



**Kerr-McGee Chemical Corporation
Oklahoma City, Oklahoma**

INTERMEDIATE (60 PERCENT) DESIGN FOR GROUNDWATER REMEDIAL SYSTEM

**Moss-American Site
Milwaukee, Wisconsin**

VOLUME 2—TECHNICAL SPECIFICATIONS

4 September 1996



**INTERMEDIATE (60 PERCENT) DESIGN FOR
GROUNDWATER REMEDIAL SYSTEM
MOSS-AMERICAN SITE
MILWAUKEE, WISCONSIN**

VOLUME 2 – TECHNICAL SPECIFICATIONS

TABLE OF CONTENTS

DIVISION 1 – GENERAL REQUIREMENTS

- 01000 Summary of Work
- 01010 Special Requirements
- 01020 Subsurface Exploration
- 01030 Substitutions
- 01050 Site Survey
- 01080 Codes and Standards
- 01090 Abbreviations and Symbols
- 01100 Environmental Protection
- 01300 Submittals
- 01390 Health and Safety
- 01400 Contractor's Quality Control
- 01500 Temporary Facilities and Controls
- 01505 Mobilization and Demobilization
- 01700 Contract Closeout

**INTERMEDIATE (60 PERCENT) DESIGN FOR
GROUNDWATER REMEDIAL SYSTEM (CONTINUED)
MOSS-AMERICAN SITE
MILWAUKEE, WISCONSIN**

VOLUME 2 – TECHNICAL SPECIFICATIONS

TABLE OF CONTENTS

DIVISION 2 – SITE WORK

- 02075 Utility Decommissioning/Sheet Pile Penetration
- 02080 Decontamination
- 02120 Clearing, Grubbing, and Stripping
- 02200 Earthwork
- 02368 Sheet Pile Driving and Joint Sealing
- 02500 Access Roads
- 02540 Erosion and Sediment Control
- 02710 Monitoring Wells
- 02831 Chain-Link Fences and Gates
- 02930 Finish Grading and Seeding

DIVISION 1 — GENERAL REQUIREMENTS

SECTION 01000

SUMMARY OF WORK

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Roy F. Weston, Inc. (WESTON®), on behalf of Kerr-McGee Chemical Corporation (KMCC), is soliciting bids for construction of a funnel and gate groundwater remedial system at the Moss-American Superfund site in Milwaukee, Wisconsin. The work generally consists of installation of a subsurface funnel and gate system to include sheet piling, connection sealant (Waterloo Barrier or equivalent), installation of treatment media at specified pilot-scale gate, and installation of monitoring wells.
- B. Specifically, the scope of work includes, but is not limited to:
1. Preparation of submittals to include a detailed construction schedule, a Contractor Health and Safety Plan, a Construction Quality Control Plan, Erosion and Sedimentation Control Plan, and a Mobilization Plan (which includes an Environmental Protection Plan).
 2. Construction of temporary facilities, access roads, and security fencing (as necessary).
 3. Construction of a decontamination pad and a decon water management system.
 4. Clearing and grubbing of existing vegetation and trees from the limits of work. Installation of erosion control measures to include silt fence and runoff/runoff control structures.
 5. Demolition and removal of on-site existing facilities and debris that impede installation of the funnel and gates.
 6. Installation of steel sheet piling to include installation of connection seals.
 7. Implementation of an Installation Quality Control Program, to be prepared by the Contractor, to ensure the seal is installed in accordance with the specification.
 8. Excavation of soil within the limits of the treatment gates and relocation of soil to an area approved by the Engineer.

9. Supply and installation of the specified backfill in the treatment gates, in accordance with the specifications.
 10. Installation of monitoring wells on the upgradient and downgradient sides of the treatment gates and/or sheetpile funnel sections, as shown on the Drawings.
 11. Restoration of site following installation of the system. Restoration will include general site grading, topsoiling (if necessary), seeding, and mulching.
- C. The scope of work, as described in this section, is summarized solely for the convenience of the Contractor. The Contractor shall include in the total project cost any item of work included in the Contract documents that is not included in a lump sum or a unit price item of work. All materials and equipment shall be supplied by the Contractor to complete the finished work.

1.02 SITE LOCATION AND DESCRIPTION

- A. The Moss-American site is located in the northwest section of the City of Milwaukee, County of Milwaukee, State of Wisconsin, at the southeast corner of the intersection of Brown Deer and Granville Roads. The site address is 8716 Granville Road.
- B. The site consists of the former Moss-American wood-preserving plant and approximately 5 miles of the Little Menomonee River.

1.03 DEFINITION OF TERMS

- A. Engineer—WESTON is the Engineer and is responsible for designing and overseeing the construction/installation of the funnel and gate groundwater remedial system.
- B. Owner—KMCC is the owner and will be responsible for providing overall project guidance and direction.
- C. Contractor—The Contractor shall be the successful bidding contractor and shall include all subcontractors and vendors acting on behalf of the Contractor in completion of this work.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01010

SPECIAL REQUIREMENTS

PART 1 GENERAL

1.01 SPECIAL REQUIREMENTS

- A. The Contractor shall have in his possession, at all times, valid identification for all his employees and subcontractors.
- B. During execution of any and all items of the work, extreme care shall be exercised by the Contractor to preclude any interference/disturbance of existing structures, roadways, above-grade and below-grade utilities, or other features not associated with the work.
- C. The Contractor shall prevent damage, movement, settlement, or collapse of structures, roadways, above-grade and below-grade utilities, or other features not associated with the work. The Contractor shall assume the liability for any and all said damage, movement, settlement, or collapse, and promptly repair same at no cost to the Owner.
- D. The Contractor shall verify the locations and depths of utilities that could be affected by the work and shall notify the Engineer or Owner immediately if unknown utilities are evidenced or encountered during execution of the work.
- E. The Contractor shall protect all permanent survey controls and wells identified on the Drawings during the work. The Contractor shall assume the liability for disturbance or damage and promptly replace same at no cost to the Owner.
- F. The Contractor shall obtain any permits, as necessary, for completion of the work.
- G. The Contractor is responsible for the development and implementation of a Health and Safety Plan for his personnel, as specified in Section 01390, "Health and Safety." The Health and Safety Plan shall conform to all federal, State, and local regulations, to include those regulations issued by the Occupational Safety and Health Administration. Soil and groundwater contaminant data obtained during previous site investigations are provided in Section 01020, "Subsurface Exploration."
- H. The Contractor shall give all notices and comply with all laws, ordinances, rules, and regulations bearing on the conduct of the work as drawn and specified. If the Contractor performs any work contrary to such laws,

ordinances, rules and regulations, they shall bear all costs arising therefrom.

- I. Storage and security of materials are the sole responsibilities of the Contractor. It is the Contractor's responsibility to ensure an adequate supply of material to maintain steady execution of the work within the project time limit. Material will be stored at areas approved by the Engineer.
- J. Final inspection will be held by the Owner and the Engineer at the point of substantial completion, as determined by the Contractor and the Engineer. At that time, a list of unfinished and/or unacceptable work items (i.e., "punch list") will be made for the Contractor to correct. This "punch list" will be periodically checked by the Engineer prior to the final acceptance of the Project. The "punch list" must be completed and a Certificate of Final Inspection must be issued by the Engineer before final payment is made by the Owner.
- K. The Contractor shall, at all times, keep the premises free from the accumulation of water, materials, or rubbish caused by his operations. At the completion of the work, the Contractor shall remove all equipment, tools, and surplus materials and shall completely clean the premises, removing and disposing of all debris and rubbish.
- L. The Contractor is responsible for providing temporary electric service to the trailer facility. The Contractor shall secure all necessary permits for this work. All costs associated with temporary services and permits shall be included in the bid items.
- M. The Contractor shall be responsible for securing all necessary permits or agreements required for the transport and delivery of on-site and off-site soil to the work locations.
- N. The Contractor shall take measures to control dust at the site throughout the duration of work. If the Engineer determines that the level of dust is unacceptable, the Contractor shall employ any measures necessary to reduce dust to an acceptable level.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01020

SUBSURFACE EXPLORATION

PART 1 GENERAL

1.01 SUBSURFACE SOIL AND GROUNDWATER CONDITIONS

- A. The attached test boring logs and laboratory test results indicating subsurface conditions at and near the Moss-American site are for the information of the Contractor only, and in no event is this information to be considered as part of the Contract. It is expressly understood that the Owner or the Engineer will not be responsible for any interpretation or conclusions drawn therefrom by the Contractor.
- B. Subsurface conditions beneath and in the vicinity of the Moss-American site were explored during the remedial investigation studies and pre-design activities.
- C. Locations of the completed soil borings and monitoring wells are shown on the Plans.

1.02 SUMMARY OF ATTACHMENTS

- A. Attachment 01020-1 includes the boring logs, the well installation diagrams, and the geotechnical soil tests conducted in support of groundwater and floating product investigation activities conducted to date.
- B. Attachment 01020-2 includes chemical soil testing results showing results of field and lab analyses of site soil.

Note: Attachments 01020-1 and 01020-2 to be submitted with prefinal design report

1.03 LIMITATIONS OF SUBSURFACE INFORMATION INDICATED ON DRAWINGS

- A. Information presented, if any, regarding the presence, size, character, and locations of existing underground structures, pipes, and conduits may be indicated on the Drawings for the benefit of the Contractor. There is no certainty of the accuracy of this information; the indicated locations of the underground structures may be inaccurate, and other obstructions than those indicated may be encountered.

B. The Contractor hereby agrees that neither the Owner nor the Engineer is responsible for the correctness or sufficiency of the information given, and:

- That in no event is this information to be considered as a part of the Contract;
- That the Contractor shall have no claim for delay or for extra compensation or damages against the Owner or the Engineer on account of the incorrectness of information given, or on account of the insufficiency or absence of information regarding obstructions either revealed or not revealed by the Drawings; and
- That the Contractor shall have no claim for relief from any obligation or responsibility under the Contract, in case the location, size, or character of any pipe or other underground structure is not as indicated on the Drawings, or in case any pipe or other underground structure is encountered that is not indicated on the Drawings.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01030
SUBSTITUTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES:

- A. General Material and Equipment Requirements.
- B. Products.
- C. Product Options and Substitutions.
- D. Transportation and Handling.
- E. Storage and Protection.

1.02 RELATED SECTIONS AND REQUIREMENTS

- A. General and Specific Requirements—as stated in the Contract Documents.
- B. Section 01000—"Summary of Work."
- C. Section 01300—"Submittals."

1.03 GENERAL MATERIAL AND EQUIPMENT REQUIREMENTS

- A. Unless otherwise indicated on the Drawings or the Specifications, only new products shall be incorporated into the work. All products furnished by the Contractor, or by the vendor as appropriate, to be incorporated into the work shall be subject to the inspection and approval of the Engineer. No product shall be processed for, fabricated for, or delivered to the work without prior approval of the Engineer.
- B. For the purpose of indicating the standards of type, quality, design, and performance of product to be provided under this Contract, various materials and equipment may be named in the Contract Documents, as commercial brands, or equal.
- C. Where manufacturers' names appear in the Contract Documents, the names are presented for consideration by the Contractor, or by the vendor if appropriate, in preparing his Bid. Manufacturers may be listed on the basis of the Owner's knowledge of or experience with the various manufacturers; this listing does not represent that the manufacturers will meet the detailed requirements of the Specification. It is the responsibility of the Contractor, in preparing his Bid, to ensure that the manufacturer selected for each item will meet the detailed requirements

of the Contract Documents, whether the manufacturer selected is one of the named manufacturers or not.

1.04 PRODUCTS

- A. **Products:** Mean new material, machinery, components, equipment, fixtures, and systems forming the work. Do not include machinery and equipment used for preparation, fabrication, conveying, and erection of the work. Products may also include existing materials or components required for reuse.
- B. Provide interchangeable components of the same manufacturer for similar components.

1.05 PRODUCT OPTIONS AND SUBSTITUTIONS

- A. The Contract Documents have been prepared using particular product items to provide a complete set of plans and specifications. This is not meant to imply that the products of other manufacturers or other models from the same manufacturer cannot perform equally as well. Unless stated to the contrary in these Contract Documents, the product may be substituted if approved by the Owner (and the Engineer, if appropriate). A Record Drawing shall be maintained by the installing Contractor showing the product as actually installed. The Engineer (or other party performing similar services) shall be reimbursed by the party making the substitution for any engineering work required as the result of the substitution.
- B. The following procedures will be followed relative to substitutions:
 - 1. The General Contractor, as part of his Bid, shall submit a list of requested substitutions, which shall be accompanied by the following information:
 - a. Catalog information of the proposed product.
 - b. Other drawings and manufacturer's information necessary to fully describe the product as intended for its specific use in this project.
 - c. A letter from the manufacturer certifying that the recommended substitution will meet the performance requirements for that product.
 - d. Identification of changes required for the installation of the substituted product compared to the installation information presented in the Contract Documents.

- e. Any notable differences between the substituted product and the information presented in the Contract documents.
2. The Engineer shall review the requested substitution within 10 calendar days and make recommendation to the Owner relative to the acceptability of the substituted equipment or material. This review will not relieve the Contractor of the responsibility for the proper functioning of the product. The Owner will retain the final decision as to the acceptability of the substitution.
 3. A substitution can also be made after the Contract has been awarded, if approved by the Owner (and the Engineer, if appropriate) prior to the purchase of the equipment or material and its incorporation into the work. In this case, the request for the substitution must be clearly identified and submitted as a Shop Drawing, as described in Section 01300. Any changes in cost must be clearly explained. Approval for the substitution, or other action as appropriate, will be provided in accordance with the procedures for the review of Shop Drawings.
 4. The Contractor will maintain accurate record drawings showing the equipment or materials as actually installed.
- C. In cases where a product is purchased directly by the Owner or by others, the following procedures will be followed:
1. The product supplier will submit the information noted in Item 1.05B.1 above as part of his Bid or Proposal in addition to any other information requested by the Contract Documents. The Owner, with the advice of the Engineer, if appropriate, will make the final decision relative to the acceptability of the recommended substitution.
 2. Shop Drawings must be submitted for approval prior to fabrication or incorporation into the work, in accordance with Section 01300. This submittal must include the information identified in Item 1.05B.1 above relative to any substitutions made after the award of the initial purchase.
 3. The installing contractor shall maintain accurate Record Drawings related to equipment or material as actually installed.

- D. In cases where other purchasing and/or installation contractual arrangements are involved, specific arrangements relative to substitutions will be addressed in the Contract Documents for that specific project. The general requirements of Item 1.05 above will still apply, unless specifically stated otherwise.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01050

SITE SURVEY

PART 1 GENERAL

1.01 SUMMARY

- A. This section covers the specific survey tasks required under this contract, including proper field procedures, reporting practices, and accuracy requirements.
- B. The Contractor shall use the existing site topographic map, as shown on the Plans. The Engineer will supply the Contractor with an electronic version of the Survey for use in preparing Record Drawings.
- C. Additional requirements, though not specifically mentioned in this section, shall apply as required under normal professional surveying practice and as necessary for the accurate completion of the work described under this contract.

1.02 GENERAL REQUIREMENTS

- A. The Contractor shall provide all necessary field and office surveying work for the accurate location of all installed structures, both above- and below-grade, the construction layout, and the preparation of Record Drawings. This work includes, but is not limited to, the following activities:
 - 1. Verify site benchmark.
 - 2. Verify state plane coordinates and existing grid.
 - 3. Stake limits of clearing, grubbing, and stripping.
 - 4. Stake limits and alignment of temporary access road (if required) and support/staging area.
 - 5. Stake location and alignment of sheetpile wall and monitoring wells.
 - 6. Complete final survey of sheetpile, new installations, and monitoring wells for use in preparing Record Drawings.
- B. Reference benchmarks and U.S. Geological Survey (USGS) Datum used during remedial design activities are shown on the drawings.

1.03

QUALITY CONTROL

- A. The Contractor's representative (Surveyor) shall be a qualified and Registered Land Surveyor in the State of Wisconsin. The Surveyor shall have a minimum of 2 years' experience in construction surveying layout and maintenance of record construction drawings. Record construction drawings will be reviewed by the Engineer to verify accuracy.
- B. All survey instruments shall be calibrated or otherwise inspected prior to the start of work. Periodic field tests/inspections will be conducted to ensure the accuracy of each instrument. The Contractor shall submit certificates to the Engineer confirming this calibration prior to the start of work.

1.04

SUBMITTALS

- A. **Surveyor Qualifications:** The Contractor shall present the name, address, and telephone number of the selected survey firm, along with a resume showing the firm's related experience and data verifying the Surveyor's qualifications to complete the survey work.
- B. **Accuracy Verification:** Upon the Engineer's request, the Contractor will submit documentation verifying the accuracy of the survey work. Documentation includes computer calculations, closures on perimeter survey or areas, and/or field notes.
- C. **Field Notes and Records:** The Contractor will record surveys in duplicate page field notebooks or provide certified photocopies of fieldbook pages. The Contractor will furnish copies of the field notebooks to the Engineer, if requested.
- D. **Record Drawings:** Upon completion of construction activities, the Contractor will perform a survey of the site, as outlined on the drawings, and will prepare a record drawing showing the locations and elevations of all newly installed or disturbed existing structures. Monitoring well elevations shall consist of ground surface elevation, top of protective casing with protective cover removed, and top of inner (well) casing with any cap or cover removed. Record drawings shall be submitted to the Engineer with the final contract submittals.

1.05

HEALTH AND SAFETY

- A. All field survey crew personnel shall comply with health, safety, and training requirements, in accordance with 29 Code of Federal Regulations (CFR) 1910 and the approved site Health and Safety Plan (HASP).

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 GENERAL FIELD MEASUREMENTS

- A. Perform all measurements with instruments, tapes, and the like, in good adjustment and with corrections made for temperature, pull, air properties, etc.
- B. Make all measurements carefully and maintain proper balance between the precision of angular and distance measurements. The unadjusted error of closure shall not exceed 1 part in 10,000 parts.
- C. After the above precision has been achieved, adjust the data by accepted methods, such as the least squares or the compass rule, and present a mathematically exact closure.

3.2 ELEVATION DATUM AND BENCHMARKS

- A. Existing site elevation data are based on USGS Datum. Verify existing site benchmark elevation and use this verified benchmark during survey activities.
- B. Reestablish existing site benchmark elevations and provide correction factor if not in agreement with USGS Datum.

3.3 COORDINATE SYSTEM

- A. Establish horizontal control for benchmarks based on Wisconsin State Plane Grid Coordinates.
- B. Verify the elevations and locations of benchmarks shown on the existing site conditions drawing.

3.4 SITE PREPARATION

- A. The Contractor shall stake out the limits of clearing, grubbing, and stripping and obtain approval from the Engineer prior to commencing work. The limits of any temporary access road(s) and the office support and staging areas shall also be delineated.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01080

CODES AND STANDARDS

PART 1 GENERAL

1.01 CODES, STANDARDS, AND SPECIFICATIONS

- A. Each published code, standard, or standard specification referenced shall be the latest standard code, specification, or tentative specification of the technical society, organization, or body referred to which is in effect on the date of printing of the Drawings, unless otherwise specified. Where specific articles, sections, paragraphs, or subsections of referenced publications are not specified, the full referenced publication shall apply.
- B. Satisfactory evidence that materials and methods comply with referenced standards and codes shall be furnished when required.

1.02 ORGANIZATIONS

The following is a partial listing of organizations that publish codes and/or standards that may apply in the execution of the work and a list of their abbreviations:

AA	Aluminum Association
AAMA	American Architectural Manufacturers Association
AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AGA	American Gas Association
AHA	American Hardboard Association
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISE	American Iron and Steel Engineers
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AISI	American National Standards Institute
APA	American Plywood Association
AREA	American Railway Engineering Association
ARI	Air Conditioning and Refrigeration Institute
ASA	Acoustical Society of America
ASHRAE	American Society of Heating, Refrigerating and Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials

AWPA	American Wood Preservers' Association
AWPB	American Wood Preservers' Bureau
AWPI	American Wood Preservers' Institute
AWS	American Welding Society
AWWA	American Water Works Association
BIA	Brick Institute of America
BOCA	Building Officials and Code Administration International
CABO	Council of American Building Association
CBM	Certified Ballast Manufacturers
CMAA	Crane Manufacturers Association of America
CPSI	Consumer Products Safety Commission
CRSI	Concrete Reinforcing Steel Institute
DOC	United States Department of Commerce
EIA	Electronic Industries Association
EPA	United States Environmental Protection Agency (U.S. EPA)
ETL	Electrical Testing Laboratories, Inc.
FM	Factory Mutual Laboratories
FmHA	Farmers Home Administration, U.S. Dept. of Agriculture
FS	Federal Specification
GA	Gypsum Association
HPMA	Hardwood Plywood Manufacturers Association
HUD	United States Department of Housing and Urban Development
IBR	Institute of Boiler and Radiator Manufacturers
IEEE	Institute of Electrical and Electronics Engineers
IMIAWC	International Masonry Industry All Weather Council
	International Masonry Institute
IPCEA	Insulated Power Cable Engineers Association
MBMA	Metal Building Manufacturers Association
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
NCMA	National Concrete Masonry Association
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFIPA	National Fire Protection Association
NFOPA	National Forest Products Association
OSHA	United States Occupational Safety and Health Administration
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
PS	Product Standard
RCSHSB	Red Cedar Shingle and Hand Split Shave Bureau
SCS	Soil Conservation Service
SDI	Steel Door Institute
SFES	Southeastern Forest Experiment Station
SJI	Steel Joist Institute
TFS	Texas Forest Service
TPI	Truss Plate Institute, Inc.
UBC	Uniform Building Code

UL Underwriters Laboratories, Inc.
USD United States Diving, Inc.
WWPA Western Wood Products Association

PART 2 STANDARDS

2.01 STANDARD SPECIFICATION

- A. Construction methods and materials for applicable items of work shall be in accordance with the State of Wisconsin Department of Transportation Standard Specifications for Road and Bridge Construction, 1993 Edition (Standard Specification).

PART 3 EXECUTION

NOT USED

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01090

ABBREVIATIONS AND SYMBOLS

PART 1 GENERAL

1.01 DESCRIPTION

- A. The following is a listing of common abbreviations and symbols that may be found in the Contract Documents. Since this is a general listing, it is to be expected that not all abbreviations will appear.
- B. Abbreviations for published codes, standards, and regulations of organizations and federal agencies are defined in Section 01080, "Codes and Standards."
- C. Abbreviations and/or symbols not specifically defined shall be industry and standard definitions. Clarification of symbols and/or abbreviations shall be forwarded to the Engineer, who will furnish definitions in writing.

1.02 ABBREVIATIONS

The following is a partial listing of abbreviations and for terms that may apply in the Specifications:

A.C. or ac	Alternating Current
a or A	Amperes
AFF	Above Finished Floor
amp or AMP	Amperes
Alum.	Aluminum
Asph.	Asphalt
Aux.	Auxiliary
AWG	American or Brown and Sharp Wire Gauge
Bit. Conc.	Bituminous Concrete
Btu	British Thermal Unit
CB	Circuit Breaker
Cl.	Class
cm	Centimeter
C.O.	Clean Out
Conc.	Concrete
Cont.	Continuous
Cu.	Cubic
cc	Cubic Centimeters
C.F.	Cubic Feet
CFM or cfm	Cubic Feet Per Minute
CFS or cfs	Cubic Feet Per Second

C.Y.	Cubic Yards
CT	Current Transformer
D.C. or dc	Direct Current
Dia.	Diameter
DWG. or dwg	Drawing
Dr.	Drive
Ea. or ea.	Each
EF	Each Face
EW	Each Way
Eff. or eff	Efficiency
El. or Elev.	Elevation
Fin. Gr.	Finished Grade
fps	Feet Per Second
Ft. or ft	Feet
ftg.	Footing
g.	Grams
Ga. or ga	Gauge
Gal. or gal.	Gallon
Galv.	Galvanized
GPC or gpd	Gallon Per Day
GPM or gpm	Gallons Per Minute
H-O-A	Hand-off-automatic
Hz. or hz.	Hertz
I.D.	Inside Diameter
Inv.	Invert
IP	Instrument Panel
KVA or kva	Kilovolts-amperes
KW or kw	Kilowatt Hours
Lbs. or lbs	Pounds
L.F. or lf	Linear Feet
LPA	Lighting Panel "A"
L.S.	Lump Sum
m.	Meters
mA.	Milliamperes
Max. or max.	Maximum
MCC	Motor Control Center
mg.	Milligrams
MGD or mgd	Million Gallons Per Day
mi.	Miles
Min. or min.	Minimum
mm	Millimeters
No. or no.	Number
nom.	Nominal
NPT	National Pipe Thread
N.T.S.	Not To Scale
O.D.	Outside Diameter
Oz. or oz.	Ounce

pb	Pushbutton
PPD	Pounds Per Day
P/B	Pullbox
pri.	Primary
psf	Pounds Per Square Foot
psi	Pounds Per Square Inch
psig	Pounds Per Square Inch, Gauge Pressure
PT	Potential Transformer
Pvt. or Pvmt.	Pavement
R.	Radius
R.O.W.	Right-Of-Way
Sch.	Schedule
sec.	Secondary or Seconds
Sq. or sq.	Square
S.F.	Square Feet
S/S/P	Stop-Start-Pilot Station
Std. or std.	Standard
S.Y.	Square Yard
T&B	Top and Bottom
Typ.	Typical
U.O.N.	Unless Otherwise Noted
V or v	Volts
VAC or vac	Alternating Current Voltage
VDC or vdc	Direct Current Voltage
V.F.	Vertical Feet
Vol.	Volume
W or w	Watts
w.c.	Water Column
WSP	Working Steam Pressure
Yd. or yd	Yard

1.03 SYMBOLS

The following is a list of commonly used symbols that may be found in the Drawings and Specifications and their meanings:

0	Phase, Diameter, or Round (as applicable)
°F, °C	Degrees (F. = Fahrenheit, C. = Centigrade)
'	Feet or Minutes
"	Inches or Seconds
#	Number or Pound
/	Per or Divided By
3:1	3 horizontal to 1 vertical (slope)
1 on 3	1 vertical on 3 horizontal (slope)

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01100

ENVIRONMENTAL AND PROPERTY PROTECTION

PART 1 GENERAL

1.01 SUMMARY

Protect the environment in its natural state to the greatest extent possible during remediation activities. Environmental protection requires considerations of noise level and protection of air, water, and land resources. It involves solid waste management and activities aimed at the abatement of pollution in general.

1.02 SUBMITTALS

- A. The Contractor shall submit to the Engineer for approval a proposal for implementing an environmental protection plan as part of the Mobilization Plan submittal after the Notice of Award. This plan shall outline and provide for environmental protective measures to reduce or control unwanted environmental impacts that develop during normal construction practices. Comply with federal, State, and local regulations pertaining to the environment, including but not limited to water, air, and noise pollution.
- B. Preconstruction Survey: The Contractor shall participate in a preconstruction survey of the project site with the Engineer and photograph existing environmental conditions on and adjacent to the site.

1.03 COMPLIANCE WITH LAWS

- A. The Contractor shall ensure that all applicable federal, State, county, and municipal laws concerning unwanted environmental impacts of rivers, streams, waterways and drainage channels are being complied with by personnel and subcontractor(s). When a condition of noncompliance exists, the Engineer may issue an order stopping all or part of the work until satisfactory corrective actions are taken. All time lost due to stop orders will be at the Contractor's expense. The Contractor shall assume responsibility for the identification and acquisition of all permits required to complete the work.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 NOISE LEVELS

- A. Excessive use of vehicle horns and unmuffled exhaust systems will not be permitted. Take corrective action to redress such deficiencies.

3.02 CONTROL AND DISPOSAL OF PETROLEUM PRODUCTS

- A. Petroleum Products: Conduct the fueling and lubricating of equipment and motor vehicles to protect against spills and evaporation. Properly dispose of lubricants to be discarded and all excess oil in accordance with State regulations. In the event of a spill, immediately notify the Engineer and take countermeasures.

3.03 LAND RESOURCES PROTECTION

A. Preservation

1. Preserve all land resources within the site premises in their present condition or restore them to a natural condition at the completion of the Remedial Action, except as otherwise delineated by the Plans or Specifications.
2. Take appropriate measures to minimize damage to the wetlands during installation activities. The Plans depict the approximate wetlands boundary.

B. Erosion Protection

1. Selectively place materials to minimize erosion and to prevent excessive quantities of sediment from entering the Little Menomonee River or the adjacent wetlands.
2. Plan and conduct earthwork to minimize the duration that unprotected soil is exposed.
3. Comply with all applicable laws concerning soil erosion and sediment control.
4. Construct sedimentation or erosion control barriers as required to eliminate any impacts to the Little Menomonee River or the wetlands.

3.04 WATER RESOURCES PROTECTION

- A. Water Pollution:** Do not pollute or allow the pollution of the Little Menomonee River or drainage channels with fuels, oils, solvents, acids, insecticides, herbicides, trash, or other harmful materials and substances.

3.05 AIR RESOURCES PROTECTION

- A. Smoke:** Minimize pollution of air by adhering to the Health and Safety Plan guidelines. Take measures to prevent fires, and excessive vehicle smoke. Open burning of clearing debris, brush, demolition debris, or any other material on-site is prohibited.
- B. Dust Control:** Keep dust down at all times, including nonworking periods. Sprinkle or treat, with dust palliatives, the soil at the site and other areas disturbed by remediation activities. The use of dust palliatives other than water shall be preapproved by the Engineer in writing.

3.06 RECORDING AND PRESERVING HISTORICAL AND ARCHAEOLOGICAL DISCOVERIES

- A. Any objects having apparent historical or archaeological value discovered in the course of construction activities shall be faithfully preserved. Leave item undisturbed and immediately notify the Engineer of any such discovery. It will be the Engineer's responsibility to notify the proper archaeological or historical authorities.**

3.07 PROTECTION OF FISH AND WILDLIFE

- A. Perform all work in a manner that will not endanger fish and wildlife in the adjacent wetlands or downstream from the Little Menomonee River. Do not alter water flows or otherwise disturb the native habitat in the wetlands adjacent to the work area.**

3.08 DISPOSAL OF DEBRIS, RUBBISH, AND SOLID WASTE

- A. Rubbish and Debris:** Remove and dispose of rubbish and debris generated on the site. Transportation and disposal of rubbish shall comply with all applicable federal, State and local laws. Such materials are to be removed from the site prior to final completion and acceptance of the work.
- B. Solid Waste:** Place solid waste in containers that are regularly emptied. Do not prepare, cook, or dispose of food on-site. Prevent contamination of the site and other areas when handling and disposing waste. Upon

project completion, remove the solid waste containers and any solid waste on-site.

3.09 SEWAGE, ODOR, AND PEST CONTROL

- A. Dispose of sewage by using portable chemical toilets or comparably effective units, and arrange to periodically empty wastes by approved sanitary means, as discussed in Section 01500, "Temporary Facilities and Controls." Make provisions for pest control and the elimination of odors, if necessary.

3.10 MAINTENANCE OF EROSION CONTROL FACILITIES DURING CONSTRUCTION

- A. Maintain all facilities provided for erosion and sediment control under this contract as long as construction operations continue. Specifications for erosion control structures can be found in Section 02540, "Erosion and Sediment Control."

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.01 DESCRIPTION

- A. This section includes general requirements and procedures related to the Contractor's responsibilities for preparing and transmitting submittals to the Engineer to demonstrate that the performance of the work will be in accordance with the Contract requirements. Submittals include schedules, test results, topographic surveys, Contractor's Shop Drawings, samples, manuals, methods of construction and Record Drawings. Detailed requirements for submittals are specified under applicable sections of the Specifications pertaining to each item of work.

1.02 SUBMITTAL REQUIREMENTS

- A. No later than 30 days after the receipt of the Notice to Proceed, submit in writing a list of materials and equipment that will be purchased giving the name, the address, and the telephone number of the supplier, the manufacturer, or the processor. No material shall be incorporated into the work until approval of the source has been given. Delivery of materials to the Contract site prior to approval is made at the Contractor's risk and is subject to immediate removal at no cost to the Owner should it be determined that the source is not acceptable.
- B. Submittals shall be scheduled and coordinated with the Engineer. Submittal dates will be identified on the Contractor's construction schedule.
- C. The schedule for submission of submittals shall be arranged so that related equipment items are submitted concurrently. The Engineer may require changes to the submittal schedule to permit concurrent review of related equipment.
- D. The Contractor shall prepare a submittal log to track the proposed submittal date, the actual submittal date, the approval date, and the current status. The Contractor shall maintain an updated, accurate log and shall bring this to each scheduled progress meeting with the Engineer. The submittal log shall contain a brief description and a unique file number for use in tracking the status of submittals.

SCHEDULES

- A. Within five days after the construction start date set forth in the Notice to Proceed, the Contractor shall prepare and submit to the Engineer for review a detailed construction schedule showing the order in which the Contractor proposes to carry out the work and the dates upon which he proposes to start and complete each major work item. The schedule shall be an elaboration of the Bid Schedule, with completion dates remaining unchanged. The schedule shall show each major work item and shall include the dates for submittals, sample testing, approval of materials, and Contractor's Shop Drawings, as well as for the procurement of materials, plant, and equipment. The construction schedule shall be in chart form showing contemplated completion percentages and shall be arranged to record actual completion percentages at stated intervals. The schedule will outline in detail the proposed equipment, manpower, and production rates necessary to achieve the schedule. The Contractor shall update the schedule every two weeks, with any and all changes in equipment, manpower, etc., annotated.
- B. The Contractor shall furnish such additional information and data as required to justify the basis of the schedule.
- C. The accepted construction schedule shall be kept up to date as work progresses, including work added by change order, and shall be submitted to the Engineer every two weeks. If the Contractor fails to submit the required updated schedule within the time prescribed, the Engineer may withhold approval of progress payment estimates until such time as the Contractor submits the required updated schedule.
- D. The construction schedule shall, in general, determine the order in which the work is to proceed. However, the Engineer may order and authorize minor changes to this schedule whenever such changes are of definite advantage to or necessary for the efficient continuation of the work.
- E. The Contractor shall use Primavera Project Planner or another construction scheduling software, as approved by the Engineer. The schedule shall be arranged in general accordance with the bid form, and projected dollar cash flow requirements shall be shown for each month of construction.
- F. Schedule Revision

 - 1. The Engineer shall review and provide approval, if applicable, to the initial detailed construction schedule within 21 days of receipt of submittal.

2. Two-week schedule updates will be provided in a manner that shows the original approved schedule and the actual revised schedule on the same form. The original approved construction schedule will not be altered during construction.
 3. The Contractor will include with each schedule chart update a narrative of each specific revision, the reason for the change, the impact on schedule completion or milestone dates, and the potential for cost changes on current Contract.
 4. Two copies of each schedule update shall be submitted to the Engineer for review. The Engineer will provide approval, if applicable, to schedule updates within seven days of receipt of the submittal. Rejected schedule updates will be returned to the Contractor with comments on the reason for rejection. Resubmittal of schedule updates shall be subject to a seven-day review period.
 5. No progress payment requests shall be approved by the Engineer until there is an approved construction progress schedule update on hand.
- G. Each submittal shall be identified with a unique 10-digit numbering system.
1. The first digit shall be a D, an S, or an M, representing Shop Drawings or product data (D), material samples (S), or operation and maintenance manuals (M).
 2. The next five digits shall be the applicable specification number.
 3. The next three digits shall be the numbers 001 through 999 to indicate each sequential individual submittal under each specification section number.
 4. The last digit shall be a letter, A-Z, corresponding to the revision number (i.e., A = first submission, B = second submission, etc.).
 5. A typical submittal number would be as follows:

D-02710-003-B

D	=	Shop Drawing
02710	=	Specification section for chain-link fence and gates
003	=	Third submittal under this specification
B	=	Second submission (1st resubmittal) of that particular Shop Drawing

CONTRACTOR'S SHOP DRAWINGS

- A. The Contractor's Shop Drawings shall be neat in appearance, legible, and explicit to enable proper review to ensure Contract compliance. They shall be complete and detailed to show fabrication; assembly and installation details; material layout and connections; wiring and control diagrams; catalog data; pamphlets; descriptive literature; and performance and test data. They shall be accompanied by calculations or other sufficient information to provide a comprehensive description of the structure, machine, or system provided and its intended manner of use. If the Contractor's Shop Drawings deviate from the Contract documents, the Contractor shall advise the Engineer in writing with the submittal and state the reason for the deviation.
- B. No portion of the work requiring a Contractor's Shop Drawing shall be started nor shall any materials be fabricated, delivered to the site, or installed prior to the Engineer's approval of such items. Fabrication performed, materials purchased, or on-site construction accomplished that does not conform to approved Contractor's Shop Drawings shall be at the Contractor's risk. The Owner will not be liable for any expense or delay resulting from corrections or remedies required to accomplish conformity.
- C. The review and approval of Contractor's Shop Drawings by the Engineer shall not relieve the Contractor from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor; therefore, the Engineer shall have no responsibility.
- D. Contract work, materials, fabrication, and installation shall conform with approved Contractor's Shop Drawings.
- E. The Contractor shall submit installation Drawings that depict Contractor-designed items and methods of construction. Requirements for the Drawings will be cited in appropriate specification sections. Drawings shall be accompanied by calculations or other information to completely explain the structure, machine, or system described and list its intended use. Review and approval of such Drawings by the Engineer shall not relieve the Contractor from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error are assumed by the Contractor.
- F. Manufacturer's installation recommendations and instructions shall provide written detailed step-by-step preparation and installation instructions for the materials and products, including any recommended quality control testing, seaming, and joining, and repair specifications.

- G. When so specified or directed by the Engineer, the Contractor shall submit the proposed method of construction for specific portions of the work for review and approval. This submittal shall include a detailed written description of all phases of the installation operation to fully explain to the Engineer the proposed method of construction. If required by the Specifications, the Contractor shall submit installation Drawings to supplement the description. Review and approval by the Engineer will be in accordance with the approval process herein and shall not relieve the Contractor from his responsibility with regard to fulfillment of the terms of the Contract. All risks associated with the proposed method remain the Contractor's responsibility; therefore, the Engineer shall have no responsibility. After review and approval, if, in the opinion of the Contractor, modifications are necessary, the Contractor shall submit such modifications in detail, including reasons for the modifications. Modifications shall not be implemented without review and approval by the Engineer.
- H. Each Contractor's Drawing submitted by the Contractor shall have affixed to it the following certification statement signed by the Contractor:

"Certification Statement:

By this submittal, I hereby present that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers, and pertinent data, and I have checked and coordinated each item with other applicable approved Drawings and all contract requirements."

- I. All Drawing submittals for approval shall have the following identification data, as applicable, contained thereon or permanently adhered thereto:
1. Owner's name.
 2. Project name and location.
 3. Product identification.
 4. Drawing title, Drawing number, revision number, and date of Drawing and revision.
 5. Applicable Contract Drawing numbers and specification section and paragraph numbers.
 6. Subcontractor's, vendor's and/or manufacturer's name, address, and phone number.
 7. Contractor's certification statement.

8. For catalog product data or brochures submitted in packages of multiple items, the identification is needed on only the exterior. In such instances, the identification shall include page and catalog item numbers for items submitted for approval. If one or more of the items in such a submittal are not approved, resubmittal of only the unapproved items is required. Catalog, product data, or brochures containing various products, sizes, and materials shall be highlighted to show the particular item being submitted. Likewise, items not applicable to the Contract shall be marked "not applicable" or shall be crossed out.

- J. A vacant space approximately 2.5 inches high by 4 inches wide shall be provided adjacent to the identification data for the Engineer's status stamp.

- K. For the original submittal and each subsequent resubmittal that may be required, the Contractor shall submit six legible prints each of all Shop and Working Drawings, as well as six copies of the catalog data, the method of construction, and the manufacturer's installation recommendations to the Engineer for approval. Three copies of all Contractor's Shop Drawings will be returned to the Contractor.

- L. The Contractor shall allow 10 calendar days for checking and appropriate action by the Engineer. Contractor's Shop Drawings will be returned stamped with one of the following classifications:
 1. **APPROVED**—No corrections; no marks.
 2. **APPROVED AS NOTED**—A few minor corrections. All items may be fabricated as marked without further resubmission. Resubmit a corrected copy to the Engineer.
 3. **APPROVED AS NOTED—RESUBMIT**—Minor corrections. Items not noted to be revised and corrected may be fabricated. Resubmit Drawings as per original submission with corrections noted. Allow 10 days for checking and appropriate action by the Engineer.
 4. **REJECTED**—Requires corrections or is otherwise not in accordance with the Contract documents. No items shall be fabricated. Resubmit and allow 10 days for checking and appropriate action by the Engineer.
 5. **INFORMATION ONLY**—Items not reviewed or items for which submittals are not required.

MATERIALS AND PRODUCT CERTIFICATIONS

- A. The Contractor is required to conduct testing of materials and soil samples to certify they meet the requirements of the Specifications. The costs of sample testing shall be borne by the Contractor and included in the lump sum or unit prices shown on the Bid form. These certified test results will be submitted by the Contractor to the Engineer for approval of the material. The Engineer may conduct separate testing of material samples to confirm test results.
- B. Within 30 days after the Notice to Proceed, the Contractor shall submit names of material suppliers and borrow sources, if applicable, along with samples required by the Specifications or requested by the Engineer. Unless otherwise specified, the original submittal shall be a sample of each item and the associated testing results showing conformity with the Specifications. Approval shall be obtained prior to delivery of the material to the site. Each sample shall be representative of the actual material proposed for use in the project and of sufficient size to demonstrate design, color, texture, and finish when these attributes will be exposed to view. If samples deviate from the Contract documents, the Contractor shall so advise the Engineer in writing with the submittal and state the reason for the deviation.
- C. Each sample and laboratory test result shall have the following identification data permanently attached:
1. Contractor name, address, and phone number.
 2. Project name and location.
 3. Product identification.
 4. Applicable Contract Drawing and Specification section number.
 5. Unique identification number.
 6. Subcontractor's, vendor's, and/or manufacturer's name, address, and phone number.
- D. Allow 10 days for verification and appropriate action by the Engineer. Certain samples may be tested for specified requirements by the Owner before approval is given. Failure of a sample to pass such tests will be sufficient cause for refusal to consider further samples of the same brand and make of that material. Rejected samples will be returned upon request, and any or all resubmittals required shall consist of new samples and shall require an additional 10 days for verification and approval. All sample testing will be performed by the Contractor at the Contractor's

own expense. Upon approval, one sample so noted will be returned, and the remainder will be retained by the Engineer until completion of the work.

- E. Samples of various materials or equipment delivered to the site or during placement may be taken by the Engineer for testing. Samples failing to meet Contract requirements will automatically void previous approvals, and resubmittal or retesting of the samples will be required.

1.06 RECORD DOCUMENTS

- A. The Contractor shall keep one record copy of all Contract documents at the site in good order and annotated to show all revisions made during construction. Such annotations shall be kept current and may be inspected by the Engineer at any time. Failure to maintain current Record Drawings will be cause to delay progress payments. Record Documents shall be available to the Engineer at all times during the life of the Contract. All Contract Drawings, Specifications addenda, change orders, and other Modifications to the Contract shall be made a part of the Record Documents.
- B. Recorded information will consist of measured distances and depths of installed or removed utilities, locations of concealed portions of the work in reference to visible surface features, and field changes in dimension or detail.
- C. At the completion of the Contract, or at the Engineer's request and before final payment is made, the Contractor shall furnish the Engineer with one set of reproducible of the final Record Documents reflecting all revisions herein described.
- D. The Contractor shall be responsible for coordination and cooperation with Owner personnel and shall not permanently cover subbase, or material surfaces until after as-built surveys have been made. The Contractor shall also assist Owner personnel as required in ascertaining necessary location information.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01390

HEALTH AND SAFETY

PART 1 GENERAL

At all times, the Contractor shall conduct construction work safely and in accordance with applicable local, State, and federal requirements concerning construction health and safety. This specification provides a framework for preparation of a detailed site-specific Health and Safety Plan (HASP) that shall be submitted to the Engineer for approval prior to the start of any construction activities.

1.01 WORK INCLUDED

- A. Health and Safety Requirements for the Contractor. Health and safety is the sole responsibility of the Contractor. The Contractor shall take precautions to prevent damage, injury, or loss to all employees on the work site and to other persons who may be affected such incidents.
- B. Principal Work Items.
 - 1. Project-specific HASP development and implementation.
 - 2. Adherence to Owner's Contractor Safety Requirements (attached herein).

1.02 REFERENCES

- A. The site-specific HASP shall be consistent with the requirements of:
 - 1. 29 Code of Federal Regulations (CFR) 1926—Safety and Health Regulations for Construction, latest version.
 - 2. 29 CFR 1910—Occupational Safety and Health Standards (General Industry).
 - 3. 29 CFR 1910.120—Hazardous Operations and Emergency Response.
- B. Requirements for Worker Health and Safety included in the National Oil and Hazardous Substances Contingency Plan (40 CFR 300.38).
- C. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, NIOSH Publication No. 85-115, October 1985.
- D. The Standard Operating Safety Guidelines, EPA, November 1984.

- E. Site-specific analytical data results from the Remedial Investigation are included in Section 01020, "Subsurface Exploration," as general information on the extent of contamination present at the site.

1.03

SUBMITTALS

- A. The Contractor shall submit the proposed HASP within 10 working days from the date of the Pre-Construction Meeting and prior to conducting any mobilization or related site work.
- B. The HASP shall include, at a minimum:
 - 1. Name, qualifications, and telephone number of Contractor's physician.
 - 2. Employee training documentation.
 - 3. Employee compliance agreements.
 - 4. Logs and Reports.
 - a. Safety Inspection Log.
 - b. Weekly Health and Safety Report.
 - c. Check In/Check Out Log for the site.
 - 5. Qualifications of Health and Safety Officer (HSO).
 - 6. Qualifications of Site Safety Officer.
 - 7. Waste Excavation and Drum Removal Contingency Plan.
 - 8. Overall site operations safety plan.
 - 9. Emergency and contingency plans.
- C. Specific plan requirements are listed in Part 3 of this Specification—"Execution."

1.04

DEFINITIONS

- A. HSO. Contractor's representative responsible for development, submittal, and implementation of the HASP.
- B. Site Safety Officer. Contractor's representative directly responsible for the daily implementation of the HASP.
- C. Contaminated Material. Material that has come into contact with landfill subsurface soil and/or waste material and has not been tested or decontaminated to the satisfaction of the Engineer.
- D. Gaseous Conditions. (Use OSHA definition).
- E. Potentially Gaseous Conditions. (Use OSHA definition).

- F. Non-gaseous Conditions. (Use OSHA definition).
- G. OSHA Permissible Exposure Limits (PEL). Time-weighted average (TWA) concentrations to which most workers can be exposed for eight hours per day, 40 hours per week on a permanent basis with no significant health effects. These concentrations are enforceable OSHA standards. (Source: NIOSH/OSHA; Pocket Guide to Chemical Hazards, June, 1990.)
- H. Immediately Dangerous to Life and Health (IDLH). Concentrations representing a maximum level from which one could escape within 30 minutes without any escape-impairing symptoms or irreversible health effects. (Source: NIOSH/OSHA; Pocket Guide to Chemical Hazards, June, 1990.)
- I. Threshold Limit Values—Time Weighted Averaged (TLV-TWA). Time-weighted average concentrations to which most workers can be exposed for eight hours per day, 40 hours per week on a permanent basis with no significant health effects. They are similar to PELs, except they are not enforceable standards and are updated annually. (Source: ACGIH Threshold Limit Values and Biological Exposure Indices for (1990-91.)

1.05

SITE SAFETY REGULATIONS

- A. The Contractor shall report any suspected contaminated material to the Engineer upon discovery.
- B. Contact with contaminated or suspected contaminated surfaces should be avoided.
- C. Alcoholic beverages and controlled substances shall not be allowed on-site.
- D. A site HASP shall be developed for all phases of site operations and shall be made available to all personnel.
- E. All personnel shall be familiar with standard operating safety procedures and any additional instructions and information contained in the site HASP.
- F. All personnel shall adhere to the site HASP. Personnel entering the site will be required to read and sign the HASP, demonstrating their concurrence with the requirements and their understanding of the safety procedures of the plan.

- G. All personnel going on-site shall be adequately trained and thoroughly briefed on anticipated hazards, safety equipment to be employed, safety practices to be followed, emergency procedures and communications, and responsible safety personnel on-site.
- H. Entrance and exit locations shall be designated and posted, and emergency escape routes shall be delineated. Warning signals for site evacuation must be established and communicated to all personnel.

1.06 MEDICAL CARE

Medical care is divided into routine health care and emergency medical care and treatment.

- A. Routine Health Care. Routine health care shall provide special pre-assignment and periodic medical examinations.

Any special tests needed depend on the chemical substance to which the individual could be or has been exposed, as recommended by the physician.

Care and counseling in the case of potential, known, or suspected exposure to toxic substances shall also be provided.

- B. Emergency Medical Care and Treatment. The Medical Program shall address emergency medical care and the treatment of project personnel. The medical program shall include:

1. The posted name, address, and telephone number of the nearest medical facility with a map, the travel time, and the directions from each job site.
2. An investigation of local emergency organizations to respond to potential emergencies at the site. If local organizations are unable to adequately respond, other emergency prearrangements shall be made.
3. Arrangements shall be made to quickly obtain emergency services. Telephone numbers and procedures shall be posted.
4. Local Medical Facility:
Community Memorial Hospital
Menomonee Falls, WI
(414) 251-1000

PERSONNEL**A. HSO****1. Qualifications.**

- a. Two or more years' relevant experience.
- b. HSO Certified Safety Professional (CSP) or a Certified Industrial Hygienist (CIH).
- c. Management/supervisor training course completed in accordance with 29 CFR 1910.120(e)(4).

2. Responsibilities.

- a. Develop, submit, and implement HASP.
- b. Conduct site inspections to monitor compliance with HASP.
- c. Provide and coordinate training sessions.
- d. Conduct incident investigations and follow-up.

3. Authority.

- a. Suspend work as necessary, due to HASP violations, health-related incidents, and other increased risk situations.
- b. Remove personnel from site if construction activities endanger.
- c. Authorize personnel to enter the site.

B. Site Safety Officer.**1. Qualifications.**

- a. One or more years' relevant experience.
- b. Current certification in First Aid and CPR procedures.
- c. Management/supervisor training course completed in accordance with 29 CFR 1910.120(e)(4).

2. Responsibilities.

- a. Direct health and safety activities on-site.

- b. Report safety-related incidents to HSO and fill out incident forms as required.
 - c. Implement HASP.
 - d. Maintain health and safety equipment.
 - e. Perform air monitoring as required by the HASP under the supervision of the HSO.
3. Authority.
- a. Suspend field activities if health and safety of personnel are endangered.
 - b. Suspend an individual from field activities for infractions of the HASP.

2.0 PRODUCTS

NOT USED.

3.0 EXECUTION

3.01 GENERAL

- A. The written Health and Safety Program shall contain and/or address:**
- 1. An organizational structure.
 - 2. A comprehensive work plan.
 - 3. Project-Specific HASP.
 - 4. Health and Safety Training Program.
 - 5. The Medical Surveillance Program.
 - 6. Standard Operating Procedures (SOPs).
 - 7. Any necessary interface between general program and site-specific activities.
- B. The Contractor shall be solely responsible for ensuring the Health and Safety Program meets all requirements of 29 CFR 1910.120(b).**

HEALTH AND SAFETY PLAN**A. General.**

1. Minimum requirements for the HASP are presented in this section. The Contractor shall develop the HASP using these elements as a basis, adding additional requirements as deemed necessary by the Contractor. The Contractor shall not commence work prior to the Engineer's review of the HASP.
2. The HASP shall establish guidelines for the safety of personnel during the conduct of work. The Contractor shall make available a copy of the HASP to each employee. All employees shall be required to read and understand the HASP, to sign a compliance agreement, and to abide by all provisions of the HASP. Plan may be modified by the HSO, with written review and comments from the Engineer, in response to site conditions.
3. The HASP shall include:
 - a. A Site Description. Physical description of site and site conditions. Site-specific data pertaining to hazards. Identifies hazards known at time. If additional hazards are discovered, they should be added to this section by change order.
 - b. A Project Description. Project-specific description of work to be performed.
 - c. A Hazard Assessment. Hazard assessment shall include a task-by-task risk assessment that provides strategies for protection of workers against the following hazards:
 1. For activities that involve no hazardous material contact, primary hazards are physical hazards associated with construction, use of heavy equipment, and fire hazards.
 2. For activities that involve only limited hazardous material contact or the potential for hazardous material contact, the following hazards shall be appropriately protected against:
 - a. Physical hazards associated with construction, use of heavy equipment, and fire hazards.
 - b. Heat stress/cold stress.
 - c. Inhalation of contaminants.

- d. Skin or eye contact with contaminants.
 - e. Ingestion of contaminants.
3. For activities that involve direct contact with hazardous materials, the following hazards shall be appropriately protected against:
- a. Physical hazards associated with construction, use of heavy equipment, and fire hazards.
 - b. Heat stress/cold stress.
 - c. Inhalation of contaminants.
 - d. Skin or eye contact with contaminants.
 - e. Ingestion of contaminants.
- d. List of Key Personnel. The HASP shall identify key Contractor personnel responsible for site safety, as outlined in Item 1.05. A list of the names, telephone numbers, organizations, and addresses of these individuals shall be conspicuously posted at the site.
- e. Air Monitoring Program.
- 1. The HASP shall designate the personnel responsible for implementing the air monitoring program.
 - 2. The Site Safety Officer shall be responsible for enforcing established Air Action Levels.
 - 3. The Air Monitoring Program shall be described in detail in the HASP and, at a minimum, shall include:
 - a. Work Area Monitoring Program during construction activities.
 - b. Personnel monitoring, as appropriate.
 - 4. During construction activities, a Work Area Monitoring Program shall be implemented, including surveys of work areas and vicinity using at least the following instruments:

- a. Combustible Gas Indicator (CGI).
- b. Photoionization Detector (PID).
- c. Detector tubes for periodic measurements of specific compounds, as appropriate.

5. Action Levels.

- a. CGI measurements are applicable to confined spaces on the site.
 - i. The CGI shall measure concentrations of flammable gases in the air as a percentage of the Lower Explosive Limit (LEL).
 - ii. Action Level: 10 percent or greater of the LEL—all ignition sources shall be shut off and personnel shall be restricted from the affected area.
- b. PID readings. The HSO shall use data from the Site Characteristics Summary to determine known and suspected air contaminants and to establish level of protection upgrade/downgrade action levels to be based on PID readings.

f. Emergency Response Procedures.

- 1. Emergency Response Procedures shall be included in the HASP.
- 2. Response actions to control releases of contaminants shall be included in the HASP.

g. Decontamination Procedures

Decontamination procedures shall be developed and implemented for all appropriate phases of work.

h. Confined Space Entry Procedures

Confined space entry procedures shall be developed and implemented in accordance with the 14 January 1993 Final Rule of 129 CFR 1910.146.

i. Spill Containment Program

Where spills may occur, a spill containment program shall be implemented to contain and isolate the entire volume of the potentially hazardous material, liquid, etc.

j. Personal Protective Equipment

A written personal protective equipment program (which is part of the Health and Safety Program) shall be implemented to address the protective equipment requirements for each of the site tasks and operations to be conducted.

k. Site Control Measures

A site control program and appropriate procedures shall be implemented to control employee exposure to hazardous substances as part of the Health and Safety Program.

3.03

TRAINING REQUIREMENTS

A. The Contractor shall provide training that complies with the requirements of 29 CFR 1926.21 and other applicable portions of 29 CFR 1910 and 1926 to all of its employees and its subcontractors that will be assigned to the project. Training shall cover (at a minimum):

1. Names of personnel and alternates responsible for site health and safety.
2. Health and safety hazards present on-site.
3. Personal protective equipment use, care, and limitations.
4. Work practices that minimize risks from hazards.
5. Safe use of engineering controls and equipment on-site.
6. Hazard Communication (Right-To-Know program).
7. Site control measures.
8. Site SOPs.
9. Contingency plan.
10. Confined space entry procedures.

11. Identification and avoidance of harmful plants/animals and related first aid procedures.

In addition, employees who are responsible for responding to emergency situations shall be trained in how to respond to any anticipated emergency conditions.

B. Emergency Response Training.

1. Site Evacuation Drill. One site evacuation drill shall be conducted during the first full week of work to test the effectiveness of evacuation protocols.
2. Fire Extinguisher Training. At least one member of each crew shall be trained in the use of portable fire extinguishers, in accordance with 29 CFR 1910.157(g).

- C. Visitor Training. Contractor shall be responsible for training visitors to the site to make them aware of hazards associated with the site and to explain emergency procedures.

3.04 STANDARD OPERATING PROCEDURES

Contractor shall develop and implement SOPs. At a minimum, the following SOPs shall be written:

- A. Heat Stress/Cold Stress Prevention Plan.
- B. Respiratory Protection Plan.
- C. Hearing Conservation Plan
- D. Bloodborne Pathogens Exposure Control Plan
- E. Incident/Accident Reporting Procedures.
- F. Site Control Procedures.
 1. Security procedures.
 2. Communication procedures.
 3. Site layout.
 4. Work zones.
 5. Documentation of site access.

G. Emergency Preparedness.

1. Procedures to address the following emergency situations:
 - a. Medical emergencies.
 - b. Fires.
 - c. Spills.
 - d. Accidents.
 - e. Safety equipment problems.

2. Provisions for emergency equipment, such as (at a minimum):
 - a. First aid kits.
 - b. Fire extinguishers.
 - c. Splints.
 - d. Blankets.
 - e. Eyewashes and emergency showers.
 - f. Bloodborne pathogens kits (biohazard cleanup)

3.05 INSPECTIONS

It shall be the responsibility of the Contractor to determine and document that the Health and Safety Program is being followed in accordance with minimum requirements of this Specification and any additional requirements of the Contractor HASP. This shall be accomplished through the use of inspections and audits conducted by the Site Safety Officer and staff on a daily basis and by the HSO, as required.

3.06 RECORD-KEEPING

Contractor shall maintain, as a minimum, the records specified in this section and any additional records required to develop, implement, and maintain the requirements of the Contractor HASP.

3.07 REPORTING

- A. The Contractor shall provide submittals in accordance with Item 1.03 of this section.

- B. The Contractor shall notify the Engineer when work may affect adjacent properties. All damage, injury, or loss of any property caused by the work shall be remedied by the Contractor at no additional cost to the Engineer.

PART 4 PAYMENT

4.01 GENERAL

- A. Payment for all work necessary for preparing implementing and managing a Health and Safety Program, including preparation of a site-specific HASP, shall be considered incidental to the Contract and shall be included in the appropriate lump sum and unit prices, as stated in the bid form.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

ADHERENCE TO OWNER'S CONTRACTOR SAFETY REQUIREMENTS



SAFETY GUIDELINES

No. _____
Date _____
Page _____

CONTRACTOR SAFETY AND HEALTH PROGRAM (SUPPLEMENT)

A. MINIMUM SAFETY AND HEALTH GUIDELINES FOR CONTRACTORS

Safety and health guidelines for contractor employees performing work on Kerr-McGee premises are based on the nature of the work to be performed and the associated potential hazards. Recommended guidelines for different types of contractors, contract work and work locations are categorized and defined in this document.

For contractor employees covered by policy 50.07, orientation and training for site-specific hazards, procedures and rules should be required. While it is the contractor's responsibility to provide or obtain the necessary training for each contractor employee prior to starting work on Kerr-McGee property, Kerr-McGee should verify contractor's training status. In some cases, Kerr-McGee may agree to provide certain site-specific orientation and training.

The requirements of Corporate Policy No. 50.07 do not necessarily apply to contractor employees who, in the judgment of the operating unit head or his designee, have little or no exposure to worksite hazards. Such exemption may be applied to certain short-term, minimal-risk contractors usually working one day or less. Visitor safety and health rules in effect at the respective worksite should apply at all times when the worksite is entered.

For purposes of this guideline, contractors covered by the policy are classified into three categories; Low-Risk Contractor, Stand-Alone Contractor, and Process/Maintenance Contractor. Each category represents incremental levels of perceived risk and requires more stringent guidelines. If the appropriate contractor category is in doubt, the more stringent category should apply.

Recommended guidelines for the three contractor categories are as follows:

1. **LOW RISK CONTRACTORS** - Contractors in this category include those who, by the nature, location and duration of the work to be performed, are limited to low hazard exposure risks that can affect themselves or Kerr-McGee employees.

Low risk contractors should:

- a. Have a written, executed contract.
- b. Comply with facility access control procedures (sign in/out procedures or other notification procedures acceptable to Kerr-McGee).

- c. Limit travel on company premises and facilities to that necessary for performing the work or services contracted.
 - d. Comply with the substance abuse policies in effect for the organization or facility at which the work or services are performed.
 - e. Become familiar with the physical characteristics of the worksite, including familiarization with emergency evacuation procedures.
 - f. Provide safe, functional equipment - including approved personal protective equipment and clothing appropriate for the type of work and work location and maintain such equipment in good working condition.
 - g. Be subject to Kerr-McGee inspection, testing and acceptance of contractor-provided equipment.
 - h. Obtain Kerr-McGee approval of subcontractors before utilization on company premises. Subcontractors should meet the same safety and health requirements and provide the same information to Kerr-McGee as required of contractors.
 - i. Report all worksite accidents, injuries and occupational illnesses to the appropriate Kerr-McGee personnel in accordance with the applicable regulatory recordkeeping guidelines.
2. **STAND-ALONE CONTRACTORS** - Stand-alone projects (typically new site construction) are those contracted projects which are neither subject to hazards from Kerr-McGee operations nor capable of causing contributory risk to Kerr-McGee employees, operations or processes. However, contract employees are subject to risk from the job being performed by the contractor. For stand-alone projects, contractors should comply with all requirements for Low-Risk Contractors, applicable regulations and company safety rules pertaining to their work, and:
- a. Provide to Kerr-McGee a completed Contractor Safety and Health Screening Questionnaire (Form KM-5963).
 - b. Provide documentation that appropriate credentials, permits or licenses are in order for performing the contracted work, e.g. licensed electrician, certified crane operator, certified welders, certified hazardous waste removal, etc.

- c. Provide documentation that contractor employees have been trained and properly fitted for all personal protective equipment required to perform the contract work or services, including respirator fit testing and medical clearance for each contractor employee whose work will require regular use of respiratory protection.
 - d. Provide documentation pertaining to inspections and certification of contractor construction equipment where required by law or company contract provision.
 - e. Promptly notify appropriate company personnel of any regulatory agency inspection of contractor activities while on company property.
3. **PROCESS/MAINTENANCE CONTRACTORS** - This category includes contractors who are typically involved with day-to-day process operations, maintenance, construction, or major plant modifications with existing facilities, or whose work activity and location creates potential hazard exposure to themselves as well as Kerr-McGee employees, facilities and processes.

In addition to compliance with the requirements of the provisions of the previous two categories, contractors in this category should:

- a. Comply with the safety and health rules and procedures in effect for the facility, activity or process where the contract work is to be performed, including use of appropriate personal protective equipment and clothing. For specialized contract work such as asbestos removal, or major contract projects such as maintenance "turnarounds," appropriate requirements shall be specified in the contract.
- b. Obtain prior authorization from Kerr-McGee, including appropriate work permits where required by company procedures or regulation for work involving hazardous areas, confined spaces, hot work, high voltage electrical, pressure testing, line breaking, ground breaking, excavations and trenches, elevated work, or other work on active processes or energized systems.
- c. Follow company procedures in effect for notification and exchange of information regarding known hazards created during the performance of work.

B. CONTRACTOR SCREENING/SELECTION REQUIREMENTS

1. Prospective contractors whose work will categorize them as stand-alone or process/maintenance contractors should complete and submit a Kerr-McGee Contractor Safety and Health Screening Questionnaire (Form KM-5963). Within 24 months of the effective date of policy 50.07, contractors should not be considered for work on Kerr-McGee premises unless it is verified that:
 - a. The prospective contractor's Experience Modification Rate (EMR) for the previous year is no higher than 1.00, or the previous three-year average does not exceed 1.20, and;
 - b. The prospective contractor's three-year average injury incidence rates for cases involving days away from work and total recordable cases are not greater than the most current corresponding national industrial rates for the Standard Industrial Classification (SIC) in which the contractor works.

These rates may be determined from the most recent edition of the U.S. Bureau of Labor Statistics publication "Occupational Injuries and Illness in the United States by Industry". These are available from the Corporate Safety Division.

EXEMPTIONS: In extraordinary circumstances, contractors not meeting either of the above requirements may be allowed to work on company property provided they are acceptable to - and a specific exemption is granted by - the organizational unit head or designee.

2. Bid invitation "packages" provided to prospective contractors by Kerr-McGee shall include safety and health requirements for the work to be contracted.
3. The Contractor Safety and Health Screening Questionnaire may be used for development of a "pre-qualified" list of acceptable contractors. Once pre-qualified, these contractors may perform work requiring immediate attention, provided a current contract, Master Work or Service Agreement for each contractor is on file.
4. Pre-qualified contractors and supporting Master Work or Service Agreements should be reviewed by the appropriate operating unit personnel at least annually for determination that the contractor continues to qualify, and that the Master Work or Service Agreement continues to reflect applicable safety and health requirements.

5. Outstanding Contracts, Master Work or Service Agreements in force on the effective date of this policy should be reviewed for compliance with this policy at the earliest date possible, compatible with the terms of the contract. Thereafter, all existing and prospective contractors should be subject to this safety and health evaluation and selection process.
6. At the discretion of the Unit Head or his designee, Kerr-McGee may agree to provide specialized safety and health training to certain small contractors (<10 employees) to ensure compliance with this policy. In these cases, the completion of the Contractor Safety and Health Screening Questionnaire is optional.

C. CONTRACT PROVISIONS

1. The contractor should provide Kerr-McGee with written verification that contract safety and health requirements have been reviewed with contractor employees and that those employees understand the requirements.
2. All construction or service work should be represented by an approved, written, executed Master Work or Service Agreement, Construction or Field Services Agreement, or job-specific Contract appropriate to the work to be performed.
3. Anticipated safety and health requirements shall be addressed in all agreements. Contract addenda should be used when necessary for clarification.
 - a. Guidelines appropriate to the contractor category (as described in Section A) should be included. Safety and health protection appropriate to the potential hazards associated with the location, methods, materials, and processes, shall be specific. Some examples of work requiring specialized provisions include asbestos removal, hazardous waste operations, working in hazardous atmospheres, and confined-space entry. Contract requirements for this type of specialized work should be developed by the project manager with the assistance of corporate, organizational unit, and facility support groups.
 - b. Contracts or addenda should contain requirements for reporting to Kerr-McGee contractor accidents, injuries and illness, in accordance with the applicable regulatory recordkeeping guidelines. Contractor employee hours worked while on company premises shall also be reported, or estimated when not available. This information will be submitted to the Corporate Safety Division each month by the operating unit, as received from the contractor.

- c. Contracts or addenda should require the contractor to obtain company approval of prospective subcontractors before such subcontractors are allowed on company premises.
 - d. Safety and health requirements contained in Master Work or Service Agreements and Construction or Field Services Agreements shall be reviewed for appropriateness and revised as necessary prior to contract renewal. Responsibility for contract review and revision should rest with the project manager under the direction of the facility manager or organizational unit head or their designees. Corporate, organizational unit and facility support groups should promptly provide information to the project manager regarding changes in safety and health requirements when they occur.
- 4 A checklist should be used to review all contract requirements for completeness. Each operating unit should determine the appropriate checklist elements for its specific program and the criteria that determine the acceptability or disqualification of a contractor.

D. CONTRACT ADMINISTRATION

Knowledgeable staff should be assigned before any contract is executed to properly define the work and outline necessary safeguards for its performance. Similarly, adequate attention must be given to oversight of the actual work performed once the contract has been executed.

In developing the operating unit's Contractor Safety and Health Program, the unit head should designate resources sufficient to perform all of the required functions of contract execution, administration and enforcement.

Shown below is a list of administrative functions that should be considered when developing Contractor Safety and Health programs. This list should be used as a guide only and is not intended to be appropriate for all contract situations.

1. Evaluate and select contractors.
2. Conduct pre-startup meeting(s) with contractor (when needed).
3. Ensure that contractor has a clear understanding of Kerr-McGee's safety and health requirements.
4. Verify that all necessary contract documents are in order, properly executed, distributed and filed.
5. Monitor contractor's performance to ensure that contractor complies with agreed-upon safety and health requirements.

6. Conduct routine inspections of contractor performance.
7. Ensure that necessary work permits for jobs such as hot work, confined space, pressure testing and opening of lines are properly issued and complied with.
8. Determine if and when corrective action is needed and (in conjunction with operating unit management) provide counseling and/or take disciplinary action as required.
9. Ensure that require documentation is retained in accordance with Corporate Policy 30.02.



CONTRACTOR SAFETY AND HEALTH SCREENING QUESTIONNAIRE

Please complete this form and return it to the undersigned at your earliest convenience. This information will be kept on file and used to evaluate contractors for our various projects.

Obtain from your insurance agent (or state fund, if applicable) your workers compensation insurance experience modification rate (EMIR) for the three rating periods and complete the following:

	POLICY YEAR	EMIR
Most recent policy year		
1 year prior		
2 years prior		

If your EMIR is exactly 1.0 for any policy year, is it because your firm is (or was) too new or too small to have an EMR calculated? YES NO

We require verification for the above information. Any of the following methods will be acceptable:

- a. Furnish a letter from your insurance agent, insurance carrier, or state fund (on their letterhead) verifying the EMIR data listed above; or
- b. Provide a copy of the last three years' "Experience Rating Calculation Sheets," which your insurance carrier should forward to you annually; or
- c. Provide a copy of the page of your last three years' insurance policies that show the experience modification rate and the coverage period.

If you were required to complete OSHA 200-S reports for the last three years, please attach copies. If you were not required to complete OSHA 200-S reports, please provide the following information:

Three previous calendar years	19__	19__	19__
Number of employees			
Number of medical-treatment cases*			
Number of lost-workday cases**			
Number of fatalities			
Exposure hours***			
Number of lost workdays****			

DEFINITIONS

- * Medical Treatment Case — A case resulting from a work accident or illness that does not result in lost-time or restricted work where the contractor employee receives medical treatment administered by a physician or by registered personnel under the standing orders of a physician. Medical treatment does not include first-aid cases, even though first aid is administered by a physician or registered professional personnel, but does include loss of consciousness or incidents that require more than one dose of prescription medicine.
- ** Lost-workday case — Any injury or illness that results in the employee being unable to work the next scheduled shift, and any injury or illness where the employee, following medical treatment, is:
 - assigned to a temporary job,
 - working at a permanent job less than full time, or,
 - working at a permanently assigned job but unable to perform all duties normally required.
- *** Exposure hours — Number of actual hours worked by employees during the calendar year.
- **** Lost workdays — Number of days injured or ill employees were scheduled to work but could not.

Yes (See below) No

IF YES, DOES IT INCLUDE THE FOLLOWING?

	CHECK ONE	
	YES	NO
Safe work practices		
Inspection techniques		
Toolbox safety meetings		
Emergency procedures		
First-aid procedures		
Accident prevention		
Fire protection and prevention		
Prework orientation		
Post construction clean-up and orientation		
Hazard communication		
QUESTIONS		
Have you ever been inspected by OSHA or MSHA?		
If yes, have citations been issued in last 3 years? (Attach copies of citations)		
Do you conduct inspections and tests of construction equipment, for example: slings, cranes, hand and power tools, electrical supply, ground fault circuit interrupters?		
Are records prepared and maintained as required by federal and state laws?		

If operators of equipment are certified, enter name of person/organization/consultant providing certification for:

NAME

MOBILE EQUIPMENT

FORK LIFT TRUCKS

COMMENTS

QUESTIONNAIRE COMPLETED BY

NAME

COMPANY

ADDRESS

TELEPHONE

DATE

This evaluation form is to be completed and attached to each completed Contractor Safety and Health Screening Questionnaire, (Form KM-5963), following review.

This document is confidential and shall not be given to prospective contractors.

CONTRACTOR/COMPANY NAME

The average Workers' Compensation Experience Modification Rate (EMR) is 1.0. Less than 1.0 is better than average. An EMR equal to or greater than 1.2 for any single year requires further investigation, and an exception must be granted by the Organizational Unit Head or his designee.

COMMENTS

From the information provided in the Safety and Health Screening Questionnaire (KM-5963), or OSHA 200-S reports, calculate an annual all injury incidence rate for each calendar year indicated.

Incidence Rate = $\frac{200,000 \times \text{Total number of medical treatment cases, lost workday cases, fatalities.}}{\text{Total number of employee exposure hours}}$

Incidence Rate for 19____ = _____, 19____ = _____, 19____ = _____

INDUSTRY OR SIC CODE	MOST CURRENT NATIONAL AVERAGE ALL INJURY INCIDENCE RATE FOR SIC CODE LISTED *
----------------------	---

* Contact your local Safety department or Corporate Safety for national average all injury incidence rates and acceptable contractor incidence rates.

COMMENTS

Prospective contractor responses to contractor safety and health training program questions in form KM-5963 should be "yes" to indicate the presence of an ideal contractor safety program. Any "no" response should be evaluated further and considered in the selection process.

COMMENTS

EVALUATION (Check One)

- The information submitted by the contractor indicates acceptable safety performance as experienced by the particular industry. A basic safety program appears to be in place.
- The information submitted indicates the contractor has unacceptable safety performance or does not appear to have a basic safety program in place.

NAME (PRINT)

SIGNATURE

DATE

EXAMPLE

CONTRACTOR SAFETY AND HEALTH PROGRAM CHECKLIST

A. CONTRACTS	YES	NO
1. Has a Master Service Agreement, Master Work Agreement for construction or Field Services, or a specific job contract been prepared and executed for all contractors on company property?	_____	_____
2. Has an evaluation been conducted and a Contractor Questionnaire Evaluation (Form KM-5964), completed and signed by the appropriate company representative prior to contract execution?	_____	_____
3. Are the following contractor documents in order?		
State license?	_____	_____
Specialized work license (if applicable)?	_____	_____
Current insurance certificate?	_____	_____
Performance bond (if required)?	_____	_____
4. As part of the executed contract, have site-specific safety and health rules been identified to the contractor?	_____	_____
5. Does the contractor:		
a. Have a copy of applicable federal, state, and local safety and health regulations?	_____	_____
b. Conduct inspections & tests and maintain records? (GFCI's, slings, cranes, PPE, etc.)	_____	_____
c. Have access to injury reporting and recordkeeping requirements?	_____	_____
d. Conduct new-hire safety and health orientation?	_____	_____
e. Hold contractor employee safety meetings?	_____	_____
f. Conduct safety and housekeeping inspections?	_____	_____
g. Schedule required inspections and tests of contractor equipment?	_____	_____
h. Provide proof of certification training for crane and mobile equipment operators as appropriate?	_____	_____
i. Provide a liaison with company project/plant management?	_____	_____
j. Employ a full-time safety officer on large projects?	_____	_____

CONTINUED

- | | YES | NO |
|--|-------|-------|
| k. Conduct pre-employment physicals? | _____ | _____ |
| l. Utilize a substance abuse program? | _____ | _____ |
| m. Have a respiratory protection program? | _____ | _____ |
| n. Have a hearing conservation program? | _____ | _____ |
| o. Have a confined space entry/lockout procedure? | _____ | _____ |
| p. Have a hazard communication program? | _____ | _____ |
| q. Comply with hazardous waste regulations? | _____ | _____ |
| r. Have a current inventory list of all hazardous materials? | _____ | _____ |
| 6. If contractor does not comply with the items in No. 5 above, have arrangements been made with Kerr-McGee to provide necessary training and/or assistance? | _____ | _____ |

B. KERR-McGEE REQUIREMENTS

- | | | |
|--|-------|-------|
| 1. Has the contractor's written safety and health program been received and evaluated by the appropriate company representative? | _____ | _____ |
| a. Has the evaluation been included in contractor selection? | _____ | _____ |
| b. Is the necessary documentation being retained? | _____ | _____ |
| 2. Are the following items to be furnished to the contractor: | | |
| a. Contractor safety orientation/training? | _____ | _____ |
| b. Facility or operating unit safety handbook or copies of applicable local safety rules? | _____ | _____ |
| c. Independent Contractor Safety Handbook? | _____ | _____ |
| d. Applicable local or facility procedures such as lockout/tagout, hot work permit system, confined space entry? | _____ | _____ |
| e. Description of noise and respiratory protection areas on premises? | _____ | _____ |
| f. Information on areas of premises containing asbestos or other fibers? | _____ | _____ |
| g. Hazard Communication information on chemicals encountered on premises? | _____ | _____ |
| h. Fire protection system information? | _____ | _____ |
| i. Emergency response information such as alarm system description, evacuation procedures, etc.? | _____ | _____ |

SECTION 01400

CONTRACTOR'S QUALITY CONTROL

PART 1 GENERAL

1.01 DESCRIPTION

- A. This section includes general requirements related to the Contractor's responsibility for quality control involving inspections, tests, certificates, and reports. This section also details the requirements for preparing a Construction Quality Control (CQC) Plan.
- B. The specific quality control testing requirements are contained in the specification governing that portion of the work.

1.02 INSPECTIONS

- A. The Engineer has the right to inspect all materials and equipment at all stages of development or fabrication, and shall be allowed access to the site and to the Contractor's and the supplier's Shops to conduct such inspections. On-site work will be subjected to continuous inspection. Inspection by the Engineer will not release the Contractor from responsibility or liability with respect to material or equipment. The Engineer will provide the Contractor with a minimum of 24 hours' notice prior to unscheduled off-site inspections.
- B. When local codes or laws require approval and inspection of the work by other agencies or organizations before installation or operation, the Contractor shall obtain such approval and submit one signed original and three copies of the approval to the Engineer.

1.03 CONSTRUCTION QUALITY CONTROL TESTING

- A. All quality control testing during construction shall be completed by the Contractor in accordance with the methods and frequencies stated in the specifications and in the approved CQC Plan.
- B. Routine testing frequencies for material evaluation during construction are included in the specifications.
- C. During construction, the frequency of testing may increase as a result of the following conditions:
 - 1. Adverse weather conditions
 - 2. Breakdown of equipment

3. Failure of material to meet specification
 4. Reduction of work area
- D. Holes or perforations created from Nuclear Density Testing or other types of damage will be repaired with bentonite powder, pellets, or chips as appropriate. Compact by hand and hydrate.
- E. Defects in material placement or in the quality of materials will be corrected by the Contractor at no cost to the Engineer. Deficient work will be either scarified, reworked, and compacted to meet the specifications or removed and replaced with new materials meeting the requirements of the specifications.

1.04

REPORTS

- A. Where transcripts or certified test reports are required by the Contract documents, they shall meet the following requirements:
1. The Contractor shall submit for approval by the Engineer required transcripts, certified test reports, certified copies of the reports of all tests required in referenced specifications or specified in the Contract documents, and have subsequent approval of the Engineer before delivery of materials. The testing shall have been performed in an approved independent laboratory within six months of submittal of the reports for approval. Transcripts of test reports shall be accompanied by a notarized certificate in the form of a letter from the manufacturer or the supplier certifying that the tested material meets the specified requirements and is of the same type, quality, manufacturer, and make as that specified. The certificate shall be signed by an officer of the manufacturer or supplier.
- B. At the option of the Engineer, or where specified, the Contractor may, in lieu of the specified tests and other tests required in the various reference documents, submit for approval a notarized Certificate of Compliance in the form of a letter from the manufacturer. The Certificate shall state the following:
1. Manufacturer has performed all required tests.
 2. Materials supplied meet all test requirements.
 3. Tests were performed within six months of submittal of the Certificate.
 4. Materials that were tested are of the same type, quality, manufacture, and make as those specified.

The certificate shall include an identification of the materials. The Certificate shall be signed by an officer of the manufacturer. Materials shall not be delivered until written approval of the Certificate by the Engineer.

- C. The Contractor shall submit Manufacturer's Certificates for the installation of those items listed in the specifications.
- D. Manufacturer's Certificates shall state the product has been installed under either the continuous or the periodic supervision of the manufacturer's authorized representative, that it has been adjusted and initially operated in the presence of the manufacturer's authorized representative, and that it is operating in accordance with the specified requirements to the manufacturer's satisfaction.

1.05 CONSTRUCTION QUALITY CONTROL PLAN .

- A. The Contractor shall prepare and submit a CQC Plan for approval prior to beginning site activities.
- B. The CQC Plan shall include a statement and description of the Contractor's overall quality control program, to include procedures for sampling and document control.
- C. Specifically, the CQC Plan shall, at a minimum, include:
 - 1. A description of Contractor's quality control organization, including a chart showing lines of authority, and an acknowledgement that the quality control staff will conduct inspections for all aspects of the work specified.
 - 2. The name, qualifications, responsibilities, and authority of each person assigned to a quality control function.
 - 3. A copy of a letter to the CQC Manager, signed by an authorized official of the firm, that describes the responsibility and delegates authority to the CQC Manager.
 - 4. Procedures for scheduling and managing submittals, including those of subcontractors, fabricators, suppliers, and manufacturers.
 - 5. Control procedures for laboratory and field sampling.
 - 6. Procedures for reporting testing results and for maintaining records during construction.

7. A list of all specified tests and the frequency of their performance and verification that the procedures are in accordance with the Contract requirements.
8. A method of notification for deficient work and procedures for correcting deficiencies or replacing work at the sole expense of the Contractor.

1.06 EQUIPMENT CALIBRATION

- A. All field test equipment will be kept under control of the Contractor's Quality Control Officer or a geotechnical subcontractor. The Quality Control officer and the geotechnical subcontractor will be fully trained in the use of equipment, test procedures, and the interpretation of results for each piece of test equipment. A copy of the Calibration Certificate will be kept by the Quality Control Officer and supplied to the Engineer.
- B. Calibration of nuclear-density gauges shall conform to the frequencies and methods outlined in American Society for Testing and Materials (ASTM) D2922-78 and D3017. Unstable or erratic gauges shall not be used in density testing and shall be immediately removed from the site, in accordance with applicable local, State, and federal regulations.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 LIGHT AND POWER

- A. Each Contractor shall provide, at his own expense, temporary electric power and lighting, as required, for the proper execution of the work. If, in the opinion of the Engineer, the facilities provided by the Contractor are inadequate, the Contractor will not be permitted to proceed with any portion of the work affected by the inadequate facilities.
- B. Power service wiring, metering, and distribution from the existing service shall be furnished and installed by the Contractor at his own expense.
- C. All wiring for electric light and power shall be installed by a licensed electrician and shall be maintained in an acceptable manner.

1.02 WATER

- A. Municipal water may be available via a fire hydrant located near the entrance to the site. The Contractor will be required to install a meter and to pay the standard water rate and hydrant use fee for all water used.
- B. The Contractor shall bring in water, as required, via closed pipe and/or hose from the off-site municipal water supply or by truck. The Contractor shall provide backflow prevention and meet all usage requirements of the local water company.
- C. Pumps, hose extensions, and trucks shall be provided as required to deliver water to point of use.

1.03 TEMPORARY HEATING AND VENTILATION

- A. The Contractor shall provide temporary heat and ventilation required for work carried on during cold or hot weather and to prevent damage to the work carried on during cold or hot weather.
- B. Temporary office areas shall be provided with heat and air conditioning, as required, for year-round use.

1.04

SANITARY REGULATIONS AND PROVISIONS

- A. The Contractor shall prohibit and prevent the committing of nuisances on the site of the work, or on adjoining property, and shall discharge any employee who violates this rule. Temporary toilet facilities shall be provided by the Contractor for use by his personnel. At least one portable toilet shall be provided for each 25 persons, and one separate portable toilet shall be provided for women. Temporary toilet facilities shall be serviced regularly by a qualified waste management company. Sanitary waste shall be disposed of in accordance with applicable rules and regulations.

1.05

TELEPHONE

- A. The Contractor shall make provisions for providing telephone service to the site for the Contractor's operations and also for the Engineer's field office. All costs for such services shall be paid by the Contractor and included in his Bid. The Engineer's trailer will require two telephone lines with one dedicated for fax service. The Engineer shall pay for long distance charges, and the Contractor shall pay for all other connection and monthly service charges.

1.06

FIRST AID

- A. Each Contractor shall furnish and keep on-site a completely equipped first aid kit and shall provide ready access to the kit at all times when personnel are employed on the work.
- B. The first aid kit shall be furnished for a minimum-size crew of 10 people.

1.07

FIRE AND SAFETY PROTECTION

- A. The Contractor shall have on-site not less than four UL-rated, class "ABC" dry chemical fire extinguishers, 20-pound capacity. One fire extinguisher shall be permanently mounted in each break trailer or storage trailer on-site. Extinguishers shall be inspected monthly and serviced as required.

1.08

CONTRACTOR'S FIELD OFFICE

- A. The Contractor shall furnish his own field office and any temporary buildings or shelter required for the proper storage and protection of materials. The Contractor shall provide the Engineer with a plan view map showing the number and the locations of temporary facilities planned for the site.

ENGINEER'S FIELD OFFICE

- A. The Contractor shall provide a separate trailer for exclusive use by the Engineer and his field inspection staff. The mobile office trailer shall be a Type C field office with minimum dimensions of 10 feet by 30 feet, as specified in Section 642.2.2, Field Office of the Standard Specifications.
- B. In addition to the requirements for Type C field office, the Contractor shall provide the following:
1. Two telephone lines with one dedicated for fax use.
 2. One drafting table with minimum dimensions of 36 by 48 inches.
 3. One draftsman's stool.
 4. Two steel office desks with drawers and locks, with minimum dimensions of 30 by 60 inches.
 5. Two swivel desk chairs.
 6. Two steel folding chairs.
 7. Steel file cabinets with four letter-width drawers and locking capability.
 8. One drawing rack with drawing hangers.
 9. Two wastepaper baskets.
 10. One coat rack.
 11. One fire extinguisher, wall-mounted, 6 pounds or larger, meeting the requirements for Classes A, B, and C of the NFPA code.
 12. Bottled water service with cooler capable of producing hot and cold water, as well as a paper cup dispenser and supplies.
 13. Two telephones with conference speaker, touch-tone, and 12-foot coiled handset.
 14. One plain paper fax machine with telephone capabilities.
 15. One copier capable of 11 by-17-inch copies and reductions/enlargements, including maintenance agreement for duration of project.

- C. Field office shall be maintained and cleaned weekly, and all expendable supplies (i.e., paper cups, copier paper, toner cartridges, etc.) shall be replenished by the Contractor throughout the duration of the project.

1.10 MAINTENANCE

- A. Temporary facilities shall be maintained, including weekly cleaning of toilet facilities, and shall remain on-site until the end of the project or until permission is given by the Engineer in writing for removing them.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01505

MOBILIZATION AND DEMOBILIZATION

PART 1 GENERAL

1.01 SUMMARY

- A. This specification section covers the following:
1. Organization and mobilization of Contractor's forces and equipment.
 2. Transporting tools, materials, and equipment to the site.
 3. Erection of temporary facilities required to support initial mobilization, and funnel and gate construction activities.
 4. Subsequent removal of temporary facilities, construction equipment, materials, and supplies, including decontamination of equipment and facilities, cleaning of equipment for salvage, cleaning of the site, and restoration and reseeded of areas disturbed during construction activities not covered under other portions of the specification.
- B. Temporary facilities and other mobilization items are specified in Section 01500, "Temporary Facilities and Services."

1.02 REFERENCE

State of Wisconsin, Department of Transportation, Standard Specifications for Road and Bridge Construction, 1993 Section 619, "Mobilization."

1.03 GENERAL

- A. The Contractor shall submit in writing a Mobilization Plan delineating the locations of access roads, parking areas, and support area office trailers. The Engineer shall approve the plan prior to commencing mobilization activities.
- B. The limits of construction that constitute areas designated for funnel and gate construction activities and Contractor support and staging areas are shown on the Drawings.
- C. In the event additional space is required by the Contractor for completion of the work and the area is within the limits of work, the Contractor shall request approval from the Engineer for additional space. If the required

space is outside the property limits, the Contractor shall make his own arrangements and obtain the necessary permits and/or pay for such additional space.

- D. The Contractor shall obtain the necessary permits and make the required arrangements for all utility services required under this Contract.
- E. Mobilization shall include the following activities:
 - 1. Construction of all temporary facilities.
 - 2. Mobilization of all construction equipment, materials, supplies, and appurtenances required to perform the work.
- F. Demobilization shall include the following activities:
 - 1. Decontamination of all temporary facilities, equipment, materials, supplies, and appurtenances.
 - 2. Removal of all construction equipment, materials, supplies, appurtenances, and decontamination facilities.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 SITE CLEARING

- A. Areas to be used for access roads and parking office trailers shall be cleared and stripped, in accordance with Section 02120, "Clearing, Grubbing, and Stripping," prior to placement of aggregate-wearing surface.

3.02 ACCESS ROAD

- A. A temporary access road shall be constructed in accordance with Section 02500, "Access Road," at the lines and grades shown on the plans.

3.03 PARKING AREAS

- A. The Contractor shall supply ample all-weather parking areas to support office and site management activities. Specific requirements for parking area surfaces are specified in Section 02500, "Access Roads."

3.04

LAYOUT

- A. The Contractor shall set up construction facilities in a neat and orderly manner within the designated staging area and at a location acceptable to the Engineer. All work shall be accomplished in accordance with the Specifications.**

3.05

OBSTRUCTIONS

- A. Some obstructions to mobilization activities may not be shown. Bidders are advised to carefully inspect the existing facilities prior to preparing their proposals. The removal or relocation of minor obstructions shall be anticipated, accomplished, and included in the lump sum bid, even if the obstructions are not specifically shown or mentioned.**
- B. Major obstructions encountered that are not shown on the Drawings or that could not have been foreseen by visual inspection of the site prior to bidding should be brought to the attention of the Engineer. The Engineer will make a determination for proceeding with the work. If the Engineer finds the obstruction adversely affects the Contractor's cost or schedule, a proper adjustment will be made, in accordance with the General Conditions.**

3.06

DEMOBILIZATION

- A. The Contractor shall:**
 - 1. Conduct a final inspection of concealed spaces in preparation for subcontract completion.**
 - 2. Remove all property, temporary structures and materials, equipment, and appurtenances not required as part of the completed work.**
- B. At completion of the work and immediately prior to the final inspection by the Engineer, clean and restore the entire project area and remove all debris and rubbish.**
 - 1. If the Contractor does not remove rubbish and debris or restore the site to the satisfaction of the Engineer and in accordance with the Specification, the Engineer reserves the right to have final cleaning completed at the sole expense of the contractor.**

PART 4 PAYMENT

- A. Payment for all activities associated with mobilization/demobilization shall be included in the lump sum pay item for mobilization/demobilization in the bid form.**

- B. Schedule for payment of mobilization/demobilization lump sum bid shall be as follows:**
 - 1. Twenty-five (25) percent of the amount bid for mobilization/demobilization will be paid when 5 percent or more of the original contract amount is earned.**

 - 2. Fifty (50) percent of the amount bid for mobilization/demobilization will be paid when 25 percent or more of the original Contract amount is earned.**

 - 3. Seventy-five (75) percent of the amount bid for mobilization/demobilization will be paid when 50 percent or more of the original Contract amount is earned.**

 - 4. One hundred (100) percent of the amount bid for mobilization/demobilization will be paid when 75 percent or more of the original Contract amount is earned.**

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 DESCRIPTION

- A. This section includes the requirements for cleanup, restabilization, and restoration to prevent accidents to personnel, public, and owner employees; to protect all work in place; to restabilize and restore all disturbed areas; to remove all evidence of construction activities; and to effect the completion of the contract in an orderly manner.

1.02 CLEANUP

- A. Construction cleanup shall proceed as construction progresses and shall consist of the removal of all mud, oil, grease, soil, gravel, trash, scrap, debris, and excess materials that are unsightly or that may cause the tripping or sliding of workers, ladders, or equipment.
- B. Immediately prior to the Contractor's written request for a final inspection of the contract work or any portion thereof, the Contractor shall perform final cleanup.
- C. No items shall remain on or be discarded on-site, or on any other Owner's site. Items and excess materials that are to be discarded shall be removed and legally disposed of off-site. The Contractor shall leave the premises orderly and "broom clean."

1.03 RESTORATION AND RESTABILIZATION

- A. All areas disturbed by the Contractor's operation shall be restored and restabilized as specified herein. These areas shall include but not be limited to staging and stockpiling areas, construction strips, access roads, and all areas within the limit of work.
- B. Final restoration and restabilization shall proceed in accordance with the construction schedule. These activities shall include seeding when the season allows. The Contractor shall disassemble and remove all temporary construction facilities constructed by said Contractor and shall leave the site in an orderly and restored condition, as required by the Contract documents.
- C. The Contractor shall preserve signs, markers, and fences and maintain them in their existing locations and conditions unless written permission is obtained from the Engineer for their removal and restoration or

replacement. The Contractor shall remove such conflicting facilities when grading operations begin and shall store in a manner that keeps them clean and in their existing condition. These facilities shall be restored to their locations before removal or such new locations as directed. Damaged items shall be repaired or replaced when directed, at no cost to the Owner.

- D. The Contractor shall restabilize turf areas in accordance with Section 02930 Finish Grading and Seeding.
- E. The Contractor shall restore gravel surfaces and access roads shall be restored as near as practicable to their condition prior to being disturbed. Replace with new material of same quality and gradation. Materials and methods of construction shall be in accordance with Specification requirements and with applicable permits secured for this Contract.

1.04 DISPOSAL OF WASTE AND EXCESS MATERIALS

- A. Construction waste and excess construction materials shall be disposed of in the approved off-site disposal facilities or as directed by the Owner.
- B. Waste and excess material disposed of in an unauthorized area shall be removed by the Contractor, and the area shall be restored as near as practicable to its condition before disturbance, at no cost to the Owner.

1.05 REMOVAL OF CONDEMNED MATERIAL

- A. Material delivered to the site has been determined by the Engineer to be unsuitable or not to be in accordance with the contract documents shall be removed from the work site and disposed of in an approved off-site disposal facility at no cost to the Owner.

1.06 FINAL INSPECTION

- A. Upon receiving the Contractor's written request for substantial completion inspection, the Engineer will perform a walkthrough of the site area with the Contractor's and the Owner's representatives. The walkthrough shall identify and document (via a punch list) the additional construction items required to declare the site area to "substantial completion." If, in the opinion of the Engineer, the site area can be fully used for the purposes for which it was intended, a "Certificate of Substantial Completion" shall be issued. If, in the opinion of the Engineer, the site area cannot be fully utilized for the purposes for which it was intended, no "Certificate of Substantial Completion" will be issued, and another walkthrough will be scheduled. All punch list items identified by the walkthroughs shall be repaired or replaced, as required

to the satisfaction of the Engineer. Final payment will not be made until all of the punch list items are resolved to the satisfaction of the Engineer.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

DIVISION 2 — SITE WORK

SECTION 02075

UTILITY DECOMMISSIONING/SHEET PILE PENETRATION

PART 1 GENERAL

1.01 SUMMARY

- A. This specification section describes the disconnection, capping, and rerouting procedures to be used if utilities are affected by the work.
- B. The Engineer has conducted a preliminary investigation and has determined that no below-grade utilities will be affected by the scope of this contract.
- C. The Contractor is responsible for conducting a thorough evaluation to determine the presence of below-grade utilities within the limits of work.

1.02 SUBMITTALS

- A. The Contractor shall submit requests to Engineer for utilities to be taken out of service a minimum of seven calendar days prior to decommissioning these utilities.
- B. The Contractor shall submit a proposed utility decommissioning schedule that outlines temporary utility removal, rerouting, and replacement procedure locations, along with time periods, for approval by the Engineer.

1.03 UTILITIES AND LOCATIONS

- A. Utilities locations and demolition schedules are provided on the Drawings.
- B. Unidentified utilities may be encountered during the work. If encountered, the Contractor shall stop work and contact the Engineer. Do not proceed without approval.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 PREPARATION AND LAYOUT

- A.** The Contractor shall establish extent of demolition and decommissioning by horizontal and vertical limits.
- B.** Adequate materials shall be on hand to reroute/recommission utilities in a timely manner without delay.

3.02 PROTECTION

- A.** The Contractor shall protect existing structures and utilities not requiring demolition. Damaged items that are to remain during performance of the work shall be repaired to their original condition or replaced in kind at the Contractor's expense.
- B.** The Contractor shall follow all OSHA regulations and requirements regarding safety, trench shoring, and confined space requirements.

3.03 RESPONSIBILITIES AND NOTIFICATION

- A.** The Contractor shall not disconnect or reconnect active utility services without proper notification.
- B.** The Contractor shall provide the Engineer with written requests for utility services disconnects or reconnects a minimum of seven (7) days prior to the scheduled utility line removal or replacement. Utility line replacements, service reconnects, and testing procedures shall be coordinated with the Engineer and the local utility company (if applicable).
- C.** The Contractor shall coordinate applicable utility lock-out and tagging procedures with the Engineer.

3.04 DEMOLITION/DECOMMISSIONING PROCEDURES

- A.** Free Product Removal System Piping. In the event the existing free product remediation system is in place and operational, the Contractor shall:
 - 1.** Remove the free product header line on both sides of the proposed sheet pile centerline. The Contractor shall use removal procedures which will not damage the in-place pipe. Damage to the in-place piping as the result of Contractor negligence shall be corrected by replacement of the in-place piping by the Contractor at his own expense.

2. Open ends of the in-place pipe shall be plugged to prevent infiltrating groundwater, dirt, or debris from entering the pipe.
3. After sections are removed, install the sheet piles in the area to the elevations indicated on the Drawings. The Contractor shall then seal the cavity joints of sheet pile. (Procedures outlined in Section 02378, "Pile Driving and Joint Sealing.")
4. Following joint sealing, cut the Free Product Header Line passageway through the sheet pile, as shown on the Drawings.
5. Reinstall the header line through the passageway (note the special requirements on the pipe bedding and support, as shown on the Drawings). Pipe specifications are provided in Section 15060—"Pipe and Pipe Fittings."
6. Construct watertight concrete collar at the passageway/sewer line joint, in accordance with details shown on the Drawings.
7. Return line to service and test in accordance with Section 15050, "Piping Installation."
8. Backfill as specified.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 02080

DECONTAMINATION

PART 1 GENERAL

1.01 SUMMARY

- A. This section describes the requirements for equipment and personnel decontamination to include construction of decontamination facilities.
- B. The contractor shall provide all necessary personnel, equipment, and temporary facilities, as required, for proper decontamination of equipment materials and personnel, as specified in this section and the Contractor Site-Specific HASP.
- C. Decontamination of personnel, tools, and equipment shall be required prior to leaving the exclusion zone. Decontamination shall be required prior to breaks, when picking up equipment or tools in the support zone, or in conjunction with any other activity when the potential for contamination transfer exists.
- D. The decontamination pad shall consist of an area sufficiently large enough to decontaminate the largest piece of equipment that may potentially come in contact with contaminated soil or waste. The pad shall be constructed on stable subgrade soil with a liner consisting of a geotextile/geomembrane/geotextile sandwich and a minimum 1-foot layer of sand or gravel to act as a wearing surface. The pad shall be bermed to limit rinsate from escaping from the pad, and a sump area shall be designed to contain and remove rinse waters. The Contractor shall include within the Mobilization Plan the location and design of a decon pad for review by the Engineer.

PART 2 PRODUCTS

- A. The contractor shall provide the appropriate brushes, tubs, detergents and pressure wash units required to complete decontamination of personnel and equipment.
- B. Pressure wash units shall be portable high-pressure units with a self-contained water storage tankage and pressurizing system. Each unit provided shall be capable of heating wash waters to 180°F and providing a nozzle pressure of 150 psi.

- C. The contractor shall provide sealable United States Department of Transportation (U.S. DOT) approved 55-gallon drums or other appropriate containers for the storage of decontamination wash waters prior to testing.
- D. The geomembrane supplied for the decon pad shall be 40 MIL HDPE, 40 MIL PVC, or another geomembrane approved by the Engineer.
- E. The geotextile filter fabric shall be 8-oz. non-woven polyester or polypropylene material providing sufficient strength to maintain stability for the duration of construction activities.
- F. The aggregate shall be locally available sand and gravel appropriate for use in decon pad construction. The Contractor shall submit a material list to the Engineer for approval in the Mobilization Plan Submittal.

PART 3 EXECUTION

3.1 PERSONNEL DECONTAMINATION

- A. The contractor shall perform personnel decontamination as specified in the Contractor's Site-Specific HASP. At a minimum, and if required by the site HASP, personnel decontamination shall include an equipment drop, a boot and outer glove wash using detergent and brushes, a boot and glove rinse, and a drop location for disposing of spent personnel protective equipment.
- B. Personnel decontamination facilities shall be designed by the contractor and approved by the Engineer. Details of the personnel decontamination facility shall be included in the Contractor Site-Specific HASP.

3.2 DECONTAMINATION PAD CONSTRUCTION (IF ONE IS NOT PRESENT ON-SITE)

- A. The contractor shall construct a decontamination pad to allow for heavy equipment decontamination prior to leaving the exclusion zone. This facility shall be located near the staging and support area to allow control of site access and to ensure decontamination is completed prior to equipment leaving site.
- B. The area to receive the decontamination pad shall be stripped of topsoil, as specified in Section 02120, "Clearing, Grubbing, and Stripping." Area shall be excavated or graded as required to create bottom slopes that will facilitate drainage of decon waters to a sump location.

- C. Following grading, the area shall be proof-rolled with a smooth drum roller to ensure a smooth surface and to marginal or soft subgrade soil that would impact the stability of the pad. Soft subgrade soil will be over excavated and backfilled with clay soil as specified in Section 02200, "Earthwork." Backfilled soil will be compacted to 95 percent standard proctor maximum dry density.
- D. Geotextile filter fabric shall be placed directly onto the prepared surface. Surface shall be free from rocks debris or sharp objects that may cause damage to the fabric. Subgrade shall be inspected by the Engineer for acceptance prior to placement of the geotextile fabric. A 1-foot overlap at each seam shall be provided.
- E. The Contractor shall lay factory-seamed geomembrane directly over the geotextile fabric. The geomembrane shall be inspected for cuts, tears, or other damage caused by installation activities. Any damage to the geomembrane shall be patched using the manufacturer's recommended techniques prior to continuing installation.
- F. The Contractor shall lay geotextile directly over the factory-seamed geomembrane immediately after placement of the geomembrane. The Engineer shall inspect and approve the liner installation prior to placement of the geotextile to ensure no rocks, debris, or other material that may damage the geomembrane during subsequent construction activities has fallen on the liner.
- G. The Contractor shall carefully place aggregate the over geotextile. The aggregate shall be placed in two equal lifts and shall be compacted using a smooth drum roller.
- H. Decontamination wash waters shall be collected in a sump area and removed by pumping or other method to a storage drum or tank for storage and testing prior to disposal. The sump area shall be large enough to contain the rinse waters from one heavy equipment decontamination event. The Contractor is responsible for designing the wash water collection removal and storage system. Decon water removal and storage details shall be included in the Mobilization Plan and the Contractor's Site-Specific HASP.

3.3

EQUIPMENT DECONTAMINATION

- A. The contractor shall perform the following steps during equipment decontamination:
 - 1. Scrape, brush, or otherwise remove all visible earthen material and debris from the equipment.

2. Pressure wash all surfaces with a portable high-pressure hot water steam cleaner to remove any residual waste, dirt, or debris.
 3. Collect and manage rinsate and scrapings by placing in approved containers or, in the case of solids, by staging in a designated place for on-site disposal.
 4. Test and determine disposal requirements for rinsate (and solids, after closure has been completed).
- B. All decontamination facilities, to include pad, liner, storage tanks and piping, shall be removed by the Contractor at the completion of the project. The area disturbed by decontamination operations shall be restored to original pre-construction condition.

END OF SECTION

SECTION 02120

CLEARING, GRUBBING, AND STRIPPING

PART 1 GENERAL

1.01 SUMMARY

- A. This section covers work relating to removing trees and brush from within the limits of work, removing stumps, and stripping and stockpiling topsoil for reuse in site restoration activities.
- B. The Contractor shall protect all vegetation and trees designated to remain from damage or defacement.
- C. The Contractor shall stake the limits of proposed clearing and stripping. The Engineer shall review and approve the proposed limits prior to conducting work. Contractor shall satisfy himself as to the obstacles to be encountered and account for such obstacles within the cost for completion of the work.
- D. The Contractor shall install silt fence along the limits of clearing and stripping, immediately following clearing operations. The silt fence will conform to the Specification for the silt fence in Section 2540, "Erosion and Sedimentation Control."

PART 2 PRODUCTS

- A. The Contractor shall provide all materials and equipment in suitable and adequate quantity as required to safely and efficiently accomplish and complete the work shown.

PART 3 CLEARING

- A. All existing trees shall be cleared by cutting or by other methods to completely remove the trees, including all branches and limbs or associated brush.
- B. All trees and brush shall be collected, chipped, and stockpiled on-site for later use as mulch.
- C. All trees shall be cut in a manner allowing them to fall into an area designated for clearing or stripping to protect vegetation designated to remain.

- D. Any tree limbs removed or damaged during construction on trees designated to remain shall be treated with an approved tree sealant.

3.02 GRUBBING

- A. All stumps and root structures shall be removed,,chipped, or otherwise relocated in areas approved by the Engineer.
- B. Depressions created by stump and root structure removal shall be backfilled with soil materials suitable for general fill material, in accordance with Section 02200, "Earthwork."

3.03 STRIPPING

- A. The Contractor shall strip all topsoil from within the limits of the work.
- B. All stripped material meeting the requirements of the topsoil specifications shall be stockpiled on-site at the designated location for later reuse in site restoration activities.
- C. Topsoil stockpile shall be adequately constructed to minimize erosion. Silt fence will be placed around the perimeter toe of slope. The Engineer will determine the necessity for temporary seeding.

END OF SECTION

SECTION 02200

EARTHWORK

PART 1 GENERAL

1.01 WORK INCLUDED

- A. General excavation and fill operations related to gate construction.
- B. Finish grading.

1.02 RELATED WORK

- A. Section 02120: "Clearing, Grubbing, and Stripping"

1.03 QUALITY ASSURANCE

- A. The Contractor shall test material to be used as compacted fill, whether excavated on-site or imported as off-site borrow, for compliance with the requirements of this section prior to placement.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall stockpile excavated materials and/or borrow as instructed by the Engineer.
- B. The Contractor shall lightly compact and slope top of stockpiles to prevent excessive erosion and ponding of water.

1.05 WORK AFFECTING EXISTING FACILITIES

A. Utilities

1. Protect above- or below-grade utilities that are to remain.
2. Do not take existing utilities out of service without specific authorization by the utility owner and the Engineer.
3. Notify the utility owner and the Engineer at least five working days prior to taking existing utilities out of service to make connections or to remove utility.

1.06 PROTECTION

- A. Protect trees, shrubs, lawns, and other features remaining as portion of final landscaping.
- B. Protect benchmarks, existing structures, fences, roads, sidewalks, and paving.
- C. Protect above- or below-grade utilities that are to remain.
- D. Protect excavations by shoring, bracing, sheet piling, underpinning, or other methods, as required to prevent cave-ins or to prevent loose dirt from falling into excavations.
- E. Underpin adjacent structures that may be damaged by excavation work, including service lines and pipe chases.
- F. Notify the Engineer of unexpected sub-surface conditions and discontinue work in area until the Engineer provides notification to resume work.
- G. Protect bottom of excavations and soil around and beneath foundations from frost and freezing.
- H. Grade around excavations to prevent surface water run-off into excavated areas.
- I. Repair damage, promptly, at no cost to the Engineer.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Treatment Gate Media Backfill--Note: This will be specified within the 95 percent design submittal.
- B. Topsoil
 - 1. Friable loam free from subsoil, roots, grass, weeds, stones, and foreign matter.
 - 2. Use topsoil stockpiled on-site, if available, or obtain from a source approved by the Engineer.
- C. Select Excavated Material
 - 1. All material excavated from the site meeting the requirements for topsoil or fill material in the judgment of the Engineer.

PART 3 EXECUTION

3.01 PREPARATION AND LAYOUT

- A. Establish extent of site grading required by the Contractor for installation of the funnel-sheetpiling and gate elements by area and elevation; designate and identify datum elevation.**
- B. Set required lines and levels.**
- C. Obtain approval from the Engineer prior to conducting grading/filling activities.**

3.02 UTILITIES

- A. Known underground utilities are indicated on the Plans.**
- B. Before starting excavation, establish location and extent of underground utilities occurring in work area.**
- C. Notify the Engineer for direction of removal and/or relocation of lines that are in the way of excavation.**
- D. Maintain, re-route, or extend as required existing utility lines to remain that pass through the work area, with the approval of the Engineer.**
- E. Support and protect utility services uncovered by excavation.**
- F. Remove abandoned service lines from areas of excavation; cap, plug, or seal such lines and identify at grade.**
- G. Accurately locate and record abandoned and active lines rerouted or extended on Project Record Documents.**
- H. As excavation approaches utilities, hand excavate to uncover utilities.**

3.03 EXCAVATION

- A. Before starting excavation, clear work area.**
- B. Excavate in accordance with lines and levels required for construction of the work.**
- C. Hand trim excavations and leave free from loose or organic matter.**
- D. Keep excavations dry until backfilling is completed.**

- E. Perform additional excavation only by written authorization of the Engineer.
- F. Correct unauthorized excavation as directed, at no cost to the Engineer.
- G. Excavations are not to interfere with normal 45-degree bearing splay of any foundation.
- H. Stockpile excavated material in areas designated by the Engineer.
- I. Do not disturb soil within branch spread of existing trees or shrubs that are to remain.
- J. If necessary to excavate through roots, perform work by hand and cut roots with a sharp ax.

3.04 COMPACTED FILL

A. Preparation for Fill Placement

1. Do not start backfilling operations until structures have been inspected and backfilling has been authorized by the Engineer.
2. Ensure areas to be filled are free from debris, snow, ice, and water, and that ground surfaces are not in a frozen condition.
3. Do not place fill over existing sub-grade surfaces that are porous, wet, or spongy.
4. Compact existing sub-grade surfaces if densities are not equal to that required for materials.
5. Cut out soft areas of existing sub-grade. Backfill with select fill and compact to required density.
6. Place compacted fill to grades, contours, levels, and elevations shown on Plans.
7. Place fill systematically and as early as possible to allow maximum time for natural settlement and compaction.
8. Place and compact fill materials in continuous layers not exceeding 8 inches loose depth. Use a method that does not disturb or damage completed work constructed in the excavations.
9. Maintain optimum moisture content of fill materials to attain the required compaction density.

B. Material Placement

1. Treatment Gate Material—Note: This will be specified within the 95 percent design submittal.
2. Topsoil
 - a) Use within limits of seeded areas after the substantial completion of construction and the select excavated material has been placed.
3. Bedding
 - a) Use as fill under pipeline or as otherwise shown on Plans.
 - b) Fill a minimum of 6 inches of bedding to underside of pipes.
4. Initial Backfill
 - a) Use around and over the pipe and above the pipe bedding as shown on Plans.
5. Granular Backfill
 - a) Use under structures and roads unless otherwise shown on Plans.
 - b) Fill to within 4 inches of finished grade in areas not covered by structures or roads.
6. Select Excavated Material
 - a) Use as directed by the Engineer or as shown on the Plans.

C. Compaction

1. Compact fill materials listed below to required percentages of maximum dry density, as determined by ASTM D-698.
 - a) Compact granular backfill and initial backfill under structures and roads to 95 percent.
 - b) Compact bedding to 70 percent relative density or as approved by the Engineer.
 - c) Minimum frequency of density tests:
 - i Granular backfill: 1 test/500 cubic yards.
 - ii Initial backfill: 1 test/200 cubic yards.
 - iii Bedding: 1 test/200 cubic yards.

3.05 FINISH GRADING

A. Subgrade Preparation

1. Rough grade compacted fill systematically to allow for a maximum amount of natural settlement and compaction. Eliminate uneven areas and low spots. Remove debris, roots, branches, stones, etc. in excess of 3 inches in size.
2. Cut out areas, to sub-grade elevation, that are to receive stabilizing base for slabs.
3. Bring compacted fill to required levels, profiles, and contours. Make changes in grade gradual. Blend slopes into level areas.
4. Slope grade away from structures a minimum of 6 inches in 6 feet unless otherwise indicated on Plans.
5. Where fill to required subgrade elevation is less than 6 inches, scarify to a depth of 6 inches and compact.
6. Cultivate subgrade to a depth of 3 inches where topsoil is to be placed. Repeat cultivation in areas where equipment used for hauling and spreading topsoil has compacted subgrade.

B. Placing Topsoil

1. Place in a minimum 3-inch depth up to finished grade elevations.
2. Use topsoil in relatively dry state. Place during dry weather.
3. Fine grade topsoil, eliminating rough and low areas, to ensure positive drainage. Maintain levels, profiles, and contours of sub-grades. Rake until surface is smooth.
4. Remove stone, roots, grass, weeds, debris, and other foreign material while spreading.
5. Manually spread topsoil around trees, plants, and buildings, to prevent damage that may be caused by grading equipment.
6. Lightly compact topsoil after placing.
7. Seed topsoil in accordance with Section 02930, "Finish Grading and Seeding."

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 02368

SHEETPILE DRIVING AND JOINT SEALING

PART 1 GENERAL

1.01 SUMMARY

- A. This section specifies requirements for furnishing all materials and equipment and for performing all operations to install the steel sheetpile barrier walls, including joint sealing procedures, as shown on the Drawings.

1.02 REFERENCE STANDARDS

A. ASTM.

1. A 36—Standard Specification for Structural Steel.
2. A 325—Standard Specification for High-Strength Bolts for Structural Steel Joints.
3. A 328—Standard Specification for Steel Sheetpiling.
4. A 668—Standard Specification for Steel Forging, Carbon and Alloy, for General Industrial Use.

B. AWS. D1.1—Structural Welding Code.

1.03 SUBMITTALS

A. Submit the following items for review by the Engineer:

1. Certification: Provide documentation of being a licensed installer of Waterloo-Barrier steel sheetpiling.
2. Pile Driving Plan that outlines detailed pile placement, splicing requirements and details, quality control measures, joint sealing, etc.
3. Mill test documentation for piling to be used on project.
4. Structural properties of piling section(s) to be used, including I, S, Moment Capacity, thickness, and width/depth dimensions.
5. Proposed welding procedures and certification of welders.
6. Experience and qualifications of sheetpile quality control observer.

1.04 COORDINATION

- A. Notify the Engineer at least five days prior to beginning pile driving operations at any location. This shall not relieve the Contractor of his responsibilities for performing the work in accordance with these specifications and contract drawings.

1.05 PROTECTION OF EXISTING FACILITIES

- A. Before the start of construction, adequately protect the existing structures from damage. Take every reasonable precaution to prevent damage to permanent structures and equipment. Prior to the beginning of the project, a joint inspection will be made by the Engineer and the Contractor to determine the condition of the existing structures.

1.06 QUALITY CONTROL

- A. The Contractor is responsible for providing a University of Waterloo quality control observer during all phases of installation to ensure proper alignment of piling as well as proper joint sealing procedures. The observer shall have prior experience with the Waterloo Sealable Joint Sheetpiling (e.g., Slurry Systems Inc. or Canadian Construction Co.)
- B. Horizontal Alignment and Plumbness Tolerances
 1. The maximum permissible horizontal tolerance in pile driving shall be a deviation of not more than 6 inches from the plan location indicated on the Drawings.
 2. The maximum permissible vertical tolerance (plumbness) in pile driving shall not be greater than a deviation of 1 inch per 4 feet vertical.
 3. The top of pile at elevation of cutoff shall be within 2 inches of the specified alignment. Manipulation of piles to force them into position will not be permitted. Piles will be checked for heave. Piles found to have heaved shall be redriven to the required point elevation.
 4. Piles damaged or driven outside the above tolerances shall be replaced. Any sheetpile ruptured in the interlock or otherwise damaged during driving shall be immediately pulled and replaced.

PART 2 PRODUCTS

2.01 SHEETPILES

- A. The Contractor shall provide piling as manufactured by Canadian Metal Rolling Mills in Cambridge, Ontario, or other approved manufacturer under license from Waterloo Barrier, Inc.
- B. The female joints of the sealable sheetpiling shall be manufactured with a cover plate or a foot plate welded to the base of each joint, which will prevent earth material from entering the joint as the pile is driven into the ground. The foot plate construction shall be coordinated with the sheetpile manufacturer. At locations where splicing is required, the first sheets installed shall have foot plates.

C. Minimum Section Properties of Piling:

Thickness	0.295 inch
Depth	8.17 inches
Nominal Width	22.25 inches
Section Area	10.5 square inches
Weight	35.6 lbs/linear foot
	19.2 lbs/square foot
Moment of Inertia (I)	64.8 inches ⁴ /LF
Radius of Gyration	3.39 inches
Section Modulus	15.9 inches ³ /LF

- D. Sheetpile containment wall depths shall be 20 feet for all installations.

PART 3 EXECUTION

3.01 DRIVING SHEETPILES

A. Location and Tolerances

1. Drive piles vertically and in correct alignment so the top of the wall lies on a straight line and a proper interlocking is ensured throughout the entire length of the piles.
2. Sheetpile locations on the Drawings are approximate and shall be field located when appropriate and when approved by the Engineer.

B. Set Up Sheetpile

1. Contractor shall stabilize the piles during the set up by means of a system of guides at locations up on the wall and at the ground. The

ground-level guides shall clasp the sheets at both sides and act as an entry template to ensure plumbness during driving.

2. The joint of each sheetpile shall be visually inspected by the Contractor prior to driving. Any foreign material will be removed and any damaged joints and/or piles will be rejected.

C. Pile Driving

1. The Contractor shall drive piles with an air, a diesel, or a vibratory hammer, or another device appropriate for the conditions. The hammer selected shall be of a size and weight appropriate for the conditions encountered. The Contractor shall evaluate the allowable clearance along the proposed sheetpile alignment and shall recommend a driving method based on other similar installations with this type of clearance.
2. Following erection of a number of adjacent sheetpiles in panels, the panels shall be driven in stages alternating from one pile (or pair of piles) to another pile (or pair of piles) until the desired penetration is reached. Depth of driving during each stage shall be determined by the Engineer.
3. The Contractor shall prevent damage to the top of the piling by use of a proper helmet and a proper hammer type and size.

3.02 FIELD CUTTING AND WELDING

- A. No planned horizontal splices will be allowed.
- B. If the head of the piling is appreciably damaged during driving or other activity, the damaged portion shall be cut off prior to welding a replacement splice section and also to allow sealant injection.
- C. Welding operations shall not cause any blockage of the sheetpile joint sections (no edges or weld slag shall reduce the size of the cavity).
- D. Welding must conform to the requirements of AWS D1.1, Structural Welding Code.

3.03 JOINT SEALING

Joint sealing shall be performed by a University of Waterloo-licensed contractor with prior joint sealing experience.

- A. Joint sealing shall not be performed adjacent to sheetpile installation within a radius of the length of sheet plus 10 feet from the sheetpiling installation point.
- B. After sheetpiling has been installed in the ground, all sealable cavities shall be checked by probing and, if necessary, flushed with pressurized water or air to remove any remaining soil material.
- C. During the flushing, a hose or a pipe shall be inserted into the sealable cavity and advanced downward. The hose shall allow soil particles to travel up and out of the cavity.
- D. The flushing operation shall be considered complete when the hose has been passed to the base of the sealable cavity and the water or jet of air escaping from the top of the hole is reasonably clean. The flushing hose may then be removed from the cavity.
- E. A tremie hose or a tube for pressure injection of the sealant shall be inserted into the sealable cavity. When the tube has reached the bottom of the hole, sealant injection shall begin. The hose shall be withdrawn progressively up the joint as the sealant fills the space below. The tremie nozzle shall be kept at least 6 inches below the rising surface of sealant. The sealant shall have a hydraulic conductivity of less than or equal to 1×10^{-7} cm/sec.

3.04 RECORDS

- A. Provide accurate records of each sheetpile installed. Submitted records will include the following information:
 - 1. Pile identification number.
 - 2. Date and time of driving.
 - 3. Model of hammer and its energy rating.
 - 4. Elevation at top of pile.
 - 5. Length of sheetpile in the ground when driving is complete.
 - 6. Rate of penetration in feet/minute.
 - 7. Detailed remarks concerning alignment, obstructions, etc.
 - 8. Plumbness record of each sheetpile installed.
 - 9. Joint flushing record for each joint installed.
- B. Mark waterproof identification number clearly visible on each sheetpile, within 2 feet (500 mm) of the top, before driving is initiated.
- C. Spray paint all sheetpiles rejected from the work for any reason, at the time of rejection, with the letter "X" within 3 feet (1 m) of both ends.

- D. Provide accurate sealant installation records. Submitted records will include the following information:
1. Joint identification number.
 2. Date and time of sealing operation.
 3. List of equipment used during the installation.
 4. Volume of sealant required to seal each joint.

3.05 UTILITIES ROUTED THROUGH PILING

- A. The procedure and details for routing the free product headerline through the sheetpile are provided in Section 02075, "Utility Decommissioning," and on the Drawings.
- B. Prior to cutting utility passageways through the sheetpile walls, all joint cavities within the local area shall be joint sealed as described in Section 3.03.

3.06 REJECTION

If rejected from the work because of deviation from location, plumbness requirement, excessive bending, twisting, pulling out of interlock, or other reasons, the Contractor shall take suitable corrective action at no additional cost to the Owner. Suitable action includes extracting, furnishing, and driving of replacement sheetpiles, so that all sheetpiles installed meet the requirements of this Specification.

END OF SECTION

SECTION 02500

ACCESS ROADS

PART 1 GENERAL -

1.01 SUMMARY

- A. This section includes requirements for the construction of a temporary access road to support construction activities and the construction of a permanent site access road. This section also includes work related to repair, maintenance and restoration of wearing surface areas impacted by temporary access road construction.
- B. The proposed alignment for the temporary access road, the parking areas, and the Certificates of Compliance for materials to be used in access road construction shall be submitted in the Mobilization Plan to be reviewed and approved by the Engineer.

PART 2 PRODUCTS

- A. The selected backfill soil for temporary access road construction shall be excavated from within roadway limits or off-site material free from stones, roots, and organic material of any suitable gradation for satisfactory compaction. The maximum size of particles shall be 3/4 inch.
- B. The coarse aggregate for use in wearing surface shall conform to Gradation No. 3, and Base Course Aggregate shall conform to Gradation No. 2, in accordance with Section 3.04.2.6, "Gradation Requirements" of the Standard Specifications.
- C. The geotextile fabric shall consist of standard roadway separator fabric appropriate for use in heavy equipment traffic applications. The geotextile proposed for use shall meet the minimum requirements as listed in Table 1. Note: (This will be provided in 95 percent design submittal)
- D. Culverts shall be 24-inch-diameter corrugated steel pipe conforming to Section 521.2 materials of Section 521, "Corrugated Steel Pipe Culverts" of the Standard Specifications. Riprap for culvert inlet/outlet shall be as specified on the Drawing.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION

- A.** The area to receive access roads shall be stripped of all topsoil, organic material, and vegetation prior to placement of select backfill material.
- B.** The subgrade shall be brought to the lines and grades required by grading or placement of select backfill material. Material shall be backfilled and compacted in accordance with Section 02200, "Earthwork."
- C.** Subgrade areas will be visually observed during placement and proof-rolled with a loaded dump truck following completion to look for soft, spongy, or yielding areas. Unsatisfactory areas will be excavated, replaced with suitable backfill, and compacted. The finished grade shall provide a satisfactory base for the road and shall be acceptable to the Engineer.

3.2 AGGREGATE BASE COURSE PLACEMENT

- A.** The geotextile road fabric shall be placed between the subgrade and base course to ensure roadbed stabilization and subgrade separation. The aggregate shall be placed and spread in uniform layers over the geotextile and compacted to achieve a final thickness of 6 inches. The aggregate base course shall be compacted to 95 percent relative compaction, using a smooth drum vibratory roller.
- B.** Water shall be added by the Contractor, as necessary, to control dust and to aid compaction.
- C.** Ruts and irregularities will be graded and smoothed during the compaction process until the final elevation and conformance to the grades shown are obtained.

3.3 CULVERTS

- A.** The Contractor shall excavate trenches for culverts to a width sufficient to permit thorough tamping of the backfill under and around the pipe, but no greater than the pipe diameter plus 18 inches. The trench shall be excavated so that the culvert will be seated on a sand bedding of at least 6 inches. The pipe bedding shall be Grade 1 granular backfill in accordance with Section 209.2 of the Standard Specifications. Bell holes shall be dug to ensure complete length of the barrel will be provided uniform support throughout.
- B.** The pipe shall be laid starting from the lowest end of the culvert section. Unnecessary handling of the barrel in the trench shall be avoided.

- C. The pipe trench will be backfilled with select backfill material in 8-inch loose lifts and compacted with hand tampers. The backfill shall be moistened as necessary to aid compaction. Compaction will proceed evenly on both sides of barrel to ensure stability of the culvert section.

3.4 ACCESS ROAD MAINTENANCE

- A. Access roads will be adequately maintained to prevent the generation of dust during road usage. The Contractor shall provide sufficient water or other additive, as approved by the Engineer, at a frequency necessary to control dust. Additional stone may be required in areas that continue to be susceptible to dust generation.
- B. Failed areas, ruts, or potholes will be excavated, filled, or graded as necessary to maintain reasonably smooth travel over all access roads during completion of this contract.
- C. Culvert sections shall be cleared of brush, limbs, debris or sediment, as needed, to maintain drainage through each culvert. Culverts that become damaged or restricted due to failure of the culvert construction or overloading will be replaced by the Contractor at no cost to the Engineer.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 02540

EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 DESCRIPTION

- A. Work includes furnishing all labor, equipment, and materials needed to complete the work as shown on the Drawings and specified herein.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

- A. Erosion and Sedimentation Control Plan:
 - 1. Following the Notice to Proceed, the Contractor shall prepare an Erosion and Sedimentation Control Plan for approval by the Engineer. The Contractor will be responsible for applying for and complying with all local and State Erosion Control Permit requirements applicable to the Moss-American site.
 - 2. Prior to initiating earthmoving activities, the Contractor shall implement the soil erosion and sedimentation controls as shown on the Contract Drawings and contained in the Erosion and Sediment Control Plan.
- B. Fines and related costs resulting from failure to provide adequate protection against soil erosion and sedimentation are the obligation of the Contractor.
 - 1. Silt, sediment, and mud leaving the site will be construed as damage to neighboring property and as evidence of negligence on the part of the Contractor.
 - 2. Damage to neighboring property or adjoining wetlands outside the limits of work shall be rectified and/or restitution shall be paid by the Contractor.
- C. Erosion and sedimentation control measures employed will be subject to approval and inspection by local governing authorities having jurisdiction over such work.

1.03 SUBMITTALS

- A. Samples: Submit samples and Certificates of Compliance for all materials being used to the Engineer for approval, including names, sources, and descriptions.
- B. Erosion and Sedimentation Control Plan: Submit in accordance with Section 01300 and applicable regulations.

1.04 QUALITY ASSURANCE

- A. All erosion and sediment control work shall comply with applicable requirements of governing authorities having jurisdiction. The specifications and Drawings are not comprehensive, but instead convey the intent to provide complete erosion and sedimentation control for both the Owner's property and the adjacent property.
- B. Erosion control measures shall be established at the beginning of construction and maintained during the entire period of construction. On-site areas that are subject to severe erosion and off-site areas that are especially vulnerable to damage from erosion and/or sedimentation are to be identified and to receive special attention.
- C. All land-disturbing activities are to be planned and conducted to minimize the size of the area to be exposed at any one time and to minimize the length of time of exposure.
- D. Surface water runoff originating upgradient of exposed areas should be controlled to reduce erosion and sediment loss during the period of exposure.
- E. All land-disturbing activities are to be planned and conducted so as to minimize off-site sedimentation damage.

PART 2 MATERIALS

2.01 EROSION BALES

- A. Erosion bales shall be straw, hay, or other approved material. Bales shall be either wire-bound or string-tied.

2.02 SILT FENCE

- A. Silt fence shall consist of woven or nonwoven polyester, polypropylene, stabilized nylon, polyethylene, or polyvinylidene chloride meeting the requirements of Section 628.2.8, "Silt Fence," of the Standard Specifications.

B. Minimum Physical Properties shall be:

Test	Method	Value
Grab tensile strength (lbs)	ASTM D1682	100
Mullen burst strength (psi)	ASTM D3786	200
Equivalent opening size (U.S. standard sieve)	ASTM D4751	50-140
Water flow rate (gal./min/S.F.)	ASTM D4491	10
Ultraviolet radiation stability (%)	ASTM D4355	90

C. Geotextile fabric shall be insect-, rodent-, mildew-, and rot-resistant.

D. Silt fence support/anchoring system shall be as recommended by the manufacturer and provided as required to maintain stability, integrity, and proper functioning of the erosion control system.

PART 3 EXECUTION

3.01 EROSION BALE BARRIERS

A. Erosion bale barriers shall be constructed as needed to control erosion. Excavation shall be to the width of the bale and the length of the proposed barrier, to a minimum depth of 4 inches.

B. Bales shall be placed in a single row, lengthwise on the proposed line, with the ends of adjacent bales tightly abutting one another. In channels and ditches, the barrier shall extend to such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale.

C. Staking shall be accomplished to securely anchor bales by driving at least two wooden stakes or rebars through each bale.

3.02 SILT FENCING

Silt fencing shall be constructed at the locations shown on the Drawings.

A. The Contractor shall excavate a 6-inch by 6-inch trench as part of the installation procedure for premanufactured silt fencing, as detailed on the Drawings.

B. Install the silt fence in accordance with the manufacturer's recommendations and the details shown on the Plans.

- C. Contractor shall maintain the silt fencing by routinely removing sediment buildup from behind the silt fence and/or repairing/reconstructing the silt fence damage caused by natural or construction activity until final acceptance by the Engineer.

3.04 TEMPORARY VEGETATIVE COVER

- A. Temporary seeding may be required in areas that have no further earthwork required but will not have final seeding completed within 14 days. Temporary seeding may also be necessary in areas of excessive erosion.
- B. The Contractor shall spread the seed mix and mulch as specified in Section 02930, "Finish Grading and Seeding," uniformly at the specified rate.
- C. Mulch shall be applied either during application or immediately after placement to avoid loss of seed by wind and water.

3.05 DUST CONTROL

- A. Dust generated from the Contractor's performance of the work, either inside or outside the limit of work, shall be controlled by the Contractor by applying either water or calcium chloride with the approval of the Engineer.
- B. Water and calcium chloride shall be provided in the amounts and locations required to maintain dust control, in accordance with Section 624, "Water," and Section 623, "Calcium Chloride Treatment," of the Standard Specifications.

3.06 SOIL STABILIZATION

- A. Following initial soil disturbance or redisturbance, permanent or temporary stabilization shall be completed in accordance with Section 02930, "Finish Grading and Seeding." The in-place sediment control measures will be maintained on a continuing basis until the site is permanently stabilized and all permit requirements are met.

END OF SECTION

SECTION 02710

MONITORING WELLS

PART I GENERAL

1.01 WORK INCLUDED

- A. The work to be performed includes furnishing all labor, materials, equipment, and all other facilities and incidentals necessary to construct the monitoring wells as specified and shown on the Drawings. All work performed under this section shall be coordinated with the Engineer.
- B. The approximate well locations are shown on the Drawings. Exact locations will be determined and field verified by the Engineer before any work takes place. These Specifications are intended to give a general description of what is required, but do not cover all variations that may occur during well construction and development. The Specifications are intended to cover the successful completion of the well installation and development, whether every detail is specifically mentioned or not.

1.02 SITE CONDITIONS

- A. It is the Contractor's responsibility to acquaint himself with the nature and location of the work; the general and local conditions; the availability of transportation, disposal, handling and storage of materials; the availability of labor, water, electric power, roads, and uncertainties of weather; the conformation and conditions of the ground; the character of equipment and facilities needed prior to and during the execution of the work; and all other matters that can in any way affect the work or the cost thereof under this contract.
- B. It is also the Contractor's responsibility to acquaint himself with the character, quality, and quantity of the surface and subsurface materials to be encountered by inspecting the site and by evaluating information provided by the Engineer. Any failure by the Contractor to acquaint himself with all the available information shall not relieve him of the responsibility for properly estimating the difficulty or the cost of successfully performing the work.

1.03 PERMITS/NOTIFICATION REQUIREMENTS

- A. The Contractor shall apply for and acquire permits from authorized agencies, if required. No field operations shall begin until these approvals have been obtained.

1.04

LOCATION OF BURIED PIPELINES AND UTILITIES

- A. The Contractor shall coordinate with all applicable utility owners prior to drilling in areas where it is reasonable to expect the presence of existing utilities, whether shown on the drawings or not. The Contractor shall be responsible for any and all damage to existing utilities caused by the work and, if damage to utilities occurs, the Contractor shall contact the affected utility immediately. The utility shall then determine who shall make the necessary repairs.
- B. The Contractor shall identify and protect any utilities installed as part of the free-product recovery system or the funnel and gate system. The Contractor shall be responsible for any damage or cost of repair to piping damaged during well installation.

1.05

MONITOR WELL DESCRIPTION

The Contractor shall construct the monitoring wells in accordance with the State of Wisconsin's NR 141 regulations. Well specifications are provided below.

- A. **Borehole:** Each borehole will be drilled using hollow-stem augers with a minimum inner diameter of 4.25 inches.
- B. **Well Casing Size:** All well casings will be 2 inches in diameter and will be constructed of Type 304 stainless steel with flush-threaded joints.
- C. **Well Screen Size:** All well screens will be 5 feet in length and 2 inches in diameter, and will be constructed of Type 304 stainless steel. Well screens will be constructed with continuous wire wrap slots that are 0.010 inch in width.
- D. **Filter Pack:** A filter pack consisting of clean well-graded No. 30 silica sand will be installed to a depth that is 2 feet above the top of the well screen.
- E. **Filter Pack Seal:** A filter pack seal consisting of a clean well-graded very fine sand will be installed to a depth that is 2 feet above the top of the filter pack.
- F. **Annular Space Seal:** An annular space seal consisting of hydrated bentonite pellets will be installed to a depth that is 2 feet above the filter pack seal.
- G. **Grout:** A bentonite-cement grout will be used to fill the remaining annular space.

1.06

QUALIFICATIONS

- A. The Contractor responsible for constructing the well shall be properly licensed in the State of Wisconsin, employing only competent personnel for the execution of this work, and all such work shall be performed under the direct supervision of an experienced well driller who is satisfactory to the Engineer.
- B. The well driller shall be capable of identifying geological formations, maintaining complete and current well logs and daily notes for the well completion report, and developing and testing the well. As part of the bid submittal, the Bidder shall provide a Statement of Qualifications intended to describe the drillers to complete the work.
- C. The Engineer may make any other investigations deemed necessary to determine the ability of the Contractor to perform the work, and the Contractor shall furnish to the Engineer all such information and data for this purpose.
- D. The Contractor shall furnish satisfactory evidence upon request that all materials to be furnished in performing the specified work are new and all equipment to be used is in good working order.

1.07

SUBMITTALS

- A. Submittals shall be made in accordance with the requirements of Section 01300.
- B. At a minimum, the Contractor shall provide manufacturer's information on:
 - 1. Well Casings.
 - 2. Well Screens.
 - 3. Grout.
 - 4. Filter Pack.

1.08

NOTIFICATION

- A. The Contractor shall notify the Engineer, in writing, five days prior to the commencement of drilling activities.
- B. The Engineer shall be notified by the Contractor 24 hours prior to the start of any well construction activities.
- C. No work shall be performed by the Contractor without completing the notification requirements specified above.
- D. The Contractor shall notify the Engineer of any anticipated temporary shutdowns.

1.09 HANDLING OF MATERIALS

- A. All parts and materials shall be properly protected so that no damage, deterioration, or contamination will occur from the time of shipment until installation is completed.
- B. If, in the opinion of the Engineer, parts and materials are damaged, deteriorated, or contaminated, the materials will be rejected. The Contractor shall replace the parts and materials at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Well Casings
 - 1. All well casings shall be new.
 - 2. Stainless steel: Type 304, conforming to appropriate standards such as those developed by the ASTM or API.
 - 3. Joints: All well casing sections will have flush-threaded and coupled joints.
- B. Grout
 - 1. Cement-bentonite-water mixture in the ratio of 6.5 gallons potable water/3 to 5 pounds bentonite/94 pounds Type B cement.
- C. Well Screen: Continuous slot, wire-wound.
 - 1. Screen Type: Type 304 stainless steel.
 - 2. End fittings: Type 304 stainless steel.
 - 3. Slot opening size: 0.010-inch continuous wire-wrap openings.
 - 4. Intermediate screen sections joined by welding or by threaded and coupled connections. If welded, the welding rod shall be suitable for joining material so as not to reduce corrosion resistance. The rod selected must be approved by the Engineer.

D. Filter Pack

1. The filter pack material shall consist of clean, well-rounded grains that are smooth and uniform. The material should be mostly siliceous with not more than 5 percent calcareous material by weight. The specific gravity of the filter pack material shall be 2.5 or greater.
2. Grading of the filter pack shall be based on the screen slot size and the existing grain size distribution curves.

E. Sand Pack

1. Fine granular material resulting from the natural disintegration of rock. The material shall consist of clean, hard, durable uncoated particles of sand, free from clay lumps and soft or flaky material.

F. Concrete: Ready-mixed concrete.

2.02 MIXES

- A. Follow manufacturer's installation instructions.**

2.03 WATER SOURCE

- A. Water used in the well construction process (e.g., to prepare grout mixtures, decontamination, etc.) should be obtained from a source of known chemistry that is free from potential site contaminants, as directed by the Engineer, and handled in such a way (e.g., clean/decontaminated tanks, hoses, etc.) so as not to compromise the water's chemical integrity.**

PART 3 EXECUTION

3.01 PREPARATION

- A. Identify known underground, aboveground, and aerial utilities. Stake and flag locations.**
- B. Notify utility company to locate utilities.**
- C. Protect above- and below-grade utilities that are to remain.**
- D. Protect plant life, lawns, and other features remaining as a portion of final landscaping.**
- E. Protect benchmarks, existing structures, fences, sidewalks, paving, and curbs from drilling equipment and vehicular traffic.**

3.02 DRILLING

- A. Method to be determined.**

3.03 WELL CONSTRUCTION

- A. Assembly of the Well Screen and Riser.**

1. Inspect screen and casing pipe prior to placement.
2. Take precautions (equipment and personnel) to ensure grease, oil, or other contaminants that may ultimately alter the water chemistry do not contact the well construction materials.
3. Personnel shall wear clean gloves while handling the well assembly.
4. Ensure a watertight seal of joints with the use of O-rings, PTFE taping, or manufacturer's guarantee (e.g., square profile threads).
5. Install the well string assembly straight (plumb) with the aid of centralizers, well hangers, or chucks to the predetermined level.
6. Extend casing above grade and cap temporarily to restrict entrance of foreign materials during completion operations.

- B. Installation of the Filter Pack.**

1. **Volume of Filter Pack:** Calculate the volume of filter pack required to fill the annular space between the well screen and the wall of the borehole prior to placement, and measure and record the volume used during installation.
2. **Length of Filter Pack:** The filter pack shall extend from the bottom of the borehole to a minimum of 2 feet above the screened section.
3. **Placement of Filter Pack:** Place the filter pack using a decontaminated flush-threaded tremie pipe and a clean water source or gravity feed directly between well casing and borehole wall or drill casing. Take precautions so as not to bridge the sand.
 - a. Measure the progression of filter pack placement using a weighted measuring tape or a calibrated tremie pipe or tamper.
 - b. Maintain the stability of the borehole (i.e., the borehole does not tend to cave, blow-in, or is obstructed) during placement.

- c. Measure and record the volume and depth of the sand pack placed.
 - d. Collect and retain a sample of the sand pack material.
 - 4. Placement of the Buffer Sand: Place a minimum 6-inch-thick secondary filter pack (buffer sand) above the primary filter pack by the methods described for the primary filter pack installation to prevent the intrusion of concrete.
- C. Bentonite Slurry Seal:
 - 1. Bentonite shall be installed as shown on the drawings. The bentonite slurry seal shall possess a mud weight as close to 12 pounds per gallon as can be attained. The bentonite seal shall be placed to a minimum thickness of 5 feet.
- D. Grout:
 - 1. The grouting shall be done continuously and in such a manner as to ensure the entire filling of the annular space.
 - 2. Grout to within 8 feet of surface above bentonite slurry seal.
- E. Sand Pack
 - 1. Place an 8-foot-thick sand pack from the top of the grout layer to the ground surface.
 - 2. Place by the methods described for the primary filter pack.
- F. Capping the Well
 - 1. Upon completion of the well, the Contractor shall install a suitable screwed, flanged, or welded locking protective casing to prevent any pollutants from entering the well.

3.04 WELL DEVELOPMENT

- A. The development process shall be accomplished by high-velocity horizontal jetting and simultaneous air-lift pumping. The outside diameter of the jetting tool shall be 1/2 to 1 inch less than the inside diameter of the screen.
- B. Development shall continue until the Engineer decides further development is unnecessary. For bidding purposes, assume a 3-hour maximum.
- C. Development water shall be containerized, sampled, and disposed of off-site.

3.05 ABANDONED WELLS

- A. If the well fails to conform to these specifications and the Contractor is unable to correct the condition or to negotiate a mutually acceptable cost reduction for specification deviations, the well shall be considered to be an abandoned hole, and the Contractor shall immediately start a new well at a nearby location designated by the Engineer.**
- B. The well shall be abandoned in accordance with Wisconsin regulations.**

3.06 RECORDS

- A. Two copies of the drillers's log, signed and dated by the well driller or the drilling machine operator, will be given to the Engineer. The log will record the materials penetrated to the nearest foot.**
- B. If geophysical logs were made, a copy of each shall be given to the Engineer.**
- C. A record of all static water level measurements and the times at which they were taken will be given to the Engineer.**
- D. A complete casing and screen location record will be made by the driller and given to the Engineer. This record will show the lengths of each casing and screen section and the location of the packers, the plugs, and the seal.**

3.07 MEASUREMENT AND PAYMENT

- A. Installation and development of the well shall be paid for based on the unit price bid items shown on the bid form and shall constitute full compensation for all labor, materials, and equipment required to complete installation of the monitoring wells in accordance with the Specifications.**

END OF SECTION

SECTION 02831

CHAIN-LINK FENCES AND GATES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment, and such miscellaneous items as necessary for installation of a new or (if removed) reinstallation of existing 6-foot-high chain-link perimeter fence with barbed wire, as specified and detailed on the Drawings.
- B. The perimeter fence shall be as produced by USS Cyclone Fence, Inc., or equal. Substitutions meeting the requirements of Section 616 of the Standard Specifications shall be submitted to the Engineer for approval prior to installation.
- C. The Contractor shall install fencing according to the manufacturer's specifications unless otherwise indicated and specified herein.

1.02 REFERENCES

- A. State of Wisconsin, Department of Transportation, Standard Specifications for Road and Bridge Construction, Section 616, Property and Right-of-Way Fencing.

1.03 SHOP DRAWINGS AND PRODUCT DATA

- A. Submit two copies of shop drawings, manufacturer's technical data, and details of fabrication, in accordance with Section 01300.
- B. Clearly indicate plan layout, grid, spacing of components, accessories, fittings, and anchorage.
- C. Submit manufacturer's installation instructions and procedures, including standard details of fence and gate installation.

PART 2 PRODUCTS

2.01 GENERAL

- A. All fencing material furnished, except temporary fencing, shall be new. No used, rerolled, or open-seam material will be permitted in posts, rails, and braces.

- B. All materials shall comply with the pertinent requirements of Section 616 of the Standard Specification for chain-link fences, AASHTO Designation: M181. Type I zinc-coated steel fabric, Type III aluminum alloy, and Type IV vinyl-coated fabric shall not be used.
- C. Unless otherwise specified, all fence fabric posts, hardware, and fittings furnished for the project shall be of the same type and produced by one manufacturer.

2.02 FENCE FABRIC

- A. The fence fabric shall be either aluminum-coated, conforming to ASTM-A491, or zinc-coated, conforming to ASTM A392 Class II. Fabric shall be woven from 9-gauge wire in a 2-inch diamond mesh pattern.
- B. The fabric furnished shall be the same nominal height as the designated height of fence.
- C. The top salvage shall be twisted and barbed, and the bottom salvage shall be knuckle-end closed.

2.03 POSTS

A. GENERAL

1. The steel posts shall be galvanized pipe with hot-dipped zinc coating, at 2 oz. per square foot, in accordance with ASTM-F1083.
2. Roll-formed steel posts, conforming to ASTM-A570, Grade 45, may be substituted for steel posts on approval of the Engineer. All roll-formed shapes shall be zinc-aluminum alloy-coated at 2 oz. per square foot, in accordance with ASTM A875.
3. The line and terminal posts shall be sufficient in length to allow for approximately 36-inch settings into concrete footings.
4. All posts except roll-formed shapes shall be fitted with ornamental tops; the tops shall be standard in design, be made of metal, and fit securely over the top of pipe.

B. LINE POSTS

1. The line posts shall be 2.375-inch O.D. standard weight galvanized pipe with minimum vertical bending strength of 20 pounds under a 6-foot cantilever load.
2. The material shall be Schedule 40 pipe with a thickness of 0.154 inch.

C. CORNER AND TERMINAL POSTS

1. The corner and terminal posts shall be 2.875-inch O.D. galvanized standard weight pipe with zinc coating at 2 oz. per square foot, in accordance with ASTM F-1083.
2. The material shall be Schedule 40 pipe with a thickness of 0.203 inch.

2.04 TOP AND BRACE RAILS

- A. The top and brace rails shall be 1.66-inch O.D. standard weight galvanized pipe, hot-dipped, zinc coating at 2 oz. per square foot, in accordance with ASTM F-1083.
- B. The horizontal and diagonal pipe or roll-formed braces and diagonal truss rods shall extend from all terminal and corner posts to the first adjacent line posts. The diagonal truss rods shall be zinc-coated 0.375-inch round steel rods equipped with threaded take-up adapter.
- C. The top rail couplings, 6 inches minimum length, shall be spaced at maximum 21-foot centers.
- D. The fabric wire ties shall be 9-gauge aluminum or 11-gauge galvanized steel spaced at maximum 24-inch centers.

2.05 STRETCHER BARS

- A. The stretcher bars shall be zinc-coated, flat-milled, or rail steel, a minimum of 72 inches in length.

2.06 BARBED WIRE

- A. The barbed wire shall be 3 strands of aluminum-coated double-strand 12.5-gauge twisted wire with 14 gauge 4-point round aluminum barbs spaced 5 inches on center, conforming to ASTM-A585.
- B. The barbed wire arm shall slope 45 degrees to the outside, and the installation procedure shall be as recommended by the manufacturer.

2.07 GATES

- A. Gate frames shall be 1.90-inch galvanized steel pipe, zinc-coated, in accordance with ASTM-F1083. Braces and truss rods shall be furnished when necessary to prevent sagging, as recommended by the manufacturer.

- B. The fabric shall be as provided for the line fence. Install with stretcher bars and tie wires at the top and bottom edges in accordance with this specification.
- C. The barbed wire shall be as described in this specification and shall be installed by extending the end members 1 foot above the top horizontal section of gate frame and attaching with bands or clips as provided by the manufacturer.
- D. The gate posts shall be 4-inch O.D. standard galvanized pipe with zinc coating at 2 oz. per square foot, in accordance with ASTM-F1083.
- E. Miscellaneous hinges, latches, and gatekeepers shall be pressed steel or malleable iron, as provided by the manufacturer.
- F. The gates shall be equipped with latch mechanisms to allow for use of a padlock for locking purposes.

2.08 CONCRETE MIX

- A. Concrete for use in footers shall be Grade A concrete in accordance with Section 616 of the Standard Specifications, or equal. The diameter of the footings shall be 10 inches for line posts and 12 inches for terminal posts.

PART 3 EXECUTION

3.01 INSTALLATION

- A. The Contractor shall install line posts, corner posts, top rails, post caps, barbed wire arms, fabric, and gates to provide a rigid structure for a fence of the height indicated on Drawings. Manufacturer's standard fittings, fasteners, and hardware shall be used. Barbed wire arms shall be sloped outward.
- B. Maximum spacing of posts: 10 feet.
- C. The Contractor shall install line, corner, and terminal posts plumb, set in 36-inch concrete footings, as specified.
- D. The post shall be set to within 6 inches from bottom of the concrete footing. The top of concrete shall be sloped for water runoff. The top of footing shall be set 2 inches above finished grade. Posts footings shall be allowed to cure for seven days before tension wires are placed.
- E. The bottom of fabric shall be positioned 2 inches above finished grade with tension wire stretched taut between posts.

- F. The top rail shall be passed through line post tops to form continuous bracing. A minimum of 6-inch-long couplings shall be installed midspan at pipe ends.
- G. Each gate and corner post shall be braced back to adjacent line post with horizontal center brace rail. Brace rail shall be installed, one bay from end and gate posts.
- H. Center and bottom brace rails shall be installed on corner and gate leaves.
- I. Fabric shall be fastened to top rail, line posts, braces, and bottom tension wire with wire ties maximum 15-inch centers.
- J. Fabric shall be stretched to end, corner, and gate posts with tension bars and tension bar clips.
- K. Fabric shall be stretched between terminal posts or at intervals of 100 feet maximum, whichever is the least dimension.
- L. Three strands of barbed wire shall be installed on arms, tensioned, and secured.
- M. Gates shall be installed using fabric and barbed wire overhang to match fence. Three hinges shall be installed per leaf (swing gates), latch, catches, and drop bolt.
- N. Concrete center rest and drop bolt retainers shall be provided at center of double gate openings.
- O. Corner posts shall be placed whenever a break in 30 degrees or more occurs in the horizontal alignment of the fence.

3.02 REPAIRS

- A. Damaged coatings shall be repaired in the shop or field erection by recoating with the manufacturer's recommended repair compounds, applied per the manufacturer's directions.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 02930

FINISH GRADING AND SEEDING

PART 1 GENERAL

1.01 SUMMARY

- A. This section covers the work necessary for finish grading and establishment of vegetation, to include furnishing and delivering material, finish grading, seeding, fertilizing material testing, mulching, and seed bed maintenance.
- B. This section shall apply to all areas disturbed by construction activities and requiring restoration.

1.02 SUBMITTALS

- A. Submit certificates of compliance before delivery of materials, as specified in Section 01300, for the following items:
 - Seed.
 - Fertilizer.
 - Lime.
 - Mulch.
 - If hydroseeding, the number of pounds of materials to be used per 100 gallons of water for hydroseeding.

PART 2 PRODUCTS

2.01 SEED MIXTURE

- A. Seed mixture for all areas other than wetland areas will conform to Section 630, "Seeding," of the Standard Specifications, Mix No. 10. Seed shall be certified, delivered in its original unopened container bearing the analysis of contents, guaranteed pure and having a germination rate in accordance with Section 630.2.1.5, Seed Mixtures.

- B. Wetland seed mixtures shall conform to seed mixture No. 60 of the Standard Specifications. Seed shall be certified, delivered in its original unopened container bearing the analysis of contents, guaranteed pure and having a germination rate in accordance with Section 630.2.1.5, "Seed Mixtures."
- C. The seed mixtures shall be inoculated in accordance with Section 630.2.1.3 of the Standard Specifications and the manufacturer's recommendations.
- D. Temporary winter seeding, if required, shall be Annual Rye grass with a purity of 97 percent and a minimum germination rate of 85 percent.

2.02 FERTILIZER

- A. The fertilizer for use in connection with seeding shall be standard, commercial packaged or bulk products in granular or liquid form conforming to Section 629 of the Standard Specifications for Type A Fertilizer. Fertilizer shall contain a minimum of 16 percent nitrogen, 6 percent phosphoric acid, and 6 percent potash.
- B. The fertilizer shall be uniform in composition and delivered in its original unopened containers bearing the manufacturer's guaranteed analysis.

2.03 LIME

- A. Lime shall be calcic or dolomitic ground agricultural limestone containing not less than 85 percent of total carbonate and of such fineness that 90 percent will pass a Number 20 sieve and at least 50 percent will pass a Number 100 sieve.
- B. Caked or otherwise damaged lime may be rejected.
- C. Lime shall be furnished in new, clean, sealed, and properly labeled bags of not more than 100 pounds each, with the following information clearly marked thereon:
 - Manufacturer's Name
 - Type
 - Weight
 - Guaranteed Analysis

2.04 MULCH

- A. Mulch shall consist of any straw or hay in an air-dry condition, wood excelsior fiber, or another suitable material of similar nature acceptable to the Engineer.
- B. Asphaltic material, if used as a tackifier, shall be an emulsified asphalt meeting the requirements for Type SS-1 of the standard Specification for Emulsified Asphalt, AASHTO Designation: M140. Other binding materials shall be approved by the Engineer prior to use.

2.05 WATER

- A. Water for use in seed application or maintenance shall be potable water free from oils, acids, alkalies, salts, or any other substance injurious to plant life. The Contractor is responsible for providing an ample supply of acceptable water for use in conducting seeding activities in accordance with this Specification.

PART 3 EXECUTION

3.01 SEED BED PREPARATION

All areas that are disturbed by earthmoving activities and are not paved, stoned, or otherwise covered, shall be stabilized by the establishment of vegetation as soon as possible following completion of earthmoving for that area.

- A. The area to be seeded shall be topsoiled in accordance with Section 02200, "Earthwork." The Contractor shall verify that the prepared soil base is ready to receive seeding in accordance with this Specification. Beginning of installation means acceptance of existing site conditions.
- B. The finish grade area is to be seeded by raking, discing, or rototilling to a uniform grade. Objectionable material, such as stones (2 inches or larger), clods, brush, roots, and trash, will be removed.
- C. Fertilizer shall be evenly applied at a rate of 350 lbs/acre and rototilled or disced to a depth of 4 inches. Fertilizer may be incorporated into the water/seed mixture if hydroseeding techniques are to be used. The Contractor shall lightly water fertilized areas to aid the dissipation of fertilizer.
- D. Finished grades shall be lightly compacted with a cultipacker or other appropriate equipment to ensure a stable seed bed and to limit erosion.

3.02

SEEDING

- A. Sowing shall be conducted in accordance with Method A or Method B of the Standard Specifications, Section 630, "Seeding."
- B. Seeding shall be conducted under favorable weather conditions and when temperatures and moisture conditions are suitable for the work.
- C. Seed shall be inoculated within the time limits and procedures as recommended by the manufacturer.
- D. Areas to be reseeded shall be sown evenly with a mechanical spreader or a hydroseeding unit at a rate of 1-1/2 pounds per 1,000 square foot.
- E. Temporary winter seed, if required, shall be applied at a rate of 3 pounds per 1,000 square foot.
- F. Water shall be applied evenly as prescribed by the seed manufacturer immediately after each area has been sown.
- G. Each seeded area shall be mulched uniformly using 2 tons per acre mulch and 6 gallons per 1,000 square feet of emulsified asphalt. The Contractor shall not seed area in excess of that which can be mulched on same day. Mulch that becomes displaced shall be replaced at the Contractor's expense.

3.03

MAINTENANCE

- A. Maintenance activities shall begin after each section of the site has been seeded.
- B. Seeded surfaces shall be maintained by supplying additional topsoil, seed, fertilizer, mulch, or other erosion control measures where necessary to control erosion.
- C. Surfaces shall be watered to ensure uniform seed germination and to keep surface of soil damp. Water shall be applied slowly and in a fine spray to limit ponding.
- D. Damaged areas showing root growth failure, deterioration, bare or thin spots, or eroded areas shall be replanted.

3.04

INSPECTION FOR ACCEPTANCE AND GUARANTEE PERIOD

- A. Seeded areas shall be accepted by the Engineer when a full and uniform stand of grass has become established. A satisfactory stand of grass or a section of grass shall be defined as an area of 10,000 square feet or larger that has:**
- 1. No bare spots larger than 3 square feet.**
 - 2. Not more than 10 percent of area with bare spots larger than 1 square foot.**
- B. The Contractor shall provide a one-year guarantee on all seeded areas from the date of acceptance by the Engineer. Acceptance will be based on the criteria stated in Section 3.04, Part A, as determined by the Engineer.**

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK