 General

Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1.7.1.1 Attendees

Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Government of scheduled meeting dates and times a minimum of 10 working days prior to meeting.

1.7.1.2 Agenda

Prepare the meeting agenda. Distribute the agenda to all invited attendees.

1.7.1.3 Minutes

Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Government, within three days of the meeting.

1.7.2 Preconstruction Conference

Government will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Government, but no later than 15 days after execution of the Agreement.

1.7.2.1 Attendees

Authorized representatives of Government, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

1.7.2.2 Agenda

Discuss items of significance that could affect progress, including the following:

a. Responsibilities and personnel assignments.
b. Tentative construction schedule.
c. Phasing.
d. Critical work sequencing and long lead items.
e. Designation of key personnel and their duties.
f. Lines of communications.
g. Use of web-based Project software.
h. Procedures for processing field decisions and Change Orders.
i. Procedures for RFIs.
j. Procedures for testing and inspecting.
k. Procedures for processing Applications for Payment.
l. Distribution of the Contract Documents.
m. Submittal procedures.
n. Sustainable design requirements.
o. Preparation of Record Documents.
p. Use of the premises and existing buildings.
q. Work restrictions.
r. Working hours.
s. Government's occupancy requirements.
t. Responsibility for temporary facilities and controls.
u. Procedures for moisture and mold control.
v. Procedures for disruptions and shutdowns.
w. Construction waste management and recycling.
x. Parking availability.

y. Office, work, and storage areas.
z. Equipment deliveries and priorities.
aa. First aid.
bb. Security.
cc. Progress cleaning.

1.7.2.3 Minutes

Entity responsible for conducting meeting will record and distribute meeting minutes.

1.7.3 Preinstallation Conferences

Conduct a preinstallation conference at Project site before each construction activity when required by other Sections and when required for coordination with other construction.

Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

1.7.3.1 Attendees

Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Government of scheduled meeting dates.

1.7.3.2 Agenda

Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

a. Contract Documents.
b. Deliveries.
c. Submittals.
d. Sustainable design requirements.
e. Review of mockups.
f. Possible conflicts.
g. Compatibility requirements.
h. Time schedules.
i. Weather limitations.
j. Manufacturer's written instructions.
k. Warranty requirements.
l. Compatibility of materials.
m. Acceptability of substrates.
n. Temporary facilities and controls.
o. Space and access limitations.
p. Regulations of authorities having jurisdiction.
q. Testing and inspecting requirements.
r. Installation procedures.
s. Coordination with other work.
t. Required performance results.
u. Protection of adjacent work.
v. Protection of construction and personnel.

1.7.3.3 Minutes

Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

Distribute minutes of the meeting to each party present and to other parties requiring information.

1.7.4 Progress Meetings

Conduct progress meetings at weekly intervals.

1.7.4.1 Attendees

In addition to representatives of Government, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

1.7.4.2 Agenda

Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Contractor's Construction Schedule

1. Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

2. Review schedule for next period.

b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Status of sustainable design documentation.
5) Deliveries.
6) Off-site fabrication.
7) Access.
8) Site use.
9) Temporary facilities and controls.
10) Progress cleaning.
11) Quality and work standards.
12) Status of correction of deficient items.
13) Field observations.
14) Status of RFIs.
15) Status of Proposal Requests.
16) Pending changes.
17) Status of Change Orders.

18) Pending claims and disputes.
19) Documentation of information for payment requests.

1.7.4.3 Minutes

Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

a. Schedule Updating

1. Revise Contractor's construction schedule after each progress meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

-- End of Section --

SECTION 01 32 01.00 10

PROJECT SCHEDULE

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AACE INTERNATIONAL (AACE)

AACE 29R-03	(2011) Forensic Schedule Analysis
AACE 52R-06	(2006) Time Impact Analysis - As Applied in Construction

U.S. ARMY CORPS OF ENGINEERS (USACE)

ER 1-1-11	(1995) Administration -- Progress, Schedules, and Network Analysis Systems

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preliminary Project Schedule; G

Initial Project Schedule; G

Periodic Schedule Update; G

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Prepare for approval a Project Schedule, as specified herein, pursuant to FAR Clause 52.236-15 Schedules for Construction Contracts. Show in the schedule the proposed sequence to perform the work and dates contemplated for starting and completing all schedule activities. The scheduling of the entire project is required. The scheduling of construction is the responsibility of the Contractor. Contractor management personnel must actively participate in its development. Subcontractors and suppliers

working on the project must also contribute in developing and maintaining an accurate Project Schedule. Provide a schedule that is a forward planning as well as a project monitoring tool. Use the Critical Path Method (CPM) of network calculation to generate all Project Schedules.

3.2 BASIS FOR PAYMENT AND COST LOADING

The schedule is the basis for determining contract earnings during each update period and therefore the amount of each progress payment. The aggregate value of all activities coded to a contract CLIN must equal the value of the CLIN.

3.2.1 Activity Cost Loading

Activity cost loading must be reasonable and without front-end loading. Provide additional documentation to demonstrate reasonableness if requested by the Contracting Officer.

3.2.2 Withholdings / Payment Rejection

Failure to meet the requirements of this specification may result in the disapproval of the preliminary, initial or periodic schedule updates and subsequent rejection of payment requests until compliance is met.

In the event that the Contracting Officer directs schedule revisions and those revisions have not been included in subsequent Project Schedule revisions or updates, the Contracting Officer may withhold 10 percent of pay request amount from each payment period until such revisions to the project schedule have been made.

3.3 PROJECT SCHEDULE DETAILED REQUIREMENTS

3.3.1 Level of Detail Required

Develop the Project Schedule to the appropriate level of detail to address major milestones and to allow for satisfactory project planning and execution. Failure to develop the Project Schedule to an appropriate level of detail will result in its disapproval. The Contracting Officer will consider, but is not limited to, the following characteristics and requirements to determine appropriate level of detail:

3.3.2 Activity Durations

Reasonable activity durations are those that allow the progress of ongoing activities to be accurately determined between update periods. Less than 2 percent of all non-procurement activities may have Original Durations (OD) greater than 20 work days or 30 calendar days.

3.3.3 Procurement Activities

Include activities associated with the critical submittals and their approvals, procurement, fabrication, and delivery of long lead materials, equipment, fabricated assemblies, and supplies. Long lead procurement activities are those with an anticipated procurement sequence of over 90 calendar days.

3.3.4 Mandatory Tasks

Include the following activities/tasks in the initial project schedule and

all updates.

a. Submission, review and acceptance of SD-01 Preconstruction Submittals (individual activity for each).

b. Submission, review and acceptance of features require design completion

c. Submission of mechanical/electrical/information systems layout drawings.

d. Long procurement activities

e. Submission and approval of O & M manuals.

f. Submission and approval of as-built drawings.

g. Submission and approval of DD1354 data and installed equipment lists.

h. Submission and approval of testing and air balance (TAB).

i. Submission of TAB specialist design review report.

j. Submission and approval of fire protection specialist.

k. Submission and approval of Building Commissioning Plan, test data, and reports: Develop the schedule logic associated with testing and commissioning of mechanical systems to a level of detail consistent with the contract commissioning requirements. All tasks associated with all building testing and commissioning will be completed prior to submission of building commissioning report and subsequent contract completion.

l. Air and water balancing.

m. Building commissioning - Functional Performance Testing.

n. Controls testing plan submission.

o. Controls testing.

p. Performance Verification testing.

q. Other systems testing, if required.

r. Contractor's pre-final inspection.

s. Correction of punch list from Contractor's pre-final inspection.

t. Government's pre-final inspection.

u. Correction of punch list from Government's pre-final inspection.

v. Final inspection.

3.3.5 Government Activities

Show Government and other agency activities that could impact progress. These activities include, but are not limited to: approvals, environmental permit approvals by State regulators, inspections, utility tie-in,

Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements.

3.3.6 Standard Activity Coding Dictionary

Use the activity coding structure defined in the Standard Data Exchange Format (SDEF) in ER 1-1-11. This exact structure is mandatory. Develop and assign all Activity Codes to activities as detailed herein. A template SDEF compatible schedule backup file is available on the QCS web site: http://rms.usace.army.mil.

The SDEF format is as follows:

Field	Activity Code	Length	Description
1	WRKP	3	Workers per day
2	RESP	4	Responsible party
3	AREA	4	Area of work
4	MODF	6	Modification Number
5	BIDI	6	Bid Item (CLIN)
6	PHAS	2	Phase of work
7	CATW	1	Category of work
8	FOW	20	Feature of work*
*Some systems require that FEATURE OF WORK values be placed in several activity code fields. The notation shown is for Primavera P6. Refer to the specific software guidelines with respect to the FEATURE OF WORK field requirements.			

3.3.6.1 Workers Per Day (WRKP)

Assign Workers per Day for all field construction or direct work activities, if directed by the Contracting Officer. Workers per day is based on the average number of workers expected each day to perform a task for the duration of that activity.

3.3.6.2 Responsible Party Coding (RESP)

Assign responsibility code for all activities to the Prime Contractor, Subcontractor(s) or Government agency(ies) responsible for performing the activity.

a. Activities coded with a Government Responsibility code include, but are not limited to: Government approvals, Government design reviews, environmental permit approvals by State regulators, Government Furnished Property/Equipment (GFP) and Notice to Proceed (NTP) for phasing requirements.

b. Activities cannot have more than one Responsibility Code. Examples of acceptable activity code values are: DOR (for the designer of record); ELEC (for the electrical subcontractor); MECH (for the mechanical subcontractor); and GOVT (for USACE).

3.3.6.3 Area of Work Coding (AREA)

Assign Work Area code to activities based upon the work area in which the activity occurs. Define work areas based on resource constraints or space constraints that would preclude a resource, such as a particular trade or craft work crew from working in more than one work area at a time due to restraints on resources or space. Examples of Work Area Coding include different areas within a floor of a building, different floors within a building, and different buildings within a complex of buildings. Activities cannot have more than one Work Area Code.

Not all activities are required to be Work Area coded. A lack of Work Area coding indicates the activity is not resource or space constrained.

3.3.6.4 Modification Number (MODF)

Assign a Modification Number Code to any activity or sequence of activities added to the schedule as a result of a Contract Modification, when approved by Contracting Officer. Key all Code values to the Government's modification numbering system. An activity can have only one Modification Number Code.

3.3.6.5 Bid Item Coding (BIDI)

Assign a Bid Item Code to all activities using the Contract Line Item Schedule (CLIN) to which the activity belongs, even when an activity is not cost loaded. An activity can have only one BIDI Code.

3.3.6.6 Phase of Work Coding (PHAS)

Assign Phase of Work Code to all activities. Examples of phase of work are procurement phase and construction phase. Each activity can have only one Phase of Work code.

a. Code proposed fast track design and construction phases proposed to allow filtering and organizing the schedule by fast track design and construction packages.

b. If the contract specifies phasing with separately defined performance periods, identify a Phase Code to allow filtering and organizing the schedule accordingly.

3.3.6.7 Category of Work Coding (CATW)

Assign a Category of Work Code to all activities. Category of Work Codes include, but are not limited to construction submittal, procurement, fabrication, weather sensitive installation, non-weather sensitive installation, start-up, and testing activities. Each activity can have no more than one Category of Work Code.

3.3.6.8 Feature of Work Coding (FOW)

Assign a Feature of Work Code to appropriate activities based on the Definable Feature of Work to which the activity belongs based on the

approved QC plan.

Definable Feature of Work is defined in Section 01 45 00.00 10 QUALITY CONTROL. An activity can have only one Feature of Work Code.

3.3.7 Contract Milestones and Constraints

Milestone activities are to be used for significant project events including, but not limited to, project phasing, project start and end activities, or interim completion dates. The use of artificial float constraints such as "zero free float" or "zero total float" are prohibited.

Mandatory constraints that ignore or effect network logic are prohibited. No constrained dates are allowed in the schedule other than those specified herein. Submit additional constraints to the Contracting Officer for approval on a case by case basis.

3.3.7.1 Project Start Date Milestone and Constraint

The first activity in the project schedule must be a start milestone titled "NTP Acknowledged," which must have a "Start On" constraint date equal to the date that the NTP is acknowledged.

3.3.7.2 End Project Finish Milestone and Constraint

The last activity in the schedule must be a finish milestone titled "End Project."

Constrain the project schedule to the Contract Completion Date in such a way that if the schedule calculates an early finish, then the float calculation for "End Project" milestone reflects positive float on the longest path. If the project schedule calculates a late finish, then the "End Project" milestone float calculation reflects negative float on the longest path. The Government is under no obligation to accelerate Government activities to support a Contractor's early completion.

3.3.7.3 Interim Completion Dates and Constraints

Constrain contractually specified interim completion dates to show negative float when the calculated late finish date of the last activity in that phase is later than the specified interim completion date.

3.3.7.3.1 Start Phase

Use a start milestone as the first activity for a project phase. Call the start milestone "Start Phase X" where "X" refers to the phase of work.

3.3.7.3.2 End Phase

Use a finish milestone as the last activity for a project phase. Call the finish milestone "End Phase X" where "X" refers to the phase of work.

3.3.8 Calendars

Schedule activities on a Calendar to which the activity logically belongs. Develop calendars to accommodate any contract defined work period such as a 7-day calendar for Government Acceptance activities, concrete cure times, etc. Develop the default Calendar to match the physical work plan with non-work periods identified including weekends and holidays. Develop

sSeasonal Calendar(s) and assign to seasonally affected activities as applicable.

If an activity is weather sensitive it should be assigned to a calendar showing non-work days on a monthly basis, with the non-work days selected at random across the weeks of the calendar, using the anticipated adverse weather delay work days provided in the Special Contract Clauses . Assign non-work days over a seven-day week as weather records are compiled on seven-day weeks, which may cause some of the weather related non-work days to fall on weekends.

3.3.9 Open Ended Logic

Only two open ended activities are allowed: the first activity "NTP Acknowledged" may have no predecessor logic, and the last activity -"End Project" may have no successor logic.

Predecessor open ended logic may be allowed in a time impact analyses upon the Contracting Officer's approval.

3.3.10 Default Progress Data Disallowed

Actual Start and Finish dates must not automatically update with default mechanisms included in the scheduling software. Updating of the percent complete and the remaining duration of any activity must be independent functions. Disable program features that calculate one of these parameters from the other. Activity Actual Start (AS) and Actual Finish (AF) dates assigned during the updating process must match those dates provided in the Contractor Quality Control Reports. Failure to document the AS and AF dates in the Daily Quality Control report will result in disapproval of the Contractor's schedule.

3.3.11 Out-of-Sequence Progress

Activities that have progressed before all preceding logic has been satisfied (Out-of-Sequence Progress) will be allowed only on a case-by-case basis subject to approval by the Contracting Officer. Propose logic corrections to eliminate out of sequence progress or justify not changing the sequencing for approval prior to submitting an updated project schedule. Address out of sequence progress or logic changes in the Narrative Report and in the periodic schedule update meetings.

3.3.12 Added and Deleted Activities

Do not delete activities from the project schedule or add new activities to the schedule without approval from the Contracting Officer. Activity ID and description changes are considered new activities and cannot be changed without Contracting Officer approval.

3.3.13 Original Durations

Activity Original Durations (OD) must be reasonable to perform the work item. OD changes are prohibited unless justification is provided and approved by the Contracting Officer.

3.3.14 Leads, Lags, and Start to Finish Relationships

Lags must be reasonable as determined by the Government and not used in place of realistic original durations, must not be in place to artificially

absorb float, or to replace proper schedule logic.

a. Leads (negative lags) are prohibited.

b. Start to Finish (SF) relationships are prohibited.

3.3.15 Retained Logic

Schedule calculations must retain the logic between predecessors and successors ("retained logic" mode) even when the successor activity(s) starts and the predecessor activity(s) has not finished (out-of-sequence progress). Software features that in effect sever the tie between predecessor and successor activities when the successor has started and the predecessor logic is not satisfied ("progress override") are not be allowed.

3.3.16 Percent Complete

Update the percent complete for each activity started, based on the realistic assessment of earned value. Activities which are complete but for remaining minor punch list work and which do not restrain the initiation of successor activities may be declared 100 percent complete to allow for proper schedule management.

3.3.17 Remaining Duration

Update the remaining duration for each activity based on the number of estimated work days it will take to complete the activity. Remaining duration may not mathematically correlate with percentage found under paragraph entitled Percent Complete.

3.3.18 Cost Loading of Closeout Activities

Cost load the "Correction of punch list from Government pre-final inspection" activity(ies) not less than 1 percent of the present contract value. Activity(ies) may be declared 100 percent complete upon the Government's verification of completion and correction of all punch list work identified during Government pre-final inspection(s).

3.3.18.1 As-Built Drawings

If there is no separate contract line item (CLIN) for as-built drawings, cost load the "Submission and approval of as-built drawings" activity not less than $35,000 or 1 percent of the present contract value, which ever is greater, up to $200,000. Activity will be declared 100 percent complete upon the Government's approval.

3.3.18.2 O & M Manuals

Cost load the "Submission and approval of O & M manuals" activity not less than $20,000. Activity will be declared 100 percent complete upon the Government's approval of all O & M manuals.

3.3.19 Early Completion Schedule and the Right to Finish Early

An Early Completion Schedule is an Initial Project Schedule (IPS) that indicates all scope of the required contract work will be completed before the contractually required completion date.

a. No IPS indicating an Early Completion will be accepted without being

fully resource-loaded (including crew sizes and manhours) and the Government agreeing that the schedule is reasonable and achievable.

b. The Government is under no obligation to accelerate work items it is responsible for to ensure that the early completion is met nor is it responsible to modify incremental funding (if applicable) for the project to meet the contractor's accelerated work.

3.4 PROJECT SCHEDULE SUBMISSIONS

Provide the submissions as described below. The data CD/DVD, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS. If the Contractor fails or refuses to furnish the information and schedule updates as set forth herein, then the Contractor will be deemed not to have provided an estimate upon which a progress payment can be made.

Review comments made by the Government on the schedule(s) do not relieve the Contractor from compliance with requirements of the Contract Documents.

3.4.1 Preliminary Project Schedule Submission

Within 15 calendar days after the NTP is acknowledged submit the Preliminary Project Schedule defining the planned operations detailed for the first 90 calendar days for approval. The approved Preliminary Project Schedule will be used for payment purposes not to exceed 90 calendar days after NTP. Completely cost load the Preliminary Project Schedule to balance the contract award CLINS shown on the Price Schedule. The Preliminary Project Schedule may be summary in nature for the remaining performance period. It must be early start and late finish constrained and logically tied as specified. The Preliminary Project Schedule forms the basis for the Initial Project Schedule specified herein and must include all of the required plan and program preparations, submissions and approvals identified in the contract (for example, Quality Control Plan, Safety Plan, and Environmental Protection Plan) as well as design activities, planned submissions of all early design packages, permitting activities, design review conference activities, and other non-construction activities intended to occur within the first 90 calendar days. Government acceptance of the associated design package(s) and all other specified Program and Plan approvals must occur prior to any planned construction activities. Activity code any activities that are summary in nature after the first 90 calendar days with Bid Item (CLIN) code (BIDI), Responsibility Code (RESP) and Feature of Work code (FOW).

3.4.2 Initial Project Schedule Submission

Submit the Initial Project Schedule for approval within 42 calendar days after notice to proceed is issued. The schedule must demonstrate a reasonable and realistic sequence of activities which represent all work through the entire contract performance period. No payment will be made for work items not fully detailed in the Project Schedule.

3.4.3 Periodic Schedule Updates

Update the Project Schedule on a regular basis, monthly at a minimum. Provide a draft Periodic Schedule Update for review at the schedule update meetings as prescribed in the paragraph PERIODIC SCHEDULE UPDATE MEETINGS. These updates will enable the Government to assess Contractor's progress.

a. Update information including Actual Start Dates (AS), Actual Finish Dates (AF), Remaining Durations (RD), and Percent Complete is subject to the approval of the Government at the meeting.

b. AS and AF dates must match the date(s) reported on the Contractor's Quality Control Report for an activity start or finish.

3.5 SUBMISSION REQUIREMENTS

Submit the following items for the Preliminary Schedule, Initial Schedule, and every Periodic Schedule Update throughout the life of the project:

3.5.1 Data CD/DVDs

Provide two sets of data CD/DVDs containing the current project schedule and all previously submitted schedules in the format of the scheduling software (e.g. .xer). Also include on the data CD/DVDs the Narrative Report and all required Schedule Reports. Label each CD/DVD indicating the type of schedule (Preliminary, Initial, Update), full contract number, Data Date and file name. Each schedule must have a unique file name and use project specific settings.

3.5.2 Narrative Report

Provide a Narrative Report with each schedule submission. The Narrative Report is expected to communicate to the Government the thorough analysis of the schedule output and the plans to compensate for any problems, either current or potential, which are revealed through that analysis. Include the following information as minimum in the Narrative Report:

a. Identify and discuss the work scheduled to start in the next update period.

b. A description of activities along the two most critical paths where the total float is less than or equal to 20 work days.

c. A description of current and anticipated problem areas or delaying factors and their impact and an explanation of corrective actions taken or required to be taken.

d. Identify and explain why activities based on their calculated late dates should have either started or finished during the update period but did not.

e. Identify and discuss all schedule changes by activity ID and activity name including what specifically was changed and why the change was needed. Include at a minimum new and deleted activities, logic changes, duration changes, calendar changes, lag changes, resource changes, and actual start and finish date changes.

f. Identify and discuss out-of-sequence work.

3.5.3 Schedule Reports

The format, filtering, organizing and sorting for each schedule report will be as directed by the Contracting Officer. Typically, reports contain Activity Numbers, Activity Description, Original Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date, Total Float, Actual Start Date, Actual Finish Date, and Percent

Complete. Provide the reports electronically in .pdf format. The following lists typical reports that will be requested:

3.5.3.1 Activity Report

List of all activities sorted according to activity number.

3.5.3.2 Logic Report

List of detailed predecessor and successor activities for every activity in ascending order by activity number.

3.5.3.3 Total Float Report

A list of all incomplete activities sorted in ascending order of total float. List activities which have the same amount of total float in ascending order of Early Start Dates. Do not show completed activities on this report.

3.5.3.4 Earnings Report by CLIN

A compilation of the Total Earnings on the project from the NTP to the data date, which reflects the earnings of activities based on the agreements made in the schedule update meeting defined herein. Provided a complete schedule update has been furnished, this report serves as the basis of determining progress payments. Group activities by CLIN number and sort by activity number. Provide a total CLIN percent earned value, CLIN percent complete, and project percent complete. The printed report must contain the following for each activity: the Activity Number, Activity Description, Original Budgeted Amount, Earnings to Date, Earnings this period, Total Quantity, Quantity to Date, and Percent Complete (based on cost).

3.5.3.5 Schedule Log

Provide a Scheduling/Leveling Report generated from the current project schedule being submitted.

3.5.4 Network Diagram

The Network Diagram is required for the Preliminary, Initial and Periodic Updates. Depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Contracting Officer will use, but is not limited to, the following conditions to review compliance with this paragraph:

3.5.4.1 Continuous Flow

Show a continuous flow from left to right with no arrows from right to left. Show the activity number, description, duration, and estimated earned value on the diagram.

3.5.4.2 Project Milestone Dates

Show dates on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

3.5.4.3 Critical Path

Show all activities on the critical path. The critical path is defined as

the longest path.

3.5.4.4 Banding

Organize activities using the WBS or as otherwise directed to assist in the understanding of the activity sequence. Typically, this flow will group activities by major elements of work, category of work, work area and/or responsibility.

3.5.4.5 Cash Flow / Schedule Variance Control (SVC) Diagram

With each schedule submission, provide a SVC diagram showing 1) Cash Flow S-Curves indicating planned project cost based on projected early and late activity finish dates, and 2) Earned Value to-date.

3.6 PERIODIC SCHEDULE UPDATE

3.6.1 Periodic Schedule Update Meetings

Conduct periodic schedule update meetings for the purpose of reviewing the proposed Periodic Schedule Update, Narrative Report, Schedule Reports, and progress payment. Conduct meetings at least monthly within five days of the proposed schedule data date. Provide a computer with the scheduling software loaded and a projector which allows all meeting participants to view the proposed schedule during the meeting. The Contractor's authorized scheduler must organize, group, sort, filter, perform schedule revisions as needed and review functions as requested by the Contractor and/or Government. The meeting is a working interactive exchange which allows the Government and Contractor the opportunity to review the updated schedule on a real time and interactive basis. The meeting will last no longer than 8 hours. Provide a draft of the proposed narrative report and schedule data file to the Government a minimum of two workdays in advance of the meeting. The Contractor's Project Manager and scheduler must attend the meeting with the authorized representative of the Contracting Officer. Superintendents, foremen and major subcontractors must attend the meeting as required to discuss the project schedule and work. Following the periodic schedule update meeting, make corrections to the draft submission. Include only those changes approved by the Government in the submission and invoice for payment.

3.6.2 Update Submission Following Progress Meeting

Submit the complete Periodic Schedule Update of the Project Schedule containing all approved progress, revisions, and adjustments, pursuant to paragraph SUBMISSION REQUIREMENTS not later than 4 work days after the periodic schedule update meeting.

3.7 WEEKLY PROGRESS MEETINGS

Conduct a weekly meeting with the Government (or as otherwise mutually agreed to) between the meetings described in paragraph entitled PERIODIC SCHEDULE UPDATE MEETINGS for the purpose of jointly reviewing the actual progress of the project as compared to the as planned progress and to review planned activities for the upcoming two weeks. Use the current approved schedule update for the purposes of this meeting and for the production and review of reports. At the weekly progress meeting, address the status of RFIs, RFPs and Submittals.

3.8 REQUESTS FOR TIME EXTENSIONS

Provide a justification of delay to the Contracting Officer in accordance with the contract provisions and clauses for approval within 10 days of a delay occurring. Also prepare a time impact analysis for each Government request for proposal (RFP) to justify time extensions.

3.8.1 Justification of Delay

Provide a description of the event(s) that caused the delay and/or impact to the work. As part of the description, identify all schedule activities impacted. Show that the event that caused the delay/impact was the responsibility of the Government. Provide a time impact analysis that demonstrates the effects of the delay or impact on the project completion date or interim completion date(s). Evaluate multiple impacts chronologically; each with its own justification of delay. With multiple impacts consider any concurrency of delay. A time extension and the schedule fragnet becomes part of the project schedule and all future schedule updates upon approval by the Contracting Officer.

3.8.2 Time Impact Analysis (Prospective Analysis)

Prepare a time impact analysis for approval by the Contracting Officer based on industry standard AACE 52R-06. Utilize a copy of the last approved schedule prior to the first day of the impact or delay for the time impact analysis. If Contracting Officer determines the time frame between the last approved schedule and the first day of impact is too great, prepare an interim updated schedule to perform the time impact analysis. Unless approved by the Contracting Officer, no other changes may be incorporated into the schedule being used to justify the time impact.

3.8.3 Forensic Schedule Analysis (Retrospective Analysis)

Prepare an analysis for approval by the Contracting Officer based on industry standard AACE 29R-03.

3.8.4 Fragmentary Network (Fragnet)

Prepare a proposed fragnet for time impact analysis consisting of a sequence of new activities that are proposed to be added to the project schedule to demonstrate the influence of the delay or impact to the project's contractual dates. Clearly show how the proposed fragnet is to be tied into the project schedule including all predecessors and successors to the fragnet activities. The proposed fragnet must be approved by the Contracting Officer prior to incorporation into the project schedule.

3.8.5 Time Extension

The Contracting Officer must approve the Justification of Delay including the time impact analysis before a time extension will be granted. No time extension will be granted unless the delay consumes all available Project Float and extends the projected finish date ("End Project" milestone) beyond the Contract Completion Date. The time extension will be in calendar days.

Actual delays that are found to be caused by the Contractor's own actions, which result in a calculated schedule delay will not be a cause for an extension to the performance period, completion date, or any interim milestone date.

3.8.6 Impact to Early Completion Schedule

No extended overhead will be paid for delay prior to the original Contract Completion Date for an Early Completion IPS unless the Contractor actually performed work in accordance with that Early Completion Schedule. The Contractor must show that an early completion was achievable had it not been for the impact.

3.9 FAILURE TO ACHIEVE PROGRESS

Should the progress fall behind the approved project schedule for reasons other than those that are excusable within the terms of the contract, the Contracting Officer may require provision of a written recovery plan for approval. The plan must detail how progress will be made-up to include which activities will be accelerated by adding additional crews, longer work hours, extra work days, etc.

3.9.1 Artificially Improving Progress

Artificially improving progress by means such as, but not limited to, revising the schedule logic, modifying or adding constraints, shortening activity durations, or changing calendars in the project schedule is prohibited. Indicate assumptions made and the basis for any logic, constraint, duration and calendar changes used in the creation of the recovery plan. Any additional resources, manpower, or daily and weekly work hour changes proposed in the recovery plan must be evident at the work site and documented in the daily report along with the Schedule Narrative Report.

3.9.2 Failure to Perform

Failure to perform work and maintain progress in accordance with the supplemental recovery plan may result in an interim and final unsatisfactory performance rating and may result in corrective action directed by the Contracting Officer pursuant to FAR 52.236-15 Schedules for Construction Contracts, FAR 52.249-10 Default (Fixed-Price Construction), and other contract provisions.

3.9.3 Recovery Schedule

Should the Contracting Officer find it necessary, submit a recovery schedule pursuant to FAR 52.236-15 Schedules for Construction Contracts.

3.10 OWNERSHIP OF FLOAT

Except for the provision given in the paragraph IMPACT TO EARLY COMPLETION SCHEDULE, float available in the schedule, at any time, may not be considered for the exclusive use of either the Government or the Contractor including activity and/or project float. Activity float is the number of work days that an activity can be delayed without causing a delay to the "End Project" finish milestone. Project float (if applicable) is the number of work days between the projected early finish and the contract completion date milestone.

-- End of Section --

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 DEFINITIONS

1.1.1 Submittal Descriptions (SD)

Submittal requirements are specified in the technical sections. Examples and descriptions of submittals identified by the Submittal Description (SD) numbers and titles follow:

SD-01 Preconstruction Submittals

Preconstruction Submittals include schedules and a tabular list of locations, features, and other pertinent information regarding products, materials, equipment, or components to be used in the work.

Certificates Of Insurance

Surety Bonds

List Of Proposed Subcontractors

List Of Proposed Products

Baseline Network Analysis Schedule (NAS)

Submittal Register

Schedule Of Prices Or Earned Value Report

Work Plan

Quality Control (QC) plan

Environmental Protection Plan

SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the project.

Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials, systems or equipment for some

portion of the work.

Samples of warranty language when the contract requires extended product warranties.

SD-04 Samples

Fabricated or unfabricated physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.

Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.

Field samples and mock-ups constructed on the project site establish standards ensuring work can be judged. Includes assemblies or portions of assemblies that are to be incorporated into the project and those that will be removed at conclusion of the work.

SD-05 Design Data

Design calculations, mix designs, analyses or other data pertaining to a part of work.

SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. Unless specified in another section, testing must have been within three years of date of contract award for the project.

Report that includes findings of a test required to be performed on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report that includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports

Daily logs and checklists

Final acceptance test and operational test procedure

SD-07 Certificates

Statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that the product, system, or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a manufacturer, supplier, installer or Subcontractor through Contractor. The document purpose is to further promote the orderly progression of a portion of the work by

documenting procedures, acceptability of methods, or personnel qualifications.

Confined space entry permits

Text of posted operating instructions

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and (SDS)concerning impedances, hazards and safety precautions.

SD-09 Manufacturer's Field Reports

Documentation of the testing and verification actions taken by manufacturer's representative at the job site, in the vicinity of the job site, or on a sample taken from the job site, on a portion of the work, during or after installation, to confirm compliance with manufacturer's standards or instructions. The documentation must be signed by an authorized official of a testing laboratory or agency and state the test results; and indicate whether the material, product, or system has passed or failed the test.

Factory test reports.

SD-10 Operation and Maintenance Data

Data provided by the manufacturer, or the system provider, including manufacturer's help and product line documentation, necessary to maintain and install equipment, for operating and maintenance use by facility personnel.

Data required by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item.

Data incorporated in an operations and maintenance manual or control system.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

Submittals required for Guiding Principle Validation (GPV) or Third Party Certification (TPC).

Special requirements necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings. Also, submittal requirements necessary to properly close out a major phase of construction on a multi-phase contract.

1.1.2 Approving Authority

Office or designated person authorized to approve the submittal.

1.1.3 Work

As used in this section, on-site and off-site construction required by

contract documents, including labor necessary to produce submittals, construction, materials, products, equipment, and systems incorporated or to be incorporated in such construction. In exception, excludes work to produce SD-01 submittals.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor QC approval. Submittals with an "S" are for inclusion in the Sustainability Notebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with this section.

SD-01 Preconstruction Submittals

Submittal Register; G

1.3 SUBMITTAL CLASSIFICATION

1.3.1 Government Approved (G)

Government approval is required for extensions of design, critical materials, variations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Government.

Within the terms of the Contract Clause SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION, submittals are considered to be "shop drawings."

1.3.2 For Information Only

Submittals not requiring Government approval will be for information only. Within the terms of the Contract Clause SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION, they are not considered to be "shop drawings."

1.3.3 Sustainability Reporting Submittals (S)

Submittals for Guiding Principle Validation (GPV) or Third Party Certification (TPC) are indicated with an "S" designation. These submittals are for information only and for use as specified in Section 01 33 29 SUSTAINABILITY REPORTING.

Schedule submittals for these items throughout the course of construction as provided; do not wait until closeout.

1.4 PREPARATION

1.4.1 Transmittal Form

1.4.2 Submittal Format

1.4.2.1 Format of SD-01 Preconstruction Submittals

When the submittal includes a document that is to be used in the project, or is to become part of the project record, other than as a submittal, do not apply the Contractor's approval stamp to the document itself, but to a separate sheet accompanying the document.

Provide data in the unit of measure used in the contract documents.

1.4.2.2 Format for SD-02 Shop Drawings

Provide shop drawings not less than 8 1/2 by 11 inches nor more than 30 by 42 inches, except for full-size patterns or templates. Prepare drawings to accurate size, with scale indicated, unless another form is required. Ensure drawings are suitable for reproduction and of a quality to produce clear, distinct lines and letters, with dark lines on a white background.

a. Include the nameplate data, size, and capacity on drawings. Also include applicable federal, military, industry, and technical society publication references.

b. Dimension drawings, except diagrams and schematic drawings. Prepare drawings demonstrating interface with other trades to scale. Use the same unit of measure for shop drawings as indicated on the contract drawings. Identify materials and products for work shown.

Submit an electronic copy of drawings in PDF format.

1.4.2.2.1 Drawing Identification

Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to information required in paragraph IDENTIFYING SUBMITTALS.

Number drawings in a logical sequence. Each drawing is to bear the number of the submittal in a uniform location next to the title block. Place the Government contract number in the margin, immediately below the title block, for each drawing.

Reserve a blank space, no smaller than 2 inches on the right-hand side of each sheet for the Government disposition stamp.

1.4.2.3 Format of SD-03 Product Data

Present product data submittals for each section. Include a table of contents, listing the page and catalog item numbers for product data.

Indicate, by prominent notation, each product that is being submitted; indicate the specification section number and paragraph number to which it pertains.

1.4.2.3.1 Product Information

Supplement product data with material prepared for the project to satisfy the submittal requirements where product data does not exist. Identify this material as developed specifically for the project, with information and format as required for submission of SD-07 Certificates.

Provide product data in units used in the Contract documents. Where product data are included in preprinted catalogs with another unit, submit the dimensions in contract document units, on a separate sheet.

1.4.2.3.2 Standards

Where equipment or materials are specified to conform to industry or technical-society reference standards of such organizations as the American National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories

(UL), or Association of Edison Illuminating Companies (AEIC), submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Contracting Officer. State on the certificate that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

1.4.2.3.3 Data Submission

Collect required data submittals for each specific material, product, unit of work, or system into a single submittal that is marked for choices, options, and portions applicable to the submittal. Mark each copy of the product data identically. Partial submittals will not be accepted for expedition of the construction effort.

Submit the manufacturer's instructions before installation.

1.4.2.4 Format of SD-04 Samples

1.4.2.4.1 Sample Characteristics

Furnish samples in the following sizes, unless otherwise specified or unless the manufacturer has prepackaged samples of approximately the same size as specified:

a. Sample of Equipment or Device: Full size.

b. Sample of Materials Less Than 2 by 3 inches: Built up to 8 1/2 by 11 inches.

c. Sample of Materials Exceeding 8 1/2 by 11 inches: Cut down to 8 1/2 by 11 inches and adequate to indicate color, texture, and material variations.

d. Sample of Linear Devices or Materials: 10 inch length or length to be supplied, if less than 10 inches. Examples of linear devices or materials are conduit and handrails.

e. Sample Volume of Nonsolid Materials: Pint. Examples of nonsolid materials are sand and paint.

f. Color Selection Samples: 2 by 4 inches. Where samples are specified for selection of color, finish, pattern, or texture, submit the full set of available choices for the material or product specified. Sizes and quantities of samples are to represent their respective standard unit.

g. Sample Panel: 4 by 4 feet.

h. Sample Installation: 100 square feet.

1.4.2.4.2 Sample Incorporation

Reusable Samples: Incorporate returned samples into work only if so specified or indicated. Incorporated samples are to be in undamaged condition at the time of use.

Recording of Sample Installation: Note and preserve the notation of any area constituting a sample installation, but remove the notation at the final clean-up of the project.

1.4.2.4.3 Comparison Sample

Samples Showing Range of Variation: Where variations in color, finish, pattern, or texture are unavoidable due to nature of the materials, submit sets of samples of not less than three units showing extremes and middle of range. Mark each unit to describe its relation to the range of the variation.

When color, texture, or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.

1.4.2.5 Format of SD-05 Design Data

Provide design data and certificates on 8 1/2 by 11 inch paper.

1.4.2.6 Format of SD-06 Test Reports

By prominent notation, indicate each report in the submittal. Indicate the specification number and paragraph number to which each report pertains.

1.4.2.7 Format of SD-07 Certificates

Provide design data and certificates on 8 1/2 by 11 inch paper.

1.4.2.8 Format of SD-08 Manufacturer's Instructions

Present manufacturer's instructions submittals for each section. Include the manufacturer's name, trade name, place of manufacture, and catalog model or number on product data. Also include applicable federal, military, industry, and technical-society publication references. If supplemental information is needed to clarify the manufacturer's data, submit it as specified for SD-07 Certificates.

Submit the manufacturer's instructions before installation.

1.4.2.8.1 Standards

Where equipment or materials are specified to conform to industry or technical-society reference standards of such organizations as the American National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), or Association of Edison Illuminating Companies (AEIC), submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Contracting Officer. State on the certificate that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

1.4.2.9 Format of SD-09 Manufacturer's Field Reports

By prominent notation, indicate each report in the submittal. Indicate the specification number and paragraph number to which each report pertains.

1.4.2.10 Format of SD-10 Operation and Maintenance Data (O&M)

Comply with the requirements specified in Section 01 78 23 OPERATION AND MAINTENANCE DATA for O&M Data format.

1.4.2.11 Format of SD-11 Closeout Submittals

When the submittal includes a document that is to be used in the project or is to become part of the project record, other than as a submittal, do not apply the Contractor's approval stamp to the document itself, but to a separate sheet accompanying the document.

Provide data in the unit of measure used in the contract documents.

1.4.3 Source Drawings for Shop Drawings

1.4.3.1 Source Drawings

The entire set of source drawing files (DWG) will not be provided to the Contractor. Request the specific Drawing Number for the preparation of shop drawings. Only those drawings requested to prepare shop drawings will be provided. These drawings are provided only after award.

1.4.3.2 Terms and Conditions

Data contained on these electronic files must not be used for any purpose other than as a convenience in the preparation of construction data for the referenced project. Any other use or reuse is at the sole risk of the Contractor and without liability or legal exposure to the Government. The Contractor must make no claim, and waives to the fullest extent permitted by law any claim or cause of action of any nature against the Government, its agents, or its subconsultants that may arise out of or in connection with the use of these electronic files. The Contractor must, to the fullest extent permitted by law, indemnify and hold the Government harmless against all damages, liabilities, or costs, including reasonable attorney's fees and defense costs, arising out of or resulting from the use of these electronic files.

These electronic source drawing files are not construction documents. Differences may exist between the source drawing files and the corresponding construction documents. The Government makes no representation regarding the accuracy or completeness of the electronic source drawing files, nor does it make representation to the compatibility of these files with the Contractor hardware or software. The Contractor is responsible for determining if any conflict exists. In the event that a conflict arises between the signed and sealed construction documents prepared by the Government and the furnished source drawing files, the signed and sealed construction documents govern. Use of these source drawing files does not relieve the Contractor of the duty to fully comply with the contract documents, including and without limitation the need to check, confirm and coordinate the work of all contractors for the project. If the Contractor uses, duplicates or modifies these electronic source drawing files for use in producing construction data related to this contract, remove all previous indication of ownership (seals, logos, signatures, initials and dates).

1.4.4 Electronic File Format

Provide submittals in electronic format, with the exception of material samples required for SD-04 Samples items. Compile the submittal file as a single, complete document, to include the Transmittal Form described within. Name the electronic submittal file specifically according to its contents, and coordinate the file naming convention with the Contracting Officer. Electronic files must be of sufficient quality that all information is legible. Use PDF as the electronic format, unless otherwise specified or directed by the Contracting Officer. Generate PDF files from original documents with bookmarks so that the text included in the PDF file is searchable and can be copied. If documents are scanned, optical character resolution (OCR) routines are required. Index and bookmark files exceeding 30 pages to allow efficient navigation of the file. When required, the electronic file must include a valid electronic signature or a scan of a signature.

1.5 QUANTITY OF SUBMITTALS

1.5.1 Number of SD-01 Preconstruction Submittal Copies

Unless otherwise specified, submit electronic sets of administrative submittals.

1.5.2 Number of SD-04 Samples

a. Submit two samples, or two sets of samples showing the range of variation, of each required item. One approved sample or set of samples will be retained by the approving authority and one will be returned to the Contractor.

b. Submit one sample panel or provide one sample installation where directed. Include components listed in the technical section or as directed.

c. Submit one sample installation, where directed.

d. Submit one sample of nonsolid materials.

1.6 INFORMATION ONLY SUBMITTALS

Submittals without a "G" designation must be certified by the QC manager and submitted to the Contracting Officer for information-only. Approval of the Contracting Officer is not required on information only submittals. The Contracting Officer will mark "receipt acknowledged" on submittals for information and will return only the transmittal cover sheet to the Contractor. Normally, submittals for information only will not be returned. However, the Government reserves the right to return unsatisfactory submittals and require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

1.7 PROJECT SUBMITTAL REGISTER

A sample Project Submittal Register showing items of equipment and materials for when submittals are required by the specifications is provided as "Appendix A - Submittal Register."

1.7.1 Submittal Management

Prepare and maintain a submittal register, as the work progresses. Do not change data that is output in columns (c), (d), (e), and (f) as delivered by Government; retain data that is output in columns (a), (g), (h), and (i) as approved. As an attachment, provide a submittal register showing items of equipment and materials for which submittals are required by the specifications. This list may not be all-inclusive and additional submittals may be required.

Column (c): Lists specification section in which submittal is required.

Column (d): Lists each submittal description (SD Number. and type, e.g., SD-02 Shop Drawings) required in each specification section.

Column (e): Lists one principal paragraph in each specification section where a material or product is specified. This listing is only to facilitate locating submitted requirements. Do not consider entries in column (e) as limiting the project requirements.

Thereafter, the Contractor is to track all submittals by maintaining a complete list, including completion of all data columns and all dates on which submittals are received by and returned by the Government.

1.7.2 Preconstruction Use of Submittal Register

Submit the submittal register. Include the QC plan and the project schedule. Verify that all submittals required for the project are listed and add missing submittals. Coordinate and complete the following fields on the register submitted with the QC plan and the project schedule:

Column (a) Activity Number: Activity number from the project schedule.

Column (g) Contractor Submit Date: Scheduled date for the approving authority to receive submittals.

Column (h) Contractor Approval Date: Date that Contractor needs approval of submittal.

Column (i) Contractor Material: Date that Contractor needs material delivered to Contractor control.

1.7.3 Contractor Use of Submittal Register

Update the following fields with each submittal throughout the contract.

Column (b) Transmittal Number: List of consecutive, Contractor-assigned numbers.

Column (j) Action Code (k): Date of action used to record Contractor's review when forwarding submittals to QC.

Column (l) Date submittal transmitted.

Column (q) Date approval was received.

1.7.4 Approving Authority Use of Submittal Register

Update the following fields:

Column (b) Transmittal Number: List of consecutive, Contractor-assigned numbers.

Column (l) Date submittal was received.

Column (m) through (p) Dates of review actions.

Column (q) Date of return to Contractor.

1.7.5 Action Codes

1.7.6 Delivery of Copies

Submit an updated electronic copy of the submittal register to the Contracting Officer with each invoice request. Provide an updated Submittal Register monthly regardless of whether an invoice is submitted.

1.8 VARIATIONS

Variations from contract requirements require Contracting Officer approval pursuant to contract Clause FAR 52.236-21 Specifications and Drawings for Construction, and will be considered where advantageous to the Government.

1.8.1 Considering Variations

Discussion of variations with the Contracting Officer before submission will help ensure that functional and quality requirements are met and minimize rejections and resubmittals. When contemplating a variation that results in lower cost, consider submission of the variation as a Value Engineering Change Proposal (VECP).

Specifically point out variations from contract requirements in transmittal letters. Failure to point out variations may cause the Government to require rejection and removal of such work at no additional cost to the Government.

1.8.2 Proposing Variations

When proposing variation, deliver a written request to the Contracting Officer, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to Government. Include the DOR's written analysis and approval. If lower cost is a benefit, also include an estimate of the cost savings. In addition to documentation required for variation, include the submittals required for the item. Clearly mark the proposed variation in all documentation.

1.8.3 Warranting that Variations are Compatible

When delivering a variation for approval, the Contractor warrants that this contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of work.

1.8.4 Review Schedule Extension

In addition to the normal submittal review period, a period of 14 days will be allowed for the Government to consider submittals with variations.

1.9 SCHEDULING

Schedule and submit concurrently product data and shop drawings covering component items forming a system or items that are interrelated. Submit pertinent certifications at the same time. No delay damages or time extensions will be allowed for time lost in late submittals. .

a. Coordinate scheduling, sequencing, preparing, and processing of submittals with performance of work so that work will not be delayed by submittal processing. The Contractor is responsible for additional time required for Government reviews resulting from required resubmittals. The review period for each resubmittal is the same as for the initial submittal.

b. Submittals required by the contract documents are listed on the submittal register. If a submittal is listed in the submittal register but does not pertain to the contract work, the Contractor is to include the submittal in the register and annotate it "N/A" with a brief explanation. Approval by the Contracting Officer does not relieve the Contractor of supplying submittals required by the contract documents but that have been omitted from the register or marked "N/A."

c. Resubmit the submittal register and annotate it monthly with actual submission and approval dates. When all items on the register have been fully approved, no further resubmittal is required.

Contracting Officer review will be completed within 5 days after the date of submission.

1.10 GOVERNMENT APPROVING AUTHORITY

When the approving authority is the Contracting Officer, the Government will:

a. Note the date on which the submittal was received.

b. Review submittals for approval within the scheduling period specified and only for conformance with project design concepts and compliance with contract documents.

c. Identify returned submittals with one of the actions defined in paragraph REVIEW NOTATIONS and with comments and markings appropriate for the action indicated.

Upon completion of review of submittals requiring Government approval, stamp and date submittals. electronic copies of the submittal will be retained by the Contracting Officer and electronic copies of the submittal will be returned to the Contractor.

1.10.1 Review Notations

Submittals will be returned to the Contractor with the following notations:

a. Submittals marked "approved" or "accepted" authorize proceeding with the work covered.

b. Submittals marked "approved as noted" or "approved, except as noted, resubmittal not required," authorize proceeding with the work covered provided that the Contractor takes no exception to the corrections.

c. Submittals marked "not approved," "disapproved," or "revise and resubmit" indicate incomplete submittal or noncompliance with the contract requirements or design concept. Resubmit with appropriate changes. Do not proceed with work for this item until the resubmittal is approved.

d. Submittals marked "not reviewed" indicate that the submittal has been previously reviewed and approved, is not required, does not have evidence of being reviewed and approved by Contractor, or is not complete. A submittal marked "not reviewed" will be returned with an explanation of the reason it is not reviewed. Resubmit submittals returned for lack of review by Contractor or for being incomplete, with appropriate action, coordination, or change.

e. Submittals marked "receipt acknowledged" indicate that submittals have been received by the Government. This applies only to "information-only submittals" as previously defined.

1.11 DISAPPROVED SUBMITTALS

Make corrections required by the Contracting Officer. If the Contractor considers any correction or notation on the returned submittals to constitute a change to the contract drawings or specifications, give notice to the Contracting Officer as required under the FAR clause titled CHANGES. The Contractor is responsible for the dimensions and design of connection details and the construction of work. Failure to point out variations may cause the Government to require rejection and removal of such work at the Contractor's expense.

If changes are necessary to submittals, make such revisions and resubmit in accordance with the procedures above. No item of work requiring a submittal change is to be accomplished until the changed submittals are approved.

1.12 APPROVED SUBMITTALS

The Contracting Officer's approval of submittals is not to be construed as a complete check, and indicates only that the general method of construction, materials, detailing, and other information are satisfactory.

Approval or acceptance by the Government for a submittal does not relieve the Contractor of the responsibility for meeting the contract requirements or for any error that may exist, because under the Quality Control (QC) requirements of this contract, the Contractor is responsible for ensuring information contained with in each submittal accurately conforms with the requirements of the contract documents.

After submittals have been approved or accepted by the Contracting Officer,

no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.13 APPROVED SAMPLES

Approval of a sample is only for the characteristics or use named in such approval and is not be construed to change or modify any contract requirements. Before submitting samples, provide assurance that the materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been approved.

Match the approved samples for materials and equipment incorporated in the work. If requested, approved samples, including those that may be damaged in testing, will be returned to the Contractor, at its expense, upon completion of the contract. Unapproved samples will also be returned to the Contractor at its expense, if so requested.

Failure of any materials to pass the specified tests will be sufficient cause for refusal to consider, under this contract, any further samples of the same brand or make as that material. The Government reserves the right to disapprove any material or equipment that has previously proved unsatisfactory in service.

Samples of various materials or equipment delivered on the site or in place may be taken by the Contracting Officer for testing. Samples failing to meet contract requirements will automatically void previous approvals. Replace such materials or equipment to meet contract requirements.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

TITLE: VGLZ162323
JOB NAME: ADAL FUEL CELL & CORROSION CONTROL, BLDG 154
LOCATION: Selfridge ANGB, Michigan
CONTRACT NO:
CONTRACTOR:

SUBMITTAL REGISTER

									CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					
	(a)	(b)	(c)	(d)			(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
Line	Activity #	Transmittal #	Specification Section	SD #	Submittal Description	Item Submitted	Paragraph #	Classification: GOVT or A/E Reviewer	Submit	Approval Needed By	Material Needed By	Action Code	Date Of Action	Date FWD to APPR / Auth Date RCD From CONTR	Date FWD To Other Revwr	Date RCD From Other Reviewer	Action Code	Date Of Action	Mailed To CONTR/ Date RCD From APPR Authority	Remarks
1			01 00 10	3	Product Data	AFFIRMATIVE PROCUREMENT REPORTING FORM	1.1	G												
2			01 00 10	3	Product Data	AFFIRMATIVE PROCUREMENT REPORTING FORM	1.1	G												
3			01 00 10	11	Closeout Submittals	AFFIRMATIVE PROCUREMENT REPORTING FORM	1.1	G												
4			01 00 10	11	Closeout Submittals	AFFIRMATIVE PROCUREMENT REPORTING FORM	1.1	G												
5			01 11 00	1	Preconstruction Submittals	Salvage Plan	1.6	G												
6			01 14 00	1	Preconstruction Submittals	List of Contact Personnel	1.3.1.1	G												
7			01 30 00	1	Preconstruction Submittals	View Location Map	1.4	G												
8			01 30 00	1	Preconstruction Submittals	Progress and Completion Pictures	1.5	G												
9			01 30 00	4	Samples	Color Boards	1.3	G												
10			01 31 00	1	Preconstruction Submittals	Subcontract List	1.4.3.1	G												
11			01 31 00	1	Preconstruction Submittals	Key Personnel Names	1.4.3.2	G												
12			01 32 01.00 10	1	Preconstruction Submittals	Preliminary Project Schedule	3.4.1	G												
13			01 32 01.00 10	1	Preconstruction Submittals	Initial Project Schedule	3.4.2	G												
14			01 32 01.00 10	1	Preconstruction Submittals	Periodic Schedule Update	3.6.2	G												
15			01 33 00	1	Preconstruction Submittals	Submittal Register	1.7	G												
16			01 33 29	1	Preconstruction Submittals	Preliminary High Performance and Sustainable Building Checklist	1.5.3.1	G												
17			01 33 29	1	Preconstruction Submittals	Sustainability Action Plan	1.4.1	G												
18			01 33 29	1	Preconstruction Submittals	Preliminary Sustainability eNotebook	1.5.3.1	G												
19			01 33 29	11	Closeout Submittals	Final High Performance and Sustainable Building Checklist	1.5.3.1	G												
20			01 33 29	11	Closeout Submittals	Final Sustainability eNotebook	1.5.3.1	G												
21			01 33 29	11	Closeout Submittals	Amended Final Sustainability eNotebook	1.5.3.1	G												
22			01 33 29	11	Closeout Submittals	Amended Final High Performance and Sustainable Building Checklist	1.5.3.1	G												
23			01 35 26	1	Preconstruction Submittals	Accident Prevention Plan (APP)	1.7	G												
24			01 35 26	6	Test Reports	Monthly Exposure Reports	1.4													
25			01 35 26	6	Test Reports	Notifications and Reports	1.12													
26			01 35 26	6	Test Reports	Accident Reports	1.12.2	G												
27			01 35 26	6	Test Reports	LHE Inspection Reports	1.12.3													
28			01 35 26	7	Certificates	Crane Operators/Riggers	1.6.1.4													
29			01 35 26	7	Certificates	Standard Lift Plan	1.7.2.2	G												
30			01 35 26	7	Certificates	Critical Lift Plan	1.7.2.3	G												
31			01 35 26	7	Certificates	Activity Hazard Analysis (AHA)	1.8													
32			01 35 26	7	Certificates	Confined Space Entry Permit	1.9.1													
33			01 35 26	7	Certificates	Hot Work Permit	1.9.1													
34			01 35 26	7	Certificates	Certificate of Compliance	1.12.4													
35			01 35 26	7	Certificates	License Certificates	1.14													
36			01 35 26	7	Certificates	Radiography Operation Planning Work Sheet	1.14.1	G												

TITLE: VGLZ162323
JOB NAME: ADAL FUEL CELL & CORROSION CONTROL, BLDG 154
LOCATION: Selfridge ANGB, Michigan
CONTRACT NO:
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SUBMITTAL REGISTER

									CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					
	(a)	(b)	(c)	(d)			(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
Line	Activity #	Transmittal #	Specification Section	SD #	Submittal Description	Item Submitted	Paragraph #	Classification: GOVT or A/E Reviewer	Submit	Approval Needed By	Material Needed By	Action Code	Date Of Action	Date FWD to APPR / Auth Date RCD From CONTR	Date FWD To Other Revwr	Date RCD From Other Reviewer	Action Code	Date Of Action	Mailed To CONTR/ Date RCD From APPR Authority	Remarks
37			01 35 26	7	Certificates	Portable Gauge Operations Planning Worksheet	1.14.1	G												
38			01 45 00.00 10	1	Preconstruction Submittals	Contractor Quality Control (CQC) Plan	3.2	G												
39			01 45 00.00 10	6	Test Reports	Verification Statement	3.9.2													
40			01 45 35	6	Test Reports	Daily Reports	3.1.2													
41			01 45 35	6	Test Reports	Biweekly Reports	3.1.1													
42			01 45 35	7	Certificates	Steel Joist Institute Membership	2.1													
43			01 45 35	7	Certificates	Certificate of Compliance	2.1													
44			01 45 35	7	Certificates	Special Inspector	1.5	G												
45			01 50 00	1	Preconstruction Submittals	Construction Site Plan	1.3	G												
46			01 50 00	1	Preconstruction Submittals	Traffic Control Plan	3.4.1	G												
47			01 50 00	1	Preconstruction Submittals	Contractor Temporary Network Cybersecurity Compliance Statements	1.6.5	G												
48			01 50 00	7	Certificates	Backflow Tester	1.4.1													
49			01 50 00	7	Certificates	Backflow Preventers	1.4													
50			01 57 19	1	Preconstruction Submittals	Preconstruction Survey	1.5.1													
51			01 57 19	1	Preconstruction Submittals	Solid Waste Management Permit	1.9	G												
52			01 57 19	1	Preconstruction Submittals	Regulatory Notifications	1.5.2	G												
53			01 57 19	1	Preconstruction Submittals	Environmental Protection Plan	1.6	G												
54			01 57 19	1	Preconstruction Submittals	Dirt and Dust Control Plan	1.6.9.1	G												
55			01 57 19	1	Preconstruction Submittals	Employee Training Records	1.5.5	G												
56			01 57 19	1	Preconstruction Submittals	Environmental Manager Qualifications	1.5.4	G												
57			01 57 19	6	Test Reports	Monthly Solid Waste Disposal Report	1.9.1	G												
58			01 57 19	7	Certificates	Employee Training Records	1.5.5	G												
59			01 57 19	11	Closeout Submittals	Waste Determination Documentation	3.7.1	G												
60			01 57 19	11	Closeout Submittals	Disposal Documentation for Hazardous and Regulated Waste	3.7.3.6	G												
61			01 57 19	11	Closeout Submittals	Assembled Employee Training Records	1.5.5	G												
62			01 57 19	11	Closeout Submittals	Solid Waste Management Permit	1.9	G												
63			01 57 19	11	Closeout Submittals	Project Solid Waste Disposal Documentation Report	3.7.2.1	G												
64			01 57 19	11	Closeout Submittals	Hazardous Waste/Debris Management	3.7.3.1	G												
65			01 57 19	11	Closeout Submittals	Regulatory Notifications	1.5.2	G												
66			01 57 19	11	Closeout Submittals	Sales Documentation	3.7.2.1	G												
67			01 73 00	7	Certificates	Certificate Of Survey	3.3.2													
68			01 74 19	1	Preconstruction Submittals	Construction Waste Management Plan	1.7	G												
69			01 74 19	6	Test Reports	Quarterly Reports	1.9.2													
70			01 74 19	6	Test Reports	Annual Report	1.9.3													
71			01 74 19	11	Closeout Submittals	Final Construction Waste Diversion Report	1.1	S												

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72			01 78 00	3	Product Data	Warranty Management Plan	1.5.1													
73			01 78 00	3	Product Data	Spare Parts Data	1.4													
74			01 78 00	8	Manufacturer's Instructions	Instructions	1.5.1													
75			01 78 00	10	Operation and Maintenance Data	Operation and Maintenance Manuals	3.2	G												
76			01 78 00	11	Closeout Submittals	As-Built Drawings	3.1	G												
77			01 78 00	11	Closeout Submittals	As-Built Record of Equipment and Materials	1.5.1													
78			01 78 00	11	Closeout Submittals	Certification of EPA Designated Items	2.1	G												
79			01 78 23	10	Operation and Maintenance Data	Training Plan	3.1.1	G												
80			01 78 23	10	Operation and Maintenance Data	Training Outline	3.1.3	G												
81			01 78 23	10	Operation and Maintenance Data	Training Content	3.1.2	G												
82			01 78 23	11	Closeout Submittals	Training Video Recording	3.1.4	G												
83			01 78 23	11	Closeout Submittals	Validation of Training Completion	3.1.6	G												
84			01 79 00	7	Certificates	Instructor Qualifications	1.3.1													
85			01 79 00	7	Certificates	Evaluation	1.7.6													
86			01 79 00	10	Operation and Maintenance Data	Instruction Program	1.5.1													
87			01 79 00	10	Operation and Maintenance Data	Attendance Record	1.7.5													
88			01 79 00	10	Operation and Maintenance Data	Demonstration And Training Video Recordings	1.8													
89			01 91 00.15 10	1	Preconstruction Submittals	Commissioning Firm	1.7	G												
90			01 91 00.15 10	1	Preconstruction Submittals	Lead Commissioning Specialist	1.7.1	G												
91			01 91 00.15 10	6	Test Reports	Interim Construction Phase Commissioning Plan	3.1.2.1	G												
92			01 91 00.15 10	6	Test Reports	Final Construction Phase Commissioning Plan	3.1.2.2	G												
93			01 91 00.15 10	6	Test Reports	Pre-Functional Checklists	3.1.4.2	G												
94			01 91 00.15 10	6	Test Reports	Issues Log	1.9													
95			01 91 00.15 10	6	Test Reports	Commissioning Report	3.2	G												
96			01 91 00.15 10	7	Certificates	Certificate of Readiness	1.1	G												
97			01 91 00.15 10	10	Operation and Maintenance Data	Training Plan	3.1.5	G												
98			01 91 00.15 10	10	Operation and Maintenance Data	Training Attendance Rosters	3.1.5	G												
99			01 91 00.15 10	10	Operation and Maintenance Data	Systems Manual	3.1.6	G												
100			01 91 00.15 10	11	Closeout Submittals	Final Commissioning Report	3.2	S												
101			01 91 00.15 10	11	Closeout Submittals	Final Construction Phase Commissioning Plan	3.1.2.2	S												
102			02 41 00	1	Preconstruction Submittals	Existing Conditions	1.1													
103			02 41 00	7	Certificates	Notification	1.6	G												
104			02 82 00	3	Product Data	Amended Water	1.2.2	G												
105			02 82 00	3	Product Data	Safety Data Sheets (SDS) for All Materials	1.3.9	G												

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106			02 82 00	3	Product Data	Encapsulants	2.1	G												
107			02 82 00	3	Product Data	Respirators	3.1.2.1	G												
108			02 82 00	3	Product Data	Local Exhaust Equipment	3.1.7	G												
109			02 82 00	3	Product Data	Pressure Differential Automatic Recording Instrument	3.1.7	G												
110			02 82 00	3	Product Data	Vacuums	3.1.8	G												
111			02 82 00	6	Test Reports	Air Sampling Results	1.5.5	G												
112			02 82 00	6	Test Reports	Pressure Differential Recordings for Local Exhaust System	1.5.6	G												
113			02 82 00	6	Test Reports	Clearance Sampling	3.2.13.5	G												
114			02 82 00	6	Test Reports	Asbestos Disposal Quantity Report	3.3.3.2	G												
115			02 82 00	7	Certificates	Employee Training	1.3.4	G												
116			02 82 00	7	Certificates	Notifications	1.3.5	G												
117			02 82 00	7	Certificates	Respiratory Protection Program	1.3.7	G												
118			02 82 00	7	Certificates	Asbestos Hazard Abatement Plan	1.3.10	G												
119			02 82 00	7	Certificates	Testing Laboratory	1.3.11	G												
120			02 82 00	7	Certificates	Landfill Approval	1.3.12	G												
121			02 82 00	7	Certificates	Delivery Tickets	1.3.12	G												
122			02 82 00	7	Certificates	Waste Shipment Records	1.3.12	G												
123			02 82 00	7	Certificates	Transporter Certification	1.3.13	G												
124			02 82 00	7	Certificates	Medical Certification	1.3.14	G												
125			02 82 00	7	Certificates	Private Qualified Person Documentation	1.5.1	G												
126			02 82 00	7	Certificates	Designated Competent Person	1.5.2	G												
127			02 82 00	7	Certificates	Worker's License	1.5.3	G												
128			02 82 00	7	Certificates	Contractor's License	1.5.4	G												
129			02 82 00	7	Certificates	Federal, State or Local Citations on Previous Projects	1.5.7	G												
130			02 82 00	7	Certificates	Encapsulants	2.1	G												
131			02 82 00	7	Certificates	Equipment Used to Contain Airborne Asbestos Fibers	3.1	G												
132			02 82 00	7	Certificates	Water Filtration Equipment	3.1.3.3	G												
133			02 82 00	7	Certificates	Vacuums	3.1.8	G												
134			02 82 00	7	Certificates	Ventilation Systems	3.1.8	G												
135			02 82 00	11	Closeout Submittals	Permits	1.3.5	G												
136			02 82 00	11	Closeout Submittals	Notifications	1.3.5	G												
137			02 82 00	11	Closeout Submittals	Respirator Program Records	1.3.7.1	G												
138			02 82 00	11	Closeout Submittals	Rental Equipment	1.7.1	G												
139			02 83 00	1	Preconstruction Submittals	Competent Person	1.5.1.1	G												
140			02 83 00	1	Preconstruction Submittals	Training Certification	1.5.1.2	G												
141			02 83 00	1	Preconstruction Submittals	Occupational and Environmental Assessment Data Report	1.5.2.3	G												
142			02 83 00	1	Preconstruction Submittals	Medical Examinations	1.5.2.4	G												
143			02 83 00	1	Preconstruction Submittals	Lead, Cadmium, Chromium Waste Management Plan	1.5.2.8	G												
144			02 83 00	1	Preconstruction Submittals	Licenses, Permits and Notifications	1.5.4	G												
145			02 83 00	1	Preconstruction Submittals	Occupant Protection Plan	1.5.5	G												

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146			02 83 00	1	Preconstruction Submittals	Lead, Cadmium, Chromium Compliance Plan	1.5.2.2	G												
147			02 83 00	1	Preconstruction Submittals	Lead, Cadmium, Chromium Compliance Plan	3.1.1.6	G												
148			02 83 00	1	Preconstruction Submittals	Written Evidence of TSD Approval	3.5.2.1	G												
149			02 83 00	3	Product Data	Respirators	1.6.1	G												
150			02 83 00	3	Product Data	Vacuum Filters	1.6.4	G												
151			02 83 00	3	Product Data	Negative Air Pressure System	1.6.7	G												
152			02 83 00	3	Product Data	Materials and Equipment	2.1	G												
153			02 83 00	3	Product Data	Expendable Supplies	2.1.1	G												
154			02 83 00	3	Product Data	Local Exhaust Equipment	3.1.1.5	G												
155			02 83 00	3	Product Data	Pressure Differential Automatic Recording Instrument	3.1.1.5	G												
156			02 83 00	3	Product Data	Pressure Differential Log	3.1.1.6	G												
157			02 83 00	6	Test Reports	Sampling and Analysis	1.3.3	G												
158			02 83 00	6	Test Reports	Occupational and Environmental Assessment Data Report	1.5.2.3	G												
159			02 83 00	6	Test Reports	Sampling Results	1.5.2.3	G												
160			02 83 00	6	Test Reports	Pressure Differential Recordings For Local Exhaust System	1.5.3	G												
161			02 83 00	7	Certificates	Testing Laboratory	1.5.1.3	G												
162			02 83 00	7	Certificates	Clearance Certification	3.5.1.1	G												
163			02 83 00	11	Closeout Submittals	Hazardous Waste Manifest	3.5.2.1	G												
164			02 83 00	11	Closeout Submittals	Turn-In Documents or Weight Tickets	3.5.2.1	G												
165			02 84 16	7	Certificates	Qualifications of CIH	1.8.1	G												
166			02 84 16	7	Certificates	Training Certification	1.8.1	G												
167			02 84 16	7	Certificates	PCB and Lamp Removal Work Plan	1.8.2	G												
168			02 84 16	7	Certificates	PCB and Lamp Disposal Plan	1.8.3	G												
169			02 84 16	11	Closeout Submittals	Transporter Certification	3.5.2	G												
170			02 84 16	11	Closeout Submittals	Certification of Decontamination	3.2.4													
171			02 84 16	11	Closeout Submittals	Certificate of Disposal and/or recycling	3.5.2.1													
172			03 30 00	2	Shop Drawings	Reinforcing Steel	1.6.2.1	G												
173			03 30 00	3	Product Data	Joint Sealants	2.4.5													
174			03 30 00	3	Product Data	Joint Filler	2.4.4													
175			03 30 00	3	Product Data	Cementitious Materials	2.3.1													
176			03 30 00	3	Product Data	Vapor Retarder	2.4.6													
177			03 30 00	3	Product Data	Reinforcement	2.6													
178			03 30 00	3	Product Data	Liquid Chemical Floor Hardeners and Sealers	2.4.3.1													
179			03 30 00	3	Product Data	Admixtures	2.3.4													
180			03 30 00	3	Product Data	Biodegradable Form Release Agent	2.2.2													
181			03 30 00	3	Product Data	Nonshrink Grout	2.4.2													
182			03 30 00	3	Product Data	Crystalline Waterproofing	2.5.1													
183			03 30 00	5	Design Data	Concrete Mix Design	1.6.1.1	G												
184			03 30 00	6	Test Reports	Concrete Mix Design	1.6.1.1	G												

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185			03 30 00	6	Test Reports	Fly Ash	1.6.3.1													
186			03 30 00	6	Test Reports	Pozzolan	1.6.3.1													
187			03 30 00	6	Test Reports	Slag Cement	1.6.3.2													
188			03 30 00	6	Test Reports	Aggregates	1.6.3.3													
189			03 30 00	6	Test Reports	Compressive Strength Tests	3.13.2.3	G												
190			03 30 00	6	Test Reports	Slump Tests	3.13.2.1													
191			04 20 00	2	Shop Drawings	Cut CMU	3.3.5.1	G												
192			04 20 00	2	Shop Drawings	Detail Drawings	3.4.1.1	G												
193			04 20 00	3	Product Data	Hot Weather Procedures	1.5.1	G												
194			04 20 00	3	Product Data	Cold Weather Procedures	1.5.2	G												
195			04 20 00	3	Product Data	Clay or Shale Brick	2.2.2	G												
196			04 20 00	3	Product Data	Cement	2.2.3.2.1	G												
197			04 20 00	3	Product Data	Cementitious Materials	2.4.1.1	G												
198			04 20 00	3	Product Data	Insulation	2.6.8	G												
199			04 20 00	4	Samples	Mock-Up Panel	1.3.1.1	G												
200			04 20 00	4	Samples	Clay or Shale Brick	2.2.2	G												
201			04 20 00	4	Samples	Concrete Masonry Units (CMU)	2.2.3.2	G												
202			04 20 00	4	Samples	Admixtures for Masonry Mortar	2.4.1.4	G												
203			04 20 00	4	Samples	Anchors, Ties, and Bar Positioners	2.6.2	G												
204			04 20 00	4	Samples	Joint Reinforcement	2.6.3	G												
205			04 20 00	4	Samples	Clay Masonry Expansion-Joint Materials	2.6.6	G												
206			04 20 00	4	Samples	Insulation	2.6.8	G												
207			04 20 00	5	Design Data	Masonry Compressive Strength	2.1.2	G												
208			04 20 00	5	Design Data	Fire-Rated Concrete Masonry Units	2.2.3.3													
209			04 20 00	5	Design Data	Bracing Calculations	3.2.5	G												
210			04 20 00	6	Test Reports	Efflorescence Test	2.2.2.1.3													
211			04 20 00	6	Test Reports	Fire-Rated Concrete Masonry Units	2.2.3.3													
212			04 20 00	6	Test Reports	Prism Tests	3.6.1.1													
213			04 20 00	6	Test Reports	Single-Wythe Masonry Wall Water Penetration Test	3.6.1.2													
214			04 20 00	7	Certificates	Special Masonry Inspector Qualifications	1.3.2													
215			04 20 00	7	Certificates	Clay or Shale Brick	2.2.2													
216			04 20 00	7	Certificates	Concrete Masonry Units (CMU)	2.2.3.2													
217			04 20 00	7	Certificates	Cementitious Materials	2.4.1.1													
218			04 20 00	7	Certificates	Admixtures for Masonry Mortar	2.4.1.4													
219			04 20 00	7	Certificates	Admixtures for Grout	2.4.2.2													
220			04 20 00	7	Certificates	Anchors, Ties, and Bar Positioners	2.6.2													
221			04 20 00	7	Certificates	Joint Reinforcement	2.6.3													
222			04 20 00	7	Certificates	Insulation	2.6.8													
223			04 20 00	7	Certificates	Insulation	2.6.8													
224			04 20 00	8	Manufacturer's Instructions	Admixtures for Masonry Mortar	2.4.1.4													
225			04 20 00	8	Manufacturer's Instructions	Admixtures for Grout	2.4.2.2													
226			04 20 00	11	Closeout Submittals	Recycled Content	2.2.3.2.2	S												

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227			05 12 00	2	Shop Drawings	Fabrication Drawings	1.4.1	G												
228			05 12 00	3	Product Data	Shop Primer	2.6.2													
229			05 12 00	3	Product Data	Welding Electrodes and Rods	2.4.1													
230			05 12 00	3	Product Data	Direct Tension Indicator Washers	2.3.2.3													
231			05 12 00	3	Product Data	Non-Shrink Grout	2.4.2													
232			05 12 00	3	Product Data	Tension Control Bolts	2.3.3													
233			05 12 00	3	Product Data	Recycled Content for Structural Steel	2.2.1													
234			05 12 00	3	Product Data	Recycled Content for Structural Steel Tubing	2.2.2													
235			05 12 00	3	Product Data	Recycled Content for Steel Pipe	2.2.3													
236			05 12 00	6	Test Reports	Class B Coating	2.6.2													
237			05 12 00	6	Test Reports	Bolts, Nuts, and Washers	2.3													
238			05 12 00	6	Test Reports	Direct Tension Indicator Washer Inspection Reports	3.7.2.1													
239			05 12 00	6	Test Reports	Bolt Testing Reports	3.7.3.1													
240			05 12 00	7	Certificates	Steel	2.2													
241			05 12 00	7	Certificates	Bolts, Nuts, and Washers	2.3													
242			05 12 00	7	Certificates	Galvanizing	2.5													
243			05 12 00	7	Certificates	AISC Structural Steel Fabricator Quality Certification	1.3													
244			05 12 00	7	Certificates	AISC Structural Steel Erector Quality Certification	1.3													
245			05 12 00	7	Certificates	Welding Procedures and Qualifications	1.4.2.1													
246			05 12 00	7	Certificates	Certified Welding Inspector	3.7.1.1													
247			05 12 00	7	Certificates	Welding Procedure Specifications (WPS)	3.4													
248			05 21 00	2	Shop Drawings	Steel Joist Framing	1.3.1	G												
249			05 21 00	3	Product Data	Recycled Content Of Steel Products	2.3	G												
250			05 21 00	5	Design Data	Design Calculations	2.2	G												
251			05 30 00	2	Shop Drawings	Fabrication Drawings	1.3.5	G												
252			05 30 00	3	Product Data	Accessories	2.2													
253			05 30 00	3	Product Data	Deck Units	2.1													
254			05 30 00	3	Product Data	Touch-Up Paint	2.1.4													
255			05 30 00	3	Product Data	Welding Equipment	1.3.3													
256			05 30 00	3	Product Data	Welding Rods and Accessories	1.3.3													
257			05 30 00	3	Product Data	Recycled Content of Steel Products	2.1	S												
258			05 30 00	5	Design Data	Deck Units	2.1	G												
259			05 30 00	7	Certificates	Powder-Actuated Tool Operator	1.3.2													
260			05 30 00	7	Certificates	Welder Qualifications	1.3.3													
261			05 30 00	7	Certificates	Welding Procedures	1.3.3													
262			05 30 00	7	Certificates	Fire Safety	1.3.4.1													
263			05 30 00	7	Certificates	Wind Storm Resistance	1.3.4.2													
264			05 30 00	7	Certificates	Manufacturer's Certificate	1.3.1													
265			05 40 00	2	Shop Drawings	Framing Components	1.6.1	G												
266			05 40 00	3	Product Data	Studs, Joists	2.1													

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267			05 40 00	3	Product Data	Recycled Content of Steel Products	2.1	S												
268			05 40 00	5	Design Data	Metal Framing Calculations	1.6.2	G												
269			05 40 00	7	Certificates	Load-Bearing Cold-Formed Metal Framing	1.4													
270			05 40 00	7	Certificates	Welds	3.1.1													
271			05 50 13	2	Shop Drawings	Bollards	2.5	G												
272			05 50 13	2	Shop Drawings	Metal Railings	2.4	G												
273			05 50 13	2	Shop Drawings	Angles and Plates	2.6	G												
274			05 50 13	2	Shop Drawings	Recycled Content	2.1													
275			05 51 33	2	Shop Drawings	Ladders	2.3													
276			05 51 33	2	Shop Drawings	Ship's Ladder	2.3.3													
277			05 51 33	3	Product Data	Ladders	2.3													
278			05 51 33	3	Product Data	Ship's Ladder	2.3.3													
279			05 51 33	3	Product Data	Ladder Safety Devices	2.3.2													
280			05 51 33	7	Certificates	Fabricator Certification for Ladder Assembly	1.3													
281			05 51 33	7	Certificates	Fabricator Certification for Ships Ladder Assembly	1.3													
282			06 10 00	2	Shop Drawings	Nailing Strips	2.2.1	G												
283			06 10 00	3	Product Data	Fire-retardant Treatment	1.8													
284			06 10 00	3	Product Data	Adhesives	2.4.2													
285			06 10 00	6	Test Reports	Preservative-treated	1.4.3													
286			06 10 00	7	Certificates	Certificates of Grade	1.9.1													
287			06 10 00	7	Certificates	Preservative Treatment	1.7													
288			06 10 00	7	Certificates	Indoor Air Quality for Aerosol Adhesives	2.4.2	S												
289			06 10 00	7	Certificates	Indoor Air Quality for Non-aerosol Adhesives	2.4.2	S												
290			06 41 16.00 10	2	Shop Drawings	Shop Drawings	2.9													
291			06 41 16.00 10	2	Shop Drawings	Installation	3.1													
292			06 41 16.00 10	3	Product Data	Wood Materials	2.1													
293			06 41 16.00 10	3	Product Data	Finish Schedule	2.9.7.3													
294			06 41 16.00 10	4	Samples	Plastic Laminates	2.3													
295			06 41 16.00 10	4	Samples	Cabinet Hardware	2.6													
296			06 41 16.00 10	7	Certificates	Quality Assurance	1.5													
297			06 41 16.00 10	7	Certificates	Laminate Clad Casework	3.1													
298			06 61 16	2	Shop Drawings	Installation	3.1	G												
299			06 61 16	3	Product Data	Solid Polymer Material	2.1													
300			06 61 16	3	Product Data	Qualifications	1.5.1													
301			06 61 16	3	Product Data	Fabrications	2.3													
302			06 61 16	3	Product Data	Indoor air quality for solid surface seam and sealant products	2.2.4	S												
303			06 61 16	4	Samples	Material	2.1	G												
304			06 61 16	4	Samples	Counter and Vanity Tops	2.3.5	G												
305			06 61 16	6	Test Reports	Solid Polymer Material	2.1													
306			06 61 16	7	Certificates	Fabrications	2.3													

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307			06 61 16	7	Certificates	Qualifications	1.5.1													
308			06 61 16	7	Certificates	Indoor Air Quality for solid surface fabrication products	2.1	S												
309			06 61 16	10	Operation and Maintenance Data	Clean-up	3.2													
310			07 12 00	3	Product Data	Manufacturer's Standard Details	1.3	G												
311			07 12 00	3	Product Data	Protection Board	2.7	G												
312			07 12 00	3	Product Data	Prefabricated Laminated Asphalt Waterproofing	2.8	G												
313			07 12 00	3	Product Data	Membrane Fabric	2.4	G												
314			07 12 00	7	Certificates	Membrane Fabric	2.4	G												
315			07 12 00	7	Certificates	Protection Board	2.7	G												
316			07 12 00	7	Certificates	Prefabricated Laminated Asphalt Waterproofing	2.8	G												
317			07 12 00	7	Certificates	Certificates of Compliance	2.1.1	G												
318			07 12 00	7	Certificates	Certificates of Compliance	2.1.2	G												
319			07 12 00	11	Closeout Submittals	Certificates of Compliance	2.1.1	S												
320			07 12 00	11	Closeout Submittals	Certificates of Compliance	2.1.2	S												
321			07 12 00	11	Closeout Submittals	Volatile Organic Compounds (VOC) Contents	2.1.1	S												
322			07 12 00	11	Closeout Submittals	Recycled Content	2.1.2	S												
323			07 21 13	3	Product Data	Manufacturer's Standard Details	1.3	G												
324			07 21 13	3	Product Data	Block or Board Insulation	2.1	G												
325			07 21 13	3	Product Data	Vapor Retarder	2.3	G												
326			07 21 13	3	Product Data	Pressure Sensitive Tape	2.4	G												
327			07 21 13	3	Product Data	Protection Board or Coatings	1.4	G												
328			07 21 13	3	Product Data	Accessories	2.6	G												
329			07 21 13	3	Product Data	Recycled Content for Block or Board Insulation	2.1.5	S												
330			07 21 13	7	Certificates	Block or Board Insulation	2.1	G												
331			07 21 13	7	Certificates	Vapor Retarder	2.3	G												
332			07 21 13	7	Certificates	Protection Board or Coating	2.5	G												
333			07 21 13	7	Certificates	Protection Board or Coating	3.4.5	G												
334			07 21 13	7	Certificates	Special Warranties	1.7	G												
335			07 21 13	7	Certificates	Special Warranties	1.7	G												
336			07 21 13	7	Certificates	Indoor Air Quality For Block Or Board Insulation	2.1.6	S												
337			07 21 13	8	Manufacturer's Instructions	Block or Board Insulation	2.1													
338			07 21 13	8	Manufacturer's Instructions	Adhesive	2.6.1													
339			07 21 16	3	Product Data	Blanket Insulation	2.1													
340			07 21 16	3	Product Data	Recycled Content for Insulation Materials	2.1.2	S												
341			07 21 16	3	Product Data	Sill Sealer Insulation	2.2													
342			07 21 16	3	Product Data	Vapor Retarder	2.4													
343			07 21 16	3	Product Data	Pressure Sensitive Tape	2.5													
344			07 21 16	3	Product Data	Accessories	2.6													

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345			07 21 16	7	Certificates	Indoor Air Quality for Insulation Materials	2.1.4	S												
346			07 21 16	7	Certificates	Indoor Air Quality for Adhesives	2.6.1	S												
347			07 21 16	8	Manufacturer's Instructions	Insulation	3.3.1													
348			07 27 10.00 10	2	Shop Drawings	Air Barrier System Shop Drawings	2.1	G												
349			07 27 10.00 10	3	Product Data	Air Barrier System Product Data	2.1	G												
350			07 27 10.00 10	4	Samples	Material Samples For Air Barrier System	2.1	G												
351			07 27 10.00 10	6	Test Reports	Testing and Inspection	3.1.2	G												
352			07 27 19.01	1	Preconstruction Submittals	Qualifications of Manufacturer	1.8.1	G												
353			07 27 19.01	1	Preconstruction Submittals	Qualifications of Installer	1.8.2	G												
354			07 27 19.01	2	Shop Drawings	Self-adhering Air Barrier	1.4	G												
355			07 27 19.01	3	Product Data	Self-adhering Air Barrier	1.4	G												
356			07 27 19.01	3	Product Data	Primers, Adhesives, and Mastics	2.2	G												
357			07 27 19.01	3	Product Data	Safety Data Sheets	1.4.2	G												
358			07 27 19.01	4	Samples	Self-adhering Air Barrier	1.4	G												
359			07 27 19.01	6	Test Reports	Field Peel Adhesion Test	1.6	G												
360			07 27 19.01	6	Test Reports	Flame Propagation of Wall Assemblies	1.4.4	G												
361			07 27 19.01	6	Test Reports	Flame Spread and Smoke Developed Index Ratings	1.4.4	G												
362			07 27 19.01	6	Test Reports	Site Inspections and Testing	3.4.1	G												
363			07 27 19.01	7	Certificates	Self-adhering Air Barrier	1.4	G												
364			07 27 19.01	8	Manufacturer's Instructions	Self-adhering Air Barrier	1.4	G												
365			07 27 19.01	8	Manufacturer's Instructions	Primers, Adhesives, and Mastics	2.2	G												
366			07 27 26	1	Preconstruction Submittals	Qualifications of Manufacturer	1.9.1	G												
367			07 27 26	1	Preconstruction Submittals	Qualifications of Installer	1.9.2	G												
368			07 27 26	2	Shop Drawings	Fluid-Applied Membrane Air Barrier	1.4	G												
369			07 27 26	3	Product Data	Fluid-Applied Membrane Air Barrier	1.4	G												
370			07 27 26	3	Product Data	Primers, Adhesives, and Mastics	2.2	G												
371			07 27 26	3	Product Data	Reinforcement	2.4	G												
372			07 27 26	3	Product Data	Safety Data Sheets	1.4.2	G												
373			07 27 26	4	Samples	Mockup	1.4.3	G												
374			07 27 26	6	Test Reports	Capillary Moisture Test	1.6	G												
375			07 27 26	6	Test Reports	Field Peel Adhesion Test	1.4.4	G												
376			07 27 26	6	Test Reports	Flame Propagation of Wall Assemblies	1.4.4	G												
377			07 27 26	6	Test Reports	Flame Spread and Smoke Developed Index Ratings	1.4.4	G												
378			07 27 26	6	Test Reports	Site Inspections	3.4.1	G												
379			07 27 26	7	Certificates	Fluid-Applied Membrane Air Barrier	1.4	G												
380			07 27 26	7	Certificates	Qualifications of Manufacturer	1.9.1	G												
381			07 27 26	7	Certificates	Qualifications of Installer	1.9.2	G												
382			07 27 26	8	Manufacturer's Instructions	Fluid-Applied Membrane Air Barrier	1.4	G												
383			07 27 26	8	Manufacturer's Instructions	Primers, Adhesives, and Mastics	2.2	G												
384			07 42 13	1	Preconstruction Submittals	Qualification of Manufacturer	1.5.3	G												

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385			07 42 13	1	Preconstruction Submittals	Qualification of Installation Contractor	1.5.4	G												
386			07 42 13	1	Preconstruction Submittals	Warranty	1.8	G												
387			07 42 13	2	Shop Drawings	Installation Drawings	1.5.1.1	G												
388			07 42 13	3	Product Data	Recycled Content;	2.1													
389			07 42 13	3	Product Data	Wall Panels	2.2.1													
390			07 42 13	3	Product Data	Closure Materials	1.5.5													
391			07 42 13	3	Product Data	Pressure Sensitive Tape	2.5.4.4													
392			07 42 13	3	Product Data	Sealants and Caulking	2.5.4.1													
393			07 42 13	3	Product Data	Galvanizing Repair Paint	1.5.3.1													
394			07 42 13	3	Product Data	Enamel Repair Paint	1.5.3.1													
395			07 42 13	3	Product Data	Accessories	1.5.5													
396			07 42 13	3	Product Data	Accessories	2.5													
397			07 42 13	4	Samples	Wall Panels	2.2.1	G												
398			07 42 13	4	Samples	Fasteners	1.5.3.1	G												
399			07 42 13	4	Samples	Metal Closure Strips	2.5.3	G												
400			07 42 13	5	Design Data	Wind load design analysis	1.5.1.2	G												
401			07 42 13	6	Test Reports	Leakage Tests	3.7.2	G												
402			07 42 13	6	Test Reports	Wind Load Tests	1.3.2	G												
403			07 42 13	7	Certificates	Coil Stock	1.5.3.1	G												
404			07 42 13	7	Certificates	Fasteners	1.5.3.1	G												
405			07 42 13	7	Certificates	Galvanizing Repair Paint	1.5.3.1	G												
406			07 42 13	7	Certificates	Enamel Repair Paint	1.5.3.1	G												
407			07 42 13	8	Manufacturer's Instructions	Installation	3.3	G												
408			07 42 13	9	Manufacturer's Field Reports	Manufacturer's Field Reports	3.8.1	G												
409			07 42 13	11	Closeout Submittals	Warranty	1.8	G												
410			07 42 13	11	Closeout Submittals	Maintenance Instructions	1.5.6	G												
411			07 42 13	11	Closeout Submittals	20 year 'No Dollar Limit' warranty for labor and material	1.8.1													
412			07 54 19	2	Shop Drawings	Detail Drawings	1.6	G												
413			07 54 19	2	Shop Drawings	Roof Plan	1.6	G												
414			07 54 19	3	Product Data	PVC Roofing Membrane	3.3.2	G												
415			07 54 19	3	Product Data	Energy Star Label for roof membrane	2.1.2	S												
416			07 54 19	3	Product Data	Bonding Adhesive	2.1.4													
417			07 54 19	3	Product Data	Flashing	1.5.5													
418			07 54 19	3	Product Data	Flashing	3.3.2.2													
419			07 54 19	3	Product Data	Membrane Fasteners and Plates	2.1.7													
420			07 54 19	3	Product Data	Roof Insulation	2.1.9													
421			07 54 19	3	Product Data	Information Card	2.1.1													
422			07 54 19	7	Certificates	Qualification of Manufacturer	1.5.1													
423			07 54 19	7	Certificates	Qualifications of Applicator	1.5.2													
424			07 54 19	7	Certificates	Qualification of Engineer of Record	1.5.4													
425			07 54 19	7	Certificates	Minimum Polymer Thickness	2.1.1													
426			07 54 19	7	Certificates	Minimum Polymer Thickness	2.1.6													

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427			07 54 19	7	Certificates	Sample	1.1	G												
428			07 54 19	8	Manufacturer's Instructions	Application Method	3.3	G												
429			07 54 19	8	Manufacturer's Instructions	Membrane Flashing	2.1.6	G												
430			07 54 19	8	Manufacturer's Instructions	Membrane Flashing	3.4.2	G												
431			07 54 19	8	Manufacturer's Instructions	Auxiliary Fasteners	2.1.7.2													
432			07 54 19	8	Manufacturer's Instructions	Cold Weather	1.8	G												
433			07 54 19	11	Closeout Submittals	Warranty	1.1	G												
434			07 54 19	11	Closeout Submittals	Information Card	2.1.1	G												
435			07 54 19	11	Closeout Submittals	Instructions to Government Personnel	3.1	G												
436			07 60 00	2	Shop Drawings	Exposed Sheet Metal	2.2.1	G												
437			07 60 00	2	Shop Drawings	Gutters	3.1.14	G												
438			07 60 00	2	Shop Drawings	Downspouts	3.1.15	G												
439			07 60 00	2	Shop Drawings	Expansion Joints	3.1.21	G												
440			07 60 00	2	Shop Drawings	Gravel Stops and fascia	2.2.1	G												
441			07 60 00	2	Shop Drawings	Splash Pans	3.1.19	G												
442			07 60 00	2	Shop Drawings	Flashing for Roof Drains	3.1.16	G												
443			07 60 00	2	Shop Drawings	Base Flashing	3.1.8	G												
444			07 60 00	2	Shop Drawings	Counterflashing	3.1.9	G												
445			07 60 00	2	Shop Drawings	Flashing at Roof Penetrations and Equipment Supports	3.1.22	G												
446			07 60 00	2	Shop Drawings	Reglets	2.2.8	G												
447			07 60 00	2	Shop Drawings	Scuppers	3.1.17	G												
448			07 60 00	2	Shop Drawings	Copings	3.1.25	G												
449			07 60 00	2	Shop Drawings	Drip Edges	3.1.13	G												
450			07 60 00	2	Shop Drawings	Conductor Heads	3.1.18	G												
451			07 60 00	2	Shop Drawings	Recycled Content	2.1	S												
452			07 60 00	4	Samples	Finish Samples	1.4.2	G												
453			07 60 00	8	Manufacturer's Instructions	Instructions for Installation	1.4.3	G												
454			07 60 00	8	Manufacturer's Instructions	Quality Control Plan	3.5	G												
455			07 60 00	10	Operation and Maintenance Data	Cleaning and Maintenance	1.4.3	G												
456			07 84 00	2	Shop Drawings	Firestopping System	2.1	G												
457			07 84 00	3	Product Data	Firestopping Materials	2.2	G												
458			07 84 00	7	Certificates	Firestopping Materials	2.2													
459			07 84 00	7	Certificates	Installer Qualifications	1.5.1	G												
460			07 92 00	3	Product Data	Sealants	2.1	G												
461			07 92 00	3	Product Data	Primers	2.2	G												
462			07 92 00	3	Product Data	Bond Breakers	2.3	G												
463			07 92 00	3	Product Data	Backstops	2.4	G												
464			07 92 00	3	Product Data	Field Adhesion	3.1	G												
465			07 92 00	7	Certificates	Indoor Air Quality For Interior Sealants	2.1.1	S												
466			07 92 00	7	Certificates	Indoor Air Quality For Interior Floor Joint Sealants	2.1.3	S												

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467			07 92 00	7	Certificates	Indoor Air Quality For Interior Acoustical Sealants	2.1.4	S												
468			07 92 00	7	Certificates	Indoor Air Quality For Interior Caulking	2.5	S												
469			08 11 13	2	Shop Drawings	Doors	2.1	G												
470			08 11 13	2	Shop Drawings	Doors	2.1	G												
471			08 11 13	2	Shop Drawings	Recycled Content for Steel Door Product	2.1	S												
472			08 11 13	2	Shop Drawings	Frames	2.5	G												
473			08 11 13	2	Shop Drawings	Frames	2.5	G												
474			08 11 13	2	Shop Drawings	Recycled Content for Steel Frame Product	2.5	S												
475			08 11 13	2	Shop Drawings	Accessories	2.3													
476			08 11 13	2	Shop Drawings	Weatherstripping	2.7													
477			08 11 13	3	Product Data	Doors	2.1	G												
478			08 11 13	3	Product Data	Frames	2.5	G												
479			08 11 13	3	Product Data	Accessories	2.3													
480			08 31 00	2	Shop Drawings	Access Doors And Panels	1.3	G												
481			08 31 00	3	Product Data	Access Doors And Panels	1.3	G												
482			08 31 00	3	Product Data	Hardware	1.3.2	G												
483			08 31 00	3	Product Data	Accessories	2.2.6	G												
484			08 31 00	3	Product Data	Recycled Content	2.1	S												
485			08 31 00	4	Samples	Finishes	2.5	G												
486			08 34 16.20	1	Preconstruction Submittals	Manufacturer's Qualifications	1.4.1	G												
487			08 34 16.20	1	Preconstruction Submittals	Installer's Qualifications	1.4.2	G												
488			08 34 16.20	2	Shop Drawings	Door Design	1.3.1	G												
489			08 34 16.20	3	Product Data	Electric Operator	2.3													
490			08 34 16.20	3	Product Data	Doors	2.2	G												
491			08 34 16.20	3	Product Data	Controls	2.3.2	G												
492			08 34 16.20	3	Product Data	Door Fabric	2.1.7	G												
493			08 34 16.20	5	Design Data	Calculations	1.3.2.1	G												
494			08 34 16.20	5	Design Data	Load Diagrams	1.3.4	G												
495			08 34 16.20	6	Test Reports	Door Fabric	2.1.7	G												
496			08 34 16.20	6	Test Reports	Door Fabric	2.1.7	G												
497			08 34 16.20	7	Certificates	Manufacturer's Qualifications	1.4.1	G												
498			08 34 16.20	7	Certificates	Installers Qualifications	1.4.2	G												
499			08 34 16.20	7	Certificates	Welding Procedures and Qualifications	1.5	G												
500			08 34 16.20	9	Manufacturer's Field Reports	Acceptance Testing Procedure	3.3	G												
501			08 34 16.20	10	Operation and Maintenance Data	Door Operation	2.9.1	G												
502			08 34 16.20	10	Operation and Maintenance Data	Emergency and Routine Preventative Maintenance Plan	1.4.3.1	G												
503			08 34 16.20	11	Closeout Submittals	Acceptance Testing Procedure	3.3	G												
504			08 34 16.20	11	Closeout Submittals	Warranty	1.4.3	G												
505			08 36 13	2	Shop Drawings	Doors	2.2	G												

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506			08 36 13	3	Product Data	Doors	2.2	G												
507			08 36 13	3	Product Data	Electric Operators	2.6	G												
508			08 36 13	8	Manufacturer's Instructions	Doors	2.2													
509			08 36 13	10	Operation and Maintenance Data	Doors	2.2	G												
510			08 51 13	2	Shop Drawings	Windows	2.1	G												
511			08 51 13	2	Shop Drawings	Fabrication Drawings	1.7													
512			08 51 13	3	Product Data	Windows	2.1	G												
513			08 51 13	3	Product Data	Hardware	2.2.7.1	G												
514			08 51 13	3	Product Data	Fasteners	2.2.2	G												
515			08 51 13	3	Product Data	Window Performance	1.8	G												
516			08 51 13	3	Product Data	Mullions	2.4	G												
517			08 51 13	3	Product Data	Weatherstripping	2.1.4	G												
518			08 51 13	3	Product Data	Accessories	2.2.7	G												
519			08 51 13	3	Product Data	Adhesives	2.2.3													
520			08 51 13	3	Product Data	Thermal Performance	1.8.5	G												
521			08 51 13	4	Samples	Finish Sample	1.3.4.1													
522			08 51 13	5	Design Data	Structural Calculations for Deflection	2.1	G												
523			08 51 13	5	Design Data	Design Analysis	1.3.5	G												
524			08 51 13	6	Test Reports	Minimum Condensation Resistance Factor	1.3.6													
525			08 51 13	7	Certificates	Engineer's Qualifications	1.3.3													
526			08 51 13	10	Operation and Maintenance Data	Windows	2.1	G												
527			08 51 13	10	Operation and Maintenance Data	Plastic Identification	1.5													
528			08 71 00	2	Shop Drawings	Manufacturer's Detail Drawings	1.3	G												
529			08 71 00	2	Shop Drawings	Verification of Existing Conditions	1.3	G												
530			08 71 00	2	Shop Drawings	Hardware Schedule	1.5	G												
531			08 71 00	2	Shop Drawings	Keying System	2.3.6	G												
532			08 71 00	3	Product Data	Hardware Items	2.3	G												
533			08 71 00	8	Manufacturer's Instructions	Installation	3.1													
534			08 71 00	10	Operation and Maintenance Data	Hardware Schedule	1.5	G												
535			08 81 00	3	Product Data	Insulating Glass	2.2													
536			08 81 00	3	Product Data	Glazing Accessories	1.3													
537			08 81 00	3	Product Data	Sealants	2.3.3.1													
538			08 81 00	4	Samples	Insulating Glass	2.2													
539			08 81 00	4	Samples	Glazing Compound	2.3.2													
540			08 81 00	4	Samples	Sealing Tapes	2.3.5													
541			08 81 00	7	Certificates	Insulating Glass	2.2													
542			08 81 00	8	Manufacturer's Instructions	Setting and Sealing Materials	2.3													
543			08 81 00	8	Manufacturer's Instructions	Glass Setting	3.2													
544			08 81 00	11	Closeout Submittals	Insulated Glass Units	1.7.1													
545			08 91 00	2	Shop Drawings	Wall louvers	1.4													

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546			08 91 00	2	Shop Drawings	Wall louvers	1.5													
547			08 91 00	3	Product Data	Metal Wall Louvers	2.2													
548			08 91 00	4	Samples	Wall louvers	1.4	G												
549			08 91 00	4	Samples	Wall louvers	1.5	G												
550			08 91 00	4	Samples	Door louvers	1.5	G												
551			09 29 00	3	Product Data	Cementitious Backer Units	2.1.4													
552			09 29 00	3	Product Data	Glass Mat Water-Resistant Gypsum Tile Backing Board	2.1.3													
553			09 29 00	3	Product Data	Water-Resistant Gypsum Backing Board	2.1.2													
554			09 29 00	3	Product Data	Accessories	2.1.8													
555			09 29 00	3	Product Data	Gypsum Board	2.1.1													
556			09 29 00	3	Product Data	VOC Content of Joint Compound	2.1.5	S												
557			09 29 00	7	Certificates	Asbestos Free Materials	2.1	G												
558			09 29 00	7	Certificates	Indoor Air Quality for Gypsum Board	2.1.1	S												
559			09 29 00	7	Certificates	Indoor Air Quality for Non-aerosol Adhesives	2.1.7	S												
560			09 29 00	7	Certificates	Indoor Air Quality for Aerosol Adhesives	2.1.7	S												
561			09 30 10	2	Shop Drawings	Detail Drawings	3.2	G												
562			09 30 10	3	Product Data	Porcelain Tile	2.1.1	G												
563			09 30 10	3	Product Data	Glazed Wall Tile	2.1.2	G												
564			09 30 10	3	Product Data	Mortar, Grout, and Adhesive	2.2	G												
565			09 30 10	4	Samples	Tile	2.1	G												
566			09 30 10	4	Samples	Accessories	2.1	G												
567			09 30 10	4	Samples	Transition Strips	2.1	G												
568			09 30 10	4	Samples	Transition Strips	2.3	G												
569			09 30 10	4	Samples	Grout	2.2.3	G												
570			09 30 10	7	Certificates	Indoor Air Quality for Adhesives	2.2													
571			09 30 10	7	Certificates	Indoor Air Quality for Sealants	2.2.4													
572			09 30 10	8	Manufacturer's Instructions	Maintenance Instructions	3.7													
573			09 30 10	10	Operation and Maintenance Data	Installation	3.2	G												
574			09 51 00	2	Shop Drawings	Approved Detail Drawings	2.1	G												
575			09 51 00	3	Product Data	Recycled Content for Type III Ceiling Tiles	2.2.1.1	S												
576			09 51 00	4	Samples	Acoustical Units	2.2	G												
577			09 51 00	4	Samples	Acoustical Ceiling Tiles	2.2.1.1	G												
578			09 51 00	6	Test Reports	Ceiling Attenuation Class and Test	2.1.1	G												
579			09 51 00	7	Certificates	Indoor Air Quality for Type III Ceiling Tiles	2.2.1.1	S												
580			09 65 00	2	Shop Drawings	Resilient Flooring and Accessories	2.6	G												
581			09 65 00	3	Product Data	Resilient Flooring and Accessories	2.6	G												
582			09 65 00	3	Product Data	Adhesives	2.2													
583			09 65 00	4	Samples	Resilient Flooring and Accessories	2.6	G												
584			09 65 00	6	Test Reports	Moisture, Alkalinity and Bond Tests	3.3	G												

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585			09 65 00	7	Certificates	Indoor Air Quality for Adhesives	2.2	S												
586			09 65 00	8	Manufacturer's Instructions	Surface Preparation	3.2	G												
587			09 65 00	8	Manufacturer's Instructions	Installation	3.1	G												
588			09 65 00	10	Operation and Maintenance Data	Resilient Flooring and Accessories	2.6	G												
589			09 67 23.13	2	Shop Drawings	Installation Drawings	2.1	G												
590			09 67 23.13	3	Product Data	Manufacturer's Catalog Data for each system	1.3.2													
591			09 67 23.13	4	Samples	Mockups	1.6.1	G												
592			09 67 23.13	4	Samples	Hangar-Grade Resinous Floor	2.2													
593			09 67 23.13	4	Samples	Ergonomic Resinous Floor	2.3													
594			09 67 23.13	4	Samples	Heavy Duty Resinous Floor	2.4													
595			09 67 23.13	4	Samples	Electro-Static Dissipative Resinous Floor	2.5													
596			09 67 23.13	4	Samples	Electro-Static Dissipative Hangar-Grade Resinous Floor	2.6													
597			09 67 23.13	5	Design Data	Design Mix Data for each system	1.3.3													
598			09 67 23.13	7	Certificates	Listing of Product Installations	1.6.2													
599			09 67 23.13	7	Certificates	Referenced Standards Certificates	1.6													
600			09 67 23.13	11	Closeout Submittals	Warranty	1.8	G												
601			09 90 00	3	Product Data	Coating	2.1	G												
602			09 90 00	4	Samples	Color	1.9	G												
603			09 90 00	4	Samples	Textured Wall Coating System	1.4.2	G												
604			09 90 00	7	Certificates	Qualification Testing	1.4.1.2													
605			09 90 00	7	Certificates	Indoor Air Quality for Paints and Primers	2.1													
606			09 90 00	7	Certificates	Indoor Air Quality for Consolidated Latex Paints	2.1													
607			09 90 00	8	Manufacturer's Instructions	Application Instructions	3.2.1													
608			09 90 00	8	Manufacturer's Instructions	Mixing	3.6.2													
609			09 90 00	8	Manufacturer's Instructions	Manufacturer's Safety Data Sheets	1.7.2													
610			09 90 00	10	Operation and Maintenance Data	Coatings	2.1	G												
611			10 14 00.20	2	Shop Drawings	Detail Drawings	1.3.2	G												
612			10 14 00.20	3	Product Data	Installation	3.1	G												
613			10 14 00.20	3	Product Data	Warranty	1.5	G												
614			10 14 00.20	4	Samples	Interior Signage	1.3.1	G												
615			10 14 00.20	10	Operation and Maintenance Data	Approved Manufacturer's Instructions	3.1	G												
616			10 14 00.20	10	Operation and Maintenance Data	Protection and Cleaning	3.1.2	G												
617			10 21 13	2	Shop Drawings	Fabrication Drawings	2.1													
618			10 21 13	2	Shop Drawings	Installation Drawings	3.2	G												
619			10 21 13	3	Product Data	Cleaning and Maintenance Instructions	2.1													
620			10 21 13	3	Product Data	Colors And Finishes	2.7													
621			10 21 13	3	Product Data	Anchoring Devices and Fasteners	2.2.2													

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622			10 21 13	3	Product Data	Hardware and Fittings	2.2.4													
623			10 21 13	3	Product Data	Brackets	2.2.3													
624			10 21 13	3	Product Data	Door Hardware	2.2.5													
625			10 21 13	3	Product Data	Pilaster Shoes	2.5													
626			10 21 13	3	Product Data	Finishes	2.2.4.2	G												
627			10 21 13	3	Product Data	Recycled content for plastic, solidHDPE partitions and screens	2.3	S												
628			10 21 13	4	Samples	Colors and Finishes	2.7	G												
629			10 21 13	4	Samples	Hardware and Fittings	2.2.4													
630			10 21 13	4	Samples	Anchoring Devices and Fasteners	2.2.2													
631			10 21 13	7	Certificates	Warranty	1.5													
632			10 26 40	1	Preconstruction Submittals	Manufacturer's Qualifications	1.6.1	G												
633			10 26 40	1	Preconstruction Submittals	Installer's Qualifications	1.6.2	G												
634			10 26 40	3	Product Data	Product Data	1.6.3	G												
635			10 26 40	5	Design Data	DELEGATED-DESIGN SUBMITTAL	1.7	G												
636			10 26 40	10	Operation and Maintenance Data	Operation and Maintenance Data	1.6.4													
637			10 26 40	11	Closeout Submittals	As-Built Drawings	1.6.5													
638			10 28 13	3	Product Data	Finishes	2.1.2	G												
639			10 28 13	3	Product Data	Accessory Items	2.2	G												
640			10 28 13	3	Product Data	Recycled content for stainless steel toilet accessories	2.1	S												
641			10 28 13	4	Samples	Finishes	2.1.2	G												
642			10 28 13	4	Samples	Accessory Items	2.2													
643			10 28 13	7	Certificates	Accessory Items	2.2													
644			10 51 13	2	Shop Drawings	Types	2.1	G												
645			10 51 13	2	Shop Drawings	Location	1.4	G												
646			10 51 13	2	Shop Drawings	Installation	3.1													
647			10 51 13	2	Shop Drawings	Numbering system	3.2													
648			10 51 13	3	Product Data	Material	2.2													
649			10 51 13	3	Product Data	Locking Devices	2.3.1													
650			10 51 13	3	Product Data	Handles	2.3.3													
651			10 51 13	3	Product Data	components	2.3													
652			10 51 13	3	Product Data	Assembly	3.1													
653			10 51 13	4	Samples	Color	2.2.2	G												
654			12 21 00	2	Shop Drawings	Installation	3.2													
655			12 21 00	3	Product Data	Window Blinds	2.1	G												
656			12 21 00	4	Samples	Window Blinds	2.1	G												
657			12 21 00	10	Operation and Maintenance Data	Window Blinds	2.1	G												
658			12 48 13	3	Product Data	Adhesives and Concrete Primers	2.1.2	G												
659			12 48 13	4	Samples	Manufacturer's Instructions	3.2													
660			12 48 13	10	Operation and Maintenance Data	Operation And Maintenance Data	1.3													
661			21 13 13	1	Preconstruction Submittals	Qualified Fire Protection Engineer (QFPE)	1.2.3	G												

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662			21 13 13	1	Preconstruction Submittals	Sprinkler System Designer	1.4.2.1	G												
663			21 13 13	1	Preconstruction Submittals	Sprinkler System Installer	1.4.2.2	G												
664			21 13 13	2	Shop Drawings	Shop Drawing	1.4.1.1	G												
665			21 13 13	3	Product Data	Pipe	2.2.1	G												
666			21 13 13	3	Product Data	Fittings	2.3.1.2	G												
667			21 13 13	3	Product Data	Valves	2.3.4	G												
668			21 13 13	3	Product Data	Riser Check Valves	2.3.5	G												
669			21 13 13	3	Product Data	Relief Valves	2.7.5	G												
670			21 13 13	3	Product Data	Sprinklers	2.6	G												
671			21 13 13	3	Product Data	Pipe Hangers and Supports	2.3.3	G												
672			21 13 13	3	Product Data	Sprinkler Alarm Switch	2.4.1	G												
673			21 13 13	3	Product Data	Valve Supervisory (Tamper) Switch	2.4.2	G												
674			21 13 13	3	Product Data	Fire Department Connection	2.5	G												
675			21 13 13	3	Product Data	Air Vent	2.7.6	G												
676			21 13 13	3	Product Data	Nameplates	2.1.2	G												
677			21 13 13	5	Design Data	Hydraulic Calculations	1.2.1.2	G												
678			21 13 13	6	Test Reports	Test Procedures	3.7.1	G												
679			21 13 13	7	Certificates	Verification of Compliant Installation	3.7.2.1	G												
680			21 13 13	7	Certificates	Request for Government Final Test	3.7.2.2	G												
681			21 13 13	10	Operation and Maintenance Data	Operating and Maintenance (O&M) Instructions	3.9	G												
682			21 13 13	10	Operation and Maintenance Data	Spare Parts	1.6	G												
683			21 13 13	11	Closeout Submittals	As-built drawings	3.9													
684			21 30 00	1	Preconstruction Submittals	Fire Pump Installation Related Submittals	1.3													
685			21 30 00	2	Shop Drawings	Installation Drawings	3.3.1	G												
686			21 30 00	2	Shop Drawings	As-Built Drawings	3.11.2	G												
687			21 30 00	2	Shop Drawings	Pump Room	3.3.2	G												
688			21 30 00	3	Product Data	Catalog Data	2.1	G												
689			21 30 00	3	Product Data	Spare Parts	1.6													
690			21 30 00	3	Product Data	Preliminary Tests	3.9.2													
691			21 30 00	3	Product Data	Field Tests	3.9	G												
692			21 30 00	3	Product Data	Manufacturer's Representative	1.7.6	G												
693			21 30 00	3	Product Data	Field Training	3.11.1	G												
694			21 30 00	3	Product Data	Final Acceptance Test	3.9.3													
695			21 30 00	5	Design Data	Surge Arrestor Calculations	2.14	G												
696			21 30 00	6	Test Reports	Preliminary Tests	3.9.2													
697			21 30 00	6	Test Reports	Final Acceptance Test	3.9.3													
698			21 30 00	7	Certificates	Fire Protection Specialist	1.7.1													
699			21 30 00	7	Certificates	Qualifications of Welders	1.7.2													
700			21 30 00	7	Certificates	Qualifications of Installer	1.7.3													
701			21 30 00	7	Certificates	Preliminary Test Certification	1.7.4													
702			21 30 00	7	Certificates	Final Test Certification	1.7.5													

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703			21 30 00	10	Operation and Maintenance Data	Operating and Maintenance Instructions	3.11.1	G												
704			21 30 00	10	Operation and Maintenance Data	Flow Meter	2.13													
705			22 00 00	3	Product Data	Fixtures	2.4													
706			22 00 00	3	Product Data	Flush Valve Water Closets	2.4.2													
707			22 00 00	3	Product Data	WaterSense Label for Flush Valve Water Closet	2.4.2	S												
708			22 00 00	3	Product Data	Flush Valve Urinals	2.4.3													
709			22 00 00	3	Product Data	WaterSense Label for Urinal	2.4.3	S												
710			22 00 00	3	Product Data	Countertop Lavatories	2.4.4													
711			22 00 00	3	Product Data	Kitchen Sinks	2.4.5													
712			22 00 00	3	Product Data	Drinking-Water Coolers	2.4.6	G												
713			22 00 00	3	Product Data	Energy Star Label for Electric Water Cooler	2.4.6	S												
714			22 00 00	3	Product Data	Energy Star Label for Wheelchair Electric Water Cooler	2.4.7	S												
715			22 00 00	3	Product Data	Shower Pan	2.7													
716			22 00 00	3	Product Data	WaterSense Label for Showerhead	2.6.2	S												
717			22 00 00	3	Product Data	Water Heaters	2.9	G												
718			22 00 00	3	Product Data	Energy Star Label for Gas Instantaneous Water Heater	2.9.1	S												
719			22 00 00	3	Product Data	Pumps	2.1	G												
720			22 00 00	3	Product Data	Backflow Prevention Assemblies	3.9.1.1	G												
721			22 00 00	3	Product Data	Air Dryer	2.12.1	G												
722			22 00 00	3	Product Data	Shower Faucets	2.6.2	G												
723			22 00 00	3	Product Data	Welding	1.5.1													
724			22 00 00	3	Product Data	Vibration-Absorbing Features	3.4	G												
725			22 00 00	3	Product Data	Plumbing System	3.9.1													
726			22 00 00	6	Test Reports	Tests, Flushing and Disinfection	3.9													
727			22 00 00	6	Test Reports	Test of Backflow Prevention Assemblies	3.9.1.1	G												
728			22 00 00	7	Certificates	Materials and Equipment	1.3													
729			22 00 00	7	Certificates	Bolts	2.1.1													
730			22 00 00	10	Operation and Maintenance Data	Plumbing System	3.9.1	G												
731			22 05 48.00 20	3	Product Data	Isolators	2.3													
732			22 05 48.00 20	3	Product Data	Flexible Connectors	2.6													
733			22 05 48.00 20	3	Product Data	Inertia Bases	2.5													
734			22 05 48.00 20	3	Product Data	Machinery Bases	2.4													
735			22 05 48.00 20	3	Product Data	Machinery Foundations and Subbases	3.1.6													
736			22 05 48.00 20	6	Test Reports	Equipment Vibration Tests	3.2.2.1													
737			22 05 48.00 20	8	Manufacturer's Instructions	Vibration and Noise Isolation Components	3.1.1													
738			22 07 19.00 40	2	Shop Drawings	Installation Drawings	3.1	G												
739			22 07 19.00 40	3	Product Data	Adhesives	2.3	G												
740			22 07 19.00 40	3	Product Data	Insulating Cement	2.3	G												

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741			22 07 19.00 40	3	Product Data	Insulation Materials	2.3	G												
742			22 07 19.00 40	3	Product Data	Jacketing	2.3	G												
743			22 07 19.00 40	3	Product Data	Tape	2.3	G												
744			22 07 19.00 40	8	Manufacturer's Instructions	Installation Manual	3.1	G												
745			22 07 19.00 40	11	Closeout Submittals	Record Drawings	3.4													
746			22 07 19.00 40	11	Closeout Submittals	Adhesives	2.3	S												
747			22 07 19.00 40	11	Closeout Submittals	Insulation Materials	2.3	S												
748			22 07 19.00 40	11	Closeout Submittals	Recycled Materials	1.3.1	S												
749			23 05 15	1	Preconstruction Submittals	Material, Equipment, and Fixture Lists	1.2													
750			23 05 15	2	Shop Drawings	Record Drawings	1.2	G												
751			23 05 15	2	Shop Drawings	Connection Diagrams	1.2													
752			23 05 15	2	Shop Drawings	Coordination Drawings	1.2													
753			23 05 15	2	Shop Drawings	Fabrication Drawings	1.2													
754			23 05 15	2	Shop Drawings	Installation Drawings	3.1													
755			23 05 15	3	Product Data	Pipe and Fittings	2.1	G												
756			23 05 15	3	Product Data	Piping Specialties	2.2	G												
757			23 05 15	3	Product Data	Valves	2.3	G												
758			23 05 15	3	Product Data	Miscellaneous Materials	2.4													
759			23 05 15	3	Product Data	Supporting Elements	2.5													
760			23 05 15	3	Product Data	Equipment Foundation Data	1.2													
761			23 05 15	4	Samples	Manufacturer's Standard Color Charts	1.2													
762			23 05 15	5	Design Data	Pipe and Fittings	2.1													
763			23 05 15	5	Design Data	Piping Specialties	2.2													
764			23 05 15	5	Design Data	Valves	2.3													
765			23 05 15	6	Test Reports	Hydrostatic Tests	3.1	G												
766			23 05 15	6	Test Reports	Air Tests	3.1	G												
767			23 05 15	6	Test Reports	Valve-Operating Tests	3.1	G												
768			23 05 15	6	Test Reports	Drainage Tests	3.1	G												
769			23 05 15	6	Test Reports	Pneumatic Tests	3.1													
770			23 05 15	6	Test Reports	Non-Destructive Electric Tests	3.1													
771			23 05 15	6	Test Reports	System Operation Tests	3.1	G												
772			23 05 15	7	Certificates	Record of Satisfactory Field Operation	1.4.2	G												
773			23 05 15	7	Certificates	List of Qualified Permanent Service Organizations	1.4.3													
774			23 05 15	7	Certificates	Listing of Product Installations	1.2													
775			23 05 15	7	Certificates	Records of Existing Conditions	1.2	G												
776			23 05 15	7	Certificates	Surface Resistance	3.1													
777			23 05 15	7	Certificates	Shear and Tensile Strengths	3.1													
778			23 05 15	7	Certificates	Temperature Ratings	3.1													
779			23 05 15	7	Certificates	Bending Tests	3.1													
780			23 05 15	7	Certificates	Flattening Tests	3.1													
781			23 05 15	7	Certificates	Transverse Guided Weld Bend Tests	3.1													

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782			23 05 15	10	Operation and Maintenance Data	Operation and Maintenance Manuals	3.1	G												
783			23 05 48.00 40	2	Shop Drawings	Installation Drawings	1.2													
784			23 05 48.00 40	2	Shop Drawings	Outline Drawings	1.2													
785			23 05 48.00 40	3	Product Data	Equipment and Performance Data	1.2	G												
786			23 05 48.00 40	6	Test Reports	Type of Isolator	2.4	G												
787			23 05 48.00 40	6	Test Reports	Type of Base	2.4	G												
788			23 05 48.00 40	6	Test Reports	Allowable Deflection	2.4	G												
789			23 05 48.00 40	6	Test Reports	Measured Deflection	2.4	G												
790			23 05 48.19	2	Shop Drawings	Coupling and Bracing	3.1													
791			23 05 48.19	2	Shop Drawings	Equipment Restraint	2.1													
792			23 05 48.19	3	Product Data	Coupling and Bracing	3.1													
793			23 05 48.19	3	Product Data	Equipment Restraint	2.1													
794			23 05 48.19	3	Product Data	Anchor Bolts	3.3													
795			23 05 48.19	3	Product Data	Vibration Isolators	2.1.2													
796			23 05 48.19	6	Test Reports	Anchor Bolts	3.3													
797			23 05 93	2	Shop Drawings	TAB Schematic Drawings and Report Forms	1.3.3													
798			23 05 93	3	Product Data	Equipment and Performance Data	1.3	G												
799			23 05 93	6	Test Reports	Completed Pre-Final DALT Report	3.3.5													
800			23 05 93	6	Test Reports	Certified Final DALT Report	3.3.8	G												
801			23 05 93	7	Certificates	Independent TAB Agency and Personnel Qualifications	1.5.1	G												
802			23 07 00	3	Product Data	Pipe Insulation Systems	2.3	G												
803			23 07 00	3	Product Data	Pipe Insulation Systems	3.2	G												
804			23 07 00	3	Product Data	Duct Insulation Systems	3.3	G												
805			23 07 00	3	Product Data	Equipment Insulation Systems	3.4	G												
806			23 07 00	7	Certificates	Indoor air quality for adhesives	2.2.1	S												
807			23 07 00	8	Manufacturer's Instructions	Pipe Insulation Systems	2.3	G												
808			23 07 00	8	Manufacturer's Instructions	Pipe Insulation Systems	3.2	G												
809			23 07 00	8	Manufacturer's Instructions	Duct Insulation Systems	3.3	G												
810			23 07 00	8	Manufacturer's Instructions	Equipment Insulation Systems	3.4	G												
811			23 09 00	2	Shop Drawings	DDC Contractor Design Drawings	3.3	G												
812			23 09 00	2	Shop Drawings	Draft As-Built Drawings	3.3	G												
813			23 09 00	2	Shop Drawings	Final As-Built Drawings	3.3	G												
814			23 09 00	3	Product Data	Programming Software	1.8.3	G												
815			23 09 00	3	Product Data	Controller Application Programs	1.8.4	G												
816			23 09 00	3	Product Data	Configuration Software	1.8.1	G												
817			23 09 00	3	Product Data	Controller Configuration Settings	1.8.2	G												
818			23 09 00	3	Product Data	Manufacturer's Product Data	2.2	G												
819			23 09 00	5	Design Data	Boiler Plant Gateway Request	1.9													
820			23 09 00	6	Test Reports	Existing Conditions Report	3.1.1													
821			23 09 00	6	Test Reports	Start-Up Testing Report	3.5.2	G												
822			23 09 00	6	Test Reports	PVT Procedures	3.6.1	G												

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823			23 09 00	6	Test Reports	PVT Report	3.6.3	G												
824			23 09 00	6	Test Reports	Pre-Construction Quality Control (QC) Checklist	1.10.1	G												
825			23 09 00	6	Test Reports	Post-Construction Quality Control (QC) Checklist	1.10.2	G												
826			23 09 00	10	Operation and Maintenance Data	Operation and Maintenance (O&M) Instructions	3.7	G												
827			23 09 00	10	Operation and Maintenance Data	Training Documentation	3.9.1	G												
828			23 09 00	11	Closeout Submittals	Enclosure Keys	2.5	G												
829			23 09 00	11	Closeout Submittals	Password Summary Report	3.2.6.1	G												
830			23 09 00	11	Closeout Submittals	Closeout Quality Control (QC) Checklist	1.10.3	G												
831			23 11 20	2	Shop Drawings	Gas Piping System	1.5.2	G												
832			23 11 20	2	Shop Drawings	Gas Piping System	2.2	G												
833			23 11 20	2	Shop Drawings	Gas Piping System	3.3	G												
834			23 11 20	3	Product Data	Gas Equipment Connectors	1.5.2													
835			23 11 20	3	Product Data	Gas Piping System	1.5.2													
836			23 11 20	3	Product Data	Gas Piping System	2.2													
837			23 11 20	3	Product Data	Gas Piping System	3.3													
838			23 11 20	3	Product Data	Pipe Coating Materials	2.1													
839			23 11 20	3	Product Data	Pressure Regulators	2.6													
840			23 11 20	3	Product Data	Risers	2.4													
841			23 11 20	3	Product Data	Transition Fittings	2.2.7													
842			23 11 20	3	Product Data	Valves	2.3													
843			23 11 20	3	Product Data	Warning and Identification Tape	2.2.3													
844			23 11 20	6	Test Reports	Testing	3.18													
845			23 11 20	6	Test Reports	Pressure Tests	3.18.1	G												
846			23 11 20	6	Test Reports	Test with Gas	3.18.2	G												
847			23 11 20	7	Certificates	Welders Procedures and Qualifications	1.5.1													
848			23 11 20	7	Certificates	Assigned Number, Letter, or Symbol	1.5.1													
849			23 11 20	8	Manufacturer's Instructions	Pipe Coating Materials	2.1													
850			23 11 20	10	Operation and Maintenance Data	Gas Facility System and Equipment Operation	1.3.1	G												
851			23 11 20	10	Operation and Maintenance Data	Gas Facility System Maintenance	1.3.2	G												
852			23 11 20	10	Operation and Maintenance Data	Gas Facility Equipment Maintenance	1.3.3	G												
853			23 21 23	2	Shop Drawings	System Coordination	2.1.2													
854			23 21 23	3	Product Data	Instructions	2.2.2	G												
855			23 21 23	3	Product Data	Equipment Data	2.2.5	G												
856			23 21 23	3	Product Data	Training Period	3.5.2													
857			23 21 23	6	Test Reports	Factory Tests	2.8													
858			23 21 23	6	Test Reports	Field Quality Control	3.3													
859			23 21 23	7	Certificates	Manufacturer's Representative	1.3.1													
860			23 21 23	10	Operation and Maintenance Data	Operation and Maintenance Manuals	3.5.1	G												

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861			23 21 23	10	Operation and Maintenance Data	Training	3.5.2	G												
862			23 30 00	2	Shop Drawings	Detail Drawings	1.4.4	G												
863			23 30 00	3	Product Data	Insulated Nonmetallic Flexible Duct Runouts	2.8.1.1													
864			23 30 00	3	Product Data	Duct Connectors	2.8.1.1													
865			23 30 00	3	Product Data	Duct Access Doors	2.8.2	G												
866			23 30 00	3	Product Data	Fire Dampers	2.8.3													
867			23 30 00	3	Product Data	Manual Balancing Dampers	2.8.4	G												
868			23 30 00	3	Product Data	Acoustical Duct Liner	2.8.7.1													
869			23 30 00	3	Product Data	Diffusers	2.8.8.1													
870			23 30 00	3	Product Data	Registers and Grilles	2.8.8.2													
871			23 30 00	3	Product Data	Louvers	2.8.9													
872			23 30 00	3	Product Data	Air Vents, Penthouses, and Goosenecks	2.8.10													
873			23 30 00	3	Product Data	Centrifugal Fans	2.9.1.1													
874			23 30 00	3	Product Data	In-Line Centrifugal Fans	2.9.1.2													
875			23 30 00	3	Product Data	Panel Type Power Wall Ventilators	2.9.1.3													
876			23 30 00	3	Product Data	Centrifugal Type Power Wall Ventilators	2.9.1.4													
877			23 30 00	3	Product Data	Centrifugal Type Power Roof Ventilators	2.9.1.5													
878			23 30 00	3	Product Data	Destratification Fans	2.9.1.6													
879			23 30 00	3	Product Data	Rooftop Air Handling Units	2.1	G												
880			23 30 00	3	Product Data	Variable Volume, Single Duct Terminal Units	2.11.1.1	G												
881			23 30 00	3	Product Data	Reheat Units	2.11.1.2	G												
882			23 30 00	3	Product Data	Energy Recovery Devices	2.12	G												
883			23 30 00	3	Product Data	Test Procedures	1.4.5													
884			23 30 00	3	Product Data	Diagrams	1.2.1.2	G												
885			23 30 00	3	Product Data	Indoor Air Quality for Duct Sealants	2.8.1	S												
886			23 30 00	6	Test Reports	Performance Tests	3.12	G												
887			23 30 00	6	Test Reports	Damper Acceptance Test	3.1	G												
888			23 30 00	7	Certificates	Ozone Depleting Substances Technician Certification	1.4.3													
889			23 30 00	8	Manufacturer's Instructions	Manufacturer's Installation Instructions	3.2													
890			23 30 00	8	Manufacturer's Instructions	Operation and Maintenance Training	3.14.2													
891			23 30 00	10	Operation and Maintenance Data	Operation and Maintenance Manuals	3.14.1	G												
892			23 30 00	10	Operation and Maintenance Data	Fire Dampers	2.8.3	G												
893			23 30 00	10	Operation and Maintenance Data	Manual Balancing Dampers	2.8.4	G												
894			23 30 00	10	Operation and Maintenance Data	Centrifugal Fans	2.9.1.1	G												
895			23 30 00	10	Operation and Maintenance Data	In-Line Centrifugal Fans	2.9.1.2	G												

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896			23 30 00	10	Operation and Maintenance Data	Panel Type Power Wall Ventilators	2.9.1.3	G												
897			23 30 00	10	Operation and Maintenance Data	Centrifugal Type Power Wall Ventilators	2.9.1.4	G												
898			23 30 00	10	Operation and Maintenance Data	Centrifugal Type Power Roof Ventilators	2.9.1.5	G												
899			23 30 00	10	Operation and Maintenance Data	Rooftop Air Handling Units	2.1	G												
900			23 30 00	10	Operation and Maintenance Data	Variable Volume, Single Duct Terminal Units	2.11.1.1	G												
901			23 30 00	10	Operation and Maintenance Data	Energy Recovery Devices	2.12	G												
902			23 30 00	11	Closeout Submittals	Indoor Air Quality During Construction	3.13	S												
903			23 52 00	2	Shop Drawings	Detail Drawings	1.5													
904			23 52 00	3	Product Data	Materials and Equipment	2.1.1													
905			23 52 00	3	Product Data	Spare Parts	1.5													
906			23 52 00	3	Product Data	Water Treatment System	2.12													
907			23 52 00	3	Product Data	Boiler Water Treatment	2.12													
908			23 52 00	3	Product Data	Heating System Tests	3.7													
909			23 52 00	3	Product Data	Fuel System Tests	3.1													
910			23 52 00	3	Product Data	Unit Heaters	2.5													
911			23 52 00	3	Product Data	Qualifications	3.7													
912			23 52 00	3	Product Data	Field Instructions	3.9													
913			23 52 00	3	Product Data	Tests	3.3													
914			23 52 00	6	Test Reports	Heating System Tests	3.7													
915			23 52 00	6	Test Reports	Fuel System Tests	3.1													
916			23 52 00	6	Test Reports	Water Treatment Testing	3.7.1													
917			23 52 00	10	Operation and Maintenance Data	Operation and Maintenance Instructions	3.9	G												
918			23 52 00	10	Operation and Maintenance Data	Water Treatment System	2.12	G												
919			23 52 00	11	Closeout Submittals	Indoor Air Quality During Construction	3.8.2	S												
920			23 80 20.00 10	2	Shop Drawings	Detail Drawings	1.3													
921			23 80 20.00 10	2	Shop Drawings	Installation	3.2													
922			23 80 20.00 10	3	Product Data	Spare Parts	1.5													
923			23 80 20.00 10	6	Test Reports	Testing, Adjusting, and Balancing	3.4													
924			23 80 20.00 10	10	Operation and Maintenance Data	Operation and Maintenance Instructions	3.3													
925			23 82 46.00 40	2	Shop Drawings	Fabrication Drawings	1.2													
926			23 82 46.00 40	3	Product Data	Performance Data	2.1	G												
927			23 82 46.00 40	3	Product Data	Electric Unit Heaters	2.1	G												
928			23 82 46.00 40	3	Product Data	Heating Element	2.2.1	G												
929			23 82 46.00 40	3	Product Data	Controls	2.2.2	G												
930			23 82 46.00 40	3	Product Data	Casings	3.1.1	G												
931			23 82 46.00 40	3	Product Data	Propellers and Motors	2.2.3	G												
932			23 82 46.00 40	8	Manufacturer's Instructions	Manufacturer's Instructions	1.2													

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933			25 05 11	1	Preconstruction Submittals	Wireless Communication Request	3.1.5.3	G												
934			25 05 11	1	Preconstruction Submittals	Multiple IP Connection Device Request	3.8	G												
935			25 05 11	1	Preconstruction Submittals	Contractor Computer Cybersecurity Compliance Statements	1.9.1.4	G												
936			25 05 11	1	Preconstruction Submittals	Contractor Temporary Network Cybersecurity Compliance Statements	1.9.6	G												
937			25 05 11	2	Shop Drawings	User Interface Banner Schedule	3.1.3.1	G												
938			25 05 11	2	Shop Drawings	Network Communication Report	1.7.2	G												
939			25 05 11	2	Shop Drawings	Cybersecurity Riser Diagram	1.7.5	G												
940			25 05 11	2	Shop Drawings	Control System Inventory Report	1.7.3	G												
941			25 05 11	2	Shop Drawings	Cybersecurity Interconnection Schedule	1.7.1	G												
942			25 05 11	3	Product Data	Control System Cybersecurity Documentation	1.7.6	G												
943			25 05 11	6	Test Reports	Wireless Communication Test Report	3.1.5.4	G												
944			25 05 11	7	Certificates	Software Licenses	1.8	G												
945			25 05 11	11	Closeout Submittals	Password Summary Report	3.5.2.2.5	G												
946			25 05 11	11	Closeout Submittals	Software Recovery And Reconstitution Images	1.7.4	G												
947			25 05 11	11	Closeout Submittals	Device Audit Record Upload Software	3.2.2.1	G												
948			25 08 10	1	Preconstruction Submittals	Factory Test	3.4	G												
949			25 08 10	6	Test Reports	UMCS and Building Level DDC Testing Sequence	3.1													
950			25 08 10	6	Test Reports	Performance Verification Test	3.6	G												
951			25 08 10	6	Test Reports	Endurance Testing	3.7													
952			25 10 10	2	Shop Drawings	UMCS Contractor Design Drawings	3.2.2													
953			25 10 10	2	Shop Drawings	Draft As-Built Drawings	3.2.3													
954			25 10 10	2	Shop Drawings	Final As-Built Drawings	3.2.3													
955			25 10 10	3	Product Data	Product Data Sheets	2.1.5													
956			25 10 10	3	Product Data	Computer Software	2.4													
957			25 10 10	3	Product Data	Enclosure Keys	2.5.1													
958			25 10 10	5	Design Data	UMCS IP Network Bandwidth Usage Estimate	3.2.1													
959			25 10 10	6	Test Reports	Pre-Construction QC Checklist	1.6													
960			25 10 10	6	Test Reports	Post-Construction QC Checklist	1.6													
961			25 10 10	6	Test Reports	Existing Conditions Report	3.1													
962			25 10 10	6	Test Reports	Start-Up and Start-Up Testing Report	3.6	G												
963			25 10 10	6	Test Reports	PVT Phase I Procedures	3.7.1													
964			25 10 10	6	Test Reports	PVT Phase I Report	3.7.2	G												
965			25 10 10	6	Test Reports	PVT Phase II Report	3.7.3	G												
966			25 10 10	10	Operation and Maintenance Data	Operation and Maintenance (O&M) Instructions	1.7													
967			25 10 10	10	Operation and Maintenance Data	Preventive Maintenance Work Plan	3.8.6.1													

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968			25 10 10	10	Operation and Maintenance Data	Basic Training Documentation	3.9.1													
969			25 10 10	10	Operation and Maintenance Data	Advanced Training Documentation	3.9.1													
970			25 10 10	10	Operation and Maintenance Data	Refresher Training Documentation	3.9.1													
971			25 10 10	11	Closeout Submittals	Closeout QC Checklist	1.6													
972			26 05 00.00 40	2	Shop Drawings	Marking Strips	3.2.10.1	G												
973			26 05 00.00 40	3	Product Data	Conduits and Raceways	2.1.1	G												
974			26 05 00.00 40	3	Product Data	Wire and Cable	2.2.1	G												
975			26 05 00.00 40	3	Product Data	Splices and Connectors	3.2.9	G												
976			26 05 00.00 40	3	Product Data	Switches	2.2.3	G												
977			26 05 00.00 40	3	Product Data	Receptacles	2.2.5	G												
978			26 05 00.00 40	3	Product Data	Outlet Boxes, Pull Boxes and Junction Boxes	2.1.4	G												
979			26 05 00.00 40	3	Product Data	Circuit Breakers	2.1.5.1	G												
980			26 05 00.00 40	3	Product Data	Panelboards	2.1.5	G												
981			26 05 00.00 40	3	Product Data	Dry-Type Distribution Transformers	2.1.6	G												
982			26 05 00.00 40	3	Product Data	Device Plates	2.2.2	G												
983			26 05 00.00 40	6	Test Reports	Continuity Test	3.6	G												
984			26 05 00.00 40	6	Test Reports	Phase-Rotation Tests	3.6	G												
985			26 05 00.00 40	6	Test Reports	Insulation Resistance Test	3.6	G												
986			26 05 00.00 40	6	Test Reports	600-Volt Wiring Test	3.6	G												
987			26 05 00.00 40	6	Test Reports	Transformer Tests	3.6	G												
988			26 05 00.00 40	6	Test Reports	Ground-Fault Receptacle Test	3.6	G												
989			26 05 00.00 40	6	Test Reports	Insulation-Resistance Test	3.6	G												
990			26 05 00.00 40	8	Manufacturer's Instructions	Manufacturer's Instructions	3.1													
991			26 05 13.00 40	1	Preconstruction Submittals	List of Splices and Terminations to be Installed by Splicer/Terminator	1.3.1	G												
992			26 05 13.00 40	2	Shop Drawings	Pulling Plan	3.2.1	G												
993			26 05 13.00 40	3	Product Data	Single-Conductor Shielded Cables	2.2.1	G												
994			26 05 13.00 40	3	Product Data	Single-Conductor Nonshielded Cables	2.2.2	G												
995			26 05 13.00 40	3	Product Data	Cable Supports and Fittings	2.2.4	G												
996			26 05 13.00 40	3	Product Data	Polyethylene Cable Tags	2.2.5	G												
997			26 05 13.00 40	3	Product Data	Polyethylene Cable Tags	2.2.5	G												
998			26 05 13.00 40	3	Product Data	Fireproof Tape	2.2.6	G												
999			26 05 13.00 40	3	Product Data	Terminations	2.2.3	G												
1000			26 05 13.00 40	6	Test Reports	Field Testing	3.3	G												
1001			26 05 13.00 40	6	Test Reports	Qualification Test Reports	2.4.1	G												
1002			26 05 13.00 40	6	Test Reports	Radiographic Tests	3.3	G												
1003			26 05 13.00 40	7	Certificates	Splicer/Terminator Certifications	1.5.2	G												
1004			26 05 13.00 40	8	Manufacturer's Instructions	Medium-Voltage Power Cables	3.4	G												
1005			26 05 13.00 40	8	Manufacturer's Instructions	Terminations	2.2.3	G												
1006			26 05 26.00 40	3	Product Data	Ground Rods	2.1.1	G												
1007			26 05 26.00 40	3	Product Data	Ground Wires	2.1.2	G												

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1008			26 05 26.00 40	3	Product Data	Connectors and Fasteners	2.1.3	G												
1009			26 05 26.00 40	3	Product Data	Test Wells	2.1.4	G												
1010			26 05 26.00 40	3	Product Data	Conductive Corrosion Inhibiting Compounds	2.1.5	G												
1011			26 05 26.00 40	3	Product Data	Ground Buses	2.1.6	G												
1012			26 05 26.00 40	6	Test Reports	Bond Resistance Test	3.2.1	G												
1013			26 05 26.00 40	6	Test Reports	Ground Resistance Tests	3.2.2	G												
1014			26 05 26.00 40	6	Test Reports	Ground Isolation Test	3.2.3	G												
1015			26 05 26.00 40	6	Test Reports	Equipment Continuity Test	3.2.4	G												
1016			26 05 26.00 40	7	Certificates	Ground Resistance Test Equipment	1.3.3	G												
1017			26 05 26.00 40	7	Certificates	Micro-Ohmmeter Test Equipment	1.3.4	G												
1018			26 05 26.00 40	11	Closeout Submittals	Record Drawings	3.3													
1019			26 08 00	6	Test Reports	Acceptance tests and inspections	3.1	G												
1020			26 08 00	7	Certificates	Qualifications	1.4.1	G												
1021			26 08 00	7	Certificates	Acceptance test and inspections procedure	1.4.3	G												
1022			26 09 23.00 40	2	Shop Drawings	Lighting System Drawings	2.1	G												
1023			26 09 23.00 40	3	Product Data	Installation Instructions	3.1	G												
1024			26 09 23.00 40	3	Product Data	Light Level Sensor	2.2.2	G												
1025			26 09 23.00 40	3	Product Data	Lighting Contactor	2.2.3	G												
1026			26 09 23.00 40	3	Product Data	Photocell Switch	2.2.4	G												
1027			26 09 23.00 40	6	Test Reports	System Operation Tests	3.3													
1028			26 09 23.00 40	10	Operation and Maintenance Data	Lighting Control System, Data Package 5	3.4													
1029			26 12 19.00 40	2	Shop Drawings	Pad-Mounted Transformer Drawings	1.4.1	G												
1030			26 12 19.00 40	3	Product Data	Pad-Mounted Transformers	2.1.1													
1031			26 12 19.00 40	6	Test Reports	Acceptance Checks And Tests	3.3.1													
1032			26 12 19.00 40	9	Manufacturer's Field Reports	Design Tests	2.3.2													
1033			26 12 19.00 40	9	Manufacturer's Field Reports	Routine and Other Tests	2.3.3													
1034			26 12 19.00 40	10	Operation and Maintenance Data	Transformer(s)	1.5.1													
1035			26 12 19.00 40	11	Closeout Submittals	Transformer Test Schedule	2.3.1													
1036			26 12 19.00 40	11	Closeout Submittals	Warranty	1.6													
1037			26 20 00	2	Shop Drawings	Panelboards	2.14	G												
1038			26 20 00	2	Shop Drawings	Transformers	2.17	G												
1039			26 20 00	2	Shop Drawings	Cable Trays	2.4	G												
1040			26 20 00	2	Shop Drawings	Wireways	2.29	G												
1041			26 20 00	2	Shop Drawings	Marking Strips	3.1.11.1	G												
1042			26 20 00	3	Product Data	Receptacles	2.13	G												
1043			26 20 00	3	Product Data	Circuit Breakers	2.14.3	G												
1044			26 20 00	3	Product Data	Switches	2.11	G												
1045			26 20 00	3	Product Data	Transformers	2.17	G												
1046			26 20 00	3	Product Data	Enclosed Circuit Breakers	2.15	G												
1047			26 20 00	3	Product Data	Motor Controllers	2.19	G												

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1048			26 20 00	3	Product Data	Manual Motor Starters	2.2	G												
1049			26 20 00	3	Product Data	Grounding Busbar	2.23.3	G												
1050			26 20 00	3	Product Data	Surge Protective Devices	2.3	G												
1051			26 20 00	6	Test Reports	600-volt Wiring Test	3.5.2	G												
1052			26 20 00	6	Test Reports	Grounding System Test	3.5.5	G												
1053			26 20 00	6	Test Reports	Transformer Tests	3.5.3	G												
1054			26 20 00	6	Test Reports	Ground-fault Receptacle Test	3.5.4	G												
1055			26 20 00	7	Certificates	Fuses	2.12	G												
1056			26 20 00	9	Manufacturer's Field Reports	Transformer Factory Tests	2.32.1													
1057			26 24 13	2	Shop Drawings	Switchboard Drawings	1.5.2	G												
1058			26 24 13	3	Product Data	Switchboard	2.2	G												
1059			26 24 13	6	Test Reports	Switchboard Design Tests	2.5.2	G												
1060			26 24 13	6	Test Reports	Switchboard Production Tests	2.5.3	G												
1061			26 24 13	6	Test Reports	Acceptance Checks and Tests	3.5.1	G												
1062			26 24 13	10	Operation and Maintenance Data	Switchboard Operation and Maintenance	1.6.1	G												
1063			26 24 13	11	Closeout Submittals	Assembled Operation and Maintenance Manuals	1.6.2	G												
1064			26 24 13	11	Closeout Submittals	Equipment Test Schedule	2.5.1	G												
1065			26 24 13	11	Closeout Submittals	Request for Settings	3.5	G												
1066			26 24 13	11	Closeout Submittals	Service Entrance Available Fault Current Label	2.7	G												
1067			26 24 16.00 40	3	Product Data	Panelboards	2.1	G												
1068			26 24 16.00 40	6	Test Reports	Acceptance Tests	3.2	G												
1069			26 24 16.00 40	8	Manufacturer's Instructions	Manufacturer's Instructions	3.3													
1070			26 27 13.10 30	3	Product Data	Power Meters	2.1	G												
1071			26 27 13.10 30	3	Product Data	Current	2.1.3	G												
1072			26 27 13.10 30	3	Product Data	Potential Transformer	2.1.2	G												
1073			26 27 13.10 30	3	Product Data	Communications Module	2.2.2	G												
1074			26 27 13.10 30	3	Product Data	Protocol Modules	1.6.1	G												
1075			26 27 13.10 30	3	Product Data	Data Recorder	1.6.2	G												
1076			26 27 13.10 30	3	Product Data	Modem	1.6.2	G												
1077			26 27 13.10 30	6	Test Reports	Acceptance Checks and Tests	3.2.1	G												
1078			26 27 13.10 30	10	Operation and Maintenance Data	Power Meters	2.1	G												
1079			26 27 13.10 30	10	Operation and Maintenance Data	Communications Module	2.2.2	G												
1080			26 27 13.10 30	10	Operation and Maintenance Data	Protocol Modules	1.6.1	G												
1081			26 27 13.10 30	10	Operation and Maintenance Data	Data Recorder	1.6.2	G												
1082			26 27 13.10 30	10	Operation and Maintenance Data	Modem	1.6.2	G												
1083			26 27 13.10 30	11	Closeout Submittals	System Function Verification	3.2.2	G												
1084			26 28 01.00 10	3	Product Data	Fault Current Analysis	2.9													
1085			26 28 01.00 10	3	Product Data	Protective Device Coordination Study	2.9													

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1086			26 28 01.00 10	3	Product Data	Equipment	2.1													
1087			26 28 01.00 10	3	Product Data	System Coordinator	1.4.1													
1088			26 28 01.00 10	3	Product Data	Installation	3.2													
1089			26 28 01.00 10	6	Test Reports	Field Testing	3.3													
1090			26 28 01.00 10	7	Certificates	Devices and Equipment	1.6													
1091			26 29 23	2	Shop Drawings	Schematic Diagrams	1.5.1	G												
1092			26 29 23	2	Shop Drawings	Interconnecting Diagrams	1.5.2	G												
1093			26 29 23	2	Shop Drawings	Installation Drawings	1.5.3	G												
1094			26 29 23	2	Shop Drawings	As-Built Drawings	1.5.3	G												
1095			26 29 23	3	Product Data	Adjustable Speed Drives	2.1	G												
1096			26 29 23	3	Product Data	Wires and Cables	2.3													
1097			26 29 23	3	Product Data	Equipment Schedule	1.5.4													
1098			26 29 23	6	Test Reports	ASD Test	3.3.1													
1099			26 29 23	6	Test Reports	Performance Verification Tests	3.3.2													
1100			26 29 23	6	Test Reports	Endurance Test	3.3.3													
1101			26 29 23	8	Manufacturer's Instructions	Installation instructions	1.5.5													
1102			26 29 23	9	Manufacturer's Field Reports	ASD Test Plan	2.5.1	G												
1103			26 29 23	9	Manufacturer's Field Reports	Standard Products	1.5.6													
1104			26 29 23	10	Operation and Maintenance Data	Adjustable Speed Drives	2.1													
1105			26 32 15.00	2	Shop Drawings	Engine-Generator Set and Auxiliary Equipment	2.1.1	G												
1106			26 32 15.00	2	Shop Drawings	Auxiliary Systems	1.4.8	G												
1107			26 32 15.00	2	Shop Drawings	Detailed Drawings	1.4.7	G												
1108			26 32 15.00	2	Shop Drawings	Acceptance	3.17	G												
1109			26 32 15.00	3	Product Data	Harmonic Requirements	2.1.8	G												
1110			26 32 15.00	3	Product Data	Engine-Generator Set Efficiencies	2.1.1	G												
1111			26 32 15.00	3	Product Data	Emissions	2.12	G												
1112			26 32 15.00	3	Product Data	filters	2.7.2	G												
1113			26 32 15.00	3	Product Data	special tools	2.14	G												
1114			26 32 15.00	3	Product Data	Remote Alarm Annunciator	2.13.4	G												
1115			26 32 15.00	3	Product Data	Engine-Generator Parameter Schedule	2.1.1													
1116			26 32 15.00	3	Product Data	Heat Exchanger	2.8.2													
1117			26 32 15.00	3	Product Data	Generator	2.15													
1118			26 32 15.00	3	Product Data	Manufacturer's Catalog	2.5													
1119			26 32 15.00	3	Product Data	Spare Parts	1.7.2													
1120			26 32 15.00	3	Product Data	Onsite Training	3.12													
1121			26 32 15.00	3	Product Data	Vibration-Isolation	2.1.7													
1122			26 32 15.00	3	Product Data	Posted Data and Instructions	3.16	G												
1123			26 32 15.00	3	Product Data	Instructions	3.6.7.1	G												
1124			26 32 15.00	3	Product Data	Experience	1.4.5													
1125			26 32 15.00	3	Product Data	Field Engineer	1.4.6													
1126			26 32 15.00	3	Product Data	General Installation	3.2													
1127			26 32 15.00	3	Product Data	Exciter	2.16													

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1128			26 32 15.00	5	Design Data	Performance Criteria	2.15													
1129			26 32 15.00	5	Design Data	Sound Limitations	2.9	G												
1130			26 32 15.00	5	Design Data	Integral Main Fuel Storage Tank	2.6.4													
1131			26 32 15.00	5	Design Data	Power Factor	3.6.1.2													
1132			26 32 15.00	5	Design Data	Heat Exchanger	2.8.2													
1133			26 32 15.00	5	Design Data	Time-Delay on Alarms	2.19.5													
1134			26 32 15.00	5	Design Data	Cooling System	2.8													
1135			26 32 15.00	5	Design Data	Vibration Isolation	2.1.7													
1136			26 32 15.00	5	Design Data	Battery Charger	2.13.3.2													
1137			26 32 15.00	5	Design Data	Capacity Calculations for Engine-Generator Set	2.1.1	G												
1138			26 32 15.00	5	Design Data	Brake Mean Effective Pressure (BMEP) Calculations	2.1.1	G												
1139			26 32 15.00	5	Design Data	Torsional Vibration Stress Analysis Computations	2.1.1	G												
1140			26 32 15.00	5	Design Data	Capacity Calculations for Batteries	2.1.1	G												
1141			26 32 15.00	5	Design Data	Turbocharger Load Calculations	2.1.1	G												
1142			26 32 15.00	6	Test Reports	Performance Tests	3.6.9													
1143			26 32 15.00	6	Test Reports	Factory Inspection and Tests	2.28													
1144			26 32 15.00	6	Test Reports	Factory Tests	2.28.2													
1145			26 32 15.00	6	Test Reports	Onsite Inspection and Tests	3.6	G												
1146			26 32 15.00	6	Test Reports	Acceptance Checks and Tests	3.9.1	G												
1147			26 32 15.00	6	Test Reports	Functional Acceptance Tests	3.10.2	G												
1148			26 32 15.00	6	Test Reports	Maintenance Procedures	3.12	G												
1149			26 32 15.00	6	Test Reports	Operation and Maintenance Manuals	3.12	G												
1150			26 32 15.00	6	Test Reports	Inspections	3.6.3	G												
1151			26 32 15.00	6	Test Reports	Functional Acceptance Test Procedure	3.9.5	G												
1152			26 32 15.00	7	Certificates	Cooling System	2.8													
1153			26 32 15.00	7	Certificates	Vibration Isolation	2.1.7													
1154			26 32 15.00	7	Certificates	Prototype Test	2.28.2													
1155			26 32 15.00	7	Certificates	Reliability and Durability	2.1.5													
1156			26 32 15.00	7	Certificates	Fuel System Certification	1.4.10	G												
1157			26 32 15.00	7	Certificates	Start-Up Engineer	3.8	G												
1158			26 32 15.00	7	Certificates	Instructor's Qualification Resume	3.11.1	G												
1159			26 32 15.00	7	Certificates	Engine Emission Limits	2.1.2.1	G												
1160			26 32 15.00	7	Certificates	Sound Limitations	2.9													
1161			26 32 15.00	7	Certificates	Site Visit	3.1													
1162			26 32 15.00	7	Certificates	Current Balance	2.15.1													
1163			26 32 15.00	7	Certificates	Materials and Equipment	2.4													
1164			26 32 15.00	7	Certificates	Factory Inspection and Tests	2.28													
1165			26 32 15.00	7	Certificates	Engine Tests	3.6.4	G												
1166			26 32 15.00	7	Certificates	Generator Tests	3.6.5	G												
1167			26 32 15.00	7	Certificates	Assembled Engine-Generator Set Tests	3.6.6	G												

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1168			26 32 15.00	10	Operation and Maintenance Data	Preliminary Assembled Operation and Maintenance Manuals	3.9.4	G												
1169			26 32 15.00	10	Operation and Maintenance Data	Posted Data and Instructions	3.16	G												
1170			26 32 15.00	10	Operation and Maintenance Data	Training Plan	3.11.2	G												
1171			26 36 23	2	Shop Drawings	Automatic Transfer Switch Drawings	1.4.2	G												
1172			26 36 23	3	Product Data	Automatic Transfer Switches	2.1	G												
1173			26 36 23	3	Product Data	REMOTE ANNUNCIATOR AND CONTROL SYSTEM PANEL	2.3	G												
1174			26 36 23	6	Test Reports	Acceptance Checks and Tests	3.3.1	G												
1175			26 36 23	6	Test Reports	Functional Acceptance Tests	3.3.2	G												
1176			26 36 23	6	Test Reports	Factory Testing	2.4	G												
1177			26 36 23	6	Test Reports	Factory Test Reports	2.4.2	G												
1178			26 36 23	7	Certificates	Proof of Listing	1.4.1	G												
1179			26 36 23	10	Operation and Maintenance Data	Operation and Maintenance Manual	1.3	G												
1180			26 41 00	2	Shop Drawings	Overall lightning protection system	1.4.1.1	G												
1181			26 41 00	2	Shop Drawings	Each major component	1.4.1.2	G												
1182			26 41 00	6	Test Reports	Lightning Protection and Grounding System Test Plan	1.4.3	G												
1183			26 41 00	6	Test Reports	Lightning Protection and Grounding System Test	3.5.1	G												
1184			26 41 00	7	Certificates	Lightning Protection System Installers Documentation	1.2.3	G												
1185			26 41 00	7	Certificates	Component UL Listed and Labeled	1.4.2	G												
1186			26 41 00	7	Certificates	Lightning protection system inspection certificate	1.4.4	G												
1187			26 41 00	7	Certificates	Roof manufacturer's warranty	3.1.1	G												
1188			26 51 00	2	Shop Drawings	Luminaire Drawings	1.5.1	G												
1189			26 51 00	2	Shop Drawings	Occupancy/Vacancy Sensor Coverage Layout	1.5.8	G												
1190			26 51 00	2	Shop Drawings	Lighting Control System One-Line Diagram	1.7.2	G												
1191			26 51 00	2	Shop Drawings	Sequence of Operation for Lighting Control System	2.5.1	G												
1192			26 51 00	3	Product Data	Luminaires	2.2	G												
1193			26 51 00	3	Product Data	Light Sources	2.3	G												
1194			26 51 00	3	Product Data	LED Drivers	2.4	G												
1195			26 51 00	3	Product Data	Luminaire Warranty	1.6.1	G												
1196			26 51 00	3	Product Data	Lighting Controls Warranty	1.6.2	G												
1197			26 51 00	3	Product Data	Local Area Controller	2.5.1.1.1	G												
1198			26 51 00	3	Product Data	Lighting Control Panel	2.5.1.2.1	G												
1199			26 51 00	3	Product Data	Gateway	2.5.1.2.2	G												
1200			26 51 00	3	Product Data	Lighting Contactor	2.5.1.2.3	G												
1201			26 51 00	3	Product Data	Switches	2.5.2.1	G												
1202			26 51 00	3	Product Data	Wall Box Dimmers	2.5.2.2	G												
1203			26 51 00	3	Product Data	Scene Wallstations	2.5.2.3	G												

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1204			26 51 00	3	Product Data	Occupancy/Vacancy Sensors	2.5.2.4	G												
1205			26 51 00	3	Product Data	Photosensors	2.5.2.5	G												
1206			26 51 00	3	Product Data	Power Packs	2.5.2.4.6	G												
1207			26 51 00	3	Product Data	Power Hook Luminaire Hangers	2.7.4	G												
1208			26 51 00	3	Product Data	Mini Inverters	2.6.5	G												
1209			26 51 00	3	Product Data	Exit Signs	2.6.1	G												
1210			26 51 00	3	Product Data	Emergency Drivers	2.6.3	G												
1211			26 51 00	5	Design Data	Luminaire Design Data	1.5.2	G												
1212			26 51 00	6	Test Reports	IES LM-79 Test Report	1.5.3	G												
1213			26 51 00	6	Test Reports	IES LM-80 Test Report	1.5.4	G												
1214			26 51 00	6	Test Reports	IES TM-21 Test Report	1.5.5	G												
1215			26 51 00	6	Test Reports	IES TM-30 Test Report	1.5.6	G												
1216			26 51 00	6	Test Reports	Occupancy/Vacancy Sensor Verification Test	3.2.1.1	G												
1217			26 51 00	6	Test Reports	Photosensor Verification Test	3.2.1.1	G												
1218			26 51 00	7	Certificates	LED Driver and Dimming Switch Compatibility Certificate	1.5.7	G												
1219			26 51 00	10	Operation and Maintenance Data	Lighting System	1.7.1	G												
1220			26 51 00	10	Operation and Maintenance Data	Lighting Control System	1.7.2	G												
1221			26 51 00	10	Operation and Maintenance Data	Maintenance Staff Training Plan	3.3.2.1	G												
1222			26 51 00	10	Operation and Maintenance Data	End-User Training Plan	3.3.2.2	G												
1223			27 10 00	2	Shop Drawings	Telecommunications drawings	1.6.1.1	G												
1224			27 10 00	2	Shop Drawings	Telecommunications Space Drawings	1.6.1.2	G												
1225			27 10 00	3	Product Data	Telecommunications cabling	2.3	G												
1226			27 10 00	3	Product Data	Patch panels	2.4.5	G												
1227			27 10 00	3	Product Data	Telecommunications outlet/connector assemblies	2.5	G												
1228			27 10 00	3	Product Data	Equipment support frame	2.4.2	G												
1229			27 10 00	3	Product Data	Connector blocks	2.4.3	G												
1230			27 10 00	3	Product Data	Spare Parts	1.10.3	G												
1231			27 10 00	6	Test Reports	Telecommunications cabling testing	3.5.1	G												
1232			27 10 00	7	Certificates	Telecommunications Contractor	1.6.2.1	G												
1233			27 10 00	7	Certificates	Key Personnel	1.6.2.2	G												
1234			27 10 00	7	Certificates	Manufacturer Qualifications	1.6.2.3	G												
1235			27 10 00	7	Certificates	Test plan	1.6.3	G												
1236			27 10 00	9	Manufacturer's Field Reports	Factory reel tests	2.10.1	G												
1237			27 10 00	10	Operation and Maintenance Data	Telecommunications cabling and pathway system	1.10.1	G												
1238			27 10 00	11	Closeout Submittals	Record Documentation	1.10.2	G												
1239			27 51 16	1	Preconstruction Submittals	Qualifications	1.7	G												
1240			27 51 16	2	Shop Drawings	Detail Drawings	2.1.3	G												
1241			27 51 16	2	Shop Drawings	System Layout	1.2.1	G												

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1242			27 51 16	3	Product Data	Spare Parts	1.9													
1243			27 51 16	5	Design Data	Design Analysis and Calculations	1.5.7	G												
1244			27 51 16	6	Test Reports	Approved Test Procedures	3.5	G												
1245			27 51 16	6	Test Reports	Acceptance Tests	3.5													
1246			27 51 16	6	Test Reports	Accreditation	1.6	G												
1247			27 51 16	7	Certificates	Components	2.2													
1248			27 51 16	10	Operation and Maintenance Data	Paging System	2.1	G												
1249			28 31 76	1	Preconstruction Submittals	Qualified Fire Protection Engineer (QFPE)	1.3.2	G												
1250			28 31 76	1	Preconstruction Submittals	Fire alarm system designer	1.9.2.1	G												
1251			28 31 76	1	Preconstruction Submittals	Supervisor	1.9.2.2	G												
1252			28 31 76	1	Preconstruction Submittals	Technician	1.9.2.3	G												
1253			28 31 76	1	Preconstruction Submittals	Installer	1.9.2.4	G												
1254			28 31 76	1	Preconstruction Submittals	Test Technician	1.9.2.5	G												
1255			28 31 76	1	Preconstruction Submittals	Fire Alarm System Site-Specific Software Acknowledgement	1.7	G												
1256			28 31 76	2	Shop Drawings	Nameplates	1.9.1.3	G												
1257			28 31 76	2	Shop Drawings	Instructions	2.2.4	G												
1258			28 31 76	2	Shop Drawings	Wiring Diagrams	1.9.1.4	G												
1259			28 31 76	2	Shop Drawings	System Layout	1.9.1.5	G												
1260			28 31 76	2	Shop Drawings	Notification Appliances	1.9.1.6	G												
1261			28 31 76	2	Shop Drawings	Initiating devices	1.9.1.7	G												
1262			28 31 76	2	Shop Drawings	Amplifiers	1.9.1.8	G												
1263			28 31 76	2	Shop Drawings	Battery Power	1.9.1.9	G												
1264			28 31 76	2	Shop Drawings	Voltage Drop Calculations	1.9.1.10	G												
1265			28 31 76	3	Product Data	Fire Alarm and Mass Notification Control Unit (FMCU)	2.3	G												
1266			28 31 76	3	Product Data	Local Operating Console (LOC)	1.4.3	G												
1267			28 31 76	3	Product Data	Amplifiers	1.9.1.8	G												
1268			28 31 76	3	Product Data	Tone Generators	2.5	G												
1269			28 31 76	3	Product Data	Digitalized voice generators	2.5	G												
1270			28 31 76	3	Product Data	LCD Annunciator	2.6.1	G												
1271			28 31 76	3	Product Data	Manual Stations	2.7	G												
1272			28 31 76	3	Product Data	Smoke Detectors	2.8	G												
1273			28 31 76	3	Product Data	Duct Smoke Detectors	2.8.2	G												
1274			28 31 76	3	Product Data	Triple Infrared (IR) Flame Detectors	2.22	G												
1275			28 31 76	3	Product Data	Releasing Service Fire Alarm Control Unit	2.21.1	G												
1276			28 31 76	3	Product Data	Addressable Interface Devices	2.9	G												
1277			28 31 76	3	Product Data	Addressable Control Modules	2.1	G												
1278			28 31 76	3	Product Data	Isolation Modules	2.11	G												
1279			28 31 76	3	Product Data	Notification Appliances	1.9.1.6	G												
1280			28 31 76	3	Product Data	Textual Display Signs	2.12.4	G												
1281			28 31 76	3	Product Data	Batteries	2.14.1	G												
1282			28 31 76	3	Product Data	Battery Chargers	2.14.2	G												

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1283			28 31 76	3	Product Data	Supplemental Notification Appliance Circuit Panels	2.14.1.1	G												
1284			28 31 76	3	Product Data	Auxiliary Power Supply Panels	2.14.1.1	G												
1285			28 31 76	3	Product Data	Surge Protective Devices	2.15	G												
1286			28 31 76	3	Product Data	Alarm Wiring	2.15	G												
1287			28 31 76	3	Product Data	Back Boxes and Conduit	3.3.4	G												
1288			28 31 76	3	Product Data	Ceiling Bridges	3.2.8	G												
1289			28 31 76	3	Product Data	Terminal Cabinets	3.3.2	G												
1290			28 31 76	3	Product Data	Radio Transmitter and Interface Panels	2.17.1	G												
1291			28 31 76	3	Product Data	Environmental Enclosures or Guards	2.19	G												
1292			28 31 76	3	Product Data	Knox Box	2.2	G												
1293			28 31 76	3	Product Data	Document Storage Cabinet	3.11.3	G												
1294			28 31 76	6	Test Reports	Test Procedures	3.7.1	G												
1295			28 31 76	7	Certificates	Verification of Compliant Installation	3.7.2.1	G												
1296			28 31 76	7	Certificates	Request for Government Final Test	3.7.2.2	G												
1297			28 31 76	10	Operation and Maintenance Data	Operation and Maintenance (O&M) Instructions	3.9	G												
1298			28 31 76	10	Operation and Maintenance Data	Instruction of Government Employees	3.1	G												
1299			28 31 76	11	Closeout Submittals	As-Built Drawings	1.9.1.13													
1300			28 31 76	11	Closeout Submittals	Spare Parts	1.11.1													
1301			31 00 00	1	Preconstruction Submittals	Shoring	3.5	G												
1302			31 00 00	1	Preconstruction Submittals	Dewatering Work Plan	1.4.3	G												
1303			31 00 00	3	Product Data	Utilization of Excavated Materials	3.9	G												
1304			31 00 00	3	Product Data	Rock Excavation	1.4.1.2													
1305			31 00 00	3	Product Data	Opening of any Excavation or Borrow Pit	3.4													
1306			31 00 00	6	Test Reports	Testing	3.16													
1307			31 00 00	6	Test Reports	Borrow Site Testing	2.1													
1308			31 00 00	7	Certificates	Testing	3.16													
1309			31 62 16.16	1	Preconstruction Submittals	Installation Procedures	1.7.4	G												
1310			31 62 16.16	1	Preconstruction Submittals	Contractor's Geotechnical Consultant	1.7.2	G												
1311			31 62 16.16	1	Preconstruction Submittals	Testing Agency Qualification	3.3.3	G												
1312			31 62 16.16	2	Shop Drawings	Pile splices	2.1.3.1	G												
1313			31 62 16.16	2	Shop Drawings	Pile placement	3.2.2	G												
1314			31 62 16.16	3	Product Data	Pile Driving Equipment	1.7.4	G												
1315			31 62 16.16	3	Product Data	Pile Driving Records	3.2.1	G												
1316			31 62 16.16	3	Product Data	Delivery, Storage, and Handling	1.6	G												
1317			31 62 16.16	5	Design Data	Wave Equation Analysis	3.1.1													
1318			31 62 16.16	5	Design Data	Quantities List	3.1.2	G												
1319			31 62 16.16	6	Test Reports	Dynamic Pile Analysis	3.3.1.1	G												
1320			31 62 16.16	6	Test Reports	Pile Performance Report	3.3.1.4													
1321			31 62 16.16	7	Certificates	Pile Material Certificates of Compliance	2.1.1	G												

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1322			31 62 16.16	7	Certificates	Pile Splices	2.1.3.1	G												
1323			31 62 16.16	11	Closeout Submittals	Pile Driving Records	3.2.1													
1324			32 01 19.61	3	Product Data	Sealants	2.1													
1325			32 01 19.61	3	Product Data	Manufacturer's Recommendations	3.5.2													
1326			32 01 19.61	4	Samples	Sealants	2.1													
1327			32 01 19.61	4	Samples	Blocking Media/Backup Materials	2.3.1													
1328			32 01 19.61	4	Samples	Backer Rod	3.3.4.1													
1329			32 01 19.61	4	Samples	Bond Breaking Tapes	2.3.2													
1330			32 01 19.61	7	Certificates	Equipment List	3.1													
1331			32 01 19.61	8	Manufacturer's Instructions	Sealants	2.1													
1332			32 11 23	3	Product Data	Plant, Equipment, and Tools	1.4													
1333			32 11 23	6	Test Reports	Initial Tests	2.3.1	G												
1334			32 11 23	6	Test Reports	In-Place Tests	3.12.1	G												
1335			32 12 13	6	Test Reports	Sampling and Testing	3.7													
1336			32 12 16.16	2	Shop Drawings	Placement Plan	2.1	G												
1337			32 12 16.16	3	Product Data	Diamond Grinding Plan	2.1.6	G												
1338			32 12 16.16	3	Product Data	Mix Design	2.4	G												
1339			32 12 16.16	3	Product Data	Contractor Quality Control	3.1	G												
1340			32 12 16.16	4	Samples	Asphalt Cement Binder	2.3													
1341			32 12 16.16	6	Test Reports	Aggregates	2.2	G												
1342			32 12 16.16	6	Test Reports	QC Monitoring	3.1.3.9													
1343			32 12 16.16	7	Certificates	Asphalt Cement Binder	2.3	G												
1344			32 12 16.16	7	Certificates	Laboratory Accreditation and Validation	1.3.11													
1345			32 13 13.06	3	Product Data	Curing Materials	2.1.6	G												
1346			32 13 13.06	3	Product Data	Admixtures	2.1.4	G												
1347			32 13 13.06	3	Product Data	Dowel	2.1.5.1	G												
1348			32 13 13.06	3	Product Data	Reinforcement	2.1.5.4	G												
1349			32 13 13.06	5	Design Data	Mix Design	2.3	G												
1350			32 13 13.06	6	Test Reports	Aggregate	2.1.3	G												
1351			32 13 13.06	6	Test Reports	Concrete Slump Tests	3.7.2	G												
1352			32 13 13.06	6	Test Reports	Air Content Tests	3.7.4	G												
1353			32 13 13.06	6	Test Reports	Flexural Strength Tests	3.7.3	G												
1354			32 13 13.06	6	Test Reports	Cementitious Materials	2.1.1	G												
1355			32 13 13.06	7	Certificates	Ready-mixed Concrete Plant	1.6.1	G												
1356			32 13 13.06	7	Certificates	Batch Tickets	1.6.4	G												
1357			32 13 13.06	7	Certificates	Cementitious Materials	2.1.1	G												
1358			32 13 14.13	3	Product Data	Dowels	2.9.1	G												
1359			32 13 14.13	3	Product Data	Dowel Bar Assemblies	2.9.2	G												
1360			32 13 14.13	3	Product Data	Equipment	2.11													
1361			32 13 14.13	3	Product Data	Proposed Techniques	3.1.2	G												
1362			32 13 14.13	5	Design Data	Preliminary Proposed Proportioning	2.13.2	G												
1363			32 13 14.13	5	Design Data	Proportioning Studies	2.13.2	G												

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1364			32 13 14.13	6	Test Reports	Batch Plant Manufacturer's Inspection Report	1.4.1	G												
1365			32 13 14.13	6	Test Reports	Slipform Paver Manufacturer's Inspection Report	1.4.1	G												
1366			32 13 14.13	6	Test Reports	Sampling and Testing	2.1.4.1	G												
1367			32 13 14.13	6	Test Reports	Mixer Performance (Uniformity) Testing	2.11.1.3	G												
1368			32 13 14.13	6	Test Reports	Repair Recommendations Plan	3.9.1	G												
1369			32 13 14.13	7	Certificates	Contractor Quality Control Staff	1.4.1	G												
1370			32 13 14.13	7	Certificates	Laboratory Accreditation and Validation	1.4.3													
1371			32 13 14.13	7	Certificates	Commercial Laboratory	1.4.3.3	G												
1372			32 13 14.13	7	Certificates	NRMCA Certificate of Conformance	2.11													
1373			32 15 00	3	Product Data	Plant, Equipment, and Tools	1.4	G												
1374			32 15 00	6	Test Reports	Initial Tests	2.3.1	G												
1375			32 15 00	6	Test Reports	In-Place Tests	3.10.1	G												
1376			32 16 19	3	Product Data	Concrete	2.1													
1377			32 16 19	3	Product Data	Biodegradable Form Release Agent	2.6.5													
1378			32 16 19	3	Product Data	Biodegradable Form Release Agent	3.2													
1379			32 16 19	6	Test Reports	Field Quality Control	3.8													
1380			32 17 23	3	Product Data	Surface Preparation Equipment List	2.1.1.1	G												
1381			32 17 23	3	Product Data	Application Equipment List	2.1.2	G												
1382			32 17 23	3	Product Data	Exterior Surface Preparation	3.2													
1383			32 17 23	3	Product Data	Safety Data Sheets	1.3.1	G												
1384			32 17 23	3	Product Data	Waterborne Paint	2.2.1	G												
1385			32 17 23	6	Test Reports	Waterborne Paint	2.2.1	G												
1386			32 17 23	7	Certificates	Qualifications	1.3.2	G												
1387			32 17 23	7	Certificates	Waterborne Paint	2.2.1													
1388			32 17 23	7	Certificates	Volatile Organic Compound	1.3.1													
1389			32 17 23	8	Manufacturer's Instructions	Waterborne Paint	2.2.1	G												
1390			32 31 13	2	Shop Drawings	Fence Assembly	2.1	G												
1391			32 31 13	2	Shop Drawings	Location of Gate, Corner, End, and Pull Posts	3.2.1.1	G												
1392			32 31 13	2	Shop Drawings	Gate Assembly	2.1	G												
1393			32 31 13	2	Shop Drawings	Gate Hardware and Accessories	2.2.14	G												
1394			32 31 13	2	Shop Drawings	Erection/Installation Drawings	Part 3	G												
1395			32 31 13	3	Product Data	Fence Assembly	2.1	G												
1396			32 31 13	3	Product Data	Gate Assembly	2.1	G												
1397			32 31 13	3	Product Data	Gate Hardware and Accessories	2.2.14	G												
1398			32 31 13	3	Product Data	Zinc Coating	2.3.1	G												
1399			32 31 13	3	Product Data	Fabric	2.2.1	G												
1400			32 31 13	3	Product Data	Stretcher Bars	2.2.9	G												
1401			32 31 13	3	Product Data	Concrete	2.3.3	G												
1402			32 31 13	4	Samples	Fabric	2.2.1	G												
1403			32 31 13	4	Samples	Posts	2.2.2	G												

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1404			32 31 13	4	Samples	Braces	2.2.2	G												
1405			32 31 13	4	Samples	Line Posts	2.2.3	G												
1406			32 31 13	4	Samples	Sleeves	2.2.5	G												
1407			32 31 13	4	Samples	Top Rail	2.2.6	G												
1408			32 31 13	4	Samples	Tension Wire	2.3.2	G												
1409			32 31 13	4	Samples	Stretcher Bars	2.2.9	G												
1410			32 31 13	4	Samples	Gate Posts	2.2.12	G												
1411			32 31 13	4	Samples	Gate Hardware and Accessories	2.2.14	G												
1412			32 31 13	4	Samples	Padlocks	2.2.17	G												
1413			32 31 13	4	Samples	Wire Ties	2.2.16	G												
1414			32 31 13	7	Certificates	Certificates of Compliance	1.3.1													
1415			32 31 13	8	Manufacturer's Instructions	Fence Assembly	2.1													
1416			32 31 13	8	Manufacturer's Instructions	Gate Assembly	2.1													
1417			32 31 13	8	Manufacturer's Instructions	Hardware Assembly	2.1													
1418			32 31 13	8	Manufacturer's Instructions	Accessories	2.1													
1419			32 31 13	11	Closeout Submittals	Recycled Material Content	3.3	S												
1420			32 92 23	3	Product Data	Fertilizer	2.4													
1421			32 92 23	6	Test Reports	Topsoil composition tests	2.2.3													
1422			32 92 23	7	Certificates	sods	2.1													
1423			33 05 23.13	1	Preconstruction Submittals	Qualifications	1.3.1	G												
1424			33 05 23.13	1	Preconstruction Submittals	Horizontal Directional Drilling Plan	1.3.3	G												
1425			33 05 23.13	3	Product Data	Pipe	2.2.1	G												
1426			33 05 23.13	3	Product Data	Drilling Fluids	2.2.2	G												
1427			33 05 23.13	3	Product Data	Additives	2.2.3	G												
1428			33 05 23.13	3	Product Data	Tracer Wire	2.2.4	G												
1429			33 05 23.13	6	Test Reports	Soil Test Data	3.1													
1430			33 05 23.13	7	Certificates	Drill Rod	2.1.1													
1431			33 05 23.13	7	Certificates	Fusion Technician Qualifications	1.3.4													
1432			33 05 23.13	11	Closeout Submittals	Record Drawings	3.4													
1433			33 05 23.13	11	Closeout Submittals	Complete Work Logs of Guided Directional Drill Operations	3.4													
1434			33 11 00	1	Preconstruction Submittals	Connections	3.1.1	G												
1435			33 11 00	3	Product Data	Pipe, Fittings, Joints and Couplings	2.1.1	G												
1436			33 11 00	3	Product Data	Valves	2.1.2	G												
1437			33 11 00	3	Product Data	Valve Boxes	2.1.2.4	G												
1438			33 11 00	3	Product Data	Fire Hydrants	2.1.3.1	G												
1439			33 11 00	3	Product Data	Pipe Restraint	2.2.1	G												
1440			33 11 00	3	Product Data	Disinfection Procedures	3.2.2	G												
1441			33 11 00	6	Test Reports	Bacteriological Samples	3.3.1.4	G												
1442			33 11 00	6	Test Reports	Backflow Preventer Tests	3.3.1.5	G												
1443			33 11 00	6	Test Reports	Hydrostatic Sewer Test	3.2.1.1.6													
1444			33 11 00	6	Test Reports	Leakage Test	3.3.1.3													
1445			33 11 00	6	Test Reports	Hydrostatic Test	3.3.1.1													
1446			33 11 00	7	Certificates	Pipe, Fittings, Joints and Couplings	2.1.1													

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1447			33 11 00	7	Certificates	Lining	2.1.1.1.1													
1448			33 11 00	7	Certificates	Valves	2.1.2													
1449			33 11 00	7	Certificates	Fire Hydrants	2.1.3.1													
1450			33 11 00	8	Manufacturer's Instructions	Ductile Iron Piping	2.1.1.1													
1451			33 11 00	8	Manufacturer's Instructions	Copper Pipe For Service Lines	2.1.1.2													
1452			33 16 15	2	Shop Drawings	Tank Installation	3.7	G												
1453			33 16 15	3	Product Data	System Description	2.1													
1454			33 16 15	3	Product Data	Foundations	3.2													
1455			33 16 15	3	Product Data	Process Control Panel	2.3.1													
1456			33 16 15	6	Test Reports	Tank Installation	3.7													
1457			33 16 15	6	Test Reports	Testing of Valves and Piping	3.8.2													
1458			33 16 15	7	Certificates	System Description	2.1													
1459			33 16 15	7	Certificates	Foundations	3.2													
1460			33 30 00	1	Preconstruction Submittals	Contractor's License	1.3.1	G												
1461			33 30 00	2	Shop Drawings	Installation Drawings	3.1.1	G												
1462			33 30 00	3	Product Data	Manholes	2.2.5													
1463			33 30 00	3	Product Data	Frames, Covers, and Gratings	2.2.7													
1464			33 30 00	3	Product Data	Gravity Pipe	2.2.1													
1465			33 30 00	6	Test Reports	Deflection Testing	3.3.1.2													
1466			33 30 00	7	Certificates	Portland Cement	2.2.3													
1467			33 30 00	7	Certificates	Gaskets	2.2.1.1													
1468			33 56 10	2	Shop Drawings	Grounding and Bonding	2.1.1													
1469			33 56 10	3	Product Data	Underground Storage Tank	2.4	G												
1470			33 56 10	3	Product Data	Tank Protective Coatings	2.5	G												
1471			33 56 10	3	Product Data	Atmospheric Vent	2.6.5.1	G												
1472			33 56 10	6	Test Reports	Underground Storage Tank Tightness Tests	3.2.1	G												
1473			33 56 10	6	Test Reports	Tank Manufacturer's Tests	3.2.2													
1474			33 56 10	6	Test Reports	Tank Fill Tests	3.4													
1475			33 56 10	6	Test Reports	Tank Inspection Reports	3.2.3	G												
1476			33 56 10	7	Certificates	Contractor Qualifications	1.4.1	G												
1477			33 56 10	7	Certificates	Manufacturer's Certification	1.4.1	G												
1478			33 56 10	7	Certificates	Licensed Personnel	1.4.2.1													
1479			33 56 10	7	Certificates	Demonstrations	3.3													
1480			33 56 10	7	Certificates	STI SP001 Inspector's Certification	3.2.3	G												
1481			33 56 10	8	Manufacturer's Instructions	Underground Storage Tank	2.4													
1482			33 56 10	10	Operation and Maintenance Data	Underground Storage Tank	2.4	G												
1483			33 61 13.19	2	Shop Drawings	Detail Drawings	1.3.1	G												
1484			33 61 13.19	3	Product Data	Support of the Equipment	2.1													
1485			33 61 13.19	3	Product Data	Piping and Fittings	2.4													
1486			33 61 13.19	3	Product Data	Valves	2.5													
1487			33 61 13.19	10	Operation and Maintenance Data	Valve Manholes and Accessories	3.5	G												

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1488			33 61 13.19	10	Operation and Maintenance Data	Data Package 2	3.5.1	G												
1489			33 71 02	2	Shop Drawings	Aluminum conductors	2.2.1	G												
1490			33 71 02	2	Shop Drawings	Precast underground structures	1.5.1	G												
1491			33 71 02	3	Product Data	Medium voltage cable	2.5	G												
1492			33 71 02	3	Product Data	Medium voltage cable joints	2.7	G												
1493			33 71 02	3	Product Data	Medium voltage cable terminations	2.6	G												
1494			33 71 02	3	Product Data	Precast concrete structures	2.13.1.1	G												
1495			33 71 02	3	Product Data	Sealing Material	2.13.1.4													
1496			33 71 02	3	Product Data	Pulling-In Irons	3.4.2													
1497			33 71 02	3	Product Data	Handhole frames and covers	2.13.2	G												
1498			33 71 02	3	Product Data	Composite/fiberglass handholes	2.13.3	G												
1499			33 71 02	3	Product Data	Cable supports	2.14	G												
1500			33 71 02	6	Test Reports	Medium voltage cable qualification and production tests	2.17.2	G												
1501			33 71 02	6	Test Reports	Field Acceptance Checks and Tests	3.17.1	G												
1502			33 71 02	6	Test Reports	Arc-proofing test	2.17.1	G												
1503			33 71 02	7	Certificates	Cable splicer/terminator	1.5.2	G												
1504			33 71 02	7	Certificates	Cable Installer Qualifications	1.5.3	G												
1505			33 82 00	2	Shop Drawings	Telecommunications Outside Plant	1.6.1.1	G												
1506			33 82 00	2	Shop Drawings	Telecommunications Entrance Facility Drawings	1.6.1.2	G												
1507			33 82 00	3	Product Data	Wire and cable	2.8	G												
1508			33 82 00	3	Product Data	Cable splices, and connectors	2.4	G												
1509			33 82 00	3	Product Data	Closures	2.3	G												
1510			33 82 00	3	Product Data	Building protector assemblies	2.2.1	G												
1511			33 82 00	3	Product Data	Protector modules	2.2.2	G												
1512			33 82 00	3	Product Data	Spare Parts	1.8.2	G												
1513			33 82 00	6	Test Reports	Pre-installation tests	3.4.1	G												
1514			33 82 00	6	Test Reports	Acceptance tests	3.4.2	G												
1515			33 82 00	6	Test Reports	Outside Plant Test Plan	1.6.3	G												
1516			33 82 00	7	Certificates	Telecommunications Contractor	1.6.2.1	G												
1517			33 82 00	7	Certificates	Key Personnel	1.6.2.2	G												
1518			33 82 00	7	Certificates	Manufacturer's Qualifications	1.6.2.3	G												
1519			33 82 00	8	Manufacturer's Instructions	Building protector assembly installation	2.2.1	G												
1520			33 82 00	8	Manufacturer's Instructions	Cable tensions	3.1.7.1	G												
1521			33 82 00	9	Manufacturer's Field Reports	Factory Reel Test Data	2.14.1	G												
1522			33 82 00	10	Operation and Maintenance Data	Telecommunications outside plant (OSP)	1.6.1.1	G												
1523			33 82 00	11	Closeout Submittals	Record Documentation	1.8.1	G												
1524			40 60 00	2	Shop Drawings	Contractor Design Drawings	3.5.2	G												
1525			40 60 00	3	Product Data	Control Drawings	3.5													
1526			40 60 00	3	Product Data	Sensors and Meters	2.4													
1527			40 60 00	3	Product Data	Performance Verification Test (PVT)	3.6.2													
1528			40 60 00	3	Product Data	Factory Test Procedure	2.7.2													

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1529			40 60 00	6	Test Reports	Factory Test Report	2.7.3													
1530			40 60 00	6	Test Reports	Testing, Adjusting and Commissioning	3.6.1													
1531			40 60 00	6	Test Reports	Performance Verification Test(PVT)	3.6.2													
1532			40 60 00	6	Test Reports	Endurance Test	3.6.3													
1533			40 60 00	7	Certificates	Control and Sensor Wiring	3.4.2.2													
1534			40 60 00	7	Certificates	Ground Rods	3.6.1													
1535			40 60 00	7	Certificates	Wiring	3.2.1													
1536			40 60 00	7	Certificates	Installation	3.2.1													
1537			40 60 00	10	Operation and Maintenance Data	Training Manual	3.7	G												
1538			40 60 00	10	Operation and Maintenance Data	Control System	2.1	G												
1539			40 60 00	11	Closeout Submittals	Final As-Built Drawings	3.5.2.1	G												
1540			46 25 14	2	Shop Drawings	Separator	1.2.2	G												
1541			46 25 14	2	Shop Drawings	Accessory equipment	2.5	G												
1542			46 25 14	5	Design Data	Separator	1.2.2	G												
1543			46 25 14	5	Design Data	Accessory equipment	2.5	G												
1544			46 25 14	6	Test Reports	Shop hydrostatic test	2.6.1	G												
1545			46 25 14	6	Test Reports	Inspection	3.1													
1546			46 25 14	6	Test Reports	Field hydrostatic test	3.3.1													
1547			46 25 14	6	Test Reports	Preoperational test	3.3.2													
1548			46 25 14	6	Test Reports	In-service test	3.3.3													
1549			46 25 14	7	Certificates	Separator corrosion protection	2.1.2	G												
1550			46 25 14	8	Manufacturer's Instructions	Separator system	3.2	G												
1551			46 25 14	10	Operation and Maintenance Data	Separator system	3.2	G												

SECTION 01 33 29

SUSTAINABILITY REPORTING

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 189.1	(2014) Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings

COUNCIL ON ENVIRONMENTAL QUALITY (CEQ) (WHITE HOUSE)

HPSB Guiding Principles	(2016) Guiding Principles for Sustainable Federal Buildings and Determining Compliance with the Guiding Principles for Sustainable Federal Buildings

U.S. DEPARTMENT OF AGRICULTURE (USDA)

FSRIA 9002	Farm Security and Rural Investment Act Section 9002 (USDA Biopreferred Program)

U.S. DEPARTMENT OF ENERGY (DOE)

Energy Star	(1992; R 2006) Energy Star Energy Efficiency Labeling System (FEMP)

U.S. GREEN BUILDING COUNCIL (USGBC)

GBCI GP Assessment	(2016) Guiding Principles Assessment by GBCI (DOD Version)

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 247	Comprehensive Procurement Guideline for Products Containing Recovered Materials

1.2 SUMMARY

This specification includes general requirements and procedures for this project to be constructed and documented per the federally mandated High Performance and Sustainable Building or HPSB Guiding Principles (GP), Third Party Certification (TPC) requirements, UFC 1-200-02 High Performance and Sustainable Building Requirements, and other requirements identified in this specification.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to this section. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preliminary High Performance and Sustainable Building Checklist; G

Sustainability Action Plan; G

Preliminary Sustainability eNotebook; G

SD-11 Closeout Submittals

Final High Performance and Sustainable Building Checklist; G

Final Sustainability eNotebook; G

Amended Final Sustainability eNotebook; G

Amended Final High Performance and Sustainable Building Checklist; G

1.4 GUIDING PRINCIPLES VALIDATION (GPV)

Provide construction related sustainability documentation to verify achievement of HPSB Guiding Principles Validation (GPV). Provide the following for GPV:

a. Refer to HPSB Checklist at the end of this specification section. These requirements are based on legislative mandates that must be met by all projects. (Multiple checklists indicate multiple buildings that require HPSB tracking.)

b. No variations to the HPSB Checklist are allowed without written consent from the Contracting Officer. Immediately bring to the attention of the Contracting Officer any changes that impact meeting the approved HPSB Guiding Principles Requirements for this project.

c. All work, including "S" submittals, required to incorporate the applicable HPSB Guiding Principles Requirements indicated on the HPSB Checklist and in this contract.

d. Sustainability Action Plan

e. Construction related documentation for the project Sustainability eNotebook, and keep updated with regularly-scheduled construction meetings. Include construction related documentation containing the following components;

(1) HPSB Checklist

(2) Sustainability Action Plan

(3) Documentation illustrating HPSB Guiding Principles Requirements

compliance (including "S" submittals)

1.4.1 Sustainability Action Plan

Include the following information in the Sustainability Action Plan:

a. Planned method to achieve each construction related GP requirement.

b. For each designated construction related HPSB Guiding Principles Requirements that is applicable, as defined in UFC 1-200-02, provide justification narrative explaining what precludes achieving specific sustainability requirement or goal. Provide analysis of particular requirement and level to which project is able to comply. Final government-approved narrative(s) must be included with the HPSB Checklist submittal.

c. Name and contact information for: Point of Contact (POC) responsible for ensuring sustainability goals are accomplished and documentation is assembled. For TPC that include on-site visit by third party representative, provide list of required attendees.

d. Include the Indoor Air Quality plan with the Sustainability Action Plan.

1.4.2 Costs

Bear all costs associated with constructing, demonstrating, and documenting that project complies with approved HPSB Guiding Principles Requirements.

1.4.3 Calculations

Provide calculations, product data, labels and product certifications, required in this section to demonstrate compliance with the HPSB Guiding Principles Requirements.

1.4.4 Third Party Certification (TPC) Documentation

This project has been designed for, and must be constructed to attain a sustainability rating of GBCI GP Assessment . Project is already registered with the TPC Organization. Provide construction related sustainability documentation, in the format required by the TPC Organization, to the Contracting Officer for approval, and for final approval by the TPC organization. Third Party Certification is met when Government receives TPC organization certificate, assessment, or validation. Execute the following:

a. Refer to TPC Checklist at the end of this specification section. (Multiple checklists indicate multiple buildings that require TPC.)

b. Immediately bring to the attention of the Contracting Officer any project changes that impact meeting the approved TPC Requirements for this project.

c. Complete all work required to incorporate the applicable TPC Requirements.

d. Maintain the construction related information, and provide replacement pages, in the Sustainability eNotebook pertaining to additions and changes to the approved sustainability requirements. Maintain the

Sustainability eNotebook in electronic format. For more explanation, refer to paragraph SUSTAINABILITY eNOTEBOOK. Provide the following components in the Sustainability eNotebook, in addition to the GPV components above:

(1) TPC Checklist

(2) Completed TPC documentation for each identified requirement. Forward to the Contracting Officer for approval.

(3) Copy of all correspondence with the TPC organization.

e. Provide the following information in the Sustainability Action Plan. Provide this TPC information in addition to the GPV Action Plan items above:

(1) Planned method to achieve each TPC requirement.

(2) For each TPC requirement that is attempted but not achieved, provide narrative explaining how mission or activity precludes achieving specific sustainability requirement or goal. Provide analysis of particular requirement and level to which project is able to comply.

(3) Provide name and contact information for: Sustainability Point of Contact (POC) and other names of sustainability professionals responsible for ensuring TPC sustainability goals are accomplished and documentation is assembled. Sustainability POCs are also responsible for ensuring GPV required in paragraph GUIDING PRINCIPLES VALIDATION (GPV) above.

f. Bear all costs associated with constructing, demonstrating, and documenting that project complies with approved TPC requirements, including but not limited to:

(1) TPC coordination with Government's AE and other consultants, TPC website requirements, and management for construction related documentation.

(2) Construction work required to incorporate TPC requirements.

(3) Submittals required to demonstrating compliance with Government approved TPC checklists.

(4) Documentation illustrating compliance with TPC requirements and additional documentation required by the TPC.

g. Provide all calculations, product data, and certifications, assessments, or validations required in this contract to demonstrate compliance with the TPC Requirements of this section.

1.5 SUSTAINABILITY SUBMITTALS

Provide HPSB Checklist and other documentation in the Sustainability eNotebook to indicate compliance with the sustainability requirements of the project.

1.5.1 High Performance Sustainable Building (HPSB) Checklist

Provide construction documentation that provides proof of and supports compliance with the completed HPSB Checklist.

1.5.1.1 HPSB Checklist Submittals

Submit updated HPSB Checklist with each Sustainability eNotebook submittal. Attach final HPSB Checklist(s) to draft final DD1354 Real Property Record Submittal.

1.5.2 "S" Submittals for Sustainability Documentation

Submit the GPV sustainability documentation required in this specification as "S" submittals in all affected UFGS Sections.

a. Highlight GPV compliance data in "S" submittal.

b. Add "S" submittals to the Sustainability eNotebook only after submittal approval, and bookmark them as required in paragraph SUSTAINABILITY eNOTEBOOK below.

c. Ensure all approved "S" submittals (the sustainability documentation requirements) are included in each Sustainability eNotebook submittal.

1.5.3 Sustainability eNotebook

The Sustainability eNotebook is an electronic organizational file that serves as a repository for all required sustainability submittals. To support documentation of compliance with an approved HPSB checklist, provide and maintain a comprehensive and current Sustainability eNotebook Sustainability eNotebook must contain all required data to support full compliance with the HPSB Guiding Principles Requirements, including:

a. HPSB checklist

b. Sustainable Action Plan

c. Calculations

d. Labels

e. "S" submittals (sustainability documentation requirements)

f. Certifications, assessments, or validations

Provide sustainability eNotebook in the form of an Adobe PDF file; bookmark each HPSB Guiding Principles Requirement and sub-bookmark at each document. Match format to HPSB Guiding Principles numbering system indicated herein. Maintain up-to-date information, spreadsheets, templates, and other required documentation with each current submittal.

Contracting Officer may deduct from the monthly progress payment accordingly if Sustainability eNotebook information is not current, until information is updated and on track per project goals.

1.5.3.1 Sustainability eNotebook Submittal Schedule

Provide Sustainability eNotebook Submittals at the following milestones of

the project:

a. Preliminary Sustainability eNotebook

Submit preliminary Sustainability eNotebook for approval at the Pre-construction conference. Include Preliminary High Performance and Sustainable Building Checklist.

b. Construction Progress Meetings. Provide up-to-date GP documentation in the Sustainability eNotebook for each meeting.

c. Final Sustainability eNotebook

Provide up-to-date Sustainability eNotebook at the Beneficial Occupancy Date (BOD). Final progress payment retainage may be held by Contracting Officer until final sustainability documentation is complete. Include Final High Performance and Sustainable Building Checklist.

d. Amended Final Sustainability eNotebook

Amend and resubmit the Final Sustainability eNotebook to include post-occupancy corrections, updates, and requirements. Include Amended Final High Performance and Sustainable Building Checklist. Final progress payment retainage may be held by Contracting Officer until amended final sustainability documentation is complete. Submit final electronic copies of the Amended Final Sustainability eNotebook Submittal on DVDs to the Government no longer than 30 days after the GP designated data collection period.

1.6 DOCUMENTATION REQUIREMENTS

a. Incorporate each of the following HPSB Guiding Principles Requirements into project construction; and provide documentation that proves compliance with each listed requirement. Items below are organized according to the HPSB Guiding Principles. For life-cycle cost analysis requirements, one document with all analyses is acceptable, with Contracting Officer approval.

b. For each of the following paragraphs that require the use of products listed on Government-required websites, provide documentation of the process used to select products, or process used to determine why listed products do not meet project performance requirements.

1.6.1 Commissioning

Submit approved Final Commissioning Report required by Section 01 91 00.15 TOTAL BUILDING COMMISSIONING as proof of this tracking requirement.

1.6.2 Energy Efficient Products

Provide only energy-using products that are Energy Star rated, or have the Federal Energy Management Program (FEMP) recommended efficiency. Where Energy Star or FEMP recommendations have not been established, provide most efficient products that are life-cycle cost effective. Provide only energy using products that meet FEMP requirements for low standby power consumption. Energy efficient products can be found at: https://energy.gov/eere/femp/federal-energy-management-program and https://www.energystar.gov/. Provide the following documentation:

Proof that products are labeled energy efficient and comply with the cited requirements.

1.6.3 Indoor Water Use

Provide only water-consuming products that are EPA WaterSense labeled, or the most efficient water fixtures available that meet the requirements of ASHRAE 189.1 Section 6.3.2, when EPA WaterSense products are not available. Provide the following documentation:

For products available with EPA WaterSense labeling, proof that fixtures are labeled EPA WaterSense or Energy Star; for all other fixtures, proof they comply with the cited efficiency requirements.

1.6.4 Reduce Volatile Organic Compounds (VOC) (Low Emitting Materials)

Meet the requirements of Table 3-1 at the end of this specification. Provide the following documentation:

Provide certifications or labels that demonstrate compliance with cited requirements.

1.6.5 Indoor Air Quality During Construction

Prior to construction, create indoor air quality (IAQ) plan. Develop and implement the IAQ construction management plan during construction and flush building air before occupancy.

For new construction and for renovation of unoccupied existing buildings, indoor air quality plan must meet the requirements of ASHRAE 189.1 Section 10.3.1.4. (Indoor Air Quality (IAQ) Construction Management), with maximum outdoor air consistent with achieving relative humidity no greater than 60 percent.

Provide documentation showing that after construction ends and prior to occupancy, HVAC filters were replaced and building air was flushed out in accordance with the cited standard.

1.6.6 Recycled Content

Comply with 40 CFR 247. Refer to https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program for assistance identifying products cited in 40 CFR 247. Selected products must comply with non-proprietary requirements of the Federal Acquisition Regulation, and must meet performance requirements. Provide the following documentation:

a. Manufacturers' documents stating the recycled content by material, or written justification for claiming one of the exceptions allowed on the cited website.

b. Substitutions: Submit for Government approval, proposed alternative products or systems that provide equivalent performance and appearance and have greater contribution to project recycled content requirements. For all such proposed substitutions, submit with the Sustainability Action Plan accompanied by product data demonstrating equivalence.

c. In order to complete compliance with FAR 52.223-9 Estimate of Percentage of Recovered Material Content for EPA Designated Items, refer to submittal requirement for recycled/recovered material content in Section 01 78 00.

1.6.7 Bio-Based Products

Provide products and material composed of the highest percentage of biobased materials (including rapidly renewable resources and certified sustainably harvested products), consistent with FSRIA 9002 USDA BioPreferred Program, to the maximum extent possible without jeopardizing the intended end use or detracting from the overall quality delivered to the end user. Use only supplies and materials of a type and quality that conform to applicable specifications and standards.

Comply with FSRIA 9002 USDA BioPreferred Program. Refer to https://www.biopreferred.gov/BioPreferred/ for the product categories and BioPreferred Catalog. Selected products must comply with non-proprietary requirements of the Federal Acquisition Regulation, and must meet performance requirements. Provide the following documentation:

a. USDA BioPreferred label for each product; for bio-based products used on project but not listed with BioPreferred program, provide bio-based content and percentage.

b. In order to complete compliance with FAR 52.223-2 Affirmative Procurement of Biobased Products Under Service and Construction Contracts, refer to submittal requirement for biobased products in Section 01 78 00.

1.6.8 Waste Material Management (Recycling - Construction)

Divert construction debris from landfill disposal where markets or on-site recycling exists, and provide documentation in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 SUSTAINABILITY COORDINATION

3.1.1 Coordinating Sustainability Documentation Progress

Provide sustainability focus and coordination at the following meetings to achieve sustainability goals. The designated sustainability professional responsible for GP documentation must participate in the following meetings to coordinate documentation completion.

a. Pre-Construction Conference: Discuss the following: HPSB Checklist, Sustainability Action Plan, Construction submittal requirements and schedule, individuals responsible for achieving each Guiding Principle Requirement.

b. Construction Progress Meetings: Review GP sustainability requirements with project team including contractor and sub-contractor representatives. Demonstrate GP documentation is being collected and

updated to the Sustainability eNotebook.

(1) For TPC that include on-site visit by third party representative, execute, coordinate, and facilitate the visit.

(2) Facility Turnover Meetings: Review Sustainability eNotebook for completeness and identify any outstanding issues relating to final documentation requirements.

(3) Final Sustainability eNotebook Review

3.2 TABLE 3-1 VOLATILE ORGANIC COMPOUNDS (VOC) (LOW EMITTING MATERIALS) REQUIREMENTS

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements Source: ASHRAE 189.1 section 8.4.2 (Materials)(Interior Applications Only)				
MATERIAL CATEGORY	**EMISSIONS REQUIREMENT**		**MATERIALS WITH ADDED VOC REQUIREMENT**	**MATERIAL CATEGORY**
Adhesives and Sealants	**CDPH/EHLB/Standard method V1.1 (California Section 01350)** (Use "office" or "classroom" space limits for all applications)	or	Adhesives (carpet, resilient, wood flooring; panel; primers) Sealants (acoustical; firestop; HVAC Air duct; primers) Caulks	**SCAQMD Rule 1168** (Use "other" category for HVAC duct sealant) (for firestop adhesive, UFC 3-600-01 overrides conflicting requirements)
			Aerosol adhesives	**Section 3 of Green Seal Standard GS-36** (except: cleaners, solvent cements, and primers used with plastic piping and conduit in plumbing, fire suppression, and electrical systems; HVAC air duct sealants when the application space air temp is less than 40 F (4.5 C).
Paints and Coatings	**CDPH/EHLB/Standard method V1.1 (California Section 01350)** (Use "office" or "classroom" space limits for all applications)	or	Flat and nonflat topcoats, primers, undercoaters, and anti-corrosive coatings	**Green Seal Standard GS-11**

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

Source: ASHRAE 189.1 section 8.4.2 (Materials)(Interior Applications Only)

MATERIAL CATEGORY	**EMISSIONS REQUIREMENT**		**MATERIALS WITH ADDED VOC REQUIREMENT**	**MATERIAL CATEGORY**
Paints and Coatings	**CDPH/EHLB/Standard method V1.1 (California Section 01350)** (Use "office" or "classroom" space limits for all applications)	or	Concrete/masonry sealers (waterproofing concrete/masonry sealers), concrete curing compounds, dry fog coatings, faux finishing coatings, fire resistive coatings, floor coatings, graphic arts (sign) coatings, industrial maintenance coatings, mastic texture coatings, metallic pigmented coatings, multicolor coatings, pretreatment wash primers, reactive penetrating sealers, recycled coatings, shellacs (clear and opaque), specialty primers, stains, wood coatings (clear wood finishes), wood preservatives, and zinc primers	**California Air Resources Board (CARB) Suggested Control Measure for Architectural Coatings** or **SCAQMD Rule 1113**

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

Source: ASHRAE 189.1 section 8.4.2 (Materials)(Interior Applications Only)

MATERIAL CATEGORY	**EMISSIONS REQUIREMENT**		**MATERIALS WITH ADDED VOC REQUIREMENT**	**MATERIAL CATEGORY**
Paints and Coatings	**CDPH/EHLB/Standard method V1.1 (California Section 01350)** (Use "office" or "classroom" space limits for all applications)	or	Basement specialty coatings, high-temperature coatings, low solids coatings, stone consolidants, swimming-pool coatings, tub- and tile-refining coatings, and waterproofing membranes	**California Air Resources Board (CARB) Suggested Control Measure for Architectural Coatings**
Floor Covering Materials	For carpet, all locations: **CDPH/EHLB/Standard Method V1.1 (California Section 01350)** or label for **Section 9** of **CDPH/EHLB/Standard Method V1.1 (California Section 01350)**		none	none

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

Source: ASHRAE 189.1 section 8.4.2 (Materials)(Interior Applications Only)

MATERIAL CATEGORY	**EMISSIONS REQUIREMENT**		**MATERIALS WITH ADDED VOC REQUIREMENT**	**MATERIAL CATEGORY**
Composite Wood, Wood Structural Panel, and Agrifiber Products particleboard medium density fiberboard (MDF) wheatboard strawboard panel substrates door cores **no added urea-formaldehyde resins** including laminating adhesives for composite wood and agrifiber assemblies	Third-party certification (approved by CARB) of **California Air Resource Board's (CARB) regulation** Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products		none	none
	CDPH/EHLB/Standard method V1.1 (California Section 01350) (Use "office" or "classroom" space limits for all applications) (except: Structural panel components such as plywood, particle board, wafer board, and oriented strand board identified as "EXPOSURE 1," "EXTERIOR," or "HUD-APPROVED" are considered acceptable for interior use.)			

TABLE 3-1 Volatile Organic Compounds (VOC) (Low Emitting Materials) Requirements

Source: ASHRAE 189.1 section 8.4.2 (Materials)(Interior Applications Only)

MATERIAL CATEGORY	**EMISSIONS REQUIREMENT**		**MATERIALS WITH ADDED VOC REQUIREMENT**	**MATERIAL CATEGORY**
Office Furniture Systems and Seating installed prior to occupancy	**ANSI/BIFMA X7.1 ANSI/BIFMA X7.1:** (95 percent of installed office furniture system workstations and seating units) **Section 7.6.2 of ANSI/BIFMA e3** (50 percent of office furniture system workstations and seating units)		none	none
Ceiling and Wall Systems ceiling and wall insulation acoustical ceiling panels tackable wall panels gypsum wall board and panels wall coverings	**CDPH/EHLB/Standard method V1.1 (California Section 01350)** (Use "office" or "classroom" space limits for all applications)		none	none

-- End of Section --

SECTION 01 35 26

GOVERNMENTAL SAFETY REQUIREMENTS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B30.3	(2016) Tower Cranes
ASME B30.5	(2018) Mobile and Locomotive Cranes
ASME B30.7	(2011) Winches
ASME B30.9	(2018) Slings
ASME B30.20	(2018) Below-the-Hook Lifting Devices
ASME B30.22	(2016) Articulating Boom Cranes
ASME B30.23	(2011) Personnel Lifting Systems Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings
ASME B30.26	(2015; INT Jun 2010 - Jun 2014) Rigging Hardware

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP A10.22	(2007; R 2017) Safety Requirements for Rope-Guided and Non-Guided Workers' Hoists
ASSP A10.34	(2001; R 2012) Protection of the Public on or Adjacent to Construction Sites
ASSP A10.44	(2014) Control of Energy Sources (Lockout/Tagout) for Construction and Demolition Operations
ASSP Z244.1	(2016) The Control of Hazardous Energy Lockout, Tagout and Alternative Methods
ASSP Z359.0	(2012) Definitions and Nomenclature Used for Fall Protection and Fall Arrest
ASSP Z359.1	(2016) The Fall Protection Code
ASSP Z359.2	(2017) Minimum Requirements for a Comprehensive Managed Fall Protection Program

ASSP Z359.3	(2017) Safety Requirements for Lanyards and Positioning Lanyards
ASSP Z359.4	(2013) Safety Requirements for Assisted-Rescue and Self-Rescue Systems, Subsystems and Components
ASSP Z359.6	(2016) Specifications and Design Requirements for Active Fall Protection Systems
ASSP Z359.7	(2011) Qualification and Verification Testing of Fall Protection Products
ASSP Z359.11	(2014) Safety Requirements for Full Body Harnesses
ASSP Z359.12	(2009) Connecting Components for Personal Fall Arrest Systems
ASSP Z359.13	(2013) Personal Energy Absorbers and Energy Absorbing Lanyards
ASSP Z359.14	(2014) Safety Requirements for Self-Retracting Devices for Personal Fall Arrest and Rescue Systems
ASSP Z359.15	(2014) Safety Requirements for Single Anchor Lifelines and Fall Arresters for Personal Fall Arrest Systems
ASSP Z359.16	(2016) Safety Requirements for Climbing Ladder Fall Arrest Systems
ASSP Z359.18	(2017) Safety Requirements for Anchorage Connectors for Active Fall Protection Systems

ASTM INTERNATIONAL (ASTM)

ASTM F855	(2015) Standard Specifications for Temporary Protective Grounds to Be Used on De-energized Electric Power Lines and Equipment

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 1048	(2003) Guide for Protective Grounding of Power Lines
IEEE C2	(2017; Errata 1-2 2017; INT 1 2017) National Electrical Safety Code

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 10	(2018; TIA 18-1) Standard for Portable Fire Extinguishers
NFPA 51B	(2014) Standard for Fire Prevention During

	Welding, Cutting, and Other Hot Work
NFPA 70	(2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA 20-1; TIA 20-2; TIA 20-3; TIA 20-4) National Electrical Code
NFPA 70E	(2018; TIA 18-1; TIA 81-2) Standard for Electrical Safety in the Workplace
NFPA 241	(2019) Standard for Safeguarding Construction, Alteration, and Demolition Operations
NFPA 306	(2019) Standard for the Control of Gas Hazards on Vessels

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

TIA-222	(2005G; Add 1 2007; Add 2 2009; Add 3 2014; Add 4 2014; R 2014; R 2016) Structural Standards for Steel Antenna Towers and Antenna Supporting Structures
TIA-1019	(2012; R 2016) Standard for Installation, Alteration and Maintenance of Antenna Supporting Structures and Antennas

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

10 CFR 20	Standards for Protection Against Radiation
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.146	Permit-required Confined Spaces
29 CFR 1910.147	The Control of Hazardous Energy (Lock Out/Tag Out)
29 CFR 1910.333	Selection and Use of Work Practices
29 CFR 1915	Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment
29 CFR 1915.89	Control of Hazardous Energy (Lockout/Tags-Plus)
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.16	Rules of Construction
29 CFR 1926.450	Scaffolds

29 CFR 1926.500	Fall Protection
29 CFR 1926.552	Material Hoists, Personal Hoists, and Elevators
29 CFR 1926.553	Base-Mounted Drum Hoists
29 CFR 1926.1400	Cranes and Derricks in Construction
49 CFR 173	Shippers - General Requirements for Shipments and Packagings
CPL 02-01-056	(2014) Inspection Procedures for Accessing Communication Towers by Hoist
CPL 2.100	(1995) Application of the Permit-Required Confined Spaces (PRCS) Standards, 29 CFR 1910.146

1.2 DEFINITIONS

1.2.1 Competent Person (CP)

The CP is a person designated in writing, who, through training, knowledge and experience, is capable of identifying, evaluating, and addressing existing and predictable hazards in the working environment or working conditions that are dangerous to personnel, and who has authorization to take prompt corrective measures with regards to such hazards.

1.2.2 Competent Person, Confined Space

The CP, Confined Space, is a person meeting the competent person requirements as defined EM 385-1-1 Appendix Q, with thorough knowledge of OSHA’s Confined Space Standard, 29 CFR 1910.146, and designated in writing to be responsible for the immediate supervision, implementation and monitoring of the confined space program, who through training, knowledge and experience in confined space entry is capable of identifying, evaluating and addressing existing and potential confined space hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.3 Competent Person, Cranes and Rigging

The CP, Cranes and Rigging, as defined in EM 385-1-1 Appendix Q, is a person meeting the competent person, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the Crane and Rigging Program, who through training, knowledge and experience in crane and rigging is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.4 Competent Person, Excavation/Trenching

A CP, Excavation/Trenching, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and 29 CFR 1926, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the excavation/trenching program, who through training, knowledge and experience in excavation/trenching is capable of identifying, evaluating and addressing existing and potential

hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.5 Competent Person, Fall Protection

The CP, Fall Protection, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and in accordance with ASSP Z359.0, who has been designated in writing by the employer to be responsible for immediate supervising, implementing and monitoring of the fall protection program, who through training, knowledge and experience in fall protection and rescue systems and equipment, is capable of identifying, evaluating and addressing existing and potential fall hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.6 Competent Person, Scaffolding

The CP, Scaffolding is a person meeting the competent person requirements in EM 385-1-1 Appendix Q, and designated in writing by the employer to be responsible for immediate supervising, implementing and monitoring of the scaffolding program. The CP for Scaffolding has enough training, knowledge and experience in scaffolding to correctly identify, evaluate and address existing and potential hazards and also has the authority to take prompt corrective measures with regard to these hazards. CP qualifications must be documented and include experience on the specific scaffolding systems/types being used, assessment of the base material that the scaffold will be erected upon, load calculations for materials and personnel, and erection and dismantling. The CP for scaffolding must have a documented, minimum of 8-hours of scaffold training to include training on the specific type of scaffold being used (e.g. mast-climbing, adjustable, tubular frame), in accordance with EM 385-1-1 Section 22.B.02.

1.2.7 Competent Person (CP) Trainer

A competent person trainer as defined in EM 385-1-1 Appendix Q, who is qualified in the training material presented, and who possesses a working knowledge of applicable technical regulations, standards, equipment and systems related to the subject matter on which they are training Competent Persons. A competent person trainer must be familiar with the typical hazards and the equipment used in the industry they are instructing. The training provided by the competent person trainer must be appropriate to that specific industry. The competent person trainer must evaluate the knowledge and skills of the competent persons as part of the training process.

1.2.8 High Risk Activities

High Risk Activities are activities that involve work at heights, crane and rigging, excavations and trenching, scaffolding, electrical work, and confined space entry.

1.2.9 High Visibility Accident

A High Visibility Accident is any mishap which may generate publicity or high visibility.

1.2.10 Load Handling Equipment (LHE)

LHE is a term used to describe cranes, hoists and all other hoisting

equipment (hoisting equipment means equipment, including crane, derricks, hoists and power operated equipment used with rigging to raise, lower or horizontally move a load).

1.2.11 Medical Treatment

Medical Treatment is treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even when provided by a physician or registered personnel.

1.2.12 Near Miss

A Near Miss is a mishap resulting in no personal injury and zero property damage, but given a shift in time or position, damage or injury may have occurred (e.g., a worker falls off a scaffold and is not injured; a crane swings around to move the load and narrowly misses a parked vehicle).

1.2.13 Operating Envelope

The Operating Envelope is the area surrounding any crane or load handling equipment. Inside this "envelope" is the crane, the operator, riggers and crane walkers, other personnel involved in the operation, rigging gear between the hook, the load, the crane's supporting structure (i.e. ground or rail), the load's rigging path, the lift and rigging procedure.

1.2.14 Qualified Person (QP)

The QP is a person designated in writing, who, by possession of a recognized degree, certificate, or professional standing, or extensive knowledge, training, and experience, has successfully demonstrated their ability to solve or resolve problems related to the subject matter, the work, or the project.

1.2.15 Qualified Person, Fall Protection (QP for FP)

A QP for FP is a person meeting the definition requirements of EM 385-1-1 Appendix Q, and ASSP Z359.2 standard, having a recognized degree or professional certificate and with extensive knowledge, training and experience in the fall protection and rescue field who is capable of designing, analyzing, and evaluating and specifying fall protection and rescue systems.

1.2.16 USACE Property and Equipment

Interpret "USACE" property and equipment specified in USACE EM 385-1-1 as Government property and equipment.

1.2.17 Load Handling Equipment (LHE) Accident or Load Handling Equipment Mishap

A LHE accident occurs when any one or more of the eight elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in personnel injury or death; material or equipment damage; dropped load; derailment; two-blocking; overload; or collision, including unplanned contact between the load, crane, or other objects. A dropped load, derailment, two-blocking, overload and collision are considered accidents, even though no material damage or injury occurs. A component failure (e.g., motor

burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped load, or roll over).

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Accident Prevention Plan (APP); G

SD-06 Test Reports

Monthly Exposure Reports

Notifications and Reports

Accident Reports; G

LHE Inspection Reports

SD-07 Certificates

Crane Operators/Riggers

Standard Lift Plan; G

Critical Lift Plan ; G

Activity Hazard Analysis (AHA)

Confined Space Entry Permit

Hot Work Permit

Certificate of Compliance

License Certificates

Radiography Operation Planning Work Sheet; G

Portable Gauge Operations Planning Worksheet; G

1.4 MONTHLY EXPOSURE REPORTS

Provide a Monthly Exposure Report and attach to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both Prime and subcontractor. Failure to submit the report may result in retention of up to 10 percent of the voucher.

1.5 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this contract, comply with the most recent edition of USACE EM 385-1-1, and the following federal, state, and local laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements govern.

1.6 SITE QUALIFICATIONS, DUTIES, AND MEETINGS

1.6.1 Personnel Qualifications

1.6.1.1 Site Safety and Health Officer (SSHO)

Provide an SSHO that meets the requirements of EM 385-1-1 Section 1. The SSHO must ensure that the requirements of 29 CFR 1926.16 are met for the project. Provide a Safety oversight team that includes a minimum of one (1) person at each project site to function as the Site Safety and Health Officer (SSHO). The SSHO or an equally-qualified Alternate SSHO must be at the work site at all times to implement and administer the Contractor's safety program and government-accepted Accident Prevention Plan. The SSHO and Alternate SSHO must have the required training, experience, and qualifications in accordance with EM 385-1-1 Section 01.A.17, and all associated sub-paragraphs.

If the SSHO is off-site for a period longer than 24 hours, an equally-qualified alternate SSHO must be provided and must fulfill the same roles and responsibilities as the primary SSHO. When the SSHO is temporarily (up to 24 hours) off-site, a Designated Representative (DR), as identified in the AHA may be used in lieu of an Alternate SSHO, and must be on the project site at all times when work is being performed. Note that the DR is a collateral duty safety position, with safety duties in addition to their full time occupation.

1.6.1.1.1 Additional Site Safety and Health Officer (SSHO) Requirements and Duties

The SSHO may also serve as the Quality Control Manager. The SSHO may also serve as the Superintendent.

1.6.1.2 Competent Person Qualifications

Provide Competent Persons in accordance with EM 385-1-1, Appendix Q and herein. Competent Persons for high risk activities include confined space, cranes and rigging, excavation/trenching, fall protection, and electrical work. The CP for these activities must be designated in writing, and meet the requirements for the specific activity (i.e. competent person, fall protection).

The Competent Person identified in the Contractor's Safety and Health Program and accepted Accident Prevention Plan, must be on-site at all times when the work that presents the hazards associated with their professional expertise is being performed. Provide the credentials of the Competent Persons(s) to the the Contracting Officer for information in consultation with the Safety Office.

1.6.1.2.1 Competent Person for Confined Space Entry

Provide a Confined Space (CP) Competent Person who meets the requirements of EM 385-1-1, Appendix Q, and herein. The CP for Confined Space Entry must supervise the entry into each confined space in accordance with EM 385-1-1, Section 34.

Since this work involves operations that handle combustible or hazardous materials, this person must have the ability to understand and follow through on the air sampling, Personal Protective Equipment (PPE), and instructions of a Marine Chemist, Coast Guard authorized persons, or Certified Industrial Hygienist. Confined space and enclosed space work must comply with NFPA 306, OSHA 29 CFR 1915, Subpart B, "Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment," or as applicable, 29 CFR 1910.147 for general industry.

1.6.1.2.2 Competent Person for Scaffolding

Provide a Competent Person for Scaffolding who meets the requirements of EM 385-1-1, Section 22.B.02 and herein.

1.6.1.2.3 Competent Person for Fall Protection

Provide a Competent Person for Fall Protection who meets the requirements of EM 385-1-1, Section 21.C.04, 21.B.03, and herein.

1.6.1.3 Qualified Trainer Requirements

Individuals qualified to instruct the 40 hour contract safety awareness course, or portions thereof, must meet the definition of a Competent Person Trainer, and, at a minimum, possess a working knowledge of the following subject areas: EM 385-1-1, Electrical Standards,Lockout/Tagout, Fall Protection, Confined Space Entry for Construction; Excavation, Trenching and Soil Mechanics, and Scaffolds in accordance with 29 CFR 1926.450, Subpart L.

Instructors are required to:

a. Prepare class presentations that cover construction-related safety requirements.

b. Ensure that all attendees attend all sessions by using a class roster signed daily by each attendee. Maintain copies of the roster for at least five (5) years. This is a certification class and must be attended 100 percent. In cases of emergency where an attendee cannot make it to a session, the attendee can make it up in another class session for the same subject.

c. Update training course materials whenever an update of the EM 385-1-1 becomes available.

d. Provide a written exam of at least 50 questions. Students are required to answer 80 percent correctly to pass.

e. Request, review and incorporate student feedback into a continuous course improvement program.

1.6.1.4 Crane Operators/Riggers

Provide Operators, Signal Persons, and Riggers meeting the requirements in EM 385-1-1, Section 15.B for Riggers and Section 16.B for Crane Operators and Signal Persons. Provide proof of current qualification.

1.6.2 Personnel Duties

1.6.2.1 Duties of the Site Safety and Health Officer (SSHO)

The SSHO must:

a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Attach safety inspection logs to the Contractors' daily production report.

b. Conduct mishap investigations and complete required accident reports. Report mishaps and near misses.

c. Use and maintain OSHA's Form 300 to log work-related injuries and illnesses occurring on the project site for Prime Contractors and subcontractors, and make available to the Contracting Officer upon request. Post and maintain the Form 300A on the site Safety Bulletin Board.

d. Maintain applicable safety reference material on the job site.

e. Attend the pre-construction conference, pre-work meetings including preparatory meetings, and periodic in-progress meetings.

f. Review the APP and AHAs for compliance with EM 385-1-1, and approve, sign, implement and enforce them.

g. Establish a Safety and Occupational Health (SOH) Deficiency Tracking System that lists and monitors outstanding deficiencies until resolution.

h. Ensure subcontractor compliance with safety and health requirements.

i. Maintain a list of hazardous chemicals on site and their material Safety Data Sheets (SDS).

j. Maintain a weekly list of high hazard activities involving energy, equipment, excavation, entry into confined space, and elevation, and be prepared to discuss details during QC Meetings.

k. Provide and keep a record of site safety orientation and indoctrination for Contractor employees, subcontractor employees, and site visitors.

Superintendent, QC Manager, and SSHO are subject to dismissal if the above duties are not being effectively carried out. If Superintendent, QC Manager, or SSHO are dismissed, project work will be stopped and will not be allowed to resume until a suitable replacement is approved and the above duties are again being effectively carried out.

1.6.3 Meetings

1.6.3.1 Preconstruction Conference

a. Contractor representatives who have a responsibility or significant role in accident prevention on the project must attend the preconstruction conference. This includes the project superintendent, Site Safety and Occupational Health officer, quality control manager, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).

b. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, and Government review of AHAs to preclude project delays.

c. Deficiencies in the submitted APP, identified during the Contracting Officer's review, must be corrected, and the APP re-submitted for review prior to the start of construction. Work is not permitted to begin until an APP is established that is acceptable to the Contracting Officer.

1.6.3.2 Safety Meetings

Conduct safety meetings to review past activities, plan for new or changed operations, review pertinent aspects of appropriate AHA (by trade), establish safe working procedures for anticipated hazards, and provide pertinent Safety and Occupational Health (SOH) training and motivation. Conduct meetings at least once a month for all supervisors on the project location. The SSHO, supervisors, foremen, or CDSOs must conduct meetings at least once a week for the trade workers. Document meeting minutes to include the date, persons in attendance, subjects discussed, and names of individual(s) who conducted the meeting. Maintain documentation on-site and furnish copies to the Contracting Officer on request. Notify the Contracting Officer of all scheduled meetings 7 calendar days in advance.

1.7 ACCIDENT PREVENTION PLAN (APP)

A qualified person must prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of EM 385-1-1, Appendix A, and as supplemented herein. Cover all paragraph and subparagraph elements in EM 385-1-1, Appendix A. The APP must be job-specific and address any unusual or unique aspects of the project or activity for which it is written. The APP must interface with the Contractor's overall safety and health program referenced in the APP in the applicable APP element, and made site-specific. Describe the methods to evaluate past safety performance of potential subcontractors in the selection process. Also, describe innovative methods used to ensure and monitor safe work practices of subcontractors. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other

crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP must be signed by an officer of the firm (Prime Contractor senior person), the individual preparing the APP, the on-site superintendent, the designated SSHO, the Contractor Quality Control Manager, and any designated Certified Safety Professional (CSP) or Certified Health Physicist (CIH). The SSHO must provide and maintain the APP and a log of signatures by each subcontractor foreman, attesting that they have read and understand the APP, and make the APP and log available on-site to the Contracting Officer. If English is not the foreman's primary language, the Prime Contractor must provide an interpreter.

Submit the APP to the Contracting Officer 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP. Once reviewed and accepted by the Contracting Officer, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP is cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified. Continuously review and amend the APP, as necessary, throughout the life of the contract. Changes to the accepted APP must be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and Quality Control Manager. Incorporate unusual or high-hazard activities not identified in the original APP as they are discovered. Should any severe hazard exposure (i.e. imminent danger) become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate and remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ASSP A10.34), and the environment.

1.7.1 Names and Qualifications

Provide plans in accordance with the requirements outlined in Appendix A of EM 385-1-1, including the following:

a. Names and qualifications (resumes including education, training, experience and certifications) of site safety and health personnel designated to perform work on this project to include the designated Site Safety and Health Officer and other competent and qualified personnel to be used. Specify the duties of each position.

b. Qualifications of competent and of qualified persons. As a minimum, designate and submit qualifications of competent persons for each of the following major areas: excavation; scaffolding; fall protection; hazardous energy; confined space; health hazard recognition, evaluation and control of chemical, physical and biological agents; and personal protective equipment and clothing to include selection, use and maintenance.

1.7.2 Plans

Provide plans in the APP in accordance with the requirements outlined in Appendix A of EM 385-1-1, including the following:

1.7.2.1 Confined Space Entry Plan

Develop a confined or enclosed space entry plan in accordance with

EM 385-1-1, applicable OSHA standards 29 CFR 1910, 29 CFR 1915, and 29 CFR 1926, OSHA Directive CPL 2.100, and any other federal, state and local regulatory requirements identified in this contract. Identify the qualified person's name and qualifications, training, and experience. Delineate the qualified person's authority to direct work stoppage in the event of hazardous conditions. Include procedure for rescue by contractor personnel and the coordination with emergency responders. (If there is no confined space work, include a statement that no confined space work exists and none will be created.)

1.7.2.2 Standard Lift Plan (SLP)

Plan lifts to avoid situations where the operator cannot maintain safe control of the lift. Prepare a written SLP in accordance with EM 385-1-1, Section 16.A.03, using Form 16-2 for every lift or series of lifts (if duty cycle or routine lifts are being performed). The SLP must be developed, reviewed and accepted by all personnel involved in the lift in conjunction with the associated AHA. Signature on the AHA constitutes acceptance of the plan. Maintain the SLP on the LHE for the current lift(s) being made. Maintain historical SLPs for a minimum of 3 months.

1.7.2.3 Critical Lift Plan - Crane or Load Handling Equipment

Provide a Critical Lift Plan as required by EM 385-1-1, Section 16.H.01, using Form 16-3. In addition, Critical Lift Plans are required for the following:

a. Lifts over 50 percent of the capacity of barge mounted mobile crane's hoist.

b. When working around energized power lines where the work will get closer than the minimum clearance distance in EM 385-1-1 Table 16-1.

c. For lifts with anticipated binding conditions.

d. When erecting cranes.

1.7.2.3.1 Critical Lift Plan Planning and Schedule

Critical lifts require detailed planning and additional or unusual safety precautions. Develop and submit a critical lift plan to the Contracting Officer 30 calendar days prior to critical lift. Comply with load testing requirements in accordance with EM 385-1-1, Section 16.F.03.

1.7.2.3.2 Lifts of Personnel

In addition to the requirements of EM 385-1-1, Section 16.H.02, for lifts of personnel, demonstrate compliance with the requirements of 29 CFR 1926.1400 and EM 385-1-1, Section 16.T.

1.7.2.4 Multi-Purpose Machines, Material Handling Equipment, and Construction Equipment Lift Plan

Multi-purpose machines, material handling equipment, and construction equipment used to lift loads that are suspended by rigging gear, require proof of authorization from the machine OEM that the machine is capable of making lifts of loads suspended by rigging equipment. Written approval from a qualified registered professional engineer, after a safety analysis is performed, is allowed in lieu of the OEM's approval. Demonstrate that

the operator is properly trained and that the equipment is properly configured to make such lifts and is equipped with a load chart.

1.7.2.5 Fall Protection and Prevention (FP&P) Plan

The plan must comply with the requirements of EM 385-1-1, Section 21.D and ASSP Z359.2, be site specific, and address all fall hazards in the work place and during different phases of construction. Address how to protect and prevent workers from falling to lower levels when they are exposed to fall hazards above 6 feet. A competent person or qualified person for fall protection must prepare and sign the plan documentation. Include fall protection and prevention systems, equipment and methods employed for every phase of work, roles and responsibilities, assisted rescue, self-rescue and evacuation procedures, training requirements, and monitoring methods. Review and revise, as necessary, the Fall Protection and Prevention Plan documentation as conditions change, but at a minimum every six months, for lengthy projects, reflecting any changes during the course of construction due to changes in personnel, equipment, systems or work habits. Keep and maintain the accepted Fall Protection and Prevention Plan documentation at the job site for the duration of the project. Include the Fall Protection and Prevention Plan documentation in the Accident Prevention Plan (APP).

1.7.2.6 Rescue and Evacuation Plan

Provide a Rescue and Evacuation Plan in accordance with EM 385-1-1 Section 21.N and ASSP Z359.2, and include in the FP&P Plan and as part of the APP. Include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility.

1.7.2.7 Hazardous Energy Control Program (HECP)

Develop a HECP in accordance with EM 385-1-1 Section 12, 29 CFR 1910.147, 29 CFR 1910.333, 29 CFR 1915.89, ASSP Z244.1, and ASSP A10.44. Submit this HECP as part of the Accident Prevention Plan (APP). Conduct a preparatory meeting and inspection with all effected personnel to coordinate all HECP activities. Document this meeting and inspection in accordance with EM 385-1-1, Section 12.A.02. Ensure that each employee is familiar with and complies with these procedures.

1.7.2.8 Excavation Plan

Identify the safety and health aspects of excavation, and provide and prepare the plan in accordance with EM 385-1-1, Section 25.A and Section 31 00 00 EARTHWORK.

1.7.2.9 Occupant Protection Plan

Identify the safety and health aspects of lead-based paint removal, prepared in accordance with Section 02 83 00 LEAD REMEDIATION.

1.7.2.10 Asbestos Hazard Abatement Plan

Identify the safety and health aspects of asbestos work, and prepare in accordance with Section 02 82 00 ASBESTOS REMEDIATION.

1.7.2.11 Site Demolition Plan

Identify the safety and health aspects, and prepare in accordance with Section 02 41 00 SELECTIVE DEMOLITION and referenced sources.

1.8 ACTIVITY HAZARD ANALYSIS (AHA)

Before beginning each activity, task or Definable Feature of Work (DFOW) involving a type of work presenting hazards not experienced in previous project operations, or where a new work crew or subcontractor is to perform the work, the Contractor(s) performing that work activity must prepare an AHA. AHAs must be developed by the Prime Contractor, subcontractor, or supplier performing the work, and provided for Prime Contractor review and approval before submitting to the Contracting Officer. AHAs must be signed by the SSHO, Superintendent, QC Manager and the subcontractor Foreman performing the work. Format the AHA in accordance with EM 385-1-1, Section 1 or as directed by the Contracting Officer. Submit the AHA for review at least 15 working days prior to the start of each activity task, or DFOW. The Government reserves the right to require the Contractor to revise and resubmit the AHA if it fails to effectively identify the work sequences, specific anticipated hazards, site conditions, equipment, materials, personnel and the control measures to be implemented.

AHAs must identify competent persons required for phases involving high risk activities, including confined entry, crane and rigging, excavations, trenching, electrical work, fall protection, and scaffolding.

1.8.1 AHA Management

Review the AHA list periodically (at least monthly) at the Contractor supervisory safety meeting, and update as necessary when procedures, scheduling, or hazards change. Use the AHA during daily inspections by the SSHO to ensure the implementation and effectiveness of the required safety and health controls for that work activity.

1.8.2 AHA Signature Log

Each employee performing work as part of an activity, task or DFOW must review the AHA for that work and sign a signature log specifically maintained for that AHA prior to starting work on that activity. The SSHO must maintain a signature log on site for every AHA. Provide employees whose primary language is other than English, with an interpreter to ensure a clear understanding of the AHA and its contents.

1.9 DISPLAY OF SAFETY INFORMATION

1.9.1 Safety Bulletin Board

Within one calendar day(s) after commencement of work, erect a safety bulletin board at the job site. Where size, duration, or logistics of project do not facilitate a bulletin board, an alternative method, acceptable to the Contracting Officer, that is accessible and includes all mandatory information for employee and visitor review, may be deemed as meeting the requirement for a bulletin board. Include and maintain information on safety bulletin board as required by EM 385-1-1, Section 01.A.07. Additional items required to be posted include:

a. Confined space entry permit.

b. Hot work permit.

1.9.2 Safety and Occupational Health (SOH) Deficiency Tracking System

Establish a SOH deficiency tracking system that lists and monitors the status of SOH deficiencies in chronological order. Use the tracking system to evaluate the effectiveness of the APP. A monthly evaluation of the data must be discussed in the QC or SOH meeting with everyone on the project. The list must be posted on the project bulletin board and updated daily, and provide the following information:

a. Date deficiency identified;

b. Description of deficiency;

c. Name of person responsible for correcting deficiency;

d. Projected resolution date;

e. Date actually resolved.

1.10 SITE SAFETY REFERENCE MATERIALS

Maintain safety-related references applicable to the project, including those listed in paragraph REFERENCES. Maintain applicable equipment manufacturer's manuals.

1.11 EMERGENCY MEDICAL TREATMENT

Contractors must arrange for their own emergency medical treatment in accordance with EM 385-1-1. Government has no responsibility to provide emergency medical treatment.

1.12 NOTIFICATIONS and REPORTS

1.12.1 Mishap Notification

Notify the Contracting Officer as soon as practical, but no more than twenty-four hours, after any mishaps, including recordable accidents, incidents, and near misses, as defined in EM 385-1-1 Appendix Q, any report of injury, illness, or any property damage. For LHE or rigging mishaps, notify the Contracting Officer as soon as practical but not more than 4 hours after mishap. The Contractor is responsible for obtaining appropriate medical and emergency assistance and for notifying fire, law enforcement, and regulatory agencies. Immediate reporting is required for electrical mishaps, to include Arc Flash; shock; uncontrolled release of hazardous energy (includes electrical and non-electrical); load handling equipment or rigging; fall from height (any level other than same surface); and underwater diving. These mishaps must be investigated in depth to identify all causes and to recommend hazard control measures.

Within notification include Contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (for example, type of construction equipment used and PPE used). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted. Assist and cooperate fully with the Government's

investigation(s) of any mishap.

1.12.2 Accident Reports

a. Conduct an accident investigation for recordable injuries and illnesses, property damage, and near misses as defined in EM 385-1-1, to establish the root cause(s) of the accident. The Contracting Officer will provide copies of any required or special forms.

b. Near Misses: Near miss reports are considered positive and proactive Contractor safety management actions.

1.12.3 LHE Inspection Reports

Submit LHE inspection reports required in accordance with EM 385-1-1 and as specified herein with Daily Reports of Inspections.

1.12.4 Certificate of Compliance and Pre-lift Plan/Checklist for LHE and Rigging

Provide a FORM 16-1 Certificate of Compliance for LHE entering an activity under this contract and in accordance with EM 385-1-1. Post certifications on the crane.

Develop a Standard Lift Plan (SLP) in accordance with EM 385-1-1, Section 16.H.03 using Form 16-2 Standard Pre-Lift Crane Plan/Checklist for each lift planned. Submit SLP to the Contracting Officer for approval within 15 calendar days in advance of planned lift.

1.13 HOT WORK

1.13.1 Permit and Personnel Requirements

Submit and obtain a written permit prior to performing "Hot Work" (i.e. welding or cutting) or operating other flame-producing/spark producing devices, from the Fire Department. A permit is required from the Explosives Safety Office for work in and around where explosives are processed, stored, or handled. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. Provide at least two 20 pound 4A:20 BC rated extinguishers for normal "Hot Work". The extinguishers must be current inspection tagged, and contain an approved safety pin and tamper resistant seal. It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity. The Fire Watch must be trained in accordance with NFPA 51B and remain on-site for a minimum of one hour after completion of the task or as specified on the hot work permit.

When starting work in the facility, require personnel to familiarize themselves with the location of the nearest fire alarm boxes and place in memory the emergency Fire Department phone number. REPORT ANY FIRE, NO MATTER HOW SMALL, TO THE RESPONSIBLE FIRE DEPARTMENT IMMEDIATELY.

1.13.2 Work Around Flammable Materials

Obtain permit approval from a NFPA Certified Marine Chemist for "HOT WORK" within or around flammable materials (such as fuel systems or welding/cutting on fuel pipes) or confined spaces (such as sewer wet wells, manholes, or vaults) that have the potential for flammable or explosive atmospheres.

Whenever these materials, except beryllium and chromium (VI), are encountered in indoor operations, local mechanical exhaust ventilation systems that are sufficient to reduce and maintain personal exposures to within acceptable limits must be used and maintained in accordance with manufacturer's instruction and supplemented by exceptions noted in EM 385-1-1, Section 06.H

1.14 RADIATION SAFETY REQUIREMENTS

Submit License Certificates, employee training records, and Leak Test Reports for radiation materials and equipment to the Contracting Officer and Radiation Safety Office (RSO)for all specialized and licensed material and equipment proposed for use on the construction project (excludes portable machine sources of ionizing radiation including moisture density and X-Ray Fluorescence (XRF)). Maintain on-site records whenever licensed radiological materials or ionizing equipment are on government property.

Protect workers from radiation exposure in accordance with 10 CFR 20, ensuring any personnel exposures are maintained As Low As Reasonably Achievable.

1.14.1 Radiography Operation Planning Work Sheet

Submit a Gamma and X-Ray Radiography Operation Planning Work Sheet to Contracting Officer 14 days prior to commencement of operations involving radioactive materials or radiation generating devices. For portable machine sources of ionizing radiation, including moisture density and XRF, use and submit the Portable Gauge Operations Planning Worksheet instead. The Contracting Officer will review the submitted worksheet and provide questions and comments.

Contractors must use primary dosimeters process by a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory.

1.14.2 Site Access and Security

Coordinate site access and security requirements with the Contracting Officer for all radiological materials and equipment containing ionizing radiation that are proposed for use on a government facility. For gamma radiography materials and equipment, a Government escort is required for any travels on the Installation. The Government authorized representative will meet the Contractor at a designated location outside the Installation, ensure safety of the materials being transported, and will escort the Contractor for gamma sources onto the Installation, to the job site, and off the Installation. For portable machine sources of ionizing radiation, including moisture density and XRF, the Government authorized representative will meet the Contractor at the job site.

Provide a copy of all calibration records, and utilization records for radiological operations performed on the site.

1.14.3 Loss or Release and Unplanned Personnel Exposure

Loss or release of radioactive materials, and unplanned personnel exposures must be reported immediately to the Contracting Officer, RSO, and Base Security Department Emergency Number.

1.14.4 Site Demarcation and Barricade

Properly demark and barricade an area surrounding radiological operations to preclude personnel entrance, in accordance with EM 385-1-1, Nuclear Regulatory Commission, and Applicable State regulations and license requirements, and in accordance with requirements established in the accepted Radiography Operation Planning Work Sheet.

Do not close or obstruct streets, walks, and other facilities occupied and used by the Government without written permission from the Contracting Officer.

1.14.5 Security of Material and Equipment

Properly secure the radiological material and ionizing radiation equipment at all times, including keeping the devices in a properly marked and locked container, and secondarily locking the container to a secure point in the Contractor's vehicle or other approved storage location during transportation and while not in use. While in use, maintain a continuous visual observation on the radiological material and ionizing radiation equipment. In instances where radiography is scheduled near or adjacent to buildings or areas having limited access or one-way doors, make no assumptions as to building occupancy. Where necessary, the Contracting Officer will direct the Contractor to conduct an actual building entry, search, and alert. Where removal of personnel from such a building cannot be accomplished and it is otherwise safe to proceed with the radiography, position a fully instructed employee inside the building or area to prevent exiting while external radiographic operations are in process.

1.14.6 Transportation of Material

Comply with 49 CFR 173 for Transportation of Regulated Amounts of Radioactive Material. Notify Local Fire authorities and the site Radiation Safety officer (RSO) of any Radioactive Material use.

1.14.7 Schedule for Exposure or Unshielding

Actual exposure of the radiographic film or unshielding the source must not be initiated until after 5 p.m. on weekdays.

1.14.8 Transmitter Requirements

Adhere to the base policy concerning the use of transmitters, such as radios and cell phones. Obey Emissions control (EMCON) restrictions.

1.15 CONFINED SPACE ENTRY REQUIREMENTS

Confined space entry must comply with Section 34 of EM 385-1-1, OSHA 29 CFR 1926, OSHA 29 CFR 1910, OSHA 29 CFR 1910.146, and OSHA Directive CPL 2.100. Any potential for a hazard in the confined space requires a permit system to be used.

1.15.1 Entry Procedures

Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented. Comply with EM 385-1-1, Section 34 for entry procedures.

Hazards pertaining to the space must be reviewed with each employee during review of the AHA.

1.15.2 Forced Air Ventilation

Forced air ventilation is required for all confined space entry operations and the minimum air exchange requirements must be maintained to ensure exposure to any hazardous atmosphere is kept below its action level.

1.15.3 Sewer Wet Wells

Sewer wet wells require continuous atmosphere monitoring with audible alarm for toxic gas detection.

1.15.4 Rescue Procedures and Coordination with Local Emergency Responders

Develop and implement an on-site rescue and recovery plan and procedures. The rescue plan must not rely on local emergency responders for rescue from a confined space.

1.16 SEVERE STORM PLAN

In the event of a severe storm warning, the Contractor must:

a. Secure outside equipment and materials and place materials that could be damaged in protected areas.

b. Check surrounding area, including roof, for loose material, equipment, debris, and other objects that could be blown away or against existing facilities.

c. Ensure that temporary erosion controls are adequate.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 CONSTRUCTION AND OTHER WORK

Comply with EM 385-1-1, NFPA 70, NFPA 70E, NFPA 241, the APP, the AHA, Federal and State OSHA regulations, and other related submittals and activity fire and safety regulations. The most stringent standard prevails.

PPE is governed in all areas by the nature of the work the employee is performing. Use personal hearing protection at all times in designated noise hazardous areas or when performing noise hazardous tasks. Safety glasses must be worn or carried/available on each person. Mandatory PPE includes:

a. Hard Hat

b. Long Pants

c. Appropriate Safety Shoes

d. Appropriate Class Reflective Vests

3.1.1 Worksite Communication

Employees working alone in a remote location or away from other workers must be provided an effective means of emergency communications (i.e., cellular phone, two-way radios, land-line telephones or other acceptable means). The selected communication must be readily available (easily within the immediate reach) of the employee and must be tested prior to the start of work to verify that it effectively operates in the area/environment. An employee check-in/check-out communication procedure must be developed to ensure employee safety.

3.1.2 Hazardous Material Exclusions

Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with EM 385-1-1 such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocyanates, lead-based paint, and hexavalent chromium, are prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials. Low mercury lamps used within fluorescent lighting fixtures are allowed as an exception without further Contracting Officer approval. Notify the Radiation Safety Officer (RSO) prior to excepted items of radioactive material and devices being brought on base.

3.1.3 Unforeseen Hazardous Material

Contract documents identify materials such as PCB, lead paint, and friable and non-friable asbestos and other OSHA regulated chemicals (i.e. 29 CFR Part 1910.1000). If material(s) that may be hazardous to human health upon disturbance are encountered during construction operations, stop that portion of work and notify the Contracting Officer immediately. Within 14 calendar days the Government will determine if the material is hazardous. If material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification pursuant to FAR 52.243-4 Changes and FAR 52.236-2 Differing Site Conditions.

3.2 UTILITY OUTAGE REQUIREMENTS

Apply for utility outages at least 5 days in advance. At a minimum, the written request must include the location of the outage, utilities being affected, duration of outage, any necessary sketches, and a description of the means to fulfill energy isolation requirements in accordance with EM 385-1-1, Section 11.A.02 (Isolation). Some examples of energy isolation devices and procedures are highlighted in EM 385-1-1, Section 12.D. In accordance with EM 385-1-1, Section 12.A.01, where outages involve Government or Utility personnel, coordinate with the Government on all activities involving the control of hazardous energy.

These activities include, but are not limited to, a review of HECP and HEC procedures, as well as applicable Activity Hazard Analyses (AHAs). In accordance with EM 385-1-1, Section 11.A.02 and NFPA 70E, work on energized electrical circuits must not be performed without prior government authorization. Government permission is considered through the permit process and submission of a detailed AHA. Energized work permits are

considered only when de-energizing introduces additional or increased hazard or when de-energizing is infeasible.

3.3 OUTAGE COORDINATION MEETING

After the utility outage request is approved and prior to beginning work on the utility system requiring shut-down, conduct a pre-outage coordination meeting in accordance with EM 385-1-1, Section 12.A. This meeting must include the Prime Contractor, the Prime and subcontractors performing the work, the Contracting Officer, the Installation representative and the Public Utilities representative. All parties must fully coordinate HEC activities with one another. During the coordination meeting, all parties must discuss and coordinate on the scope of work, HEC procedures (specifically, the lock-out/tag-out procedures for worker and utility protection), the AHA, assurance of trade personnel qualifications, identification of competent persons, and compliance with HECP training in accordance with EM 385-1-1, Section 12.C. Clarify when personal protective equipment is required during switching operations, inspection, and verification.

3.4 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

Provide and operate a Hazardous Energy Control Program (HECP) in accordance with EM 385-1-1 Section 12, 29 CFR 1910.333, 29 CFR 1915.89, ASSP A10.44, NFPA 70E, and paragraph HAZARDOUS ENERGY CONTROL PROGRAM (HECP).

3.4.1 Safety Preparatory Inspection Coordination Meeting with the Government or Utility

For electrical distribution equipment that is to be operated by Government or Utility personnel, the Prime Contractor and the subcontractor performing the work must attend the safety preparatory inspection coordination meeting, which will also be attended by the Contracting Officer's Representative, and required by EM 385-1-1, Section 12.A.02. The meeting will occur immediately preceding the start of work and following the completion of the outage coordination meeting. Both the safety preparatory inspection coordination meeting and the outage coordination meeting must occur prior to conducting the outage and commencing with lockout/tagout procedures.

3.4.2 Lockout/Tagout Isolation

Where the Government or Utility performs equipment isolation and lockout/tagout, the Contractor must place their own locks and tags on each energy-isolating device and proceed in accordance with the HECP. Before any work begins, both the Contractor and the Government or Utility must perform energy isolation verification testing while wearing required PPE detailed in the Contractor's AHA and required by EM 385-1-1, Sections 05.I and 11.B. Install personal protective grounds, with tags, to eliminate the potential for induced voltage in accordance with EM 385-1-1, Section 12.E.06.

3.4.3 Lockout/Tagout Removal

Upon completion of work, conduct lockout/tagout removal procedure in accordance with the HECP. In accordance with EM 385-1-1, Section 12.E.08, each lock and tag must be removed from each energy isolating device by the authorized individual or systems operator who applied the device. Provide formal notification to the Government (by completing the Government form if

provided by Contracting Officer's Representative), confirming that steps of de-energization and lockout/tagout removal procedure have been conducted and certified through inspection and verification. Government or Utility locks and tags used to support the Contractor's work will not be removed until the authorized Government employee receives the formal notification.

3.5 FALL PROTECTION PROGRAM

Establish a fall protection program, for the protection of all employees exposed to fall hazards. Within the program include company policy, identify roles and responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and evacuation procedures in accordance with ASSP Z359.2 and EM 385-1-1, Sections 21.A and 21.D.

3.5.1 Training

Institute a fall protection training program. As part of the Fall Protection Program, provide training for each employee who might be exposed to fall hazards and using personal fall protection equipment. Provide training by a competent person for fall protection in accordance with EM 385-1-1, Section 21.C. Document training and practical application of the competent person in accordance with EM 385-1-1, Section 21.C.04 and ASSP Z359.2 in the AHA.

3.5.2 Fall Protection Equipment and Systems

Enforce use of personal fall protection equipment and systems designated (to include fall arrest, restraint, and positioning) for each specific work activity in the Site Specific Fall Protection and Prevention Plan and AHA at all times when an employee is exposed to a fall hazard. Protect employees from fall hazards as specified in EM 385-1-1, Section 21.

Provide personal fall protection equipment, systems, subsystems, and components that comply with EM 385-1-1 Section 21.I, 29 CFR 1926.500 Subpart M,ASSP Z359.0, ASSP Z359.1, ASSP Z359.2, ASSP Z359.3, ASSP Z359.4, ASSP Z359.6, ASSP Z359.7, ASSP Z359.11, ASSP Z359.12, ASSP Z359.13, ASSP Z359.14, ASSP Z359.15, ASSP Z359.16 and ASSP Z359.18.

3.5.2.1 Additional Personal Fall Protection Measures

In addition to the required fall protection systems, other protective measures such as safety skiffs, personal floatation devices, and life rings, are required when working above or next to water in accordance with EM 385-1-1, Sections 21.O through 21.O.06. Personal fall protection systems and equipment are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall protection systems are required when operating other equipment such as scissor lifts. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, travel, or while performing work.

3.5.2.2 Personal Fall Protection Equipment

Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. The use of body belts is not acceptable. Harnesses must have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and

specifically designated for attachment to the rest of the system. Snap hooks and carabineers must be self-closing and self-locking, capable of being opened only by at least two consecutive deliberate actions and have a minimum gate strength of 3,600 lbs in all directions. Use webbing, straps, and ropes made of synthetic fiber. The maximum free fall distance when using fall arrest equipment must not exceed 6 feet, unless the proper energy absorbing lanyard is used. Always take into consideration the total fall distance and any swinging of the worker (pendulum-like motion), that can occur during a fall, when attaching a person to a fall arrest system. All full body harnesses must be equipped with Suspension Trauma Preventers such as stirrups, relief steps, or similar in order to provide short-term relief from the effects of orthostatic intolerance in accordance with EM 385-1-1, Section 21.I.06.

3.5.3 Fall Protection for Roofing Work

Implement fall protection controls based on the type of roof being constructed and work being performed. Evaluate the roof area to be accessed for its structural integrity including weight-bearing capabilities for the projected loading.

a. Low Sloped Roofs:

(1) For work within 6 feet from unprotected edge of a roof having a slope less than or equal to 4:12 (vertical to horizontal), protect personnel from falling by the use of conventional fall protection systems (personal fall arrest/restraint systems, guardrails, or safety nets) in accordance with EM 385-1-1, Section 21 and 29 CFR 1926.500. A safety monitoring system is not adequate fall protection and is not authorized.

(2) For work greater than 6 feet from the unprotected roof edge, addition to the use of conventional fall protection systems the use of a warning line system is also permitted, in accordance with 29 CFR 1926.500 and EM 385-1-1, Section 21.L.

b. Steep-Sloped Roofs: Work on a roof having a slope greater than 4:12 (vertical to horizontal) requires a personal fall arrest system, guardrails with toe-boards, or safety nets. This requirement also applies to residential or housing type construction.

3.5.4 Horizontal Lifelines (HLL)

Provide HLL in accordance with EM 385-1-1, Section 21.I.08.d.2. Commercially manufactured horizontal lifelines (HLL) must be designed, installed, certified and used, under the supervision of a qualified person, for fall protection as part of a complete fall arrest system which maintains a safety factor of 2 (29 CFR 1926.500). The competent person for fall protection may (if deemed appropriate by the qualified person) supervise the assembly, disassembly, use and inspection of the HLL system under the direction of the qualified person. Locally manufactured HLLs are not acceptable unless they are custom designed for limited or site specific applications by a Registered Professional Engineer who is qualified in designing HLL systems.

3.5.5 Guardrails and Safety Nets

Design, install and use guardrails and safety nets in accordance with EM 385-1-1, Section 21.F.01 and 29 CFR 1926 Subpart M.

3.5.6 Rescue and Evacuation Plan and Procedures

When personal fall arrest systems are used, ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. Prepare a Rescue and Evacuation Plan and include a detailed discussion of the following: methods of rescue; methods of self-rescue or assisted-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. Include the Rescue and Evacuation Plan within the Activity Hazard Analysis (AHA) for the phase of work, in the Fall Protection and Prevention (FP&P) Plan, and the Accident Prevention Plan (APP). The plan must comply with the requirements of EM 385-1-1, ASSP Z359.2, and ASSP Z359.4.

3.6 WORK PLATFORMS

3.6.1 Scaffolding

Provide employees with a safe means of access to the work area on the scaffold. Climbing of any scaffold braces or supports not specifically designed for access is prohibited. Comply with the following requirements:

a. Scaffold platforms greater than 20 feet in height must be accessed by use of a scaffold stair system.

b. Ladders commonly provided by scaffold system manufacturers are prohibited for accessing scaffold platforms greater than 20 feet maximum in height.

c. An adequate gate is required.

d. Employees performing scaffold erection and dismantling must be qualified.

e. Scaffold must be capable of supporting at least four times the maximum intended load, and provide appropriate fall protection as delineated in the accepted fall protection and prevention plan.

f. Stationary scaffolds must be attached to structural building components to safeguard against tipping forward or backward.

g. Special care must be given to ensure scaffold systems are not overloaded.

h. Side brackets used to extend scaffold platforms on self-supported scaffold systems for the storage of material are prohibited. The first tie-in must be at the height equal to 4 times the width of the smallest dimension of the scaffold base.

i. Scaffolding other than suspended types must bear on base plates upon wood mudsills (2 in x 10 in x 8 in minimum) or other adequate firm foundation.

j. Scaffold or work platform erectors must have fall protection during the erection and dismantling of scaffolding or work platforms that are more than 6 feet.

k. Delineate fall protection requirements when working above 6 feet or

above dangerous operations in the Fall Protection and Prevention (FP&P) Plan and Activity Hazard Analysis (AHA) for the phase of work.

3.6.2 Elevated Aerial Work Platforms (AWPs)

Workers must be anchored to the basket or bucket in accordance with manufacturer's specifications and instructions (anchoring to the boom may only be used when allowed by the manufacturer and permitted by the CP). Lanyards used must be sufficiently short to prohibit worker from climbing out of basket. The climbing of rails is prohibited. Lanyards with built-in shock absorbers are acceptable. Self-retracting devices are not acceptable. Tying off to an adjacent pole or structure is not permitted unless a safe device for 100 percent tie-off is used for the transfer.

Use of AWPs must be operated, inspected, and maintained as specified in the operating manual for the equipment and delineated in the AHA. Operators of AWPs must be designated as qualified operators by the Prime Contractor. Maintain proof of qualifications on site for review and include in the AHA.

3.7 EQUIPMENT

3.7.1 Material Handling Equipment (MHE)

a. Material handling equipment such as forklifts must not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions. Material handling equipment fitted with personnel work platform attachments are prohibited from traveling or positioning while personnel are working on the platform.

b. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions. Material Handling Equipment Operators must be trained in accordance with OSHA 29 CFR 1910, Subpart N.

c. Operators of forklifts or power industrial trucks must be licensed in accordance with OSHA.

3.7.2 Load Handling Equipment (LHE)

The following requirements apply. In exception, these requirements do not apply to commercial truck mounted and articulating boom cranes used solely to deliver material and supplies (not prefabricated components, structural steel, or components of a systems-engineered metal building) where the lift consists of moving materials and supplies from a truck or trailer to the ground; to cranes installed on mechanics trucks that are used solely in the repair of shore-based equipment; to crane that enter the activity but are not used for lifting; nor to other machines not used to lift loads suspended by rigging equipment. However, LHE accidents occurring during such operations must be reported.

a. Equip cranes and derricks as specified in EM 385-1-1, Section 16.

b. Notify the Contracting Officer 15 working days in advance of any LHE entering the activity, in accordance with EM 385-1-1, Section 16.A.02, so that necessary quality assurance spot checks can be coordinated. Contractor's operator must remain with the crane during the spot check. Rigging gear must comply with OSHA, ASME B30.9 Standards safety standards.

c. Comply with the LHE manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Perform erection under the supervision of a designated person (as defined in ASME B30.5). Perform all testing in accordance with the manufacturer's recommended procedures.

d. Comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, ASME B30.9 for slings, ASME B30.20 for below the hook lifting devices and ASME B30.26 for rigging hardware.

e. When operating in the vicinity of overhead transmission lines, operators and riggers must be alert to this special hazard and follow the requirements of EM 385-1-1 Section 11, and ASME B30.5 or ASME B30.22 as applicable.

f. Do not use crane suspended personnel work platforms (baskets) unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Do not lift personnel with a line hoist or friction crane. Additionally, submit a specific AHA for this work to the Contracting Officer. Ensure the activity and AHA are thoroughly reviewed by all involved personnel.

g. Inspect, maintain, and recharge portable fire extinguishers as specified in NFPA 10, Standard for Portable Fire Extinguishers.

h. All employees must keep clear of loads about to be lifted and of suspended loads, except for employees required to handle the load.

i. Use cribbing when performing lifts on outriggers.

j. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.

k. A physical barricade must be positioned to prevent personnel access where accessible areas of the LHE's rotating superstructure poses a risk of striking, pinching or crushing personnel.

l. Maintain inspection records in accordance by EM 385-1-1, Section 16.D, including shift, monthly, and annual inspections, the signature of the person performing the inspection, and the serial number or other identifier of the LHE that was inspected. Records must be available for review by the Contracting Officer.

m. Maintain written reports of operational and load testing in accordance with EM 385-1-1, Section 16.F, listing the load test procedures used along with any repairs or alterations performed on the LHE. Reports must be available for review by the Contracting Officer.

n. Certify that all LHE operators have been trained in proper use of all safety devices (e.g. anti-two block devices).

o. Take steps to ensure that wind speed does not contribute to loss of control of the load during lifting operations. At wind speeds greater than 20 mph, the operator, rigger and lift supervisor must cease all crane operations, evaluate conditions and determine if the lift may proceed. Base the determination to proceed or not on wind calculations per the manufacturer and a reduction in LHE rated capacity if

applicable. Include this maximum wind speed determination as part of the activity hazard analysis plan for that operation.

3.7.3 Machinery and Mechanized Equipment

a. Proof of qualifications for operator must be kept on the project site for review.

b. Manufacture specifications or owner's manual for the equipment must be on-site and reviewed for additional safety precautions or requirements that are sometimes not identified by OSHA or USACE EM 385-1-1. Incorporate such additional safety precautions or requirements into the AHAs.

3.7.4 Base Mounted Drum Hoists

a. Operation of base mounted drum hoists must comply with EM 385-1-1 and ASSP A10.22.

b. Rigging gear must comply with applicable ASME/OSHA standards

c. When used on telecommunication towers, base mounted drum hoists must comply with TIA-1019, TIA-222, ASME B30.7, 29 CFR 1926.552, and 29 CFR 1926.553.

d. When used to hoist personnel, the AHA must include a written standard operating procedure. Operators must have a physical examination in accordance with EM 385-1-1 Section 16.B.05 and trained, at a minimum, in accordance with EM 385-1-1 Section 16.U and 16.T. The base mounted drum hoist must also comply with OSHA Instruction CPL 02-01-056 and ASME B30.23.

e. Material and personnel must not be hoisted simultaneously.

f. Personnel cage must be marked with the capacity (in number of persons) and load limit in pounds.

g. Construction equipment must not be used for hoisting material or personnel or with trolley/tag lines. Construction equipment may be used for towing and assisting with anchoring guy lines.

3.7.5 Use of Explosives

Explosives must not be used or brought to the project site without prior written approval from the Contracting Officer. Such approval does not relieve the Contractor of responsibility for injury to persons or for damage to property due to blasting operations.

Storage of explosives, when permitted on Government property, must be only where directed and in approved storage facilities. These facilities must be kept locked at all times except for inspection, delivery, and withdrawal of explosives.

3.8 EXCAVATIONS

Soil classification must be performed by a competent person in accordance with 29 CFR 1926 and EM 385-1-1.

3.8.1 Utility Locations

Provide a third party, independent, private utility locating company to positively identify underground utilities in the work area in addition to any station locating service and coordinated with the station utility department.

3.8.2 Utility Location Verification

Physically verify underground utility locations, including utility depth, by hand digging using wood or fiberglass handled tools when any adjacent construction work is expected to come within 3 feet of the underground system.

3.8.3 Utilities Within and Under Concrete, Bituminous Asphalt, and Other Impervious Surfaces

Utilities located within and under concrete slabs or pier structures, bridges, parking areas, and the like, are extremely difficult to identify. Whenever contract work involves chipping, saw cutting, or core drilling through concrete, bituminous asphalt or other impervious surfaces, the existing utility location must be coordinated with station utility departments in addition to location and depth verification by a third party, independent, private locating company. The third party, independent, private locating company must locate utility depth by use of Ground Penetrating Radar (GPR), X-ray, bore scope, or ultrasound prior to the start of demolition and construction. Outages to isolate utility systems must be used in circumstances where utilities are unable to be positively identified. The use of historical drawings does not alleviate the Contractor from meeting this requirement.

3.9 ELECTRICAL

Perform electrical work in accordance with EM 385-1-1, Appendix A, Sections 11 and 12.

3.9.1 Conduct of Electrical Work

As delineated in EM 385-1-1, electrical work is to be conducted in a de-energized state unless there is no alternative method for accomplishing the work. In those cases obtain an energized work permit from the Contracting Officer. The energized work permit application must be accompanied by the AHA and a summary of why the equipment/circuit needs to be worked energized. Underground electrical spaces must be certified safe for entry before entering to conduct work. Cables that will be cut must be positively identified and de-energized prior to performing each cut. Attach temporary grounds in accordance with ASTM F855 and IEEE 1048. Perform all high voltage cable cutting remotely using hydraulic cutting tool. When racking in or live switching of circuit breakers, no additional person other than the switch operator is allowed in the space during the actual operation. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method.

When working in energized substations, only qualified electrical workers are permitted to enter. When work requires work near energized circuits as defined by NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves and electrical arc flash protection for personnel as

required by NFPA 70E. Insulating blankets, hearing protection, and switching suits may also be required, depending on the specific job and as delineated in the Contractor's AHA. Ensure that each employee is familiar with and complies with these procedures and 29 CFR 1910.147.

3.9.2 Qualifications

Electrical work must be performed by QP personnel with verifiable credentials who are familiar with applicable code requirements. Verifiable credentials consist of State, National and Local Certifications or Licenses that a Master or Journeyman Electrician may hold, depending on work being performed, and must be identified in the appropriate AHA. Journeyman/Apprentice ratio must be in accordance with State, Local requirements applicable to where work is being performed.

3.9.3 Arc Flash

Conduct a hazard analysis/arc flash hazard analysis whenever work on or near energized parts greater than 50 volts is necessary, in accordance with NFPA 70E.

All personnel entering the identified arc flash protection boundary must be QPs and properly trained in NFPA 70E requirements and procedures. Unless permitted by NFPA 70E, no Unqualified Person is permitted to approach nearer than the Limited Approach Boundary of energized conductors and circuit parts. Training must be administered by an electrically qualified source and documented.

3.9.4 Grounding

Ground electrical circuits, equipment and enclosures in accordance with NFPA 70 and IEEE C2 to provide a permanent, continuous and effective path to ground unless otherwise noted by EM 385-1-1.

Check grounding circuits to ensure that the circuit between the ground and a grounded power conductor has a resistance low enough to permit sufficient current flow to allow the fuse or circuit breaker to interrupt the current.

3.9.5 Testing

Temporary electrical distribution systems and devices must be inspected, tested and found acceptable for Ground-Fault Circuit Interrupter (GFCI) protection, polarity, ground continuity, and ground resistance before initial use, before use after modification and at least monthly. Monthly inspections and tests must be maintained for each temporary electrical distribution system, and signed by the electrical CP or QP.

-- End of Section --

SECTION 01 42 00

SOURCES FOR REFERENCE PUBLICATIONS

PART 1 GENERAL

1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the standards producing organization (e.g. ASTM B564 Standard Specification for Nickel Alloy Forgings). However, when the standards producing organization has not assigned a number to a document, an identifying number has been assigned for reference purposes.

1.2 ORDERING INFORMATION

The addresses of the standards publishing organizations whose documents are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided.

AACE INTERNATIONAL (AACE)
1265 Suncrest Towne Centre Drive
Morgantown, WV 26505-1876 USA
Ph: 304-296-8444
Fax: 304-291-5728
Internet: https://web.aacei.org/

ACOUSTICAL SOCIETY OF AMERICA (ASA)
1305 Walt Whitman Road, Suite 300
Melville, NY 11747-4300
Ph: 516-576-2360
Fax: 631-923-2875
E-mail: asa@acousticalsociety.org
Internet: https://acousticalsociety.org/

AIR BARRIER ASSOCIATION OF AMERICA (ABAA)
1600 Boston-Providence Hwy
Walpole, MA 02081
Ph: 1-866-956-5888
Fax: 1-866-956-5819
Internet: https://www.airbarrier.org/

AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC. (AMCA)
30 West University Drive
Arlington Heights, IL 60004-1893
Ph: 847-394-0150
Fax: 847-253-0088
E-mail: communications@amca.org
Internet: http://www.amca.org

AIR-CONDITIONING, HEATING AND REFRIGERATION INSTITUTE (AHRI)
2111 Wilson Blvd, Suite 400

Arlington, VA 22201
Ph: 703-524-8800
Internet: http://www.ahrinet.org

ALUMINUM ASSOCIATION (AA)
1400 Crystal Drive
Suite 430
Arlington, VA 22202
Ph: 703-358-2960
E-Mail: info@aluminum.org
Internet: https://www.aluminum.org/

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)
1900 E Golf Rd, Suite 1250
Schaumburg, IL 60173
Ph: 847-303-5664
E-mail: customerservice@aamanet.org
Internet: https://aamanet.org/

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
444 North Capital Street, NW, Suite 249
Washington, DC 20001
Ph: 202-624-5800
Fax: 202-624-5806
E-Mail: info@aashto.org
Internet: https://www.transportation.org/

AMERICAN BEARING MANUFACTURERS ASSOCIATION (ABMA)
330 N. Wabash Ave., Suite 2000
Chicago, IL 60611
Ph: 202-367-1155
E-mail: info@americanbearings.org
Internet: https://www.americanbearings.org/

AMERICAN CONCRETE INSTITUTE (ACI)
38800 Country Club Drive
Farmington Hills, MI 48331-3439
Ph: 248-848-3700
Fax: 248-848-3701
Internet: https://www.concrete.org/

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)
1330 Kemper Meadow Drive
Cincinnati, OH 45240
Ph: 513-742-2020
Fax: 513-742-3355
Internet: https://www.acgih.org/

AMERICAN GAS ASSOCIATION (AGA)
400 North Capitol Street, NW
Suite 450
Washington, D.C. 20001
Ph: 202-824-7000
Internet: https://www.aga.org/

AMERICAN HARDBOARD ASSOCIATION (AHA)
1210 West Northwest Highway
Palatine, IL 60067

Ph: 847-934-8800
Fax: 847-934-8803
E-mail: aha@hardboard.org
Internet: http://domensino.com/AHA/

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)
130 East Randolph, Suite 2000
Chicago, IL 60601
Ph: 312-670-5444
Fax: 312-670-5403
Steel Solutions Center: 866-275-2472
E-mail: solutions@aisc.org
Internet: https://www.aisc.org/

AMERICAN IRON AND STEEL INSTITUTE (AISI)
25 Massachusetts Avenue, NW Suite 800
Washington, DC 20001
Ph: 202-452-7100
Internet: https://www.steel.org/

AMERICAN LADDER INSTITUTE (ALI)
330 N. Wabash, Suite 2000
Chicago, IL 60611
Ph: 312-321-6806
Fax: 312-673-6929
E-mail: info@americanladderinstitute.org
Internet: https://www.americanladderinstitute.org

AMERICAN LUMBER STANDARDS COMMITTEE (ALSC)
7470 New Technology Way, Suite F
Frederick, MD 21703
Ph: 301-972-1700
Fax: 301-540-8004
E-mail: alsc@alsc.org
Internet: http://www.alsc.org

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
1899 L Street, NW,11th Floor
Washington, DC 20036
Ph: 202-293-8020
Fax: 202-293-9287
E-mail: storemanager@ansi.org
Internet: https://www.ansi.org/

AMERICAN PETROLEUM INSTITUTE (API)
1220 L Street, NW
Washington, DC 20005-4070
Ph: 202-682-8000
Internet: https://www.api.org/

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)
1801 Alexander Bell Drive
Reston, VA 20191
Ph: 800-548-2723; 703-295-6300
Internet: https://www.asce.org/

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)
1791 Tullie Circle, NE

Atlanta, GA 30329
Ph: 404-636-8400 or 800-527-4723
Fax: 404-321-5478
E-mail: ashrae@ashrae.org
Internet: https://www.ashrae.org/

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
Two Park Avenue
New York, NY 10016-5990
Ph: 800-843-2763
Fax: 973-882-1717
E-mail: customercare@asme.org
Internet: https://www.asme.org/

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)
520 N. Northwest Highway
Park Ridge, IL 60068
Ph: 847-699-2929
E-mail: customerservice@assp.org
Internet: https://www.assp.org/

AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448
Ph: 708-995-3019
Fax: 708-479-6139
Internet: http://www.asse-plumbing.org

AMERICAN WATER WORKS ASSOCIATION (AWWA)
6666 W. Quincy Avenue
Denver, CO 80235 USA
Ph: 303-794-7711 or 800-926-7337
Fax: 303-347-0804
Internet: https://www.awwa.org/

AMERICAN WELDING SOCIETY (AWS)
8669 NW 36 Street, #130
Miami, FL 33166-6672
Ph: 800-443-9353
Internet: https://www.aws.org/

AMERICAN WOOD COUNCIL (AWC)
222 Catoctin Circle SE, Suite 201
Leesburg, VA 20175
Ph: 800-890-7732
Fax: 412-741-0609
E-mail: publications@awc.org
Internet: https://www.awc.org/

AMERICAN WOOD PROTECTION ASSOCIATION (AWPA)
P.O. Box 361784
Birmingham, AL 35236-1784
Ph: 205-733-4077
Fax: 205-733-4075
Internet: http://www.awpa.com

APA - THE ENGINEERED WOOD ASSOCIATION (APA)
7011 South 19th St.
Tacoma, WA 98466-5333

Ph: 253-565-6600
Fax: 253-565-7265
Internet: https://www.apawood.org/

ASPHALT INSTITUTE (AI)
2696 Research Park Drive
Lexington, KY 40511-8480
Ph: 859-288-4960
Fax: 859-288-4999
E-mail: info@asphaltinstitute.org
Internet: http://www.asphaltinstitute.org

ASSOCIATED AIR BALANCE COUNCIL (AABC)
1220 19th St NW, Suite 410
Washington, DC 20036
Ph: 202-737-0202
Fax: 202-315-0285
E-mail: info@aabc.com
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Internet: https://new.usgbc.org/

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Internet: http://www.navfac.navy.mil

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E-mail: CustomerExperienceCenter@ul.com
Internet: https://www.ul.com/
UL Directories available through IHS at https://ihsmarkit.com/

VIBRATION ISOLATION AND SEISMIC CONTROL MANUFACTURERS ASSOCIATION (VISCMA)
994 Old Eagle School Road
Suite 1019
Wayne, PA 19087-1866
Ph: 610-971-4850
E-mail: info@viscma.com
Internet: http://www.viscma.com

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6980 S.W. Varns
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Ph: 503-639-0651
Fax: 503-684-8928
E-mail: info@wclib.org
Internet: http://www.wclib.org

WESTERN WOOD PRODUCTS ASSOCIATION (WWPA)
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Portland, OR 97201
Ph: 503-224-3930
E-mail: info@wwpa.org
Internet: http://www.wwpa.org

WINDOW AND DOOR MANUFACTURERS ASSOCIATION (WDMA)
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Fax: 916-372-9950
E-mail: info@woodinst.com
Internet: https://woodworkinstitute.com

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

-- End of Section --

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SECTION 01 45 00.00 10

QUALITY CONTROL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D3740	(2019) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E329	(2020) Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection

1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program. Include all associated costs in the applicable Schedule item.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Contractor Quality Control (CQC) Plan; G

SD-06 Test Reports

Verification Statement

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Establish and maintain an effective quality control (QC) system that complies with FAR 52.246-12 Inspection of Construction. QC consist of

plans, procedures, and organization necessary to produce an end product which complies with the Contract requirements. The QC system covers all construction operations, both onsite and offsite, and be keyed to the proposed construction sequence. The project superintendent will be held responsible for the quality of work and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the Contract. In this context the highest level manager responsible for the overall construction activities at the site, including quality and production is the project superintendent. The project superintendent maintains a physical presence at the site at all times and is responsible for all construction and related activities at the site, except as otherwise acceptable to the Contracting Officer.

3.2 CONTRACTOR QUALITY CONTROL (CQC) PLAN

Submit no later than 30 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements FAR 52.246-12 Inspection of Construction. The Government will consider an interim plan for the first 15 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional work.

3.2.1 Content of the CQC Plan

Include, as a minimum, the following to cover all construction-operations, both onsite and offsite, including work by subcontractors fabricators, suppliers and purchasing agents:

a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff will implement the three phase control system for all aspects of the work specified. Include a CQC System Manager that reports to the project superintendent.

b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.

c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the Contract. Letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities will be issued by the CQC System Manager. Furnish copies of these letters to the Contracting Officer.

d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures must be in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities approved by the Contracting Officer are required to be used.)

f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. Establish verification procedures that identified deficiencies have been corrected.

h. Reporting procedures, including proposed reporting formats.

i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and is identified by different trades or disciplines, or it is work by the same trade in a different environment. Although each section of the specifications can generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.

j. Coordinate scheduled work with Special Inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Schedule of Special Inspections. Where the applicable Code issue by the International Code Council (ICC) calls for inspections by the Building Official, the Contractor must include the inspections in the Quality Control Plan and must perform the inspections required by the applicable ICC. The Contractor must perform these inspections using independent qualified inspectors. Include the Special Inspection Plan requirements in the QC Plan.

3.2.2 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in the Contractor Quality Control(CQC) Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.3 Notification of Changes

After acceptance of the CQC Plan, notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the CQC Plan, meet with the Contracting Officer and discuss the Contractor's quality control system. Submit the CQC Plan a minimum of 7 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details must be developed, including the forms for recording the CQC operations,, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting will be prepared by the Government, signed by both the Contractor and the Contracting Officer and will become a part of the contract file. There can be occasions when subsequent conferences will be called by either party to

reconfirm mutual understandings or address deficiencies in the CQC system or procedures which can require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 Personnel Requirements

The requirements for the CQC organization are a Safety and Health Manager, CQC System Manager, and sufficient number of additional qualified personnel to ensure safety and Contract compliance. The Safety and Health Manager reports directly to a senior project (or corporate) official independent from the CQC System Manager. The Safety and Health Manager will also serve as a member of the CQC Staff Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as part of the CQC organization. The Contractor's CQC staff maintains a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure Contract compliance. The CQC staff will be subject to acceptance by the Contracting Officer. Provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Promptly complete and furnish all letters, material submittals, shop drawing submittals, schedules and all other project documentation to the CQC organization. The CQC organization is responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

3.4.2 CQC System Manager

Identify as CQC System Manager an individual within the onsite work organization that is responsible for overall management of CQC and has the authority to act in all CQC matters for the Contractor. The CQC System Manager is required to be a graduate engineer, graduate architect, or a graduate of construction management, with a minimum of 5 years construction experience on construction similar to this Contract, or a construction person with a minimum of 10 years in related work. This CQC System Manager is on the site at all times during construction and is employed by the prime Contractor. The CQC System Manager is assigned as CQC System Manager but may have duties as project superintendent in addition to quality control. Identify in the plan an alternate to serve in the event of the CQC System Manager's absence. The requirements for the alternate are the same as the CQC System Manager.

3.4.3 CQC Personnel

In addition to CQC personnel specified elsewhere in the contract, provide as part of the CQC organization specialized personnel to assist the CQC System Manager for the following areas: electrical, mechanical, submittals clerk, and TAB Personnel. These individuals or specialized technical companies are employees of the prime or subcontractor; be responsible to the CQC System Manager; be physically present at the construction site during work on the specialized peronnel's areas of responsibility; have the necessary education or experience in accordance with the experience matrix listed herein. These individuals can perform other duties but need to be allowed sufficient time to perform the specialized personnel's assigned quality control duties as described in the Quality Control Plan. A single person can cover more than one area provided that the single person is qualified to perform quality control activities in each designated and that workload allows.

Experience Matrix	
Area	Qualifications
Mechanical	Graduate Mechanical Engineer with 2 yrs experience or person with 5 years of experience supervising mechanical features of work in the field with a construction company
Electrical	Graduate Electrical Engineer with 2 years related experience or person 5 years of experience supervising electrical features of work in the field with a construction company
Submittals	Submittal Clerk with 1 year experience
Testing, Adjusting and Balancing (TAB) Personnel	Specialist must be a member of AABC or an experienced technician of the firm certified by the NEBB

3.4.4 Additional Requirement

In addition to the above experience and education requirements, the Contractor Quality Control(CQC) System Manager and Alternate CQC System Manager are required to have completed the Construction Quality Management (CQM) for Contractors course. If the CQC System Manager does not have a current certification, obtain the CQM for Contractors course certification within 90 days of award. This course is periodically offered by the Naval Facilities Engineering Command and the Army Corps of Engineers. Contact the Contracting Officer for information on the next scheduled class.

The Construction Quality Management Training certificate expires after 5 years. If the CQC System Manager's certificate has expired, retake the course to remain current.

3.4.5 Organizational Changes

Maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.5 SUBMITTALS AND DELIVERABLES

Submittals, if needed, have to comply with the requirements in Section 01 33 00SUBMITTAL PROCEDURES. The CQC organization is responsible for certifying that all submittals and deliverables are in compliance with the contract requirements. When Section 01 91 00.15 10 TOTAL BUILDING COMMISSIONING are included in the contract, the submittals required by those sections have to be coordinated with Section 01 33 00 SUBMITTAL PROCEDURES to ensure adequate time is allowed for each type of submittal required.

3.6 CONTROL

CQC is the means by which the Contractor ensures that the construction, to

include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control are required to be conducted by the CQC System Manager for each definable feature of the construction work as follows:

3.6.1 Preparatory Phase

This phase is performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase includes:

a. A review of each paragraph of applicable specifications, reference codes, and standards. Make available during the preparatory inspection a copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field. Maintain and make available in the field for use by Government personnel until final acceptance of the work.

b. Review of the Contract drawings.

c. Check to assure that all materials and equipment have been tested, submitted, and approved.

d. Review of provisions that have been made to provide required control inspection and testing.

e. Review Special Inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Schedule of Special Inspections.

f. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the Contract.

g. Examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

h. Review of the appropriate activity hazard analysis to assure safety requirements are met.

i. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

j. Check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

k. Discussion of the initial control phase.

3.6.2 Initial Phase

This phase is accomplished at the beginning of a definable feature of work. Accomplish the following:

a. Check work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing are in compliance with the

contract.

c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

d. Resolve all differences.

e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

f. The initial phase for each definable feature of work is repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

g. Coordinate scheduled work with Special Inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Schedule of Special Inspections.

3.6.3 Follow-up Phase

Perform daily checks to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. Record the checks in the CQC documentation. Conduct final follow-up checks and correct all deficiencies prior to the start of additional features of work which may be affected by the deficient work. Do not build upon nor conceal non-conforming work. Coordinate scheduled work with Special Inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Schedule of Special Inspections.

3.6.4 Additional Preparatory and Initial Phases

Conduct additional preparatory and initial phases on the same definable features of work if: the quality of on-going work is unacceptable; if there are changes in the applicable CQC staff, onsite production supervision or work crew; if work on a definable feature is resumed after a substantial period of inactivity; or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

Perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and acceptance tests when specified. Procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. Perform the following activities and record and provide the following data:

a. Verify that testing procedures comply with contract requirements.

b. Verify that facilities and testing equipment are available and comply with testing standards.

c. Check test instrument calibration data against certified standards.

d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

e. Record results of all tests taken, both passing and failing on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test. If approved by the Contracting Officer, actual test reports are submitted later with a reference to the test number and date taken. Provide an information copy of tests performed by an offsite or commercial test facility directly to the Contracting Officer. Failure to submit timely test reports as stated results in nonpayment for related work performed and disapproval of the test facility for this Contract.

3.7.2 Testing Laboratories

All testing laboratories must be validated by the USACE Material Testing Center (MTC) for the tests to be performed. Information on the USACE MTC with web-links to both a list of validated testing laboratories and for the laboratory inspection request for can be found at: https://mtc.erdc.dren.mil/.

3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel is required to meet criteria detailed in ASTM D3740 and ASTM E329.

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the Contract amount due the Contractor.

3.7.3 Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.8 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

Conduct an inspection of the work by the CQC System Manager near the end of the work, or any increment of the work established by a time stated in FAR 52.211-10 Commencement, Prosecution, and Completion of Work, or by the specifications. Prepare and include in the CQC documentation a punch list of items which do not conform to the approved drawings and specifications, as required by paragraph DOCUMENTATION. Include within the list of deficiencies the estimated date by which the deficiencies will be

corrected. Make a second inspection the CQC System Manager or staff to ascertain that all deficiencies have been corrected. Once this is accomplished, notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2 Pre-Final Inspection

The Government will perform the pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. Ensure that all items on this list have been corrected before notifying the Government, so that a Final inspection with the customer can be scheduled. Correct any items noted on the Pre-Final inspection in a timely manner. These inspections and any deficiency corrections required by this paragraph need to be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative is required to be in attendance at the final acceptance inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands can also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notify the Contracting Officer at least 14 days prior to the final acceptance inspection and include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the Contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance FAR 52.246-12 Inspection of Construction.

3.9 DOCUMENTATION

3.9.1 Quality Control Activities

Maintain current records providing factual evidence that required quality control activities and tests have been performed. Include in these records the work of subcontractors and suppliers on an acceptable form that includes, as a minimum, the following information:

a. The name and area of responsibility of the Contractor/Subcontractor.

b. Operating plant/equipment with hours worked, idle, or down for repair.

c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.

d. Test and control activities performed with results and references to specifications/drawings requirements. Identify the control phase (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.

e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.

f. Submittals and deliverables reviewed, with Contract reference, by whom, and action taken.

g. Offsite surveillance activities, including actions taken.

h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

i. Instructions given/received and conflicts in plans and specifications.

3.9.2 Verification Statement

Indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. Cover both conforming and deficient features and include a statement that equipment and materials incorporated in the work and workmanship comply with the Contract. Furnish the original and one copy of these records in report form to the Government daily within 48 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, prepare and submit one report for every 7 days of no work and on the last day of a no work period. All calendar days need to be accounted for throughout the life of the contract. The first report following a day of no work will be for that day only. Reports need to be signed and dated by the Contractor Quality Control(CQC) System Manager. Include copies of test reports and copies of reports prepared by all subordinate quality control personnel within the CQC System Manager Report.

3.10 SAMPLE FORMS

Sample forms enclosed at the end of this section.

3.11 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. Take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, will be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer can issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders will be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

-- End of Section --

SECTION 01 45 35

SPECIAL INSPECTIONS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC (2018) International Building Code

1.2 GENERAL REQUIREMENTS

Perform Special Inspections in accordance with the Statement of Special Inspections, Schedule of Special Inspections and Chapter 17 of ICC IBC. The Statement of Special Inspections and Schedule of Special Inspections are included in the structural drawings. Special Inspections are to be performed by an independent third party and are intended to ensure that the work of the prime contractor is in accordance with the Contract Documents and applicable building codes. Special inspections do not take the place of the three phases of control inspections performed by the Contractor's QC Manager or any testing and inspections required by other sections of the specifications.

1.3 DEFINITIONS

1.3.1 Continuous Special Inspections

Continuous Special Inspections is the constant monitoring of specific tasks by a special inspector. These inspections must be carried out continuously over the duration of the particular tasks.

1.3.2 Perform

Perform these Special Inspections tasks for each welded joint or member.

1.3.3 Observe

Observe these Special Inspections items on a periodic daily basis. Operations need not be delayed pending these inspections.

1.3.4 Special Inspector (SI)

A qualified person retained by the contractor and approved by the Contracting Officer as having the competence necessary to inspect a particular type of construction requiring Special Inspections. The SI must be an independent third party hired directly by the Prime Contractor.

1.3.5 Associate Special Inspector (ASI)

A qualified person who assists the SI in performing Special Inspections but must perform inspection under the direct supervision of the SI and cannot

perform inspections without the SI on site.

1.3.6 Third Party

A Special inspector must not be an employee of the Contractor or of any Sub-Contractor performing the work to be inspected.

1.3.7 Contracting Officer

The Government official having overall authority for administrative contracting actions. Certain contracting actions may be delegated to the Contracting Officer's Representative (COR).

1.3.8 Contractor's Quality Control (QC) Manager

An individual retained by the prime contractor and qualified in accordance with the Section 01 45 00.00 10 QUALITY CONTROL having the overall responsibility for the contractor's QC organization.

1.3.9 Structural Engineer of Record (SER)

A registered design professional contracted by the Government as an A/E responsible for the overall design and review of submittal documents prepared by others. The SER is registered or licensed to practice their respective design profession as defined by the statutory requirements of the professional registration laws in state in which the design professional works. The SER is also referred to as the Engineer of Record (EOR) in design code documents.

1.3.10 Schedule of Special Inspections (SSI)

A schedule which lists each of the required Special Inspections, the extent to which each Special Inspection is to be performed, and the required frequency for each in accordance with ICC IBC Chapter 17. This schedule is located in the structural drawings.

1.3.11 Definable Feature of Work (DFOW)

An inspection group that is separate and distinct from other inspection groups, having inspection requirements and/or inspectors that are unique.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Special Inspections

SD-06 Test Reports

Special Inspections Daily Reports

Special Inspections Biweekly Reports

SD-07 Certificates

Steel Joist Institute Membership

Certificate of Compliance

Special Inspector Qualifications; G

1.5 SPECIAL INSPECTOR QUALIFICATIONS

Submit qualifications for each special inspector; G.

1.5.1 Steel Construction and High Strength Bolting

1.5.1.1 Special Inspector

a. ICC Structural Steel and Bolting Special Inspector certificate with one year of related experience, or

b. Registered Professional Engineer with three years of related experience

1.5.1.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.2 Welding Structural Steel

1.5.2.1 Special Inspector

a. ICC Structural Welding Special Inspector certificate with one year of related experience, or

b. AWS Certified Welding Inspector

1.5.2.2 Associate Special Inspector

AWS Certified Associate Welding Inspector

1.5.3 Nondestructive Testing of Welds

1.5.3.1 Special Inspector

NDT Level III Certificate

1.5.3.2 Associate Special Inspector

NDT Level II Certificate plus one year of related experience

1.5.4 Concrete Construction

1.5.4.1 Special Inspector

a. ICC Reinforced Concrete Special Inspector Certificate with one year of related experience, or

b. ACI Concrete Construction Special Inspector, or

c. Registered Professional Engineer with three years of related experience

1.5.4.2 Associate Special Inspector

a. ACI Concrete Construction Special Inspector in Training, or

b. Engineer-In-Training with one year of related experience

1.5.5 Masonry Construction

1.5.5.1 Special Inspector

a. ICC Structural Masonry Special Inspector Certificate with one year of related experience, or

b. Registered Professional Engineer with three years of related experience

1.5.5.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

1.5.6 Verification of Site Soil Condition, Fill Placement and Load-Bearing Requirements

1.5.6.1 Special Inspector

a. ICC Soils Special Inspector Certificate with one year of related experience, or

b. NICET Soils Technician Level II Certificate in Construction Material Testing, or

c. Geologist-In-Training with three years of related experience, or

d. Registered Professional Engineer with three years of related experience

1.5.6.2 Associate Special Inspector

a. NICET Soils Technician Level I Certificate in Construction Material Testing with one year of related experience, or

b. Engineer-In-Training with one year of related experience

1.5.7 Fire-Resistant Penetrations and Joints

1.5.7.1 Special Inspector

a. Passed the UL Firestop Exam with one year of related experience, or

b. Passed the FM Firestop Exam with one year of related experience, or

c. Registered Professional Engineer with related experience

1.5.7.2 Associate Special Inspector

Engineer-In-Training with one year of related experience.

PART 2 PRODUCTS

2.1 FABRICATOR SPECIAL INSPECTIONS

Special Inspections of fabricator's work performed in the fabricator's shop is required to be inspected in accordance with the Statement of Special Inspections and the Schedule of Special Inspections unless the fabricator is certified by the approved agency to perform such work without Special Inspections. Submit the following certification to the Contracting Officer for information to allow work performed in the fabricator's shop to not be subjected to Special Inspections.

Steel Joist Institute Membership

At the completion of fabrication, submit a certificate of compliance, to be included with the comprehensive final report of Special Inspections, stating that the materials supplied and work performed by the fabricator are in accordance the construction documents.

PART 3 EXECUTION

3.1 RESPONSIBILITIES

3.1.1 Quality Control Manager

a. Supervise all Special Inspectors required by the contract documents and the IBC.

b. Verify the qualifications of all of the Special Inspectors.

c. Verify the qualifications of fabricators.

d. Maintain a 3- ring binder for the Special Inspector's daily and biweekly reports. This file must be located in a conspicuous place in the project trailer/office to allow review by the Contracting Officer and the SER.

e. Maintain a rework items list that includes discrepancies noted on the Special Inspectors daily report.

3.1.2 Special Inspectors

a. Inspect all elements of the project for which the special inspector is qualified to inspect and are identified in the Schedule of Special Inspections.

b. Attend preparatory phase meetings related to the Definable Feature of Work (DFOW) for which the special inspector is qualified to inspect.

c. Submit a copy of the daily reports to the QC Manager.

d. Discrepancies that are observed during Special Inspections must be reported to the QC Manager for correction. If discrepancies are not corrected before the special inspector leaves the site the observed discrepancies must be documented in the daily report.

e. Submit a biweekly Special Inspection Report until all inspections are complete. A report is required for each biweekly period in which Special Inspections activity occurs, and must include the following:

(1) A brief summary of the work performed during the reporting time frame.

(2) Changes and/or discrepancies with the drawings, specifications that were observed during the reporting period.

(3) Discrepancies which were resolved or corrected.

(4) A list of nonconforming items requiring resolution.

(5) All applicable test result including nondestructive testing reports.

f. At the completion of the project submit a comprehensive final report of Special Inspections that documents the Special Inspections completed for the project and corrections of all discrepancies noted in the daily reports. The comprehensive final report of Special Inspections must be signed, dated and indicate the certification of the special inspector qualifying them to conduct the inspection.

3.2 DEFECTIVE WORK

Check work as it progresses, but failure to detect any defective work or materials must in no way prevent later rejection if defective work or materials are discovered, nor obligate the Contracting Officer to accept such work.

-- End of Section --

SECTION 01 50 00

TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C511	(2017) Reduced-Pressure Principle Backflow Prevention Assembly

FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH (FCCCHR)

FCCCHR List	(continuously updated) List of Approved Backflow Prevention Assemblies

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA 20-1; TIA 20-2; TIA 20-3; TIA 20-4) National Electrical Code
NFPA 241	(2019) Standard for Safeguarding Construction, Alteration, and Demolition Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

U.S. FEDERAL AVIATION ADMINISTRATION (FAA)

FAA AC 70/7460-1	(2015; Rev L) Obstruction Marking and Lighting

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

MUTCD	(2015) Manual on Uniform Traffic Control Devices

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction Site Plan; G

Traffic Control Plan; G

Contractor Temporary Network Cybersecurity Compliance Statements; G

SD-07 Certificates

Backflow Tester Certification

Backflow Preventers Certificate of Full Approval

1.3 CONSTRUCTION SITE PLAN

Prior to the start of work, submit a site plan showing the locations and dimensions of temporary facilities (including layouts and details, equipment and material storage area (onsite and offsite), and access and haul routes, avenues of ingress/egress to the fenced area and details of the fence installation. Identify any areas which may have to be graveled to prevent the tracking of mud. Indicate if the use of a supplemental or other staging area is desired. Show locations of safety and construction fences, site trailers, construction entrances, trash dumpsters, temporary sanitary facilities, and worker parking areas.

1.4 BACKFLOW PREVENTERS CERTIFICATE

Certificate of Full Approval from FCCCHR List, University of Southern California, attesting that the design, size and make of each backflow preventer has satisfactorily passed the complete sequence of performance testing and evaluation for the respective level of approval. Certificate of Provisional Approval will not be acceptable.

1.4.1 Backflow Tester Certificate

Prior to testing, submit to the Contracting Officer certification issued by the State or local regulatory agency attesting that the backflow tester has successfully completed a certification course sponsored by the regulatory agency. Tester must not be affiliated with any company participating in any other phase of this Contract.

1.4.2 Backflow Prevention Training Certificate

Submit a certificate recognized by the State or local authority that states the Contractor has completed at least 10 hours of training in backflow preventer installations. The certificate must be current.

1.5 DOD CONDITION OF READINESS (COR)

DOD will set the Condition of Readiness (COR) based on the weather forecast for sustained winds 50 knots (60mph or 95 km/hr) or greater. Contact the Contracting Officer for the current COR setting.

Monitor weather conditions a minimum of twice a day and take appropriate actions according to the aproved Emergency Plan in the accepted Accident Prevention Plan, EM 385-1-1 Section 01 Emergency Planning and the instructions below.

Unless otherwise directed by the Contracting Officer, comply with:

a. Condition FOUR (Sustained winds of 50 knots or greater expected within 72 hours): Normal daily jobsite cleanup and good housekeeping practices. Collect and store in piles or containers scrap lumber, waste material, and rubbish for removal and disposal at the close of each work day. Maintain the construction site including storage areas, free of accumulation of debris. Stack form lumber in neat piles less than 4 feet high. Remove all debris, trash, or objects that could become missile hazards.

b. Condition THREE (Sustained winds of 50 knots or greater expected within 48 hours): Maintain "Condition FOUR" requirements and commence securing operations necessary for "Condition ONE" which cannot be completed within 18 hours. Cease all routine activities which might interfere with securing operations. Commence securing and stow all gear and portable equipment. Make preparations for securing buildings. Review requirements pertaining to "Condition TWO" and continue action as necessary to attain "Condition THREE" readiness.

c. Condition TWO (Sustained winds of 50 knots or greater expected within 24 hours): Curtail or cease routine activities until securing operation is complete. Reinforce or remove form work and scaffolding. Secure machinery, tools, equipment, materials, or remove from the jobsite. Expend every effort to clear all missile hazards and loose equipment from general base areas.

d. Condition ONE. (Sustained winds of 50 knots or greater expected within 12 hours): Secure the jobsite, and leave Government premises.

1.6 CYBERSECURITY DURING CONSTRUCTION

{For Reference Only: This subpart (and its subparts) relates to AC-18, SA-3, CCI-00258.} Meet the following requirements throughout the construction process.

1.6.1 Contractor Computer Equipment

Contractor owned computers may be used for construction. When used, contractor computers must meet the following requirements:

1.6.1.1 Operating System

The operating system must be an operating system currently supported by the manufacturer of the operating system. The operating system must be current on security patches and operating system manufacturer required updates.

1.6.1.2 Anti-Malware Software

The computer must run anti-malware software from a reputable software manufacturer. Anti-malware software must be a version currently supported by the software manufacturer, must be current on all patches and updates, and must use the latest definitions file. All computers used on this project must be scanned using the installed software at least once per day.

1.6.1.3 Passwords and Passphrases

The passwords and passphrases for all computers must be changed from their

default values. Passwords must be a minimum of eight characters with a minimum of one uppercase letter, one lowercase letter, one number and one special character.

1.6.2 Government Access to Network

Government personnel must be allowed to have complete and immediate access to the network at any time in order to verify compliance with this specification.

1.6.3 Temporary Wireless IP Networks

In addition to the other requirements on temporary IP networks, temporary wireless IP (WiFi) networks must not interfere with existing wireless network and must use WPA2 security. Network names (SSID) for wireless networks must be changed from their default values.

1.6.4 Passwords and Passphrases

The passwords and passphrases for all network devices and network access must be changed from their default values. Passwords must be a minimum 8 characters with a minimum of one uppercase letter, one lowercase letter, one number and one special character.

1.6.5 Contractor Temporary Network Cybersecurity Compliance Statements

Provide a single submittal containing completed Contractor Temporary Network Cybersecurity Compliance Statements for each company implementing a temporary IP network. Contractor Temporary Network Cybersecurity Compliance Statements must use the template published at http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphics- Each Statement must be signed by a cybersecurity representative for the relevant company. If no temporary IP networks will be used, provide a single copy of the Statement indicating this.

PART 2 PRODUCTS

2.1 TEMPORARY SIGNAGE

2.1.1 Bulletin Board

Within one calendar day of mobilization on site and prior to the commencement of work activities, provide a clear weatherproof covered bulletin board not less than 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, Safety and Health Information as required by EM 385-1-1 Section 01 and other information approved by the Contracting Officer. Coordinate requirements herein with 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS.

2.1.2 Warning Signs

Post temporary signs, tags, and labels to give workers and the public adequate warning and caution of construction hazards according to the EM 385-1-1 Section 04. Attach signs to the perimeter fencing every 150 feet warning the public of the presence of contruction hazards. Signs must require unauthorized persons to keep out of the construction site. Correct the data required by safety signs daily.

2.2 TEMPORARY TRAFFIC CONTROL

2.2.1 Barricades

Erect and maintain temporary barricades to limit public access to hazardous areas. Whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic barricades will be required. Securely place barricades clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

2.3 FENCING

Provide fencing along the construction site and at all open excavations and tunnels to control access by unauthorized personnel. Safety fencing must be highly visible to be seen by pedestrians and vehicular traffic. Specific fencing requirements are as described herein. All fencing will meet the requirements of EM 385-1-1.

2.3.1 Polyethylene Mesh Safety Fencing

Temporary safety fencing must be a high visibility orange colored, high density polyethylene grid, a minimum of 48 inches high and maximum mesh size of 2 inches. Fencing must extend from the grade to a minimum of 48 inches above the grade and be tightly secured to T-posts spaced as necessary to maintain a rigid and taut fence. Fencing must remain rigid and taut with a minimum of 200 pounds of force exerted on it from any direction with less than 4 inches of deflection. This fencing is not allowed to be used as the project boundary fencing.

2.3.2 Chain Link Panel Fencing

Temporary panel fencing must be galvanized steel chain link panels 6 feet high. Multiple fencing panels may be linked together at the bases toform long spens as needed. Each panel base must be weighted down using sand bags or other suitable materials in order for the fencing to withstand anticipated winds while remaining upright. Fencing must remain rigid and taut with a minimum of 200 pounds of force exerted on it from any direction with less than 4 inches of deflection.

2.3.3 Post-Driven Chain Link Fencing

Temporary post-driven fencing must be galvanized chain link fencing 6 feet high supported by an tightly secured to galvanized steel posts driven below grade. Fence posts must be located on minimum 10 foot centers. Posts may be set in various sufaces such as sand, soil, ashpalt or concrete as necessary. Chain link fencing must remain rigid and taut with a minimum of 200 pounds of force exerted on it from any direction with less than 4 inches of deflection. Fencing and posts must be completely removed at the completion of construction and any surfaces disturbed or damaged must be restored to its original condition. Underground utilities must be located and identified prior to setting fence posts. Fence must be equipped with a lockable gate. Gate must remain locked when construction personnel are not present.

2.4 TEMPORARY WIRING

Provide temporary wiring in accordance with EM 385-1-1 Section 11, NFPA 241

and NFPA 70. Include monthly inspection and testing of all equipment and apparatus.

2.5 BACKFLOW PREVENTERS

Reduced pressure principle type conforming to the applicable requirements AWWA C511. Provide backflow preventers complete with 150 pound flanged , bronze or brass mounted gate valve and strainer, 304 stainless steel or bronze, internal parts.

PART 3 EXECUTION

3.1 EMPLOYEE PARKING

Construction contract employees will park privately owned vehicles in an area designated by the Contracting Officer. This area will be within reasonable walking distance of the construction site. Employee parking must not interfere with existing and established parking requirements of the government installation.

3.2 TEMPORARY BULLETIN BOARD

Locate the bulletin board at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer.

3.3 AVAILABILITY AND USE OF UTILITY SERVICES

3.3.1 Temporary Utilities

Provide temporary utilities required for construction. Materials may be new or used, must be adequate for the required usage, not create unsafe conditions, and not violate applicable codes and standards.

3.3.2 Sanitation

a. Provide and maintain within the construction area minimum field-type sanitary facilities approved by the Contracting Officer and periodically empty wastes into a municipal, district, or station sanitary sewage system, or remove waste to a commercial facility. Obtain approval from the system owner prior to discharge into any municipal, district, or commercial sanitary sewer system. Any penalties or fines associated with improper discharge will be the responsibility of the Contractor. Coordinate with the Contracting Officer and follow station regulations and procedures when discharging into the station sanitary sewer system. Maintain these conveniences at all times. Include provisions for pest control and elimination of odors. Government toilet facilities will not be available to Contractor's personnel.

3.3.3 Telephone

Make arrangements and pay all costs for telephone facilities desired.

3.3.4 Obstruction Lighting of Cranes

Provide a minimum of 2 aviation red or high intensity white obstruction lights on temporary structures (including cranes) over 100 feet above ground level. Light construction and installation must comply with FAA AC 70/7460-1. Lights must be operational during periods of reduced

visibility, darkness, and as directed by the Contracting Officer.

3.3.5 Fire Protection

Provide temporary fire protection equipment for the protection of personnel and property during construction. Remove debris and flammable materials weekly to minimize potential hazards.

3.4 TRAFFIC PROVISIONS

3.4.1 Maintenance of Traffic

a. Conduct operations in a manner that will not close any thoroughfare or interfere in any way with traffic on railways or highways except with written permission of the Contracting Officer at least 15 calendar days prior to the proposed modification date, and provide a Traffic Control Plan detailing the proposed controls to traffic movement for approval. The plan must be in accordance with State and local regulations and the MUTCD, Part VI. . Contractor may move oversized and slow-moving vehicles to the worksite provided requirements of the highway authority have been met.

b. Conduct work so as to minimize obstruction of traffic, and maintain traffic on at least half of the roadway width at all times. Obtain approval from the Contracting Officer prior to starting any activity that will obstruct traffic.

c. Provide, erect, and maintain, at contractors expense, lights, barriers, signals, passageways, detours, and other items, that may be required by the Life Safety Signage, overhead protection authority having jurisdiction.

3.4.2 Protection of Traffic

Maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment the work, and the erection and maintenance of adequate warning, danger, and direction signs, will be as required by the State and local authorities having jurisdiction. Protect the traveling public from damage to person and property. Minimize the interference with public traffic on roads selected for hauling material to and from the site. Investigate the adequacy of existing roads and their allowable load limit. Contractor is responsible for the repair of any damage to roads caused by construction operations.

3.4.3 Dust Control

Dust control methods and procedures must be approved by the Contracting Officer. Coordinate dust control methods with 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS.

3.5 CONTRACTOR'S TEMPORARY FACILITIES

Contractor-owned or -leased trailers must be identified by Government assigned numbers as directed by the Government. Temporary facilities will meet requirements as identified in EM 385-1-1 Section 04.

3.5.1 Safety Systems

Protect the integrity of any installed safety systems or personnel safety devices. Obtain prior approval from Contracting Officer if entrance into systems serving safety devices is required. If it is temporarily necessary to remove or disable personnel safety devices in order to accomplish contract requirements, provide alternative means of protection prior to removing or disabling any permanently installed safety devices or equipment and obtain approval from the Contracting Officer.

3.5.2 Administrative Field Offices

Provide and maintain administrative field office facilities within the construction area at the designated site. Government office and warehouse facilities will not be available to the Contractor's personnel.

3.5.3 Storage Area

Construct a temporary 6 foot high chain link fence around trailers and materials. Include plastic strip inserts, colored green, so that visibility through the fence is obstructed. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit. Do not place or store trailers, materials, or equipment outside the fenced area unless such trailers, materials, or equipment are assigned a separate and distinct storage area by the Contracting Officer away from the vicinity of the construction site but within the installation boundaries. Trailers, equipment, or materials must not be open to public view with the exception of those items which are in support of ongoing work on any given day. Do not stockpile materials outside the fence in preparation for the next day's work. Park mobile equipment, such as tractors, wheeled lifting equipment, cranes, trucks, and like equipment within the fenced area at the end of each work day.

3.5.4 Supplemental Storage Area

Upon request, and pending availability, the Contracting Officer will designate another or supplemental area for the use and storage of trailers, equipment, and materials. This area may not be in close proximity of the construction site but will be within the installation boundaries. The area will be maintained in an clean and orderly fashion and secured if needed to protect supplies and equipment. Utilities will not be provided to this area by the Government.

3.5.5 Appearance of Trailers

a. Trailers which are rusted, have peeling paint or are otherwise in need of repair will not be allowed on Installation property. Trailers must present a clean and neat exterior appearance and be in a state of good repair.

b. Maintain trailers and other temporary facilities. Failure to do so will be sufficient reason to require their removal.

3.5.6 Maintenance of Storage Area

a. Keep fencing in a state of good repair and proper alignment. Grassed or unpaved areas, which are not established roadways, and will be traversed with construction equipment or other vehicles, will be covered with a layer of gravel as necessary to prevent rutting and the

tracking of mud onto paved or established roadways, should the Contractor elect to traverse them with construction equipment or other vehicles. Mow and maintain grass located within the boundaries of the construction site for the duration of the project. Grass and vegetation along fences, buildings, under trailers, and in areas not accessible to mowers will be edged or trimmed neatly.

b. Snow Removal: The Contractor is responsible for removing all snow and ice within the boundaries of the construction site, including material storage and prep areas and contractor parking. Coordinate with the COR for location to pile removed snow.

3.5.7 New Building

In the event a new building is constructed for the temporary project field office, it will be a minimum 12 feet in width, 16 feet in length and have a minimum of 7 feet headroom. Equip the building with approved electrical wiring, at least one double convenience outlet and the required switches and fuses to provide 110-120 volt power. Provide a work table with stool, desk with chair, two additional chairs, and one legal size file cabinet that can be locked. The building must be waterproof, supplied with a heater, have a minimum of two doors, electric lights, a telephone, a battery operated smoke detector alarm, a sufficient number of adjustable windows for adequate light and ventilation, and a supply of approved drinking water. Approved sanitary facilities must be furnished. Screen the windows and doors and provide the doors with dead bolt type locking devices or a padlock and heavy duty hasp bolted to the door. Door hinge pins will be non-removable. Arrange the windows to open and to be securely fastened from the inside. Protect glass panels in windows by bars or heavy mesh screens to prevent easy access. In warm weather, furnish air conditioning capable of maintaining the office at 50 percent relative humidity and a room temperature 20 degrees F below the outside temperature when the outside temperature is 95 degrees F. Any new building erected for a temporary field office must be maintained during the life of the contract. Unless otherwise directed by the Contracting Officer, remove the building from the site upon completion and acceptance of the work.

3.5.8 Security Provisions

Provide adequate outside security lighting at the temporary facilities. The Contractor will be responsible for the security of its own equipment.

3.5.9 Weather Protection of Temporary Facilities and Stored Materials

Take necessary precautions to ensure that roof openings and other critical openings in the building are monitored carefully. Take immediate actions required to seal off such openings when rain or other detrimental weather is imminent, and at the end of each workday. Ensure that the openings are completely sealed off to protect materials and equipment in the building from damage.

3.5.9.1 Building and Site Storm Protection

When a warning of gale force winds is issued, take precautions to minimize danger to persons, and protect the work and nearby Government property. Precautions must include, but are not limited to, closing openings; removing loose materials, tools and equipment from exposed locations; and removing or securing scaffolding and other temporary work. Close openings in the work when storms of lesser intensity pose a threat to the work or

any nearby Government property.

3.6 PLANT COMMUNICATIONS

Whenever the individual elements of the plant are located so that operation by normal voice between these elements is not satisfactory, install a satisfactory means of communication, such as telephone or other suitable devices and make available for use by Government personnel.

3.7 TEMPORARY PROJECT SAFETY FENCING

As soon as practicable, but not later than 15 days after the date established for commencement of work, furnish and erect temporary project safety fencing at the work site. Maintain the safety fencing during the life of the contract and, upon completion and acceptance of the work, removefrom the work site.

3.8 CLEANUP

Remove construction debris, waste materials, packaging material and the like from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways must be cleaned away. Store any salvageable materials resulting from demolition activities within the fenced area described above or at the supplemental storage area. Neatly stack stored materials not in trailers, whether new or salvaged.

3.9 RESTORATION OF STORAGE AREA

Upon completion of the project remove the bulletin board, signs, barricades, haul roads, and any other temporary products from the site. After removal of trailers, materials, and equipment from within the fenced area, remove the fence. Restore areas used during the performance of the contract to the original or better condition. Remove gravel used to traverse grassed areas and restore the area to its original condition, including top soil and seeding as necessary.

-- End of Section --

SECTION 01 57 19

TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
29 CFR 1910.1053	Respirable Crystalline Silica
29 CFR 1926.1153	Respirable Crystalline Silica
40 CFR 50	National Primary and Secondary Ambient Air Quality Standards
40 CFR 60	Standards of Performance for New Stationary Sources
40 CFR 61	National Emission Standards for Hazardous Air Pollutants
40 CFR 63	National Emission Standards for Hazardous Air Pollutants for Source Categories
40 CFR 64	Compliance Assurance Monitoring
40 CFR 112	Oil Pollution Prevention
40 CFR 241	Guidelines for Disposal of Solid Waste
40 CFR 243	Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste
40 CFR 258	Subtitle D Landfill Requirements
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 261.7	Residues of Hazardous Waste in Empty Containers
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 262.31	Standards Applicable to Generators of

	Hazardous Waste-Labeling
40 CFR 262.34	Standards Applicable to Generators of Hazardous Waste-Accumulation Time
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 266	Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 273	Standards for Universal Waste Management
40 CFR 273.2	Standards for Universal Waste Management - Batteries
40 CFR 273.4	Standards for Universal Waste Management - Mercury Containing Equipment
40 CFR 273.5	Standards for Universal Waste Management - Lamps
40 CFR 279	Standards for the Management of Used Oil
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
40 CFR 300.125	National Oil and Hazardous Substances Pollution Contingency Plan - Notification and Communications
40 CFR 355	Emergency Planning and Notification
40 CFR 403	General Pretreatment Regulations for Existing and New Sources of Pollution
40 CFR 745	Lead-Based Paint Poisoning Prevention in Certain Residential Structures
40 CFR 761	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
49 CFR 171	General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials

	Communications, Emergency Response Information, and Training Requirements
49 CFR 173	Shippers - General Requirements for Shipments and Packagings
49 CFR 178	Specifications for Packagings

1.2 DEFINITIONS

1.2.1 Class I and II Ozone Depleting Substance (ODS)

Class I ODS is defined in Section 602(a) of The Clean Air Act. A list of Class I ODS can be found on the EPA website at the following weblink. https://www.epa.gov/ozone-layer-protection/ozone-depleting-substances.

Class II ODS is defined in Section 602(s) of The Clean Air Act. A list of Class II ODS can be found on the EPA website at the following weblink. https://www.epa.gov/ozone-layer-protection/ozone-depleting-substances.

1.2.2 Contractor Generated Hazardous Waste

Contractor generated hazardous waste is materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute work, but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e. methyl ethyl ketone, toluene), waste thinners, excess paints, excess solvents, waste solvents, excess pesticides, and contaminated pesticide equipment rinse water.

1.2.3 Electronics Waste

Electronics waste is discarded electronic devices intended for salvage, recycling, or disposal.

1.2.4 Environmental Pollution and Damage

Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally or historically.

1.2.5 Environmental Protection

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2.6 Hazardous Debris

As defined in paragraph SOLID WASTE, debris that contains listed hazardous waste (either on the debris surface, or in its interstices, such as pore structure) in accordance with 40 CFR 261. Hazardous debris also includes

debris that exhibits a characteristic of hazardous waste in accordance with 40 CFR 261.

1.2.7 Hazardous Materials

Hazardous materials as defined in 49 CFR 171 and listed in 49 CFR 172.

Hazardous material is any material that: Is regulated as a hazardous material in accordance with 49 CFR 173; or requires a Safety Data Sheet (SDS) in accordance with 29 CFR 1910.120; or during end use, treatment, handling, packaging, storage, transportation, or disposal meets or has components that meet or have potential to meet the definition of a hazardous waste as defined by 40 CFR 261 Subparts A, B, C, or D. Designation of a material by this definition, when separately regulated or controlled by other sections or directives, does not eliminate the need for adherence to that hazard-specific guidance which takes precedence over this section for "control" purposes. Such material includes ammunition, weapons, explosive actuated devices, propellants, pyrotechnics, chemical and biological warfare materials, medical and pharmaceutical supplies, medical waste and infectious materials, bulk fuels, radioactive materials, and other materials such as asbestos, mercury, and polychlorinated biphenyls (PCBs).

1.2.8 Hazardous Waste

Hazardous Waste is any material that meets the definition of a solid waste and exhibit a hazardous characteristic (ignitability, corrosivity, reactivity, or toxicity) as specified in 40 CFR 261, Subpart C, or contains a listed hazardous waste as identified in 40 CFR 261, Subpart D.

1.2.9 Land Application

Land Application means spreading or spraying discharge water at a rate that allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" must occur. Comply with federal, state, and local laws and regulations.

1.2.10 Municipal Separate Storm Sewer System (MS4) Permit

MS4 permits are those held by installations to obtain NPDES permit coverage for their stormwater discharges.

1.2.11 National Pollutant Discharge Elimination System (NPDES)

The NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States.

1.2.12 Oily Waste

Oily waste are those materials that are, or were, mixed with Petroleum, Oils, and Lubricants (POLs) and have become separated from that POLs. Oily wastes also means materials, including wastewaters, centrifuge solids, filter residues or sludges, bottom sediments, tank bottoms, and sorbents which have come into contact with and have been contaminated by, POLs and may be appropriately tested and discarded in a manner which is in compliance with other state and local requirements.

This definition includes materials such as oily rags, "kitty litter"

sorbent clay and organic sorbent material. These materials may be land filled provided that: It is not prohibited in other state regulations or local ordinances; the amount generated is "de minimus" (a small amount); it is the result of minor leaks or spills resulting from normal process operations; and free-flowing oil has been removed to the practicable extent possible. Large quantities of this material, generated as a result of a major spill or in lieu of proper maintenance of the processing equipment, are a solid waste. As a solid waste, perform a hazardous waste determination prior to disposal. As this can be an expensive process, it is recommended that this type of waste be minimized through good housekeeping practices and employee education.

1.2.13 Regulated Waste

Regulated waste are solid wastes that have specific additional federal, state, or local controls for handling, storage, or disposal.

1.2.14 Sediment

Sediment is soil and other debris that have eroded and have been transported by runoff water or wind.

1.2.15 Solid Waste

Solid waste is a solid, liquid, semi-solid or contained gaseous waste. A solid waste can be a hazardous waste, non-hazardous waste, or non-Resource Conservation and Recovery Act (RCRA) regulated waste. Types of solid waste typically generated at construction sites may include:

1.2.15.1 Debris

Debris is non-hazardous solid material generated during the construction, demolition, or renovation of a structure that exceeds 2.5-inch particle size that is: a manufactured object; plant or animal matter; or natural geologic material (for example, cobbles and boulders), broken or removed concrete, masonry, and rock asphalt paving; ceramics; roofing paper and shingles. Inert materials may not be reinforced with or contain ferrous wire, rods, accessories and weldments. A mixture of debris and other material such as soil or sludge is also subject to regulation as debris if the mixture is comprised primarily of debris by volume, based on visual inspection.

1.2.15.2 Green Waste

Green waste is the vegetative matter from landscaping, land clearing and grubbing, including, but not limited to, grass, bushes, scrubs, small trees and saplings, tree stumps and plant roots. Marketable trees, grasses and plants that are indicated to remain, be re-located, or be re-used are not included.

1.2.15.3 Material not regulated as solid waste

Material not regulated as solid waste is nuclear source or byproduct materials regulated under the Federal Atomic Energy Act of 1954 as amended; suspended or dissolved materials in domestic sewage effluent or irrigation return flows, or other regulated point source discharges; regulated air emissions; and fluids or wastes associated with natural gas or crude oil exploration or production.

1.2.15.4 Non-Hazardous Waste

Non-hazardous waste is waste that is excluded from, or does not meet, hazardous waste criteria in accordance with 40 CFR 263.

1.2.15.5 Recyclables

Recyclables are materials, equipment and assemblies such as doors, windows, door and window frames, plumbing fixtures, glazing and mirrors that are recovered and sold as recyclable, wiring, insulated/non-insulated copper wire cable, and structural components. It also includes commercial-grade refrigeration equipment with Freon removed, household appliances where the basic material content is metal, clean polyethylene terephthalate bottles, cooking oil, used fuel oil, textiles, high-grade paper products and corrugated cardboard, stackable pallets in good condition, clean crating material, and clean rubber/vehicle tires. Metal meeting the definition of lead contaminated or lead based paint contaminated may not be included as recyclable if sold to a scrap metal company. Paint cans that meet the definition of empty containers in accordance with 40 CFR 261.7 may be included as recyclable if sold to a scrap metal company.

1.2.15.6 Surplus Soil

Surplus soil is existing soil that is in excess of what is required for this work, including aggregates intended, but not used, for on-site mixing of concrete, mortars, and paving. Contaminated soil meeting the definition of hazardous material or hazardous waste is not included and must be managed in accordance with paragraph HAZARDOUS MATERIAL MANAGEMENT.

1.2.15.7 Scrap Metal

This includes scrap and excess ferrous and non-ferrous metals such as reinforcing steel, structural shapes, pipe, and wire that are recovered or collected and disposed of as scrap. Scrap metal meeting the definition of hazardous material or hazardous waste is not included.

1.2.15.8 Wood

Wood is dimension and non-dimension lumber, plywood, chipboard, hardboard. Treated or painted wood that meets the definition of lead contaminated or lead based contaminated paint is not included. Treated wood includes, but is not limited to, lumber, utility poles, crossties, and other wood products with chemical treatment.

1.2.16 Surface Discharge

Surface discharge means discharge of water into drainage ditches, storm sewers, creeks or "waters of the United States". Surface discharges are discrete, identifiable sources and require a permit from the governing agency. Comply with federal, state, and local laws and regulations.

1.2.17 Wastewater

Wastewater is the used water and solids from a community that flow to a treatment plant.

1.2.17.1 Stormwater

Stormwater is any precipitation in an urban or suburban area that does not

evaporate or soak into the ground, but instead collects and flows into storm drains, rivers, and streams.

1.2.18 Waters of the United States

Waters of the United States means Federally jurisdictional waters, including wetlands, that are subject to regulation under Section 404 of the Clean Water Act or navigable waters, as defined under the Rivers and Harbors Act.

1.2.19 Wetlands

Wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

1.2.20 Universal Waste

The universal waste regulations streamline collection requirements for certain hazardous wastes in the following categories: batteries, pesticides, mercury-containing equipment (for example, thermostats), and lamps (for example, fluorescent bulbs). The rule is designed to reduce hazardous waste in the municipal solid waste (MSW) stream by making it easier for universal waste handlers to collect these items and send them for recycling or proper disposal. These regulations can be found at 40 CFR 273.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preconstruction Survey

Solid Waste Management Permit; G

Regulatory Notifications; G

Environmental Protection Plan; G

Dirt and Dust Control Plan; G

Employee Training Records; G

Environmental Manager Qualifications; G

SD-06 Test Reports

Monthly Solid Waste Disposal Report; G

SD-07 Certificates

Employee Training Records; G

SD-11 Closeout Submittals

Waste Determination Documentation; G

Disposal Documentation for Hazardous and Regulated Waste; G

Assembled Employee Training Records; G

Solid Waste Management Permit; G

Project Solid Waste Disposal Documentation Report; G

Hazardous Waste/Debris Management; G

Regulatory Notifications; G

Sales Documentation; G

1.4 ENVIRONMENTAL PROTECTION REQUIREMENTS

Provide and maintain, during the life of the contract, environmental protection as defined. Plan for and provide environmental protective measures to control pollution that develops during construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Protect the environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire duration of this Contract. Comply with federal, state, and local regulations pertaining to the environment, including water, air, solid waste, hazardous waste and substances, oily substances, and noise pollution.

Tests and procedures assessing whether construction operations comply with Applicable Environmental Laws may be required. Analytical work must be performed by qualified laboratories; and where required by law, the laboratories must be certified.

1.4.1 Conformance with the Environmental Management System

Perform work under this contract consistent with the policy and objectives identified in the installation's Environmental Management System (EMS). Perform work in a manner that conforms to objectives and targets of the environmental programs and operational controls identified by the EMS. Support Government personnel when environmental compliance and EMS audits are conducted by escorting auditors at the Project site, answering questions, and providing proof of records being maintained. Provide monitoring and measurement information as necessary to address environmental performance relative to environmental, energy, and transportation management goals. In the event an EMS nonconformance or environmental noncompliance associated with the contracted services, tasks, or actions occurs, take corrective and preventative actions. In addition, employees must be aware of their roles and responsibilities under the installation EMS and of how these EMS roles and responsibilities affect work performed under the contract.

Coordinate with the installation's EMS coordinator to identify training needs associated with environmental aspects and the EMS, and arrange

training or take other action to meet these needs. Provide training documentation to the Contracting Officer. The Installation Environmental Office will retain associated environmental compliance records. Make EMS Awareness training completion certificates available to Government auditors during EMS audits and include the certificates in the Employee Training Records. See paragraph EMPLOYEE TRAINING RECORDS.

1.5 QUALITY ASSURANCE

1.5.1 Preconstruction Survey and Protection of Features

This paragraph supplements the Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS. Prior to start of any onsite construction activities, perform a Preconstruction Survey of the project site with the Contracting Officer, and take photographs showing existing environmental conditions in and adjacent to the site. Submit a report for the record. Include in the report a plan describing the features requiring protection under the provisions of the Contract Clauses, which are not specifically identified on the drawings as environmental features requiring protection along with the condition of trees, shrubs and grassed areas immediately adjacent to the site of work and adjacent to the Contractor's assigned storage area and access route(s), as applicable. The Contractor and the Contracting Officer will sign this survey report upon mutual agreement regarding its accuracy and completeness. Protect those environmental features included in the survey report and any indicated on the drawings, regardless of interference that their preservation may cause to the work under the Contract.

1.5.2 Regulatory Notifications

Provide regulatory notification requirements in accordance with federal, state and local regulations. In cases where the Government will also provide public notification (such as stormwater permitting), coordinate with the Contracting Officer. Submit copies of regulatory notifications to the Contracting Officer at least 3 days prior to commencement of work activities. Typically, regulatory notifications must be provided for the following (this listing is not all-inclusive): demolition, renovation, NPDES defined site work, construction, removal or use of a permitted air emissions source, and remediation of controlled substances (asbestos, hazardous waste, lead paint).

1.5.3 Environmental Brief

Attend an environmental brief to be included in the preconstruction meeting. Provide the following information: types, quantities, and use of hazardous materials that will be brought onto the installation; and types and quantities of wastes/wastewater that may be generated during the Contract. Discuss the results of the Preconstruction Survey at this time.

Prior to initiating any work on site, meet with the Contracting Officer and installation Environmental Office to discuss the proposed Environmental Protection Plan (EPP). Develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural and cultural resources, required reports, required permits, permit requirements (such as mitigation measures), and other measures to be taken.

1.5.4 Environmental Manager

Appoint in writing an Environmental Manager for the project site. The

Environmental Manager is directly responsible for coordinating contractor compliance with federal, state, local, and installation requirements. The Environmental Manager must ensure compliance with Hazardous Waste Program requirements (including hazardous waste handling, storage, manifesting, and disposal); implement the EPP; ensure environmental permits are obtained, maintained, and closed out; ensure compliance with Stormwater Program requirements; ensure compliance with Hazardous Materials (storage, handling, and reporting) requirements; and coordinate any remediation of regulated substances (lead, asbestos, PCB transformers). This can be a collateral position; however, the person in this position must be trained to adequately accomplish the following duties: ensure waste segregation and storage compatibility requirements are met; inspect and manage Satellite Accumulation areas; ensure only authorized personnel add wastes to containers; ensure Contractor personnel are trained in 40 CFR requirements in accordance with their position requirements; coordinate removal of waste containers; and maintain the Environmental Records binder and required documentation, including environmental permits compliance and close-out. Submit Environmental Manager Qualifications to the Contracting Officer.

1.5.5 Employee Training Records

Prepare and maintain Employee Training Records throughout the term of the contract meeting applicable 40 CFR requirements. Provide Employee Training Records in the Environmental Records Binder. Submit these Assembled Employee Training Records to the Contracting Officer at the conclusion of the project, unless otherwise directed.

Train personnel to meet state requirements. Conduct environmental protection/pollution control meetings for personnel prior to commencing construction activities. Contact additional meetings for new personnel and when site conditions change. Include in the training and meeting agenda: methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, waters of the United States, and endangered species and their habitat that are known to be in the area.

1.5.6 Non-Compliance Notifications

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with federal, state or local environmental laws or regulations, permits, and other elements of the Contractor's EPP. After receipt of such notice, inform the Contracting Officer of the proposed corrective action and take such action when approved by the Contracting Officer. The Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. FAR 52.242-14 Suspension of Work provides that a suspension, delay, or interruption of work due to the fault or negligence of the Contractor allows for no adjustments to the contract for time extensions or equitable adjustments. In addition to a suspension of work, the Contracting Officer may use additional authorities under the contract or law..

1.6 ENVIRONMENTAL PROTECTION PLAN

The purpose of the EPP is to present an overview of known or potential environmental issues that must be considered and addressed during

construction. Incorporate construction related objectives and targets from the installation's EMS into the EPP. Include in the EPP measures for protecting natural and cultural resources, required reports, and other measures to be taken. Meet with the Contracting Officer or Contracting Officer Representative to discuss the EPP and develop a mutual understanding relative to the details for environmental protection including measures for protecting natural resources, required reports, and other measures to be taken. Submit the EPP within 15 days after Contract award and not less than 10 days before the preconstruction meeting. Revise the EPP throughout the project to include any reporting requirements, changes in site conditions, or contract modifications that change the project scope of work in a way that could have an environmental impact. No requirement in this section will relieve the Contractor of any applicable federal, state, and local environmental protection laws and regulations. During Construction, identify, implement, and submit for approval any additional requirements to be included in the EPP. Maintain the current version onsite.

The EPP includes, but is not limited to, the following elements:

1.6.1 General Overview and Purpose

1.6.1.1 Descriptions

A brief description of each specific plan required by environmental permit or elsewhere in this Contract such as stormwater pollution prevention plan, spill control plan, solid waste management plan, wastewater management plan, air pollution control plan, contaminant prevention plan,.

1.6.1.2 Duties

The duties and level of authority assigned to the person(s) on the job site who oversee environmental compliance, such as who is responsible for adherence to the EPP, who is responsible for spill cleanup and training personnel on spill response procedures, who is responsible for manifesting hazardous waste to be removed from the site (if applicable), and who is responsible for training the Contractor's environmental protection personnel.

1.6.1.3 Procedures

A copy of any standard or project-specific operating procedures that will be used to effectively manage and protect the environment on the project site.

1.6.1.4 Communications

Communication and training procedures that will be used to convey environmental management requirements to Contractor employees and subcontractors.

1.6.1.5 Contact Information

Emergency contact information contact information (office phone number, cell phone number, and e-mail address).

1.6.2 General Site Information

1.6.2.1 Drawings

Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, jurisdictional wetlands, material storage areas, structures, sanitary facilities, storm drains and conveyances, and stockpiles of excess soil.

1.6.2.2 Work Area

Work area plan showing the proposed activity in each portion of the area and identify the areas of limited use or nonuse. Include measures for marking the limits of use areas, including methods for protection of features to be preserved within authorized work areas and methods to control runoff and to contain materials on site, and a traffic control plan.

1.6.2.3 Documentation

A letter signed by an officer of the firm appointing the Environmental Manager and stating that person is responsible for managing and implementing the Environmental Program as described in this contract. Include in this letter the Environmental Manager's authority to direct the removal and replacement of non-conforming work.

1.6.3 Management of Natural Resources

a. Land resources

b. Tree protection

c. Replacement of damaged landscape features

d. Temporary construction

e. Stream crossings

f. Fish and wildlife resources

g. Wetland areas

1.6.4 Protection of Historical and Archaeological Resources

a. Objectives

b. Methods

1.6.5 Stormwater Management and Control

a. Ground cover

b. Erodible soils

c. Temporary measures

(1) Structural Practices

(2) Temporary and permanent stabilization

d. Effective selection, implementation and maintenance of Best Management Practices (BMPs).

1.6.6 Protection of the Environment from Waste Derived from Contractor Operations

Control and disposal of solid and sanitary waste. Control and disposal of hazardous waste.

This item consist of the management procedures for hazardous waste to be generated. The elements of those procedures will coincide with the Installation Hazardous Waste Management Plan. The Contracting Officer will provide a copy of the Installation Hazardous Waste Management Plan. As a minimum, include the following:

a. List of the types of hazardous wastes expected to be generated

b. Procedures to ensure a written waste determination is made for appropriate wastes that are to be generated

c. Sampling/analysis plan, including laboratory method(s) that will be used for waste determinations and copies of relevant laboratory certifications

d. Methods and proposed locations for hazardous waste accumulation/storage (that is, in tanks or containers)

e. Management procedures for storage, labeling, transportation, and disposal of waste (treatment of waste is not allowed unless specifically noted)

f. Management procedures and regulatory documentation ensuring disposal of hazardous waste complies with Land Disposal Restrictions (40 CFR 268)

g. Management procedures for recyclable hazardous materials such as lead-acid batteries, used oil, and similar

h. Used oil management procedures in accordance with 40 CFR 279; Hazardous waste minimization procedures

i. Plans for the disposal of hazardous waste by permitted facilities; and Procedures to be employed to ensure required employee training records are maintained.

1.6.7 Prevention of Releases to the Environment

Procedures to prevent releases to the environment

Notifications in the event of a release to the environment

1.6.8 Regulatory Notification and Permits

List what notifications and permit applications must be made. Some permits require up to 180 days to obtain. Demonstrate that those permits have been obtained or applied for by including copies of applicable environmental permits. The EPP will not be approved until the permits have been obtained.

1.6.9 Clean Air Act Compliance

1.6.9.1 Haul Route

Submit truck and material haul routes along with a Dirt and Dust Control Plan for controlling dirt, debris, and dust on Installation roadways. As a minimum, identify in the plan the subcontractor and equipment for cleaning along the haul route and measures to reduce dirt, dust, and debris from roadways.

1.6.9.2 Pollution Generating Equipment

Identify air pollution generating equipment or processes that may require federal, state, or local permits under the Clean Air Act. Determine requirements based on any current installation permits and the impacts of the project. Provide a list of all fixed or mobile equipment, machinery or operations that could generate air emissions during the project to the Installation Environmental Office (Air Program Manager).

1.6.9.3 Stationary Internal Combustion Engines

Identify portable and stationary internal combustion engines that will be supplied, used or serviced. Comply with 40 CFR 60 Subpart IIII, 40 CFR 60 Subpart JJJJ, 40 CFR 63 Subpart ZZZZ, and local regulations as applicable. At minimum, include the make, model, serial number, manufacture date, size (engine brake horsepower), and EPA emission certification status of each engine. Maintain applicable records and log hours of operation and fuel use. Logs must include reasons for operation and delineate between emergency and non-emergency operation.

1.6.9.4 Refrigerants

Identify management practices to ensure that heating, ventilation, and air conditioning (HVAC) work involving refrigerants complies with 40 CFR 82 requirements. Technicians must be certified, maintain copies of certification on site, use certified equipment and log work that requires the addition or removal of refrigerant. Any refrigerant reclaimed is the property of the Government, coordinate with the Installation Environmental Office to determine the appropriate turn in location.

1.6.9.5 Air Pollution-engineering Processes

Identify planned air pollution-generating processes and management control measures (including, but not limited to, spray painting, abrasive blasting, demolition, material handling, fugitive dust, and fugitive emissions). Log hours of operations and track quantities of materials used.

1.6.9.6 Compliant Materials

Provide the Government a list of and SDSs for all hazardous materials proposed for use on site. Materials must be compliant with all Clean Air Act regulations for emissions including solvent and volatile organic compound contents, and applicable National Emission Standards for Hazardous Air Pollutants requirements. The Government may alter or limit use of specific materials as needed to meet installation permit requirements for emissions.

1.7 LICENSES AND PERMITS

Obtain licenses and permits required for the construction of the project and in accordance with FAR 52.236-7 Permits and Responsibilities. Notify the Government of all general use permitted equipment the Contractor plans to use on site. Coordinate with the Government for the permits obtained or being obtained by the Government. This paragraph supplements the Contractor's responsibility under FAR 52.236-7 Permits and Responsibilities.

1.8 ENVIRONMENTAL RECORDS BINDER

Maintain on-site a separate three-ring Environmental Records Binder and submit at the completion of the project. Make separate parts within the binder that correspond to each submittal listed under paragraph CLOSEOUT SUBMITTALS in this section.

1.9 SOLID WASTE MANAGEMENT PERMIT

Provide the Contracting Officer with written notification of the quantity of anticipated solid waste or debris that is anticipated or estimated to be generated by construction. Include in the report the locations where various types of waste will be disposed or recycled. Include letters of acceptance from the receiving location or as applicable; submit one copy of the receiving location state and local Solid Waste Management Permit or license showing such agency's approval of the disposal plan before transporting wastes off Government property.

1.9.1 Monthly Solid Waste Disposal Report

Monthly, submit a solid waste disposal report to the Contracting Officer. For each waste, the report will state the classification (using the definitions provided in this section), amount, location, and name of the business receiving the solid waste.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PROTECTION OF NATURAL RESOURCES

Minimize interference with, disturbance to, and damage to fish, wildlife, and plants, including their habitats. Prior to the commencement of activities, consult with the Installation Environmental Office, regarding rare species or sensitive habitats that need to be protected. The protection of rare, threatened, and endangered animal and plant species identified, including their habitats, is the Contractor's responsibility.

Preserve the natural resources within the project boundaries and outside the limits of permanent work. Restore to an equivalent or improved condition upon completion of work that is consistent with the requirements of the Installation Environmental Office or as otherwise specified. Confine construction activities to within the limits of the work indicated or specified.

3.1.1 Flow Ways

Do not alter water flows or otherwise significantly disturb the native

habitat adjacent to the project and critical to the survival of fish and wildlife, except as specified and permitted.

3.1.2 Vegetation

Except in areas to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without the Contracting Officer's permission. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages unless authorized by the Contracting Officer. Where such use of attached ropes, cables, or guys is authorized, the Contractor is responsible for any resultant damage.

Protect existing trees that are to remain to ensure they are not injured, bruised, defaced, or otherwise damaged by construction operations. Remove displaced rocks from uncleared areas. Coordinate with the Contracting Officer and Installation Environmental Office to determine appropriate action for trees and other landscape features scarred or damaged by equipment operations.

3.1.3 Streams

Stream crossings must allow movement of materials or equipment without violating water pollution control standards of the federal, state, and local governments. Construction of stream crossing structures must be in compliance with any required permits including, but not limited to, Clean Water Act Section 404, and Section 401 Water Quality.

The Contracting Officer's approval and appropriate permits are required before any equipment will be permitted to ford live streams. In areas where frequent crossings are required, install temporary culverts or bridges. Obtain Contracting Officer's approval prior to installation. Remove temporary culverts or bridges upon completion of work, and repair the area to its original condition unless otherwise required by the Contracting Officer.

3.2 STORMWATER

Do not discharge stormwater from construction sites to the sanitary sewer. If the water is noted or suspected of being contaminated, it may only be released to the storm drain system if the discharge is specifically permitted. Obtain authorization in advance from the Installation Environmental Office for any release of contaminated water.

3.2.1 Erosion and Sediment Control Measures

Provide erosion and sediment control measures in accordance with state and local laws and regulations. Preserve vegetation to the maximum extent practicable.

Erosion control inspection reports may be compiled as part of a stormwater pollution prevention plan inspection reports.

3.2.1.1 Erosion Control

Prevent erosion by Geotextiles,. Stabilize slopes by chemical stabilization, sodding, seeding, or such combination of these methods necessary for effective erosion control. Use of hay bales is prohibited.

3.2.1.2 Sediment Control Practices

Implement sediment control practices to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Implement sediment control practices prior to soil disturbance and prior to creating areas with concentrated flow, during the construction process to minimize erosion and sediment laden runoff. Include the following devices: silt fence, storm drain inlet protection,

3.2.2 Work Area Limits

Mark the areas that need not be disturbed under this Contract prior to commencing construction activities. Mark or fence isolated areas within the general work area that are not to be disturbed. Protect monuments and markers before construction operations commence. Where construction operations are to be conducted during darkness, any markers must be visible in the dark. Personnel must be knowledgeable of the purpose for marking and protecting particular objects.

3.2.3 Contractor Facilities and Work Areas

Place field offices, staging areas, stockpile storage, and temporary buildings in areas designated on the drawings or as directed by the Contracting Officer. Move or relocate the Contractor facilities only when approved by the Government. Provide erosion and sediment controls for onsite borrow and spoil areas to prevent sediment from entering nearby waters. Control temporary excavation and embankments for plant or work areas to protect adjacent areas.

3.2.4 Municipal Separate Storm Sewer System (MS4) Management

Comply with the Installation's MS4 permit requirements.

3.3 SURFACE AND GROUNDWATER

3.3.1 Cofferdams, Diversions, and Dewatering

Construction operations for dewatering, removal of cofferdams, tailrace excavation, and tunnel closure must be constantly controlled to maintain compliance with existing state water quality standards and designated uses of the surface water body. Comply with the State of Michigan water quality standards and anti-degradation provisions. Do not discharge excavation ground water to the sanitary sewer, storm drains, or to surface waters without prior specific authorization in writing from the Installation Environmental Office. Discharge of hazardous substances will not be permitted under any circumstances. Use sediment control BMPs to prevent construction site runoff from directly entering any storm drain or surface waters.

If the construction dewatering is noted or suspected of being contaminated, it may only be released to the storm drain system if the discharge is specifically permitted. Obtain authorization for any contaminated groundwater release in advance from the Installation Environmental Officer and the federal or state authority, as applicable. Discharge of hazardous substances will not be permitted under any circumstances.

3.3.2 Waters of the United States

Do not enter, disturb, destroy, or allow discharge of contaminants into waters of the United States

3.4 PROTECTION OF CULTURAL RESOURCES

3.4.1 Archaeological Resources

If, during excavation or other construction activities, any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found, activities that may damage or alter such resources will be suspended. Resources covered by this paragraph include, but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, immediately notify the Contracting Officer so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. Cease all activities that may result in impact to or the destruction of these resources. Secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources. The Government retains ownership and control over archaeological resources.

3.5 AIR RESOURCES

Equipment operation, activities, or processes will be in accordance with 40 CFR 64 and state air emission and performance laws and standards.

3.5.1 Burning

Burning is prohibited on the Government premises.

3.5.2 Class I and II ODS Prohibition

Class I and II ODS are Government property and must be returned to the Government for appropriate management. Coordinate with the Installation Environmental Office to determine the appropriate location for turn in of all reclaimed refrigerant.

3.5.3 Accidental Venting of Refrigerant

Accidental venting of a refrigerant is a release and must be reported immediately to the Contracting Officer.

3.5.4 EPA Certification Requirements

Heating and air conditioning technicians must be certified through an EPA-approved program. Maintain copies of certifications at the employees' places of business; technicians must carry certification wallet cards, as provided by environmental law.

3.5.5 Dust Control

Keep dust down at all times, including during nonworking periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming will not be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power

brooming. Air blowing will be permitted only for cleaning nonparticulate debris such as steel reinforcing bars. Only wet cutting will be permitted for cutting concrete blocks, concrete, and bituminous concrete. Do not unnecessarily shake bags of cement, concrete mortar, or plaster. Since these products contain Crystalline Silica, comply with the applicable OSHA standard, 29 CFR 1910.1053 or 29 CFR 1926.1153 for controlling exposure to Crystalline Silica Dust.

3.5.5.1 Particulates

Dust particles, aerosols and gaseous by-products from construction activities, and processing and preparation of materials (such as from asphaltic batch plants) must be controlled at all times, including weekends, holidays, and hours when work is not in progress. Maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates that would exceed 40 CFR 50, state, and local air pollution standards or that would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators, or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp. Provide sufficient, competent equipment available to accomplish these tasks. Perform particulate control as the work proceeds and whenever a particulate nuisance or hazard occurs. Comply with state and local visibility regulations.

3.5.5.2 Abrasive Blasting

Blasting operations cannot be performed without prior approval of the Installation Air Program Manager. The use of silica sand is prohibited in sandblasting.

Provide tarpaulin drop cloths and windscreens to enclose abrasive blasting operations to confine and collect dust, abrasive agent, paint chips, and other debris. Perform work involving removal of hazardous material in accordance with 29 CFR 1910.

3.5.6 Odors

Control odors from construction activities. The odors must be in compliance with state regulations and local ordinances and may not constitute a health hazard.

3.6 WASTE MINIMIZATION

Minimize the use of hazardous materials and the generation of waste. Include procedures for pollution prevention/ hazardous waste minimization in the Hazardous Waste Management Section of the EPP. Obtain a copy of the installation's Pollution Prevention/Hazardous Waste Minimization Plan for reference material when preparing this part of the EPP. If no written plan exists, obtain information by contacting the Contracting Officer. Describe the anticipated types of the hazardous materials to be used in the construction when requesting information.

3.6.1 Salvage, Reuse and Recycle

Identify anticipated materials and waste for salvage, reuse, and recycling. Describe actions to promote material reuse, resale or

recycling. To the extent practicable, all scrap metal must be sent for reuse or recycling and will not be disposed of in a landfill.

Include the name, physical address, and telephone number of the hauler, if transported by a franchised solid waste hauler. Include the destination and, unless exempted, provide a copy of the state or local permit (cover) or license for recycling.

3.6.2 Nonhazardous Solid Waste Diversion Report

Maintain an inventory of nonhazardous solid waste diversion and disposal of construction and demolition debris. Submit a report to the Contracting Officer on the first working day after each fiscal year quarter, starting the first quarter that nonhazardous solid waste has been generated. Include the following in the report:

Construction and Demolition (C&D) Debris Disposed	tons, as appropriate
C&D Debris Recycled	tons, as appropriate
C&D Debris Composted	tons, as appropriate
Total C&D Debris Generated	tons, as appropriate
Waste Sent to Waste-To-Energy Incineration Plant (This amount should not be included in the recycled amount)	tons, as appropriate

3.7 WASTE MANAGEMENT AND DISPOSAL

3.7.1 Waste Determination Documentation

Complete a Waste Determination form (provided at the pre-construction conference) for Contractor-derived wastes to be generated. All potentially hazardous solid waste streams that are not subject to a specific exclusion or exemption from the hazardous waste regulations (e.g. scrap metal, domestic sewage) or subject to special rules, (lead-acid batteries and precious metals) must be characterized in accordance with the requirements of 40 CFR 261 or corresponding applicable state or local regulations. Base waste determination on user knowledge of the processes and materials used, and analytical data when necessary. Consult with the Installation environmental staff for guidance on specific requirements. Attach support documentation to the Waste Determination form. As a minimum, provide a Waste Determination form for the following waste (this listing is not inclusive): oil- and latex -based painting and caulking products, solvents, adhesives, aerosols, petroleum products, and containers of the original materials.

3.7.2 Solid Waste Management

3.7.2.1 Project Solid Waste Disposal Documentation Report

Provide copies of the waste handling facilities' weight tickets, receipts, bills of sale, and other sales documentation. In lieu of sales documentation, a statement indicating the disposal location for the solid waste that is signed by an employee authorized to legally obligate or bind the firm may be submitted. The sales documentation must include the receiver's tax identification number and business, EPA or state registration number, along with the receiver's delivery and business addresses and telephone numbers. For each solid waste retained for the Contractor's own use, submit the information previously described in this paragraph on the solid waste disposal report. Prices paid or received do not have to be reported to the Contracting Officer unless required by other provisions or specifications of this Contract or public law.

3.7.2.2 Control and Management of Solid Wastes

Pick up solid wastes, and place in covered containers that are regularly

emptied. Do not prepare or cook food on the project site. Prevent contamination of the site or other areas when handling and disposing of wastes. At project completion, leave the areas clean. Employ segregation measures so that no hazardous or toxic waste will become co-mingled with non-hazardous solid waste. Transport solid waste off Government property and dispose of it in compliance with 40 CFR 260, state, and local requirements for solid waste disposal. A Subtitle D RCRA permitted landfill is the minimum acceptable offsite solid waste disposal option. Verify that the selected transporters and disposal facilities have the necessary permits and licenses to operate. Solid waste disposal offsite must comply with most stringent local, state, and federal requirements, including 40 CFR 241, 40 CFR 243, and 40 CFR 258.

Manage hazardous material used in construction, including but not limited to, aerosol cans, waste paint, cleaning solvents, contaminated brushes, and used rags, in accordance with 49 CFR 173.

3.7.3 Control and Management of Hazardous Waste

Do not dispose of hazardous waste on Government property. Do not discharge any waste to a sanitary sewer, storm drain, or to surface waters or conduct waste treatment or disposal on Government property without written approval of the Contracting Officer.

3.7.3.1 Hazardous Waste/Debris Management

Identify construction activities that will generate hazardous waste or debris. Provide a documented waste determination for resultant waste streams. Identify, label, handle, store, and dispose of hazardous waste or debris in accordance with federal, state, and local regulations, including 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, and 40 CFR 268.

Manage hazardous waste in accordance with the approved Hazardous Waste Management Section of the EPP. Store hazardous wastes in approved containers in accordance with 49 CFR 173 and 49 CFR 178. Hazardous waste generated within the confines of Government facilities is identified as being generated by the Government. Prior to removal of any hazardous waste from Government property, hazardous waste manifests must be signed by personnel from the Installation Environmental Office. Do not bring hazardous waste onto Government property. Provide the Contracting Officer with a copy of waste determination documentation for any solid waste streams that have any potential to be hazardous waste or contain any chemical constituents listed in 40 CFR 372-SUBPART D.

3.7.3.2 Waste Storage/Satellite Accumulation/90 Day Storage Areas

Accumulate hazardous waste at satellite accumulation points and in compliance with 40 CFR 262.34 and applicable state or local regulations. Individual waste streams will be limited to 55 gallons of accumulation (or 1 quart for acutely hazardous wastes). If the Contractor expects to generate hazardous waste at a rate and quantity that makes satellite accumulation impractical, the Contractor may request a temporary 90 day accumulation point be established. Submit a request in writing to the Contracting Officer and provide the following information (Attach Site Plan to the Request):

Contract Number	
Contractor	
Haz/Waste or Regulated Waste POC	
Phone Number	
Type of Waste	
Source of Waste	
Emergency POC	
Phone Number	
Location of the Site	

Attach a Waste Determination form for the expected waste streams. Allow 10 working days for processing this request. Additional compliance requirements (e.g. training and contingency planning) that may be required are the responsibility of the Contractor. Barricade the designated area where waste is being stored and post a sign identifying as follows:

"DANGER - UNAUTHORIZED PERSONNEL KEEP OUT"

3.7.3.3 Hazardous Waste Disposal

3.7.3.3.1 Responsibilities for Contractor's Disposal

Provide hazardous waste manifest to the Installations Environmental Office for review, approval, and signature prior to shipping waste off Government property.

3.7.3.3.1.1 Services

Provide service necessary for the final treatment or disposal of the hazardous material or waste in accordance with 40 CFR 260, local, and state, laws and regulations, and the terms and conditions of the Contract within 60 days after the materials have been generated. These services include necessary personnel, labor, transportation, packaging, detailed analysis (if required for disposal or transportation, include manifesting or complete waste profile sheets, equipment, and compile documentation).

3.7.3.3.1.2 Samples

Obtain a representative sample of the material generated for each job done to provide waste stream determination.

3.7.3.3.1.3 Analysis

Analyze each sample taken and provide analytical results to the Contracting Officer. See paragraph WASTE DETERMINATION DOCUMENTATION.

3.7.3.3.1.4 Labeling

Determine the Department of Transportation's (DOT's) proper shipping names for waste (each container requiring disposal) and demonstrate to the Contracting Officer how this determination is developed and supported by the sampling and analysis requirements contained herein. Label all

containers of hazardous waste with the words "Hazardous Waste" or other words to describe the contents of the container in accordance with 40 CFR 262.31 and applicable state or local regulations.

3.7.3.4 Universal Waste Management

Manage the following categories of universal waste in accordance with federal, state, and local requirements and installation instructions:

a. Batteries as described in 40 CFR 273.2

b. Lamps as described in 40 CFR 273.5

c. Mercury-containing equipment as described in 40 CFR 273.4

Mercury is prohibited in the construction of this facility, unless specified otherwise, and with the exception of mercury vapor lamps and fluorescent lamps. Dumping of mercury-containing materials and devices such as mercury vapor lamps, fluorescent lamps, and mercury switches, in rubbish containers is prohibited. Remove without breaking, pack to prevent breakage, and transport out of the activity in an unbroken condition for disposal as directed.

3.7.3.5 Electronics End-of-Life Management

Recycle or dispose of electronics waste, including, but not limited to, used electronic devices such computers, monitors, hard-copy devices, televisions, mobile devices, in accordance with 40 CFR 260-262, state, and local requirements, and installation instructions.

3.7.3.6 Disposal Documentation for Hazardous and Regulated Waste

Contact the Contracting Officer for the facility RCRA identification number that is to be used on each manifest.

3.7.4 Releases/Spills of Oil and Hazardous Substances

3.7.4.1 Response and Notifications

Exercise due diligence to prevent, contain, and respond to spills of hazardous material, hazardous substances, hazardous waste, sewage, regulated gas, petroleum, lubrication oil, and other substances regulated in accordance with 40 CFR 300. Maintain spill cleanup equipment and materials at the work site. In the event of a spill, take prompt, effective action to stop, contain, curtail, or otherwise limit the amount, duration, and severity of the spill/release. In the event of any releases of oil and hazardous substances, chemicals, or gases; immediately (within 15 minutes) notify the Installation Fire Department, the Installation Command Duty Officer, the Installation Environmental Office, the Contracting Officer.

Submit verbal and written notifications as required by the federal (40 CFR 300.125 and 40 CFR 355), state, local regulations and instructions. Provide copies of the written notification and documentation that a verbal notification was made within 20 days. Spill response must be in accordance with 40 CFR 300 and applicable state and local regulations. Contain and clean up these spills without cost to the Government.

3.7.4.2 Clean Up

Clean up hazardous and non-hazardous waste spills. Reimburse the Government for costs incurred including sample analysis materials, clothing, equipment, and labor if the Government will initiate its own spill cleanup procedures, for Contractor- responsible spills, when: Spill cleanup procedures have not begun within one hour of spill discovery/occurrence; or, in the Government's judgment, spill cleanup is inadequate and the spill remains a threat to human health or the environment.

3.7.5 Mercury Materials

Immediately report to the Environmental Office and the Contracting Officer instances of breakage or mercury spillage. Clean mercury spill area to the satisfaction of the Contracting Officer.

Do not recycle a mercury spill cleanup; manage it as a hazardous waste for disposal.

3.7.6 Wastewater

3.7.6.1 Disposal of wastewater must be as specified below.

3.7.6.1.1 Treatment

Do not allow wastewater from construction activities, such as onsite material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, and forms to enter water ways or to be discharged prior to being treated to remove pollutants. Dispose of the construction- related waste water off-Government property in accordance with 40 CFR 403, state, regional, and local laws and regulations.

3.7.6.1.2 Surface Discharge

For discharge of ground water, obtain a state or federal permit specific for pumping and discharging ground water prior to surface discharging. Surface discharge in accordance with federal, state, and local laws and regulations.

3.7.6.1.3 Land Application

Water generated from the flushing of lines after disinfection or disinfection in conjunction with hydrostatic testing must be discharged into the sanitary sewer with prior approval and notification to the Wastewater Treatment Plant's Operator.

3.8 HAZARDOUS MATERIAL MANAGEMENT

Include hazardous material control procedures in the Safety Plan, in accordance with Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS. Address procedures and proper handling of hazardous materials, including the appropriate transportation requirements. Do not bring hazardous material onto Government property that does not directly relate to requirements for the performance of this contract. Submit an SDS and estimated quantities to be used for each hazardous material to the Contracting Officer prior to bringing the material on the installation. Typical materials requiring SDS and quantity reporting include, but are not limited to, oil and latex based painting and caulking products, solvents, adhesives, aerosol, and petroleum

products. Use hazardous materials in a manner that minimizes the amount of hazardous waste generated. Containers of hazardous materials must have National Fire Protection Association labels or their equivalent. Certify that hazardous materials removed from the site are hazardous materials and do not meet the definition of hazardous waste, in accordance with 40 CFR 261.

3.9 PREVIOUSLY USED EQUIPMENT

Clean previously used construction equipment prior to bringing it onto the project site. Equipment must be free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. Consult with the U.S. Department of Agriculture jurisdictional office for additional cleaning requirements.

3.10 CONTROL AND MANAGEMENT OF ASBESTOS-CONTAINING MATERIAL (ACM)

Manage and dispose of asbestos- containing waste in accordance with 40 CFR 61. Refer to Section 02 82 00 ASBESTOS REMEDIATION. Manifest asbestos-containing waste and provide the manifest to the Contracting Officer. Notifications to the state and Installation Air Program Manager are required before starting any asbestos work.

3.11 CONTROL AND MANAGEMENT OF LEAD-BASED PAINT (LBP)

Manage and dispose of lead-contaminated waste in accordance with 40 CFR 745 and Section 02 83 00 LEAD REMEDIATION. Manifest any lead-contaminated waste and provide the manifest to the Contracting Officer.

3.12 CONTROL AND MANAGEMENT OF LIGHTING BALLAST AND LAMPS CONTAINING PCBS

Manage and dispose of contaminated waste in accordance with 40 CFR 761. Refer to Section 02 84 16 HANDLING OF LIGHTING BALLASTS AND LAMPS CONTAINING PCBS AND MERCURY.

3.13 PETROLEUM, OIL, LUBRICANT (POL) STORAGE AND FUELING

POL products include flammable or combustible liquids, such as gasoline, diesel, lubricating oil, used engine oil, hydraulic oil, mineral oil, and cooking oil. Store POL products and fuel equipment and motor vehicles in a manner that affords the maximum protection against spills into the environment. Manage and store POL products in accordance with EPA 40 CFR 112, and other federal, state, regional, and local laws and regulations. Use secondary containments, dikes, curbs, and other barriers, to prevent POL products from spilling and entering the ground, storm or sewer drains, stormwater ditches or canals, or navigable waters of the United States. Describe in the EPP (see paragraph ENVIRONMENTAL PROTECTION PLAN) how POL tanks and containers must be stored, managed, and inspected and what protections must be provided. Storage of fuel on the project site must be in accordance with EPA, state, and local laws and regulations and paragraph OIL STORAGE INCLUDING FUEL TANKS. Contractor must be familiar with the Base Oil and Hazardous Substances Spill Prevention and Response Plan.

3.13.1 Used Oil Management

Manage used oil generated on site in accordance with 40 CFR 279. Determine if any used oil generated while onsite exhibits a characteristic of hazardous waste. Used oil containing 1,000 parts per million of solvents is considered a hazardous waste and disposed of at the Contractor's

expense. Used oil mixed with a hazardous waste is also considered a hazardous waste. Dispose in accordance with paragraph HAZARDOUS WASTE DISPOSAL.

3.13.2 Oil Storage Including Fuel Tanks

Provide secondary containment and overfill protection for oil storage tanks. A berm used to provide secondary containment must be of sufficient size and strength to contain the contents of the tanks plus 5 inches freeboard for precipitation. Construct the berm to be impervious to oil for 72 hours that no discharge will permeate, drain, infiltrate, or otherwise escape before cleanup occurs. Use drip pans during oil transfer operations; adequate absorbent material must be onsite to clean up any spills and prevent releases to the environment. Cover tanks and drip pans during inclement weather. Provide procedures and equipment to prevent overfilling of tanks. If tanks and containers with an aggregate aboveground capacity greater than 1320 gallons will be used onsite (only containers with a capacity of 55 gallons or greater are counted), provide and implement a SPCC plan meeting the requirements of 40 CFR 112. Do not bring underground storage tanks to the installation for Contractor use during a project. Submit the SPCC plan to the Contracting Officer for approval.

Monitor and remove any rainwater that accumulates in open containment dikes or berms. Inspect the accumulated rainwater prior to draining from a containment dike to the environment, to determine there is no oil sheen present.

3.14 INADVERTENT DISCOVERY OF PETROLEUM-CONTAMINATED SOIL OR HAZARDOUS WASTES

If petroleum-contaminated soil, or suspected hazardous waste is found during construction that was not identified in the Contract documents, immediately notify the Contracting Officer. Do not disturb this material until authorized by the Contracting Officer.

3.15 CHLORDANE

Evaluate excess soils and concrete foundation debris generated during the demolition of housing units or other wooden structures for the presence of chlordane or other pesticides prior to reuse or final disposal.

3.16 SOUND INTRUSION

Make the maximum use of low-noise emission products, as certified by the EPA. Blasting or use of explosives are not permitted without written permission from the Contracting Officer, and then only during the designated times. Confine pile-driving operations to the period between 8 a.m. and 4 p.m., Monday through Friday, exclusive of holidays, unless otherwise specified.

Keep construction activities under surveillance and control to minimize environment damage by noise. Comply with the provisions of the State of Michigan rules.

3.17 POST CONSTRUCTION CLEANUP

Clean up areas used for construction in accordance with Contract Clause:

"Cleaning Up". Unless otherwise instructed in writing by the Contracting Officer, remove traces of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. Grade parking area and similar temporarily used areas to conform with surrounding contours.

-- End of Section --

1.1 Summary

A. The project work is within designated Areas of Concern (AOCs), having known land-use controls (LUCs)/institutional controls (ICs) (media [soil and/or groundwater] relocation restrictions) due to exposure from historical contamination. Environmental impacts, site boundaries, and analytical results are available.

B. The contractor (including subcontractors) must comply with all state requirements for LUCs/ICs for proper media management, in accordance with Section 201120c of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection (NREPA) Act, 1994 PA 451, as amended, Act 451, and other applicable federal and state regulations and Department of Defense, Air Force, National Guard Bureau policies, as identified. Media management plans and processes shall be reviewed and approved by the installation Environmental Management Office (127 CES/CEV).

C. Where impacted ground water is present and anticipates dewatering will be necessary, the contractor must provide a dewatering plan for review and approval prior to accomplishing any dewatering within the impacted delineated areas with LUCs/ICs. The contractor is responsible for all costs associated with media management.

1.2 Waste Handling and Disposal

A. Soils

a. Identified media concentrations below Part 201 Criteria ("clean soil") may be transported and deposited within the installation, in accordance with the Soil Relocation Guidance for SANGB, dated 10/24/2018.

b. Identified media concentration exceedances above Part 201 criteria, coordination with 127 CES/CEV is required:

i. Media may be used as backfill or remain in-place within impacted delineated area; or,
ii. Media may be graded, covered in topsoil, and seeded within the impacted delineated area.

c. Identified media concentration exceedances above Part 201 criteria, coordination with the Michigan Department of Environment, Great Lakes, and Energy (EGLE) by 127 CES/CEV is required:

i. Soils with similar contamination may be transported from one impacted delineated area to another impacted delineated area within the installation; or,
ii. Soils which cannot be transported from one impacted delineated area to another impacted delineated area within the installation:

1. Contaminated soil shall be properly containerized;
2. The licensed disposal facility may require additional analytical testing requirements for media characterization, prior to waste disposal acceptance. The Contractor shall coordinate directly with a licensed disposal facility to confirm sampling requirements;

3. Any additional sampling necessary for waste characterization to obtain approved waste profiles shall be accomplished by the Contractor; and,
4. Waste profiles and characterization signatures for waste disposal must be coordinated with 127 CES/CEV (in advance of disposal pickup dates).

B. Groundwater

a. Identified media concentration below Part 201 Criteria ("clean water") may be transported and deposited within the installation.

b. Media management must be in accordance with Crock Wells and Groundwater Wells Guidance for SANGB Memorandum, dated 03 May 2002.

c. Identified media concentration exceedances above Part 201 criteria, dewatering groundwater (including surface water and groundwater entering excavation with media [soil and/or groundwater] relocation restrictions) coordination with 127 CES/CEV required prior to discharge:

i. Via an adjacent grassy area for natural soil infiltration within the impacted delineated area; and/or,
ii. Via off-site disposal within appropriate containers to a licensed facility;

1. Contaminated groundwater shall be properly containerized;
2. The licensed disposal facility may require additional analytical testing requirements for media characterization, prior to waste disposal acceptance. The Contractor shall coordinate directly with a licensed disposal facility to confirm sampling requirements;
3. Any additional sampling necessary for waste characterization to obtain approved waste profiles shall be accomplished by the Contractor; and,
4. Waste profiles and characterization signatures for waste disposal must be coordinated with 127 CES/CEV (in advance of disposal pickup dates); and/or,

iii. Via authorization from the Great Lakes Water Authority (GLWA) with a Special Discharge Permit through the sanitary sewer system:

1. A Special Discharge Permit will be required prior to any impacted groundwater discharge to the GLWA sanitary sewer system;
2. Additional analytical testing requirements (including sampling methods, analytical suites, minimum detection limits, etc.) for Special Discharge Permits may be required/defined by GLWA, as applicable;
3. Any additional sampling necessary for Special Discharge Permit to obtain GLWA permit shall be accomplished by the Contractor;
4. Groundwater with contaminant levels that exceed GLWA applicable limits may require on-site pretreatment (i.e. temporary treatment system), prior to discharge to the sanitary sewer system

under a special discharge permit and/or may require off-site disposal to a licensed facility;

5. Pre-treatment using granular activated carbon (GAC), organo-clay media, and/or other controls, as necessary, will be listed within the permit as a pre-treatment requirement;
6. Frequency of additional analytical testing requirements will be determined by GLWA permit.

C. Other Source Liquids

a. Liquid collected from excavations and stockpiles shall be temporarily stored in frac tanks appropriately sized for the groundwater anticipated. Liquid storage containers shall be water-tight and shall be located as directed by the government. Liquids will be properly disposed, as previously described.

D. Labeling

a. All containers (drums) must have the appropriate label identifying the waste media:
    i. A black and white “Pending Analysis” label will be used when historical sampling data is not available. After waste characterization by the contractor, pending analysis labels should be replaced with the appropriate labeling (non-hazardous or hazardous waste labels); or,
    ii. A green and white “Non-Hazardous Waste” label will be used when historical sampling data is available and media is below hazardous waste concentrations; or,
    iii. A red and yellow “Hazardous Waste” label will be used when historical sampling data is available and media is at or greater than hazardous waste concentrations.

E. EGLE Requirements

a. Laboratory Analytical Testing
    i. AOC unknown media (soil and/or groundwater) laboratory analytical testing must remain in compliance with State of Michigan and DOD laboratory requirements.
    ii. Samples must only be submitted to approved and validated laboratories, as required by EGLE.
    iii. Analytical results may be required to be compared to the EGLE Cleanup Criteria Requirements for Response Activity (Formerly Part 201 Generic Cleanup Criteria and Screening Levels [Part 201]), as applicable.

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SECTION 01 73 00

EXECUTION

PART 1 GENERAL

1.1 SUMMARY

Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 241	(2019) Standard for Safeguarding Construction, Alteration, and Demolition Operations

1.3 DEFINITIONS

Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-07 Certificates

Certificate Of Survey

1.5 QUALITY ASSURANCE

1.5.1 Land Surveyor Qualifications

A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

1.5.2 Professional Engineer Qualifications

A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.

1.5.3 Cutting and Patching

Comply with requirements for and limitations on cutting and patching of construction elements.

1.5.3.1 Structural Elements

When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify Government of locations and details of cutting and await directions from Government before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.

1.5.3.2 Operational Elements

Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

1.5.3.3 Other Construction Elements

Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

1.5.3.4 Visual Elements

Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Government's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1.5.4 Manufacturer's Installation Instructions

Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

PART 2 PRODUCTS

2.1 MATERIALS

Comply with requirements specified in other Sections.

a. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.

2.1.1 In-Place Materials

Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

a. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Government for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.

2.1.2 Cleaning Agents

Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

3.1.1 Existing Conditions

The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, and other construction affecting the Work.

a. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, and water-service piping; underground electrical services; and other utilities.

b. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

3.1.2 Examination and Acceptance of Conditions

Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

a. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.

b. Examine walls, floors, and roofs for suitable conditions where products

and systems are to be installed.

c. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

d. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

3.2.1 Field Measurements

Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

3.2.2 Space Requirements

Verify space requirements and dimensions of items shown diagrammatically on Drawings.

3.2.3 Review of Contract Documents and Field Conditions

Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Government in accordance with requirements in Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION.

3.3 CONSTRUCTION LAYOUT

3.3.1 Verification

Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks and existing conditions. If discrepancies are discovered, notify Government promptly.

3.3.2 Site Survey

Engage a land surveyor experienced in laying out the Work, using the following accepted surveying practices:

a. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.

b. Establish limits on use of Project site.

c. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.

d. Inform installers of lines and levels to which they must comply.

e. Check the location, level and plumb, of every major element as the Work progresses.

f. Notify Government when deviations from required lines and levels exceed

allowable tolerances.

g. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

Submit Certificate of Survey signed by land surveyor, certifying that location and elevation of improvements comply with requirements.

3.3.3 Site Improvements

Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

3.3.4 Building Lines and Levels

Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

3.3.5 Record Log

Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Government.

3.4 FIELD ENGINEERING

3.4.1 Reference Points

Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

a. Do not change or relocate existing benchmarks or control points without prior written approval of Government. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Government before proceeding.

b. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

3.4.2 Benchmarks

Establish and maintain a minimum of one permanent benchmark on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

a. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

b. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.

c. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.5 INSTALLATION

a. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

    1. Make vertical work plumb and make horizontal work level.

    2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

    3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

b. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

c. Install products at the time and under conditions that will ensure satisfactory results as judged by Government. Maintain conditions required for product performance until Substantial Completion.

d. Conduct construction operations, so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.

e. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.

f. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels.

g. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

h. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.

    1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Government.

    2. Allow for building movement, including thermal expansion and contraction.

    3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

i. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as

judged by Government. Fit exposed connections together to form hairline joints.

j. Repair or remove and replace damaged, defective, or nonconforming Work.

3.6 CUTTING AND PATCHING

3.6.1 General

Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

a. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

3.6.2 Existing Warranties

Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

3.6.3 Temporary Support

Provide temporary support of Work to be cut.

3.6.4 Protection:

Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

3.6.5 Adjacent Occupied Areas

Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements in Section 01 11 00 SUMMARY OF WORK.

3.6.6 Existing Utility Services and Mechanical/Electrical Systems

Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

3.6.7 Cutting

Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

a. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

b. Finished Surfaces: Cut or drill from the exposed or finished side into

concealed surfaces.

c. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

d. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.

e. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.

f. Proceed with patching after construction operations requiring cutting are complete.

3.6.8 Patching

Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as practicable, as judged by Government. Provide materials and comply with installation requirements specified in other Sections, where applicable.

3.6.8.1 Inspection

Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.

3.6.8.2 Exposed Finishes

Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

a. Clean piping, conduit, and similar features before applying paint or other finishing materials.

b. Restore damaged pipe covering to its original condition.

3.6.8.3 Floors and Walls

Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.

3.6.8.4 Ceilings

Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

3.6.8.5 Exterior Building Enclosure

Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

3.6.9 Cleaning

Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 PROGRESS CLEANING

a. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

    1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.

    2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.

    3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

        (a) Use containers intended for holding waste materials of type to be stored.

b. Site: Maintain Project site free of waste materials and debris.

c. Work Areas: Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.

    1. Remove liquid spills promptly.

    2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

d. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

e. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

f. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

g. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

h. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

i. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

j. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

a. Coordinate startup and adjusting of equipment and operating components with requirements in Section 01 91 00.15 10 TOTAL BUILDING COMMISSIONING.

b. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

c. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

d. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

e. Manufacturer's Field Service: Comply with qualification requirements in Section 01 45 00.00 10 QUALITY CONTROL.

3.9 PROTECTION AND REPAIR OF INSTALLED CONSTRUCTION

a. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

b. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.

c. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

d. Comply with manufacturer's written instructions for temperature and relative humidity.

-- End of Section --

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 273	Standards for Universal Waste Management
49 CFR 173	Shippers - General Requirements for Shipments and Packagings
49 CFR 178	Specifications for Packagings

1.2 DEFINITIONS

1.2.1 Co-mingle

The practice of placing unrelated materials together in a single container, usually for benefits of convenience and speed.

1.2.2 Construction Waste

Waste generated by construction activities, such as scrap materials, damaged or spoiled materials, temporary and expendable construction materials, and other waste generated by the workforce during construction activities.

1.2.3 Demolition Debris/Waste

Waste generated from demolition activities, including minor incidental demolition waste materials generated as a result of Intentional dismantling of all or portions of a building, to include clearing of building contents that have been destroyed or damaged.

1.2.4 Disposal

Depositing waste in a solid waste disposal facility, usually a managed landfill, regulated in the US under the Resource Conservation and Recovery Act (RCRA).

1.2.5 Diversion

The practice of diverting waste from disposal in a landfill, by means of eliminating or minimizing waste, or reuse of materials.

1.2.6 Final Construction Waste Diversion Report

A written assertion by a material recovery facility operator identifying

constituent materials diverted from disposal, usually including summary tabulations of materials, weight in short-ton.

1.2.7 Recycling

The series of activities, including collection, separation, and processing, by which products or other materials are diverted from the solid waste stream for use in the form of raw materials in the manufacture of new products sold or distributed in commerce, or the reuse of such materials as substitutes for goods made of virgin materials, other than fuel.

1.2.8 Reuse

The use of a product or materials again for the same purpose, in its original form or with little enhancement or change.

1.2.9 Salvage

Usable, salable items derived from buildings undergoing demolition or deconstruction, parts from vehicles, machinery, other equipment, or other components.

1.2.10 Source Separation

The practice of administering and implementing a management strategy to identify and segregate unrelated waste at the first opportunity.

1.3 CONSTRUCTION WASTE (INCLUDES DEMOLITION DEBRIS/WASTE)

Divert a minimum of 60 percent by weight of the project from the landfill. Follow applicable industry standards in the management of waste. Apply sound environmental principles in the management of waste. (1) Practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction waste and demolition debris/waste from landfills and incinerators and to facilitate the recycling or reuse of .

1.4 CONSTRUCTION WASTE MANAGEMENT

Implement a construction waste management program for the project. Take a pro-active, responsible role in the management of construction construction waste, recycling process, disposal of demolition debris/waste, and require all subcontractors, vendors, and suppliers to participate in the construction waste management program. Establish a process for clear tracking, and documentation of construction waste and demolition debris/waste.

1.4.1 Implementation of Construction Waste Management Program

Develop and document how the construction waste management program will be implemented in a construction waste management plan. Submit a Construction Waste Management Plan to the Contracting Officer for approval. Construction waste and demolition debris/waste materials include un-used construction materials not incorporated in the final work, as well as demolition debris/waste materials from demolition activities or deconstruction activities. In the management of waste, consider the availability of viable markets, the condition of materials, the ability to provide material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal project

completion mandates.

1.4.2 Special Programs

Implement any special programs involving rebates or similar incentives related to recycling of. Retain revenue or savings from salvaged or recycling, unless otherwise directed. Ensure firms and facilities used for recycling, reuse, and disposal are permitted for the intended use to the extent required by federal, state, and local regulations.

1.4.3 Special Instructions

Provide on-site instruction of appropriate separation, handling, recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the projects. Designation of single source separating or commingling will be clearly marked on the containers.

1.4.4 Waste Streams

Delineate waste streams and characterization, including estimated material types and quantities of waste, in the construction waste management plan. Manage all waste streams associated with the project. Typical waste streams are listed below. Include additional waste steams not listed:

a. Land Clearing Debris
b. Asphalt
c. Masonry and CMU
d. Concrete
e. Metals (e.g. banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, bronze, etc.)
f. Wood (nails and staples allowed)
g. Glass
h. Paper
i. Plastics (PET, HDPE,PVC,LDPE,PP,PS, Other)
j. Gypsum
k. Non-hazardous paint and paint cans
l. Carpet
m. Ceiling Tiles
n. Insulation
o. Beverage Containers

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction Waste Management Plan; G

SD-06 Test Reports

Quarterly Reports

Annual Report

SD-11 Closeout Submittals

Final Construction Waste Diversion Report; S

1.6 MEETINGS

At a minimum, discuss and document waste management goals at following meetings:

a. Preconstruction meeting.

b. Regular site meetings.

c. Work safety meeting (if applicable).

1.7 CONSTRUCTION WASTE MANAGEMENT PLAN

Submit Construction Waste Management Plan within 15 days after contract award. Revise and resubmit Construction Waste Management Plan until it receives final approval from the Contracting Officer, in order for construction to begin. Execute demolition or deconstruction activities in accordance with Section 02 41 00 SELECTIVE DEMOLITION. Manage demolition debris/waste or deconstruction materials in accordance with the approved construction waste management plan.

An approved construction waste management plan will not relieve the Contractor of responsibility for compliance with applicable environmental regulations or meeting project cumulative waste diversion requirement. Ensure all subcontractors receive a copy of the approved Construction Waste Management Plan. The plan demonstrates how to meet the project waste diversion requirement. Also, include the following in the plan:

a. Identify the names of individuals responsible for waste management and waste management tracking, along with roles and responsibilities on the project..

b. Actions that will be taken to reduce solid waste generation, including coordination with subcontractors to ensure awareness and participation.

c. Description of the regular meetings to be held to address waste management.

d. Description of the specific approaches to be used in recycling/reuse of the various materials generated, including the areas on site and equipment to be used for processing, sorting, and temporary storage of materials.

e. Name of landfill and/or incinerator to be used.

f. Identification of local and regional re-use programs, including non-profit organizations such as schools, local housing agencies, and organization that accept used materials such as material exchange networks and resale stores. Include the name, location, phone number for each re-use facility identified, and provide a copy of the permit or license for each facility.

g. List of specific materials, by type and quantity, that will be salvaged

for resale, salvaged and reused on the current project, salvaged and stored for reuse on a future project, or recycled. Identify the recycling facilities by name, address, and phone number.

h. Identification of materials that cannot be recycled or reused with an explanation or justification, to be approved by the Contracting Officer.

i. Description of the means by which any materials identified in item (g) above will be protected from contamination.

j. Description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site).

k. Copy of training plan for subcontractors and other services to prevent contamination by co-mingling materials identified for diversion and waste materials.

l. Facilities or subcontractors offering construction waste transport on-site or off-site must ensure that proper shipping orders, bill of lading, manifests, or other shipping documents containing waste diversion information meet requirements of 40 CFR 273 Universal Waste Management, 49 CFR 173 Shippers - General Requirements for Shipments and Packagings, and 49 CFR 178 Specifications for Packaging. Individuals signing manifests or other shipping documents should meet the minimum training requirements.

m. List each supplier who deliver construction materials, in bulk, or package products in returnable containers or returnable packaging, or have take-back programs. List each program and the applicable material to actively monitor and track to assist in meeting waste diversion requirements on the project.

Distribute copies of the waste management plan to each subcontractor, Quality Control Manager, and the Contracting Officer.

1.8 RECORDS (DOCUMENTATION)

1.8.1 General

Maintain records to document the types and quantities of waste generated and diverted though re-use, recycling and/or sale to third parties; through disposal to a landfill or incinerator facility. Provide explanations for any materials not recycled, reused or sold. Collect and retain manifests, weight tickets, sales receipts, and invoices specifically identifying diverted project waste materials or disposed materials.

1.8.2 Accumulated

Maintain a running record of materials generated and diverted from landfill disposal, including accumulated diversion rates for the project. Make records available to the Contracting Officer during construction or incidental demolition activities. Provide a copy of the diversion records to the Contracting Officer upon completion of the construction, incidental demolitions or minor deconstruction activities.

1.9 REPORTS

1.9.1 General

Maintain current construction waste diversion information on site for periodic inspection by the Contracting Officer. Include in the quarterly reports, annual reports and final reports: the project name, contract information, information for waste generated, diverted and disposed of for the current reporting period and show cumulative totals for the project. Reports must identify quantifies of waste by type and disposal method. Also include in each report, supporting documentation to include manifests, weigh tickets, receipts, and invoices specifically identifying the project and waste material type and weighted sum.

1.9.2 Quarterly Reporting

Provide cumulative reports at the end of each quarter (December, March, June, and September, corresponding with the federal fiscal year for reporting purposes). Submit quarterly reports not later than 15 calendar days after the preceding quarter has ended. Submit Quarterly Reports to the appropriate office or identified point of contact.

1.9.3 Annual Reporting

Provide a cumulative construction waste diversion report annually. Submit annual report not later than 30 calendar days after the preceding fourth quarter has ended. Provide copy of annual construction waste diversion report to the installation POC.

1.10 FINAL CONSTRUCTION WASTE DIVERSION REPORT

A Final Construction Waste Diversion Report is required at the end of the project. Provide Final Construction Waste Diversion Report 14 days prior to the Beneficial Occupancy Date (BOD). The final Construction Waste Diversion Report must be included in the Sustainability eNotebook in accordance with Section 01 33 29 SUSTAINABILITY REPORTING.

1.11 COLLECTION

Collect, store, protect, and handle reusable and recyclable materials at the site in a manner which prevents contamination, and provides protection from the elements to preserve their usefulness and monetary value. Provide receptacles and storage areas designated specifically for recyclable and reusable materials and label them clearly and appropriately to prevent contamination from other waste materials. Keep receptacles or storage areas neat and clean.

Train subcontractors and other service providers to either separate waste streams or use the co-mingling method as described in the construction waste management plan. Handle hazardous waste and hazardous materials in accordance with applicable regulations and coordinate with Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS Separate materials by one of the following methods described herein:

1.11.1 Source Separation Method

Separate waste products and materials that are recyclable from trash and sort as described below into appropriately marked separate containers and then transport to the respective recycling facility for further

processing. Deliver materials in accordance with recycling or reuse facility requirements (e.g., free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process). Separate materials into the category types as defined in the construction waste management plan.

1.11.2 Other Methods

Other methods proposed by the Contractor may be used when approved by the Contracting Officer.

1.12 DISPOSAL

Control accumulation of waste materials and trash. Recycle or dispose of collected materials off-site at intervals approved by the Contracting Officer and in compliance with waste management procedures as described in the waste management plan. Except as otherwise specified in other sections of the specifications, dispose of in accordance with the following:

1.12.1 Reuse

Give first consideration to reusing construction and demolition materials as a disposition strategy. Recover for reuse materials, products, and components as described in the approved construction waste management plan. Coordinate with the Contracting Officer to identify onsite reuse opportunities or material sales or donation available through Government resale or donation programs. Sale of recovered materials is not allowed on the Installation.

1.12.2 Recycle

Recycle non-hazardous construction and demolition/debris materials that are not suitable for reuse. Track rejection of contaminated recyclable materials by the recycling facility. Rejected recyclables materials will not be counted as a percentage of diversion calculation. Recycle all fluorescent lamps, HID lamps, mercury (Hg) -containing thermostats and ampoules, and PCBs-containing ballasts and electrical components as directed by the Contracting Officer. Do not crush lamps on site as this creates a hazardous waste stream with additional handling requirements.

1.12.3 Waste

Dispose by landfill or incineration only those waste materials with no practical use, economic benefit, or recycling opportunity.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

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SECTION 01 78 00

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 DEFINITIONS

1.1.1 As-Built Drawings

As-built drawings are the marked-up drawings, maintained by the Contractor on-site, that depict actual conditions and deviations from the Contract Documents. These deviations and additions may result from coordination required by, but not limited to: contract modifications; official responses to submitted Requests for Information (RFI's); direction from the Contracting Officer; design that is the responsibility of the Contractor, and differing site conditions. Maintain the as-builts throughout construction as red-lined hard copies on site. These files serve as the basis for the creation of the record drawings.

1.1.2 Record Drawings

The record drawings are the final compilation of actual conditions reflected in the as-built drawings.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Warranty Management Plan

Spare Parts Data

SD-08 Manufacturer's Instructions

Posted Instructions

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals; G

SD-11 Closeout Submittals

As-Built Drawings; G

As-Built Record of Equipment and Materials

Certification of EPA Designated Items; G

1.3 SPARE PARTS DATA

Submit electronic copies of the Spare Parts Data list.

a. Indicate manufacturer's name, part number, and stock level required for test and balance, pre-commissioning, maintenance and repair activities. List those items that may be standard to the normal maintenance of the system.

1.4 WARRANTY MANAGEMENT

1.4.1 Warranty Management Plan

Develop a warranty management plan which contains information relevant to FAR 52.246-21 Warranty of Construction. At least 30 days before the planned pre-warranty conference, submit an electronic version of the warranty management plan. Include within the warranty management plan all required actions and documents to assure that the Government receives all warranties to which it is entitled. The plan narrative must contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The term "status" as indicated below must include due date and whether item has been submitted or was accomplished. Submit warranty information, made available during the construction phase, to the Contracting Officer for approval prior to each monthly pay estimate. Assemble approved information in a binder and turn over to the Government upon acceptance of the work. The construction warranty period must begin on the date of project acceptance and continue for the full product warranty period. Conduct a joint 4 month and 9 month warranty inspection, measured from time of acceptance; with the Contractor, Contracting Officer and the Customer Representative. The warranty management plan must include, but is not limited to, the following:

a. Roles and responsibilities of personnel associated with the warranty process, including points of contact and telephone numbers within the organizations of the Contractors, subcontractors, manufacturers or suppliers involved.

b. For each warranty, the name, address, telephone number, and e-mail of each of the guarantor's representatives nearest to the project location.

c. A list and status of delivery of Certificates of Warranty for extended warranty items, including roofs, HVAC balancing, pumps, motors, transformers, and for commissioned systems, such as fire protection and alarm systems, sprinkler systems, and lightning protection systems.

d. As-Built Record of Equipment and Materials list for each warranted equipment, item, feature of construction or system indicating:

(1) Name of item.
(2) Model and serial numbers.
(3) Location where installed.
(4) Name and phone numbers of manufacturers or suppliers.
(5) Names, addresses and telephone numbers of sources of spare parts.
(6) Warranties and terms of warranty. Include one-year overall warranty of construction, including the starting date of warranty of construction. Items which have warranties longer than one year must be indicated with separate warranty expiration dates.
(7) Cross-reference to warranty certificates as applicable.
(8) Starting point and duration of warranty period.

(9) Summary of maintenance procedures required to continue the warranty in force.
(10) Cross-reference to specific pertinent Operation and Maintenance manuals.
(11) Organization, names and phone numbers of persons to call for warranty service.
(12) Typical response time and repair time expected for various warranted equipment.

e. The plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.

f. Procedure and status of tagging of equipment covered by warranties longer than one year.

g. Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty or safety reasons.

1.4.2 Performance Bond

The Performance Bond must remain effective throughout the construction and warranty period .

a. In the event the Contractor fails to commence and diligently pursue any construction warranty work required, the Contracting Officer will have the work performed by others, and after completion of the work, will charge the remaining construction warranty funds of expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.

b. In the event sufficient funds are not available to cover the construction warranty work performed by the Government at the Contractor's expense, the Contracting Officer will have the right to recoup expenses from the bonding company.

c. Following oral or written notification of required construction warranty repair work, respond in a timely manner. Written verification will follow oral instructions. Failure to respond will be cause for the Contracting Officer to proceed against the Contractor.

1.4.3 Pre-Warranty Conference

Prior to contract completion, and at a time designated by the Contracting Officer, meet with the Contracting Officer to develop a mutual understanding with respect to the requirements of this section. At this meeting, establish and review communication procedures for Contractor notification of construction warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Contracting Officer for the execution of the construction warranty In connection with these requirements and at the time of the Contractor's quality control completion inspection, furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue construction warranty work action on behalf of the Contractor. This point of contact must be located within the local service area of the warranted construction, be continuously available, and be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of its responsibilities in connection with other portions of this provision.

PART 2 PRODUCTS

2.1 CERTIFICATION OF EPA DESIGNATED ITEMS

Submit the Certification of EPA Designated Items as required by FAR 52.223-9 Estimate of Percentage of Recovered Material Content for EPA Designated Items and FAR 52-223-17 Affirmative Procurement of EPA designated items in Service and Construction Contracts.. Include on the certification form the following information: project name, project number, Contractor name, license number, Contractor address, and certification. The certification will read as follows and be signed and dated by the Contractor.

Record each product used in the project that has a requirement or option of containing recycled content in accordance with SECTION 01 33 29 SUSTAINABILITY REPORTING, noting total price, total value of post-industrial recycled content, total value of post-consumer recycled content, exemptions (1, 2, 3, or 4, as indicated), and comments. Recycled content values may be determined by weight or volume percent, but must be consistent throughout.

PART 3 EXECUTION

3.1 AS-BUILT DRAWINGS

3.1.1 Markup Guidelines

Make comments and markup the drawings complete without reference to letters, memos, or materials that are not part of the As-Built drawing. Show what was changed, how it was changed, where item(s) were relocated and change related details. These working as-built markup prints must be neat, legible and accurate as follows:

a. Use base colors of red, green, and blue. Color code for changes as follows:

   (1) Special (Blue) - Items requiring special information, coordination, or special detailing or detailing notes.

   (2) Deletions (Red) - Over-strike deleted graphic items (lines), lettering in notes and leaders.

   (3) Additions (Green) - Added items, lettering in notes and leaders.

b. Provide a legend if colors other than the "base" colors of red, green, and blue are used.

c. Add and denote any additional equipment or material facilities, service lines, incorporated under As-Built Revisions if not already shown in legend.

d. Use frequent written explanations on markup drawings to describe changes. Do not totally rely on graphic means to convey the revision.

e. Use legible lettering and precise and clear digital values when marking prints. Clarify ambiguities concerning the nature and application of change involved.

f. Wherever a revision is made, also make changes to related section views, details, legend, profiles, plans and elevation views, schedules, notes and call out designations, and mark accordingly to avoid conflicting data on all other sheets.

g. For deletions, cross out all features, data and captions that relate to that revision.

h. For changes on small-scale drawings and in restricted areas, provide large-scale inserts, with leaders to the applicable location.

i. Indicate one of the following when attaching a print or sketch to a markup print:

   1) Add an entire drawing to contract drawings

   2) Change the contract drawing to show

   3) Provided for reference only to further detail the initial design.

j. Incorporate all shop and fabrication drawings into the markup drawings.

3.1.2 As-Built Drawings Content

Show on the as-built drawings, but not limited to, the following information:

a. The actual location, kinds and sizes of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, show by offset dimensions to two permanently fixed surface features the end of each run including each change in direction on the record drawings. Locate valves, splice boxes and similar appurtenances by dimensioning along the utility run from a reference point. Also record the average depth below the surface of each run.

b. The location and dimensions of any changes within the building structure.

c. Layout and schematic drawings of electrical circuits and piping.

d. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.

e. Changes in details of design or additional information obtained from working drawings specified to be prepared or furnished by the Contractor; including but not limited to shop drawings, fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment, and foundations.

f. The topography, invert elevations and grades of drainage installed or affected as part of the project construction.

g. Changes or Revisions which result from the final inspection.

h. Where contract drawings or specifications present options, show only the option selected for construction on the working as-built markup

drawings.

i. If borrow material for this project is from sources on Government property, or if Government property is used as a spoil area, furnish a contour map of the final borrow pit/spoil area elevations.

j. Systems designed or enhanced by the Contractor, such as HVAC controls, fire alarm, fire sprinkler, and irrigation systems.

k. Changes in location of equipment and architectural features.

l. Modifications.

m. Actual location of anchors, construction and control joints, etc., in concrete.

n. Unusual or uncharted obstructions that are encountered in the contract work area during construction.

o. Location, extent, thickness, and size of stone protection particularly where it will be normally submerged by water.

3.2 OPERATION AND MAINTENANCE MANUALS

Provide project operation and maintenance manuals as specified in Section 01 78 23 OPERATION AND MAINTENANCE MANUALS DATA. Provide electronic copies of the Operation and Maintenance Manual files. Submitto the Contracting Officer for approval within 14 calendardays of the Beneficial Occupancy Date (BOD). Update and resubmit files forfinal approval at BOD.

3.3 CLEANUP

Leave premises "broom clean." Clean interior and exterior glass surfaces exposed to view; remove temporary labels, stains and foreign substances; polish transparent and glossy surfaces; vacuum carpeted and soft surfaces. Clean equipment and fixtures to a sanitary condition. Replace filters of operating equipment. Clean debris from roofs, gutters, downspouts and drainage systems. Sweep paved areas and rake clean landscaped areas. Remove waste and surplus materials, rubbish and construction facilities from the site..

-- End of Section --

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-10 Operation and Maintenance Data

Training Plan ; G

Training Outline ; G

Training Content ; G

SD-11 Closeout Submittals

Training Video Recording ; G

Validation of Training Completion ; G

1.2 OPERATION AND MAINTENANCE DATA

Submit Operation and Maintenance (O&M) Data for the provided equipment, product, or system, defining the importance of system interactions, troubleshooting, and long-term preventive operation and maintenance. Compile, prepare, and aggregate O&M data to include clarifying and updating the original sequences of operation to as-built conditions. Organize and present information in sufficient detail to clearly explain O&M requirements at the system, equipment, component, and subassembly level. Include an index preceding each submittal. Submit in accordance with this section and Section 01 33 00 SUBMITTAL PROCEDURES.

1.2.1 Package Quality

Documents must be fully legible. Operation and Maintenance data must be consistent with the manufacturer's standard brochures, schematics, printed instructions, general operating procedures, and safety precautions.

1.2.2 Package Content

Provide data package content in accordance with paragraph SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES. Comply with the data package requirements specified in the individual technical sections, including the content of the packages and addressing each product, component, and system designated for data package submission, except as follows. Use Data Package 4 for commissioned items without a specified data package requirement in the individual technical sections. Provide a Data Package 3 instead of Data Package 1 or 2, as specified in the individual technical

section, for items that are commissioned.

1.2.3 Changes to Submittals

Provide manufacturer-originated changes or revisions to submitted data if a component of an item is so affected subsequent to acceptance of the O&M Data. Submit changes, additions, or revisions required by the Contracting Officer for final acceptance of submitted data within 30 calendar days of the notification of this change requirement.

1.2.4 Commissioning Authority Review and Approval

Submit the commissioned systems and equipment submittals to the Commissioning Authority (CxA) to review for completeness and applicability. Obtain validation from the CxA that the systems and equipment provided meet the requirements of the Contract documents and design intent, particularly as they relate to functionality, energy performance, water performance, maintainability, sustainability, system cost, indoor environmental quality, and local environmental impacts. The CxA communicates deficiencies to the Contracting Officer. Submit the O&M manuals to the Contracting Officer upon a successful review of the corrections, and with the CxA recommendation for approval and acceptance of these O&M manuals. This work is in addition to the normal review procedures for O&M data.

1.3 OPERATION AND MAINTENANCE MANUAL FILE FORMAT

Assemble data packages into electronic Operation and Maintenance Manuals. Assemble each manual into a composite electronically indexed file using the most current version of Adobe Acrobat or similar software capable of producing PDF file format. Provide compact disks (CD) or data digital versatile disk (DVD) as appropriate, so that each one contains operation, maintenance and record files, project record documents, and training videos. Include a complete electronically linked operation and maintenance directory.

1.3.1 Organization

Bookmark Product and Drawing Information documents using the current version of CSI Masterformat numbering system, and arrange submittals using the specification sections as a structure. Use CSI Masterformat and UFGS numbers along with descriptive bookmarked titles that explain the content of the information that is being bookmarked.

1.3.2 CD or DVD Label and Disk Holder or Case

Provide the following information on the disk label and disk holder or case:

a. Building Number

b. Project Title

c. Activity and Location

d. Construction Contract Number

e. Prepared For: (Contracting Agency)

f. Prepared By: (Name, title, phone number and email address)

g. Include the disk content on the disk label

h. Date

i. Virus scanning program used

1.4 TYPES OF INFORMATION REQUIRED IN O&M DATA PACKAGES

The following are a detailed description of the data package items listed in paragraph SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES.

1.4.1 Operating Instructions

Provide specific instructions, procedures, and illustrations for the following phases of operation for the installed model and features of each system:

1.4.1.1 Safety Precautions and Hazards

List personnel hazards and equipment or product safety precautions for operating conditions. List all residual hazards identified in the Activity Hazard Analysis provided under Section 01 35 26 GOVERNMENT SAFETY REQUIREMENTS. Provide recommended safeguards for each identified hazard.

1.4.1.2 Operator Prestart

Provide procedures required to install, set up, and prepare each system for use.

1.4.1.3 Startup, Shutdown, and Post-Shutdown Procedures

Provide narrative description for Startup, Shutdown and Post-shutdown operating procedures including the control sequence for each procedure.

1.4.1.4 Normal Operations

Provide Control Diagrams with data to explain operation and control of systems and specific equipment. Provide narrative description of Normal Operating Procedures.

1.4.1.5 Emergency Operations

Provide Emergency Procedures for equipment malfunctions to permit a short period of continued operation or to shut down the equipment to prevent further damage to systems and equipment. Provide Emergency Shutdown Instructions for fire, explosion, spills, or other foreseeable contingencies. Provide guidance and procedures for emergency operation of utility systems including required valve positions, valve locations and zones or portions of systems controlled.

1.4.1.6 Operator Service Requirements

Provide instructions for services to be performed by the operator such as lubrication, adjustment, inspection, and recording gauge readings.

1.4.1.7 Environmental Conditions

Provide a list of Environmental Conditions (temperature, humidity, and

other relevant data) that are best suited for the operation of each product, component or system. Describe conditions under which the item equipment should not be allowed to run.

1.4.1.8 Operating Log

Provide forms, sample logs, and instructions for maintaining necessary operating records.

1.4.1.9 Additional Requirements for HVAC Control Systems

Provide Data Package 5 and the following for control systems:

a. Narrative description on how to perform and apply functions, features, modes, and other operations, including unoccupied operation, seasonal changeover, manual operation, and alarms. Include detailed technical manual for programming and customizing control loops and algorithms.

b. Full as-built sequence of operations.

c. Copies of checkout tests and calibrations performed by the Contractor (not Cx tests).

d. Full points list. Provide a listing of rooms with the following information for each room:

(1) Floor

(2) Room number

(3) Room name

(4) Air handler unit ID

(5) Reference drawing number

(6) Air terminal unit tag ID

(7) Heating or cooling valve tag ID

(8) Minimum cfm

(9) Maximum cfm

e. Full print out of all schedules and set points after testing and acceptance of the system.

f. Full as-built print out of software program.

g. Marking of system sensors and thermostats on the as-built floor plan and mechanical drawings with their control system designations.

1.4.2 Preventive Maintenance

Provide the following information for preventive and scheduled maintenance to minimize repairs for the installed model and features of each system. Include potential environmental and indoor air quality impacts of recommended maintenance procedures and materials.

1.4.2.1 Lubrication Data

Include the following preventive maintenance lubrication data, in addition to instructions for lubrication required under paragraph OPERATOR SERVICE REQUIREMENTS:

a. A table showing recommended lubricants for specific temperature ranges and applications.

b. Charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, and capacities.

c. A Lubrication Schedule showing service interval frequency.

1.4.2.2 Preventive Maintenance Plan, Schedule, and Procedures

Provide manufacturer's schedule for routine preventive maintenance, inspections, condition monitoring (predictive tests) and adjustments required to ensure proper and economical operation and to minimize repairs. Provide instructions stating when the systems should be retested. Provide manufacturer's projection of preventive maintenance work-hours on a daily, weekly, monthly, and annual basis including craft requirements by type of craft. For periodic calibrations, provide manufacturer's specified frequency and procedures for each separate operation.

a. Define the anticipated time required to perform each of each test (work-hours), test apparatus, number of personnel identified by responsibility, and a testing validation procedure permitting the record operation capability requirements within the schedule. Provide a remarks column for the testing validation procedure referencing operating limits of time, pressure, temperature, volume, voltage, current, acceleration, velocity, alignment, calibration, adjustments, cleaning, or special system notes. Delineate procedures for preventive maintenance, inspection, adjustment, lubrication and cleaning necessary to minimize repairs.

b. Repair requirements must inform operators how to check out, troubleshoot, repair, and replace components of the system. Include electrical and mechanical schematics and diagrams and diagnostic techniques necessary to enable operation and troubleshooting of the system after acceptance.

1.4.3 Repair

Provide manufacturer's recommended procedures and instructions for correcting problems and making repairs.

1.4.3.1 Troubleshooting Guides and Diagnostic Techniques

Provide step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or require replacement.

1.4.3.2 Wiring Diagrams and Control Diagrams

Provide point-to-point drawings of wiring and control circuits including

factory-field interfaces. Provide a complete and accurate depiction of the actual job specific wiring and control work. On diagrams, number electrical and electronic wiring and pneumatic control tubing and the terminals for each type, identically to actual installation configuration and numbering.

1.4.3.3 Repair Procedures

Provide instructions and a list of tools required to repair or restore the product or equipment to proper condition or operating standards.

1.4.3.4 Removal and Replacement Instructions

Provide step-by-step procedures and a list of required tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings and adjustments required. Use a combination of text and illustrations.

1.4.3.5 Spare Parts and Supply Lists

Provide lists of spare parts and supplies required for repair to ensure continued service or operation without unreasonable delays. Special consideration is required for facilities at remote locations. List spare parts and supplies that have a long lead-time to obtain.

1.4.3.6 Repair Work-Hours

Provide manufacturer's projection of repair work-hours including requirements by type of craft. Identify, and tabulate separately, repair that requires the equipment manufacturer to complete or to participate.

1.4.4 Appendices

Provide information required below and information not specified in the preceding paragraphs but pertinent to the maintenance or operation of the product or equipment. Include the following:

1.4.4.1 Product Submittal Data

Provide a copy of SD-03 Product Data submittals documented with the required approval.

1.4.4.2 Manufacturer's Instructions

Provide a copy of SD-08 Manufacturer's Instructions submittals documented with the required approval.

1.4.4.3 O&M Submittal Data

Provide a copy of SD-10 Operation and Maintenance Data submittals documented with the required approval.

1.4.4.4 Parts Identification

Provide identification and coverage for the parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Include special hardware requirements, such as requirement to use high-strength bolts and nuts. Identify parts by make, model, serial

number, and source of supply to allow reordering without further identification. Provide clear and legible illustrations, drawings, and exploded views to enable easy identification of the items. When illustrations omit the part numbers and description, both the illustrations and separate listing must show the index, reference, or key number that will cross-reference the illustrated part to the listed part. Group the parts shown in the listings by components, assemblies, and subassemblies in accordance with the manufacturer's standard practice. Parts data may cover more than one model or series of equipment, components, assemblies, subassemblies, attachments, or accessories, such as typically shown in a master parts catalog.

1.4.4.5 Warranty Information

List and explain the various warranties and clearly identify the servicing and technical precautions prescribed by the manufacturers or contract documents in order to keep warranties in force. Include warranty information for primary components of the system. Provide copies of warranties required by Section 01 78 00 CLOSEOUT SUBMITTALS.

1.4.4.6 Extended Warranty Information

List all warranties for products, equipment, components, and sub-components whose duration exceeds one year. For each warranty listed, indicate the applicable specification section, duration, start date, end date, and the point of contact for warranty fulfillment. Also, list or reference the specific operation and maintenance procedures that must be performed to keep the warranty valid. Provide copies of warranties required by Section 01 78 00 CLOSEOUT SUBMITTALS.

1.4.4.7 Personnel Training Requirements

Provide information available from the manufacturers that is needed for use in training designated personnel to properly operate and maintain the equipment and systems.

1.4.4.8 Testing Equipment and Special Tool Information

Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components. Provide final set points.

1.4.4.9 Testing and Performance Data

Include completed prefunctional checklists, functional performance test forms, and monitoring reports. Include recommended schedule for retesting and blank test forms. Provide final set points.

1.4.4.10 Field Test Reports

Provide a copy of Field Test Reports (SD-06) submittals documented with the required approval.

1.4.4.11 Contractor Information

Provide a list that includes the name, address, and telephone number of the General Contractor and each Subcontractor who installed the product or equipment, or system. For each item, also provide the name address and telephone number of the manufacturer's representative and service

organization that can provide replacements most convenient to the project site. Provide the name, address, and telephone number of the product, equipment, and system manufacturers.

1.5 SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES

Provide the O&M data packages specified in individual technical sections. The information required in each type of data package follows:

1.5.1 Data Package 1

a. Safety precautions and hazards

b. Cleaning recommendations

c. Maintenance and repair procedures

d. Warranty information

e. Extended warranty information

f. Contractor information

g. Spare parts and supply list

1.5.2 Data Package 2

a. Safety precautions and hazards

b. Normal operations

c. Environmental conditions

d. Lubrication data

e. Preventive maintenance plan, schedule, and procedures

f. Cleaning recommendations

g. Maintenance and repair procedures

h. Removal and replacement instructions

i. Spare parts and supply list

j. Parts identification

k. Warranty information

l. Extended warranty information

m. Contractor information

1.5.3 Data Package 3

a. Safety precautions and hazards

b. Operator prestart

c. Startup, shutdown, and post-shutdown procedures

d. Normal operations

e. Emergency operations

f. Environmental conditions

g. Operating log

h. Lubrication data

i. Preventive maintenance plan, schedule, and procedures

j. Cleaning recommendations

k. Troubleshooting guides and diagnostic techniques

l. Wiring diagrams and control diagrams

m. Maintenance and repair procedures

n. Removal and replacement instructions

o. Spare parts and supply list

p. Product submittal data

q. O&M submittal data

r. Parts identification

s. Warranty information

t. Extended warranty information

u. Testing equipment and special tool information

v. Testing and performance data

w. Contractor information

x. Field test reports

1.5.4 Data Package 4

a. Safety precautions and hazards

b. Operator prestart

c. Startup, shutdown, and post-shutdown procedures

d. Normal operations

e. Emergency operations

f. Operator service requirements

g. Environmental conditions

h. Operating log

i. Lubrication data

j. Preventive maintenance plan, schedule, and procedures

k. Cleaning recommendations

l. Troubleshooting guides and diagnostic techniques

m. Wiring diagrams and control diagrams

n. Repair procedures

o. Removal and replacement instructions

p. Spare parts and supply list

q. Repair work-hours

r. Product submittal data

s. O&M submittal data

t. Parts identification

u. Warranty information

v. Extended warranty information

w. Personnel training requirements

x. Testing equipment and special tool information

y. Testing and performance data

z. Contractor information

aa. Field test reports

1.5.5 Data Package 5

a. Safety precautions and hazards

b. Operator prestart

c. Start-up, shutdown, and post-shutdown procedures

d. Normal operations

e. Environmental conditions

f. Preventive maintenance plan, schedule, and procedures

g. Troubleshooting guides and diagnostic techniques

h. Wiring and control diagrams

i. Maintenance and repair procedures

j. Removal and replacement instructions

k. Spare parts and supply list

l. Product submittal data

m. Manufacturer's instructions

n. O&M submittal data

o. Parts identification

p. Testing equipment and special tool information

q. Warranty information

r. Extended warranty information

s. Testing and performance data

t. Contractor information

u. Field test reports

v. Additional requirements for HVAC control systems

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 TRAINING

Prior to acceptance of the facility by the Contracting Officer for Beneficial Occupancy, provide comprehensive training for the systems and equipment specified in the technical specifications. The training must be targeted for the building maintenance personnel, and applicable building occupants. Instructors must be well-versed in the particular systems that they are presenting. Address aspects of the Operation and Maintenance Manual submitted in accordance with Section 01 78 00 CLOSEOUT SUBMITTALS.. Training must include classroom or field lectures based on the system operating requirements. The location of classroom training requires approval by the Contracting Officer.

3.1.1 Training Plan

Submit a written training plan to the Contracting Officer for approval at least 60 calendar days prior to the scheduled training. Training plan must be approved by the Commissioning Authority (CxA) prior to forwarding to the Contracting Officer. Also, coordinate the training schedule with the Contracting Officer and . Include within the plan the following elements:

a. Equipment included in training

b. Intended audience

c. Location of training

d. Dates of training

e. Objectives

f. Outline of the information to be presented and subjects covered including description

g. Start and finish times and duration of training on each subject

h. Methods (e.g. classroom lecture, video, site walk-through, actual operational demonstrations, written handouts)

i. Instructor names and instructor qualifications for each subject

j. List of texts and other materials to be furnished by the Contractor that are required to support training

k. Description of proposed software to be used for video recording of training sessions.

3.1.2 Training Content

The core of this training must be based on manufacturer's recommendations and the operation and maintenance information. The QC is responsible for overseeing and approving the content and adequacy of the training. Spend 95 percent of the instruction time during the presentation on the OPERATION AND MAINTENANCE DATA. Include the following for each system training presentation:

a. Start-up, normal operation, shutdown, unoccupied operation, seasonal changeover, manual operation, controls set-up and programming, troubleshooting, and alarms.

b. Relevant health and safety issues.

c. Discussion of how the feature or system is environmentally responsive. Advise adjustments and optimizing methods for energy conservation.

d. Design intent.

e. Use of O&M Manual Files.

f. Review of control drawings and schematics.

g. Interactions with other systems.

h. Special maintenance and replacement sources.

i. Tenant interaction issues.

3.1.3 Training Outline

Provide the Operation and Maintenance Manual Files (Bookmarked PDF) and a written course outline listing the major and minor topics to be discussed by the instructor on each day of the course to each trainee in the course. Provide the course outline 14 calendar days prior to the training.

3.1.4 Training Video Recording

Record classroom training session(s) on video. Provide to the Contracting Officer two copies of the training session(s) in DVD video recording format. Capture within the recording, in video and audio, the instructors' training presentations including question and answer periods with the attendees. The recording camera(s) must be attended by a person during the recording sessions to assure proper size of exhibits and projections during the recording are visible and readable when viewed as training.

3.1.5 Unresolved Questions from Attendees

If, at the end of the training course, there are questions from attendees that remain unresolved, the instructor must send the answers, in writing, to the Contracting Officer for transmittal to the attendees, and the training video must be modified to include the appropriate clarifications.

3.1.6 Validation of Training Completion

Ensure that each attendee at each training session signs a class roster daily to confirm Government participation in the training. At the completion of training, submit a signed validation letter that includes a sample record of training for reporting what systems were included in the training, who provided the training, when and where the training was performed, and copies of the signed class rosters. Provide two copies of the validation to the Contracting Officer, and one copy to the Operation and Maintenance Manual Preparer for inclusion into the Manual's documentation.

3.1.7 Quality Control Coordination

Coordinate this training with the QC in accordance with Section 01 45 00.00 10 QUALITY CONTROL.

-- End of Section --

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SECTION 01 79 00

DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.1 SUMMARY

Section includes administrative and procedural requirements for instructing Government's personnel, including the following:

1. Instruction in operation and maintenance of systems, subsystems, and equipment.
2. Demonstration and training video recordings.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-07 Certificates

Instructor Qualifications

Evaluation

SD-10 Operation and Maintenance Data

Instruction Program

Attendance Record

Demonstration And Training Video Recordings

1.3 QUALITY ASSURANCE

1.3.1 Instructor Qualifications

A factory-authorized service representative experienced in operation and maintenance procedures and training.

1.3.2 Preinstruction Conference

Conduct conference at Project site to comply with requirements in Section 01 31 00 PROJECT MANAGEMENT AND COORDINATION. Review methods and procedures related to demonstration and training including, but not limited to, the following:

a. Inspect and discuss locations and other facilities required for instruction.

b. Review and finalize instruction schedule and verify availability of

educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.

c. Review required content of instruction.

d. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.4 COORDINATION

a. Coordinate instruction schedule with Government's operations. Adjust schedule as required to minimize disrupting Government's operations and to ensure availability of Government's personnel.

b. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

c. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Government.

1.5 INSTRUCTION PROGRAM

1.5.1 Instruction Program

Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

a. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

1.5.2 Program Structure

Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

1.5.2.1 Basis of System Design, Operational Requirements, and Criteria

Include the following:

a. System, subsystem, and equipment descriptions.
b. Performance and design criteria if Contractor is delegated design responsibility.
c. Operating standards.
d. Regulatory requirements.
e. Equipment function.
f. Operating characteristics.
g. Limiting conditions.
h. Performance curves.

1.5.2.2 Documentation

Review the following items in detail:

a. Emergency manuals.
b. Systems and equipment operation manuals.
c. Systems and equipment maintenance manuals.
d. Product maintenance manuals.
e. Project Record Documents.
f. Identification systems.
g. Warranties and bonds.
h. Maintenance service agreements and similar continuing commitments.

1.5.2.3 Emergencies

Include the following, as applicable:

a. Instructions on meaning of warnings, trouble indications, and error messages.
b. Instructions on stopping.
c. Shutdown instructions for each type of emergency.
d. Operating instructions for conditions outside of normal operating limits.
e. Sequences for electric or electronic systems.
f. Special operating instructions and procedures.

1.5.2.4 Operations

Include the following, as applicable:

a. Startup procedures.
b. Equipment or system break-in procedures.
c. Routine and normal operating instructions.
d. Regulation and control procedures.
e. Control sequences.
f. Safety procedures.
g. Instructions on stopping.
h. Normal shutdown instructions.
i. Operating procedures for emergencies.
j. Operating procedures for system, subsystem, or equipment failure.
k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

1.5.2.5 Adjustments

Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

1.5.2.6 Troubleshooting

Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

1.5.2.7 Maintenance

Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning.
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

1.5.2.8 Repairs

Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

1.6 PREPARATION

Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 78 23 OPERATION AND MAINTENANCE DATA.

Set up instructional equipment at instruction location.

1.7 INSTRUCTION

1.7.1 Facilitator

Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Government for number of participants, instruction times, and location.

1.7.2 Instructors

Engage qualified instructors to instruct Government's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1.7.3 Scheduling

Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

a. Schedule training with Government with at least seven days' advance notice.

1.7.4 Training Location and Reference Material

Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation

and maintenance data submittals.

1.7.5 Attendance Record

For each training module, submit list of participants and length of instruction time.

1.7.6 Evaluation

At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.

1.7.7 Cleanup

Collect used and leftover educational materials and give to Government. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

1.8 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

1.8.1 General

Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

a. At beginning of each training module, record each chart containing learning objective and lesson outline.

1.8.2 Digital Video Recordings

Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD mode.

1.8.2.1 File Hierarchy

Organize folder structure and file locations according to Project Manual table of contents. Provide complete screen-based menu.

1.8.2.2 File Names

Utilize file names based on name of equipment generally described in video segment, as identified in Project specifications.

1.8.2.3 Contractor and Installer Contact File

Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the following for each Contractor involved on the Project, arranged according to Project Manual table of contents:

a. Name of Contractor/Installer.
b. Business address.
c. Business phone number.
d. Point of contact.
e. Email address.

1.8.3 Recording

Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.

1.8.4 Narration

Describe scenes on video recording by audio narration by microphone while dubbing audio narration off-site after video recording is recorded. Include description of items being viewed.

1.8.5 Transcript

Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.

1.8.6 Preproduced Video Recordings

Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

-- End of Section --

SECTION 01 91 00.15 10

TOTAL BUILDING COMMISSIONING

PART 1 GENERAL

1.1 SUMMARY

Commission the building systems listed herein. Employ the services of an independent Commissioning Firm. The Commissioning Firm must be a 1st tier subcontractor of the General or Prime Contractor and must be financially and corporately independent of all other subcontractors. The Commissioning Firm must employ a Lead Commissioning Specialist that coordinates all aspects of the commissioning process. Conform to the commissioning procedures outlined in this specification.

1.2 SYSTEMS TO BE COMMISSIONED

Commission the following systems:

Heating, Ventilating, Air Conditioning, and Refrigeration Systems (HVAC)
Building Automation System
Lighting Systems
Power Distribution Systems
Plumbing Systems
Compressed Air and Vacuum Systems
Energy and Water Utility Metering Systems and Sub-Meters

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 202	(2013; Addenda B 2018) Commissioning Process for Buildings and Systems

ASSOCIATED AIR BALANCE COUNCIL (AABC)

ACG Commissioning Guideline	(2005) Commissioning Guideline

NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB)

NEBB Commissioning Standard	(2009) Procedural Standards for Whole Building Systems Commissioning of New Construction; 3rd Edition

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

ANSI/SMACNA 014	(2013) HVAC Systems Commissioning Manual, 2nd Edition

U.S. ARMY CORPS OF ENGINEERS (USACE)

ER 25-345-1 (2019) Systems Manual

1.4 COMMUNICATION WITH THE GOVERNMENT

The Lead Commissioning Specialist (CxC) must submit all plans, schedules, reports, and documentation directly to the Contracting Officer Representative concurrent with submission to the CQC System Manager. The Lead Commissioning Specialist must have direct communication with the Contracting Officer's Representative regarding all elements of the commissioning process; however, the Government has no direct contract authority with the Lead Commissioning Specialist.

1.5 SEQUENCING AND SCHEDULING

1.5.1 Sequencing

Complete the following prior to starting Functional Performance Tests of mechanical systems:

a. All equipment and systems have been completed, cleaned, flushed, disinfected, calibrated, tested, and operate in accordance with contract documents and construction plans and specifications.

b. Performance Verification Tests of the controls systems have been completed and the Performance Verification Test Report has been submitted and approved in accordance with Specification Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

c. Testing, Adjusting, and Balancing has been completed and the Testing, Adjusting, and Balancing Report, has been submitted and approved in accordance with Specification Section 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC.

d. The building envelope is enclosed according to contract documents with final construction completed.

e. The Pre-Functional Checklists have been submitted and approved.

f. The Certificate of Readiness for mechanical systems has been submitted and approved.

Complete the following prior to starting Functional Performance Tests of the electrical systems:

a. All electrical, power generation, and lighting equipment and systems have been completed, calibrated, tested, and operate in accordance with contract documents and construction plans and specifications.

b. The building envelope is enclosed according to contract documents with final construction completed.

c. Ceiling tiles, floor coverings, and window coverings are in place.

d. The Certificate of Readiness for electrical systems has been submitted and approved.

1.6 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Commissioning Firm; G

Lead Commissioning Specialist; G

SD-06 Test Reports

Interim Construction Phase Commissioning Plan; G

Final Construction Phase Commissioning Plan; G

Pre-Functional Checklists; G

Issues Log

Commissioning Report; G

SD-07 Certificates

Certificate of Readiness; G

SD-10 Operation and Maintenance Data

Training Plan; G

Training Attendance Rosters; G

Systems Manual G

SD-11 Closeout Submittals

Final Commissioning Report; S

Final Construction Phase Commissioning Plan; S

1.7 COMMISSIONING FIRM

Provide a Commissioning Firm that is certified in commissioning by one of the following: the AABC Commissioning Group (ACG); the National Environmental Balancing Bureau (NEBB); the International Certification Board/Testing, Adjusting, and Balancing Bureau (ICB/TABB), the Building Commissioning Association (BCA); the Association of Energy Engineers (AEE). The Commissioning Firm must be certified in all systems to be commissioned to the extent such certifications are available from the certifying body. Describe any lapses in certification or disciplinary action taken by the certifying body against the proposed Commissioning Firm or Lead Commissioning Specialist in detail. Any firm or commissioning professional that has been the subject of disciplinary action by the certifying body within the five years preceding contract award is not

eligible to perform any duties related to commissioning.

a. Submit the Commissioning Firm's certification of qualifications including the name of the firm and certifications no later than 60 calendar days after Notice to Proceed. Submit an electronic copy.

b. The Commissioning Firm's and Commissioning Specialists' certifications must be maintained for the entire duration of the duties specified herein. If, for any reason, the firm or a specialist loses a certification during this period, immediately notify the Contracting Officer's Representative and submit another Commissioning Firm or Commissioning Specialist for approval. All work specified in this specification section performed by the Commissioning Firm or associated Commissioning Specialists is invalid if the Commissioning Firm or Commissioning Specialist loses its certification prior to contract completion and must be performed by an approved successor.

c. The Commissioning Firm must oversee and assist the General or Prime Contractor with the work specified herein.

1.7.1 Lead Commissioning Specialist

The Commissioning Firm must provide a Lead Commissioning Specialist (CxC) that has a minimum of five years of commissioning experience, including two projects of similar size and complexity, and that is one of the following: a NEBB qualified Systems Commissioning Administrator (SCA); ACG Certified Commissioning Authority (CxA); ICB/TABB Certified Commissioning Supervisor; BCA Certified Commissioning Professional (CCP); AEE Certified Building Commissioning Professional (CBCP); University of Wisconsin-Madison Qualified Commissioning Process Provider (QCxP); ASHRAE Commissioning Process Management Professional (CPMP).

a. Submit the Lead Commissioning Specialist's certification of qualifications including the name of the specialist and firm; certifications; years of experience; and a listing of representative projects of similar size and complexity no later than 60 calendar days after Notice to Proceed. Submit an electronic copy.

b. The Lead Commissioning Specialists certifications must be maintained for the entire duration of the duties specified herein. If, for any reason, the specialist loses a certification during this period, immediately notify the Contracting Officer's Representative and submit another Lead Commissioning Specialist for approval. All work specified in this specification section to be performed by the Lead Commissioning Specialist is invalid if the Lead Commissioning Specialist loses its certification prior to contract completion and must be performed by an approved successor.

c. The Lead Commissioning Specialist must lead and oversee the commissioning work specified herein and be the primary point of contact for the Government regarding the commissioning work. One of the Technical Commissioning Specialists may be the Lead Commissioning Specialist provided that all of the qualification requirements are met.

1.7.2 Commissioning Standard

Comply with the requirements of the commissioning standard under which the Commissioning Firm and Specialists qualifications are approved. When the firm and specialists are certified by BCA, AEE, ASHRAE, or the University

of Wisconsin-Madison, comply with the requirements of one of the acceptable standards unless otherwise stated herein. The acceptable standards are ACG Commissioning Guideline, NEBB Commissioning Standard, ANSI/SMACNA 014, or ASHRAE 202. Comply with applicable NETA testing standards for electrical systems.

a. Implement all recommendations and suggested practices contained in the Commissioning Standard and electrical test standards.

b. Use the Commissioning Standard for all aspects of Commissioning, including calibration of instruments.

c. Where the instrument manufacturer calibration recommendations are more stringent than those listed in the Commissioning Standard, adhere to the manufacturer calibration recommendations.

d. All quality assurance provisions of the Commissioning Standard such as performance guarantees are part of this contract.

e. The Commissioning Specialists must develop commissioning procedures for any systems or system components not covered in the Commissioning Standard.

f. Use any new requirements, recommendations, and procedures published or adopted prior to contract solicitation by the body responsible for the Commissioning Standard.

1.8 SUSTAINABILITY THIRD PARTY CERTIFICATION (TPC)

The Commissioning Specialists must execute and document the commissioning activities required of the Commissioning Authority for the purposes of complying with the Third Party Certification (TPC) requirements for the project in accordance with Section 01 33 29 SUSTAINABILITY REPORTING. Provide all commissioning documentation required to meet the TPC requirements.

1.9 ISSUES LOG

The Lead Commissioning Specialist must develop and maintain an Issues Log for tracking and resolution of all deficiencies discovered through submittal reviews, inspection, and testing. Include the date of final resolution of issues as confirmed by the Commissioning Specialist. Submit the Issues Log on a monthly basis at a minimum. At any point during construction, any commissioning team member finding deficiencies may communicate those deficiencies in writing to the Commissioning Specialist for inclusion into the Issues Log.

1.10 CERTIFICATE OF READINESS

Prior to scheduling Functional Performance Tests for each system, issue a Certificate of Readiness for the system certifying that the system is ready for Functional Performance Testing. The Certificate of Readiness must include, for each system to be commissioned, all equipment and system start-up reports; Performance Verification Test Reports; completed Pre-Functional Checklists; Testing, Adjusting, and Balancing (TAB) Report; HVAC Controls Start-Up Reports to the extent applicable to the system. The Contractor; the Lead Commissioning Specialist; the Contractor's Quality Control Representative; the Mechanical, Electrical, Controls, and TAB subcontractor representatives must sign and date the Certificate of

Readiness. Submit the Certificate of Readiness for each system no later than 14 calendar days prior to Functional Performance Tests of that system. Submit an electronic copy. Do not schedule Functional Performance Tests for a system until the Certificate of Readiness for that system receives approval by the Government.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

3.1 CONSTRUCTION PHASE

3.1.1 Construction Commissioning Coordination Meeting

The Lead Commissioning Specialist must lead a Construction Commissioning Coordination Meeting no later than 14 days after approval of the Commissioning Firm and Commissioning Specialists to discuss the commissioning process including contract requirements, lines of communication, roles and responsibilities, schedules, documentation requirements, inspection and test procedures, and logistics as specified in this specification section. The Contractor's Superintendent or Project Manager, the Contractor's Quality Control Representative, and the Government must attend this meeting. Invite the User and a Base Civil Engineer Office Representative, to attend this meeting.

3.1.2 Construction Phase Commissioning Plan

3.1.2.1 Interim Construction Phase Commissioning Plan

The Lead Commissioning Specialist (CxC) must prepare the Interim Construction Phase Commissioning Plan. Submit the Interim Construction Phase Commissioning Plan no later than 30 calendar days after the Construction Commissioning Coordination Meeting and no later than 14 days prior to the start of construction of the building envelope. Submit an electronic copy.

Identify the commissioning and testing standards and outline the overall commissioning process, the commissioning schedule, the commissioning team members and responsibilities, lines of communication, documentation requirements for the construction phase of the project in the Interim Construction Phase Commissioning Plan.

3.1.2.1.1 Checklists

Download example Pre-Functional Checklists, Integrated Systems Test Checklists, and Functional Performance Test Checklists for specification section 01 91 00.15 10 TOTAL BUILDING COMMISSIONING at the following location:
http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphics-
The checklists submitted in the Interim and Final Construction Phase Commissioning Plans must contain the same level of detail shown in the examples. The submitted checklists are not required to match the format of the examples.

3.1.2.2 Final Construction Phase Commissioning Plan

The Lead Commissioning Specialist (CxC) must prepare the Final Construction

Phase Commissioning Plan. Submit the Final Construction Phase Commissioning Plan no later than 30 calendar days prior to the start of Pre-Functional Checks. Submit an electronic copy. Once approved, file the approved plan in the Sustainability eNotebook.

Include the information provided in the Interim Construction Phase Commissioning Plan. In addition, the Technical Commissioning Specialist must develop the Pre-Functional Checklists, Integrated Systems Test Checklists, and Functional Performance Test Checklists for each building, for each system required to be commissioned, and for each component for inclusion in the Final Construction Phase Commissioning Plan.

3.1.2.2.1 Pre-Functional Checklists

The Pre-Functional Checklists must include items for physical inspection or testing that demonstrate that installation and start-up of equipment and systems is complete. Refer to paragraph Pre-Functional Checks for more information.

3.1.2.2.2 Functional Performance Test Checklists

Functional Performance Test Checklists must include procedures that explain, step-by-step, the actions and expected results that will demonstrate that the system performs in accordance with the contract. Refer to paragraph Functional Performance and Integrated Systems Tests for more information. Include the following sections and details appropriate to the systems being tested in the Functional Performance Test Checklists:

a. Notable system features including information about controls to facilitate understanding of system operation

b. Conclusions and recommendations. Conclusions must clearly indicate if system does or does not perform in accordance with contract requirements. Recommendation must clearly indicate that the system should or should not be accepted by the Government.

c. Test conditions including date, beginning and ending time, and beginning and ending outdoor air conditions

d. Attendees

e. Identification of the equipment involved in the test

f. Control system feature identification

g. Point-to-point observations including demonstrating system flow meters and sensors have been calibrated and are correctly displayed on the Operator work station

h. Actuator operation observations demonstrating actuator responses to commands from the control system

i. As-found condition of the system operation

j. List of test items with step numbers along with the corresponding feature or control operation, intended test procedure, expected system response, and pass/fail indication.

k. Space for comments for each test item.

3.1.2.2.3 Integrated Systems Test Checklists

Integrated Systems Test Checklists must include test procedures that explain, step-by-step, the actions and expected results that will demonstrate that the interactive operations between systems performs in accordance with the contract. Refer to paragraph Functional Performance and Integrated Systems Tests for more information. Include the following sections in the Integrated Systems Test Checklists:

a. Notable features of the interconnected systems organized by discipline including information to facilitate understanding of system operation

b. Conclusions and recommendations. Conclusions must clearly indicate if the systems do or do not perform in accordance with contract requirements. Recommendation must clearly indicate that the systems should or should not be accepted by the Government

c. Test conditions including date and beginning and ending time

d. Attendees

e. Identification of the equipment and systems involved in the test

f. List of test items with step numbers along with the corresponding feature or control operation, intended test procedure, expected system response, and pass/fail indication.

g. Space for comments for each test item.

3.1.3 Construction Submittals

Provide all submittals associated with the systems to be commissioned, including shop drawings; equipment submittals; test plans, procedures, and reports; and resubmittal's to the Commissioning Specialists. The Technical Commissioning Specialist must review the submittals to the extent necessary verify that the equipment and system installation will comply with the contract requirements and the requirements of the Basis of Design and the Owner's Project Requirements Document.

3.1.4 Inspection and Testing

Demonstrate that all system components have been installed, that each control device and item of equipment operates, and that the systems operate and perform, including interactive operation between systems, in accordance with contract documents and the Owner's Project Requirements. Requirements in related specification sections are independent from the requirements of this section and do not satisfy any of the requirements specified in this specification section. Provide all materials, services, and labor required to perform the Pre-Functional Checks, Integrated Systems Tests, and Functional Performance Tests.

3.1.4.1 Commissioning Team

Provide a commissioning representative for each sub-contractor associated with the systems to be commissioned. Each commissioning representative is responsible for coordination of their respective sub-contractor's execution of the commissioning activities and participation in the inspection and testing required by this specification section. The designers listed below

are the designers of record for their respective systems. Substitutes must be approved by the Contracting Officer's Representative.

3.1.4.1.1 Mechanical System Pre-Functional Checks Team

The following team members must participate in Pre-Functional checks of mechanical systems:

Designation	Function
CxM	Mechanical System Technical Commissioning Specialist
QAR	Contracting Officer's Quality Assurance Representative
CQC	Contractor's Quality Control Personnel
MC	Contractor's Mechanical Commissioning Representative
EC	Contractor's Electrical Commissioning Representative
CC	Contractor's Controls Commissioning Representative
TABC	Contractor's TAB Commissioning Representative
PC	Contractor's Plumbing Commissioning Representative
IC	Contractor's Irrigation Commissioning Representative

3.1.4.1.2 Electrical System Pre-Functional Checks Team

The following team members must participate in Pre-Functional checks of electrical systems:

Designation	Function
CxE	Electrical System Technical Commissioning Specialist
QAR	Contracting Officer's Quality Assurance Representative
CQC	Contractor's Quality Control Personnel
EC	Contractor's Electrical Commissioning Representative

3.1.4.1.3 Mechanical Systems Test Team

The following team members must participate in Functional Performance and Integrated Systems Testing of mechanical systems:

Designation	Function
CxM	Mechanical System Technical Commissioning Specialist

Designation	Function
QAR	Contracting Officer's Quality Assurance Representative
CQC	Contractor's Quality Control Personnel
MC	Contractor's Mechanical Commissioning Representative
EC	Contractor's Electrical Commissioning Representative
CC	Contractor's Controls Commissioning Representative
TABC	Contractor's TAB Commissioning Representative
PC	Contractor's Plumbing Commissioning Representative
IC	Contractor's Irrigation Commissioning Representative

3.1.4.1.4 Electrical Systems Test Team

The following team members must participate in Functional Performance and Integrated Systems Testing of electrical systems:

Designation	Function
CxE	Electrical System Technical Commissioning Specialist
QAR	Contracting Officer's Quality Assurance Representative
CQC	Contractor's Quality Control Personnel
EC	Contractor's Electrical Commissioning Representative

3.1.4.2 Pre-Functional Checks

Pre-Functional Checklists from the approved Final Construction Phase Commissioning Plan must be completed by the commissioning team. Complete one Pre-Functional Checklist for each individual item of equipment or system for each system required to be commissioned including, but not limited to, ductwork, piping, equipment, fixtures (lighting and plumbing), and controls. Indicate commissioning team member inspection and acceptance of each Pre-Functional Checklist item by initials. Acceptance of each Pre-Functional Checklist item by each team member indicates that item conforms to the construction contract requirements in their area of responsibility. Technical Commissioning Specialist acceptance of each Pre-Functional Checklist item indicates that each item has been installed correctly and in accordance with contract documents and the Owner's Project Requirements. Submit the completed and initialed Pre-Functional Checklists no later than 7 calendar days after completion of inspection of all checklists items for each system. Submit an electronic copy. Include manufacturer start-up checklists associated with equipment with the submission of the Pre-Functional Checklists.

3.1.4.3 Testing, Adjusting, and Balancing (TAB) Report and Field Acceptance Testing

The Mechanical System Technical Commissioning Specialist must review the pre-final TAB Report required by Specification Section 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC. Identify any deficiencies to the Contracting Officer's Representative and the Contractor's Quality Control Personnel. Resolve all deficiencies prior to TAB Field Acceptance Testing.

The Mechanical System Technical Commissioning Specialist must witness the TAB Field Acceptance Testing specified by Specification Section 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC. Include a certification by the Mechanical Technical Specialist that no outstanding deficiencies exist in the systems relative to Testing, Adjusting, and Balancing with the final TAB Report submittal.

3.1.4.4 HVAC Controls Test Reports

The Mechanical System Technical Commissioning Specialist must review the Start-Up Testing Report and the PVT Procedures and Reports required by Specification Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC . Include a certification by the Mechanical System Technical Commissioning Specialist that the submittals contain no deficiencies or that the submittals do not indicate any deficiencies in the HVAC systems or HVAC control systems with each of these submittals.

3.1.4.5 Tests

3.1.4.5.1 Functional Performance and Integrated Systems Tests

Schedule Functional Performance Tests for each system only after the Certificate of Readiness has been approved by the Government for the system. Correct all deficiencies identified through any prior review, inspection, or test activity before the start of Functional Performance Tests. Perform Integrated Systems Tests only after the Functional Performance Tests for each associated system are completed with all deficiencies resolved and after the related Functional Performance Test Checklists have been signed by each commissioning team member.

a. Functional Performance Tests and Integrated Systems Tests must be performed with the Contracting Officer's Quality Assurance Representative present.

b. Abort Functional Performance Tests or Integrated Systems Tests when any system deficiency prevents the successful completion of the test.

c. Technical Commissioning Specialists must lead and document all Functional Performance Tests and Integrated Systems Tests for the systems to be commissioned with the Contractor and appropriate sub-contractors performing the Functional Performance Tests and Integrated Systems Tests. The representatives listed in the paragraph Commissioning Team must attend the tests. Abort Functional Performance Tests or Integrated Systems Tests when any required commissioning team member is not present for the test.

3.1.4.5.1.1 Checklist

Use the Functional Performance Test and Integrated Systems Test Checklists from the approved Final Construction Phase Commissioning Plan to guide the

Functional Performance Tests and Integrated Systems Tests. Functional Performance Tests must be performed for each item of equipment and each system required to be commissioned and verify all sensor calibrations, control responses, safeties, interlocks, operating modes, sequences of operation, capacities, lighting levels, and all other performance requirements comply with construction contract regardless of the specific items listed within the Functional Performance Test and Integrated Systems Test Checklists provided. Testing must progress from equipment or components to subsystems to systems to interlocks and connections between systems. Integrated Systems Tests must be performed for the interactive operation between systems such as HVAC systems, fire protection systems, back-up electrical supply, energy generation systems, and other systems, and verify correct interactive operation, acceptable speed of response, and other contract requirements for both normal and failure modes. Examples of Integrated Systems Tests include the correct operation of HVAC systems during emergency system activation, correct operation of uninterruptible power supplies or energy generators and connected systems, or lighting system operation during power outage or emergency system activation. The order of components and systems to be tested must be determined by the Technical Commissioning Specialists.

3.1.4.5.1.2 Acceptance

Indicate acceptance of each item of equipment and systems tested by signature of each commissioning team member for each Functional Performance Test or Integrated Systems Test Checklist. The Contractor's Quality Control Representative and the Technical Commissioning Specialists must indicate acceptance after the equipment and systems are free of deficiencies.

3.1.4.5.2 HVAC Test Methods

Perform Functional Performance Tests in accordance with the following:

3.1.4.5.2.1 Prior to Testing

Prior to testing operating modes, sequences of operation, interlocks, and safeties, complete control point-to-point observations, test sensor calibrations, and test actuator commands.

3.1.4.5.2.2 Simulating Conditions

Over-writing control input values through the controls system is not acceptable, unless approved by the Contracting Officer's Representative. Identify proposed exceptions in a protocol submitted to the Contracting Officer's Representative for approval. Before simulating conditions, overwriting values (if approved), or changing set-points, calibrate all sensors, transducers and devices. Below are several examples of exceptions that would be considered acceptable:

a. When varying static pressures inside ductwork can not be simulated within the duct, and where a sensor signals the controls system to initiate sequences at various duct static pressures, it is acceptable to simulate the various pressures with a Pneumatic Squeeze-Bulb Type Signaling Device with gauge temporarily attached to the sensing tube leading to the transmitter. It is not acceptable to reset the various set-points, nor to simulate an electric analog signal (unless approved as noted above).

b. Dirty filter pressure drops can be simulated using sheets of cardboard at filter face.

c. Freeze-stat safeties can be simulated by packing portion of sensor with ice.

d. High outside air temperatures can be simulated with a hair blower.

e. High entering cooling coil temperatures can be used to simulate entering cooling coil conditions.

f. Do not use signal generators to simulate sensor signals unless approved by the Contracting Officer's Representative, as noted above, for special cases.

g. Control set points can be altered. For example, to see the air conditioning compressor lockout work at an outside air temperature below 55 degrees F, when the outside air temperature is above 55 degrees F, temporarily change the lockout set point to be 0 degrees F above the current outside air temperature. Caution: Set points are not to be raised or lowered to a point such that damage to the components, systems, or the building structure and/or contents will occur.

h. Test duct mounted smoke detectors in accordance with the manufacturer's recommendations. Perform the tests with air system at minimum airflow condition in ductwork.

i. Test current sensing relays used for fan and pump status signals to control system to indicate unit failure and run status by resetting the set point on the relay to simulate a lost belt or unit failure while the unit is running. Confirm that the failure alarm was generated and received at the control system. After the test is conducted, return the set point to its original set-point or a set-point as indicated by the Contracting Officer's Representative.

3.1.4.5.2.3 Setup

Perform each test under conditions that simulate actual conditions as close as is practically possible. Provide all necessary materials and system modifications to produce the necessary flows, pressures, temperatures, and other conditions necessary to execute the test according to the specified conditions. At completion of the test, return the affected building equipment and systems to their pre-test condition.

3.1.4.5.3 Sample Strategy

Perform Functional Performance Tests using the following sample strategy. Prepare and complete a Functional Performance Test Checklist for each item of equipment or system to be tested. For sample sizes less than 100 percent for all similar equipment, the Government will select the specific equipment or system to be tested during testing. Equipment Identifiers are as indicated on the design drawings:

Equipment Identifier	Sample Size (Percent)
AHU	100

Equipment Identifier	Sample Size (Percent)
VAV	100
CUH	100
CWP	100
DWH	100
Lighting Controls	100

Perform Integrated Systems Tests for all systems and equipment having interactive operation.

3.1.4.5.4 Seasonal Tests

3.1.4.5.4.1 Initial Functional Performance Tests

Perform Initial Functional Performance Tests as soon as all contract work is completed, regardless of the season. Develop and implement means of artificial loading to demonstrate, to a reasonable level of confidence, the ability of the HVAC systems to handle peak seasonal loads.

3.1.4.5.4.2 Full-Load Conditions

In addition to the Initial Functional Performance Tests, perform Functional Performance Tests of HVAC systems under full-load conditions during peak heating and cooling seasons during outdoor air condition design extremes.

Schedule Seasonal Functional Performance Tests in coordination with the Government.

3.1.4.5.4.3 System Acceptance

Systems may be partially accepted by the Government prior to seasonal testing if they comply with all construction contract that can be tested during initial Functional Performance Tests. All Functional Performance Test procedures must be completed prior to full systems acceptance.

3.1.4.5.5 Aborted Tests and Re-Testing

Abort Functional Performance Tests, Integrated Systems Tests, or Seasonal Tests if any deficiency prevents successful completion of the test or if any required commissioning team member is not present for the test. Reimburse the Government for all costs associated with effort lost due to re-testing due to test failures and aborted tests. These costs must include salary, travel costs, and per diem for Government commissioning team members. Re-test only after all deficiencies identified during the original tests have been corrected.

3.1.4.5.5.1 100 Percent Sample

Systems or equipment for which 100 percent sample size are tested fail if one or more of the test procedures results in discovery of a deficiency and the deficiency cannot be resolved within 5 minutes during the test.

Re-test to the extent necessary to confirm that the deficiencies have been corrected without negatively impacting the performance of the rest of the

system.

3.1.4.5.5.2 Less than 100 Percent Sample

For systems tests with a sample size less than 100 percent, if one or more of the test procedures for an item of equipment or a system results in discovery of a deficiency, regardless of whether the deficiency is corrected during the sample tests, the item of equipment or system fails the test.

a. If the system failure rate is 5 percent or less, meaning that 5 percent or less of the equipment or systems had at least one deficiency, re-test only on the items which experienced the initial failures.

b. If the system failure rate is higher than 5 percent, meaning that more than 5 percent of equipment or systems tested had at least one deficiency, re-test the items which experienced the initial failures to the extent necessary to confirm that the deficiencies have been corrected . In addition, test another random sample of the same size as the initial sample for the first time. If the second random sample set has any failures, re-test those failed items and all remaining equipment and systems to complete 100 percent testing of that system type.

3.1.5 Training Plan

Develop a training plan which identifies all training required by specification sections associated with commissioned systems. Include a matrix listing each training requirement, content of the training, the trainer name, trainer contact information, and schedule and location of training. Submit one hard copy and an electronic copy of the Training Plan to the Commissioning Specialists and the Government no later than 30 calendar days prior to the associated training.

Document training attendance using training attendance rosters and provide completed attendance rosters to the Commissioning Specialists and the Government no later than 7 calendar days following the completion of training for each system to be commissioned. Submit an electronic copy..

3.1.6 Systems Manual

Prepare and submit a Systems Manual including a signed certification or letter from the Technical Commissioning Specalists and the Lead Commissioning Specialist stating that the Systems Manual is complete, clear, and accurate. The Systems Manual, for all commissioned systems, must conform to Appendix A SYSTEMS MANUAL ORGANIZATION AND CONTENT to ER 25-345-1, available at the USACE Publications website at the following location:
https://www.publications.usace.army.mil/USACE-Publications/Engineer-Regulations/.
Update and resubmit the Systems Manual based on any corrective action taken during the warranty period.

Submit Systems Manual no later than 30 calendar days following completion of Functional Performance Tests and Integrated Systems Tests. Submit three hard copies and an electronic copy.

3.2 COMMISSIONING REPORT

Following the completion of Functional Performance Tests and Integrated

Systems Tests, with the exception of Seasonal Tests, the Lead Commissioning Specialist must prepare a Commissioning Report.

a. Include an executive summary describing the overall commissioning process, the results of the commissioning process, any outstanding deficiencies and recommended resolutions, and any seasonal testing that must be scheduled for a later date. Indicate, in the executive summary, whether the systems meet the requirements of the construction contract and the Owner's Project Requirements.

b. Detail any deficiencies discovered during the commissioning process and the corrective actions taken in the report. Include the completed Pre-Functional Checklists, Functional Performance Test Checklists, Integrated Systems Test Checklists,the Commissioning Plans, the Issues Log, Performance Verification Test Reports, Training Attendance Rosters, the Design Review Report, the final TAB Report.

c. Submit the Commissioning Report no later than 14 calendar days following commissioning team acceptance of all Functional Performance Tests and Integrated Systems Tests with the exception of Seasonal Tests. Submit one hard copies and an electronic copy.

d. Following any Seasonal Tests or Post-Construction Activities, update the Final Commissioning Report to reflect any changes and resubmit. File the approved, updated, Final Commissioning Report in the Sustainability eNotebook.

APPENDIX A - OWNER'S PROJECT REQUIREMENTS DOCUMENT

-- End of Section --

TETRA TECH Mead & Hunt

Joint Venture with

Mason & Hanger

Owner's Project Requirements

ADAL Fuel Cell & Corrosion Control – Bldg 154
Michigan Air National Guard
Selfridge ANGB, MI

Project Number # VGLZ162323

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Introduction
The ultimate objective is to provide a complete and usable 18,975 square foot facility to support assigned Fuel System Maintenance Dock and Aircraft Corrosion Control functions for 18 PAA A-10 aircraft while meeting all applicable codes and regulations including Department of Defense (DoD) Antiterrorism/ Force Protection requirements

The approximately 17,650 gross square foot Building 154 was built in 1991 and is considered to be nonhistorical although it is located near a potential historic district.

Key Owner's Project Requirements
The facility shall be in compliance with applicable DoD, Air Force, and Selfridge Design Standards. In addition, local materials and construction techniques shall be used where cost effective. This project shall comply with DoD antiterrorism/force protection requirements per UFC. Repair supporting utilities, pavements, infrastructure, communications, fire protection, and provide needed site improvements.

This facility shall be designed in accordance with UFC 1-200-02, High Performance and Sustainable Building (HPSB) Requirements. In order to accomplish UFC required third party certification, the A-E shall register this project with the Green Business Certification Incorporated (GBCI) for Guiding Principles Compliance certification and shall achieve Federal HPSB requirements as detailed in UFC 1-200-02. The A-E shall complete the ANG Sustainability Requirements Scoresheet, HPSB Compliance (2017v1).

General Project Description
This project will include the construction of a 1,325 square foot addition and the reconfiguration of the existing 17,650 square foot Fuel Cell/Corrosion Control Facility utilizing conventional design and construction methods to accommodate the mission of the facility. The facility shall be designed as permanent construction in accordance with DoD unified Facilities Criteria.

Functional Uses
Provide a design to provide an appropriately configured and environmentally safe fuel cell/corrosion control facility to support assigned Fuel System Maintenance Dock and Aircraft Corrosion Control functions for 18 PAA A-10 aircraft. Design to include but not limited to:

- Fuel cell hangar bay
- Corrosion control hangar bay
- Two offices to include a supervisor office
- Open office
- Repair of supporting utilities
- Pavements/airfield pavements
- Infrastructure
- Communications
- Fire protection
- Site improvements
- Break Room
- Class Room

- Toilet/Shower/Locker Rooms
- Janitor Closet
- Electrical Closet
- Maintenance Corrosion Dock
- External Fuel Tank
- Fire Protection Room
- Operating system for hangar door that will allow door operation during electrical
- outages.
- Windows/Doors
- Parking/Driveways
- ATFP setbacks
- Exterior brick repair.
- Gutters/downspouts
- Roof /Building Envelope

Occupancy Requirements

Number of Occupants

OCCUPANTS	ASSIGNED (Male/Female)	VISITORS
Daily	20 (15/5)	Varies
Unit Training Assemblies	70 (55/15)	Varies
Night	0	0

Hours of Operation

The facility will be regularly utilized 12 hours a day, 5 days per week, 52 weeks per year plus two weekends per month per year or as mission requirements and mission scheduling dictates. Normal operating hours are 0600 – 1800, Monday through Friday.

Budget Considerations And Limitations

The maximum construction cost (MCC) is $14,000,000. The construction cost includes the construction or improvement of buildings and necessary supporting facilities such as roads, drives, landscaping, parking, and utilities.

Performance Criteria

The facility will be built in compliance with the:

- Selfridge Design Standards
- GBCI Guiding Principles Implemented by UFC 1-200-02
- ANG ETL 15-01 ANG Design Policy.
    - ETL 15-01-01 Sustainable Design, Development, and Resource Conservation
    - ETL 15-01-02 SKIF & ATFP Guidance
    - ETL 15-01-03 Fire Protection Design Guidance
    - ETL 15-01-04 Mechanical Engineering
- ETL 11-11 Reducing Inappropriate Hangar Fire System Activations
- ETL 11-12 Compliance with Handicapped Accessibility Standards
    - ETL 15-01-05 Electrical and Communication Engineering

  - ETL15-01-06 Roof Design Guidance
  - ETL15-01-07 Airfield and Pavement Design
- Applicable State, City, and county codes and regulations

Project Criteria
The project design shall conform to the following criteria:

- APPLICABLE STANDARDS: Latest published versions shall be used.
  - The Secretary of Interior Standards
  - Air Force Instruction 32-7065
  - UFC 3-101-012-4.2 Historic Architecture
  - UFC 3-101-01, Architecture.
  - UFC 3-101-01 Architecture Mechanical systems – ASHRAE 90.1 2007 and SMACNA Standards.
  - National Electric Code, NFPA No. 70.
  - National Electric Safety Code (ANSI C2).
  - National Fire Protection Association (NFPA 101) Life Safety Code.
  - International Building Code (IBC).
  - International Mechanical Code (IMS)
  - International Plumbing Code (IPC)
  - Uniform Federal Accessibility Standard (UFAS).
  - Americans with Disabilities Act (ADA).
  - Applicable State, City and County codes and regulations.

Site Specific Requirements

1. The facility will be construction in a flood plain.
2. The site will require to be constructed based on historical preservation.

Guiding Principles (Section will be completed as more information is available.)

I. Employ Integrated Design Principles

1. Integrated Design - Design Submittal

2. Commissioning- Construction Submittal

II. Optimize Energy Performance

3. Energy Efficiency - Design Submittal

4. Renewable and Clean Energy - Design Submittal

5. Metering - Design Submittal

6. Benchmarking - Construction Submittal

III. Protect and Conserve Water

7. Indoor Water Use - Design Submittal

8. Outdoor Water Use - Design Submittal

9. Alternate Water - Design Submittal

10. Stormwater Management - Design Submittal

IV. Enhance Indoor Environmental Quality

11. Ventilation and Thermal Comfort - Design Submittal

12. Daylighting and Lighting Controls - Design Submittal

13. Indoor Air Quality - Design and Construction Submittal

14. Occupant Health and Wellness - Design Submittal

V. Reduce the Environmental Impact of Materials

15. Material Content and Performance - Design and Construction Submittal

16. Waste Diversion - Design Submittal

17. Materials Management - Construction Submittal

VI. Assess and Consider Climate Change Risks

18. Mission Criticality - Design Submittal

19. Floodplain Considerations - Design Submittal

20. Facility Design - Design Submittal

21. Facility Adaptation - Design Submittal

Owner's Project Requirements Version History

The following is a summary of the changes made to the Owner's Project Requirement document throughout Pre-Design, Design, Construction, and Occupancy and Operations. This information is critical to understand and document the trade-offs made and the resulting impact on the project.

Rev. No.	Date	Description of Revisions
0	1/6/2020	Original Version
	10/4/2022	Update to replace HEF Pump Room with Fire Protection Room

SECTION 02 41 00

SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 145	(1991; R 2012) Standard Specification for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP A10.6	(2006) Safety & Health Program Requirements for Demolition Operations - American National Standard for Construction and Demolition Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 61	National Emission Standards for Hazardous Air Pollutants

1.2 PROJECT DESCRIPTION

1.2.1 Definitions

1.2.1.1 Demolition

Demolition is the process of wrecking or taking out any load-supporting structural member of a facility together with any related handling and disposal operations.

1.2.1.2 Deconstruction

Deconstruction is the process of taking apart a facility with the primary goal of preserving the value of all useful building materials.

1.2.1.3 Demolition Plan

Demolition Plan is the planned steps and processes for managing demolition activities and identifying the required sequencing activities and disposal mechanisms.

1.2.1.3.1 Remove

Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

1.2.1.3.2 Remove and Salvage for Reinstallation

Detach items from existing construction, in a manner to prevent damage. Store item in secure area until time for reinstallation. Prepare for reuse and reinstall where indicated.

1.2.1.3.3 Existing to Remain

Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled. Provide protection to prevent damage to item.

1.2.2 General Requirements

Do not begin demolition or deconstruction until authorization is received from the Contracting Officer. The work includes demolition, , salvage of identified items and materials, and removal of resulting rubbish and debris. Remove rubbish and debris from Government property daily, unless otherwise directed. Store materials that cannot be removed daily in areas specified by the Contracting Officer. In the interest of occupational safety and health, perform the work in accordance with EM 385-1-1, Section 23, Demolition, and other applicable Sections.

1.3 ITEMS TO REMAIN IN PLACE

Take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Government. Repair or replace damaged items as approved by the Contracting Officer. Coordinate the work of this section with all other work indicated. Construct and maintain shoring, bracing, and supports as required. Ensure that structural elements are not overloaded. Increase structural supports or add new supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract. Do not overload structural elements . Provide new supports and reinforcement for existing construction weakened by demolition, deconstruction, or removal work. Repairs, reinforcement, or structural replacement require approval by the Contracting Officer prior to performing such work.

1.3.1 Existing Construction Limits and Protection

Do not disturb existing construction beyond the extent indicated or necessary for installation of new construction. Provide temporary shoring and bracing for support of building components to prevent settlement or other movement. Provide protective measures to control accumulation and migration of dust and dirt in all work areas. Remove snow, dust, dirt, and debris from work areas daily.

1.3.2 Weather Protection

For portions of the building to remain, protect building interior and materials and equipment from the weather at all times. Where removal of existing roofing is necessary to accomplish work, have materials and

workmen ready to provide adequate and temporary covering of exposed areas.

1.3.3 Utility Service

Maintain existing utilities indicated to stay in service and protect against damage during demolition and deconstruction operations. Prior to start of work, utilities serving each area of alteration or removal will be shut off by the Government and disconnected and sealed by the Contractor .

1.3.4 Facilities

Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities. Floors, roofs, walls, columns, pilasters, and other structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, must remain standing without additional bracing, shoring, or lateral support until demolished or deconstructed, unless directed otherwise by the Contracting Officer. Ensure that no elements determined to be unstable are left unsupported and place and secure bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract.

1.4 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Existing Conditions

SD-07 Certificates

Notification; G

1.6 QUALITY ASSURANCE

Submit timely notification of demolition projects to Federal, State, regional, and local authorities in accordance with 40 CFR 61, Subpart M. Notify the and the Contracting Officer in writing 10 working days prior to the commencement of work in accordance with 40 CFR 61, Subpart M. Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," conform to the safety requirements contained in ASSP A10.6. Comply with the Environmental Protection Agency requirements specified. Use of explosives will not be permitted.

1.6.1 Dust and Debris Control

Prevent the spread of dust and debris and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution. Vacuum and dust the work area daily . Sweep pavements as often as necessary to control the spread of debris that may result in foreign object damage potential to aircraft.

1.7 PROTECTION

1.7.1 Protection of Personnel

Before, during and after the selective demolition work continuously evaluate the condition of the structure being deconstructed and take immediate action to protect all personnel working in and around the project site. No area, section, or component of floors, roofs, walls, columns, pilasters, or other structural element will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

1.7.2 Construction Perimeter Fencing

Provide six foot minimum chainlink fencing at entire perimeter of site to provide protection of non-construction personnel. It shall also prevent non-construction, motor vehicle and aircraft traffic from entering the site.

1.8 FOREIGN OBJECT DAMAGE (FOD)

Aircraft and aircraft engines are subject to FOD from debris and waste material lying on airfield pavements. Remove all such materials that may appear on operational aircraft pavements due to the Contractor's operations. If necessary, the Contracting Officer may require the Contractor to install a temporary barricade at the Contractor's expense to control the spread of FOD potential debris. The barricade shall include a fence covered with a fabric designed to stop the spread of debris. Anchor the fence and fabric to prevent displacement by winds or jet/prop blasts. Remove barricade when no longer required.

1.9 RELOCATIONS

Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Repair or replace items to be relocated which are damaged by the Contractor with new undamaged items as approved by the Contracting Officer.

1.10 EXISTING CONDITIONS

Before beginning any demolition or deconstruction work, survey the site and examine the drawings and specifications to determine the extent of the work. Record existing conditions in the presence of the Contracting Officer showing the condition of structures and other facilities adjacent to areas of alteration or removal. Photographs sized 4 inch will be acceptable as a record of existing conditions. Include in the record the elevation of the top of foundation walls, finish floor elevations, possible conflicting electrical conduits, plumbing lines, alarms systems, the location and extent of existing cracks and other damage and description of

surface conditions that exist prior to before starting work. It is the Contractor's responsibility to verify and document all required outages which will be required during the course of work, and to note these outages on the record document. Submit survey results.

PART 2 PRODUCTS

2.1 FILL MATERIAL

a. Comply with excavating, backfilling, and compacting procedures for soils used as backfill material to fill basements, voids, depressions or excavations resulting from demolition or deconstruction of structures.

b. Fill material shall conform to the definition of satisfactory soil material as defined in AASHTO M 145, Soil Classification Groups A-1, A-2-4, A-2-5 and A-3. In addition, fill material shall be free from roots and other organic matter, trash, debris, frozen materials, and stones larger than 2 inches in any dimension.

PART 3 EXECUTION

3.1 SELECTIVE DEMOLITION, GENERAL

3.1.1 General

Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows: 1) Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level. 2) Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain. 3) Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces. 4) Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site. 5) Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation. 6) Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing. 7) Dispose of demolished items and materials promptly.

3.1.2 Temporary Shoring

Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

3.1.3 Existing to Remain

Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Contracting Officer, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after

selective demolition operations are complete.

3.2 EXISTING FACILITIES TO BE REMOVED

Inspect and evaluate existing structures onsite for reuse. Existing construction scheduled to be removed for reuse shall be disassembled. Dismantled and removed materials are to be separated, set aside, and prepared as specified, and stored or delivered to a collection point for reuse, remanufacture, recycling, or other disposal, as specified. Materials shall be designated for reuse onsite whenever possible.

3.2.1 Utilities and Related Equipment

3.2.1.1 General Requirements

Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Contracting Officer. Do not interrupt existing utilities serving facilities occupied and used by the Government except when approved in writing and then only after temporary utility services have been approved and provided. Do not begin demolition or deconstruction work until all utility disconnections have been made. Shut off and cap utilities for future use, as indicated.

3.2.2 Roofing

Remove single-ply roofing to effect the connections with new flashing or roofing. Sequence work to minimize building exposure between demolition or deconstruction and new roof materials installation.

3.2.2.1 Temporary Roofing

Install temporary roofing and flashing as necessary to maintain a watertight condition throughout the course of the work. Remove temporary work prior to installation of permanent roof system materials unless approved otherwise by the Contracting Officer.

3.2.2.2 Reroofing

When removing the existing roofing system from the roof deck, remove only as much roofing as can be recovered by the end of the work day, unless approved otherwise by the Contracting Officer. Do not attempt to open the roof covering system in threatening weather. Reseal all openings prior to suspension of work the same day.

3.2.3 Masonry

Sawcut and remove masonry so as to prevent damage to surfaces to remain, to removed materials being salvaged and to facilitate the installation of new work. Where new masonry adjoins existing, the new work shall abut or tie into the existing construction as specified for the new work. Provide square, straight edges and corners where existing masonry adjoins new work and other locations..

3.2.4 Concrete

Saw concrete along straight lines to a depth of a minimum 2 inch. Make each cut in walls perpendicular to the face and in alignment with the cut in the opposite face. Break out the remainder of the concrete provided that the broken area is concealed in the finished work, and the remaining

concrete is sound. At locations where the broken face cannot be concealed, grind smooth or saw cut entirely through the concrete.

3.2.5 Structural Steel

Dismantle structural steel at field connections and in a manner that will prevent bending or damage. Salvage for recycle structural steel, steel joists, girders, angles, plates, columns and shapes. Do not use flame-cutting torches . Transport steel joists and girders as whole units and not dismantled. Transport structural steel shapes to a designated storage area , stacked according to size, type of member and length, and stored off the ground, protected from the weather.

3.2.6 Miscellaneous Metal

Salvage shop-fabricated items such as access doors and frames, steel gratings, metal ladders, wire mesh partitions, metal railings, metal windows and similar items as whole units. Salvage light-gage and cold-formed metal framing, such as steel studs, steel trusses, metal gutters, roofing and siding, metal toilet partitions, toilet accessories and similar items. Recycle scrap metal as part of demolition and deconstruction operations. Provide separate containers to collect scrap metal and transport to a scrap metal collection or recycling facility, in accordance with the Waste Management Plan.

3.2.7 Patching

Where removals leave holes and damaged surfaces exposed in the finished work, patch and repair these holes and damaged surfaces to match adjacent finished surfaces, using on-site materials when available. Where new work is to be applied to existing surfaces, perform removals and patching in a manner to produce surfaces suitable for receiving new work. Finished surfaces of patched area shall be flush with the adjacent existing surface and shall match the existing adjacent surface as closely as possible as to texture and finish. Patching shall be as specified and indicated, and shall include:

a. Concrete and Masonry: Completely fill holes and depressions, caused by previous physical damage or left as a result of removals in existing masonry walls to remain, with an approved masonry patching material, applied in accordance with the manufacturer's printed instructions.

b. Where existing partitions have been removed leaving damaged or missing resilient tile flooring, patch to match the existing floor tile.

c. Patch acoustic lay-in ceiling where partitions have been removed. The transition between the different ceiling heights shall be effected by continuing the higher ceiling level over to the first runner on the lower ceiling and closing the vertical opening with a painted sheet metal strip.

3.3 DISPOSITION OF MATERIAL

3.3.1 Title to Materials

Except for salvaged items specified in related Sections, and for materials or equipment scheduled for salvage, all materials and equipment removed and not reused or salvaged, shall become the property of the Contractor and shall be removed from Government property. Title to materials resulting

from demolition and deconstruction, and materials and equipment to be removed, is vested in the Contractor upon approval by the Contracting Officer of the Contractor's demolition, deconstruction, and removal procedures, and authorization by the Contracting Officer to begin demolition and deconstruction. The Government will not be responsible for the condition or loss of, or damage to, such property after contract award. Showing for sale or selling materials and equipment on site is prohibited.

3.3.2 Reuse of Materials and Equipment

Remove and store materials and equipment to be reused or relocated to prevent damage, and reinstall as the work progresses. Coordinate the re-use of materials and equipment with the re-use requirements in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL. Capture re-use of materials in the diversion calculations for the project.

3.3.3 Salvaged Materials and Equipment

Remove materials and equipment that are to be removed by the Contractor and that are to remain the property of the Government, and deliver to a storage site .

a. Salvage items and material to the maximum extent possible.

b. Store all materials salvaged for the Contractor as approved by the Contracting Officer and remove from Government property before completion of the contract. Coordinate the salvaged materials with tracking requirements in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL. Capture salvaged materials in the diversion calculations for the project.

c. Remove salvaged items to remain the property of the Government in a manner to prevent damage, and packed or crated to protect the items from damage while in storage or during shipment. Items damaged during removal or storage must be repaired or replaced to match existing items. Properly identify the contents of containers. Deliver the following items reserved as property of the Government to the areas designated: .

d. Remove the following items reserved as property of the using service prior to commencement of work under this contract: .

3.4 CLEANUP

Remove debris and rubbish from basement and similar excavations. Remove and transport the debris in a manner that prevents spillage on streets or adjacent areas. Apply local regulations regarding hauling and disposal.

3.5 DISPOSAL OF REMOVED MATERIALS

3.5.1 Regulation of Removed Materials

Dispose of debris, rubbish, scrap, and other nonsalvageable materials resulting from removal operations with all applicable federal, state and local regulations as contractually specified . Storage of removed materials on the project site is prohibited.

3.5.2 Burning on Government Property

Burning of materials removed from demolished and deconstructed structures will not be permitted on Government property .

3.5.3 Removal to Spoil Areas on Government Property

Transport noncombustible materials removed from demolition and deconstruction structures to designated spoil areas on Government property.

3.5.4 Removal from Government Property

Transport waste materials removed from demolished and deconstructed structures, except waste soil, from Government property for legal disposal. Dispose of waste soil as directed.

3.6 REUSE OF SALVAGED ITEMS

Recondition salvaged materials and equipment designated for reuse before installation. Replace items damaged during removal and salvage operations or restore them as necessary to usable condition.

-- End of Section --

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SECTION 02 82 00

ASBESTOS REMEDIATION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP Z9.2	(2018) Fundamentals Governing the Design and Operation of Local Exhaust Ventilation Systems

ASTM INTERNATIONAL (ASTM)

ASTM C732	(2006; R 2012) Aging Effects of Artificial Weathering on Latex Sealants
ASTM D522/D522M	(2014) Mandrel Bend Test of Attached Organic Coatings
ASTM D2794	(1993; R 2019) Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D4397	(2016) Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications
ASTM E84	(2020) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM E96/E96M	(2016) Standard Test Methods for Water Vapor Transmission of Materials
ASTM E119	(2020) Standard Test Methods for Fire Tests of Building Construction and Materials
ASTM E736/E736M	(2017) Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members
ASTM E1368	(2014) Visual Inspection of Asbestos Abatement Projects

COMPRESSED GAS ASSOCIATION (CGA)

CGA G-7	(2014) Compressed Air for Human Respiration; 6th Edition

INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION (ISEA)

ANSI/ISEA Z87.1	(2015) Occupational and Educational Personal Eye and Face Protection Devices

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 701	(2019) Standard Methods of Fire Tests for Flame Propagation of Textiles and Films

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH NMAM	(2016; 5th Ed) NIOSH Manual of Analytical Methods

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 340/1-90/018	(1990) Asbestos/NESHAP Regulated Asbestos Containing Materials Guidance

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.147	The Control of Hazardous Energy (Lock Out/Tag Out)
29 CFR 1926.51	Sanitation
29 CFR 1926.59	Hazard Communication
29 CFR 1926.103	Respiratory Protection
29 CFR 1926.200	Accident Prevention Signs and Tags
29 CFR 1926.1101	Asbestos
40 CFR 61-SUBPART A	General Provisions
40 CFR 61-SUBPART M	National Emission Standard for Asbestos
40 CFR 763	Asbestos
42 CFR 84	Approval of Respiratory Protective Devices
49 CFR 107	Hazardous Materials Program Procedures
49 CFR 171	General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements

49 CFR 173	Shippers - General Requirements for Shipments and Packagings

U.S. NAVAL FACILITIES ENGINEERING COMMAND (NAVFAC)

ND OPNAVINST 5100.23	(2005; Rev G) Navy Occupational Safety and Health (NAVOSH) Program Manual

UNDERWRITERS LABORATORIES (UL)

UL 586	(2009; Reprint Dec 2017) UL Standard for Safety High-Efficiency Particulate, Air Filter Units

1.2 DEFINITIONS

1.2.1 ACM

Asbestos Containing Materials.

1.2.2 Amended Water

Water containing a wetting agent or surfactant with a maximum surface tension of 0.00042 psi.

1.2.3 Area Sampling

Sampling of asbestos fiber concentrations which approximates the concentrations of asbestos in the theoretical breathing zone but is not actually collected in the breathing zone of an employee.

1.2.4 Asbestos

The term asbestos includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, and actinolite asbestos and any of these minerals that has been chemically treated or altered. Materials are considered to contain asbestos if the asbestos content of the material is determined to be at least one percent.

1.2.5 Asbestos Control Area

That area where asbestos removal operations are performed which is isolated by physical boundaries which assist in the prevention of the uncontrolled release of asbestos dust, fibers, or debris.

1.2.6 Asbestos Fibers

Those fibers having an aspect ratio of at least 3:1 and longer than 5 micrometers as determined by National Institute for Occupational Safety and Health (NIOSH) Method 7400.

1.2.7 Asbestos Permissible Exposure Limit

0.1 fibers per cubic centimeter of air as an 8-hour time weighted average measured in the breathing zone as defined by 29 CFR 1926.1101 or other Federal legislation having legal jurisdiction for the protection of workers health.

1.2.8 Authorized Person

Any person authorized by the Contractor and required by work duties to be present in the regulated areas.

1.2.9 Background

The ambient airborne asbestos concentration in an uncontaminated area as measured prior to any asbestos hazard abatement efforts. Background concentrations for other (contaminated) areas are measured in similar but asbestos free locations.

1.2.10 Competent Person (CP)

A person meeting the requirements for competent person as specified in 29 CFR 1926.1101 including a person capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, and is specifically trained in a training course which meet the criteria of EPA's Model Accreditation Plan (40 CFR 763) for project designer or supervisor, or its equivalent. The competent person must have a current State of Michigan asbestos contractors or supervisors license.

1.2.11 Contractor

The Contractor is that individual, or entity under contract to perform the herein listed work.

1.2.12 Disposal Bag

A 6 mil thick, leak-tight plastic bag, pre-labeled in accordance with 29 CFR 1926.1101, used for transporting asbestos waste from containment to disposal site.

1.2.13 Disturbance

Activities that disrupt the matrix of ACM, crumble or pulverize ACM, or generate visible debris from ACM. Disturbance includes cutting away small amounts of ACM, no greater than the amount which can be contained in one standard sized glovebag or waste bag, not larger than 60 inches in length and width in order to access a building component.

1.2.14 Encapsulation

The abatement of an asbestos hazard through the appropriate use of chemical encapsulants.

1.2.15 Encapsulants

Specific materials in various forms used to chemically or physically entrap asbestos fibers in various configurations to prevent these fibers from becoming airborne. There are four types of encapsulants as follows which must comply with performance requirements as specified herein.

a. Removal Encapsulant (can be used as a wetting agent)

b. Bridging Encapsulant (used to provide a tough, durable surface coating to asbestos containing material)

c. Penetrating Encapsulant (used to penetrate the asbestos containing material encapsulating all asbestos fibers and preventing fiber release due to routine mechanical damage)

d. Lock-Down Encapsulant (used to seal off or "lock-down" minute asbestos fibers left on surfaces from which asbestos containing material has been removed).

1.2.16 Friable Asbestos Material

A term defined in 40 CFR 61-SUBPART M and EPA 340/1-90/018 meaning any material which contains more than 1 percent asbestos, as determined using the method specified in 40 CFR 763, Polarized Light Microscopy (PLM), that when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

1.2.17 Glovebag Technique

Those asbestos removal and control techniques put forth in 29 CFR 1926.1101.

1.2.18 Government Consultant (GC)

That qualified person employed directly by the Government to monitor, sample, inspect the work or in some other way advise the Contracting Officer. The GC is normally a private consultant, but can be an employee of the Government.

1.2.19 HEPA Filter Equipment

High efficiency particulate air (HEPA) filtered vacuum and exhaust ventilation equipment with a filter system capable of collecting and retaining asbestos fibers. Filters must retain 99.97 percent of particles 0.3 microns or larger as indicated in UL 586.

1.2.20 Model Accreditation Plan (MAP)

USEPA training accreditation requirements for persons who work with asbestos as specified in 40 CFR 763.

1.2.21 Negative Pressure Enclosure (NPE)

That engineering control technique described as a negative pressure enclosure in 29 CFR 1926.1101.

1.2.22 NESHAP

National Emission Standards for Hazardous Air Pollutants. The USEPA NESHAP regulation for asbestos is at 40 CFR 61-SUBPART M.

1.2.23 Nonfriable Asbestos Material

Material that contains asbestos in which the fibers have been immobilized by a bonding agent, coating, binder, or other material so that the asbestos is well bound and will not normally release asbestos fibers during any appropriate use, handling, storage or transportation. It is understood that asbestos fibers may be released under other conditions such as demolition, removal, or mishap.

1.2.24 Permissible Exposure Limits (PELs)

1.2.24.1 PEL-Time Weighted Average(TWA)

Concentration of asbestos not in excess of 0.1 fibers per cubic centimeter of air (f/cc) as an 8-hour time weighted average (TWA).

1.2.24.2 PEL-Excursion Limit

An airborne concentration of asbestos not in excess of 1.0 f/cc of air as averaged over a sampling period of 30 minutes.

1.2.25 Personal Sampling

Air sampling which is performed to determine asbestos fiber concentrations within the breathing zone of a specific employee, as performed in accordance with 29 CFR 1926.1101.

1.2.26 Private Qualified Person (PQP)

That qualified person hired by the Contractor to perform the herein listed tasks.

1.2.27 Qualified Person (QP)

A Registered Architect, Professional Engineer, Certified Industrial Hygienist, consultant or other qualified person who has successfully completed training and is therefore accredited under a legitimate State Model Accreditation Plan as described in 40 CFR 763 as a Building Inspector, Contractor/Supervisor Abatement Worker, and Asbestos Project Designer; and has successfully completed the National Institute of Occupational Safety and Health (NIOSH) 582 course "Sampling and Evaluating Airborne Asbestos Dust" or equivalent. The QP must be qualified to perform visual inspections as indicated in ASTM E1368. The QP must be appropriately licensed in the State of Michigan.

1.2.28 TEM

Refers to Transmission Electron Microscopy.

1.2.29 Time Weighted Average (TWA)

The TWA is an 8-hour time weighted average airborne concentration of asbestos fibers.

1.2.30 Transite

A generic name for asbestos cement wallboard and pipe.

1.2.31 Wetting Agent

A chemical added to water to reduce the water's surface tension thereby increasing the water's ability to soak into the material to which it is applied. An equivalent wetting agent must have a surface tension of at most 0.00042 psi.

1.2.32 Worker

Individual (not designated as the Competent Person or a supervisor) who

performs asbestos work and has completed asbestos worker training required by 29 CFR 1926.1101, to include EPA Model Accreditation Plan (MAP) "Worker" training; accreditation, if required by the OSHA Class of work to be performed or by the state where the work is to be performed. The worker must be appropriately licensed in the State of Michigan.

1.3 REQUIREMENTS

1.3.1 Description of Work

The work covered by this section includes the handling and control of asbestos containing materials and describes some of the resultant procedures and equipment required to protect workers, the environment and occupants of the building or area, or both, from contact with airborne asbestos fibers. The work also includes the disposal of any asbestos containing materials generated by the work. More specific operational procedures must be outlined in the Asbestos Hazard Abatement Plan called for elsewhere in this specification. The asbestos work includes the demolition and removal of asbestos located in the building. Under normal conditions non-friable or chemically bound materials containing asbestos would not be considered hazardous; however, this material may release airborne asbestos fibers during demolition and removal and therefore must be handled in accordance with the removal and disposal procedures as specified herein. Provide negative pressure enclosure techniques as outlined in this specification. The work area will be evacuated during the asbestos abatement work. A competent person must supervise asbestos removal work as specified herein.

1.3.2 Unexpected Discovery of Asbestos

Notify the Contracting Officer if any previously untested building components suspected to contain asbestos are impacted by the work.

1.3.3 Medical Requirements

Provide medical requirements including but not limited to medical surveillance and medical record keeping as listed in 29 CFR 1926.1101.

1.3.3.1 Medical Examinations

Before exposure to airborne asbestos fibers, provide workers with a comprehensive medical examination as required by 29 CFR 1926.1101 or other pertinent State or local directives. This requirement must have been satisfied within the 12 months prior to the start of work on this contract. The same medical examination must be given on an annual basis to employees engaged in an occupation involving asbestos and within 30 calendar days before or after the termination of employment in such occupation. Specifically identify x-ray films of asbestos workers to the consulting radiologist and mark medical record jackets with the word "ASBESTOS."

1.3.3.2 Medical Records

Maintain complete and accurate records of employees' medical examinations, medical records, and exposure data for a period of 50 years after termination of employment and make records of the required medical examinations and exposure data available for inspection and copying to: The Assistant Secretary of Labor for Occupational Safety and Health (OSHA), or authorized representatives of them, and an employee's physician upon the

request of the employee or former employee.

1.3.4 Employee Training

Submit certificates, prior to the start of work but after the main abatement submittal, signed by each employee indicating that the employee has received training in the proper handling of materials and wastes that contain asbestos in accordance with 40 CFR 763; understands the health implications and risks involved, including the illnesses possible from exposure to airborne asbestos fibers; understands the use and limits of the respiratory equipment to be used; and understands the results of monitoring of airborne quantities of asbestos as related to health and respiratory equipment as indicated in 29 CFR 1926.1101 on an initial and annual basis. Organize certificates by individual worker, not grouped by type of certification. Post appropriate evidence of compliance with the training requirements of 40 CFR 763. Train personnel involved in the asbestos control work in accordance with United States Environmental Protection Agency (USEPA) Asbestos Hazard Emergency Response Act (AHERA) training criteria or State training criteria whichever is more stringent. Document the training by providing: dates of training, training entity, course outline, names of instructors, and qualifications of instructors upon request by the Contracting Officer. Furnish each employee with respirator training and fit testing administered by the PQP as required by 29 CFR 1926.1101 and 29 CFR 1926.103. Fully cover engineering and other hazard control techniques and procedures. Asbestos workers must have a current State of Michigan asbestos worker's license.

1.3.5 Permits and Notifications

Prior to the start of work, obtain necessary permits in conjunction with asbestos removal, encapsulation, hauling, and disposition, and furnish notification of such actions required by Federal, State, regional, and local authorities. Notify the State's environmental protection agency and the Contracting Officer in writing 10 working days prior to commencement of work in accordance with 40 CFR 61-SUBPART M. Notify the Contracting Officer and other appropriate Government agencies in writing 20 working days prior to the start of asbestos work as indicated in applicable laws, ordinances, criteria, rules, and regulations. Submit copies of all Notifications to the Contracting Officer.

1.3.6 Environment, Safety and Health Compliance

In addition to detailed requirements of this specification, comply with those applicable laws, ordinances, criteria, rules, and regulations of Federal, State, regional, and local authorities regarding handling, storing, transporting, and disposing of asbestos waste materials. Comply with the applicable requirements of the current issue of EM 385-1-1, 29 CFR 1926.1101, 40 CFR 61-SUBPART A, 40 CFR 61-SUBPART M, 40 CFR 763 and ND OPNAVINST 5100.23. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting the work. Where the requirements of this specification, applicable laws, rules, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirement as defined by the Government apply.

1.3.7 Respiratory Protection Program

Establish and implement a respirator program as required by 29 CFR 1926.1101, and 29 CFR 1926.103. Submit a written description of the program to the Contracting Officer. Submit a written program manual or operating

procedure including methods of compliance with regulatory statutes.

1.3.7.1 Respirator Program Records

Submit records of the respirator program as required by 29 CFR 1926.103, and 29 CFR 1926.1101.

1.3.7.2 Respirator Fit Testing

The Contractor's PQP must conduct a qualitative or quantitative fit test conforming to 29 CFR 1926.103 for each worker required to wear a respirator, and any authorized visitors who enter a regulated area where respirators are required to be worn. A respirator fit test must be performed prior to initially wearing a respirator and every 12 months thereafter. If physical changes develop that will affect the fit, a new fit test must be performed. Functional fit checks must be performed each time a respirator is put on and in accordance with the manufacturer's recommendation.

1.3.7.3 Respirator Selection and Use Requirements

Provide respirators, and ensure that they are used as required by 29 CFR 1926.1101 and in accordance with CGA G-7 and the manufacturer's recommendations. Respirators must be approved by the National Institute for Occupational Safety and Health NIOSH, under the provisions of 42 CFR 84, for use in environments containing airborne asbestos fibers. For air-purifying respirators, the particulate filter must be high-efficiency particulate air (HEPA)/(N-,R-,P-100). The initial respirator selection and the decisions regarding the upgrading or downgrading of respirator type must be made by the Contractor's Designated IH based on the measured or anticipated airborne asbestos fiber concentrations to be encountered.

1.3.8 Asbestos Hazard Control Supervisor

The Contractor must be represented on site by a supervisor, trained using the model Contractor accreditation plan as indicated in the Federal statutes for all portions of the herein listed work.

1.3.9 Hazard Communication

Adhere to all parts of 29 CFR 1926.59 and provide the Contracting Officer with a copy of the Safety Data Sheets (SDS) for all materials brought to the site.

1.3.10 Asbestos Hazard Abatement Plan

Submit a detailed plan of the safety precautions such as lockout, tagout, tryout, fall protection, and confined space entry procedures and equipment and work procedures to be used in the removal of materials containing asbestos. The plan, not to be combined with other hazard abatement plans, must be prepared, signed, and sealed by the PQP. Provide a Table of Contents for each abatement submittal, which follows the sequence of requirements in the contract. The plan must include but not be limited to the precise personal protective equipment to be used including, but not limited to, respiratory protection, type of whole-body protection, the location of asbestos control areas including clean and dirty areas, buffer zones, showers, storage areas, change rooms, removal method, interface of trades involved in the construction, sequencing of asbestos related work, disposal plan, type of wetting agent and asbestos sealer to be used,

locations of local exhaust equipment, planned air monitoring strategies, and a detailed description of the method to be employed in order to control environmental pollution. The plan must also include (both fire and medical emergency) response plans and an Activity Hazard Analyses (AHAs) in accordance with EM 385-1-1. The Asbestos Hazard Abatement Plan must be approved in writing prior to starting any asbestos work. The Contractor, Asbestos Hazard Control Supervisor,, CP and PQP must meet with the Contracting Officer prior to beginning work, to discuss in detail the Asbestos Hazard Abatement Plan, including work procedures and safety precautions. Once approved by the Contracting Officer, the plan will be enforced as if an addition to the specification. Any changes required in the specification as a result of the plan must be identified specifically in the plan to allow for free discussion and approval by the Contracting Officer prior to starting work.

1.3.11 Testing Laboratory

Submit the name, address, and telephone number of each testing laboratory selected for the analysis, and reporting of airborne concentrations of asbestos fibers along with certification that each laboratory is American Industrial Hygiene Association (AIHA) accredited and that persons counting the samples have been judged proficient by current inclusion on the AIHA Asbestos Analysis Registry (AAR) and successful participation of the laboratory in the Proficiency Analytical Testing (PAT) Program. Where analysis to determine asbestos content in bulk materials or transmission electron microscopy is required, submit evidence that the laboratory is accredited by the National Institute of Science and Technology (NIST) under National Voluntary Laboratory Accreditation Program (NVLAP) for asbestos analysis. The testing laboratory firm must be independent of the asbestos contractor and must have no employee or employer relationship which could constitute a conflict of interest.

1.3.12 Landfill Approval

Submit written evidence that the landfill is approved for asbestos disposal by the U.S. Environmental Protection Agency, Region 3, Air Enforcement Section (38W12), and local regulatory agencies. Within three working days after delivery, submit detailed delivery tickets, prepared, signed, and dated by an agent of the landfill, certifying the amount of asbestos materials delivered to the landfill. Submit a copy of the waste shipment records within one day of the shipment leaving the project site.

1.3.13 Transporter Certification

Submit written evidence that the transporter is approved to transport asbestos waste in accordance with the DOT requirements of 49 CFR 171, 49 CFR 172 and 49 CFR 173 as well as registration requirements of 49 CFR 107 and all other State and local regulatory agency requirements.

1.3.14 Medical Certification

Provide a written certification for each worker and supervisor, signed by a licensed physician indicating that the worker and supervisor has met or exceeded all of the medical prerequisites listed herein and in 29 CFR 1926.1101 and 29 CFR 1926.103 as prescribed by law. Submit certificates prior to the start of work but after the main abatement submittal.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Amended Water; G

Safety Data Sheets (SDS) for All Materials; G

Encapsulants; G

Respirators; G

Local Exhaust Equipment; G

Pressure Differential Automatic Recording Instrument; G

Vacuums; G

SD-06 Test Reports

Air Sampling Results; G

Pressure Differential Recordings for Local Exhaust System; G

Clearance Sampling; G

Asbestos Disposal Quantity Report; G

SD-07 Certificates

Employee Training; G

Notifications; G

Respiratory Protection Program; G

Asbestos Hazard Abatement Plan; G

Testing Laboratory; G

Landfill Approval; G

Delivery Tickets; G

Waste Shipment Records; G

Transporter Certification; G

Medical Certification; G

Private Qualified Person Documentation; G

Designated Competent Person; G

Worker's License; G

Contractor's License; G

Federal, State or Local Citations on Previous Projects; G

Encapsulants; G

Equipment Used to Contain Airborne Asbestos Fibers; G

Water Filtration Equipment; G

Vacuums; G

Ventilation Systems; G

SD-11 Closeout Submittals

Permits; G

Notifications; G

Respirator Program Records; G

Rental Equipment; G

1.5 QUALITY ASSURANCE

1.5.1 Private Qualified Person Documentation

Submit the name, address, and telephone number of the Private Qualified Person (PQP) selected to prepare the Asbestos Hazard Abatement Plan, direct monitoring and training, and documented evidence that the PQP has successfully completed training in and is accredited and where required is certified as, a Building Inspector, Contractor/Supervisor Abatement Worker, and Asbestos Project Designer as described by 40 CFR 763 and has successfully completed the National Institute of Occupational Safety and Health (NIOSH) 582 course "Sampling and Evaluating Airborne Asbestos Dust" or equivalent.. The PQP and the asbestos contractor must not have an employee/employer relationship or financial relationship which could constitute a conflict of interest. The PQP must be a first tier subcontractor.

1.5.2 Designated Competent Person Documentation

The Designated Competent Person must be experienced in the administration and supervision of asbestos abatement projects including exposure assessment and monitoring, work practices, abatement methods, protective measures for personnel, setting up and inspecting asbestos abatement work areas, evaluating the integrity of containment barriers, placement and operation of local exhaust systems, ACM generated waste containment and disposal procedures, decontamination units installation and maintenance requirements, site safety and health requirements, notification of other employees onsite, . The Designated Competent Person must be on-site at all times when asbestos abatement activities are underway.Submit training certification and a current State of Asbestos Contractor's and Supervisor's License. Submit evidence that the Designated Competent Person has a minimum of years of on-the-job asbestos abatement experience

relevant to OSHA designated competent person requirements. The Designated Competent Person must be a first tier subcontractor.

1.5.3 Worker's License

Submit documentation that workers meet the requirements of 29 CFR 1926.1101, 40 CFR 61-SUBPART M and have a current State of Michigan Asbestos Workers License.

1.5.4 Contractor's License

Submit a copy of the asbestos contractor's license issued by the State of Michigan. Submit the following certification along with the license: "I certify that the personnel I am responsible for during the course of this project fully understand the contents of 29 CFR 1926.1101, 40 CFR 61-SUBPART MEM 385-1-1, and the Federal, State and local requirements for those asbestos abatement activities that they will be involved in." This certification statement must be signed by the Company's President or Chief Executive.

1.5.5 Air Sampling Results

Complete fiber counting and provide results to the PQP and GC for review within 16 hours of the "time off" of the sample pump. Notify the Contracting Officer immediately of any airborne levels of asbestos fibers in excess of the acceptable limits. Submit sampling results to the Contracting Officer and the affected Contractor employees where required by law within three working days, signed by the testing laboratory employee performing air sampling, the employee that analyzed the sample, and the PQP and GC. Notify the Contractor and the Contracting Officer immediately of any variance in the pressure differential which could cause adjacent unsealed areas to have asbestos fiber concentrations in excess of 0.01 fibers per cubic centimeter or background whichever is higher. In no circumstance must levels exceed 0.1 fibers per cubic centimeter.

1.5.6 Pressure Differential Recordings for Local Exhaust System

Provide a local exhaust system that creates a negative pressure of at least 0.02 inches of water relative to the pressure external to the enclosure and operate it continuously, 24-hours a day, until the temporary enclosure of the asbestos control area is removed. Submit pressure differential recordings for each work day to the PQP and GC for review and to the Contracting Officer within 24-hours from the end of each work day.

1.5.7 Federal, State or Local Citations on Previous Projects

Submit a statement, signed by an officer of the company, containing a record of any citations issued by Federal, State or local regulatory agencies relating to asbestos activities within the last 5 years (including projects, dates, and resolutions); a list of penalties incurred through non-compliance with asbestos project specifications, including liquidated damages, overruns in scheduled time limitations and resolutions; and situations in which an asbestos-related contract has been terminated (including projects, dates, and reasons for terminations). If there are none, a negative declaration signed by an officer of the company must be provided.

1.5.8 Preconstruction Conference

Conduct a safety preconstruction conference to discuss the details of the Asbestos Hazard Abatement Plan, Accident Prevention Plan (APP) including the AHAs required in specification Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS . The safety preconstruction conference must include the Contractor and their Designated Competent Person, Designated IH and Project Supervisor and the Contracting Officer. Deficiencies in the APP will be discussed. Onsite work must not begin until the APP has been accepted.

1.6 SECURITY

A log book must be kept documenting entry into and out of the regulated area. Entry into regulated areas must only be by personnel authorized by the Contractor and the Contracting Officer. Personnel authorized to enter regulated areas must be trained, medically evaluated, and wear the required personal protective equipment.

1.7 EQUIPMENT

1.7.1 Rental Equipment

Provide a copy of the written notification to the rental company concerning the intended use of the equipment and the possibility of asbestos contamination of the equipment.

PART 2 PRODUCTS

2.1 ENCAPSULANTS

Encapsulants must conform to current USEPA requirements, contain no toxic or hazardous substances as defined in 29 CFR 1926.59, and conform to the following performance requirements.

2.1.1 Removal Encapsulants

Requirement	Test Standard
Flame Spread - 25, Smoke Emission - 50	ASTM E84
Life Expectancy - 20 years	ASTM C732 Accelerated Aging Test
Permeability - Minimum 0.4 perms	ASTM E96/E96M
Fire Resistance - Negligible affect on fire resistance rating over 3 hour test (Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E119
Impact Resistance - Minimum 43 in/lb	ASTM D2794 Gardner Impact Test
Flexibility - no rupture or cracking	ASTM D522/D522M Mandrel Bend Test

2.1.2 Bridging Encapsulant

Requirement	Test Standard
Flame Spread - 25, Smoke Emission - 50	ASTM E84
Life Expectancy - 20 years	ASTM C732 Accelerated Aging Test
Permeability - Minimum 0.4 perms	ASTM E96/E96M
Fire Resistance - Negligible affect on fire resistance rating over 3-hour test (Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E119
Impact Resistance - Minimum 43 in/lb	ASTM D2794 Gardner Impact Test
Flexibility - no rupture or cracking	ASTM D522/D522M Mandrel Bend Test

2.1.3 Penetrating Encapsulant

Requirement	Test Standard
Flame Spread - 25, Smoke Emission - 50	ASTM E84
Life Expectancy - 20 years	ASTM C732 Accelerated Aging Test
Permeability - Minimum 0.4 perms	ASTM E96/E96M
Cohesion/Adhesion Test - 50 pounds of force/foot	ASTM E119
Fire Resistance - Negligible affect on fire resistance rating over 3-hour test (Classified by UL for use over fibrous and cementitious sprayed fireproofing)	ASTM E119
Impact Resistance - Minimum 43 in/lb	ASTM D2794 Gardner Impact Test
Flexibility - no rupture or cracking	ASTM D522/D522M Mandrel Bend Test

2.1.4 Lock-down Encapsulant

Requirement	Test Standard
Flame Spread - 25, Smoke Emission - 50	ASTM E84
Life Expectancy - 20 years	ASTM C732 Accelerated Aging Test
Permeability - Minimum 0.4 perms	ASTM E96/E96M
Fire Resistance - Negligible affect on fire resistance rating over 3-hour test (Tested with fireproofing over encapsulant applied directly to steel member)	ASTM E119
Bond Strength: 100 pounds of force/foot	ASTM E736/E736M
(Tests compatibility with cementitious and fibrous fireproofing)	

2.2 DUCT TAPE

Industrial grade duct tape of appropriate widths suitable for bonding sheet plastic and disposal container.

2.3 DISPOSAL CONTAINERS

Leak-tight (defined as solids, liquids, or dust that cannot escape or spill out) disposal containers must be provided for ACM wastes as required by 29 CFR 1926.1101. Disposal containers can be in the form of:

a. Disposal Bags

b. Fiberboard Drums

c. Cardboard Boxes

2.4 SHEET PLASTIC

Sheet plastic must be polyethylene of 6 mil minimum thickness and must be provided in the largest sheet size necessary to minimize seams. Film must be clearfrosted or black and conform to ASTM D4397, except as specified below

2.4.1 Flame Resistant

Where a potential for fire exists, flame-resistant sheets must be provided. Film must be frosted or black and must conform to the requirements of NFPA 701.

2.4.2 Reinforced

Reinforced sheets must be provided where high skin strength is required, such as where it constitutes the only barrier between the regulated area and the outdoor environment. The sheet stock must consist of translucent, nylon-reinforced or woven-polyethylene thread laminated between 2 layers of polyethylene film. Film must meet flame resistant standards of NFPA 701.

2.5 MASTIC REMOVING SOLVENT

Mastic removing solvent must be nonflammable and must not contain methylene chloride, glycol ether, or halogenated hydrocarbons. Solvents used onsite must have a flash point greater than 140 degrees F.

2.6 LEAK-TIGHT WRAPPING

Two layers of 6 mil minimum thick polyethylene sheet stock must be used for the containment of removed asbestos-containing components or materials such as large tanks, boilers, insulated pipe segments and other materials. Upon placement of the ACM component or material, each layer must be individually leak-tight sealed with duct tape.

2.7 VIEWING INSPECTION WINDOW

Where feasible, a minimum of one clear, 1/8 inch thick, acrylic sheet, 18 by 24 inches, must be installed as a viewing inspection window at eye level on a wall in each containment enclosure. The windows must be sealed leak-tight with industrial grade duct tape.

2.8 WETTING AGENTS

Removal encapsulant (a penetrating encapsulant) must be provided when conducting removal abatement activities that require a longer removal time or are subject to rapid evaporation of amended water. The removal encapsulant must be capable of wetting the ACM and retarding fiber release during disturbance of the ACM greater than or equal to that provided by amended water. Performance requirements for penetrating encapsulants are specified in paragraph ENCAPSULANTS above.

PART 3 EXECUTION

3.1 EQUIPMENT

Provide the Contracting Officer or the Contracting Officer's Representative, with at least two complete sets of personal protective equipment as required for entry to and inspection of the asbestos control area. Provide equivalent training to the Contracting Officer or a designated representative as provided to Contractor employees in the use of the required personal protective equipment. Provide manufacturer's certificate of compliance for all equipment used to contain airborne asbestos fibers.

3.1.1 Air Monitoring Equipment

The Contractor's PQP must approve air monitoring equipment. The equipment must include, but must not be limited to:

a. High-volume sampling pumps that can be calibrated and operated at a constant airflow up to 16 liters per minute.

b. Low-volume, battery powered, body-attachable, portable personal pumps that can be calibrated to a constant airflow up to approximately 3.5 liters per minute, and a self-contained rechargeable power pack capable of sustaining the calibrated flow rate for a minimum of 10 hours. The pumps must also be equipped with an automatic flow control unit which must maintain a constant flow, even as filter resistance increases due to accumulation of fiber and debris on the filter surface.

c. Single use standard 25 mm diameter cassette, open face, 0.8 micron pore size, mixed cellulose ester membrane filters and cassettes with 50 mm electrically conductive extension cowl, and shrink bands for personal air sampling.

d. Single use standard 25 mm diameter cassette, open face, 0.45 micron pore size, mixed cellulose ester membrane filters and cassettes with 50 mm electrically conductive cowl, and shrink bands when conducting environmental area sampling using NIOSH NMAM Methods 7400 and 7402, (and the transmission electric microscopy method specified at 40 CFR 763 if required).

e. A flow calibrator capable of calibration to within plus or minus 2 percent of reading over a temperature range of minus 4 to plus 140 degrees F and traceable to a NIST primary standard.

3.1.2 Respirators

Select respirators from those approved by the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services.

3.1.2.1 Respirators for Handling Asbestos

Provide personnel engaged in pre-cleaning, cleanup, handling, removal and or demolition of asbestos materials with respiratory protection as indicated in 29 CFR 1926.1101 and 29 CFR 1926.103. Breathing air must comply with CGA G-7.

3.1.3 Exterior Whole Body Protection

3.1.3.1 Outer Protective Clothing

Provide personnel exposed to asbestos with disposable "non-breathable," whole body outer protective clothing, head coverings, gloves, and foot coverings. Provide disposable plastic or rubber gloves to protect hands. Cloth gloves may be worn inside the plastic or rubber gloves for comfort, but must not be used alone. Make sleeves secure at the wrists, make foot coverings secure at the ankles, and make clothing secure at the neck by the use of tape.

3.1.3.2 Work Clothing

Provide cloth work clothes for wear under the outer protective clothing and foot coverings and either dispose of or properly decontaminate them as recommended by the PQP after each use.

3.1.3.3 Personal Decontamination Unit

Provide a temporary, negative pressure unit with a separate decontamination

locker room and clean locker room with a shower that complies with 29 CFR 1926.51(f)(4)(ii) through (V) in between for personnel required to wear whole body protective clothing. Provide two separate lockers for each asbestos worker, one in each locker room. Keep street clothing and street shoes in the clean locker. HEPA vacuum and remove asbestos contaminated disposable protective clothing while still wearing respirators at the boundary of the asbestos work area and seal in impermeable bags or containers for disposal. Do not wear work clothing between home and work. Locate showers between the decontamination locker room and the clean locker room and require that all employees shower before changing into street clothes. Collect used shower water and filter with approved water filtration equipment to remove asbestos contamination. Wastewater filters must be installed in series with the first stage pore size 20 microns and the second stage pore size of 5 microns. Dispose of filters and residue as asbestos waste. Discharge clean water to the sanitary system. Dispose of asbestos contaminated work clothing as asbestos contaminated waste. Keep the floor of the decontamination unit's clean room dry and clean at all times. Proper housekeeping and hygiene requirements must be maintained. Provide soap and towels for showering, washing and drying. Cloth towels provided must be disposed of as ACM waste or must be laundered in accordance with 29 CFR 1926.1101. Physically attach the decontamination units to the asbestos control area. Construct both a personnel decontamination unit and an equipment decontamination unit onto and integral with each asbestos control area.

3.1.3.4 Eye Protection

Provide eye protection that complies with ANSI/ISEA Z87.1 when operations present a potential eye injury hazard. Provide goggles to personnel engaged in asbestos abatement operations when the use of a full face respirator is not required.

3.1.4 Regulated Areas

All Class I, II, and III asbestos work must be conducted within regulated areas. The regulated area must be demarcated to minimize the number of persons within the area and to protect persons outside the area from exposure to airborne asbestos. Control access to regulated areas, ensure that only authorized personnel enter, and verify that Contractor required medical surveillance, training and respiratory protection program requirements are met prior to allowing entrance.

3.1.5 Load-out Unit

Provide a temporary load-out unit that is adjacent and connected to the regulated area. Attach the load-out unit in a leak-tight manner to each regulated area.

3.1.6 Warning Signs and Labels

Provide warning signs at all approaches to asbestos control areas. Locate signs at such a distance that personnel may read the sign and take the necessary protective steps required before entering the area. Provide labels and affix to all asbestos materials, scrap, waste, debris, and other products contaminated with asbestos. Containers with preprinted warning labels conforming to the requirements are acceptable

3.1.6.1 Warning Sign

Provide vertical format conforming to 29 CFR 1926.200, and 29 CFR 1926.1101 minimum 20 by 14 inches displaying the following legend in the lower panel:

Legend	Notation
DANGER	one inch Sans Serif Gothic or Block
ASBESTOS	one inch Sans Serif Gothic or Block
MAY CAUSE CANCER	one inch Sans Serif Gothic or Block
CAUSES DAMAGE TO LUNGS	1/4 inch Sans Serif Gothic or Block
AUTHORIZED PERSONNEL ONLY	1/4 inch Sans Serif Gothic or Block

Spacing between lines must be at least equal to the height of the upper of any two lines.

3.1.6.2 Warning Labels

Provide labels conforming to 29 CFR 1926.1101 of sufficient size to be clearly legible, displaying the following legend:

DANGER
CONTAINS ASBESTOS FIBERS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATHE DUST AVOID CREATING DUST

3.1.7 Local Exhaust System

Provide a local exhaust system in the asbestos control area in accordance with ASSP Z9.2 and 29 CFR 1926.1101 that will provide at least four air changes per hour inside of the negative pressure enclosure. Local exhaust equipment must be operated 24-hours per day, until the asbestos control area is removed and must be leak proof to the filter and equipped with HEPA filters. Maintain a minimum pressure differential in the control area of minus 0.02 inch of water column relative to adjacent, unsealed areas. Provide continuous 24-hour per day monitoring of the pressure differential with a pressure differential automatic recording instrument. The building ventilation system must not be used as the local exhaust system for the asbestos control area. Filters on exhaust equipment must conform to ASSP Z9.2 and UL 586. Terminate the local exhaust system out of doors and remote from any public access or ventilation system intakes.

3.1.8 Tools

Vacuums must be leak proof to the filter and equipped with HEPA filters. Filters on vacuums must conform to ASSP Z9.2 and UL 586. Do not use power tools to remove asbestos containing materials unless the tool is equipped with effective, integral HEPA filtered exhaust ventilation systems. Remove all residual asbestos from reusable tools prior to storage or reuse. Reusable tools must be thoroughly decontaminated prior to being removed from the regulated areas.

3.1.9 Rental Equipment

If rental equipment is to be used, furnish written notification to the rental agency concerning the intended use of the equipment and the possibility of asbestos contamination of the equipment.

3.1.10 Single Stage Decontamination Area

A decontamination area (equipment room/area) must be provided for Class I work involving less than 25 feet or 10 square feet of TSI or surfacing ACM, and for Class II and Class III asbestos work operations where exposures exceed the PELs or where there is no negative exposure assessment. The equipment room or area must be adjacent to the regulated area for the decontamination of employees, material, and their equipment which could be contaminated with asbestos. The area must be covered by an impermeable drop cloth on the floor or horizontal working surface. The area must be of sufficient size to accommodate cleaning of equipment and removing personal protective equipment without spreading contamination beyond the area.

3.1.11 Decontamination Area Exit Procedures

Ensure that the following procedures are followed:

a. Before leaving the regulated area, remove all gross contamination and debris from work clothing using a HEPA vacuum.

b. Employees must remove their protective clothing in the equipment room and deposit the clothing in labeled impermeable bags or containers for disposal or laundering.

c. Employees must not remove their respirators until showering.

d. Employees must shower prior to entering the clean room. If a shower has not been located between the equipment room and the clean room or the work is performed outdoors, ensure that employees engaged in Class I asbestos jobs: a) Remove asbestos contamination from their work suits in the equipment room or decontamination area using a HEPA vacuum before proceeding to a shower that is not adjacent to the work area; or b) Remove their contaminated work suits in the equipment room, without cleaning worksuits, and proceed to a shower that is not adjacent to the work area.

3.2 WORK PROCEDURE

Perform asbestos related work in accordance with 29 CFR 1926.1101, 40 CFR 61-SUBPART M, and as specified herein. Use wet or if given prior EPA approval, dry removal procedures and negative pressure enclosure _____ techniques. Wear and utilize protective clothing and equipment as specified herein. No eating, smoking, drinking, chewing gum, tobacco, or

applying cosmeticsis permitted in the asbestos work or control areas. Personnel of other trades not engaged in the removal and demolition of asbestos containing material must not be exposed at any time to airborne concentrations of asbestos unless all the personnel protection and training provisions of this specification are complied with by the trade personnel. Seal all roof top penetrations, except plumbing vents, prior to asbestos roofing work. Shut down the building heating, ventilating, and air conditioning system, cap the openings to the system, and provide temporary heating, and ventilation, and air conditioning prior to the commencement of asbestos work. Power to the regulated area must be locked-out and tagged in accordance with 29 CFR 1910.147. All electrical work must be performed by a licensed electrician. Stop abatement work in the regulated area immediately when the airborne total fiber concentration: (1) equals or exceeds 0.01 f/cc, or the pre-abatement concentration, whichever is greater, outside the regulated area; or (2) equals or exceeds 1.0 f/cc inside the regulated area. Correct the condition to the satisfaction of the Contracting Officer, including visual inspection and air sampling. Work must resume only upon notification by the Contracting Officer. Corrective actions must be documented. If an asbestos fiber release or spill occurs outside of the asbestos control area, stop work immediately, correct the condition to the satisfaction of the Contracting Officer including clearance sampling, prior to resumption of work.

3.2.1 Building Ventilation System and Critical Barriers

Building ventilation system supply and return air ducts in a regulated area must be shut down and isolated by lockable switch or other positive means in accordance with 29 CFR 1910.147. The airtight seals must consist of . Edges to wall, ceiling and floor surfaces must be sealed with industrial grade duct tape.

a. A Competent Person must supervise the work.

b. For indoor work, critical barriers must be placed over all openings to the regulated area.

c. Impermeable dropcloths must be placed on surfaces beneath all removal activity.

3.2.2 Protection of Existing Work to Remain

Perform work without damage or contamination of adjacent work. Where such work is damaged or contaminated as verified by the Contracting Officer using visual inspection or sample analysis, it must be restored to its original condition or decontaminated by the Contractor at no expense to the Government as deemed appropriate by the Contracting Officer. This includes inadvertent spill of dirt, dust, or debris in which it is reasonable to conclude that asbestos may exist. When these spills occur, stop work immediately. Then clean up the spill. When satisfactory visual inspection and air sampling results are obtained from the PQP work may proceed at the discretion of the Contracting Officer.

3.2.3 Furnishings

Furniture and equipment will be removed from the area of work by the Government before asbestos work begins.

3.2.4 Precleaning

Wet wipe and HEPA vacuum all surfaces potentially contaminated with asbestos prior to establishment of an enclosure.

3.2.5 Asbestos Control Area Requirements

3.2.5.1 Negative Pressure Enclosure

Removal of gypsum wallboard/joint compound require the use of a negative pressure enclosure. Block and seal openings in areas where the release of airborne asbestos fibers can be expected. Establish an asbestos negative pressure enclosure with the use of curtains, portable partitions, or other enclosures in order to prevent the escape of asbestos fibers from the contaminated asbestos work area. Negative pressure enclosure development must include protective covering of uncontaminated walls, and ceilings with a continuous membrane of two layers of minimum 6-mil plastic sheet sealed with tape to prevent water or other damage. Provide two layers of 6-mil plastic sheet over floors and extend a minimum of 12 inches up walls. Seal all joints with tape. Provide local exhaust system in the asbestos control area. Openings will be allowed in enclosures of asbestos control areas for personnel and equipment entry and exit, the supply and exhaust of air for the local exhaust system and the removal of properly containerized asbestos containing materials. Replace local exhaust system filters as required to maintain the efficiency of the system.

3.2.5.2 Glovebag

If the construction of a negative pressure enclosure is infeasible for the of located . Use alternate techniques as indicated in 29 CFR 1926.1101. Establish designated limits for the asbestos regulated area with the use of rope or other continuous barriers, and maintain all other requirements for asbestos control areas. The PQP must conduct personal samples of each worker engaged in asbestos handling (removal, disposal, transport and other associated work) throughout the duration of the project. If the quantity of airborne asbestos fibers monitored at the breathing zone of the workers at any time exceeds background or 0.01 fibers per cubic centimeter whichever is greater, stop work, evacuate personnel in adjacent areas or provide personnel with approved protective equipment at the discretion of the Contracting Officer. This sampling may be duplicated by the Government at the discretion of the Contracting Officer. If the air sampling results obtained by the Government differ from those obtained by the Contractor, the Government will determine which results predominate. If adjacent areas are contaminated as determined by the Contracting Officer, clean the contaminated areas, monitor, and visually inspect the area as specified herein.

3.2.5.3 Regulated Area for Class II Removal

Removal of asbestos containing floor tile/mastic, carpet/mastic, and sealants are Class II removal activities. Establish designated limits for the asbestos regulated work area with the use of red barrier tape; install critical barriers, splash guards and signs, and maintain all other requirements for asbestos control area except local exhaust. Place impermeable dropcloths on surfaces beneath removal activity extending out 3 feet in all directions. A detached decontamination system may be used. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If workers the airborne fiber

concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.6 Removal Procedures

Wet asbestos material with a fine spray of amended water during removal, cutting, or other handling so as to reduce the emission of airborne fibers. Remove material and immediately place in 6 mil plastic disposal bags. Remove asbestos containing material in a gradual manner, with continuous application of the amended water or wetting agent in such a manner that no asbestos material is disturbed prior to being adequately wetted. Where unusual circumstances prohibit the use of 6 mil plastic bags, submit an alternate proposal for containment of asbestos fibers to the Contracting Officer for approval. For example, in the case where both piping and insulation are to be removed, the Contractor may elect to wet the insulation, wrap the pipes and insulation in plastic and remove the pipe by sections. Containerize asbestos containing material while wet. Do not allow asbestos material to accumulate or become dry. Lower and otherwise handle asbestos containing material as indicated in 40 CFR 61-SUBPART M.

3.2.6.1 Sealing Contaminated Items Designated for Disposal

Remove contaminated architectural, mechanical, and electrical appurtenances such as venetian blinds, full-height partitions, carpeting, duct work, pipes and fittings, radiators, light fixtures, conduit, panels, and other contaminated items designated for removal by completely coating the items with an asbestos lock-down encapsulant at the demolition site before removing the items from the asbestos control area. These items need not be vacuumed. The asbestos lock-down encapsulant must be tinted a contrasting color and spray-applied by airless method. Thoroughness of sealing operation must be visually gauged by the extent of colored coating on exposed surfaces. Lock-down encapsulants must comply with the performance requirements specified herein.

3.2.6.2 Exposed Pipe Insulation Edges

Contain edges of asbestos insulation to remain that are exposed by a removal operation. Wet and cut the rough ends true and square with sharp tools and then encapsulate the edges with a 1/4 inch thick layer of non-asbestos containing insulating cement troweled to a smooth hard finish. When cement is dry, lag the end with a layer of non-asbestos lagging cloth, overlapping the existing ends by at least 4 inches. When insulating cement and cloth is an impractical method of sealing a raw edge of asbestos, take appropriate steps to seal the raw edges as approved by the Contracting Officer.

3.2.7 Methods of Compliance

3.2.7.1 Mandated Practices

The specific abatement techniques and items identified must be detailed in the Contractor's AHAP. Use the following engineering controls and work practices in all operations, regardless of the levels of exposure:

a. Vacuum cleaners equipped with HEPA filters.

b. Wet methods or wetting agents except where it can be demonstrated that

the use of wet methods is unfeasible due to the creation of electrical hazards, equipment malfunction, and in roofing.

c. Prompt clean-up and disposal.

d. Inspection and repair of polyethylene.

e. Cleaning of equipment and surfaces of containers prior to removing them from the equipment room or area.

3.2.7.2 Control Methods

Use the following control methods:

a. Local exhaust ventilation equipped with HEPA filter;

b. Enclosure or isolation of processes producing asbestos dust;

c. Where the feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PELs, use them to reduce employee exposure to the lowest levels attainable and must supplement them by the use of respiratory protection.

3.2.7.3 Unacceptable Practices

The following work practices must not be used:

a. High-speed abrasive disc saws that are not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air.

b. Compressed air used to remove asbestos containing materials, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air.

c. Dry sweeping, shoveling, or other dry clean up.

d. Employee rotation as a means of reducing employee exposure to asbestos.

3.2.8 Class I Work Procedures

In addition to requirements of paragraphs MANDATED PRACTICES and CONTROL METHODS, the following engineering controls and work practices must be used:

a. A Competent Person must supervise the installation and operation of the control methods.

b. For jobs involving the removal of more than 25 feet or 10 square feet of TSI or surfacing material, place critical barriers over all openings to the regulated area.

c. HVAC systems must be isolated in the regulated area by sealing with a double layer of plastic or air-tight rigid covers.

d. Impermeable dropcloths (6 mil or greater thickness) must be placed on surfaces beneath all removal activity.

e. Where a negative exposure assessment has not been provided or where exposure monitoring shows the PEL was exceeded, the regulated area must be ventilated with a HEPA unit and employees must use PPE.

3.2.9 Specific Control Methods for Class I Work

Use Class I work procedures, control methods and removal methods for the following ACM:

a. Spray Applied Fireproofing

b. Gypsum Wallboard and Joint Compound

c. Thermal System Insulation and Mudded Pipe Fittings

d. Plaster and Textured Ceilings and Walls

e. Vermiculite

3.2.9.1 Negative Pressure Enclosure (NPE) System

The system must provide at least four air changes per hour inside the containment. The local exhaust unit equipment must be operated 24-hours per day until the containment is removed. The NPE must be smoke tested for leaks at the beginning of each shift and be sufficient to maintain a minimum pressure differential of minus 0.02 inch of water column relative to adjacent, unsealed areas. Pressure differential must be monitored continuously, 24-hours per day, with an automatic manometric recording instrument and Records must be provided daily on the same day collected to the Contracting Officer. The Contracting Officer must be notified immediately if the pressure differential falls below the prescribed minimum. The building ventilation system must not be used as the local exhaust system for the regulated area. The NPE must terminate outdoors unless an alternate arrangement is allowed by the Contracting Officer. All filters used must be new at the beginning of the project and must be periodically changed as necessary and disposed of as ACM waste.

3.2.9.2 Glovebag Systems

Glovebags must be used without modification, smoke-tested for leaks, and completely cover the circumference of pipe or other structures where the work is to be done. Glovebags must be used only once and must not be moved. Glovebags must not be used on surfaces that have temperatures exceeding 150 degrees F. Prior to disposal, glovebags must be collapsed using a HEPA vacuum. Before beginning the operation, loose and friable material adjacent to the glovebag operation must be wrapped and sealed in 2 layers of plastic or otherwise rendered intact. At least two persons must perform glovebag removal. Asbestos regulated work areas must be established for glovebag abatement. Designated boundary limits for the asbestos work must be established with rope or other continuous barriers and all other requirements for asbestos control areas must be maintained, including area signage and boundary warning tape.

a. Attach HEPA vacuum systems to the bag to prevent collapse during removal of ACM.

b. The negative pressure glove boxes must be fitted with gloved apertures and a bagging outlet and constructed with rigid sides from metal or other material which can withstand the weight of the ACM and water used during removal. A negative pressure must be created in the system using a HEPA filtration system. The box must be smoke tested for leaks prior to each use.

3.2.9.3 Mini-Enclosure

Single bulkhead containment Double bulkhead containment or Mini-containment (small walk-in enclosure) to accommodate no more than two persons, may be used if the disturbance or removal can be completely contained by the enclosure. The mini-enclosure must be inspected for leaks and smoke tested before each use. Air movement must be directed away from the employee's breathing zone within the mini-enclosure.

3.2.9.4 Wrap and Cut Operation

Prior to cutting pipe, the asbestos-containing insulation must be wrapped with polyethylene and securely sealed with duct tape to prevent asbestos becoming airborne as a result of the cutting process. The following steps must be taken: install glovebag, strip back sections to be cut 6 inches from point of cut, and cut pipe into manageable sections.

3.2.9.5 Class I Removal Method

Class I ACM must be removed using a control method described above. Prepare work area as previously specified. Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area. Spread one layer of 6-mil seamless plastic sheeting on the floor below the work area. Cut manageable sections of gypsum wallboard and joint compound and immediately place into a 6-mil minimum thickness disposal bag or other approved container. Make every effort to keep the material from falling to the floor of the work area. Use a wire brush and wet clean to remove residual material from studs. Continue wet cleaning until the surface is clean of visible material and encapsulate stud walls. Bag all asbestos debris which has fallen to the floor as asbestos-containing debris. Place all debris in plastic disposal bags of 6-mil minimum thickness. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duck tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Lower and otherwise handle asbestos containing materials as indicated in 40 CFR 61-SUBPART M. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the quantity of airborne asbestos fibers monitored at the breathing zone of the workers or the designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work, and immediately correct the situation.

3.2.10 Class II Work Procedures

In addition to the requirements of paragraphs MANDATED PRACTICES and CONTROL METHODS, the following engineering controls and work practices must be used:

a. A Competent Person must supervise the work.

b. For indoor work, critical barriers must be placed over all openings to the regulated area.

c. Impermeable dropcloths must be placed on surfaces beneath all removal activity.

3.2.11 Specific Control Methods for Class II Work

3.2.11.1 Vinyl and Asphaltic Flooring Materials Carpet and Mastic

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. A detached decontamination system may be used. When removing vinyl floor tile and masticcarpet and mastic which contains ACM, use the following practices. Remove floor tile and masticcarpet and mastic using adequately wet methods. Remove floor tilescarpet and mastic intact (if possible). Wetting is not required when floor tiles are heated and removed intact. Do not sand flooring or its backing. Scrape residual adhesive and backing using wet methods. Mechanical chipping is prohibited unless performed in a negative pressure enclosure. Dry sweeping is prohibited. Use vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (no brush) to clean floors. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duck tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Lower and otherwise handle asbestos containing materials as indicated in 40 CFR 61-SUBPART M. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If workers the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.11.2 Sealants and Mastic

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers and signs, and maintain all other requirements for asbestos control area except local exhaust. Spread 6-mil plastic sheeting on the ground around the perimeter of the work area extending out in all directions. Using adequately wet methods, carefully remove the ACM sealants and mastics using a scraper of knife blade. As it is removed place the material into a disposal bag. Make every effort to keep the asbestos material from falling to the ground or work area floor below. Dry sweeping is prohibited. Use vacuums equipped with HEPA filter and disposable dust bag. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duck tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Lower and otherwise handle asbestos containing materials as indicated in 40 CFR 61-SUBPART M. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or at designated limits at any time exceeds background or 0.01 fibers per cubic

centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.11.3 Suspect Fire Doors

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. A detached decontamination system may be used. Spread 6-mil plastic sheeting on the ground beneath the work area and around the perimeter of the work area extending out in all directions. Remove door intact from hinges and wrap with 6-mil plastic sheeting. Inspect the interior areas of the door to determine if ACM is present. If ACM is not present the door may be disposed of as general construction debris. If ACM is present place whole door in enclosed container for disposal. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.11.4 Roofing Materials

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. When removing roofing materials which contain ACM as described in 29 CFR 1926.1101 (g)(8)(ii), use the following practices. Roofing material must be removed in an intact state. Wet methods must be used to remove roofing materials that are not intact, or that will be rendered not intact during removal, unless such wet methods are not feasible or will create safety hazards. When removing built-up roofs, with asbestos-containing roofing felts and an aggregate surface, using a power roof cutter, all dust resulting from the cutting operations must be collected by a HEPA dust collector, or must be HEPA vacuumed by vacuuming along the cut line. Asbestos-containing roofing material must not be dropped or thrown to the ground, but must be lowered to the ground via covered, dust-tight chute, crane, hoist or other method approved by the Contracting Officer. Any ACM that is not intact must be lowered to the ground as soon as practicable, but not later than the end of the work shift. While the material remains on the roof it must be kept wet or placed in an impermeable waste bag or wrapped in plastic sheeting. Intact ACM must be lowered to the ground as soon as practicable, but not later than the end of the work shift. Unwrapped material must be transferred to a closed receptacle. Critical barriers must be placed over roof level heating and ventilation air intakes. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.11.5 Cementitious Siding and Shingles or Transite Panels

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. When removing cementitious asbestos-containing siding, shingles or Transite panels use the following work practices. Intentionally cutting, abrading or breaking is prohibited. Each panel or shingle must be sprayed with amended water

prior to removal. Nails must be cut with flat, sharp instruments. Unwrapped or unbagged panels or shingles must be immediately lowered to the ground via covered dust-tight chute, crane or hoist, or placed in an impervious waste bag or wrapped in plastic sheeting and lowered to the ground no later than the end of the work shift. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duck tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.11.6 Gaskets

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. Gaskets must be thoroughly wetted with amended water prior to removal and immediately placed in a disposal container. If a gasket is visibly deteriorated and unlikely to be removed intact, removal must be undertaken within a glovebag. Any scraping to remove residue must be performed wet. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duck tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.12 Abatement of Asbestos Contaminated Soil

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. Asbestos contaminated soil must be removed from areas to a minimum depth of 2 inches. Soil must be thoroughly dampened with amended water and then removed by manual shoveling into labeled containers. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duck tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each

worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.13 Air Sampling

Perform sampling of airborne concentrations of asbestos fibers in accordance with 29 CFR 1926.1101, the Contractor's air monitoring plan and as specified herein. Sampling performed in accordance with 29 CFR 1926.1101 must be performed by the PQP. Sampling performed for environmental and quality control reasons must be performed by the PQP. Unless otherwise specified, use NIOSH Method 7400 for sampling and analysis. Monitoring may be duplicated by the Government at the discretion of the Contracting Officer. If the air sampling results obtained by the Government differ from those results obtained by the Contractor, the Government will determine which results predominate. Results of breathing zone samples must be posted at the job site and made available to the Contracting Officer. Submit all documentation regarding initial exposure assessments, negative exposure assessments, and air-monitoring results.

3.2.13.1 Sampling Prior to Asbestos Work

Provide area air sampling and establish the baseline one day prior to the masking and sealing operations for each removal site. Establish the background by performing area sampling in similar but uncontaminated sites in the building.

3.2.13.2 Sampling During Asbestos Work

The PQP must provide personal and area sampling as indicated in 29 CFR 1926.1101 and governing environmental regulations. Breathing zone samples must be taken for at least 25 percent of the workers in each shift, or a minimum of two, whichever is greater. Air sample fiber counting must be completed and results provided within 24-hours (breathing zone samples), and 48 hours (environmental/clearance monitoring) after completion of a sampling period. In addition, provided the same type of work is being performed, provide area sampling at least once every work shift close to the work inside the enclosure, outside the clean room entrance to the enclosure, and at the exhaust opening of the local exhaust system. If sampling outside the enclosure shows airborne levels have exceeded background or 0.01 fibers per cubic centimeter, whichever is greater, stop all work, correct the condition(s) causing the increase, and notify the Contracting Officer immediately. The written results must be signed by testing laboratory analyst, testing laboratory principal and the Contractor's PQP. The air sampling results must be documented on a Contractor's daily air monitoring log.

3.2.13.3 Final Clearance Requirements, NIOSH PCM Method

For PCM sampling and analysis using NIOSH NMAM Method 7400, the fiber concentration inside the abated regulated area, for each airborne sample, must be less than 0.01 f/cc. The abatement inside the regulated area is considered complete when every PCM final clearance sample is below the clearance limit. If any sample result is greater than 0.01 total f/cc, the asbestos fiber concentration (asbestos f/cc) must be confirmed from that same filter using NIOSH NMAM Method 7402 (TEM) at Contractor's expense. If any confirmation sample result is greater than 0.01 asbestos f/cc, abatement is incomplete and cleaning must be repeated at the Contractor's

expense. Upon completion of any required recleaning, resampling with results to meet the above clearance criteria must be done at the Contractor's expense.

3.2.13.4 Final Clearance Requirements, EPA TEM Method

For EPA TEM sampling and analysis, using the EPA Method specified in 40 CFR 763, abatement inside the regulated area is considered complete when the arithmetic mean asbestos concentration of the five inside samples is less than or equal to 70 structures per square millimeter (70 S/mm). When the arithmetic mean is greater than 70 S/mm, the three blank samples must be analyzed. If the three blank samples are greater than 70 S/mm, resampling must be done. If less than 70 S/mm, the five outside samples must be analyzed and a Z-test analysis performed. When the Z-test results are less than 1.65, the decontamination must be considered complete. If the Z-test results are more than 1.65, the abatement is incomplete and cleaning must be repeated. Upon completion of any required recleaning, resampling with results to meet the above clearance criteria must be done at the Contractor's expense.

3.2.13.5 Sampling After Final Clean-Up (Clearance Sampling)

Provide area sampling of asbestos fibers and establish an airborne asbestos concentration of less than 0.01 fibers per cubic centimeter after final clean-up but before removal of the enclosure or the asbestos work control area. After final cleanup and the asbestos control area is dry but prior to clearance sampling, the PQP must perform a visual inspection in accordance with ASTM E1368 to ensure that the asbestos control and work area is free of any accumulations of dirt, dust, or debris. Prepare a written report signed and dated by the PQP documenting that the asbestos control area is free of dust, dirt, and debris and all waste has been removed. The asbestos fiber counts from these samples must be less than 0.01 fibers per cubic centimeter or be not greater than the background, whichever is greater. Should any of the final samples indicate a higher value take appropriate actions to re-clean the area and repeat the sampling and analysis at the Contractor's expense.

3.2.13.6 Air Clearance Failure

If clearance sampling results fail to meet the final clearance requirements, pay all costs associated with the required recleaning, resampling, and analysis, until final clearance requirements are met.

3.2.14 Lock-Down

Prior to removal of plastic barriers and after pre-clearance clean up of gross contamination, the PQP must conduct a visual inspection of all areas affected by the removal in accordance with ASTM E1368. Inspect for any visible fibers.

3.2.15 Site Inspection

While performing asbestos engineering control work, the Contractor must be subject to on-site inspection by the Contracting Officer who may be assisted by or represented by safety or industrial hygiene personnel. If the work is found to be in violation of this specification, the Contracting Officer or his representative will issue a stop work order to be in effect immediately and until the violation is resolved. All related costs including standby time required to resolve the violation must be at the

Contractor's expense.

3.3 CLEAN-UP AND DISPOSAL

3.3.1 Housekeeping

Essential parts of asbestos dust control are housekeeping and clean-up procedures. Maintain surfaces of the asbestos control area free of accumulations of asbestos fibers. Give meticulous attention to restricting the spread of dust and debris; keep waste from being distributed over the general area. Use HEPA filtered vacuum cleaners. DO NOT BLOW DOWN THE SPACE WITH COMPRESSED AIR. When asbestos removal is complete, all asbestos waste is removed from the work-site, and final clean-up is completed, the Contracting Officer will attest that the area is safe before the signs can be removed. After final clean-up and acceptable airborne concentrations are attained but before the HEPA unit is turned off and the enclosure removed, remove all pre-filters on the building HVAC system and provide new pre-filters. Dispose of filters as asbestos contaminated materials. Reestablish HVAC mechanical, and electrical systems in proper working order. The Contracting Officer will visually inspect all surfaces within the enclosure for residual material or accumulated dust or debris. The Contractor must re-clean all areas showing dust or residual materials. If re-cleaning is required, air sample and establish an acceptable asbestos airborne concentration after re-cleaning. The Contracting Officer must agree that the area is safe in writing before unrestricted entry will be permitted. The Government must have the option to perform monitoring to determine if the areas are safe before entry is permitted.

3.3.2 Title to Materials

All waste materials, except as specified otherwise, become the property of the Contractor and must be disposed of as specified in applicable local, State, and Federal regulations and herein.

3.3.3 Disposal of Asbestos

3.3.3.1 Procedure for Disposal

Coordinate all waste disposal manifests with the Contracting Officer and NAVFAC EV. Collect asbestos waste, contaminated waste water filters, asbestos contaminated water, scrap, debris, bags, containers, equipment, and asbestos contaminated clothing which may produce airborne concentrations of asbestos fibers and place in sealed fiber-proof, waterproof, non-returnable containers (e.g. double plastic bags 6 mils thick, cartons, drums or cans). Wastes within the containers must be adequately wet in accordance with 40 CFR 61-SUBPART M. Affix a warning and Department of Transportation (DOT) label to each container including the bags or use at least 6 mils thick bags with the approved warnings and DOT labeling preprinted on the bag. Clearly indicate on the outside of each container the name of the waste generator and the location at which the waste was generated. Prevent contamination of the transport vehicle (especially if the transport vehicle is a rented truck likely to be used in the future for non-asbestos purposes). These precautions include lining the vehicle cargo area with plastic sheeting (similar to work area enclosure) and thorough cleaning of the cargo area after transport and unloading of asbestos debris is complete. Dispose of waste asbestos material at an Environmental Protection Agency (EPA) or State-approved asbestos landfill off Government property. For temporary storage, store sealed impermeable bags in asbestos waste drums or skids. An area for

interim storage of asbestos waste-containing drums or skids will be assigned by the Contracting Officer or his authorized representative. Comply with 40 CFR 61-SUBPART M, State, regional, and local standards for hauling and disposal. Sealed plastic bags may be dumped from drums into the burial site unless the bags have been broken or damaged. Damaged bags must remain in the drum and the entire contaminated drum must be buried. Uncontaminated drums may be recycled. Workers unloading the sealed drums must wear appropriate respirators and personal protective equipment when handling asbestos materials at the disposal site.

3.3.3.2 Asbestos Disposal Quantity Report

Allow the GC to inspect, record and report the amount of asbestos containing material removed and released for disposal on a daily basis.

3.4 ASBESTOS INSPECTION REPORT

NESHAPs ASBESTOS INSPECTION REPORT for Selfridge Building 154 prepared by Arch Environmental Group, Inc., dated January 20, 2020, immediately follows this section as an appendix. This report is provided as a convenience to the contractor. Contractor remains responsible for abatement of materials presented in the report. The report states there could be other hazmat in areas that were inaccessible for investigation. If other locations not included in the report are found, report the findings to the Contracting Officer.

-- End of Section --

NESHAPs ASBESTOS INSPECTION REPORT

Selfridge Building 154
44580 North Jefferson Avenue
Harrison Township, Michigan 48045

Prepared For:
Tetra Tech, Inc.
65 Cadillac Square, Suite 3610
Detroit, Michigan 48226

Prepared By:
Arch Environmental Group, Inc.
37720 Interchange Drive
Farmington Hills, Michigan 48335

Project #:	AE190875
Project Date(s):	December 16, 2019
Report Date:	January 20, 2020

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Appendices

1.0 / Project Summary

Arch Environmental Group, Inc. (AEG) completed a NESHAPs Asbestos Inspection to evaluate the Selfridge Building 154 located at 44580 North Jefferson Avenue, Harrison Township, Michigan for Tetra Tech, Inc. to identify asbestos-containing materials which may be present and impacted by the proposed building demolition activities. The inspection included the entire interior and exterior of the building to identify specific locations and quantities of asbestos-containing materials.

2.0 / Asbestos Inspection

AEG's Accredited Asbestos Inspector completed a comprehensive asbestos inspection which examined each material in each functional space in the building. The field inspection also included a review of the building for all suspect materials (to ensure that all asbestos-containing materials have been properly identified).

All inspection work was completed by Ms. Michelle Carriere and Mr. Pedro Pacheco, experienced inspectors properly trained and accredited through the State of Michigan's Department of Licensing and Regulatory Affairs. Copies of all current accreditation and training documents are located in Appendix F. All material analysis ("bulk sample analysis") was conducted by an independent third-party laboratory - APEX Research, Inc., Whitmore Lake, Michigan. APEX Research, Inc. is an accredited laboratory through the EPA's NVLAP program.

2.1 / Materials Proven to Be Asbestos

The inspection identified the following known and assumed asbestos-containing materials:

<u>Surfacing Materials</u>
None

<u>Thermal System Insulation</u>
None

<u>Miscellaneous Materials</u>

Exterior Window Caulk, Exterior Side, Brown	24 sf
Tagged Fire Door (Assumed)	18 #
Tagged Fire Frame (Assumed)	14 #

2.2 / Materials Proven to Be Non-Asbestos

All other materials identified during the asbestos inspection activities were sampled and determined to be non-asbestos-containing. This includes:

- Covebase Adhesive, 4", Blue
- Covebase Adhesive, 4", Tan
- Covebase, 4", Blue
- Covebase, 4", Tan
- Exterior Door Caulk, Interior Side, White
- Exterior Wall Joint Caulk, Exterior Side, White
- Exterior Window Caulk, Interior Side, Brown
- Floor Tile Mastic, 12" x 12", Blue Mottled
- Floor Tile Mastic, 12" x 12", Tan Mottled
- Floor Tile, 12" x 12", Blue Mottled
- Floor Tile, 12" x 12", Tan Mottled
- Hard Plaster Ceiling, Smooth, Brown Coat
- Hard Plaster Ceiling, Smooth, Finish Coat
- Interior Door Caulk, Interior Side, White
- Interior Wall Joint Caulk, White
- Lay-in Ceiling Tiles, 2' x 2', Dots and Small Gouges
- Lay-in Ceiling Tiles, 2' x 2', Small Dots

- Sink Undercoating, Grey
- Unknown Floor Tile Mastic, Red with Cream Streaks
- Unknown Floor Tile, Red with Cream Streaks

3.0 / Exclusions and Exceptions

3.1 / Inaccessible Materials
AEG did not conduct destructive investigation activities. It is likely that there may be additional asbestos pipe insulation materials in various inaccessible locations, such as inside wall cavities, inside wall construction materials (between cinder block or brick, especially around water sources) and above inaccessible hard ceilings.

AEG was unable to inspect the interior of any mechanical equipment and boilers. There may be suspect asbestos-containing materials inside of older mechanical equipment, such as fire bricks, mortar, and door lining materials. These materials should be sampled once the mechanical equipment is shut off and opened. If present, and until sampled, these materials must be assumed to be asbestos-containing and must be handled accordingly during any maintenance, renovation, or demolition activities.

3.2 / Inaccessible Locations
AEG's Accredited Asbestos Inspectors indicated that all known functional spaces in the building were accessible for review.

4.0 / Sampling Strategies
AEG sampled all materials in accordance with AHERA (763.86 "Sampling"). For each similar material found throughout the facility, AEG collected at least two (2) samples of the material to determine if the material contained asbestos.

4.1 / Sampling Exceptions
In an effort to preserve the integrity of the roof, AEG did not conduct destructive sampling of roofing materials. All roofing materials, including, but not necessarily limited to, felt papers, shingles, flashings, tars, and mastics, should be sampled prior to any renovation or demolition activities. Until sampled, all roofing materials must be assumed to be asbestos containing and must be handled accordingly during any maintenance, renovation, or demolition activities.

There were no other unusual sampling exceptions made during this investigation. AEG did not sample wood paneling, wood ceilings, rolled fiberglass insulation, yellow fiberglass pipe insulation, yellow fiberglass ceiling panels, glass, brick, cinder block or concrete. These building materials are specifically excluded by the EPA in building inspections through the AHERA regulation or the EPA's "100 Commonly Asked Questions about the AHERA Regulation."

5.0 / Regulations and Standards Used for Inspection
The inspection was conducted in accordance with the United States Environmental Protection Agency's (EPA's) Asbestos Hazard Emergency Response Act (AHERA). The AHERA regulation provides stringent standards and guidelines for the sampling, identification and management of asbestos-containing materials, which at a minimum meet the asbestos inspection requirements for demolition and renovation activities under the EPA's National Emissions Standard for Hazardous Air Pollutants (NESHAPs) for asbestos. Pursuant to the needs of Tetra Tech, Inc. (determination of locations of asbestos-containing materials throughout the building prior to renovations or demolition) and the description of services provided by AEG for this NESHAPs Asbestos Inspection, AEG did not assess any material during the inspection activities. Assessments, identification of types, locations and extent of damaged materials and recommended response actions are not included in this report. **The report should be made available to all building employees, occupants (or their legal guardians), short-term workers, and renovation/demolition contractors.**

6.0 / Asbestos Inspection Terminology

For purposes of this Asbestos Inspection, AEG completed all aspects of the inspection in accordance with EPA and OSHA regulations. AHERA, ASHARA, NESHAPs, the EPA's "Purple" and "Green" books and the OSHA regulation outline procedures for identifying, sampling, analyzing and assessing potential asbestos-containing materials. Important words/phrases used throughout these regulations and guidance documents and used throughout this report are (as defined by AHERA (in 40 CFR 763.83):

- "Asbestos-containing Material (ACM)" means any material containing greater than one percent (>1%) asbestos.

- "Category I Non-Friable Asbestos-containing Materials" means non-friable asbestos-containing packings, gaskets, resilient floor coverings, and asphalt roofing products.

- "Category II Non-Friable Asbestos-containing Materials" means any other non-friable asbestos-containing materials, excluding Category I non-friable materials.

- "Functional space" means a room, group of rooms, or homogeneous area (including crawl spaces or the space between a dropped ceiling and the floor or roof deck above), such as classroom(s), a cafeteria, a gymnasium, hallway(s), designated by a person accredited to prepare management plans, design abatement projects, or conduct response actions. [For purposes of this inspection, AEG's Accredited Asbestos Inspector has included the area above a ceiling in the corresponding functional space. For example, the space above the ceiling in Office A is a part of Office A.]

- "Friable" when referring to material in a school building means that the material, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure, and includes previously non-friable material after such previously non-friable material becomes damaged to the extent that when dry it may be crumbled, pulverized, or reduced to powder by hand pressure.

- "Homogeneous Area" means an area of surfacing material, thermal system insulation material, or miscellaneous material that is uniform in color and texture.

- "Non-friable" means material in a school building which when dry may not be crumbled, pulverized, or reduced to powder by hand pressure.

- "Regulated Asbestos-containing Materials" means all friable asbestos-containing materials; Category I non-friable ACM that has become friable; Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting or abrading; or Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized or reduced to powder by forces expected to act on it during demolition or renovation operations.

7.0 / Report Format

The remainder of AEG's report is broken down into the following five (5) sections:

- *Appendix A – Information on Asbestos-containing Materials*: This appendix provides a report user (which may be Owner's representatives, maintenance and custodial workers, as well as construction managers or architects) with information related to the presence of asbestos-containing materials. AEG provides this information for use by persons unaccustomed to the technical detail of standard asbestos inspection reports. The user will be able to gather a synopsis of all other information provided in the report.

- *Appendix B – Floor Plans Indicating Locations of Asbestos-containing Materials*: This appendix provides color maps graphically illustrating the approximate locations of each of the asbestos-containing materials identified during the inspection.

- *Appendix C – Tables of ACM/Non-ACM*: This appendix provides a detailed listing of all materials (homogeneous areas) in each location (functional space) in the building. Information on each material includes; material description, indication of asbestos-containing material (yes, no or assumed), material category (surfacing, thermal system insulation, friable (or non-friable) and quantity. There are two (2) tables provided: one (1) sorted by location (functional space) and one (1) sorted by material (homogeneous area).

- *Appendix D – Bulk Sample Results*: This appendix provides all of the laboratory results for the bulk samples collected. An AEG formatted report is provided with results from the laboratory. Sample chains-of-custody and laboratory accreditation are provided as well.

- *Appendix E – Information on Regulated Construction Waste (RCW):* This appendix provides a detailed listing of all regulated construction waste materials in each location (functional space) in the building. Information on each material includes; material description, material category (PCBs, fuel tanks, hydraulic oil, etc.) and quantity. Information on RCWs can be reviewed in the table provided.

- *Appendix F – Inspector Credentials*: This appendix provides The State of Michigan accreditations, training documentation, and appropriate signatures for each of the Accredited Asbestos Inspectors.

APPENDIX A

Information on Asbestos-Containing Materials

INFORMATION ON ASBESTOS-CONTAINING MATERIALS

AEG's NESHAPs Asbestos Inspection includes an inspection of the building for asbestos-containing materials and correlates the locations of the materials to the current building layout.

Summary of Impact of Asbestos-Containing Materials on Building Renovation or Demolition Projects

AEG's inspection of the facility identified several asbestos-containing materials which may be impacted by any building renovations or demolition. No materials were identified as Regulated Asbestos-Containing Materials (RACM) as part of this inspection.

In accordance with the EPA's National Emissions Standard for Hazardous Air Pollutants (NESHAPs), these materials should be removed prior to the proposed renovation or demolition activities. The NESHAPs regulation does allow for certain Category I and Category II non-friable materials to remain in the building prior to demolition, and this can be accomplished if certain demolition criteria are met (i.e. worker protection, material handling, waste disposal, etc.). However, this is typically cost prohibitive. AEG recommends the removal of all asbestos-containing materials prior to building renovation or demolition.

Quantities of Asbestos-Containing Materials

The following types of materials are known asbestos-containing materials, or are assumed and could not be sampled as part of this inspection, at Selfridge Building 154 located at 44580 North Jefferson Avenue, Harrison Township, Michigan for Tetra Tech, Inc.:

Known Material Type	Total sf/lf/#
Exterior Window Caulk, Exterior Side, Brown	24 sf

Assumed Material Type	Total sf/lf/#
Tagged Fire Door	18 #
Tagged Fire Frame	14 #

Room-by-Room Inventory of Asbestos-Containing Materials

A listing of all materials in each room (functional space) can be found in Appendix B. The following is a room-by-room listing of all asbestos-containing materials.

Floor	Location	Material	sf/lf/#
1	127th Fuel Office - Room 2	Tagged Fire Door	1 #
1	127th Fuel Office - Room 2	Tagged Fire Frame	1 #
1	191st Fuel Office - Room 1	Tagged Fire Door	1 #
1	191st Fuel Office - Room 1	Tagged Fire Frame	1 #
1	Break Room	Tagged Fire Door	1 #
1	Break Room	Tagged Fire Frame	1 #
1	East Maintenance/Corrosion Dock	Tagged Fire Door	2 #
1	East Maintenance/Corrosion Dock	Tagged Fire Frame	1 #
1	External Fuel Tank Maintenance	Tagged Fire Door	2 #
1	External Fuel Tank Maintenance	Tagged Fire Frame	1 #
1	Hallway	Tagged Fire Door	1 #
1	Hallway	Tagged Fire Frame	1 #
1	Janitor Closet	Tagged Fire Door	1 #
1	Janitor Closet	Tagged Fire Frame	1 #
1	Men's Restroom and Locker Room	Tagged Fire Door	2 #
1	Men's Restroom and Locker Room	Tagged Fire Frame	2 #
1	Utility Room	Tagged Fire Door	2 #
1	Utility Room	Tagged Fire Frame	1 #

1	Vestibule	Tagged Fire Door	1	#
1	Vestibule	Tagged Fire Frame	1	#
1	West Maintenance/Corrosion Dock	Tagged Fire Door	2	#
1	West Maintenance/Corrosion Dock	Tagged Fire Frame	1	#
1	Women's Restroom and Locker Room	Tagged Fire Door	2	#
1	Women's Restroom and Locker Room	Tagged Fire Frame	2	#
1	Exterior of Building	Exterior Window Caulk, Exterior Side, Brown	24	sf

Inaccessible Materials:
There may be additional quantities of asbestos pipe insulation or types of pipe insulation, which were not identified or sampled as a part of the inspection, in various inaccessible locations, such as inside wall cavities, inside wall construction materials (between cinder block or brick, especially around water sources) and above inaccessible ceilings (such as drywall or plaster). If suspect pipe insulation is found, please contact the Accredited Asbestos Inspector, Ms. Michelle Carriere and Mr. Pedro Pacheco, AEG, at (248) 426-0165.

APPENDIX B

FLOOR PLANS INDICATING LOCATIONS OF ASBESTOS-CONTAINING MATERIALS

FLOOR PLANS INDICATING LOCATIONS OF ASBESTOS-CONTAINING MATERIALS

AEG prepared several floor plans for the Selfridge Building 154 located at 44580 North Jefferson Avenue, Harrison Township, Michigan for Tetra Tech, Inc. to illustrate the approximate locations of certain asbestos-containing materials. Floor plans include:

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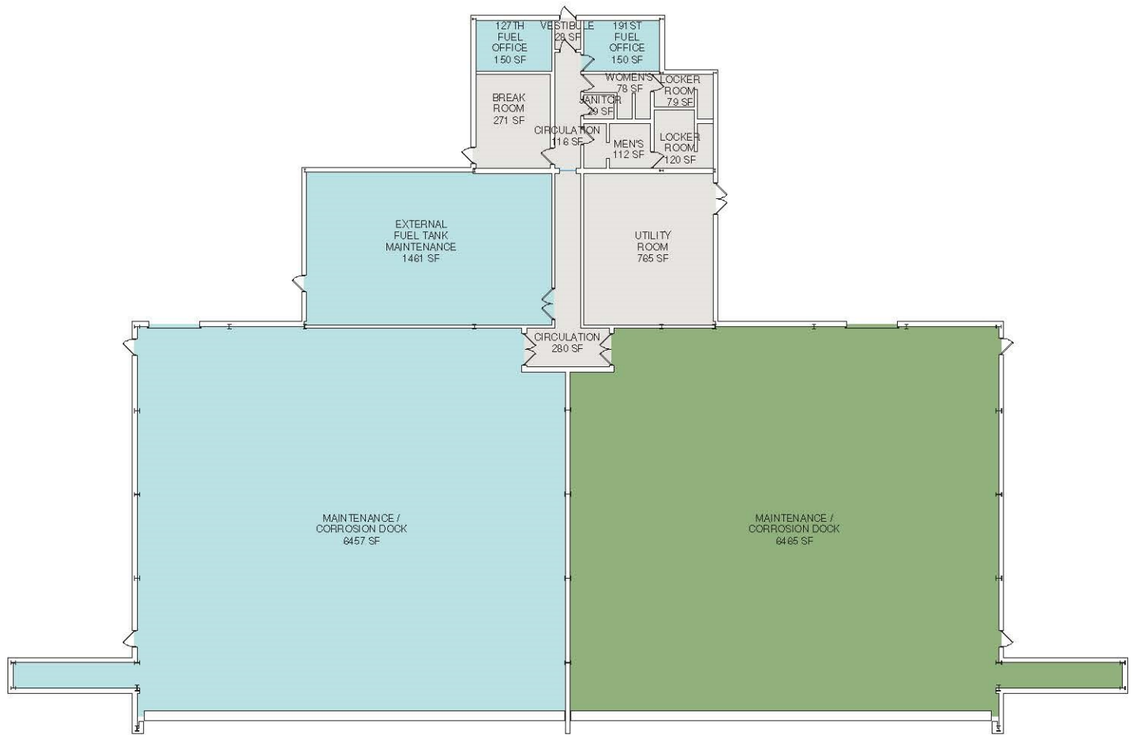
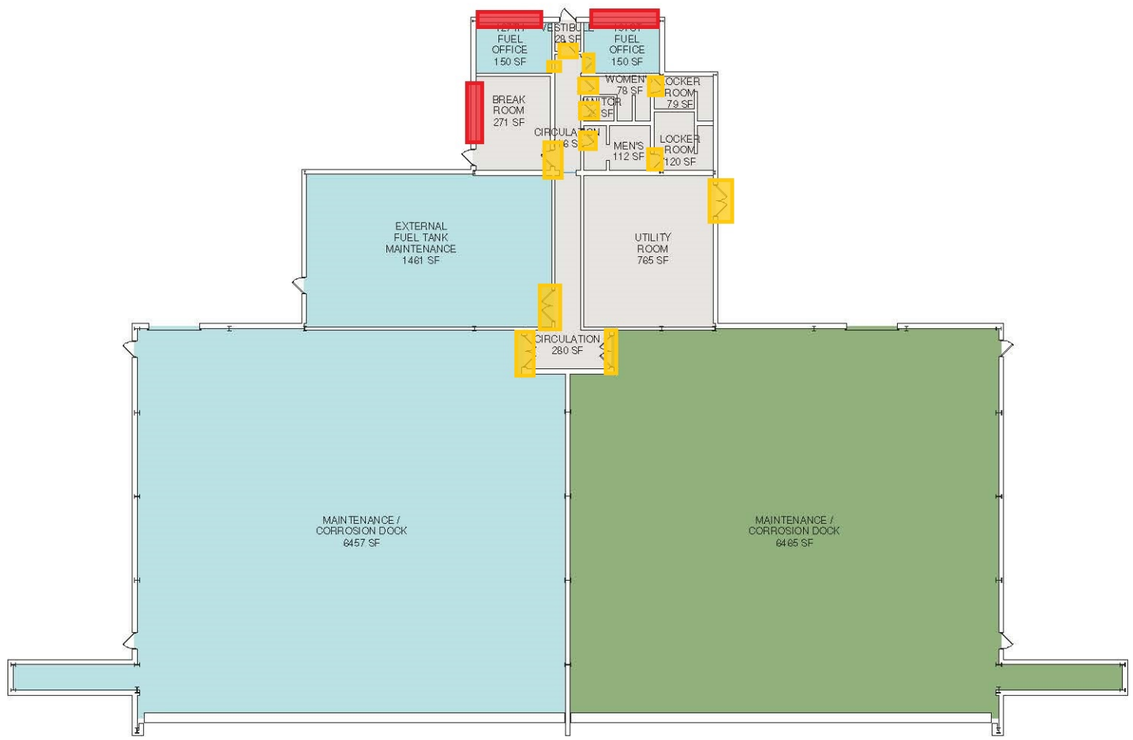


1 BUILDING 154 - EXISTING

1" = 30'-0"



Exterior Window Caulk, Exterior Side, Brown

Tagged Door and Frame

1 BUILDING 154 - EXISTING

1" = 30'-0"

APPENDIX C

Tables of ACM/Non-ACM

TABLES OF ACM/NON-ACM

The following tables provide a listing by building area showing the locations of all asbestos-containing materials and non-asbestos-containing materials. There are two (2) tables provided: one (1) sorted by location (functional space) and one (1) sorted by material (homogeneous area). Each table includes the following information for each functional space:

- Floor
- Functional Space Name
- Material Description
- ACM – Does the material contain asbestos?
- Category – Is the material a surfacing material (S), thermal system insulation (TSI) or a miscellaneous material (M)?
- Friable – Is the material friable (F) or non-friable (NF)
- Quantity – Approximate quantity of the material present in the functional space.
- Notes – Additional information about the material
- Status – Is the asbestos material present?

Asbestos-Containing Materials	Quantity
Surfacing Materials	
None	
Thermal System Insulation	
None	
Miscellaneous Materials	
Exterior Window Caulk, Exterior Side, Brown	24 sf

Assumed Asbestos-Containing Materials	Quantity
Surfacing Materials	
None	
Thermal System Insulation	
None	
Miscellaneous Materials	
Tagged Fire Door	18 #
Tagged Fire Frame	14 #

Non-Asbestos-Containing Materials	Quantity
Surfacing Materials	
Hard Plaster Ceiling, Smooth, Brown Coat	422 sf
Hard Plaster Ceiling, Smooth, Finish Coat	422 sf
Thermal System Insulation	
None	
Miscellaneous Materials	
Covebase Adhesive, 4", Blue	300 lf
Covebase Adhesive, 4", Tan	26 lf
Covebase, 4", Blue	300 lf

Covebase, 4", Tan	26	lf
Exterior Door Caulk, Interior Side, White	67	sf
Exterior Wall Joint Caulk, Exterior Side, White	12	sf
Exterior Window Caulk, Interior Side, Brown	24	sf
Floor Tile Mastic, 12" x 12", Blue Mottled	1,483	sf
Floor Tile Mastic, 12" x 12", Tan Mottled	1,242	sf
Floor Tile, 12" x 12", Blue Mottled	1,483	sf
Floor Tile, 12" x 12", Tan Mottled	1,242	sf
Interior Door Caulk, Interior Side, White	95	sf
Interior Wall Joint Caulk, White	270	sf
Lay-in Ceiling Tiles, 2' x 2', Dots and Small Gouges	703	sf
Lay-in Ceiling Tiles, 2' x 2', Small Dots	750	sf
Sink Undercoating, Grey	1	#
Unknown Floor Tile Mastic, Red with Cream Streaks	1,212	sf
Unknown Floor Tile, Red with Cream Streaks	1,212	sf

TABLE OF FUNTIONAL SPACE BY FUNCTIONAL SPACE

Floor	Functional Space	Material Description	ACM	Category	Friable	Quantity	Status
1	127th Fuel Office - Room 2	Cinder Block Walls	N/A	N/A	N/A		
1	127th Fuel Office - Room 2	Covebase Adhesive, 4", Blue	Negative	Miscellaneous	Non-Friable	40 lf	
1	127th Fuel Office - Room 2	Covebase, 4", Blue	Negative	Miscellaneous	Non-Friable	40 lf	
1	127th Fuel Office - Room 2	Exterior Window Caulk, Interior Side, Brown	Negative	Miscellaneous	Non-Friable	8 sf	
1	127th Fuel Office - Room 2	Floor Tile Mastic, 12" x 12", Blue Mottled	Negative	Miscellaneous	Non-Friable	192 sf	
1	127th Fuel Office - Room 2	Floor Tile Mastic, 12" x 12", Tan Mottled	Negative	Miscellaneous	Non-Friable	192 sf	
1	127th Fuel Office - Room 2	Floor Tile, 12" x 12", Blue Mottled	Negative	Miscellaneous	Non-Friable	192 sf	
1	127th Fuel Office - Room 2	Floor Tile, 12" x 12", Tan Mottled	Negative	Miscellaneous	Non-Friable	192 sf	
1	127th Fuel Office - Room 2	Interior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	5 sf	
1	127th Fuel Office - Room 2	Lay-in Ceiling Tiles, 2' x 2', Dots and Small Gouges	Negative	Miscellaneous	Friable	192 sf	
1	127th Fuel Office - Room 2	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	127th Fuel Office - Room 2	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	127th Fuel Office - Room 2	Unknown Floor Tile Mastic, Red with Cream Streaks	Negative	Miscellaneous	Non-Friable	192 sf	
1	127th Fuel Office - Room 2	Unknown Floor Tile, Red with Cream Streaks	Negative	Miscellaneous	Non-Friable	192 sf	
1	191st Fuel Office - Room 1	Cinder Block Walls	N/A	N/A	N/A		
1	191st Fuel Office - Room 1	Covebase Adhesive, 4", Blue	Negative	Miscellaneous	Non-Friable	48 lf	
1	191st Fuel Office - Room 1	Covebase, 4", Blue	Negative	Miscellaneous	Non-Friable	48 lf	
1	191st Fuel Office - Room 1	Exterior Window Caulk, Interior Side, Brown	Negative	Miscellaneous	Non-Friable	8 sf	
1	191st Fuel Office - Room 1	Floor Tile Mastic, 12" x 12", Blue Mottled	Negative	Miscellaneous	Non-Friable	150 sf	
1	191st Fuel Office - Room 1	Floor Tile Mastic, 12" x 12", Tan Mottled	Negative	Miscellaneous	Non-Friable	150 sf	
1	191st Fuel Office - Room 1	Floor Tile, 12" x 12", Blue Mottled	Negative	Miscellaneous	Non-Friable	150 sf	
1	191st Fuel Office - Room 1	Floor Tile, 12" x 12", Tan Mottled	Negative	Miscellaneous	Non-Friable	150 sf	
1	191st Fuel Office - Room 1	Interior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	5 sf	
1	191st Fuel Office - Room 1	Lay-in Ceiling Tiles, 2' x 2', Dots and Small Gouges	Negative	Miscellaneous	Friable	150 sf	
1	191st Fuel Office - Room 1	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	191st Fuel Office - Room 1	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	191st Fuel Office - Room 1	Unknown Floor Tile Mastic, Red with Cream Streaks	Negative	Miscellaneous	Non-Friable	150 sf	
1	191st Fuel Office - Room 1	Unknown Floor Tile, Red with Cream Streaks	Negative	Miscellaneous	Non-Friable	150 sf	
1	Break Room	Cinder Block Walls	N/A	N/A	N/A		
1	Break Room	Covebase Adhesive, 4", Blue	Negative	Miscellaneous	Non-Friable	44 lf	
1	Break Room	Covebase, 4", Blue	Negative	Miscellaneous	Non-Friable	44 lf	
1	Break Room	Exterior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	1 sf	
1	Break Room	Exterior Window Caulk, Interior Side, Brown	Negative	Miscellaneous	Non-Friable	8 sf	
1	Break Room	Floor Tile Mastic, 12" x 12", Blue Mottled	Negative	Miscellaneous	Non-Friable	271 sf	
1	Break Room	Floor Tile, 12" x 12", Blue Mottled	Negative	Miscellaneous	Non-Friable	271 sf	
1	Break Room	Interior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	5 sf	
1	Break Room	Lay-in Ceiling Tiles, 2' x 2', Dots and Small Gouges	Negative	Miscellaneous	Friable	271 sf	
1	Break Room	Sink Undercoating, Grey	Negative	Miscellaneous	Non-Friable	1 sf	
1	Break Room	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	Break Room	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	East Maintenance/Corrosion Dock	Cinder Block Walls	N/A	N/A	N/A		

TABLE OF FUNTIONAL SPACE BY FUNCTIONAL SPACE

Floor	Functional Space	Material Description	ACM	Category	Friable	Quantity	Status
1	East Maintenance/Corrosion Dock	Concrete Floor	N/A	N/A	N/A		
1	East Maintenance/Corrosion Dock	Exterior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	10 sf	
1	East Maintenance/Corrosion Dock	Interior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	20 sf	
1	East Maintenance/Corrosion Dock	Interior Wall Joint Caulk, White	Negative	Miscellaneous	Non-Friable	100 sf	
1	East Maintenance/Corrosion Dock	Metal Deck	N/A	N/A	N/A		
1	East Maintenance/Corrosion Dock	Straight Pipe Insulation, Fiberglass	N/A	N/A	N/A		
1	East Maintenance/Corrosion Dock	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	2 #	Present
1	East Maintenance/Corrosion Dock	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	Exterior of Bulding	Exterior Wall Joint Caulk, Exterior Side, White	Negative	Miscellaneous	Non-Friable	12 sf	
1	Exterior of Bulding	Exterior Window Caulk, Exterior Side, Brown	Positive	Miscellaneous	Non-Friable	24 sf	Present
1	External Fuel Tank Maintenance	Cinder Block Walls	N/A	N/A	N/A		
1	External Fuel Tank Maintenance	Concrete Floor	N/A	N/A	N/A		
1	External Fuel Tank Maintenance	Exterior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	5 sf	
1	External Fuel Tank Maintenance	Interior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	10 sf	
1	External Fuel Tank Maintenance	Interior Wall Joint Caulk, White	Negative	Miscellaneous	Non-Friable	50 sf	
1	External Fuel Tank Maintenance	Metal Deck	N/A	N/A	N/A		
1	External Fuel Tank Maintenance	Straight Pipe Insulation, Fiberglass	N/A	N/A	N/A		
1	External Fuel Tank Maintenance	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	2 #	Present
1	External Fuel Tank Maintenance	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	Hallway	Cinder Block Walls	N/A	N/A	N/A		
1	Hallway	Covebase Adhesive, 4", Blue	Negative	Miscellaneous	Non-Friable	144 lf	
1	Hallway	Covebase, 4", Blue	Negative	Miscellaneous	Non-Friable	144 lf	
1	Hallway	Exterior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	1 sf	
1	Hallway	Floor Tile Mastic, 12" x 12", Blue Mottled	Negative	Miscellaneous	Non-Friable	840 sf	
1	Hallway	Floor Tile Mastic, 12" x 12", Tan Mottled	Negative	Miscellaneous	Non-Friable	840 sf	
1	Hallway	Floor Tile, 12" x 12", Blue Mottled	Negative	Miscellaneous	Non-Friable	840 sf	
1	Hallway	Floor Tile, 12" x 12", Tan Mottled	Negative	Miscellaneous	Non-Friable	840 sf	
1	Hallway	Interior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	5 sf	
1	Hallway	Lay-in Ceiling Tiles, 2' x 2', Dots and Small Gouges	Negative	Miscellaneous	Friable	90 sf	
1	Hallway	Lay-in Ceiling Tiles, 2' x 2', Small Dots	Negative	Miscellaneous	Friable	750 sf	
1	Hallway	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	Hallway	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	Hallway	Unknown Floor Tile Mastic, Red with Cream Streaks	Negative	Miscellaneous	Non-Friable	840 sf	
1	Hallway	Unknown Floor Tile, Red with Cream Streaks	Negative	Miscellaneous	Non-Friable	840 sf	
1	Janitor Closet	Cinder Block Walls	N/A	N/A	N/A		
1	Janitor Closet	Covebase Adhesive, 4", Tan	Negative	Miscellaneous	Non-Friable	26 lf	
1	Janitor Closet	Covebase, 4", Tan	Negative	Miscellaneous	Non-Friable	26 lf	
1	Janitor Closet	Floor Tile Mastic, 12" x 12", Tan Mottled	Negative	Miscellaneous	Non-Friable	30 sf	
1	Janitor Closet	Floor Tile, 12" x 12", Tan Mottled	Negative	Miscellaneous	Non-Friable	30 sf	
1	Janitor Closet	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	Janitor Closet	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	1 #	Present

TABLE OF FUNTIONAL SPACE BY FUNCTIONAL SPACE

Floor	Functional Space	Material Description	ACM	Category	Friable	Quantity	Status
1	Mens Restroom and Locker Room	Cinder Block Walls	N/A	N/A	N/A		
1	Mens Restroom and Locker Room	Hard Plaster Ceiling, Smooth, Brown Coat	Negative	Surfacing	Non-Friable	232 sf	
1	Mens Restroom and Locker Room	Hard Plaster Ceiling, Smooth, Finish Coat	Negative	Surfacing	Non-Friable	232 sf	
1	Mens Restroom and Locker Room	Interior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	10 sf	
1	Mens Restroom and Locker Room	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	2 #	Present
1	Mens Restroom and Locker Room	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	2 #	Present
1	Utility Room	Cinder Block Walls	N/A	N/A	N/A		
1	Utility Room	Concrete Floor	N/A	N/A	N/A		
1	Utility Room	Exterior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	sf	
1	Utility Room	Interior Wall Joint Caulk, White	Negative	Miscellaneous	Non-Friable	sf	
1	Utility Room	Metal Deck	N/A	N/A	N/A		
1	Utility Room	Straight Pipe Insulation, Fiberglass	N/A	N/A	N/A		
1	Utility Room	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	#	Present
1	Utility Room	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	#	Present
1	Vestibule	Cinder Block Walls	N/A	N/A	N/A		
1	Vestibule	Covebase Adhesive, 4", Blue	Negative	Miscellaneous	Non-Friable	24 lf	
1	Vestibule	Covebase, 4", Blue	Negative	Miscellaneous	Non-Friable	24 lf	
1	Vestibule	Exterior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	30 sf	
1	Vestibule	Floor Tile Mastic, 12" x 12", Blue Mottled	Negative	Miscellaneous	Non-Friable	30 sf	
1	Vestibule	Floor Tile Mastic, 12" x 12", Tan Mottled	Negative	Miscellaneous	Non-Friable	30 sf	
1	Vestibule	Floor Tile, 12" x 12", Blue Mottled	Negative	Miscellaneous	Non-Friable	30 sf	
1	Vestibule	Floor Tile, 12" x 12", Tan Mottled	Negative	Miscellaneous	Non-Friable	30 sf	
1	Vestibule	Hard Plaster Ceiling, Smooth, Brown Coat	Negative	Surfacing	Non-Friable	30 sf	
1	Vestibule	Hard Plaster Ceiling, Smooth, Finish Coat	Negative	Surfacing	Non-Friable	30 sf	
1	Vestibule	Interior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	5 sf	
1	Vestibule	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	Vestibule	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	Vestibule	Unknown Floor Tile Mastic, Red with Cream Streaks	Negative	Miscellaneous	Non-Friable	30 sf	
1	Vestibule	Unknown Floor Tile, Red with Cream Streaks	Negative	Miscellaneous	Non-Friable	30 sf	
1	West Maintenance/Corrosion Dock	Cinder Block Walls	N/A	N/A	N/A		
1	West Maintenance/Corrosion Dock	Concrete Floor	N/A	N/A	N/A		
1	West Maintenance/Corrosion Dock	Exterior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	10 sf	
1	West Maintenance/Corrosion Dock	Interior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	20 sf	
1	West Maintenance/Corrosion Dock	Interior Wall Joint Caulk, White	Negative	Miscellaneous	Non-Friable	100 sf	
1	West Maintenance/Corrosion Dock	Metal Deck	N/A	N/A	N/A		
1	West Maintenance/Corrosion Dock	Straight Pipe Insulation, Fiberglass	N/A	N/A	N/A		
1	West Maintenance/Corrosion Dock	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	2 #	Present
1	West Maintenance/Corrosion Dock	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	Womens Restoom and Locker Room	Cinder Block Walls	N/A	N/A	N/A		
1	Womens Restoom and Locker Room	Hard Plaster Ceiling, Smooth, Brown Coat	Negative	Surfacing	Non-Friable	160 sf	
1	Womens Restoom and Locker Room	Hard Plaster Ceiling, Smooth, Finish Coat	Negative	Surfacing	Non-Friable	160 sf	

TABLE OF FUNTIONAL SPACE BY FUNCTIONAL SPACE

Floor	Functional Space	Material Description	ACM	Category	Friable	Quantity	Status
1	Womens Restoom and Locker Room	Interior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	10 sf	
1	Womens Restoom and Locker Room	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	2 #	Present
1	Womens Restoom and Locker Room	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	2 #	Present

TABLE OF HOMOGENEOUS AREAS BY HOMOGENOUS AREA

Floor	Functional Space	Material Description	ACM	Category	Friable	Quantity	Status
1	127th Fuel Office - Room 2	Cinder Block Walls	N/A	N/A	N/A		
1	191st Fuel Office - Room 1	Cinder Block Walls	N/A	N/A	N/A		
1	Break Room	Cinder Block Walls	N/A	N/A	N/A		
1	East Maintenance/Corrosion Dock	Cinder Block Walls	N/A	N/A	N/A		
1	External Fuel Tank Maintenance	Cinder Block Walls	N/A	N/A	N/A		
1	Hallway	Cinder Block Walls	N/A	N/A	N/A		
1	Janitor Closet	Cinder Block Walls	N/A	N/A	N/A		
1	Mens Restroom and Locker Room	Cinder Block Walls	N/A	N/A	N/A		
1	Utility Room	Cinder Block Walls	N/A	N/A	N/A		
1	Vestibule	Cinder Block Walls	N/A	N/A	N/A		
1	West Maintenance/Corrosion Dock	Cinder Block Walls	N/A	N/A	N/A		
1	Womens Restoom and Locker Room	Cinder Block Walls	N/A	N/A	N/A		
1	East Maintenance/Corrosion Dock	Concrete Floor	N/A	N/A	N/A		
1	External Fuel Tank Maintenance	Concrete Floor	N/A	N/A	N/A		
1	Utility Room	Concrete Floor	N/A	N/A	N/A		
1	West Maintenance/Corrosion Dock	Concrete Floor	N/A	N/A	N/A		
1	127th Fuel Office - Room 2	Covebase Adhesive, 4", Blue	Negative	Miscellaneous	Non-Friable	40 lf	
1	191st Fuel Office - Room 1	Covebase Adhesive, 4", Blue	Negative	Miscellaneous	Non-Friable	48 lf	
1	Break Room	Covebase Adhesive, 4", Blue	Negative	Miscellaneous	Non-Friable	44 lf	
1	Hallway	Covebase Adhesive, 4", Blue	Negative	Miscellaneous	Non-Friable	144 lf	
1	Vestibule	Covebase Adhesive, 4", Blue	Negative	Miscellaneous	Non-Friable	24 lf	
1	Janitor Closet	Covebase Adhesive, 4", Tan	Negative	Miscellaneous	Non-Friable	26 lf	
1	127th Fuel Office - Room 2	Covebase, 4", Blue	Negative	Miscellaneous	Non-Friable	40 lf	
1	191st Fuel Office - Room 1	Covebase, 4", Blue	Negative	Miscellaneous	Non-Friable	48 lf	
1	Break Room	Covebase, 4", Blue	Negative	Miscellaneous	Non-Friable	44 lf	
1	Hallway	Covebase, 4", Blue	Negative	Miscellaneous	Non-Friable	144 lf	
1	Vestibule	Covebase, 4", Blue	Negative	Miscellaneous	Non-Friable	24 lf	
1	Janitor Closet	Covebase, 4", Tan	Negative	Miscellaneous	Non-Friable	26 lf	
1	Break Room	Exterior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	1 sf	
1	East Maintenance/Corrosion Dock	Exterior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	10 sf	
1	External Fuel Tank Maintenance	Exterior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	5 sf	
1	Hallway	Exterior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	1 sf	
1	Utility Room	Exterior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	sf	
1	Vestibule	Exterior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	30 sf	
1	West Maintenance/Corrosion Dock	Exterior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	10 sf	
1	Exterior of Bulding	Exterior Wall Joint Caulk, Exterior Side, White	Negative	Miscellaneous	Non-Friable	12 sf	
1	Exterior of Bulding	Exterior Window Caulk, Exterior Side, Brown	Positive	Miscellaneous	Non-Friable	24 sf	Present
1	127th Fuel Office - Room 2	Exterior Window Caulk, Interior Side, Brown	Negative	Miscellaneous	Non-Friable	8 sf	
1	191st Fuel Office - Room 1	Exterior Window Caulk, Interior Side, Brown	Negative	Miscellaneous	Non-Friable	8 sf	
1	Break Room	Exterior Window Caulk, Interior Side, Brown	Negative	Miscellaneous	Non-Friable	8 sf	
1	127th Fuel Office - Room 2	Floor Tile Mastic, 12" x 12", Blue Mottled	Negative	Miscellaneous	Non-Friable	192 sf	

TABLE OF HOMOGENEOUS AREAS BY HOMOGENOUS AREA

Floor	Functional Space	Material Description	ACM	Category	Friable	Quantity	Status
1	191st Fuel Office - Room 1	Floor Tile Mastic, 12" x 12", Blue Mottled	Negative	Miscellaneous	Non-Friable	150 sf	
1	Break Room	Floor Tile Mastic, 12" x 12", Blue Mottled	Negative	Miscellaneous	Non-Friable	271 sf	
1	Hallway	Floor Tile Mastic, 12" x 12", Blue Mottled	Negative	Miscellaneous	Non-Friable	840 sf	
1	Vestibule	Floor Tile Mastic, 12" x 12", Blue Mottled	Negative	Miscellaneous	Non-Friable	30 sf	
1	127th Fuel Office - Room 2	Floor Tile Mastic, 12" x 12", Tan Mottled	Negative	Miscellaneous	Non-Friable	192 sf	
1	191st Fuel Office - Room 1	Floor Tile Mastic, 12" x 12", Tan Mottled	Negative	Miscellaneous	Non-Friable	150 sf	
1	Hallway	Floor Tile Mastic, 12" x 12", Tan Mottled	Negative	Miscellaneous	Non-Friable	840 sf	
1	Janitor Closet	Floor Tile Mastic, 12" x 12", Tan Mottled	Negative	Miscellaneous	Non-Friable	30 sf	
1	Vestibule	Floor Tile Mastic, 12" x 12", Tan Mottled	Negative	Miscellaneous	Non-Friable	30 sf	
1	127th Fuel Office - Room 2	Floor Tile, 12" x 12", Blue Mottled	Negative	Miscellaneous	Non-Friable	192 sf	
1	191st Fuel Office - Room 1	Floor Tile, 12" x 12", Blue Mottled	Negative	Miscellaneous	Non-Friable	150 sf	
1	Break Room	Floor Tile, 12" x 12", Blue Mottled	Negative	Miscellaneous	Non-Friable	271 sf	
1	Hallway	Floor Tile, 12" x 12", Blue Mottled	Negative	Miscellaneous	Non-Friable	840 sf	
1	Vestibule	Floor Tile, 12" x 12", Blue Mottled	Negative	Miscellaneous	Non-Friable	30 sf	
1	127th Fuel Office - Room 2	Floor Tile, 12" x 12", Tan Mottled	Negative	Miscellaneous	Non-Friable	192 sf	
1	191st Fuel Office - Room 1	Floor Tile, 12" x 12", Tan Mottled	Negative	Miscellaneous	Non-Friable	150 sf	
1	Hallway	Floor Tile, 12" x 12", Tan Mottled	Negative	Miscellaneous	Non-Friable	840 sf	
1	Janitor Closet	Floor Tile, 12" x 12", Tan Mottled	Negative	Miscellaneous	Non-Friable	30 sf	
1	Vestibule	Floor Tile, 12" x 12", Tan Mottled	Negative	Miscellaneous	Non-Friable	30 sf	
1	Mens Restroom and Locker Room	Hard Plaster Ceiling, Smooth, Brown Coat	Negative	Surfacing	Non-Friable	232 sf	
1	Vestibule	Hard Plaster Ceiling, Smooth, Brown Coat	Negative	Surfacing	Non-Friable	30 sf	
1	Womens Restoom and Locker Room	Hard Plaster Ceiling, Smooth, Brown Coat	Negative	Surfacing	Non-Friable	160 sf	
1	Mens Restroom and Locker Room	Hard Plaster Ceiling, Smooth, Finish Coat	Negative	Surfacing	Non-Friable	232 sf	
1	Vestibule	Hard Plaster Ceiling, Smooth, Finish Coat	Negative	Surfacing	Non-Friable	30 sf	
1	Womens Restoom and Locker Room	Hard Plaster Ceiling, Smooth, Finish Coat	Negative	Surfacing	Non-Friable	160 sf	
1	127th Fuel Office - Room 2	Interior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	5 sf	
1	191st Fuel Office - Room 1	Interior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	5 sf	
1	Break Room	Interior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	5 sf	
1	East Maintenance/Corrosion Dock	Interior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	20 sf	
1	External Fuel Tank Maintenance	Interior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	10 sf	
1	Hallway	Interior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	5 sf	
1	Mens Restroom and Locker Room	Interior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	10 sf	
1	Vestibule	Interior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	5 sf	
1	West Maintenance/Corrosion Dock	Interior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	20 sf	
1	Womens Restoom and Locker Room	Interior Door Caulk, Interior Side, White	Negative	Miscellaneous	Non-Friable	10 sf	
1	East Maintenance/Corrosion Dock	Interior Wall Joint Caulk, White	Negative	Miscellaneous	Non-Friable	100 sf	
1	External Fuel Tank Maintenance	Interior Wall Joint Caulk, White	Negative	Miscellaneous	Non-Friable	50 sf	
1	Utility Room	Interior Wall Joint Caulk, White	Negative	Miscellaneous	Non-Friable	sf	
1	West Maintenance/Corrosion Dock	Interior Wall Joint Caulk, White	Negative	Miscellaneous	Non-Friable	100 sf	
1	127th Fuel Office - Room 2	Lay-in Ceiling Tiles, 2' x 2', Dots and Small Gouges	Negative	Miscellaneous	Friable	192 sf	
1	191st Fuel Office - Room 1	Lay-in Ceiling Tiles, 2' x 2', Dots and Small Gouges	Negative	Miscellaneous	Friable	150 sf	

TABLE OF HOMOGENEOUS AREAS BY HOMOGENOUS AREA

Floor	Functional Space	Material Description	ACM	Category	Friable	Quantity	Status
1	Break Room	Lay-in Ceiling Tiles, 2' x 2', Dots and Small Gouges	Negative	Miscellaneous	Friable	271 sf	
1	Hallway	Lay-in Ceiling Tiles, 2' x 2', Dots and Small Gouges	Negative	Miscellaneous	Friable	90 sf	
1	Hallway	Lay-in Ceiling Tiles, 2' x 2', Small Dots	Negative	Miscellaneous	Friable	750 sf	
1	East Maintenance/Corrosion Dock	Metal Deck	N/A	N/A	N/A		
1	External Fuel Tank Maintenance	Metal Deck	N/A	N/A	N/A		
1	Utility Room	Metal Deck	N/A	N/A	N/A		
1	West Maintenance/Corrosion Dock	Metal Deck	N/A	N/A	N/A		
1	Break Room	Sink Undercoating, Grey	Negative	Miscellaneous	Non-Friable	1 #	
1	East Maintenance/Corrosion Dock	Straight Pipe Insulation, Fiberglass	N/A	N/A	N/A		
1	External Fuel Tank Maintenance	Straight Pipe Insulation, Fiberglass	N/A	N/A	N/A		
1	Utility Room	Straight Pipe Insulation, Fiberglass	N/A	N/A	N/A		
1	West Maintenance/Corrosion Dock	Straight Pipe Insulation, Fiberglass	N/A	N/A	N/A		
1	127th Fuel Office - Room 2	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	191st Fuel Office - Room 1	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	Break Room	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	East Maintenance/Corrosion Dock	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	2 #	Present
1	External Fuel Tank Maintenance	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	2 #	Present
1	Hallway	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	Janitor Closet	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	Mens Restroom and Locker Room	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	2 #	Present
1	Utility Room	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	Vestibule	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	West Maintenance/Corrosion Dock	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	2 #	Present
1	Womens Restoom and Locker Room	Tagged Fire Door	Assumed	Miscellaneous	Non-Friable	2 #	Present
1	127th Fuel Office - Room 2	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	191st Fuel Office - Room 1	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	Break Room	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	East Maintenance/Corrosion Dock	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	External Fuel Tank Maintenance	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	Hallway	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	Janitor Closet	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	Mens Restroom and Locker Room	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	2 #	Present
1	Utility Room	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	Vestibule	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	West Maintenance/Corrosion Dock	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	1 #	Present
1	Womens Restoom and Locker Room	Tagged Fire Frame	Assumed	Miscellaneous	Non-Friable	2 #	Present
1	127th Fuel Office - Room 2	Unknown Floor Tile Mastic, Red with Cream Streaks	Negative	Miscellaneous	Non-Friable	192 sf	
1	191st Fuel Office - Room 1	Unknown Floor Tile Mastic, Red with Cream Streaks	Negative	Miscellaneous	Non-Friable	150 sf	
1	Hallway	Unknown Floor Tile Mastic, Red with Cream Streaks	Negative	Miscellaneous	Non-Friable	840 sf	
1	Vestibule	Unknown Floor Tile Mastic, Red with Cream Streaks	Negative	Miscellaneous	Non-Friable	30 sf	
1	127th Fuel Office - Room 2	Unknown Floor Tile, Red with Cream Streaks	Negative	Miscellaneous	Non-Friable	192 sf	

TABLE OF HOMOGENEOUS AREAS BY HOMOGENOUS AREA

Floor	Functional Space	Material Description	ACM	Category	Friable	Quantity	Status
1	191st Fuel Office - Room 1	Unknown Floor Tile, Red with Cream Streaks	Negative	Miscellaneous	Non-Friable	150 sf	
1	Hallway	Unknown Floor Tile, Red with Cream Streaks	Negative	Miscellaneous	Non-Friable	840 sf	
1	Vestibule	Unknown Floor Tile, Red with Cream Streaks	Negative	Miscellaneous	Non-Friable	30 sf	

APPENDIX D

Bulk Sample Results

BULK SAMPLE RESULTS

AEG collected a total of thirty-three (33) bulk samples during the on-site activities of the NESHAPs Asbestos Inspection. The bulk sample results are documented on the following pages and a copy of the laboratory results follow AEG's report. A total of thirty-two (32) samples were analyzed.

Bulk Sampling and Laboratory Information
The information listed below is provided to summarize pertinent information regarding the collection and analysis of the bulk samples.

Bulk Sampling Information
Dates of Sampling: December 16, 2019

Name of Accredited Inspector(s) who collected Bulk Samples:
Name of Inspector: Ms. Michelle Carriere
Accreditation Number: A44105
State of Accreditation: Michigan
Accred. Exp. Date: February 20, 2020
Training Exp. Date: April 15, 2020

Name of Accredited Inspector(s) who collected Bulk Samples:
Name of Inspector: Mr. Pedro Pacheco
Accreditation Number: A51780
State of Accreditation: Michigan
Accred. Exp. Date: March 6, 2020
Training Exp. Date: September 23, 2020

Sampling Strategies
All samples collected by AEG are collected in accordance with either the applicable sections of the EPA's AHERA regulation (40 CFR 763.86), the OSHA asbestos standard (29 CFR 1926.1101) or the EPA's Asbestos in Buildings: Simplified Sampling Scheme for Friable Surfacing Materials.

Laboratory Information
Name of Laboratory: APEX Research Laboratories
Address of Laboratory: 11051 Hi-Tech Drive
Whitmore Lake, Michigan 48189
Name of Analyst: Robert T. Letarte
Signature of Analyst: See Attached Laboratory Results Sheet
NVLAP Number: 102118-0

Laboratory Statement of Accreditation:
All samples collected by AEG are analyzed for asbestos by laboratories accredited under the National Voluntary Laboratory Accreditation Program (NVLAP), in accordance with 40 CFR, Part 763.87(a). This program is provided under the auspices of the United States Department of Commerce National Institute of Standards and Technology. The NVLAP Accreditation Number for the laboratory that performed the asbestos bulk analysis on the samples collected is provided above and noted on the Official Laboratory Results.

ASBESTOS BULK SAMPLE ANALYSIS RESULTS

Client:	Tetra Tech, Inc.	**Samples Collected By:**	Pedro Pacheco/ Michelle Carriere
Building:	Selfridge Building 154	**Samples Analyzed By:**	Apex Research, Inc.
Location(s):	Throughout	**Sample Analysis Date:**	12/26/2019

Sample ID	Date Collected	Material Description	Functional Space	Results
		Concrete Floor		Not Sampled
		Metal Deck		Not Sampled
		Cinder Block Walls		Not Sampled
AE190875-004A	12/16/2019	Interior Door Caulk, Interior Side, White	East Maintenance/Corrosion Dock	No Asbestos Observed
AE190875-004B	12/16/2019	Interior Door Caulk, Interior Side, White	Hallway	No Asbestos Observed
		Tagged Fire Door		Not Sampled
		Tagged Fire Frame		Not Sampled
AE190875-007A	12/16/2019	Exterior Door Caulk, Interior Side, White	East Maintenance/Corrosion Dock	No Asbestos Observed
AE190875-007B	12/16/2019	Exterior Door Caulk, Interior Side, White	External Fuel Tank Maintenance	No Asbestos Observed
		Straight Pipe Insulation, Fiberglass		Not Sampled
AE190875-009A	12/16/2019	Interior Wall Joint Caulk, White	East Maintenance/Corrosion Dock	No Asbestos Observed
AE190875-009B	12/16/2019	Interior Wall Joint Caulk, White	External Fuel Tank Maintenance	No Asbestos Observed
AE190875-024A	12/16/2019	Lay-in Ceiling Tiles, 2' x 2', Small Dots	Hallway	No Asbestos Observed
AE190875-024B	12/16/2019	Lay-in Ceiling Tiles, 2' x 2', Small Dots	Break Room	No Asbestos Observed
AE190875-025A	12/16/2019	Lay-in Ceiling Tiles, 2' x 2', Dots and Small Gouges	Break Room	No Asbestos Observed
AE190875-025B	12/16/2019	Lay-in Ceiling Tiles, 2' x 2', Dots and Small Gouges	191st Fuel Office - Room 1	No Asbestos Observed
AE190875-026A	12/16/2019	Floor Tile, 12" x 12", Blue Mottled	Hallway	No Asbestos Observed
AE190875-026B	12/16/2019	Floor Tile, 12" x 12", Blue Mottled	Break Room	No Asbestos Observed
AE190875-027A	12/16/2019	Floor Tile Mastic, 12" x 12", Blue Mottled	Hallway	No Asbestos Observed
AE190875-027B	12/16/2019	Floor Tile Mastic, 12" x 12", Blue Mottled	Break Room	No Asbestos Observed
AE190875-028A	12/16/2019	Covebase, 4", Blue	Hallway	No Asbestos Observed
AE190875-028B	12/16/2019	Covebase, 4", Blue	Break Room	No Asbestos Observed
AE190875-029A	12/16/2019	Covebase Adhesive, 4", Blue	Hallway	No Asbestos Observed
AE190875-029B	12/16/2019	Covebase Adhesive, 4", Blue	Break Room	No Asbestos Observed
AE190875-030A	12/16/2019	Unknown Floor Tile, Red with Cream Streaks	Hallway	No Asbestos Observed
AE190875-030B	12/16/2019	Unknown Floor Tile, Red with Cream Streaks	Break Room	No Asbestos Observed
AE190875-031A	12/16/2019	Unknown Floor Tile Mastic, Red with Cream Streaks	Hallway	No Asbestos Observed
AE190875-031B	12/16/2019	Unknown Floor Tile Mastic, Red with Cream Streaks	Break Room	No Asbestos Observed
AE190875-032A	12/16/2019	Floor Tile, 12" x 12", Tan Mottled	Hallway	No Asbestos Observed
AE190875-032B	12/16/2019	Floor Tile, 12" x 12", Tan Mottled	Janitor Closet	No Asbestos Observed
AE190875-033A	12/16/2019	Floor Tile Mastic, 12" x 12", Tan Mottled	Hallway	No Asbestos Observed
AE190875-033B	12/16/2019	Floor Tile Mastic, 12" x 12", Tan Mottled	Janitor Closet	No Asbestos Observed
AE190875-038A	12/16/2019	Exterior Window Caulk, Interior Side, Brown	Break Room	No Asbestos Observed
AE190875-038B	12/16/2019	Exterior Window Caulk, Interior Side, Brown	191st Fuel Office - Room 1	No Asbestos Observed
AE190875-039A	12/16/2019	Sink Undercoating, Grey	Break Room	No Asbestos Observed
AE190875-039B	12/16/2019	Sink Undercoating, Grey	Break Room	No Asbestos Observed
AE190875-042A	12/16/2019	Hard Plaster Ceiling, Smooth, Finish Coat	Mens Restroom and Locker Room	No Asbestos Observed

ASBESTOS BULK SAMPLE ANALYSIS RESULTS

Client:	Tetra Tech, Inc.	**Samples Collected By:**	Pedro Pacheco/ Michelle Carriere
Building:	Selfridge Building 154	**Samples Analyzed By:**	Apex Research, Inc.
Location(s):	Throughout	**Sample Analysis Date:**	12/26/2019

Sample ID	Date Collected	Material Description	Functional Space	Results
AE190875-042B	12/16/2019	Hard Plaster Ceiling, Smooth, Finish Coat	Mens Restroom and Locker Room	No Asbestos Observed
AE190875-042C	12/16/2019	Hard Plaster Ceiling, Smooth, Finish Coat	Womens Restoom and Locker Room	No Asbestos Observed
AE190875-043A	12/16/2019	Hard Plaster Ceiling, Smooth, Brown Coat	Mens Restroom and Locker Room	No Asbestos Observed
AE190875-043B	12/16/2019	Hard Plaster Ceiling, Smooth, Brown Coat	Mens Restroom and Locker Room	No Asbestos Observed
AE190875-043C	12/16/2019	Hard Plaster Ceiling, Smooth, Brown Coat	Womens Restoom and Locker Room	No Asbestos Observed
AE190875-044A	12/16/2019	Covebase, 4", Tan	Janitor Closet	No Asbestos Observed
AE190875-044B	12/16/2019	Covebase, 4", Tan	Janitor Closet	No Asbestos Observed
AE190875-045A	12/16/2019	Covebase Adhesive, 4", Tan	Janitor Closet	No Asbestos Observed
AE190875-045B	12/16/2019	Covebase Adhesive, 4", Tan	Janitor Closet	No Asbestos Observed
AE190875-050A	12/16/2019	Exterior Door Caulk, Exterior Side, Grey	Exterior of Bulding	No Asbestos Observed
AE190875-050B	12/16/2019	Exterior Door Caulk, Exterior Side, Grey	Exterior of Bulding	No Asbestos Observed
AE190875-056A	12/16/2019	Exterior Window Caulk, Exterior Side, Brown	Exterior of Bulding	Chrysotile - 2%
AE190875-056B	12/16/2019	Exterior Window Caulk, Exterior Side, Brown	Exterior of Bulding	Not Analyzed
AE190875-057A	12/16/2019	Exterior Wall Joint Caulk, Exterior Side, White	Exterior of Bulding	No Asbestos Observed
AE190875-057B	12/16/2019	Exterior Wall Joint Caulk, Exterior Side, White	Exterior of Bulding	No Asbestos Observed

Certificate of Laboratory Analysis

Test Method, Polarized Light Microscopy (PLM)

Project : Selfridge ANG - Building 154
Project # :AE190875-190875

Report To:
Mr. Pedro Pacheco, Ms. Michelle /Carriere
Arch Environmental Group
37720 Interchange Drive
Farmington Hills, MI 48335

ARI Report # 24-88123
Date Collected: 12/16/19
Date Received: 12-+24
Date Analyzed: 12/26/19
Date Reported: 12/26/19

Sample Information	Asbestos Type/Percent	Non-Asbestos Material
Lab ID #: 88123 - 01 Cust. #: AE190875-004A Material: Interior Door Caulk-Interior Side - White Location: East Maintenance Appearance: white,nonfibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 02 Cust. #: AE190875-004B Material: Interior Door Caulk-Interior Side - White Location: Hallway Appearance: white,nonfibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 03 Cust. #: AE190875-007A Material: Exterior Door Caulk-Interior Side -White Location: East Maintenance Appearance: red,nonfibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** No Asbestos Observed	Other - 100%

For Layered Samples, each component will be analyzed and reported separately.

Robert T. Letarte Jr., Laboratory Director

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ARI Report # 24-88123
Date Collected: 12/16/19
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Date Analyzed: 12/26/19
Date Reported: 12/26/19

Sample Information	Asbestos Type/Percent	Non-Asbestos Material
Lab ID #: 88123 - 04 Cust. #: AE190875-007B Material: Exterior Door Caulk-Interior Side -White Location: External Fuel Tank Maintenance Appearance: red,nonfibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 05 Cust. #: AE190875-009A Material: Interior Wall Joint Caulk - White Location: East Maintenance Appearance: white,nonfibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 06 Cust. #: AE190875-009B Material: Interior Wall Joint Caulk - White Location: External Fuel Tank Maintenance Appearance: white,nonfibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** No Asbestos Observed	Other - 100%

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ARI Report # 24-88123
Date Collected: 12/16/19
Date Received: 12-+24
Date Analyzed: 12/26/19
Date Reported: 12/26/19

Sample Information	Asbestos Type/Percent	Non-Asbestos Material
Lab ID #: 88123 - 07 Cust. #: AE190875-024A Material: LICT 2x2, Small Dots Location: Hallway Appearance: beige,fibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** No Asbestos Observed	Cellulose - 30% Mineral Wool - 30% Fiberglass - 10% Other - 30%
Lab ID #: 88123 - 08 Cust. #: AE190875-024B Material: LICT 2x2, Small Dots Location: Breakroom Appearance: beige,fibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** No Asbestos Observed	Cellulose - 30% Mineral Wool - 30% Fiberglass - 10% Other - 30%
Lab ID #: 88123 - 09 Cust. #: AE190875-25A Material: LICT 2x2, Dots & Small Gouges Location: Breakroom Appearance: beige,fibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** No Asbestos Observed	Cellulose - 30% Mineral Wool - 30% Fiberglass - 10% Other - 30%

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ARI Report # 24-88123
Date Collected: 12/16/19
Date Received: 12-+24
Date Analyzed: 12/26/19
Date Reported: 12/26/19

Sample Information	Asbestos Type/Percent	Non-Asbestos Material
Lab ID #: 88123 - 10 Cust. #: AE190875-025B Material: LICT 2x2, Dots & Small Gouges Location: 191st Fuel Office - Room 1 Appearance: beige,fibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** No Asbestos Observed	Cellulose - 30% Mineral Wool - 30% Fiberglass - 10% Other - 30%
Lab ID #: 88123 - 11 Cust. #: AE190875-026A/027A Material: 12x12 Blue Mottled Floor Tile Location: Hallway Appearance: grey,nonhomogenous Layer: 1 of 2	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 11a Cust. #: AE190875-026A/027A Material: Mastic Location: Hallway Appearance: yellow,nonfibrous,homogenous Layer: 2 of 2	Asbestos Present: **NO** No Asbestos Observed	Other - 100%

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ARI Report # 24-88123
Date Collected: 12/16/19
Date Received: 12-+24
Date Analyzed: 12/26/19
Date Reported: 12/26/19

Sample Information	Asbestos Type/Percent	Non-Asbestos Material
Lab ID #: 88123 - 12 Cust. #: AE190875-026B/027B Material: 12x12 Blue Mottled Floor Tile Location: Breakroom Appearance: grey,nonfibrous,homogenous Layer: 1 of 2	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 12a Cust. #: AE190875-026B/027B Material: Mastic Location: Breakroom Appearance: yellow,nonfibrous,homogenous Layer: 2 of 2	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 13 Cust. #: AE190875-028A/029A Material: 4" Blue Covebase Location: Hallway Appearance: grey,nonfibrous,homogenous Layer: 1 of 2	Asbestos Present: **NO** No Asbestos Observed	Other - 100%

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ARI Report # 24-88123
Date Collected: 12/16/19
Date Received: 12-+24
Date Analyzed: 12/26/19
Date Reported: 12/26/19

Sample Information	Asbestos Type/Percent	Non-Asbestos Material
Lab ID #: 88123 - 13a Cust. #: AE190875-028A/029A Material: Adhesive Location: Hallway Appearance: yellow,nonfibrous,homogenous Layer: 2 of 2	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 14 Cust. #: AE190875-028B/029B Material: 4" Blue Covebase Location: Breakroom Appearance: grey,nonfibrous,homogenous Layer: 1 of 2	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 14a Cust. #: AE190875-028B/029B Material: Adhesive Location: Breakroom Appearance: yellow,nonfibrous,homogenous Layer: 2 of 2	Asbestos Present: **NO** No Asbestos Observed	Other - 100%

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ARI Report # 24-88123
Date Collected: 12/16/19
Date Received: 12-+24
Date Analyzed: 12/26/19
Date Reported: 12/26/19

Sample Information	Asbestos Type/Percent	Non-Asbestos Material
Lab ID #: 88123 - 15 Cust. #: AE190875-030A/031A Material: Unknown Red w/ Cream Streaks Floor Tile Location: Hallway Appearance: red,nonfibrous,homogenous Layer: 1 of 2	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 15a Cust. #: AE190875-030A/031A Material: Mastic Location: Hallway Appearance: yellow,nonfibrous,homogenous Layer: 2 of 2	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 16 Cust. #: AE190875-030B/031B Material: Unknown Red w/ Cream Streaks Floor Tile Location: Breakroom Appearance: red,nonfibrous,homogenous Layer: 1 of 2	Asbestos Present: **NO** No Asbestos Observed	Other - 100%

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ARI Report # 24-88123
Date Collected: 12/16/19
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Date Analyzed: 12/26/19
Date Reported: 12/26/19

Sample Information	Asbestos Type/Percent	Non-Asbestos Material
Lab ID #: 88123 - 16a Cust. #: AE190875-030B/031B Material: Mastic Location: Breakroom Appearance: yellow,nonfibrous,homogenous Layer: 2 of 2	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 17 Cust. #: AE190875-032A/033A Material: 12x12 Tan Mottled Floor Tile Location: Hallway Appearance: beige,nonfibrous,homogenous Layer: 1 of 2	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 17a Cust. #: AE190875-032A/033A Material: Mastic Location: Hallway Appearance: black,nonfibrous,homogenous Layer: 2 of 2	Asbestos Present: **NO** No Asbestos Observed	Other - 100%

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Farmington Hills, MI 48335

ARI Report # 24-88123
Date Collected: 12/16/19
Date Received: 12-+24
Date Analyzed: 12/26/19
Date Reported: 12/26/19

Sample Information	Asbestos Type/Percent	Non-Asbestos Material
Lab ID #: 88123 - 18 Cust. #: AE190875-032B/033B Material: 12x12 Tan Mottled Floor Tile Location: Janitors Closet Appearance: beige,nonfibrous,homogenous Layer: 1 of 2	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 18a Cust. #: AE190875-032B/033B Material: Mastic Location: Janitors Closet Appearance: black,nonfibrous,homogenous Layer: 2 of 2	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 19 Cust. #: AE190875-038A Material: Exterior Window Caulk-Int. Side-Brown Location: Breakroom Appearance: black,fibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** Chrysotile - < 1%	Other - > 99%

For Layered Samples, each component will be analyzed and reported separately.

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ARI Report # 24-88123
Date Collected: 12/16/19
Date Received: 12-+24
Date Analyzed: 12/26/19
Date Reported: 12/26/19

Sample Information	Asbestos Type/Percent	Non-Asbestos Material
Lab ID #: 88123 - 20 Cust. #: AE190875-038B Material: Exterior Window Caulk-Int. Side-Brown Location: 191st Fuel Office - Room 1 Appearance: black,fibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** Chrysotile - < 1%	Other - > 99%
Lab ID #: 88123 - 21 Cust. #: AE190875-039A Material: Grey Sink Undercoating Location: Breakroom Appearance: grey,fibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** No Asbestos Observed	Cellulose - 20% Other - 80%
Lab ID #: 88123 - 22 Cust. #: AE190875-039B Material: Grey Sink Undercoating Location: Breakroom Appearance: grey,fibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** No Asbestos Observed	Cellulose - 20% Other - 80%

For Layered Samples, each component will be analyzed and reported separately.

Robert T. Letarte Jr., Laboratory Director

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Date Collected: 12/16/19
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Date Analyzed: 12/26/19
Date Reported: 12/26/19

Sample Information	Asbestos Type/Percent	Non-Asbestos Material
Lab ID #: 88123 - 23 Cust. #: AE190875-042A/043A Material: Hard Plaster Ceiling Location: Men's Restroom & Locker Room Appearance: white,nonfibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 24 Cust. #: AE190875-042B/043B Material: Hard Plaster Ceiling Location: Men's Restroom & Locker Room Appearance: white,nonfibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 25 Cust. #: AE190875-042C/043C Material: Hard Plaster Ceiling Location: Women's Restroom & Locker Room Appearance: white,nonfibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** No Asbestos Observed	Other - 100%

For Layered Samples, each component will be analyzed and reported separately.

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ARI Report # 24-88123
Date Collected: 12/16/19
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Date Analyzed: 12/26/19
Date Reported: 12/26/19

Sample Information	Asbestos Type/Percent	Non-Asbestos Material
Lab ID #: 88123 - 26 Cust. #: AE190875-044A/045A Material: 4" Tan Covebase Location: Janitors Closet Appearance: beige,nonfibrous,homogenous Layer: 1 of 2	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 26a Cust. #: AE190875-044A/045A Material: Adhesive Location: Janitors Closet Appearance: yellow,nonfibrous,homogenous Layer: 2 of 2	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 27 Cust. #: AE190875-044B/045B Material: 4" Tan Covebase Location: Janitors Closet Appearance: beige,nonfibrous,homogenous Layer: 1 of 2	Asbestos Present: **NO** No Asbestos Observed	Other - 100%

For Layered Samples, each component will be analyzed and reported separately.

Robert T. Letarte Jr., Laboratory Director

Test Method EPA 600/R-93/116 was used to analyze the above samples. Matrix interference and/or resolution limits may yield false/negative results in certain circumstances. Suspect floor tiles containing <1% should be tested with SEM or TEM. This certificate of analysis relates only to the samples tested and to insure the integrity of the results, may only be reproduced in full. This certificate must not be used by the customer to claim product certification,approval, or endorsement by NVLAP, NIST, or any agency of the US Government. APEX Research Inc. is not responsible for the accuracy of the results for layered samples or samples comprising multiple materials. Liability limited to cost of analysis.

Certificate of Laboratory Analysis

Test Method, Polarized Light Microscopy (PLM)

Project : Selfridge ANG - Building 154
Project # :AE190875-190875

Report To:
Mr. Pedro Pacheco, Ms. Michelle /Carriere
Arch Environmental Group
37720 Interchange Drive
Farmington Hills, MI 48335

ARI Report # 24-88123
Date Collected: 12/16/19
Date Received: 12-+24
Date Analyzed: 12/26/19
Date Reported: 12/26/19

Sample Information	Asbestos Type/Percent	Non-Asbestos Material
Lab ID #: 88123 - 27a Cust. #: AE190875-044B/045B Material: Adhesive Location: Janitors Closet Appearance: yellow,nonfibrous,homogenous Layer: 2 of 2	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 28 Cust. #: AE190875-050A Material: Exterior Door Caulk-Exterior Side - Grey Location: Exterior Appearance: grey,nonfibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: 88123 - 29 Cust. #: AE190875-050B Material: Exterior Door Caulk-Exterior Side - Grey Location: Exterior Appearance: grey,nonfibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** No Asbestos Observed	Other - 100%

For Layered Samples, each component will be analyzed and reported separately.

Robert T. Letarte Jr., Laboratory Director

Test Method EPA 600/R-93/116 was used to analyze the above samples. Matrix interference and/or resolution limits may yield false/negative results in certain circumstances. Suspect floor tiles containing <1% should be tested with SEM or TEM. This certificate of analysis relates only to the samples tested and to insure the integrity of the results, may only be reproduced in full. This certificate must not be used by the customer to claim product certification,approval, or endorsement by NVLAP, NIST, or any agency of the US Government. APEX Research Inc. is not responsible for the accuracy of the results for layered samples or samples comprising multiple materials. Liability limited to cost of analysis.

Certificate of Laboratory Analysis

Test Method, Polarized Light Microscopy (PLM)

Project : Selfridge ANG - Building 154
Project # :AE190875-190875

Report To:
Mr. Pedro Pacheco, Ms. Michelle /Carriere
Arch Environmental Group
37720 Interchange Drive
Farmington Hills, MI 48335

ARI Report # 24-88123
Date Collected: 12/16/19
Date Received: 12-+24
Date Analyzed: 12/26/19
Date Reported: 12/26/19

Sample Information	Asbestos Type/Percent	Non-Asbestos Material
Lab ID #: 88123 - 30 Cust. #: AE190875-056A Material: Exterior Window Caulk-Ext Side - Brown Location: Exterior Appearance: brown,fibrous,homogenous Layer: 1 of 1	Asbestos Present: **YES** Chrysotile - 2%	Cellulose - 5% Other - 93%
Lab ID #: 88123 - 31 Cust. #: AE190875-056B Material: Exterior Window Caulk-Ext Side - Brown Location: Exterior Appearance: Layer: of	Asbestos Present: NOT ANALYZED	
Lab ID #: 88123 - 32 Cust. #: AE190875-057A Material: Exterior Wall Joint Caulk Exterior Side Location: Exterior Appearance: grey,nonfibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** No Asbestos Observed	Other - 100%

For Layered Samples, each component will be analyzed and reported separately.

Robert T. Letarte Jr., Laboratory Director

Test Method EPA 600/R-93/116 was used to analyze the above samples. Matrix interference and/or resolution limits may yield false/negative results in certain circumstances. Suspect floor tiles containing <1% should be tested with SEM or TEM. This certificate of analysis relates only to the samples tested and to insure the integrity of the results, may only be reproduced in full. This certificate must not be used by the customer to claim product certification,approval, or endorsement by NVLAP, NIST, or any agency of the US Government. APEX Research Inc. is not responsible for the accuracy of the results for layered samples or samples comprising multiple materials. Liability limited to cost of analysis.

Certificate of Laboratory Analysis

Test Method, Polarized Light Microscopy (PLM)

Project : Selfridge ANG - Building 154
Project # :AE190875-190875

Report To:
Mr. Pedro Pacheco, Ms. Michelle /Carriere
Arch Environmental Group
37720 Interchange Drive
Farmington Hills, MI 48335

ARI Report # 24-88123
Date Collected: 12/16/19
Date Received: 12-+24
Date Analyzed: 12/26/19
Date Reported: 12/26/19

Sample Information	Asbestos Type/Percent	Non-Asbestos Material
Lab ID #: 88123 - 33 Cust. #: AE190875-057B Material: Exterior Wall Joint Caulk Exterior Side Location: Exterior Appearance: grey,nonfibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** No Asbestos Observed	Other - 100%
Lab ID #: Cust. #: Material: Location: Appearance: Layer: of	Asbestos Present:	
Lab ID #: Cust. #: Material: Location: Appearance: Layer: of	Asbestos Present:	

For Layered Samples, each component will be analyzed and reported separately.

Robert T. Letarte Jr., Laboratory Director

Test Method EPA 600/R-93/116 was used to analyze the above samples. Matrix interference and/or resolution limits may yield false/negative results in certain circumstances. Suspect floor tiles containing <1% should be tested with SEM or TEM. This certificate of analysis relates only to the samples tested and to insure the integrity of the results, may only be reproduced in full. This certificate must not be used by the customer to claim product certification,approval, or endorsement by NVLAP, NIST, or any agency of the US Government. APEX Research Inc. is not responsible for the accuracy of the results for layered samples or samples comprising multiple materials. Liability limited to cost of analysis.

Certificate of Laboratory Analysis

Test Method, Polarized Light Microscopy (PLM)

Project : Selfridge ANG - Building 154
Project # :AE190875-190875
Supplemental Report

Report To:
Mr. Pedro Pacheco, Ms. Michelle /Carriere
Arch Environmental Group
37720 Interchange Drive
Farmington Hills, MI 48335

ARI Report # 19-88123pc
Date Collected: 12/16/19
Date Received: 12/24/20
Date Analyzed: 12/26/19
Date Reported: 12/26/19

Sample Information	Asbestos Type/Percent	Non-Asbestos Material
Lab ID #: 88123 - 19 Cust. #: AE190875-038A Material: Exterior Window Caulk-Int. Side-Brown Location: Breakroom Appearance: black,fibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** Chrysotile - 0.5% POINT COUNT RESULT	Other - 99.5%
Lab ID #: 88123 - 20 Cust. #: AE190875-038B Material: Exterior Window Caulk-Int. Side-Brown Location: 191st Fuel Office - Room 1 Appearance: black,fibrous,homogenous Layer: 1 of 1	Asbestos Present: **NO** Chrysotile - 0.75% POINT COUNT RESULT	Other - 99.25%
Lab ID #: Cust. #: Material: Location: Appearance: Layer: of	Asbestos Present:	

For Layered Samples, each component will be analyzed and reported separately.

Robert T. Letarte Jr., Laboratory Director

Test Method EPA 600/R-93/116 was used to analyze the above samples. Matrix interference and/or resolution limits may yield false/negative results in certain circumstances. Suspect floor tiles containing <1% should be tested with SEM or TEM. This certificate of analysis relates only to the samples tested and to insure the integrity of the results, may only be reproduced in full. This certificate must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government. APEX Research Inc. is not responsible for the accuracy of the results for layered samples or samples comprising multiple materials. Liability limited to cost of analysis.

Apex # **88123**

APEX Research, Inc.

11054 Hi Tech Drive, Whitmore Lake, MI 48189. Phone: (734) 449 - 9990, Fax (734) 449 - 9991.
Web Site: http://apexresearch-inc.com. Email: Bob.Letarte@apexresearchlab.com

Customer Name: Arch Environmental Group, Inc.
Address: 37720 Interchange Drive
City, St., Zip: Farmington Hills, MI 48335
Phone: (248) 426-0165 Fax: (248) 427-0305

Date of Survey: 12/16/19
Project: SELFRIDGE ANG - BUILDING 154
Project # AE190875
Contact Person: PEDRO PACHECO / MICHELLE CARRIZOSA
Email: labs@archenvgroup.com

***Terms and conditions on the other side.*

Lab Use Only
Log-In:
Report:
Fax:
Verbal:
Email:

Turn Around Times: (Circle One)

Rush
48 hour
(24 hour)
72 hour
Other:
TTP (yes) / no (Test Till Positive)

*Note: Test Till Positive for all asbestos bulk samples unless otherwise noted.

Asbestos: Bulk X Wipe ___ Point Count ___ PCM ___
Lead: Bulk ___ Wipe ___ Air ___ Paint ___ Soil ___
Mold: Bulk ___ Tape ___ BioSIS ___ Other ___ Viable ___
TEM: Bulk/NOP ___ AHERA ___ EPA Level II ___ Other ___

Lab ID	Customer ID #	Material/Location	Volume	Area	Results
1	AE190875-004A	INT. DOOR CAULK, INT. SIDE, WHITE / EAST MAINTENANCE			
2	004B	" " " " " " / HALLWAY			
3	007A	EXT. DOOR CAULK, INT. SIDE, WHITE / EAST MAINTENANCE			
4	007B	" " " " " " / EXTERNAL FUEL TANK MAINTENANCE			
5	009A	INT. ~~DOOR CAULK~~ WALL JOINT CAULK, WHITE / EAST MAINTENANCE			
6	009B	" " " " " " / EXTERNAL FUEL TANK MAINTENANCE			
7	024A	LCT, 2'x2', SMALL DOTS / HALLWAY			
8	024B	" " " " / BREAK ROOM			
9	025A	LCT, 2'x2', DOTS & SMALL GOUGES / BREAK ROOM			
10	025B	" " " " " / 1st FUEL OFFICE - ROOM 1			

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Date: 12/20/19
Revision Date: June/2011

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Date: ___

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Date: ___

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11054 Hi Tech Drive, Whitmore Lake, MI 48189. Phone: (734) 449 - 9990, Fax (734) 449 - 9991.
Web Site: http://apexresearch-inc.com. Email: Bob.Letarte@apexresearchlab.com

Customer Name: Arch Environmental Group, Inc.
Address: 37720 Interchange Drive
City, St., Zip: Farmington Hills, MI 48335
Phone: (248) 426-0165 Fax: (248) 427-0305

Date of Survey: 12/16/19
Project: SELFRIDGE ANG - BUILDING 154
Project #: AE190875
Contact Person: PEDRO P. / MICHELLE C.
Email: labs@archenvgroup.com

***Terms and conditions on the other side.*

Lab Use Only
Log-In: ____
Report: ____
Fax: ____
Verbal: ____
Email: ____

Turn Around Times: (Circle One)

Rush ~~24 hour~~
48 hour 72 hour
Other: ____ TTP (yes) / no (Test Till Positive)

*Note: Test Till Positive for all asbestos bulk samples unless otherwise noted.

Asbestos: Bulk ✓ Wipe ____ Point Count ____ PCM ____
Lead: Bulk ____ Wipe ____ Air ____ Paint ____ Soil ____
Mold: Bulk ____ Tape ____ BioSIS ____ Other ____ Viable ____
TEM: Bulk/NOP ____ AHERA ____ EPA Level II ____ Other ____

Lab ID	Customer ID #	Material/Location	Volume	Area	Results
11	AE190875-026A/027A	FTM, 12"x12", BLUE MOTTLED / HALLWAY			
12	026B/027B	" " " " / BREAK ROOM			
13	028A/029A	C/A, 4" BLUE / HALLWAY			
14	028B/029B	" " " / BREAK ROOM			
15	030A/031A	UNKNOWN FTM, RED w/ CREAM STREAKS / HALLWAY			
16	030B/031B	" " " " " / BREAK ROOM			
17	032A/033A	FTM, 12"x12", TAN MOTTLED / HALLWAY			
18	032B/033B	" " " " / JANITOR CLOSET			
19	038A	EXT. WINDOW CAULK, INT. SIDE, BROWN / BREAK ROOM			
20	038B	" " " " " " / 191st FUEL OFFICE - ROOM 1			

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Date: 12/20/19
Revision Date: June/2011

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Date: ____

Relinquished By: ____
Date: ____

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APEX Research, Inc.

11054 Hi Tech Drive, Whitmore Lake, MI 48189. Phone: (734) 449 - 9990, Fax (734) 449 - 9991.
Web Site: http://apexresearch-inc.com. Email: Bob.Letarte@apexresearchlab.com

Customer Name: Arch Environmental Group, Inc.
Address: 37720 Interchange Drive
City, St., Zip: Farmington Hills, MI 48335
Phone: (248) 426-0165 Fax: (248) 427-0305

Date of Survey: 12/16/19
Project: Selfridge ANG - Bldg 154
Project # AE190875
Contact Person: Pedro P. / Michelle C.
Email: labs@archenvgroup.com

***Terms and conditions on the other side.*

Lab Use Only
Log-In:
Report:
Fax:
Verbal:
Email:

Turn Around Times: (Circle One)

Rush 24 hour
48 hour 72 hour
Other: TTP yes / no (Test Till Positive)

*Note: Test Till Positive for all asbestos bulk samples unless otherwise noted.

Asbestos: Bulk X Wipe ___ Point Count ___ PCM ___
Lead: Bulk ___ Wipe ___ Air ___ Paint ___ Soil ___
Mold: Bulk ___ Tape ___ BioSIS ___ Other ___ Viable ___
TEM: Bulk/NOP ___ AHERA ___ EPA Level II ___ Other ___

Lab ID	Customer ID #	Material/Location	Volume	Area	Results
21	AE190875 - 038A	Sink Undercoating, Grey / Breakroom			
22	039B	" " " / "	"		
23	042A/043A	Hard Plaster Ceiling, Smooth Brown & Finish Coat / Mens Restroom & Locker Room			
24	042B/043B	" " " " "	" "	/ "	" " "
25	042C/043C	" " " " "	" "	/ Womens Restroom & Locker Room	
26	044A/045A	C/A, 4", Tan / Janitor Closet			
27	044B/045B	" " " / " "			
28	050A	Ext. Door Caulk, Ext. Side, Grey / Exterior			
29	050B	" " " " " " / "			
30	056A	Ext. ~~Door~~ Window Caulk, Ext. Side, Brown / Exterior			
31	056B	" " " " " " / "			

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APEX Research, Inc.

11054 Hi Tech Drive, Whitmore Lake, MI 48189. Phone: (734) 449 - 9990, Fax (734) 449 - 9991.
Web Site: http://apexresearch-inc.com. Email: Bob.Letarte@apexresearchlab.com

Customer Name: Arch Environmental Group, Inc.
Address: 37720 Interchange Drive
City, St., Zip: Farmington Hills, MI 48335
Phone: (248) 426-0165 Fax: (248) 427-0305

Date of Survey: 12/16/19
Project: Selfridge ANG - Building 154
Project # AE190875
Contact Person: Pedro P. / Michelle C.
Email: labs@archenvgroup.com

***Terms and conditions on the other side.*

Lab Use Only
Log-In:
Report:
Fax:
Verbal:
Email:

Turn Around Times: (Circle One)

Rush (24 hour) 48 hour 72 hour
Other:
TTP (yes) / no (Test Till Positive)
*Note: Test Till Positive for all asbestos bulk samples unless otherwise noted.

Asbestos: Bulk ✓ Wipe ___ Point Count ___ PCM ___
Lead: Bulk ___ Wipe ___ Air ___ Paint ___ Soil ___
Mold: Bulk ___ Tape ___ BioSIS ___ Other ___ Viable ___
TEM: Bulk/NOP ___ AHERA ___ EPA Level II ___ Other ___

Lab ID		Customer ID #	Material/Location	Volume	Area	Results
32		AE190875_ 057A	Ext. Wall Joint Caulk, Ext Side, White / Exterior			
33		057B	" " " " " " " / "			

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Date:

Appendix E

Information on Regulated Construction Waste (RCW)

INFORMATION ON REGULATED CONSTRUCTION WASTE (RCW)

Arch Environmental Group's field consultants completed a room-by-room survey of the functional spaces which will be impacted by the currently scheduled renovations for materials that may be considered hazardous, or that may pose a threat to human health or the environment. Items identified during the survey included: fluorescent lamps, PCB/non-PCB lamp ballasts, engine oil drums and containers, fire extinguishers, electronic components, and miscellaneous chemicals.

Through discussions with Tetra Tech, Inc. during the pre-bid site review, it was determined that the exterior transformers and chiller units would not be disturbed as part of the currently scheduled mechanical renovations, therefore, these items were not included in this survey.

Room-by-Room Inventory of Regulated Construction Waste

The following is a room-by-room listing of all potentially hazardous materials identified.

Floor	Location	Material	sf/lf/#	
1	127th Fuel Office - Room 2	Ballasts	2	#
1	127th Fuel Office - Room 2	Fluorescent Light Bulbs	4	#
1	127th Fuel Office - Room 2	P.A. System	1	#
1	191st Fuel Office - Room 1	Ballasts	2	#
1	191st Fuel Office - Room 1	Fluorescent Light Bulbs	4	#
1	Break Room	Ballasts	8	#
1	Break Room	Exit Door Sign	1	#
1	Break Room	Fire Alarm	1	#
1	Break Room	Fluorescent Light Bulbs	16	#
1	Break Room	Water Fountain	1	#
1	East Maintenance/Corrosion Dock	Compressed Air Valves	1	#
1	East Maintenance/Corrosion Dock	Emergency Flood Lights	5	#
1	East Maintenance/Corrosion Dock	Exit Door Sign	3	#
1	East Maintenance/Corrosion Dock	Fire Alarm	2	#
1	East Maintenance/Corrosion Dock	Fire Extinguisher	2	#
1	East Maintenance/Corrosion Dock	Fuel Tanks	2	#
1	East Maintenance/Corrosion Dock	Mercury Bulbs	8	#
1	Exterior of Building	Jet Fuel Tank	1	#
1	Exterior of Building	Mercury Bulbs	32	#
1	Exterior of Building	PCB Transformers	2	#
1	External Fuel Tank Maintenance	Compressed Air Valves	2	#
1	External Fuel Tank Maintenance	Emergency Flood Lights	1	#
1	External Fuel Tank Maintenance	Exit Door Sign	1	#
1	External Fuel Tank Maintenance	Fire Alarm	1	#
1	External Fuel Tank Maintenance	Fire Extinguisher	1	#
1	External Fuel Tank Maintenance	Flammables Cabinet	1	#
1	External Fuel Tank Maintenance	Fuel Tanks	3	#
1	Hallway	Ballasts	14	#
1	Hallway	Emergency Flood Lights	2	#
1	Hallway	Exit Door Sign	1	#
1	Hallway	Fire Alarm	2	#
1	Hallway	Fire Extinguisher	1	#
1	Hallway	Fluorescent Light Bulbs	28	#
1	Hallway	Smoke Detector	2	#
1	Janitor Closet	Ballasts	1	#
1	Janitor Closet	Cleaning Bleach	1	gal

1	Janitor Closet	Fluorescent Light Bulbs	2	#
1	Men’s Restroom and Locker Room	Ballasts	4	#
1	Men’s Restroom and Locker Room	Fire Alarm	2	#
1	Men’s Restroom and Locker Room	Fluorescent Light Bulbs	8	#
1	Utility Room	Air Compressor	4	#
1	Utility Room	Ballasts	4	#
1	Utility Room	Electrical Panel	5	#
1	Utility Room	Emergency Flood Lights	9	#
1	Utility Room	Fire Alarm	4	#
1	Utility Room	Fluorescent Light Bulbs	8	#
1	Utility Room	Fuel Tanks	1	#
1	Utility Room	Hydraulic Oil	1	gal
1	Utility Room	Liquid Coolant	2	gal
1	Vestibule	Ballasts	1	#
1	Vestibule	Fluorescent Light Bulbs	2	#
1	West Maintenance/Corrosion Dock	Compressed Air Valves	1	#
1	West Maintenance/Corrosion Dock	Emergency Flood Lights	5	#
1	West Maintenance/Corrosion Dock	Exit Door Sign	3	#
1	West Maintenance/Corrosion Dock	Fire Alarm	2	#
1	West Maintenance/Corrosion Dock	Fire Extinguisher	2	#
1	West Maintenance/Corrosion Dock	Fuel Tanks	2	#
1	West Maintenance/Corrosion Dock	Mercury Bulbs	8	#
1	Women’s Restroom and Locker Room	Ballasts	3	#
1	Women’s Restroom and Locker Room	Fire Alarm	2	#
1	Women’s Restroom and Locker Room	Fluorescent Light Bulbs	6	#

APPENDIX F

Inspector Credentials

INSPECTOR CREDENTIALS

This appendix provides information regarding the Accredited Asbestos Inspector(s) who inspected the suspect asbestos-containing materials and collected asbestos bulk samples:

Date of Inspection:	December 16, 2019
Building Name and Address:	Selfridge Building 154 44580 North Jefferson Avenue Harrison Township, Michigan 48045

Name of Accredited Inspector:	Ms. Michelle Carriere
State of Accreditation:	Michigan
Accreditation Number:	A44105
State Accreditation Expiration Date:	February 12, 2020
Training Institute:	Arch Environmental Group
Training Certificate Expiration Date:	April 15, 2020

Signature of Accredited Inspector: Michelle Carriere

Name of Accredited Inspector:	Mr. Pedro Pacheco
State of Accreditation:	Michigan
Accreditation Number:	A51780
State Accreditation Expiration Date:	March 6, 2020
Training Institute:	ETC Training Services, Inc.
Training Certificate Expiration Date:	September 23, 2020

Signature of Accredited Inspector: _____

Copies of current State of Michigan Accreditation Cards and training certificates are located on the following pages.

Michelle Carriere

Accredited Asbestos Inspector

State:	Michigan
Accreditation Number:	A44105
Accreditation Expiration Date:	February 12, 2020
Training Provider:	Arch Environmental Group
Training Expiration Date:	April 15, 2020

Signature: Michelle Carriere

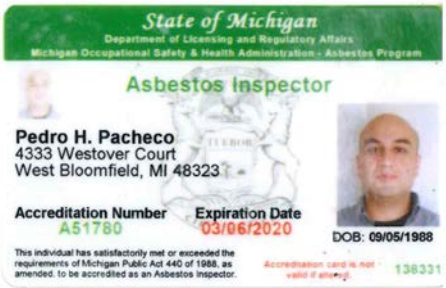

State of Michigan
Department of Licensing and Regulatory Affairs
Michigan Occupational Safety & Health Administration - Asbestos Program
Asbestos Inspector
Michelle L. Carriere
1515 Ridge Road
Lot 206
Ypsilanti, MI 48198
Accreditation Number
A44105
Expiration Date
02/12/2020
DOB: 06/12/1989
This individual has satisfactorily met or exceeded the requirements of Michigan Public Act 440 of 1988, as amended, to be accredited as an Asbestos Inspector.
Accreditation card is not valid if altered.
137803

Pedro Pacheco

Accredited Asbestos Inspector, Asbestos Management Planner

State:	Michigan
Accreditation Number:	A51780
Accreditation Expiration Date:	March 6, 2020 *(Inspector)* July 15, 2020 *(Management Planner)*
Training Provider:	ETC Training Services Group
Training Expiration Date:	September 23, 2020

Signature: 



SECTION 02 83 00

LEAD REMEDIATION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP Z9.2	(2018) Fundamentals Governing the Design and Operation of Local Exhaust Ventilation Systems

ASTM INTERNATIONAL (ASTM)

ASTM E1727	(2016) Standard Practice for Field Collection of Soil Samples for Subsequent Lead Determination
ASTM E1728/E1728M	(2020) Standard Practice for Collection of Settled Dust Samples Using Wipe Sampling Methods for Subsequent Lead Determination

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 701	(2019) Standard Methods of Fire Tests for Flame Propagation of Textiles and Films

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD)

HUD 6780	(1995; Errata Aug 1996;Rev Ch. 7 - 1997) Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1926.21	Safety Training and Education
29 CFR 1926.33	Access to Employee Exposure and Medical Records
29 CFR 1926.55	Gases, Vapors, Fumes, Dusts, and Mists
29 CFR 1926.59	Hazard Communication
29 CFR 1926.62	Lead

29 CFR 1926.65	Hazardous Waste Operations and Emergency Response
29 CFR 1926.103	Respiratory Protection
29 CFR 1926.1126	Chromium
29 CFR 1926.1127	Cadmium
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 745	Lead-Based Paint Poisoning Prevention in Certain Residential Structures
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 178	Specifications for Packagings

U.S. NAVAL FACILITIES ENGINEERING COMMAND (NAVFAC)

ND OPNAVINST 5100.23	(2005; Rev G) Navy Occupational Safety and Health (NAVOSH) Program Manual

UNDERWRITERS LABORATORIES (UL)

UL 586	(2009; Reprint Dec 2017) UL Standard for Safety High-Efficiency Particulate, Air Filter Units

1.2 DEFINITIONS

1.2.1 Abatement

Measures defined in 40 CFR 745, Section 223, designed to permanently eliminate lead-based paint hazards.

1.2.2 Action Level

Employee exposure, without regard to use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air averaged over an 8-hour period; to an airborne concentration of cadmium of 2.5 micrograms per cubic meter of air averaged over an 8-hour period; to an airborne concentration of chromium (VI) of 2.5 micrograms per cubic meter of air averaged over an 8-hour period.

1.2.3 Area Sampling

Sampling of lead, cadmium, chromium concentrations within the lead, cadmium, chromium control area and inside the physical boundaries which is representative of the airborne lead, cadmium, chromium concentrations but is not collected in the breathing zone of personnel (approximately 5 to 6 feet above the floor).

1.2.4 Cadmium Permissible Exposure Limit (PEL)

Five micrograms per cubic meter of air as an 8-hour time weighted average as determined by 29 CFR 1926.1127. If an employee is exposed for more than 8-hours in a work day, determine the PEL by the following formula:

PEL (micrograms/cubic meter of air) = 40/No. hrs worked per day

1.2.5 Certified Industrial Hygienist (CIH)

As used in this section refers to a person retained by the Contractor who is certified as an industrial hygienist and who is trained in the recognition and control of lead, cadmium and chromium hazards in accordance with current federal, State, and local regulations. CIH must be certified for comprehensive practice by the American Board of Industrial Hygiene. The Certified Industrial Hygienist must be independent of the Contractor and must have no employee or employer relationship which could constitute a conflict of interest.

1.2.6 Child-Occupied Facility

Real property which is a building or portion of a building constructed prior to 1978 visited regularly by the same child, six-years of age or under, on at least two different days within any week (Sunday through Saturday period), provided that each day's visit lasts at least 3-hours, and the combined annual visits last at least 60-hours. Child-occupied facilities include but are not limited to, day-care centers, preschools and kindergarten classrooms.

1.2.7 Chromium Permissible Exposure Limit (PEL)

Five micrograms per cubic meter of air as an 8-hour time weighted average as determined by 29 CFR 1926.1126. If an employee is exposed for more than 8-hours in a work day, determine the PEL by the following formula:

PEL (micrograms/cubic meter of air) = 40/No. hrs worked per day

1.2.8 Competent Person (CP)

As used in this section, refers to a person employed by the Contractor who is trained in the recognition and control of lead, cadmium and chromium hazards in accordance with current federal, State, and local regulations

and has the authority to take prompt corrective actions to control the lead, cadmium and chromium hazard. The Contractor may provide more than one CP as required to supervise and monitor the work. The CP must be a Certified Industrial Hygienist (CIH) certified by the American Board of Industrial Hygiene or a Certified Safety Professional (CSP) certified by the Board of Certified Safety Professionals or a licensed lead-based paint abatement Supervisor/Project Designer in the State of Michigan.

1.2.9 Contaminated Room

Refers to a room for removal of contaminated personal protective equipment (PPE).

1.2.10 Decontamination Shower Facility

That facility that encompasses a clean clothing storage room, and a contaminated clothing storage and disposal rooms, with a shower facility in between.

1.2.11 Deleading

Activities conducted by a person who offers to eliminate lead-based paint or lead-based paint hazards or paints containing cadmium/chromium or to plan such activities in commercial buildings, bridges or other structures.

1.2.12 Eight-Hour Time Weighted Average (TWA)

Airborne concentration of lead, cadmium, chromium to which an employee is exposed, averaged over an 8-hour workday as indicated in 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

1.2.13 High Efficiency Particulate Air (HEPA) Filter Equipment

HEPA filtered vacuuming equipment with a UL 586 filter system capable of collecting and retaining lead, cadmium, chromiumcontaminated particulate. A high efficiency particulate filter demonstrates at least 99.97 percent efficiency against 0.3 micron or larger size particles.

1.2.14 Lead

Metallic lead, inorganic lead compounds, and organic lead soaps. Excludes other forms of organic lead compounds. The use of the term Lead in this section also refers to paints which contain detectable concentrations of Cadmium and Chromium. For the purposes of the section lead-based paint (LBP) and paint with lead (PWL) also contains cadmium and chromium.

1.2.15 Lead-Based Paint (LBP)

Paint or other surface coating that contains lead in excess of 1.0 milligrams per centimeter squared or 0.5 percent by weight.

1.2.16 Lead-Based Paint Hazards

Paint-lead hazard, dust-lead hazard or soil-lead hazard as identified in 40 CFR 745, Section 65. Any condition that causes exposure to lead from lead-contaminated dust, lead-contaminated soil, lead-based paint that is deteriorated or present in accessible surfaces, friction surfaces, or impact surfaces that would result in adverse human health effects.

1.2.17 Lead, Cadmium, Chromium Control Area

A system of control methods to prevent the spread of lead, cadmium, chromium dust, paint chips or debris to adjacent areas that may include temporary containment, floor or ground cover protection, physical boundaries, and warning signs to prevent unauthorized entry of personnel. HEPA filtered local exhaust equipment may be used as engineering controls to further reduce personnel exposures or building/outdoor environmental contamination.

1.2.18 Lead Permissible Exposure Limit (PEL)

Fifty micrograms per cubic meter of air as an 8-hour time weighted average as determined by 29 CFR 1926.62. If an employee is exposed for more than 8-hours in a work day, determine the PEL by the following formula:

PEL (micrograms/cubic meter of air) = 400/No. hrs worked per day

1.2.19 Material Containing Lead/Paint with Lead (MCL/PWL)

Any material, including paint, which contains lead as determined by the testing laboratory using a valid test method. The requirements of this section does not apply if no detectable levels of lead are found using a quantitative method for analyzing paint or MCL using laboratory instruments with specified limits of detection (usually 0.01 percent). An X-Ray Fluorescence (XRF) instrument is not considered a valid test method.

1.2.20 Personal Sampling

Sampling of airborne lead, cadmium, chromium concentrations within the breathing zone of an employee to determine the 8-hour time weighted average concentration in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127. Samples must be representative of the employees' work tasks. Breathing zone must be considered an area within a hemisphere, forward of the shoulders, with a radius of 6 to 9 inches and centered at the nose or mouth of an employee.

1.2.21 Physical Boundary

Area physically roped or partitioned off around lead, cadmium, chromium control area to limit unauthorized entry of personnel.

1.3 DESCRIPTION

Construction activities impacting PWL or material containing lead, cadmium, chromium which are covered by this specification include the demolition or removal of material containing lead, cadmium, chromium in good condition, located in the building and as indicated on the drawings. The work covered by this section includes work tasks and the precautions specified in this section for the protection of building occupants and the environment during and after the performance of the hazard abatement activities.

1.3.1 Protection of Existing Areas To Remain

Project work including, but not limited to, lead, cadmium, chromium hazard abatement work, storage, transportation, and disposal must be performed without damaging or contaminating adjacent work and areas. Where such work or areas are damaged or contaminated, restore work and areas to the

original condition.

1.3.2 Coordination with Other Work

Coordinate with work being performed in adjacent areas to ensure there are no exposure issues. Explain coordination procedures in the Lead, Cadmium, Chromium Compliance Plan and describe how the Contractor will prevent lead, cadmium and chromium exposure to other contractors and Government personnel performing work unrelated to lead, cadmium and chromium activities.

1.3.3 Sampling and Analysis

Submit a log of the analytical results from sampling conducted during the abatement. Keep the log of results current with project activities and brief the results to the Contracting Officer as analytical results are reported.

1.3.3.1 Dust Wipe Materials, Sampling and Analysis

Sampling must conform to ASTM E1728/E1728M.

1.3.3.2 Soil Sampling and Analysis

Sampling must conform to ASTM E1727.

1.3.3.3 Clearance Monitoring

a. Collect dust wipe samples inside the lead, cadmium and chromium hazard control area after the final visual inspection in the quantities and at the locations specified.

   (1) Floors as required by 40 CFR 745.
   (2) Interior Window Sills as required by 40 CFR 745.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Competent Person Qualifications; G

Training Certification; G

Occupational and Environmental Assessment Data Report; G

Medical Examinations; G

Lead, Cadmium, Chromium Waste Management Plan; G

Licenses, Permits and Notifications; G

Occupant Protection Plan; G

Lead, Cadmium, Chromium Compliance Plan; G

Written Evidence of TSD Approval; G

SD-03 Product Data

Respirators; G

Vacuum Filters; G

Negative Air Pressure System; G

Materials and Equipment; G

Expendable Supplies; G

Local Exhaust Equipment; G

Pressure Differential Automatic Recording Instrument; G

Pressure Differential Log; G

SD-06 Test Reports

Sampling and Analysis; G

Occupational and Environmental Assessment Data Report; G

Sampling Results; G

Pressure Differential Recordings For Local Exhaust System; G

SD-07 Certificates

Testing Laboratory; G

Clearance Certification; G

SD-11 Closeout Submittals

Hazardous Waste Manifest; G

Turn-In Documents or Weight Tickets; G

1.5 QUALITY ASSURANCE

1.5.1 Qualifications

1.5.1.1 Competent Person (CP)

Submit name, address, and telephone number of the CP selected to perform responsibilities specified in paragraph COMPETENT PERSON (CP) RESPONSIBILITIES. Provide documented construction project-related experience with implementation of OSHA's Lead in Construction standard (29 CFR 1926.62), Chromium standard (29 CFR 1926.1126), Cadmium standard (29 CFR 1926.1127) which shows ability to assess occupational and environmental exposure to lead, cadmium, chromium; experience with the use of respirators, personal protective equipment and other exposure reduction methods to protect employee health. Demonstrate a minimum of 3 years

experience implementing OSHA's Lead in Construction standard (29 CFR 1926.62), Chromium standard (29 CFR 1926.1126), and Cadmium standard (29 CFR 1926.1127). Submit proper documentation that the CP is trained and certified in accordance with federal, State and local laws..

1.5.1.2 Training Certification

Submit a certificate for each worker and supervisor, signed and dated by the training provider, stating that the employee has received the required lead, cadmium and chromium training specified in 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 and is certified to perform or supervise deleading, lead removal or demolition activities in the State of Michigan.

1.5.1.3 Testing Laboratory

Submit the name, address, and telephone number of the testing laboratory selected to perform the air and wipe analysis, testing, and reporting of airborne concentrations of lead, cadmium and chromium. Use a laboratory participating in the EPA National Lead Laboratory Accreditation Program (NLLAP) by being accredited by either the American Association for Laboratory Accreditation (A2LA) or the American Industrial Hygiene Association (AIHA) and that is successfully participating in the Environmental Lead Proficiency Analytical Testing (ELPAT) program to perform sample analysis. Laboratories selected to perform blood lead analysis must be OSHA approved.

1.5.1.4 Certified Risk Assessor

The Certified Risk Assessor must be certified pursuant to 40 CFR 745, Section 226 and be responsible to perform the clearance sampling, clearance sample data evaluation and summarize clearance sampling results in a section of the abatement report. The risk assessor must sign the abatement report to indicate clearance requirements for the contract have been met.

1.5.2 Requirements

1.5.2.1 Competent Person (CP) Responsibilities

a. Verify training meets all federal, State, and local requirements.

b. Review and approve Lead, Cadmium, Chromium Compliance Plan for conformance to the applicable referenced standards.

c. Continuously inspect LBP/PWL or MCL work for conformance with the approved plan.

d. Perform (or oversee performance of) air sampling. Recommend upgrades or downgrades (whichever is appropriate based on exposure) on the use of PPE (respirators included) and engineering controls.

e. Ensure work is performed in strict accordance with specifications at all times.

f. Control work to prevent hazardous exposure to human beings and to the environment at all times.

g. Supervise final cleaning of the lead, cadmium, chromium control area, take clearance wipe samples if necessary; review clearance sample results and make recommendations for further cleaning.

h. Certify the conditions of the work as called for elsewhere in this specification.

i. The CP must be certified pursuant to 40 CFR 745, Section 226 and is responsible for development and implementation of the occupant protection plan, the abatement report and supervise lead, cadmium and chromium hazard abatement work activities.

1.5.2.2 Lead, Cadmium, Chromium Compliance Plan

Submit a detailed job-specific plan of the work procedures to be used in the disturbance of lead, cadmium and chromium, LBP/PWL or MCL. Include in the plan a sketch showing the location, size, and details of lead, cadmium, chromium control areas, critical barriers, physical boundaries, location and details of decontamination facilities, viewing ports, and mechanical ventilation system. Include a description of equipment and materials, work practices, controls and job responsibilities for each activity from which lead, cadmium, chromium is emitted. Include in the plan, eating, drinking, smoking, hygiene facilities and sanitary procedures, interface of trades, sequencing of lead, cadmium, chromium related work, collected waste water and dust containing lead, cadmium, chromium and debris, air sampling, respirators, personal protective equipment, and a detailed description of the method of containment of the operation to ensure that lead, cadmium, chromium is not released outside of the lead, cadmium, chromium control area. Include site preparation, cleanup and clearance procedures. Include occupational and environmental sampling, training and strategy, sampling and analysis strategy and methodology, frequency of sampling, duration of sampling, and qualifications of sampling personnel in the air sampling portion of the plan. Include a description of arrangements made among contractors on multicontractor worksites to inform affected employees and to clarify responsibilities to control exposures.

1.5.2.3 Occupational and Environmental Assessment Data Report

If initial monitoring is necessary, submit occupational and environmental sampling results to the Contracting Officer within three working days of collection, signed by the testing laboratory employee performing the analysis, the employee that performed the sampling, and the CP.

In order to reduce the full implementation of 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 the Contractor must provide documentation. Submit a report that supports the determination to reduce full implementation of the requirements of 29 CFR 1926.62,29 CFR 1926.1126, 29 CFR 1926.1127 and supporting the Lead, Cadmium, Chromium Compliance Plan.

a. The initial monitoring must represent each job classification, or if working conditions are similar to previous jobs by the same employer, provide previously collected exposure data that can be used to estimate worker exposures per 29 CFR 1926.62,29 CFR 1926.1126, 29 CFR 1926.1127. The data must represent the worker's regular daily exposure to lead, cadmium, chromium for stated work.

b. Submit worker exposure data gathered during the task based trigger operations of 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 with a complete process description. This includes manual demolition, manual scraping, manual sanding, heat gun, power tool cleaning, rivet busting, cleanup of dry expendable abrasives, abrasive blast enclosure removal, abrasive blasting, welding, cutting and torch burning where lead,

cadmium and chromium containing coatings are present.

c. The initial assessment must determine the requirement for further monitoring and the need to fully implement the control and protective requirements including the lead, cadmium, chromium compliance plan per 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

1.5.2.4 Medical Examinations

Submit pre-work blood lead levels and post-work blood lead levels for all workers performing lead, cadmium, chromium activities during the execution of the work. Initial medical surveillance as required by 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 must be made available to all employees exposed to lead, cadmium, chromium at any time (one day) above the action level. Full medical surveillance must be made available to all employees on an annual basis who are or may be exposed to lead, cadmium and chromium in excess of the action level for more than 30 days a year or as required by 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127. Adequate records must show that employees meet the medical surveillance requirements of 29 CFR 1926.33, 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 and 29 CFR 1926.103. Provide medical surveillance to all personnel exposed to lead, cadmium, chromium as indicated in 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127. Maintain complete and accurate medical records of employees for the duration of employment plus 30 years.

1.5.2.5 Training

Train each employee performing work that disturbs lead, cadmium, chromium, who performs LBP/MCL/PWL disposal, and air sampling operations prior to the time of initial job assignment and annually thereafter, in accordance with 29 CFR 1926.21, 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127, 40 CFR 745 and State and local regulations where appropriate.

1.5.2.6 Respiratory Protection Program

a. Provide each employee required to wear a respirator a respirator fit test at the time of initial fitting and at least annually thereafter as required by 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

b. Establish and implement a respiratory protection program as required by 29 CFR 1926.103, 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 and 29 CFR 1926.55.

1.5.2.7 Hazard Communication Program

Establish and implement a Hazard Communication Program as required by 29 CFR 1926.59.

1.5.2.8 Lead, Cadmium, Chromium Waste Management

The Lead, Cadmium, Chromium Waste Management Plan must comply with applicable requirements of federal, State, and local hazardous waste regulations and address:

a. Identification and classification of wastes associated with the work.

b. Estimated quantities of wastes to be generated and disposed of.

c. Names and qualifications of each contractor that will be transporting,

storing, treating, and disposing of the wastes. Include the facility location and a 24-hour point of contact. Furnish two copies of hazardous waste .

d. Names and qualifications (experience and training) of personnel who will be working on-site with hazardous wastes.

e. List of waste handling equipment to be used in performing the work, to include cleaning, volume reduction, and transport equipment.

f. Spill prevention, containment, and cleanup contingency measures including a health and safety plan to be implemented in accordance with 29 CFR 1926.65.

g. Work plan and schedule for waste containment, removal and disposal. Proper containment of the waste includes using acceptable waste containers (e.g., 55-gallon drums) as well as proper marking/labeling of the containers. Clean up and containerize wastes daily.

h. Include any process that may alter or treat waste rendering a hazardous waste non hazardous.

i. Unit cost for hazardous waste disposal according to this plan.

1.5.2.9 Environmental, Safety and Health Compliance

In addition to the detailed requirements of this specification, comply with laws, ordinances, rules, and regulations of federal, State, and local authorities regarding lead, cadmium and chromium. Comply with the applicable requirements of the current issue of 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127, EM 385-1-1, ND OPNAVINST 5100.23. Submit matters regarding interpretation of standards to the Contracting Officer for resolution before starting work. Where specification requirements and the referenced documents vary, the most stringent requirements apply.

1.5.3 Pressure Differential Recordings for Local Exhaust System

Provide a local exhaust system that creates a negative pressure of at least 0.02 inches of water relative to the pressure external to the enclosure and operate it continuously, 24-hours a day, until the temporary enclosure of the lead, cadmium, chromium control area is removed. Submit pressure differential recordings for each work day to the PQP for review and to the Contracting Officer within 24-hours from the end of each work day.

1.5.4 Licenses, Permits and Notifications

Certify and submit in writing to the state's environmental protection agency responsible for lead hazard abatement activities at least 10 days prior to the commencement of work that licenses, permits and notifications have been obtained. All associated fees or costs incurred in obtaining the licenses, permits and notifications are included in the contract price.

1.5.5 Occupant Protection Plan

The certified project designer must develop and implement an Occupant Protection Plan describing the measures and management procedures to be taken during lead, cadmium and chromium hazard abatement activities to protect the building occupants/building facilities and the outside

environment from exposure to any lead, cadmium and chromium contamination while lead, cadmium and chromium hazard abatement activities are performed.

1.5.6 Pre-Construction Conference

Along with the CP, meet with the Contracting Officer to discuss in detail the Lead, Cadmium, Chromium Waste Management Plan and the Lead, Cadmium, Chromium Compliance Plan, including procedures and precautions for the work.

1.6 EQUIPMENT

1.6.1 Respirators

Furnish appropriate respirators approved by the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services, for use in atmospheres containing lead, cadmium and chromium dust, fume and mist. Respirators must comply with the requirements of 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

1.6.2 Special Protective Clothing

Personnel exposed to lead, cadmium, chromiumcontaminated dust must wear proper disposable protective whole body clothing, head covering, gloves, eye, and foot coverings as required by 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127. Furnish proper disposable plastic or rubber gloves to protect hands. Reduce the level of protection only after obtaining approval from the CP.

1.6.3 Rental Equipment Notification

If rental equipment is to be used during PWL or MCL handling and disposal, notify the rental agency in writing concerning the intended use of the equipment.

1.6.4 Vacuum Filters

UL 586 labeled HEPA filters.

1.6.5 Equipment for Government Personnel

Furnish the Contracting Officer with two complete sets of personal protective equipment (PPE) daily, as required herein, for entry into and inspection of the lead, cadmium and chromium removal work within the lead, cadmium and chromium controlled area. Personal protective equipment must include disposable whole body covering, including appropriate foot, head, eye, and hand protection. PPE remains the property of the Contractor. The Government will provide respiratory protection for the Contracting Officer.

1.6.6 Abrasive Removal Equipment

The use of powered machine for vibrating, sanding, grinding, or abrasive blasting is prohibited unless equipped with local exhaust ventilation systems equipped with high efficiency particulate air (HEPA) filters.

1.6.7 Negative Air Pressure System

1.6.7.1 Minimum Requirements

Do not proceed with work in the area until containment is set up and HEPA filtration systems are in place. The negative air pressure system must meet the requirements of ASSP Z9.2 including approved HEPA filters in accordance with UL 586. Negative air pressure equipment must be equipped with new HEPA filters, and be sufficient to maintain a minimum pressure differential of minus 0.02 inch of water column relative to adjacent, unsealed areas. Negative air pressure system minimum requirements are listed as follows:

a. The unit must be capable of delivering its rated volume of air with a clean first stage filter, an intermediate filter and a primary HEPA filter in place.

b. The HEPA filter must be certified as being capable of trapping and retaining mono-disperse particles as small as 0.3 micrometers at a minimum efficiency of 99.97 percent.

c. The unit must be capable of continuing to deliver no less than 70 percent of rated capacity when the HEPA filter is 70 percent full or measures 2.5 inches of water static pressure differential on a magnehelic gauge.

d. Equip the unit with a manometer-type negative pressure differential monitor with minor scale division of 0.02 inch of water and accuracy within plus or minus 1.0 percent. The manometer must be calibrated daily as recommended by the manufacturer.

e. Equip the unit with a means for the operator to easily interpret the readings in terms of the volumetric flow rate of air per minute moving through the machine at any given moment.

f. Equip the unit with an electronic mechanism that automatically shuts the machine off in the event of a filter breach or absence of a filter.

g. Equip the unit with an audible horn that sounds an alarm when the machine has shut itself off.

h. Equip the unit with an automatic safety mechanism that prevents a worker from improperly inserting the main HEPA filter.

1.6.7.2 Auxiliary Generator

Provide an auxiliary generator with capacity to power a minimum of 50 percent of the negative air machines at any time during the work. When power fails, the generator controls must automatically start the generator and switch the negative air pressure system machines to generator power. The generator must not present a carbon monoxide hazard to workers.

1.6.8 Vacuum Systems

Vacuum systems must be suitably sized for the project, and filters must be capable of trapping and retaining all mono-disperse particles as small as 0.3 micrometers (mean aerodynamic diameter) at a minimum efficiency of 99.97 percent. Properly dispose of used filters that are being replaced.

1.6.9 Heat Blower Guns

Heat blower guns must be flameless, electrical, paint-softener type with controls to limit temperature to 1,100 degrees F. Heat blower must be (grounded) 120 volts ac, and must be equipped with cone, fan, glass protector and spoon reflector nozzles.

1.7 PROJECT/SITE CONDITIONS

1.7.1 Protection of Existing Work to Remain

Perform work without damage or contamination of adjacent areas. Where existing work is damaged or contaminated, restore work to its original condition or better as determined by the Contracting Officer.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Keep materials and equipment needed to complete the project available and on the site. Submit a description of the materials and equipment required; including Safety Data Sheets (SDSs) for material brought onsite to perform the work.

2.1.1 Expendable Supplies

Submit a description of the expendable supplies required.

2.1.1.1 Polyethylene Bags

Disposable bags must be polyethylene plastic and be a minimum of 6 mils thick (4 mils thick if double bags are used) or any other thick plastic material shown to demonstrate at least equivalent performance; and capable of being made leak-tight. Leak-tight means that solids, liquids or dust cannot escape or spill out.

2.1.1.2 Polyethylene Leak-tight Wrapping

Wrapping used to wrap lead, cadmium, chromium contaminated debris must be polyethylene plastic that is a minimum of 6 mils thick or any other thick plastic material shown to demonstrate at least equivalent performance.

2.1.1.3 Polyethylene Sheeting

Sheeting must be polyethylene plastic with a minimum thickness of 6 mil, or any other thick plastic material shown to demonstrate at least equivalent performance; and be provided in the largest sheet size reasonably accommodated by the project to minimize the number of seams. Where the project location constitutes an out of the ordinary potential for fire, or where unusual fire hazards cannot be eliminated, provide flame-resistant polyethylene sheets which conform to the requirements of NFPA 701.

2.1.1.4 Tape and Adhesive Spray

Tape and adhesive must be capable of sealing joints between polyethylene sheets and for attachment of polyethylene sheets to adjacent surfaces. After dry application, tape or adhesive must retain adhesion when exposed to wet conditions, including amended water. Tape must be minimum 2 inches wide, industrial strength.

2.1.1.5 Containers

When used, containers must be leak-tight and be labeled in accordance with EPA, DOT and OSHA standards.

2.1.1.6 Chemical Paint Strippers

Chemical paint strippers must not contain methylene chloride and be formulated to prevent stain, discoloration, or raising of the substrate materials.

2.1.1.7 Chemical Paint Stripper Neutralizer

Neutralizers for paint strippers must be compatible with the substrate and suitable for use with the chemical stripper that has been applied to the surface.

2.1.1.8 Detergents and Cleaners

Detergents or cleaning agents must not contain trisodium phosphate and have demonstrated effectiveness in lead, cadmium and chromium control work using cleaning techniques specified by HUD 6780 guidelines.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Protection

3.1.1.1 Notification

a. Notify the Contracting Officer 20 days prior to the start of any lead, cadmium and chromium work.

3.1.1.2 Lead, Cadmium, Chromium Control Area

a. Physical Boundary - Provide physical boundaries around the lead, cadmium, chromium control area by roping off the area designated in the work plan or providing curtains, portable partitions or other enclosures to ensure that lead, cadmium and chromium will not escape outside of the lead, cadmium and chromium control area. Prohibit the general public from accessing the lead, cadmium, chromium control areas.

b. Warning Signs - Provide warning signs at approaches to lead, cadmium, chromium control areas. Locate signs at such a distance that personnel may read the sign and take the necessary precautions before entering the area. Signs must comply with the requirements of 29 CFR 1926.62.

3.1.1.3 Furnishings

The Government will remove furniture and equipment from the building before lead, cadmium and chromium work begins.

3.1.1.4 Heating, Ventilating and Air Conditioning (HVAC) Systems

Shut down, lock out, and isolate HVAC systems that supply, exhaust, or pass through the lead, cadmium, chromium control areas. Seal intake and exhaust

vents in the lead, cadmium, chromium control area with 6 mil plastic sheet and tape. Seal seams in HVAC components that pass through the lead, cadmium, chromium control area. Provide temporary HVAC system for areas in which HVAC has been shut down outside the lead, cadmium, chromium control area.

3.1.1.5 Local Exhaust System

Provide a local exhaust system in the lead, cadmium, chromium control area in accordance with ASSP Z9.2, 29 CFR 1926.62, 29 CFR 1926.1126 and 29 CFR 1926.1127 that will provide at least 2 air changes per hour inside of the negative pressure enclosure. Local exhaust equipment must be operated 24-hours per day, until the lead, cadmium, chromium control area is removed and must be leak proof to the filter and equipped with HEPA filters. Maintain a minimum pressure differential in the lead, cadmium, chromium control area of minus 0.02 inch of water column relative to adjacent, unsealed areas. Provide continuous 24-hour per day monitoring of the pressure differential with a pressure differential automatic recording instrument. The building ventilation system must not be used as the local exhaust system for the lead, cadmium, chromium control area. Filters on exhaust equipment must conform to ASSP Z9.2 and UL 586. Terminate the local exhaust system out of doors and remote from any public access or ventilation system intakes.

3.1.1.6 Negative Air Pressure System Containment

a. Operate the negative air pressure systems to provide at least 4 air changes per hour inside the containment. Operate the local exhaust unit equipment continuously until the containment is removed. Smoke test the negative air pressure system for leaks at the beginning of each shift. The certified supervisor is responsible to continuously monitor and keep a pressure differential log with an automatic manometric recording instrument. Notify the Contracting Officer immediately if the pressure differential falls below the prescribed minimum. Submit the continuously monitored pressure differential log, as specified. Do not use the building ventilation system as the local exhaust system. Terminate the local exhaust system out of doors unless the Contracting Officer allows an alternate arrangement. All filters must be new at the beginning of the project and be periodically changed as necessary to maintain specified pressure differential and disposed of as lead, cadmium and chromium contaminated waste.

b. Discontinuing Negative Air Pressure System. Operate the negative air pressure system continuously during abatement activities unless otherwise authorized by the Contracting Officer. At the completion of the project, units must be run until full cleanup has been completed and final clearance testing requirements have been met. Dismantling of the negative air pressure systems must conform to written decontamination procedures be as presented in the Lead, Cadmium, Chromium Compliance Plan. Seal the HEPA filter machine intakes with polyethylene to prevent environmental contamination.

3.1.1.7 Decontamination Shower Facility

Provide clean and contaminated change rooms and shower facilities in accordance with this specification and 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

3.1.1.8 Eye Wash Station

Provide suitable facilities within the work area for quick drenching or flushing of the eyes where eyes may be exposed to injurious corrosive materials.

3.1.1.9 Mechanical Ventilation System

a. Use adequate ventilation to control personnel exposure to lead, cadmium and chromium in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127. To the extent feasible, use local exhaust ventilation or other collection systems, approved by the CP. Evaluate and maintain local exhaust ventilation systems in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

b. Vent local exhaust outside the building and away from building ventilation intakes or ensure system is connected to HEPA filters.

c. Use locally exhausted, power actuated tools or manual hand tools.

3.1.1.10 Personnel Protection

Personnel must wear and use protective clothing and equipment as specified herein. Eating, smoking, or drinking or application of cosmetics is not permitted in the lead, cadmium, chromium control area. No one will be permitted in the lead, cadmium, chromium control area unless they have been appropriately trained and provided with protective equipment.

3.2 ERECTION

3.2.1 Lead, Cadmium, Chromium Control Area Requirements

Establish a lead, cadmium, chromium control area by completely establishing barriers and physical boundaries around the area or structure where PWL or MCL removal operations will be performed.

3.3 APPLICATION

3.3.1 Lead, Cadmium, Chromium Work

Perform lead, cadmium, chromium work in accordance with approved Lead, Cadmium, Chromium Compliance Plan. Use procedures and equipment required to limit occupational exposure and environmental contamination with lead, cadmium, chromium when the work is performed in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 or 40 CFR 745, and as specified herein. Dispose of all PWL or MCL and associated waste in compliance with federal, State, and local requirements.

3.3.2 Paint with Lead, Cadmium, Chromium or Material Containing Lead, Cadmium, Chromium Removal

Manual or power sanding or grinding of lead, cadmium, chromium surfaces or materials is not permitted unless tools are equipped with HEPA attachments or wet methods. The dry sanding or grinding of surfaces that contain lead, cadmium, chromium is prohibited. Provide methodology for removing lead, cadmium, chromium in the Lead, Cadmium, Chromium Compliance Plan. Select lead, cadmium, chromium removal processes to minimize contamination of work areas outside the control area with lead, cadmium, chromium contaminated dust or other lead, cadmium, chromium contaminated debris or waste and to

ensure that unprotected personnel are not exposed to hazardous concentrations of lead, cadmium, chromium. Describe this removal process in the Lead, Cadmium, Chromium Compliance Plan.

Avoid deterioration of the substrate. Provide surface preparations for painting in accordance with Section 09 90 00 PAINTS AND COATINGS.

Provide methodology for lead, cadmium and chromium, LBP/PWL abatement/control and processes to minimize contamination of work areas outside the control area with lead, cadmium, chromium contaminated dust or other lead, cadmium, chromium contaminated debris/waste and to ensure that unprotected personnel are not exposed to hazardous concentrations of lead, cadmium, chromium. Describe this lead,, cadmium and chromium, LBP/PWL removal/control process in the Lead, Cadmium, Chromium Compliance Plan.

3.3.2.1 Paint with Lead, Cadmium, Chromium or Material Containing Lead, Cadmium, Chromium - Indoor Removal

Perform manualmechanical removal in the lead, cadmium, chromium control areas using enclosures, barriers or containments. Collect residue and debris for disposal in accordance with federal, State, and local requirements.

3.3.2.2 Paint with Lead, Cadmium, Chromium or Material Containing Lead, Cadmium, Chromium - Outdoor Removal

Perform outdoor removal as indicated in federal, State, and local regulations and in the Lead, Cadmium, Chromium Compliance Plan. The worksite preparation (barriers or containments) must be job dependent and presented in the Lead, Cadmium, Chromium Compliance Plan.

3.3.3 Personnel Exiting Procedures

Whenever personnel exit the lead, cadmium, chromium controlled area, they must perform the following procedures and must not leave the work place wearing any clothing or equipment worn in the control area:

a. Vacuum all clothing before entering the contaminated change room.

b. Remove protective clothing in the contaminated change room, and place them in an approved impermeable disposal bag.

c. Wash hands and face at the site, don appropriate disposable or uncontaminated reusable clothing, move to an appropriate shower facility, shower.

d. Change to clean clothes prior to leaving the clean clothes storage area.

3.4 FIELD QUALITY CONTROL

3.4.1 Tests

3.4.1.1 Air and Wipe Sampling

Conduct sampling for lead, cadmium, chromium in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 and as specified herein. Air and wipe sampling must be directed or performed by the CP.

a. The CP must be on the job site directing the air and wipe sampling and

inspecting the PWL or MCL removal work to ensure that the requirements of the contract have been satisfied during the entire PWL or MCL operation.

b. Collect personal air samples on employees who are anticipated to have the greatest risk of exposure as determined by the CP. In addition, collect air samples on at least twenty-five percent of the work crew or a minimum of two employees, whichever is greater, during each work shift.

c. Submit results of air samples, signed by the CP, within 72-hours after the air samples are taken.

d. Conduct area air sampling daily, on each shift in which lead, cadmium and chromium and lead-based paint removal operations are performed, in areas immediately adjacent to the lead, cadmium and chromium control area. Conduct sufficient area monitoring to ensure unprotected personnel are not exposed at or above 30 micrograms of lead per cubic meter of air or 2.5 micrograms of cadmium/chromium per cubic meter of air. If 30 micrograms of lead per cubic meter of air or 2.5 micrograms of cadmium/chromium per cubic meter of air is reached or exceeded, stop work, correct the conditions(s) causing the increased levels. Notify the Contracting Officer immediately. Determine if condition(s) require any further change in work methods. Resume removal work only after the CP and the Contracting Officer give approval.

3.4.1.2 Sampling After Removal

After the visual inspection, collect wipe samples according to the HUD protocol contained in HUD 6780 to determine the lead, cadmium and chromium content of settled dust in micrograms per square meter foot of surface area.

3.5 CLEANING AND DISPOSAL

3.5.1 Cleanup

Maintain surfaces of the lead, cadmium, chromium control area free of accumulations of dust and debris. Restrict the spread of dust and debris; keep waste from being distributed over the work area. Do not dry sweep or use pressurized air to clean up the area. At the end of each shift and when the lead, cadmium, chromium operation has been completed, clean the controlled area of all visible contamination by vacuuming with a HEPA filtered vacuum cleaner, wet mopping the area and wet wiping the area as indicated by the Lead, Cadmium, Chromium Compliance Plan. Reclean areas showing dust or debris. After visible dust and debris is removed, wet wipe and HEPA vacuum all surfaces in the controlled area. If adjacent areas become contaminated at any time during the work, clean, visually inspect, and then wipe sample all contaminated areas. The CP must then certify in writing that the area has been cleaned of lead, cadmium and chromium contamination before clearance testing.

3.5.1.1 Clearance Certification

The CP must certify in writing that air samples collected outside the lead, cadmium, chromium control area during paint removal operations are less than 30 micrograms of lead per cubic meter of airand less than 2.5 micrograms of cadmium/chromium per cubic meter of air; the respiratory protection used for the employees was adequate; the work procedures were performed in accordance with 29 CFR 1926.62, 29 CFR 1926.1126,

29 CFR 1926.1127; and that there were no visible accumulations of material and dust containing lead, cadmium, chromium left in the work site. Do not remove the lead, cadmium, chromium control area or roped off boundary and warning signs prior to the Contracting Officer's acknowledgement of receipt of the CP certification.

3.5.2 Disposal

a. Dispose of material, whether hazardous or non-hazardous in accordance with all laws and provisions and all federal, State or local regulations. Ensure all waste is properly characterized. The result of each waste characterization (TCLP for RCRA materials) will dictate disposal requirements.

b. Contractor is responsible for segregation of waste. Collect lead, cadmium, chromium contaminated waste, scrap, debris, bags, containers, equipment, and lead, cadmium, chromiumcontaminated clothing that may produce airborne concentrations of lead, cadmium, chromium particles. Label the containers in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 and 40 CFR 261, 40 CFR 262 and corresponding state regulations.

c. Dispose of lead, cadmium, chromiumcontaminated material classified as hazardous waste at an approved hazardous waste treatment, storage, or disposal facility off Government property.

d. Accumulate waste materials in U.S. Department of Transportation (49 CFR 178) approved 55 gallon drums or appropriately sized container for smaller volumes. Properly label each drum to identify the type of hazardous material (49 CFR 172). For hazardous waste, the collection container requires marking/labeling in accordance with 40 CFR 262 and corresponding state regulations during the accumulation/collection timeframe. The Contracting Officer or an authorized representative will assign an area for accumulation of waste containers. Coordinate authorized accumulation volumes and time limits with the host installation environmental function.

e. Handle, store, transport, and dispose lead, cadmium, chromium or lead, cadmium, chromium contaminated waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, and 40 CFR 265. Comply with land disposal restriction notification requirements as required by 40 CFR 268.

f. All lead, cadmium, and chromium waste generation, management,and disposal will be coordinated with the host installation environmental function.

3.5.2.1 Disposal Documentation

Coordinate all disposal or off-site shipments of lead, cadmium, and chromium waste with the host installation environmental function. Submit written evidence of TSD approval to demonstrate the hazardous waste treatment, storage, or disposal facility (TSD) is approved for lead, cadmium, chromium disposal by the EPA, State or local regulatory agencies. Submit one copy of the completed hazardous waste manifest, signed and dated by the initial transporter in accordance with 40 CFR 262. Provide a certificate that the waste was accepted by the disposal facility. Provide turn-in documents or weight tickets for non-hazardous waste disposal.

3.5.2.2 Payment for Hazardous Waste

Payment for disposal of hazardous and non-hazardous waste will not be made until a signed copy of the manifest from the treatment or disposal facility is received and approved by the Contracting Officer. The manifest must detail and certify the amount of lead, cadmium, chromium containing materials or non-hazardous waste delivered to the treatment or disposal facility.

3.6 LEAD-BASED PAINT SURVEY REPORT

LEAD-BASED PAINT SURVEY REPORT for Selfridge Building 154 prepared by Arch Environmental Group, Inc., dated January 20, 2020, immediately follows this section as an appendix. This report is provided as a convenience to the contractor. Contractor remains responsible for abatement of materials presented in the report. The report states there could be other hazmat in areas that were inaccessible for investigation. If other locations not included in the report are found, report the findings to the Contracting Officer.

-- End of Section --

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LEAD-BASED PAINT SURVEY REPORT

Selfridge Building 154
44580 North Jefferson Avenue
Harrison Township, Michigan 48045

Owner:
United States Air Force National Guard
44580 North Jefferson Avenue
Harrison Township, Michigan 48045
Telephone: (586) 465-0960

Prepared For:
Tetra Tech, Inc.
65 Cadillac Square, Suite 3610
Detroit, Michigan 48226
Telephone: (313) 964-0790

Prepared By:
Arch Environmental Group, Inc.
37720 Interchange Drive
Farmington Hills, Michigan 48335
Telephone: (248) 426-0165

Project #: AE190875
Project Date(s): December 16, 2019
Report Date: January 20, 2020

Table of Contents

1.0 / Introduction

The sole intent of this report is to present the results of the lead-based paint survey conducted by Arch Environmental Group, Inc. (AEG) of Selfridge Building 154 (Harrison Township, Michigan) at the request of Tetra Tech, Inc.. The lead based paint survey was conducted in response to scheduled renovation of the building. All lead-based paint survey activities were conducted by Ms. Michelle Carriere and Mr. Pedro Pacheco of AEG. The lead-based paint survey was conducted on December 16, 2019.

1.1 / Qualifications

AEG is a full spectrum environmental services firm specializing in environmental health and safety consulting and hazardous materials management. With offices in Farmington Hills, Michigan; Cedar Springs, Michigan, and Cary, Illinois, AEG services educational, commercial, industrial, and residential clientele throughout the State of Michigan and the Midwest.

Ms. Michelle Carriere and Mr. Pedro Pacheco are accredited by the Michigan Department of Community Health's Healthy Homes Section as inspectors and risk assessors.

2.0 / Regulations

Where applicable, this lead-based paint survey was conducted in accordance with: the Department of Housing and Urban Development's (HUD's) *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* (2012 Revision); the EPA's *Lead; Requirements for Lead-Based Paint Activities in Target Housing and Child Occupied Facilities* (40 CFR 745); HUD's *Requirements for Notification, Evaluation and Reduction of Lead-Based Paint Hazards in Federally Owned Residential Property and Housing Receiving Federal Assistance* (24 CFR Part 35); the EPA's *Lead: Renovation, Repair, and Painting Program Rule* (40 CFR 745, Subpart E); the Occupational Safety and Health Administration's (OSHA's) *Lead in Construction Standard* (29 CFR 1926.62); State of Michigan's *Lead Abatement Act* (MCL 333.5451-5477); the State of Michigan Department of Community Health's *Lead Hazard Control* (R 325.99101-99409); the State of Michigan's Occupational Health Standard *Part 603 – Lead Exposure in Construction* (R 325.51991-51993); and all other applicable federal, state, and local regulations and standards. These regulations provide guidelines for the sampling, identification, and management of lead-based paint. All necessary provisions of all above referenced regulations and standards were followed.

3.0 / Property Information

Selfridge Building 154 currently consists of single-story building containing offices and fueling stations located at 44580 North Jefferson Avenue, Harrison Township, Michigan. Based on available information, it was determined that the date of construction is presumed to be pre-1978. The building does not contain any residential structures or child-occupied facilities, such as day cares or pre-schools.

The property is currently, and has always been, owned by The United States Air Force National Guard.

4.0 / Summary of Findings

The building as a whole and the paint throughout are in relatively good condition overall. Similarly, the locations of the building included in the survey are in relatively good condition. Most surfaces throughout the location of the building included in the survey have intact or minimally to moderately deteriorated paint. Most deterioration of paint appears to be the result of what would be considered normal "wear and tear".

At the request of Mr. Kyle Kositz, Tetra Tech, Inc., a lead-based paint survey was conducted of the locations and component identified in Section 1.0. The testing results from said survey, which are summarized below, are applicable strictly for the date and time that testing was conducted and for the condition of surfaces at the time of testing.

4.1 / Identified Lead-Based Paint

Paint chip sampling of the identified painted building component surfaces at Selfridge Building 154 provided the following information. Detailed information for each paint chip sample, including official laboratory results, is located in Appendix C.

The following test locations for this building were analyzed with lead content greater than or equal to (≥) 0.5% by weight for paint chip samples and are to be considered to have lead-based paint:

Room	Side	Component	Substrate	Condition	Color	Result
Exterior of Building	B	Pillar	Concrete	Intact	Yellow	Positive
Exterior of Building	B	Door Casing	Metal	Intact	Yellow	Positive
Exterior of Building	B	Door Casing	Metal	Intact	Black	Positive

All other test locations for this building were analyzed with lead content less than (<) 0.5% by weight and are to be considered not to have lead-based paint.

4.2 / Limitations and Exclusions

Over the course of any lead-based paint survey, certain limitations may affect the completeness of the final report. These limitations may be caused by any number of factors, including limited access, recent renovations, or instructions from the client.

The following limitations and exclusions apply to the current lead-based paint survey:

- While the condition of painted surfaces was noted, potential lead-based paint hazards were not identified as part of the lead survey activities. A lead-based paint risk assessment is required to identify lead paint, lead dust, or lead soil hazards.

- Limited locations and components were tested to identify potential lead-based painted surfaces. As such, the current lead-based paint survey does not constitute a lead-based paint inspection, either full or partial, in accordance with EPA, HUD, and State of Michigan regulations and standards.

5.0 / Methods

The current lead-based paint survey was conducted using procedures outlined in Chapter 7 of HUD's *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* (2012 Revision).

For the current lead-based paint survey activities paint chip samples were analyzed in accordance with EPA Method SW 846 7420 and 305B Method *Test Methods for lead (Flame Atomic Absorption)*. The results are presented in both micrograms of lead per gram of paint (ug/g), often identified as parts per million (ppm), as well as percentage (%) of lead by weight. The results are then compared to the accepted level of both the EPA and HUD for lead-based paint of 5,000 ug/g or 0.5% lead by weight. All painted surfaces which are analyzed greater than or equal to this level (≥5,000 ug/g or ≥0.5%) are to be considered to have lead-based paint, and are reported as **POSITIVE**. All painted surfaces which are analyzed less than this level (<5,000 ug/g or<0.5%) are to be considered not to have lead-based paint, and are reported as **NEGATIVE**. This does not necessarily mean that there is no lead present in negative paint only that is below the EPA and HUD guidelines for a paint to be considered lead-based. All paint chip samples were analyzed by an accredited independent laboratory. Accreditation information can be found on the official laboratory results located in Appendix C.

Test locations for the current lead-based paint survey were chosen based upon the identification of distinct testing combinations. A testing combination is a unique combination of room equivalent (e.g. hallway, office, garage bay), building component type (e.g. wall, door casing, window sash), and substrate (e.g. concrete block, drywall, metal). Since visible paint color is not necessarily an accurate predictor of painting history, it is not included in the definition of testing combination. However, paint color may be taken into consideration when determining test locations. Each testing combination in each room equivalent, both inside and outside of the building, was then tested. The

test location selected for each specific testing combination was determined based upon the likelihood that all layers of paint would be represented in the test. Therefore, locations where the paint appears to be the thickest were ideally selected, and areas where paint was chipped or scraped away were avoided.

6.0 / Additional Information

Unlike the EPA and HUD which utilize 0.5% lead by weight as the lower limit lead concentration for paint to be considered lead-based, OSHA considers any lead content as a potential hazard. According to the OSHA *Lead in Construction Standard* (29 CFR 1926.62) and State of Michigan's Occupational Health Standard *Part 603 – Lead Exposure in Construction* (R 325.51991-51993), any paint, even those with a lead content below 0.5% lead by weight, that may produce large amounts of lead-containing construction dust must be handled in an appropriate manner. Therefore, materials painted with paint containing any level of lead are not necessarily safe to sand, demolish, or otherwise disturb them in manners that may produce dust.

Several surfaces tested as part of the current lead-based paint inspection were analyzed as "negative" for lead-based paint, according to the EPA and HUD 0.5% lead by weight guideline, but were analyzed to have some lead content. These surfaces, when treated in some abrasive and/or destructive manner, may still result in airborne lead-containing dust that exceeds OSHA standards. These surfaces should be handled appropriately during renovation activities.

Additional information concerning standards and regulations, safe remodeling procedures, or lead hazards may be obtained from the National Lead Information Clearing House at 1-800-424-LEAD (5323), the EPA Region V Office at 1-800-621-8431, or the Michigan Department of Community, Healthy Homes Section at 1-866-691-LEAD (5323).

7.0 / Signatures

Inspectors

Ms. Michelle Carriere	Arch Environmental Group
Name	Title/Company
Michelle Carriere	January 20, 2020
Signature	Date
Mr. Pedro Pacheco	Arch Environmental Group
Name	Title/Company
	January 20, 2020
Signature	Date

APPENDIX A

Site Map

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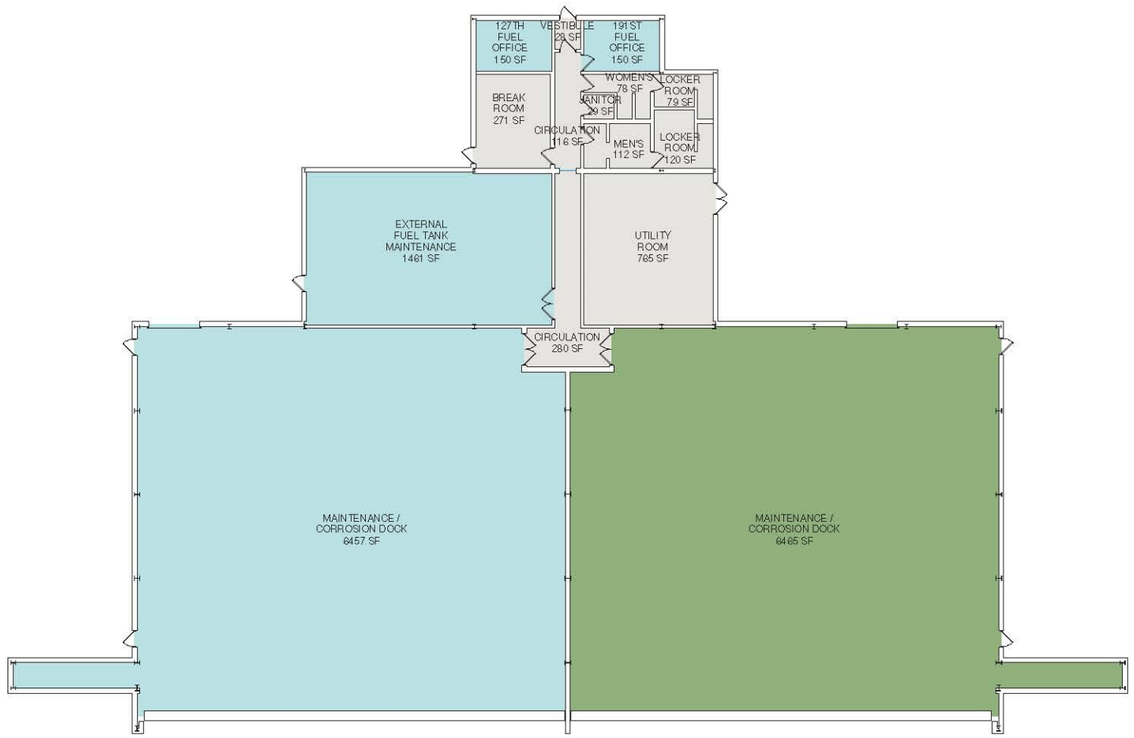

1 BUILDING 154 - EXISTING

1" = 30'-0"

APPENDIX B

Detailed List of Lead Paint by Functional Space

TABLE OF LEAD PAINT BY FUNCTIONAL SPACE

Floor	Functional Space	Material Description	Paint Color(s)	Results
1	127th Fuel Office - Room 2	Grey Paint on Metal Door	Grey	0.01%
1	127th Fuel Office - Room 2	Tan Paint on Metal Door	Tan	< 0.01%
1	127th Fuel Office - Room 2	White Paint on Cinder Block	White	< 0.01%
1	191st Fuel Office - Room 1	Tan Paint on Metal Door	Tan	< 0.01%
1	191st Fuel Office - Room 1	White Paint on Cinder Block	White	< 0.01%
1	Break Room	Cream Paint on Cinder Block Wall	Cream	< 0.01%
1	Break Room	Tan Paint on Metal Door	Tan	< 0.01%
1	East Maintenance/Corrosion Dock	Brown Paint on Metal Door	Brown	<0.01%
1	East Maintenance/Corrosion Dock	Cream Paint on Concrete Floor	Cream	< 0.01%
1	East Maintenance/Corrosion Dock	Cream Paint on Cinder Block Wall	Cream	< 0.01%
1	East Maintenance/Corrosion Dock	Cream Paint on Metal Air Duct	Cream	< 0.01%
1	East Maintenance/Corrosion Dock	Green Paint on Concrete Floor	Green	< 0.02%
1	East Maintenance/Corrosion Dock	Red Paint on Metal Door	Red	0.01%
1	Exterior of Bulding	Black Paint on Metal Door Casing	Black	0.73%
1	Exterior of Bulding	Cream Paint on Exterior Metal Siding	Cream	< 0.01%
1	Exterior of Bulding	Yellow Paint on Concrete Pillar	Yellow	6.35%
1	Exterior of Bulding	Yellow Paint on Metal Door Casing	Yellow	8.66%
1	External Fuel Tank Maintenance	Brown Paint on Metal Door	Brown	< 0.01%
1	External Fuel Tank Maintenance	Cream Paint on Concrete Floor	Cream	< 0.01%
1	External Fuel Tank Maintenance	Cream Paint on Cinder Block Wall	Cream	< 0.01%
1	External Fuel Tank Maintenance	Cream Paint on Metal Air Duct	Cream	< 0.01%
1	External Fuel Tank Maintenance	Green Paint on Concrete Floor	Green	< 0.02%
1	External Fuel Tank Maintenance	Red Paint on Metal Door	Red	0.01%
1	Hallway	Brown Paint on Metal Door	Brown	< 0.01%
1	Janitor Closet	Tan Paint on Metal Door	Tan	< 0.01%
1	Janitor Closet	White Paint on Cinder Block	White	< 0.01%
1	Mens Restroom and Locker Room	Cream Paint on Cinder Block Wall	Cream	< 0.01%
1	Mens Restroom and Locker Room	Tan Paint on Metal Door	Tan	< 0.01%
1	Utility Room	Cream Paint on Cinder Block Wall	Cream	< 0.01%
1	Utility Room	Cream Paint on Metal Air Duct	Cream	< 0.01%
1	Utility Room	Tan Paint on Metal Door	Tan	< 0.01%
1	Vestibule	Tan Paint on Metal Door	Tan	< 0.01%
1	Vestibule	White Paint on Cinder Block	White	< 0.01%
1	West Maintenance/Corrosion Dock	Brown Paint on Metal Door	Brown	< 0.01%
1	West Maintenance/Corrosion Dock	Cream Paint on Concrete Floor	Cream	< 0.01%
1	West Maintenance/Corrosion Dock	Cream Paint on Cinder Block Wall	Cream	< 0.01%
1	West Maintenance/Corrosion Dock	Cream Paint on Metal Air Duct	Cream	< 0.01%
1	West Maintenance/Corrosion Dock	Green Paint on Concrete Floor	Green	< 0.02%
1	West Maintenance/Corrosion Dock	Red Paint on Metal Door	Red	0.01%
1	Womens Restoom and Locker Room	Cream Paint on Cinder Block Wall	Cream	< 0.01%
1	Womens Restoom and Locker Room	Tan Paint on Metal Door	Tan	< 0.01%

APPENDIX C

Paint Chip Sample Results

LEAD PAINT CHIP SAMPLE ANALYSIS RESULTS

Client:	Tetra Tech, Inc.	**Samples Collected By:**	Ms. Michelle Carriere and Mr. Pedro Pacheco
Building:	Selfridge Building 154	**Sample Collection Date:**	December 16, 2019
Location:	Throughout	**Samples Analyzed By:**	Apex Research, Inc.
Project #:	AE190875	**Sample Analysis Date:**	December 26, 2019

Sample #	Sample Type	Sample Location	Results
AE190875-10	Cream Paint on Concrete Floor	East Maintenance & Corrosion Deck	<0.01%
AE190875-11	Cream Paint on Cinder Block Wall	East Maintenance & Corrosion Deck	<0.01%
AE190875-12	Cream Paint on Metal Air Duct	East Maintenance & Corrosion Deck	<0.01%
AE190875-13	Brown Paint on Metal Door	East Maintenance & Corrosion Deck	<0.01%
AE190875-14	Red Paint on Metal Door	East Maintenance & Corrosion Deck	<0.01%
AE190875-15	Green Paint on Concrete Floor	East Maintenance & Corrosion Deck	<0.02%
AE190875-37	Tan Paint on Metal Door	Men's Locker Room	<0.01%
AE190875-46	White Paint on Cinder Block	Janitor Closet	<0.01%
AE190875-49	Grey Paint on Metal Door	127th Fuel Office – Room 2	<0.01%
AE190875-55	Cream Paint on Exterior Metal Siding	Exterior of Building	<0.01%
AE190875-58	Yellow Paint on Concrete Pillar	Exterior of Building	6.35%
AE190875-59	Yellow Paint on Metal Door Casing	Exterior of Building	8.66%
AE190875-60	Black Paint on Metal Door Casing	Exterior of Building	<0.73%

Official Laboratory Results are attached.
Results are provided as a percentage (%) of lead by total weight.
Lead-Based Paint is defined by the EPA and HUD as "Paint or other surface coating that contains lead equal to or greater than 0.5 percent by weight."

Certificate of Analysis - Metals in Paint

Method: EPA SW846-7420M

Project: Selfridge ANG - Building 154

Project #: AE190875

Report to:
Mr. Pedro Pacheco
Arch Environmental Group, Inc.
37720 Interchange Dr.
Farmington Hills, MI 48335

ARL Report #: 19-L18078
Date Sampled: 12/16/19
Date Received: 12/24/19
Date Analyzed: 12/26/19
Date Reported: 12/27/19

Laboratory ID:	Client ID:	Reporting Limit:	Lead:
L18078-01	AE190875-010 E. Maintenance & Corrosion Deck, Concrete Floor - Cream	0.01%	**Pb** - < 0.01%
L18078-02	AE190875-011 E. Maintenance & Corrosion Deck, Cinderblock Wall - Cream	0.01%	**Pb** - < 0.01%
L18078-03	AE190875-012 E. Maintenance & Corrosion Deck, Metal Air Duct - Cream	0.01%	**Pb** - < 0.01%
L18078-04	AE190875-013 E. Maintenance & Corrosion Deck, Metal Door - Brown	0.01%	**Pb** - < 0.01%
L18078-05	AE190875-015 E. Maintenance & Corrosion Deck, Concrete Floor - Green	0.02%	**Pb** - < 0.02%
L18078-06	AE190875-014 E. Maintenance & Corrosion Deck, Metal Door - Red	0.01%	**Pb** - 0.01%
L18078-07	AE190875-037 Men's Locker Room, Metal Door - Tan	0.01%	**Pb** - < 0.01%
L18078-08	AE190875-046 Janitor Closet, Cinderblock - White	0.01%	**Pb** - < 0.01%
L18078-09	AE190875-049 127th Fuel Office, Room 2 Metal Door - Grey	0.01%	**Pb** - 0.01%
L18078-10	AE190875-055 Exterior of Building, Metal Siding - Cream	0.01%	**Pb** - < 0.01%
L18078-11	AE190875-058 Exterior of Building, Concrete Pillar - Yellow	0.01%	**Pb** - 6.35%
L18078-12	AE190875-059 Exterior of Building, Metal Door Casing - Yellow	0.01%	**Pb** - 8.66%
L18078-13	AE190875-060 Exterior of Building, Metal Door Casing - Black	0.01%	**Pb** - 0.73%

Reporting Limit of 0.01% is based on minimum sample weight of 100mg per our SOP, and may vary based on smaller sample size. APEX Research is not responsible for sample collection activities, and results apply to samples as received. Methods have been slightly modified. This certificate of analysis relates only to the samples tested and to ensure the integrity of the results, may only be reproduced in full. Liability limited to cost of analysis. APEX Research, Inc. (Laboratory ID# 227441) is accredited by the AIHA Laboratory Accreditation Programs, LLC (AIHA-LAP,LLC) in the Environmental Lead Laboratory Accreditation Program for Lead in Paint as documented by the Scope of Accreditation Certificate and associated Scope.

Robert T. Letarte Jr., Laboratory Director

Apex # **L18078**

APEX Research, Inc.

11054 Hi Tech Drive, Whitmore Lake, MI 48189. Phone: (734) 449 - 9990, Fax (734) 449 - 9991.
Web Site: http://apexresearch-inc.com. Email: Bob.Letarte@apexresearchlab.com

Customer Name: Arch Environmental Group, Inc.
Address: 37720 Interchange Drive
City, St., Zip: Farmington Hills, MI 48335
Phone: (248) 426-0165 Fax: (248) 427-0305

Date of Survey: 12/16/19
Project: SELFRIDGE ANG - BUILDING 154
Project # AE190875
Contact Person: PEDRO PACHECO / MICHELLE CARDIERE
Email: labs@archenvgroup.com

***Terms and conditions on the other side.*

Lab Use Only
Log-In:
Report:
Fax:
Verbal:
Email:

Turn Around Times: (Circle One)

Rush 24 hour
48 hour 72 hour
Other: TTP yes / no (Test Till Positive)

*Note: Test Till Positive for all asbestos bulk samples unless otherwise noted.

Asbestos: Bulk ___ Wipe ___ Point Count ___ PCM ___
Lead: Bulk ___ Wipe ___ Air ___ Paint ✓ Soil ___
Mold: Bulk ___ Tape ___ BioSIS ___ Other ___ Viable ___
TEM: Bulk/NOP ___ AHERA ___ EPA Level II ___ Other ___

Lab ID	Customer ID #	Material/Location	Volume	Area	Results
1	AE190875-010	CREAM PAINT ON CONCRETE FLOOR / EXT MAINTENANCE & CORROSION DECK			
2	011	CREAM PAINT ON CINDERBLOCK WALL / " "	" "		"
3	012	CREAM PAINT ON METAL AIR DUCT / " "	" "		"
4	013	BROWN PAINT ON METAL DOOR / " "	" "		"
5	015 ~~014~~	GREEN PAINT ON CONCRETE FLOOR / " "	" "		"
6	014 ~~015~~	RED PAINT ON METAL DOOR / " "	" "		"
7	037	TAN PAINT ON METAL DOOR / MEN'S LOCKER ROOM			
8	046	WHITE PAINT ON CINDER BLOCK / JANITOR CLOSET			
9	049	GREY PAINT ON METAL DOOR / 127TH FUEL OFFICE - ROOM 2			
10	055	CREAM PAINT ON EXT METAL SIDING / EXTERIOR OF BUILDING			
11	058	YELLOW PAINT ON CONCRETE PILLAR / EXTERIOR OF BUILDING			

Relinquished By: [signature]
Date: 12/20/19
Revision Date: June/2011

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Date:

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Date:

Apex # **L18078** Page 2

APEX Research, Inc.

11054 Hi Tech Drive, Whitmore Lake, MI 48189. Phone: (734) 449 - 9990, Fax (734) 449 - 9991.
Web Site: http://apexresearch-inc.com. Email: Bob.Letarte@apexresearchlab.com

Customer Name: Arch Environmental Group, Inc.
Address: 37720 Interchange Drive
City, St., Zip: Farmington Hills, MI 48335
Phone: (248) 426-0165 Fax: (248) 427-0305

Date of Survey: 12/16/19
Project:
Project # AE190875
Contact Person: Pedro P. / Michelle C.
Email: labs@archenvgroup.com

***Terms and conditions on the other side.*

Lab Use Only
Log-In:
Report:
Fax:
Verbal:
Email:

Turn Around Times: (Circle One)

Rush (24 hour) 48 hour 72 hour
Other: TTP (yes) / no (Test Till Positive)

*Note: Test Till Positive for all asbestos bulk samples unless otherwise noted.

Asbestos: Bulk ___ Wipe ___ Point Count ___ PCM ___
Lead: Bulk ___ Wipe ___ Air ___ Paint ✓ Soil ___
Mold: Bulk ___ Tape ___ BioSIS ___ Other ___ Viable ___
TEM: Bulk/NOP ___ AHERA ___ EPA Level II ___ Other ___

Lab ID		Customer ID #	Material/Location	Volume	Area	Results
12		AE190875 - 059	Yellow Paint on Metal Door Casing /	Exterior of Building		
13		060	Black Paint on Metal Door Casing /	Exterior of Building		

Relinquished By: [signature]
Date: 12/20/19
Revision Date: June/2011

Received By: B. Tu
Date:
Received @ APEX Research
12/24/19 8:39:15

Relinquished By:
Date:

Relinquished By:
Date:

APPENDIX D

Current Accreditation and Training Documents

Michelle Carriere

Accredited Lead Inspector, Lead Risk Assessor

State:	Michigan
Accreditation Number:	P-08507
Accreditation Expiration Date:	March 31, 2020
Training Provider:	ETC Training Services
Training Expiration Date:	March 31, 2022

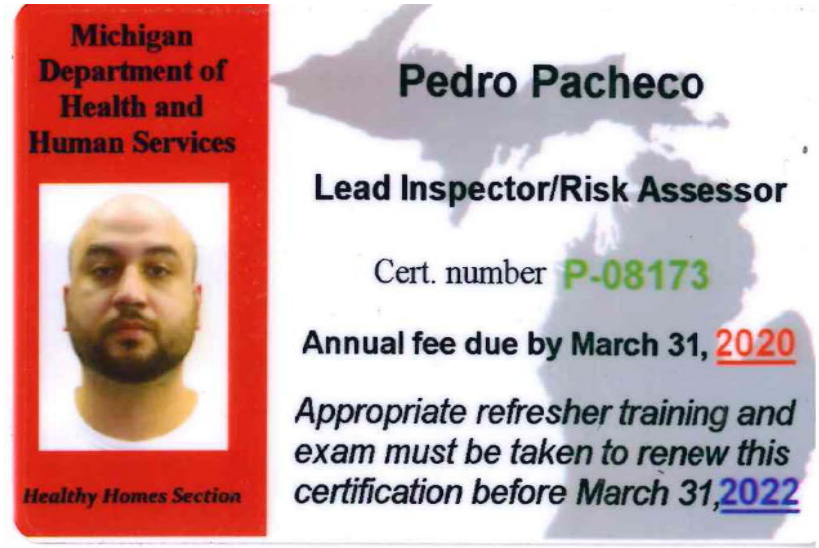
Signature: Michelle Carriere

Pedro Pacheco

Accredited Lead Inspector, Lead Risk Assessor

State:	Michigan
Accreditation Number:	P-08173
Accreditation Expiration Date:	March 31, 2020
Training Provider:	ETC Training Services Group
Training Expiration Date:	February 6, 2022

Signature: _____



APPENDIX E

Glossary of Relevant Terms

Glossary of Relevant Terms

Abatement: A measure or set of measures designed to permanently (minimum of 20 years) eliminate lead-based paint hazards or lead-based paint.

Bare Soil: Soil not covered with grass, sod, other similar vegetation, or paving, including sand in sandboxes or other play areas.

Building Component: A distinct structure found in or on a building. Examples of building components include: walls, doors, floors, window casings, window stools, exterior trim, downspouts, and porch columns.

Deteriorated paint: Any paint coating on a damaged or deteriorated surface or fixture, or any interior or exterior lead-based paint that is peeling, chipping, blistering, flaking, worn, chalking, alligatoring, cracking, or otherwise becoming separated from the substrate.

Drip Line/Foundation Area: The area within 3 feet out from the building wall and surrounding the perimeter of a building.

EPA: Refers to the United States Environmental Protection Agency.

Friction surface: Any interior or exterior surface, such as a window or stair tread, subject to abrasion or friction.

HUD: Refers to the United States Department of Housing and Urban Development.

Impact surface: An interior or exterior surface, such as doors, subject to damage by repeated impact or contact.

Interim controls: A set of measures designed to temporarily reduce human exposure or possible exposure to lead-based paint hazards.

Lead-Based Paint: Paint or other surface coating that contains lead equal to or greater than 1.0 mg/cm^2 or 0.5 percent by weight.

Lead-Based Paint Hazard: A condition in which exposure to lead from lead contaminated dust, lead contaminated soil, or deteriorated lead-based paint would have an adverse effect on human health, including:

- Dust Lead Hazard – Surface dust that contains a concentration of lead equal to or in excess of the established standards. Currently these are 40 ug/ft^2 for floors, 250 ug/ft^2 for window stools (sills), and 400 ug/ft^2 for window troughs (wells).
- Paint Lead Hazard – Lead-based paint that is deteriorated or damaged; lead-based paint on a friction surface that is subject to abrasion and where a dust lead hazard is present on the nearest horizontal surface (e.g., the window sill, or floor); lead-based paint on an impact surface that is deteriorated or damaged caused by impact from a related building component; lead-based paint on a chewable surface on which there is evidence of teeth marks.
- Soil Lead Hazard – Bare soil that contains a concentration of lead equal to or in excess of the established standards. Currently these are 400 ug/g for play areas and 1,200 ug/g for the rest of the yard.

OSHA: Refers to the Occupational Safety and Health Administration of the United States Department of Labor.

Room Equivalent: An identifiable, distinct part of a residence/building, including exterior areas. Closets are not typically considered a separate room equivalents. Examples of room equivalents include: classrooms, stairwells, hallways, kitchens, playgrounds, and porches.

Glossary of Relevant Terms (continued)

Side: Used to distinguish between sides of a room equivalent or entire building. For the purposes of the current inspection, Side A always identifies the address side or the side nearest Barfield Street. Side B, C, and D identify each consecutive side in a clockwise fashion.

Substrate: The material underneath the paint. For building components that have multiple layers of substrates, only the outermost layer is identified. Examples of substrates include: brick, concrete, drywall, wood, metal, and plaster.

Testing Combination: A unique combination of room equivalent, building component type, and substrate that should be tested separately.

Test Location: A specific area on a testing combination where either a paint-chip sample will be taken.

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SECTION 02 84 16

HANDLING OF LIGHTING BALLASTS AND LAMPS CONTAINING PCBs AND MERCURY

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.1000	Air Contaminants
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 270	EPA Administered Permit Programs: The Hazardous Waste Permit Program
40 CFR 273	Standards for Universal Waste Management
40 CFR 761	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
49 CFR 178	Specifications for Packagings

1.2 REQUIREMENTS

Removal and disposal of PCB containing lighting ballasts and associated mercury-containing lamps. Contractor may encounter leaking PCB ballasts.

1.3 DEFINITIONS

1.3.1 Certified Industrial Hygienist (CIH)

A industrial hygienist hired by the contractor shall be certified by the American Board of Industrial Hygiene.

1.3.2 Leak

Leak or leaking means any instance in which a PCB article, PCB container, or PCB equipment has any PCBs on any portion of its external surface.

1.3.3 Lamps

Lamp is defined as the bulb or tube portion of an electric lighting device. A lamp is specifically designed to produce radiant energy, most often in the ultraviolet, visible, and infra-red regions of the electromagnetic spectrum. Examples of common electric lamps include, but are not limited to, fluorescent, high intensity discharge, neon, mercury vapor, high pressure sodium, and metal halide lamps.

1.3.4 Polychlorinated Biphenyls (PCBs)

PCBs as used in this specification shall mean the same as PCBs, and all related items, as defined in 40 CFR 761, Section 3, Definitions.

1.3.5 Spill

Spill means both intentional and unintentional spills, leaks, and other uncontrolled discharges when the release results in any quantity of PCBs running off or about to run off the external surface of the equipment or other PCB source, as well as the contamination resulting from those releases.

1.3.6 Universal Waste

Universal Waste means any of the following hazardous wastes that are managed under the universal waste requirements 40 CFR 273:

(1) Batteries as described in Sec. 273.2 of this chapter;

(2) Pesticides as described in Sec. 273.3 of this chapter;

(3) Mercury containing equipment as described in Sec. 273.4 of this chapter; and

(4) Lamps as described in Sec. 273.5 of this chapter.

1.4 QUALITY ASSURANCE

1.4.1 Regulatory Requirements

Perform PCB related work in accordance with 40 CFR 761. Perform mercury-containing lamps storage and transport in accordance with 40 CFR 261, 40 CFR 264, 40 CFR 265, 40 CFR 273.

1.4.2 Training

Certified industrial hygienist (CIH) shall instruct and certify the

training of all persons involved in the removal of PCB containing lighting ballasts and mercury-containing lamps. The instruction shall include: The dangers of PCB and mercury exposure, decontamination, safe work practices, and applicable OSHA and EPA regulations. The CIH shall review and approve the PCB and Mercury-Containing Lamp Removal Work Plans.

1.4.3 Regulation Documents

Maintain at all times one copy each at the office and one copy each in view at the job site of 29 CFR 1910.1000, 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 265, 40 CFR 268, 40 CFR 270, 40 CFR 273 and of the Contractor removal work plan and disposal plan for PCB and for associated mercury-containing lamps.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-07 Certificates

Qualifications of CIH; G

Training Certification; G

PCB and Lamp Removal Work Plan; G

PCB and Lamp Disposal Plan; G

SD-11 Closeout Submittals

Transporter Certification of notification to EPA of their PCB waste activities and EPA ID numbers; G

Certification of Decontamination

Certificate of Disposal and/or recycling. Submit to the Government before application for payment within 30 days of the date that the disposal of the PCB and mercury-containing lamp waste identified on the manifest was completed.

1.6 ENVIRONMENTAL REQUIREMENTS

Use special clothing:

a. Disposable gloves (polyethylene)

b. Eye protection

c. PPE as required by CIH

1.7 SCHEDULING

Notify the Contracting Officer 20 days prior to the start of PCB and mercury-containing lamp removal work.

1.8 QUALITY ASSURANCE

1.8.1 Qualifications of CIH

Submit the name, address, and telephone number of the Industrial Hygienist selected to perform the duties in paragraph CERTIFIED INDUSTRIAL HYGIENIST. Submit training certification that the Industrial Hygienist is certified, including certification number and date of certification or re certification.

1.8.2 PCB and Lamp Removal Work Plan

Submit a job-specific plan within 20 calendar days after award of contract of the work procedures to be used in the removal, packaging, and storage of PCB-containing lighting ballasts and associated mercury-containing lamps. Include in the plan: Requirements for Personal Protective Equipment (PPE), spill cleanup procedures and equipment, eating, smoking and restroom procedures. The plan shall be approved and signed by the Certified Industrial Hygienist. Obtain approval of the plan by the Contracting Officer prior to the start of PCB and/or lamp removal work.

1.8.3 PCB and Lamp Disposal Plan

Submit a PCB and lamp Disposal Plan with 45 calendar days after award of contract. The PCB and Lamp Disposal Plan shall comply with applicable requirements of federal, state, and local PCB and Universal waste regulations and address:

a. Estimated quantities of wastes to be generated, disposed of, and recycled.

b. Names and qualifications of each Contractor that will be transporting, storing, treating, and disposing of the wastes. Include the facility location. Furnish two copies of EPA and state PCB and mercury-containing lamp waste permit applications and EPA identification numbers, as required.

c. Names and qualifications (experience and training) of personnel who will be working on-site with PCB and mercury-containing lamp wastes.

d. Spill prevention, containment, and cleanup contingency measures to be implemented.

e. Work plan and schedule for PCB and mercury-containing lamp waste removal, containment, storage, transportation, disposal and or recycling. Wastes shall be cleaned up and containerize daily.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 WORK PROCEDURE

Furnish labor, materials, services, and equipment necessary for the removal of PCB containing lighting ballasts, associated mercury-containing fluorescent lamps, and high intensity discharge (HID) lamps in accordance

with local, state, or federal regulations. Do not expose PCBs to open flames or other high temperature sources since toxic decomposition by-products may be produced. Do not break mercury containing fluorescent lamps or high intensity discharge lamps.

3.1.1 Work Operations

Ensure that work operations or processes involving PCB or PCB-contaminated materials are conducted in accordance with 40 CFR 761, 40 CFR 262 40 CFR 263, and the applicable requirements of this section, including but not limited to:

a. Obtaining suitable PCB and mercury-containing lamp storage sites.

b. Notifying Contracting Officer prior to commencing the operation.

c. Reporting leaks and spills to the Contracting Officer.

d. Cleaning up spills.

e. Inspecting PCB and PCB-contaminated items and waste containers for leaks and forwarding copies of inspection reports to the Contracting Officer.

f. Maintaining inspection, inventory and spill records.

3.2 PCB SPILL CLEANUP REQUIREMENTS

3.2.1 PCB Spills

Immediately report to the Contracting Officer any PCB spills.

3.2.2 PCB Spill Control Area

Rope off an area around the edges of a PCB leak or spill and post a "PCB Spill Authorized Personnel Only" caution sign. Immediately transfer leaking items to a drip pan or other container.

3.2.3 PCB Spill Cleanup

40 CFR 761, subpart G. Initiate cleanup of spills as soon as possible, but no later than 24 hours of its discovery. Mop up the liquid with rags or other conventional absorbent. The spent absorbent shall be properly contained and disposed of as solid PCB waste.

3.2.4 Records and Certification

Document the cleanup with records of decontamination in accordance with 40 CFR 761, Section 125, Requirements for PCB Spill Cleanup. Provide test results of cleanup and certification of decontamination.

3.3 REMOVAL

3.3.1 Ballasts

As ballast are removed from the lighting fixture, inspect label on ballast. Ballasts without a "No PCB" label shall be assumed to contain PCBs and containerized and disposed of as required under paragraphs STORAGE FOR DISPOSAL and DISPOSAL. If there are less than 1600 "No PCB" labeled

lighting ballasts, dispose of them in accordance with 40 CFR 761.

3.3.2 Lighting Lamps

Remove lighting tubes/lamps from the lighting fixture and carefully place (unbroken) into appropriate containers (original transport boxes or equivalent). In the event of a lighting tube/lamp breaking, sweep and place waste in double plastic taped bags and dispose of as universal waste as specified herein.

3.4 STORAGE FOR DISPOSAL

3.4.1 Storage Containers for PCBs

49 CFR 178. Store PCB in containers approved by DOT for PCB.

3.4.2 Storage Containers for lamps

Store mercury containing lamps in appropriate DOT containers. The boxes shall be stored and labeled for transport in accordance with 40 CFR 273.

3.4.3 Labeling of Waste Containers

Label with the following:

a. Date the item was placed in storage and the name of the cognizant activity/building.

b. "Caution Contains PCB," conforming to 40 CFR 761, CFR Subpart C. Affix labels to PCB waste containers.

c. Label mercury-containing lamp waste in accordance with 40 CFR 273. Affix labels to all lighting waste containers.

3.5 DISPOSAL

Dispose of off Government property in accordance with EPA, DOT, and local regulations at a permitted site.

3.5.1 Identification Number

Federal regulations 40 CFR 761, and 40 CFR 263 require that generators, transporters, commercial storers, and disposers of PCB waste posses U.S. EPA identification numbers. The contractor shall verify that the activity has a U.S. EPA generator identification number for use on the Uniform Hazardous Waste manifest. If not, the contractor shall advise the activity that it must file and obtain an I.D. number with EPA prior to commencement of removal work. For mercury containing lamp removal, Federal regulations 40 CFR 273 require that large quantity handlers of Universal waste (LQHUW) must provide notification of universal waste management to the appropriate EPA Region (or state director in authorized states), obtain an EPA identification number, and retain for three years records of off-site shipments of universal waste. The contractor shall verify that the activity has a U.S. EPA generator identification number for use on the Universal Waste manifest. If not, the contractor shall advise the activity that it must file and obtain an I.D. number with EPA prior to commencement of removal work.

3.5.2 Transporter Certification

Comply with disposal and transportation requirements outlined in 40 CFR 761 and 40 CFR 263. Before transporting the PCB waste, sign and date the manifest acknowledging acceptance of the PCB waste from the Government. Return a signed copy to the Government before leaving the job site. Ensure that the manifest accompanies the PCB waste at all times. Submit transporter certification of notification to EPA of their PCB waste activities (EPA Form 7710-53).

3.5.2.1 Certificate of Disposal and/or Recycling

40 CFR 761. Certificate for the PCBs and PCB items disposed shall include:

a. The identity of the disposal and or recycling facility, by name, address, and EPA identification number.

b. The identity of the PCB waste affected by the Certificate of Disposal including reference to the manifest number for the shipment.

c. A statement certifying the fact of disposal and or recycling of the identified PCB waste, including the date(s) of disposal, and identifying the disposal process used.

d. A certification as defined in 40 CFR 761.

-- End of Section --

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must provide a 4-20 mAdc output signal to the programmable logic controller, proportional to the measured parameter. The controller must be provided with an internal battery to maintain operation for a minimum of 12 hours if power is lost.

2.4.2.2 Temperature Switch

All devices must be suitable for process temperatures, which define the exposure of the element, and as described in the table shown on the drawings. Temperature switch must have a repetitive accuracy of plus or minus 1 percent of the operating ranges shown. Switch actuation must be adjustable over the operating temperature range. The switch must have Form C snap action contacts, rated in accordance with NEMA ICS 1.

2.4.2.3 Thermocouple

Thermocouple must be factory assembled with Series 300 stainless steel sheathing. Wiring insulation must be magnesium oxide. Minimum insulation resistance wire to wire or wire to sheath must be 1.5 megohm at 500 V dc. Thermocouple must be Type K,or Type J, . Thermocouple error must not exceed that specified in IEC 60584-1. All wire/cable from thermocouple to transmitter must be of the type necessary to match the thermocouple used. Transmitter selected must match the type of thermocouple provided. The transmitter must include automatic cold junction reference compensation with span and offset adjustments, and upscale open thermocouple detection.

2.4.2.4 Thermowell

Thermowell must be monel, brass, or copper for use in water lines; wrought iron for measuring flue gases; and austenitic stainless steel for other applications. Calibrated thermowells must be provided with threaded plug and chain, 2 inch lagging neck and inside diameter insertion neck as required for the application. The thermowell must include a connection box, sized to accommodate the temperature sensing devise.

2.5 CONTROL PANELS

2.5.1 Components

2.5.1.1 Enclosures

The enclosure for each control panel must conform to the requirements of NEMA 250 for the types specified. Finish color must be the manufacturer's standard, unless otherwise indicated. Enclosures for installation in mechanical equipment rooms must be Type 4; those for installation in clean, dry indoor occupied space may be Type 1; other locations must be as otherwise specified or shown. Enclosures for equipment installed outdoors must be Type 4 or as shown. Enclosures for installation in a corrosive environment must be Type 4X and must be constructed of stainless steel . Painted steel must not be allowed for use in a corrosive environment. Enclosure must be provided with a single, continuously hinged exterior door with print pocket, 3-point latching mechanism and key lock and a single, continuously hinged interior door.

2.5.1.2 Standard Indicator Light

Indicator lights showing on, off, stand-by, automatic, manual depending on the application must comply with NEMA ICS 1, NEMA ICS 2 and UL 508. Lights must be heavy duty, round and must mount in a 0.875 inch mounting hole.

Indicator lights must be LED type and must operate at 120 VAC or 24 VDC. Long life bulbs must be used. Indicator light must be provided with a legend plate labeled as shown on the drawings. Lens color must be as indicated on the drawings. Lights must be push to test (lamp) type.

2.5.1.3 Selector Switches

Selector switches must comply with NEMA ICS 1, NEMA ICS 2 and UL 508. Selector switches must be heavy duty, round and must mount in a 0.875 inch mounting hole. The number of positions must be as indicated on the drawings. Switches must be illuminated or non-illuminated. Switches must be rated for 600 volts, 10 amperes continuous. Selector switches must be provided with a legend plate labeled as shown on the drawings. Where indicated or required, dual auxiliary contacts must be provided for the automatic position to provide position sensing at the central station or workstation. Auxiliary contacts must be rated for 120 VAC, 1A as a minimum. Where indicated on the drawings, switches must be key operated. All keys must be identical.

2.5.1.4 Push Buttons

Push buttons must comply with NEMA ICS 1, NEMA ICS 2 and UL 508. Push buttons must be heavy duty, round and must mount in a 22.5 mm 0.875 inch mounting hole. The number and type of contacts must be as indicated on the drawings or required by the Sequence of Control. Push buttons must be rated for 600 volts, 10 amperes continuous. Push buttons must be provided with a legend plate labeled as shown on the drawings.

2.5.1.5 Relays

Relays must comply with NEMA ICS 5 and derated for altitude above 1,500 m. Relays must be double-pole, double-throw (DPDT) . Relay coil must be 120 VAC and must be provided with matching mounting socket. Power consumption must not be greater than 3 watts. Coils must have a minimum current rating of 20 amps and minimum voltage rating of 120 volts. Contacts must have a minimum current rating of 10 amps and minimum voltage rating of 120 volts.

2.5.1.6 Terminal Blocks

Terminal blocks must comply with NEMA ICS 4 and UL 1059. Terminal blocks for conductors exiting control panels must be two-way type with double terminals, one for internal wiring connections and the other for external wiring connections. Terminal blocks must be made of bakelite or other suitable insulating material with full deep barriers between each pair of terminals. A terminal identification strip must form part of the terminal block and each terminal must be identified by a number in accordance with the numbering scheme on the approved wiring diagrams.

2.5.1.7 Alarm Horns

Alarm horns must be provided where indicated on the drawings. Horns must be vibrating type and must comply with UL 508. Horns must provide 100 dB at 10 feet. Exterior mounted horns must be weather proof by design or must be mounted in a weather proof enclosure that does not reduce the effectiveness of the horn.

2.5.2 Panel Assembly

Control panels must be factory assembled and shipped to the jobsite as a

single unit. Panels must be fabricated as indicated and devices must be mounted as shown or required. Each panel must be fabricated as a bottom-entry connection point for process control system electrical power, process control system wiring, communications system wiring to other control panels .

2.5.3 Electrical Requirements

Each panel must be powered by a dedicated 120 volts ac circuit, with a fuse, 10 amp , and a disconnect switch located inside the panel. Wiring must terminate inside the panel on terminal blocks. Electrical work must be as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM and as shown on the drawings.

2.5.4 Power Line Conditioner

Each control panel must be provided with a power line conditioner to provide both voltage regulation and noise rejection. The power line conditioner must be of the ferro-resonant design, with no moving parts and no tap switching, while electrically isolating the secondary from the power line side. The power line conditioner must be sized for 125 percent of the actual connected kva load. Characteristics of the power line conditioner must be as follows:

2.5.4.1 85 Percent Load

At 85 percent load, the output voltage shall not deviate by more than plus or minus 1 percent of nominal voltage when the input voltage fluctuates between minus 20 percent to plus 10 percent of nominal voltage.

2.5.5 Grounding

Control panel enclosures must be equipped with a solid copper ground bus or equivalent. The ground bus must be securely anchored to the enclosure so as to effectively ground the entire structure. Clamp-type terminals sized large enough to carry the maximum expected current must be provided on the ground bus for grounding cables. Where a definite circuit ground is required, a single wire not less than #10 AWG must run independently to the panel ground bus and must be fastened to the ground bus with a bolted terminal lug. Cases of instruments, relays and other devices must be effectively grounded through the enclosures steel structure unless otherwise indicated. Insulated wiring having a continuous rated current of not less than the circuit fuse rating must be used for grounding. Grounding terminals of power receptacles must be solidly grounded to the panel enclosure.

2.5.6 Convenience Outlet

A 120 volt ac, 20 amp, ground fault interruption (GFI) type duplex convenience outlet must be provided inside the panel. The outlet circuit must be separate from the panel power circuit.

2.6 DATA COMMUNICATION REQUIREMENTS

Process control system data communications must support the specified functions and process control system configuration shown on the drawings.

2.6.1 EMCS Communications

Each control panel must be able to communicate with the building EMCS. Provide ALC communications modules compatible with EMCS. Refer to 25 10 10 UTILITY MONITORING AND CONTROL SYSTEM (UMCS) FRONT END AND INTEGRATION.

2.7 FACTORY TEST

The process control system must be tested at the factory prior to shipment. Written notification of planned testing must be given to the Government at least 21 days prior to testing, and in no case must notice be given until after the Contractor has received written Government approval of the test procedures.

2.7.1 Factory Test Setup

Assemble and integrate the factory test setup as specified to prove that performance of the system satisfies all requirements of this project, including system communications requirements in accordance with the approved test procedures. The factory test must take place during regular daytime working hours on weekdays. Equipment used must be the same equipment that is to be delivered to the site. The factory test setup must include the following:

Factory Test	
control panel	not less than two control panels: at least one of each type used in the system plus at least one per
test set	one of each type
portable tester	one of each type
communications circuits	one of each type and speed to be utilized in the proposed system including bridges, modems, encoder/decoders, transceivers and repeaters
surge protection equipment	for power, communications, I/O functions and networks
I/O functions	sufficient to demonstrate the I/O capability and system normal operation

2.7.2 Factory Test Procedure

Test procedures must define the tests required to ensure that the system meets technical, operational, and performance requirements. The test procedures must define location of tests, milestones for the tests, and identify simulation programs, equipment, personnel, facilities, and supplies required. Provide for testing all process control system capabilities and functions specified and shown. Cover actual equipment and sequences to be used for the specified project and include detailed instructions for test setup, execution, and evaluation of test results. The test reports must document results of the tests. Surge testing need not be conducted acceptable documented proof can be provided that such

testing has been satisfactorily demonstrated to the Government with identical surge protection applied. The procedures must include the following:

	Test Procedure
equipment	block diagram
hardware and software	descriptions
commands	operator commands
I/O functions	test database points with failure modes
passwords	required for each operator access level
each type of digital and analog point in the test	description
test equipment	list
surge protection	circuit diagrams
inputs required (I/O point values and status) and corresponding expected results of each set of input	for each application program
default values	for the application program inputs not implemented or provided for in the contract documents for the application programs to be tested

2.7.3 Factory Test Report

Submit original copies of data produced during the factory test, including results of each demonstration procedure within 7 days after completion of each test. Arrange the report so that commands, responses, and data acquired are correlated to allow logical interpretation of the data.

PART 3 EXECUTION

3.1 FACTORY TEST

Perform factory testing of the System as specified. The Contractor is responsible for providing personnel, equipment, instrumentation, and supplies necessary to perform required testing. Provide written notification of planned testing to the Government at least 21 days prior to testing, and do not give this notice until after receiving written Government approval of the specific Factory Test Procedures. Provide Factory Test Procedures which define the tests required to ensure that the system meets technical, operational, and performance specifications. Within the Procedures define location of tests, milestones for the tests, and identify simulation programs, equipment, personnel, facilities, and supplies required. Provide procedures which test all capabilities and functions specified and indicated. Perform the Factory Test using equipment and software of the same manufacturer, model and revision as will

be used for the specified project. Include detailed instructions for test setup, execution, and evaluation of test results in the Procedures. Upon completion of the test, prepare a Factory Test Report, documenting the results of the Test, and submit it as specified. This report must be approved before any equipment is shipped.

Perform the Factory Test and provide Factory Test Submittals as shown in TABLE II. FACTORY TEST SEQUENCING.

TABLE II FACTORY TEST SEQUENCING

ITEM #	DESCRIPTION	SEQUENCING (START of ACTIVITY or DEADLINE FOR SUBMITTAL)
1	Submit Factory Test Procedure	14 days after notice to Proceed
2	Perform Factory Test	After Approval of #1
3	Submit Factory Test Report	14 days After Completion of #2

3.2 EQUIPMENT INSTALLATION REQUIREMENTS

3.2.1 Installation

Install system components and appurtenances in accordance with the manufacturer's instructions and provide necessary interconnections, services, and adjustments required for a complete and operable system. Adjust or replace devices not conforming to the required accuracies. Replace factory sealed devices, rather than adjusting. Installation, adjustment, and operation of the equipment specified must be supervised by a manufacturer's representative experienced in the installing, adjusting, and testing of the equipment.

a. Install instrumentation and communication equipment and cable grounding as necessary to preclude ground loops, noise, and surges from adversely affecting system operation.

b. Install wiring in exposed areas, including low voltage wiring, in rigid conduit as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Wiring in air plenum areas installed without conduit must be plenum-rated in accordance with NFPA 70.

c. Submit detail drawings containing complete wiring, and schematic diagrams and any other details required to demonstrate that the system has been coordinated and will properly function as a unit. Piping and Instrumentation (P&ID) drawings (prepared using industry recognized device symbols, clearly defined and describing piping designations to define the service and materials of individual pipe segments and instrument tags employing Instrument Society of America suggested identifiers). Include in the Drawings, as appropriate: product specific catalog cuts; a drawing index; a list of symbols; a series of drawings for each process control system using abbreviations, symbols, nomenclature and identifiers as shown; valve schedules; compressed instrument air station schematics and ASME air storage tank certificates for each type and make of compressed instrument air

station.

3.2.1.1 Isolation, Penetrations and Clearance from Equipment

Dielectric isolation must be provided where dissimilar metals are used for connection and support. Penetrations through and mounting holes in the building exteriors must be made watertight. Holes in concrete, brick, steel and wood walls must be drilled or core drilled with proper equipment; conduits installed through openings must be sealed with materials which are compatible with existing materials. Openings must be sealed with materials which meet the requirements of NFPA 70 and Section 07 84 00 FIRESTOPPING. Installation must provide clearance for control-system maintenance. Process control system installation must not interfere with the clearance requirements for mechanical and electrical system maintenance.

3.2.1.2 Device Mounting

Devices must be installed in accordance with manufacturers' recommendations and as shown. Control devices to be installed in piping must be provided with required gaskets, flanges, thermal compounds, insulation, piping, fittings, and manual valves for shutoff, equalization, purging, and calibration. Any deviations must be documented and submitted to the Government for approval prior to mounting. Damaged insulation must be replaced or repaired after devices are installed to match existing work. Damaged galvanized surfaces must be repaired by touching up with zinc paint.

3.2.1.3 Grooved Mechanical Joints

Grooves must be prepared according to the coupling manufacturer's instructions. Grooved fittings, couplings, and grooving tools must be the products of the same manufacturer. Pipe and groove dimensions must comply with the tolerances specified by the coupling manufacturer. The diameter of grooves made in the field must be measured using a "go/no-go" gauge, vernier or dial caliper, narrow-land micrometer, or other method specifically approved by the coupling manufacturer for the intended application. Groove width and dimension of groove from end of pipe must be measured and recorded.

3.2.2 Sequences of Operation

Study the operation and sequence of local equipment controls, as a part of the conditions report, and note any deviations from the described sequences of operation on the contract drawings. Perform necessary adjustments to make the equipment operate in an optimum manner and must fully document changes made.

3.3 INSTALLATION OF EQUIPMENT

Install equipment as specified, as shown and as required in the manufacturer's instructions for a complete and fully operational control system.

3.3.1 Control Panels

Control panels must be located as indicated on the drawings. Devices located in the control panels must be as shown on the drawings or as needed to provide the indicated control sequences.

3.3.2 Level Instruments

3.3.2.1 Liquid Level Sensor (Bubble Type)

The air pressure regulating valve, air filter, moisture trap, air flow adjustment valve, level gauge, air isolation valve and pressure transducer must be mounted on a panel where indicated on the drawings. The level gauge must be labeled to identify the tank being measured. The isolation valve must be located in the air supply line upstream of the moisture trap, air filter and pressure regulator. The air inlet line to the dip tube and the dip tube must be mounted to a flange at the top of the tank. The dip tube must extend to the bottom of the tank, leaving the manufacturer's recommended clearance between the dip tube and tank bottom. The dip tube material must be compatible with the tank contents. The pressure regulating valve must be adjusted to the outlet pressure recommended by the manufacturer. Where exposed, the air supply line to the tank and from the tank to the level gauge and pressure transducer must be protected from damage.

3.3.2.2 Capacitance Liquid Level Sensors

The sensing probes must be located close to, and parallel with, the tank or sump wall.

3.3.2.3 Conductivity Level Switch

Level switches must be installed vertically and in accordance with the manufacturer's instructions. Switches must be accessible for maintenance and calibration. In applications where switches cannot be directly mounted to a tank by the threaded or flanged connection, a mounting bracket must be provided for connection to the inside tank wall, maintaining the minimum recommended distance from the tank fill opening.

3.3.2.4 Mercury Float Switches

Switches must be mounted in accordance with manufacturer's published instructions. Procedures must be those used for equipment in hazardous locations.

3.3.2.5 Ultrasonic Level Sensor

Sensor must be installed vertically in the top of the tank and in accordance with the manufacturer's instructions. Switches must be accessible for maintenance and calibration. In applications where switches cannot be directly mounted to a tank by the threaded or flanged connection, a mounting bracket must be provided for connection to the inside tank wall. Sensor must be positioned to maximize the return echo signal and minimize vessel obstructions in the sensors line of sight. The minimum recommended distance from the tank fill opening and from the side of the tank must be maintained.

3.3.3 Temperature Instrument Installation3.3.3.1 RTD

RTD must be installed in a thermowell. Thermowells must be filled with conductive heat transfer fluid prior to installation of the RTD in the thermowell. RTDs used for space temperature sensing must include a housing suitable for wall mounting. RTDs used for outside air sensing must have an instrument shelter or sun shield as shown to minimize solar effects, and must be mounted to minimize building effects. RTD assemblies must be

readily accessible and installed to allow easy replacement.

3.3.3.2 Temperature Switches

Temperature switches must be installed as specified for RTDs. Temperature switches must be adjusted to the proper setpoint and must be verified by calibration. Switch contact ratings and duty must be selected for the application.

3.3.3.3 Thermocouples

Each thermocouple must be installed in a protective tube or in a thermowell. Thermocouples must be insulated from ambient temperature effects. Thermocouple wires must not be installed in the same conduits as power wiring. Thermocouples must not be used for measuring temperatures below 500 degrees F.

3.3.4 Electric Power Devices

3.3.5 Output Devices

Output devices (transducers, relays, contactors, or other devices) which are not an integral part of the control panel, must be mounted in an enclosure mounted adjacent to the control panel, unless otherwise shown. Where H-O-A and/or override switches on the drawings or required by the control sequence, the switches must be installed so that the process control system controls the function through the automatic position and other controls work through the hand position.

3.3.6 Enclosures

All enclosure penetrations must be from the bottom of the enclosure, and must be sealed to preclude entry of water using a silicone rubber sealant.

3.4 WIRE, CABLE AND CONNECTING HARDWARE

3.4.1 LAN Cables and Connecting Hardware

LAN cables and connecting hardware must be installed in accordance with Section 27 10 00 BUILDING TELECOMMUNICATIONS CABLING SYSTEM and Section 33 82 00 TELECOMMUNICATIONS OUTSIDE PLANT (OSP).

3.4.2 Sensor Wiring

Metering and sensor wiring must be installed in accordance with the requirements of ANSI C12.1, NFPA 70, Section 33 71 02 UNDERGROUND ELECTRICAL DISTRIBUTION and Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM.

3.4.2.1 Power Line Surge Protection

Control panels must be protected from power line surges. Protection must meet the requirements of IEEE C62.41.1 and IEEE C62.41.2. Fuses must not be used for surge protection.

3.4.2.2 Sensor and Control Wiring Surge Protection

Digital and analog inputs must be protected against surges induced on control and sensor wiring. Protect binary and analog outputs against surges induced on control and sensor wiring installed outdoors and as

shown. Fuses must not be used for surge protection. Test the inputs and outputs in both the normal and common mode using the following two waveforms: The first waveform must be 10 microseconds by 1000 microseconds with a peak voltage of 1500 volts and a peak current of 60 amperes. The second waveform must be 8 microseconds by 20 microseconds with a peak voltage of 1000 volts and a peak current of 500 amperes. Submit certified test results for surge protection.

3.5 CONTROL DRAWINGS

3.5.1 Control

Control drawings, framed, non-fading half-size in laminated plastic , must be provided for equipment furnished and for interfaces to equipment at each respective equipment location. Condensed operating instructions explaining preventive maintenance procedures, methods of checking the system for normal safe operation and procedures for safely starting and stopping the system manually must be prepared in typed form, framed as specified for the instrumentation and control diagrams and posted beside the diagrams. Diagrams and instructions must be submitted prior to posting. The framed instructions must be posted before acceptance testing of the system.

3.5.2 Contractor Design Drawings

Contractor Design Drawings as a single complete package:
two hard copies and one copy in electronic form. As a minimum they must include wiring, logic, and layout. Submit hardcopy drawings on ISO A1 841 by 594 mm 34 by 22 inchesorA3 420 by 297 mm 17 by 11 inches sheets, and electronic drawings in PDF and in AutoCAD format. In addition, submit electronic drawings in editable Excel format for all drawings that are tabular, including but not limited to the Point Schedule and Equipment Schedule. Contractor Design Drawings must be approved prior to any fabrication.

3.5.2.1 Final As-Built

Final As-Built Drawings as a single complete package: two hard copies and one copy in electronic form. Submit hardcopy drawings on ISO A1 841 by 594 mm 34 by 22 inchesorA3 420 by 297 mm 17 by 11 inches sheets, and electronic drawings in PDF and in AutoCAD format. In addition, submit electronic drawings in editable Excel format for all drawings that are tabular, including but not limited to the Point Schedule and Equipment Schedule.

3.5.3 Points Schedule

Provide a Points Schedule in tabular form for each system, with the indicated columns and with each row representing a hardware point, network point or configuration point in the system.

a. When a Points Schedule was included in the Contract Drawing package, use the same fields as the Contract Drawing with updated information in addition to the indicated fields.

b. When Point Schedules are included in the contract package, items requiring contractor verification or input have been shown in angle brackets ("<" and ">"), such as <___> for a required entry or <value> for a value requiring confirmation. Complete all items in brackets as well as any blank cells. Do not modify values which are not in brackets without approval. Points Schedule Columns must include:

3.5.3.1 Point Name

The abbreviated name for the point using the indicated naming convention.

3.5.3.2 Description

A brief functional description of the point such as "Supply Air Temperature".

3.5.3.3 DDC Hardware Identifier

The Unique DDC Hardware Identifier shown on the DDC Hardware Schedule and used across all drawings for the DDC Hardware containing the point.

3.5.3.4 Settings

The value and units of any setpoints, configured setpoints, configuration parameters, and settings related to each point.

3.5.3.5 Range

The range of values, including units, associated with the point, including but not limited to setpoint adjustment range, a sensor measurement range, or the status of a safety.

3.5.3.6 Input or Output (I/O) Type

The type of input or output signal associated with the point. Use the following abbreviations for entires in this column:

a. BI: The value comes from a hardware (physical) Binary Input

b. BO: The value is output as a hardware (physical) Binary Output

c. NET-OUT: The value is provided to another controller over the network.
Use this entry only when the value is transmitted to another device as part of scheduling or as part of a sequence of operation, not when the value is transmitted on the network for supervisory functions such as trending, alarming, override or display at a user interface.

3.5.3.7 Network Data Exchange Information

(Gets Data From, Sends Data To) Provide the DDC Hardware Identifier of other DDC Hardware the point is shared with.

3.5.3.8 Alarm Information

Indicate the Alarm Generation Type.

3.6 FIELD TESTING AND ADJUSTING EQUIPMENT

Provide personnel, equipment, instrumentation, and supplies necessary to perform site testing. The Government will witness the PVT, and written permission must be obtained from the Government before proceeding with the testing. Original copies of data produced, including results of each test procedure, during PVT must be turned over to the Government at the conclusion of each phase of testing prior to Government approval of the test. The test procedures must cover actual equipment and functions

specified for the project.

3.6.1 Testing, Adjusting and Commissioning

After successful completion of the factory test as specified, the Contractor will be authorized to proceed with the installation of the system equipment, hardware, and software. Once the installation has been completed, tested, adjusted, and commissioned each control loop and system in accordance with NIST SP 250 and must verify proper operation of each item in the sequences of operation, including hardware and software. Calibrate field equipment, including control devices, adjust control parameters and logic (virtual) points including control loop setpoints, gain constants, constraints, and verify data communications before the system is placed online. Test installed ground rods as specified in IEEE 142 and submit certification stating that the test was performed in accordance with IEEE 142. Calibrate each instrumentation device connected to the process control system control network by making a comparison between the reading at the device and from the EMCS, using a standard at least twice as accurate as the device to be calibrated. Check each control point within the process control system control network by making a comparison between the control command at the central station and field-controlled device. One log must be provided showing concurrent samples taken once a minute for a total of 4 hours. One log must be provided showing concurrent samples taken once every 30 minutes, for a total of 24 hours. Verify operation of systems in the specified failure modes upon Process control system network failure or loss of power, and verify that systems return to process control system control automatically upon a resumption of process control system network operation or return of power. Deliver a report describing results of functional tests, diagnostics, calibrations and commissioning procedures including written certification to the Government that the installed complete system has been calibrated, tested, adjusted and commissioned and is ready to begin the PVT. The report must also include a copy of the approved PVT procedure.

3.6.2 Performance Verification Test (PVT)

Submit test procedures for the PVT. The test procedure must describe all tests to be performed and other pertinent information such as specialized test equipment required and the length of the PVT. The test procedures must explain, in detail, step-by-step actions and the expected results, to demonstrate compliance with all the requirements of the drawings and this specification. The test procedure must be site specific and based on the inputs and outputs, required calculated points and the sequence of control. Refer to the actions and expected results to demonstrate that the process control system performs in accordance with the sequence of control. Include a list of the equipment to be used during the testing plus manufacturer's name, model number, equipment function, the date of the latest calibration and the results of the latest calibration.

Demonstrate that the completed Process control system complies with the contract requirements. All physical and functional requirements of the project including communication requirements must be demonstrated and shown. Demonstrate that each system operates as required in the sequence of operation. The PVT as specified must not be started until after receipt of written permission by the Government, based on the written report including certification of successful completion of testing, adjusting and commissioning as specified, and upon successful completion of training as specified. Upon successful completion of the PVT, furnish test reports and other documentation.

3.6.3 Endurance Test

Use the endurance test to demonstrate the overall system reliability of the completed system. The endurance test must be conducted in phases. The endurance test must not be started until the Government notifies the Contractor in writing that the PVT is satisfactorily completed, training as specified has been completed, outstanding deficiencies have been satisfactorily corrected, and that the Contractor has permission to start the endurance test. Provide an operator to man the system 8 hours per day during daytime operations, including weekends and holidays, The Government may terminate testing at any time when the system fails to perform as specified. Upon termination of testing by the Government or by the Contractor, commence an assessment period as described for Phase II. Upon successful completion of the endurance test, deliver test reports and other documentation, as specified, to the Government prior to acceptance of the system.

3.6.3.1 Phase I (Testing)

The test must be conducted 24 hours per day, 7 days per week, for 7 consecutive calendar days, including holidays, and the system must operate as specified. Make no repairs during this phase of testing unless authorized by the Government in writing.

3.6.3.2 Phase II (Assessment)

After the conclusion of Phase I, identify failures, determine causes of failures, repair failures, and deliver a written report to the Government. The report must explain in detail the nature of each failure, corrective action taken, results of tests performed, and must recommend the point at which testing should be resumed. After delivering the written report, convene a test review meeting at the job site to present the results and recommendations to the Government. The meeting must not be scheduled earlier than 5 business days after receipt of the report by the Government. As a part of this test review meeting, demonstrate that failures have been corrected by performing appropriate portions of the performance verification test. The Government reserves the right to cancel the test review meeting if no failures or deficiencies occur during the Phase I testing. If the Government chooses to do so, the Contractor will be notified in writing. Based on the Contractor's report and the test review meeting, the Government will determine if retesting is necessary and the restart point. The Government reserves the right to require that the Phase I test be totally or partially rerun. Do not commence any required retesting until after receipt of written notification by the Government. After the conclusion of any retesting which the Government may require, the Phase II assessment must be repeated as if Phase I had just been completed.

3.6.3.3 Exclusions

The Contractor will not be held responsible for failures resulting from the following: Outage of the main power supply in excess of the capability of any backup power source, provided that the automatic initiation of all backup sources was accomplished and that automatic shutdown and restart of the process control system performed as specified. Failure of a Government furnished communications link, provided that the PLC automatically and correctly operates in the stand-alone mode as specified, and that the failure was not due to Contractor furnished equipment, installation, or software. Failure of existing Government owned equipment, provided that

the failure was not due to Contractor furnished equipment, installation, or software.

3.7 FIELD TRAINING

Field training oriented to the specific system must be provided for designated personnel. Furnish a copy of the training manual for each trainee plus two additional copies. Manuals must include an agenda, the defined objectives for each lesson, and a detailed description of the subject matter for each lesson. Furnish audiovisual equipment and other training supplies and materials. Copies of the audiovisuals must be delivered with the printed training manuals. The Government reserves the right to videotape training sessions for later use. A training day is defined as 8 hours of classroom instruction, excluding lunchtime, Monday through Friday, during the daytime shift in effect at the training facility. Submit the training manual and schedule to receive approval from the Government at least 30 days before the training.

3.7.1 Preliminary Operator Training

Prior to the start of field testing, preliminary operator training must be taught at the project site for 8 consecutive training hours. Upon completion of this course, each student, using appropriate documentation, should be able to perform elementary operations with guidance and describe the general hardware architecture and functionality of the system. This course must include: general system architecture; functional operation of the system, including workstations; operator commands; application programs, control sequences, and control loops; database entry and modification; reports generation; alarm reporting; diagnostics; and historical files.

3.7.2 Maintenance Training

Following the endurance test a minimum period of one training days must be provided by a factory representative or a qualified Contractor trainer for five designated personnel on maintenance of the equipment. The training must include: physical layout of each piece of hardware, calibration procedures, preventive maintenance procedures, schedules, troubleshooting, diagnostic procedures and repair instructions.

3.8 OPERATION AND MAINTENANCE DATA REQUIREMENTS

Outline the step-by-step procedures required for system startup, operation and shutdown. Include in the instructions layout, wiring and control diagrams of the system as installed, the manufacturer's name, model number, service manual, parts list and a brief description of all equipment and their basic operating features. List routine maintenance procedures, possible breakdowns and repairs and troubleshooting guides.

-- End of Section --

SECTION 46 25 14

COALESCING OIL-WATER SEPARATORS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B16.5	(2017) Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA 10084	(2017) Standard Methods for the Examination of Water and Wastewater

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2020) Structural Welding Code - Steel

ASTM INTERNATIONAL (ASTM)

ASTM A36/A36M	(2019) Standard Specification for Carbon Structural Steel
ASTM C990	(2009; R 2019) Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
ASTM E165/E165M	(2018) Standard Practice for Liquid Penetrant Examination for General Industry

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 30	(2021) Flammable and Combustible Liquids Code

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC SP 6/NACE No.3	(2007) Commercial Blast Cleaning
SSPC SP 10/NACE No. 2	(2015) Near-White Blast Cleaning

U.S. DEPARTMENT OF DEFENSE (DOD)

MIL-DTL-24441	(2009; Rev D) Paint, Epoxy-Polyamide, General Specification for

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 600/4-79/020	(1983) Methods for Chemical Analysis of Water and Wastes

UNDERWRITERS LABORATORIES (UL)

UL 1746	(2007; Reprint Dec 2014) External Corrosion Protection Systems for Steel Underground Storage Tanks
UL SU2215	(2017) Oil/Water Separator Design, Construction, and Performance Standards
UL 58	(2018) UL Standard for Safety Steel Underground Tanks for Flammable and Combustible Liquids

1.2 SYSTEM DESCRIPTION

1.2.1 Applications

The separator shall remove free oil and emulsified oil and suspended solids from oil-in-water mixtures of freshwater originating from hydrocarbon spills, and/or aircraft hangar cleaning/maintenance operations. The influent oil-in-water mixture will flow by gravity to the unit which will not be located in an area with a corrosive atmosphere.

1.2.2 Influent Characteristics

Provide oil-water separator designed for a maximum flow of 35 gallons per minute. Operating temperatures of the influent oil-in-water mixture will range from 50 to 230 degrees F and ambient air temperatures will range from -10 to 95 degrees F. The specific gravity of the oil at operating oil-water temperatures will range from 0.0 to 1.0. The specific gravity of the freshwater at operating temperatures will range from 0.9 to 1.1. The influent is further characterized as follows:

Oil-in-Water Mixture	Minimum	TO	Maximum
Oil droplet size	Greater than 20 microns		

1.2.3 Performance Requirements

The grease and oil concentration in the effluent from the oil-water separator shall not exceed the following limitations:

Contaminants	Maximum
Total grease and oil, daily maximum	10 mg/l

To achieve these goals, it will be necessary to remove all free oil droplets equal to or greater than 20 microns.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Separator; G

Accessory equipment; G

Submit shop drawings for separator and accessory equipment including principal dimensions, location of fittings and unit foundation. Include data to verify center of gravity with the unit empty and filled with water.

SD-05 Design Data

Separator; G

Accessory equipment; G

Submit analysis, signed by a registered professional engineer, which indicates that at the calculated overflow rate, the separator will be provided with the required square feet of projected plate separation area to achieve the specified performance under laminar flow (i.e. Reynolds number of less than 500) conditions. Calculations shall take into account the rate of flow, potential surge flow, influent concentrations, particle characteristics, fluid temperature, fluid specific gravities, and pH.

SD-06 Test Reports

Shop hydrostatic test; G

Submit results of hydrostatic and dynamic testing.

Inspection

Field hydrostatic test

Preoperational test

In-service test

SD-07 Certificates

Separator corrosion protection; G

Submit written verification on the fabricator's letterhead that surface preparation and coating application were performed in accordance with the manufacturer's printed recommendations for the coating system.

SD-08 Manufacturer's Instructions

Separator system; G

SD-10 Operation and Maintenance Data

Separator system, Data Package 3; G

Accessory equipment, Data Package 3; G

Submit in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Delivery and Storage

Inspect materials delivered to site for damage; unload and store with minimum handling. Store materials on-site in enclosures or under protective coverings. Protect materials not suitable for outdoor storage to prevent damage during periods of inclement weather, such as subfreezing temperatures, precipitation, and high winds. Store materials susceptible to deterioration by direct sunlight under cover and avoid damage due to high temperatures. Do not store materials directly on ground. If special precautions are required, prominently and legibly stencil instructions for such precautions on outside of equipment or its crating.

1.4.2 Handling

Handle separator in such a manner as to ensure delivery to final location in sound, undamaged condition. Take special care not to damage interior and exterior surfaces of separator, coalescing plates, and associated supports and pipe coatings or linings. Make satisfactory repairs to damaged materials at no cost to Government. Carry and do not drag materials.

PART 2 PRODUCTS

2.1 MATERIALS

Oil/Water Separator shall be cylindrical, horizontal, atmospheric-type double-wall steel vessel intended for the separation and storage of flammable and combustible liquids. Separator shall be fabricated of carbon steel with shell seams of continuous lap weld construction. The double-wall construction shall include an interstitial leak monitoring system.

Steel thickness per UL 58 Standard or a minimum 3/16 inch minimum thick carbon steel conforming to ASTM A36/A36M or material having equivalent structural properties and corrosion resistance for separator, hoppers, stationary and adjustable weirs, nozzles, flow distributor and energy dissipator device, bolts, seals, stiffeners, washers, separator cover and nuts. Weld in accordance with AWS D1.1/D1.1M to provide watertight separator that will not warp or deform under load. Use welders qualified in accordance with AWS Standard Qualification Procedure. Grind welds smooth and remove weld spatter. Fabricate free of kinks and sharp bends in a manner not to reduce the strength of steel to a value less than that intended by the design. Size and shape of bends shall be uniform. Clean and finish steel surfaces as described in paragraph entitled "Separator Corrosion Protection."

A sediment chamber to disperse flow and collect oily solids and sediments is required.

2.1.1 Conformance

1. The oil/water separator(s) shall be listed under UL SU2215. Construction and performance of the oil/water separator(s) must be in accordance with UL SU2215. Provide current UL SU2215 Certificate of Compliance. UL SU2215 label shall be prominently displayed on the oil/water separator.

2. Effective surface area calculations, signed and stamped by a Registered Professional Engineer shall be submitted to document specified effluent quality based on complete removal of the specified oil globule at design flow. An oil/water separator with lower effective surface area than required is not permissible.

3. Oil/Water Separator capacities, dimensions, construction and thickness shall be in strict accordance with UL 58.

   a. The inner steel wall shall be completely contained within the outer steel wall, enclosing 100 percent of the separator volume.

   b. The oil/water separator must have a double steel shell with a space between the layers. The space between the inner and outer steel walls shall be monitored with an approved electronic interstitial monitoring device through a pipe that extends vertically to the top of the separator.

   c. Oil/Water Separator construction using thin wall primary steel wall with external fiberglass jacket shall not be permissible.

2.1.2 Separator Corrosion Protection

2.1.2.1 Steel Separator

After shop conducted hydrostatic tests have been successfully completed, provide a MIL-DTL-24441 coating system to the interior and exterior surfaces of the separator. Prior to shop painting, abrasive blast clean the surfaces in accordance with SSPC SP 10/NACE No. 2 to a surface profile of 1 to 2 1/2 mils. Apply primer conforming to MIL-DTL-24441/1, Formula 150 applied to a minimum dry film thickness of 3 to 4 mils. Apply intermediate coat conforming to MIL-DTL-24441/2, Formula 151 applied to a minimum dry film thickness of 3 to 4 mils. Apply topcoat conforming to MIL-DTL-24441/3, Formula 152 applied to a minimum dry film thickness of 3 to 4 mils. Total dry film thickness shall not be less than 9 mils. Repair and replace areas of the coating system which are found to be damaged or defective upon delivery of equipment to the site or found to be defective due to work of the applicator. An interior polytetrafluoroethylene liner with a minimum thickness of 1/8 inch may be provided in lieu of paint coating the interior separator surfaces.

2.1.3 Substitutions

Separators constructed of reinforced fiberglass, corella pvc plates or reinforced glass fiber resin laminates over a rigid urethane foam core may be provided in lieu of carbon steel. Provide fiber glass separator with lifting straps. Glass fiber reinforced plastic weirs may be accepted as a suitable weir and baffle material provided that necessary requirements for

anchorage of these items include provisions for contraction and expansion. Surfaces shall be seamless, chemically resistant to oil-in-water mixture, and resistant to ultraviolet deterioration.

2.1.4 External Surfaces

External surfaces and appurtenances shall be resistant to corrosion from the in situ soil, backfill material, groundwater, and surface runoff.

Oil/Water Separator Corrosion Control System shall be in strict accordance with Underwriters Laboratories Inc. Subject UL 1746 Standard for External Corrosion Protection Systems for Steel Underground Storage Tanks and HighGuard External Corrosion Protection Specifications.

Exterior Protective Coating:

a. Surface Preparation: Steel Grit blast - SSPC SP 6/NACE No.3 Commercial Blast Cleaning.

b. External surfaces coated with 75 mils DFT HighGuard Self-Reinforcing Polyurethane.

c. Polyurethane coating shall have a high cross-link density, which is, in essence, self-reinforcing or self-fibrating. Artificial fillers or reinforcement (chopped fiberglass or roving) shall not be permitted.

d. Coating shall be subjected to a 15,000 volt spark test after application to ensure coating integrity and effective corrosion protection.

2.1.5 Internal Surfaces

Internal Protective Lining:

a. Surface Preparation: Steel Grit blast - SSPC SP 10/NACE No. 2, Near-White Blast Cleaning.

b. Internal surfaces coated with 15 mils DFT solvent-free, two component polyurethane lining. The lining must comply with UL SU2215 and be subjected to the required Physical Properties, Corrosion Resistance, Permeation, and Impact Tests.

Parallel plate material and orientation shall enhance oil coalescence and solids removal, and be corrosion and chemically resistant to the oil-in-water mixture as specified in paragraph entitled "SYSTEM DESCRIPTION."

2.1.6 Hardware

Bolts, stiffeners, washers, nuts, screws, pins, and fittings as required shall be corrosion resistant. Provide materials that are inherently corrosion resistant and not merely treated with a corrosion-resistant coating, such as provided by the galvanizing process.

2.1.7 Accessibility

Do not bury tops of separators. Make the entire top area of the separator visible from ground surface. Separators below grade with access manholes

and extension tubes to the surface will not be permitted. Use separators with an open top or a completely removable cover. Use open top separators with removable grating unless otherwise shown. Use top cover and grating that is easily removable by two persons. As a minimum provide access hatches over the following areas: parallel plates, oil storage compartments, Influent sampling area, effluent sampling area, oil skimmer, and weirs. Parts subject to wear or requiring adjustment, inspection, cleaning or repair shall be accessible and capable of convenient removal when required.

Grade Level Manways designed to Highway 20 requirements.

2.2 SEPARATION CHAMBER

Provide below ground separator to withstand hydraulic and soil loadings under static and dynamic conditions while empty and during operating conditions. Provide adequate support for additional loadings from separator appurtenances including weirs, hoppers, internal supports, parallel plate oil coalescers, equipment transportation, and rapid lowering and braking of load during handling operations. Bolt separator and accessories to weld-fabricated, structural steel skid base, or mount on manufacturer's standard base.

2.2.1 Lifting Mechanism

Oil/Water Separator(s) shall be handled, lifted, stored, and secured in accordance with the manufacturer's instructions.

2.2.2 Flanges

Use only flat face flanges and drill 150 pound ANSI Standard bolt circle and remove burrs. Use flanged piping connections that conform to ASME B16.5, welding neck type.

2.2.3 Weirs

Attach stationary weirs and adjustable weir supports to separator side walls to provide a watertight seal between adjoining compartments and trough to prevent hydraulic short-circuiting. Use carbon steel for weir plates and baffles. Provide sharp crested weirs of size and section specified by manufacture. Provide slotted holes in weir plates and baffles or supports to permit horizontal and vertical adjustment of weir or baffle. Use nondeteriorating sealant or gaskets for mounting weir plates. Fill voids between separator wall and weir plate with sealant to make watertight.

2.2.4 Low Point Drains

Provide means at low points for dewatering separator.

2.2.5 Identification Plates

Provide identification and instruction plates and stamp necessary data. Securely affix plates, in prominent location, to separator with nonferrous screws or bolts of not less than 1/8 inch in diameter.

2.2.6 Instruction Plates

Instruction plates shall describe special or required procedures to operate and service equipment, and shall include warnings of hazardous procedures

and notice of safety and health requirements. Plates shall be durable and legible throughout equipment life.

2.2.7 Warning Sign

On entrances to the separator (and entrances to the vault) place a permanent sign which states the following: "DO NOT ENTER separator (OR VAULT) OR PERFORM HOT WORK ON OR IN separator UNTIL THE ATMOSPHERE HAS BEEN TESTED AND CERTIFIED GAS FREE AND SAFE."

2.3 INLET COMPARTMENT

Provide inlet compartment of sufficient volume to effectively reduce influent suspended solids and dissipate energy. Use inlet compartment that provides a minimum of 45 minutes detention ahead of the oil coalescing compartment. Provide nonclogging flow distributor and energy dissipator device and the primary solids collection hopper as specified in paragraph entitled "Reduction of Solids". Locate adjustable, primary surface oil overflow weir and sample ports as recommended by the manufacturer.

2.4 OIL SEPARATION COMPARTMENT

2.4.1 General

The oil/water separator shall be a pre-packaged, pre-engineered, ready to install unit consisting of:

a. An influent flanged connection.
   i. An internal influent nozzle at the inlet end of the separator.
   ii. Nozzle discharge to be located at the furthest diagonal point from the effluent discharge opening.

b. A velocity head diffusion baffle at the inlet to:
   i. reduce horizontal velocity and flow turbulence.
   ii. distribute the flow equally over the separators cross sectional area.
   iii. direct the flow in a serpentine path in order to enhance hydraulic characteristics and fully utilize all separator volume.
   iv. completely isolate all inlet turbulence from the Oil/Water Separation Chamber.

The separator will also provide a minimum detention time within the oil separation compartment of 45 minutes at design flow. Detention time will recomputed by calculating the volume of the separation zone within the separator and dividing this volume by the design flow rate. For computing detention time, total volume shall be reduced by 20 percent for the space occupied by settled solids (sediment) and accumulated oil at the surface.

2.4.2 Parallel Plates

Provide parallel plates at an angle from 40 to 60 degrees with respect to longitudinal axis of the plate corrugations and space not less than 3/4 inch apart for removal of free oil and settleable solids. Configuration used shall not promote solids buildup on plates which would increase velocities to point of discharging an effluent of unacceptable quality. Maintain laminar flow at maximum design flow rate throughout plate packs including entrance and exit so as to prevent re-entrainment of oil(s) with water. Flow through plate packs shall be in a downflow mode parallel to plate corrugations or cross-flow perpendicular to plate corrugations, so that the

oil collects and coalesces at high point of corrugations and rises to top of pack without clogging from oil or settleable solids.

2.4.3 Supports

Brace and support individual plates or plate packs to withstand loads associated with transportation and operation of units, including inplace cleaning. Equip each plate pack with lifting lugs or other attachments for handling and installation. Each lug shall carry total weight of plate pack. Provide adequate structural supports to facilitate inplace cleaning of plate pack bundles.

2.4.4 Baffles

Provide oil retention baffle, adjustable surface oil overflow weir with trough, and stationary underflow baffle. Position underflow baffle to prevent resuspension of solids that have accumulated in secondary solids hopper.

2.5 ACCESSORIES AND ACCESSORY EQUIPMENT

Provide bolts, stiffeners, washers, nuts, screws, pins, gaskets, and fittings as required for adjustable weirs, separator covers and parallel plate packs.

2.5.1 Hold-Down Straps

1. Oil/water separator anchoring is required.

    a. Polyester corrosion resistant, hold-down straps with turnbuckles and a cable restraint system will be provided.

    b. Steel hold-down straps with neoprene liners shall be provided where polyester straps are not applicable.

2. Prefabricated Concrete Deadman Anchors

Concrete deadman anchors are beams of reinforced concrete used to counteract the buoyant forces acting on an under-ground vessel. Placed alongside the tank in the bottom of an excavation, they are secured in place using hold-down straps. The weight of the backfll on the concrete anchors provides additional resistance to those buoyant forces.

    a. Pre-engineered and pre-fabricated concrete deadman anchors calculations are submitted and signed by an engineer of the separator manufacturer.

    b. The concrete deadman anchors must be supplied by the separator manufacturer and have been a standard product for at least five years.

    c. All pre-fabricated concrete deadman anchors shall be sized and installed in accordance with the separator manufacturer’s guidelines.

    d. Utilize a minimum 4,000 psi concrete mix reinforced with #4 rebar.

2.5.2 Independent Level Alarm System

Provide an independent level alarm system that will monitor 4 programmable liquid level setpoints. The system must delineate between each individual setpoint . The system must produce an audible and visible alarm in the event of monitoring an alarm condition. Mechanically-actuated float assemblies must be field adjustable. The system must be totally independent of the tank gauging system.

2.5.2.1 Setpoints

Configure the alarm system's 4 setpoints in accordance with the following.

a. High Level Setpoint. Produce an alarm condition when a tank's liquid level rises above 20 percent capacity.

b. High-High Level Setpoint. Produce an alarm condition when a tank's liquid level rises above 43 percent capacity.

2.5.2.2 Independent Level Alarm Control Panel

Install the control panel for the alarm system in a NEMA 4 rated enclosure in accordance with electrical specifications. Panel doors must swing left or right.

2.5.2.3 Audible Alarm

Panel must have external speakers that produce a buzzer sound of 70 decibels or greater in the event of a detected alarm condition.

2.5.2.4 Visual Alarm

Panel must have a visual alarm that illuminates in the event of a detected alarm condition. The visual alarm must include either individual lights for each alarm condition or must include a single light and a liquid crystal display (LCD) panel that displaces information regarding each alarm condition.

2.5.2.5 Acknowledge Switch

Panel must have a manual acknowledge switch that will deactivate the audible alarm. The acknowledge switch must not deactivate subsequent audible alarms unless depressed manually again for each occurrence. Under no circumstance must this acknowledgement switch extinguish the visual alarms until the alarm condition has been corrected. The acknowledge switch must be an integral component located on the front of the control panel. The switch must be either a key switch or push button.

2.5.2.6 Test Pushbutton

Panel must have a manual test pushbutton that will enable operators to verify that the panel is powered, and the visual and audible alarms are working properly.

2.5.2.7 Alarm Control Panel Communications

Control panel shall be equipped with a communication module capable of transmitting high, high-high, and interstitial liquid alarms.

Module shall communicate with buildings energy management and control system (UMCS). UMCS system is manufactured by Automated Logic Corp. (ALC)

Communications protocol shall be ARC156 or MS/TP (9600bps-76.8kbps).

Provide triple electrode gas surge arrestors to protect communication circuits.

2.6 FABRICATION

Provide shop fabricated, skid mounted oil-water separator, or other shop fabricated unit approved by the Contracting Officer, which is comprised of a separator containing an inlet compartment, parallel plate oil coalescing compartment, outlet compartment and the following accessories:

1. Separator Cover with vapor proof seal.

2. Fittings for vent, interface/oil level sensor, interstitial monitoring sensor, waste oil pump-out, and gauge.

3. Manways as shown on Drawing, UL approved, complete with extension, cover, gasket, and bolts. (Manway extension length determined by burial depth.)

4. Lifting lugs at balancing points for handling and installation.

5. Threaded NPT Fittings: Threaded fittings with thread protectors shall be supplied as follows:

    a. Interface/Oil Level Sensor
    b. Interstitial Monitoring Sensor
    c. Normal Vent (per manway in manway extension)

6. Level Sensor Pipe

7. Leak Detection Pipe

8. Alarm Panel

9. Float Interface Suspended Sensor

10. Liquid Only Leak Sensor

11. Concrete Deadman

12. Polyester Holddown Straps W/Galv.TB ,wirerope, with clamps

13. Rectangular Grade Level Manway, 48 inches by 48 inches

2.6.1 Shop Hydrostatic Test

Prior to applying coatings, perform hydrostatic test at atmospheric pressure by filling separator with water in the shop for a minimum of 4 hours. Testing shall be conducted after all seams have been cleaned and all welds have been inspected in accordance with ASTM E165/E165M. Acceptance criteria, for the hydrostatic test, is no leakage after 4 hours using a thorough visual inspection for the leaks.

The oil/water separator(s), their welds, seams and connecting fittings must

be factory-tested for tightness using the above described method or standard engineering practices, whichever method is more stringent stringent shall be used. Oil/Water Separator(s) must be guaranteed by the manufacturer to be tight.

Double-Wall Oil/Water Separator shall be shipped with a factory applied vacuum on the interstitial space. Manufacturer shall provide confirmation of vacuum gauge reading after loading for shipment.

2.6.2 Reduction of Solids

To prevent extensive shutdown and maintenance, the oil/water separator’s coalescer design must allow solids to fall unhindered by turbulence, and oil droplets to rise, without risk of re-emulsifying due to collisions with interfering solids. The use of plastic perforated tubes, spherical balls, or irregular shaped media will increase maintenance costs and shall not be permitted.

2.6.3 Oil Coalescing Compartment

Equip oil coalescing compartment with easily removable and reinstallable, parallel, corrugated plates arranged to optimize separation of free oil from liquid carrier. Use parallel plates that are easily removable without dismantling packs and without confined space entry. Provide adjustable surface oil overflow weir with trough, oil outlet nozzle and stationary underflow baffle, oil retention baffle positioned to prevent discharge of free oil that has been separated from the carrier liquid in inlet and oil coalescing compartments. Provide access to each plate pack from top. Each bundle shall be equipped with handles or lifting rings. Plate designs that permit cleaning of plate packs in place are not acceptable.

Oil/Water Separator shall comply with National Fire Protection Association NFPA 30 Flammable and Combustible Liquids Code.

2.6.4 Wastewater Sampling Port

Equip inlet and outlet compartments, adjustable overflow effluent weir, effluent trough, and wastewater outlet nozzle with wastewater sampling ports permitting easy access for obtaining isokinetic influent and effluent samples.

2.6.5 Connections

Connect the separator at the inlet and outlet pipe invert elevations indicated. Follow equipment manufacturer's recommendation for setting and adjusting top of weir elevations throughout unit.

2.6.6 Storage

Provide oil and suspended solids collection, storage, and transfer systems as an integral part of proposed oil-water separator system. As a minimum, the separator oil storage compartment shall have a capacity of not less than 10 percent of the total separator volume.

PART 3 EXECUTION

3.1 INSPECTION

Inspect each component of separator for compliance with requirements

specified in PART 2 PRODUCTS. Redesign or modification of equipment to comply with specified requirements, or necessary redesign or modification following failure to meet specified requirements, shall receive particular attention for adequacy and suitability. This element of inspection shall encompass visual examinations and dimensional measurements. Noncompliance with specified requirements, or presence of one or more defects preventing or lessening maximum efficiency of separator operation, shall constitute cause for rejection.

3.2 INSTALLATION

Lift separator as required without parallel plate packs in place onto level foundation using lifting mechanism provided. Level separator and bolt to supports to prevent hydrostatic uplift and ensure unit stability. Use a lifting bar through lugs to insert plate packs into separator and place on supports. Caulk around packs and pack supports with sealing compound conforming to ASTM C990 to prevent hydraulic short-circuiting. Avoid abrupt contact between the packs and the separator walls and pack supports to avoid damage. Separator system installation shall be conducted in accordance with manufacturer's recommendations.

Separator shall be installed underground with top access near or above grade level.

3.3 FIELD QUALITY CONTROL

3.3.1 Field Hydrostatic Test

After separator has been leveled and secured to foundation and parallel plate packs are in place, level effluent overflow weir at elevation specified by manufacturer and hydrostatically test unit at atmospheric or operational pressure (for no leakage) for an additional 8 hours by filling with water. Perform the hydrostatic test prior to backfilling below ground or partially below ground installations.

3.3.2 Preoperational Test

The manufacturer's service representative shall inspect, operate, and test unit before in-service testing by the Contractor.

3.3.2.1 Tests

Tests shall include but not be limited to the following:

a. Soundness (without cracked or otherwise damaged parts).

b. Completeness in all details, as specified.

c. Correctness of setting, alignment, and relative arrangement of each component.

d. Verification of proper operation for all system components.

3.3.2.2 Preoperational Investigation and Test Report

Submit manufacturer's service representative's preoperational test report. Document inspections, operations, adjustments, and tests performed and indicate whether they were acceptable or not. For unacceptable items, describe corrective action taken or recommended. Include detailed

descriptions of points inspected, tests and adjustments made, quantitative results obtained if such are specified, and suggestions for precautions to be taken to ensure proper maintenance. Include the manufacturer's certificate that equipment conforms to specified requirements and is ready for permanent operation and that nothing in installation will render manufacturer's warranty null and void.

3.3.3 In-Service Test

After hydrostatic test and preoperational test have been successfully completed and unit has been properly connected to influent and effluent piping, allow influent oil-in-water mixture previously described in paragraph entitled "SYSTEM DESCRIPTION" to flow into separator filled with water. Adjust and level primary and secondary surface oil overflow weirs to optimize oil skimming and minimize water overflow to oil recovery. Optimize operation of unit within 5 working days. Operate unit for a minimum of ten separator volume changes prior to testing for removal of contaminants and document testing results.

3.3.3.1 Analytical Methods

Test and sample preservation methods for test contaminants shall be in accordance with the latest revisions of AWWA 10084, APHA Standard Methods for the Examination of Water and Wastewater, EPA 600/4-79/020, EPA Methods for Chemical Analysis of Water and Wastes, or those substitute methods approved by the governing regulatory agencies having jurisdiction.

3.3.3.2 Test for Contaminants

Verify the separator efficiency by testing influent and effluent for contaminants described in paragraph entitled "Performance Requirements." If effluent quality is found to be unacceptable, then verify influent to effluent performance in particle size removal at the site. Tests shall be performed by an independent certified testing laboratory.

3.3.3.3 Sampling Procedures

Within an 8 hour period and at regular intervals collect a minimum of 10 influent and effluent samples from sampling ports provided as part of the separator. Purge each sampling port to remove built-up solids or other material prior to collecting sample. Collect wastewater samples isokinetically in clean glass containers with polytetrafluoroethylene lined caps. Collect duplicate wastewater samples in separate glass containers. Do not attempt to split sample. Use containers for other contaminants as recommended in references listed in paragraph entitled "Analytical Methods."

3.3.3.4 Acceptance Criteria

90 percent of the effluent samples taken shall not exceed the specified daily maximum limit for grease and oil contaminants. The remaining samples shall not exceed 10 mg/L for grease and oil contaminants. If the separator does not meet requirements of this specification, due to poor workmanship and wrong fabrication dimensions, the unit may be rejected. If the unit is

not operating at design efficiency 5 days after installation, Government may reject system. In the event Government rejects unit, Contractor shall remove separator or defective components and replace with acceptable unit or components and test as specified above.

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