verdantas

CONTRACT DOCUMENTS AND SPECIFICATIONS

FOR

FORT WRIGHT SALT STORAGE BUILDING – PHASE II

Prepared for:
CITY OF FORT WRIGHT
409 KYLES LANE
FORT WRIGHT, KENTUCKY 41011

Prepared by:
Verdantas LLC
300 Buttermilk Pike, Suite 332
Fort Mitchell, Kentucky 41017

Verdantas Project No: 39973-02

July 2026

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1. Project Information

PROJECT:	**FORT WRIGHT SALT STORAGE BUILDING – PHASE II**
OWNER:	**CITY OF FORT WRIGHT** **409 KYLES LANE** **FORT WRIGHT, KENTUCKY 41011** **KENTON COUNTY, KENTUCKY**
ENGINEER:	**VERDANTAS, LLC** **300 BUTTERMILK PIKE, SUITE 332** **FORT MITCHELL, KENTUCKY 41017** **CONTACT: MARTIN HELLMANN** **TELEPHONE: (859) 534-9934** **EMAIL: MHELLMANN@VERDANTAS.COM** **Web Site: www.verdantas.com**
PROJECT #:	**39973-02**
BID OPENING DATE:	**THURSDAY, JULY 30, 2026 @ 11:00 AM**
ADVERTISING DATE:	**THURSDAY, JULY 9, 2026**
COMMENCEMENT DATE:	**AUGUST 10, 2026**
COMPLETION DATE:	**OCTOBER 23, 2026**

2. CITY OF FORT WRIGHT OFFICIALS

MAYOR

DAVE HATTER

CITY ADMINISTRATOR

JILL C. BAILEY

PUBLIC WORKS ADMINISTRATOR

JEFF BETHELL

CITY COUNCIL

JASON COLLINS

DONNA ROSS

SCOTT WALL

JAY WEBER

BERNIE WESSELS

MARGIE WITT

3. Legal Notice – Invitation to Bid

CITY OF FORT WRIGHT, KENTUCKY

KENTON COUNTY

LEGAL NOTICE

Sealed proposals will be received at the office of the City Clerk, Municipal Building, **CITY OF FORT WRIGHT**, **409 KYLES LANE, FORT WRIGHT, KENTON KENTUCKY**, **41011** until **11:00 AM**. local time on **THURSDAY, JULY 30, 2026,** for furnishing all labor, materials, and equipment necessary to complete project known as **FORT WRIGHT SALT STORAGE BUILDING – PHASE II** and, at said time and place, publicly opened and read aloud.

Bids must be in accordance with drawings and specifications and on forms available from Verdantas LLC at a non-refundable cost of One Hundred Dollars ($100.00) for mailed hard copies and $45.00 for electronic files. Documents may be ordered by registering and paying for the documents online at https://bids.verdantas.com. Please contact planroom@verdantas.com or call 440-530-2351 if you encounter any problems registering or paying for the documents.

The bid specifications, drawings, plan holders list, addenda, and other bid information (**but not the bid forms**) may be viewed and/or downloaded for free via the internet at https://bids.verdantas.com. The bidder shall be responsible to check for Addenda and obtain same from the web site.

Proposals must contain the full name of the party or parties submitting the same and all persons interested therein. It is the intent and requirements of the owner that this project be completed no later than **OCTOBER 23, 2026**.

The City Council of the **CITY OF FORT WRIGHT**, reserve the right to waive irregularities and to reject any or all bids.

The City Council of the **CITY OF FORT WRIGHT** shall authorize acceptance of the bid made by the responsible bidder who, in Council's judgment, offers the best and most responsive proposal to the City, considering quality, service, performance record, and price; or Council may direct the rejection of all bids. The City may award based on "functional equivalence" concerning specified work or products.

By the order of the City Council of the **CITY OF FORT WRIGHT**.

Publishing Date: LINKNKY.com – **THURSDAY, JULY 9, 2026**

4. Instructions to Bidders

4.1 General

Sealed bids will be received until **JULY 30, 2026**, at **11:00 AM**, at the office of the City Clerk, Municipal Building, **CITY OF FORT WRIGHT**, **409 KYLES LANE**, **FORT WRIGHT**, **41011**, for the furnishing of labor and materials required for the **FORT WRIGHT SALT STORAGE BUILDING – PHASE II**, all in accordance with these instructions, conditions, specifications, and on the enclosed forms. All shall be submitted in a sealed envelope addressed to the **CITY OF FORT WRIGHT** and shall be plainly marked on the outside of the envelope **FORT WRIGHT SALT STORAGE BUILDING – PHASE II**. No bid may be withdrawn, once the bid has been deposited with the Owner, except in accordance with Kentucky Standard Specifications for Road and Bridge Construction, Section 102.11. Proposals received after the time for the opening of bids will be returned to the Bidder unopened. All bids shall remain valid for a period of sixty (60) days from the date of Bid Opening.

4.2 Definition of Terms

Whenever the term “Bidder” occurs, it shall mean any person, firm or corporation as a Prime Contractor who submits a proposal/bid for the Project, either acting directly or through a duly authorized representative.

Whenever the term “Bid Packet” occurs, it shall mean all the documents contained herein and any addenda thereto.

Whenever the term “City” or “Owner” occurs, it shall mean the **CITY OF FORT WRIGHT**. The Mayor, or their designee, shall be the representative for the Owner.

Whenever the term “Contract” occurs, it shall mean the written agreement between the Owner and the Contractor covering the performance of the Work on the Project and the furnishing of labor and/or materials in the construction of the Work on the Project, including the Contract Documents.

“Contract Documents” shall mean these Instructions to Bidders and General Conditions, the Specifications, any Drawings and/or Plans, the Contract Bond and all other forms or certificates required by these Instructions, all forms included with the Contractor’s Bid, all the material contained in this Bid Packet, any Change Orders, and all addenda to any of the aforementioned items. The Contract Documents shall be a part of the Contract as if fully rewritten therein.

Whenever the term “Contractor” occurs, it shall mean a person, firm or corporation contracting with the Owner as a Prime Contractor to supply labor, materials, or equipment or all for the Project.

Whenever the term “Construction Manager” or “Engineer” occurs, it shall mean Verdantas., or agent so designated by the Owner to act as the Owner’s agent.

Whenever the term “Director” occurs, it shall mean the Owner, or the Owner’s agent.

Whenever the term “Project” occurs, it shall mean the entire public improvement proposed by the Owner to be constructed in part or in whole pursuant to the Contract.

Whenever the term “Proposal or “Bid” occurs, it shall mean the offer of the Bidder to perform the Work on the Project, when said offer is made out and submitted on the prescribed forms, properly signed and guaranteed, and in the prescribed manner.

Whenever the term “Subcontractor” occurs, it shall mean a person, firm, or corporation other than the Prime Contractor supplying labor and materials for the Work to the Contractor and under the control of the Contractor.

Whenever the term “the Work” occurs, it shall mean the Work to be performed in constructing and completing the Project, including all labor, materials and equipment.

4.3 General Provisions

The most current State of Kentucky, Transportation Cabinet, Department of Highways (KTC) Standard Specifications for Road and Bridge Construction, as specifically set forth herein, are adopted and made part of these Contract Documents, unless specifically excluded herein.

All references to the Director, the Director of Highways, the First Assistant Director, and Chief Engineer, the Deputy Director of Design and Construction, the Deputy Director of Operations, the Engineer of Construction, the Engineer of Maintenance, the Engineer of Bridges, the Engineer of Tests, shall be considered to read the Engineer.

All references to the State, the State of Kentucky, the Cabinet, or the Transportation Cabinet shall be considered to read the Owner.

4.4 Examination of Plans, Specifications, General Provisions and Site

The Bidder is expected to examine carefully the site of the proposed Work, the proposal, plans, specifications, contract documents, general provisions, and addenda, before submitting a proposal. The submission of a bid shall be considered evidence that the Bidder has made such examination and is satisfied as to the conditions to be encountered in performing the Work and as to the requirements of the plans, specifications, general conditions, special provisions, addenda and Contract.

Subject to public safety and convenience, prospective Bidders will be permitted to explore the site of the Work by boring or test pits, permits for which will be issued by the Engineer.

Explorations shall be at the sole risk and expense to the Bidder and under conditions of safety, maintaining traffic, and restoring all areas disturbed by any and all explorations to conditions equal to, or better than, the condition prior to exploration.

The Owner does not make any representation of soil or foundation conditions or materials, nor does it represent that drawings may not be modified to meet changes in soil conditions encountered as the Work progresses. The Contractor must inspect the site of the proposed Work and must assume all risk as to the nature and behavior of the material which may be encountered in excavation, whether apparent on the surface or disclosed only in the course of the Work.

4.5 Interpretation of Quantities in Proposal

The quantities appearing in the proposal are approximate only and are prepared for the comparison of the bids. Payment to the Contractor will be made only for the actual quantities of Work performed and accepted or materials furnished and accepted in accordance with the Contract except for lump sum contracts and except for lump sum items in unit price contracts. The scheduled quantities of Work to be done and materials to be furnished may be increased, decreased, or omitted as hereinafter provided.

4.6 "Or Approved Equal" Items

In the preparation of these documents and plans, several proprietary products may have been specified. In all such cases, it is to be understood that the Contractor may offer a substitute for the specified product, as indicated by "Or Approved Equal". However, the Contractor must be aware that, before commencement of construction, he must provide information to the Engineer concerning the substituted product, and that the Engineer must approve in writing the offered product as being equal to the specified product before use or incorporation in the Work.

Unless otherwise modified by the Engineer, proprietary products are to be installed and/or constructed in strict compliance with the pertinent manufacturer's specifications.

4.7 Addenda

The Contractor shall notify the Engineer promptly of any discrepancies in, or omissions from the Contract Documents. The Engineer will issue a clarifying addendum to each person on record as having received a set of Contract Documents. The Owner will not be responsible for oral instruction or information. Questions received less than five (5) days prior to bid date cannot be answered. Any Addenda issued during the bidding period are to be included in the Proposal and shall become a part thereof.

4.8 Alternate Bid

It is the Owner's intent for the Contractor to bid on either the base or the alternate bid items (if provided). Upon award of the Contract, the Owner will inform the Contractor, in writing, if the standard bid or alternate bid items will be included with the Project.

Award of the project will be based on the standard bid and/or alternate bid items ultimately selected by the Owner for inclusion in the project and award amount.

The Owner reserves the right to award or delete any or all combinations.

4.9 General Conditions

The successful Bidder/Contractor shall be responsible for all site operations related to the Work as shown and described in the Specifications, Plans and related General Provisions, and shall meet all requirements of these Instructions, General Provisions, and Specifications. All Work shall be completed in compliance with these Instructions, the General Provisions, Specifications, Plans and other Contract Documents.

4.10 Bidder Qualifications

The Owner requires that the Bidder furnish satisfactory evidence that he has the necessary resources to fulfill the conditions of the Contract and the Specifications. Each Bidder shall submit on the form included in the Bid Packet, a statement of the Bidder's qualifications. Each Bidder must furnish satisfactory evidence that it is operating a business of a type that can meet the Specifications for the Work and that

it has operated such business for at least the last two (2) years. Only Bidders who have sufficient experience; ample equipment and personnel; adequate financial resources or the ability to obtain such resources as required during the performance of the Contract; who are able to comply with the required performance schedule for the Work; who have a satisfactory record of integrity; who have a satisfactory record of performance (Bidders who are delinquent in current contract performance, when the number and the extent of the delinquencies of each are considered, shall be presumed to be unable to fulfill this requirement, in the absence of evidence to the contrary or circumstances properly explained); and who are otherwise qualified and eligible to receive an award under applicable Kentucky laws and regulations, shall be considered.

The Owner shall have the right to take such steps as it deems necessary to determine the ability of the Bidder to perform his obligations under the Contract, and the Bidder shall furnish to the Owner all such information and data for this purpose as it may request. The right is reserved to reject any bid where an investigation of the available evidence or information does not satisfy the Owner that the Bidder is qualified to carry out properly the terms of the Contract.

The Owner requires that the Bidder furnish a list of references of **all** persons, corporations, political subdivisions or firms for whom the Bidder has done the type of Work required for this Project within the last two (2) years.

4.11 Subcontracts

The Bidder shall submit, with his bid, a complete list of the names and addresses of any subcontractors he contemplates for use on the Project. In addition, the Owner requires that the Bidder furnish a list of subcontractor references of all persons, corporations, political subdivisions or firms for whom the proposed subcontractor has done the type of Work proposed under contract between the Contractor and the subcontractor within the last two (2) years.

The subcontractor must be acceptable to the Owner and approved by the Owner, in writing, prior to the execution of the Contract. Although such approval shall not be arbitrarily withheld, subcontractors that have proven unsatisfactory in the past or do not have adequate manpower or resources to perform the Work will not be accepted. Only subcontractors who have sufficient experience; ample equipment and personnel; adequate financial resources or the ability to obtain such resources; who are able to comply with the required performance schedule for the Work; who have a satisfactory record of integrity; who have a satisfactory record or performance (Bidders who are delinquent in current contract performance, when the number and the extent of the delinquencies of each are considered, shall presumed to be unable to fulfill this requirement, in the absence of evidence to the contrary or circumstances properly explained); and who are otherwise qualified and eligible to receive an award under applicable Kentucky laws and regulations, shall be considered.

The subcontractor must submit a non-collusion affidavit prior to the execution of the Contract.

Approval of the proposed subcontractor(s) will not be given by the Owner unless and until the above requirements are met. Although the Bidder is not required to submit the required Subcontractor forms, filled out by any proposed subcontractors, with its bid, the Bidder is hereby advised of these requirements so that appropriate action can be taken to prevent subsequent delays in subcontract awards and/or the execution of the Contract.

After the Subcontractors have been approved and the Contract signed, no changes in the subcontractors shall be made without the prior written approval of the Owner.

4.12 Bid Guaranty

In accordance with Kentucky Transportation Cabinet Standard Specifications for Road and Bridge Construction Section 102.09, and in order to assure that if the Bidder's bid is accepted that it will enter into the Contract with the Owner, each bid must be accompanied by a Bid Guaranty in the form of either:

1. A Bond for 10% percent of the bid, in the form of a Bid Guaranty Bond, acknowledged by the Bidder, as principal, and by a surety company qualified to do business in the State of Kentucky, and satisfactory to the Owner as surety; or
2. A cashier's check or certified check issued by a responsible bank or trust company, and made payable to the order of the Owner, in the sum of at least ten percent (10%) of the Bid.

The Bid Guaranty shall be enclosed in the sealed envelope containing the Bid.

If the bidder chooses to submit a Bid Guaranty Bond, the bond shall be in form prescribed by KTC Standard Specifications for Road and Bridge Construction Section 103.05. The Bond must be signed by an authorized agent of an acceptable surety bonding company and by the Bidder. The bond must be countersigned by a resident agent of the bonding company and its corporate seals must be affixed to all copies. ***The name and address of both the surety and surety's agent must appear on the bond***. Bid Guaranty must be supported by credentials showing the Power of Attorney of the surety's agent.

Bid guaranties (cashier's check or certified check) will be returned to unsuccessful Bidders within fifteen (15) days of the execution of the Contract with the successful Bidder.

Once the bid is awarded pursuant to the Notice of Award, the Contractor will be required to execute the Contract with the Owner within ten (10) days of its receipt of said Notice. Execution of the Contract shall require the submittal of a Performance Bond (unless the Bidder has already submitted a Bid Guaranty Bond), proof of insurance, and other documents, as outlined below. Executed copies of the bond and insurance certificates are required for each set of Contract Documents. If the Contractor fails to execute the Contract within the required time, the Contractor's Bid Guaranty may be forfeited to the Owner, not as a penalty, but as liquidated damages, in accordance with the terms of the Bid Guaranty. The Project may then be rebid or awarded to the next lowest and best bidder, as the Owner determines at it own discretion.

4.13 Preparation of Proposal

The Bidder shall submit their Proposal upon the forms furnished by the Owner. All blank spaces for bid prices must be filled in, in words or figures, and shall be written in ink or typewritten. The Bidder shall initialize any corrections or changes in the Proposal.

The Bidder's Proposal must be signed in ink by the individual, by one or more members of the partnership, or by one or more officers of a corporation, or by an agent of the Bidder legally qualified and acceptable to the Owner. If the Proposal is made by an individual, his name and business address must be shown; by a partnership, the name and business address of each partnership member must be shown; by a corporation, the name of the state under the laws of which the corporation is chartered and the name and title of the officer or officers having authority under the bylaws to sign contracts, the name of the corporation and the business address of its corporate officials must be shown.

A foreign corporation submitting a Proposal must comply with the laws of doing business in the State of Kentucky, if its Proposal or any part thereof is accepted.

To be considered responsive, each bid shall consist of the following, fully executed:

1. Bidder Information Sheet
2. Bid Proposal

3. Bid Form
4. Bid Guaranty and Contract Bond
5. Certificate as to Interest
6. Subcontractors List
7. Certification As to Kentucky Resident Status OR Certification As to Non-Resident Status
8. Personal Property Tax Affidavit

The Bidder's attention is directed to all applicable Federal, State, and local laws, and the rules and regulations of all authorities and agencies having jurisdiction over the Work. All such laws, rules, and regulations shall apply to the Contract and every aspect of the Work and shall be deemed included as a part of the Contract as if the same were fully written therein.

The attention of Bidders is especially directed to the following:

1. Federal and Civil Rights Law regulating Equal Opportunity Employment
2. Bid Guaranty and Contract Bond requirements
3. Statutory requirements of the State of Kentucky relative to licensing of corporations organized under the laws of any other state
4. Federal or State of Kentucky Prevailing Wage Law

The price or prices shown on the proposal shall include all costs associated with the Work (including labor), shall be the actual price(s) to be paid by the Owner, and shall include all discounts, allowances, etc. Each Bidder shall bid on each item listed in the Proposal.

Where a discrepancy appears between the sum shown in the "Total" column and the correct product of the sums appearing in the "Estimated Quantity" and "Unit Price" columns, the correct product of the sums appearing in the "Estimated Quantity" and "Unit Price" columns shall control.

4.14 Commencement And Completion Dates

Contractor may not begin work prior to **AUGUST 10, 2026** (unless previous approval is given by the Owner).

It is the intent and requirement of the Owner that the proposed work shall be installed and operational no later than the date stated in the contract contained within this document.

4.15 Delivery of Proposals

The total Contract Documents and Specifications book shall be placed, together the required completed forms, in a sealed envelope addressed to the Owner. Proposals will be received until the hour and date set for the opening thereof and must be in the hands of the Owner's appointed representative by such time. Proposals received after the time indicated for the opening of bids will be returned to the Bidder unopened.

4.16 Withdrawal or Modification of Proposals

No bid may be withdrawn, once the bid has been deposited with the Owner, except in accordance with Kentucky Standard Specifications for Road and Bridge Construction, Section 102.11. Likewise, modifications to a bid, once submitted, shall not be accepted.

4.17 Public Opening of Proposals

Proposals will be opened and read aloud publicly at the time and place designated in the Legal Notice to Bidders. Bidders, their authorized agents, and other interested parties are invited to be present.

4.18 Disqualification of Bids

Any bid submitted unsealed or unsigned, or any bid deemed unresponsive will be disqualified and returned to the Bidder. Bids submitted without a Bid Guaranty or an invalid Guaranty will be disqualified and will be returned to the Bidder.

4.19 Non-Responsive Proposals

Proposals may be considered non-responsive and may be rejected for the following reasons:

1. If the Proposal is on a form other than that furnished by the Owner of if the form is altered or any part thereof is detached.
2. If there are unauthorized additions, conditional or alternate bids, conditions, or irregularities of any kind which may tend to make the Proposal incomplete, indefinite or ambiguous as to its meaning.
3. If the Bidder adds any provisions reserving the right to accept or reject the Award or to enter into the Contract pursuant to the Award. This does not exclude a bid limiting the maximum gross amount of awards acceptable to any one Bidder at any one bid letting, provided that any selection of awards will be made by the Owner.

4.20 Rights Reserved By The Owner

The Owner reserves the right to review and evaluate all bids for a period of sixty (60) days before final notice of award. The Owner may hold the Bid Proposal of the lowest bidder longer than 60 days if the bidder concurs. An notice of award will be sent to the mailing address or email address as listed in the Bid Proposal, which will serve as the official notice that the project has been awarded to the selected contractor.

The Owner reserves the right to reject any and all bids, to waive any discrepancies or irregularities in the bidding, and to determine, in its own discretion, which Proposal is the best bid. Lowest bid, while a major consideration, will not exclusively govern the Bid Award. The Bid Award shall be made from all considerations, including costs and the responsibility of the Bidder.

The Owner reserves the right to reject the bid of any Bidder who has previously failed to perform properly or complete on time contracts of similar nature; who is not in a position to perform the Contract; or who has habitually, and without just cause, neglected the payment of bills or otherwise disregarded his obligations to subcontractors, materialmen or employees.

In addition to the above-mentioned items, the Owner will also consider the following in determining the best bid: that the Bidder maintains a permanent place of business; has adequate equipment to do the Work properly and expeditiously; has suitable financial status to meet the obligations incidental to the Work; and has the necessary experience.

The Owner reserves the right to award or delete any or all items or combination of items.

4.21 Material Guaranty

Before the Contract is awarded, the Bidder may be required to furnish a complete statement of the origin, composition and manufacturer of any or all materials to be used in the construction of the Work together with samples, of which said samples may be subjected to any tests the Owner, in its sole discretion, deems appropriate to determine their quality and fitness for the Work.

4.22 Notice of Award

The award of the Contract, if it be awarded, will be made to the best overall Bidder whose Proposal complies with all the requirements prescribed. In no case will an award be made until all necessary investigations are made as to the responsibility of the Bidder to whom it is proposed to award the Contract. The successful Bidder will be notified by letter, mailed or emailed to the address shown on his Proposal that his bid has been accepted and that he has been awarded the Contract.

4.23 Documents Required Prior To Signing of Contract

Immediately upon the award of the bid and prior to the signing of the Contract, the Contractor shall furnish to the Owner:

1. Kentucky Workers' Compensation Certificate.

2. Credentials showing the Power of Attorney of the Agent of the Surety

3. A Certificate of Compliance issued by the Division of Insurance showing the right of the bonding company to do business in the State of Kentucky.

4. A Certificate of Insurance with coverage as specified in these Instructions, covering the period of time the Work will be in progress.

5. Listing of selected subcontractor(s) for Owner approval, in accordance with the second paragraph under "Subcontracts" of these Instructions.

4.24 Contract Guaranty

The Contractor at the time the Contract is entered into, shall furnish a Performance Bond, in the form prescribed by KTC Standard Specifications for Road and Bridge Construction Section 102.09, payable to the Owner, for the total amount of the Contract. Said Bond shall be duly executed by the Contractor, as principal, and by a surety company qualified to do business under the laws of the State of Kentucky and satisfactory to the Owner, as surety, for the faithful performance of the Contract and payment for labor and materials. The Bond must be signed by an Authorized Agent of an acceptable surety bonding company and by the Contractor. The Performance Bond must be countersigned by a resident agent of the bonding company and its corporate seals must be affixed to all copies. The name and address of both the surety and surety's agent must appear on Bond, and it must be supported by credentials showing the Power of Attorney of the surety's agent.

The premiums of such Bonds shall be paid by the Contractor.

If the Contractor fails to perform under the Contract, the Performance Bond may be forfeited by the Contractor to the Owner, in accordance with the termination provisions contained herein.

5. General Provisions

5.1 Quantities

The Owner reserves the right to delete quantities of either labor or materials or both, from the Contract, as deemed necessary by the Owner, to meet any funding restrictions for the Work.

5.2 Subcontractors

The Contractor may utilize subcontractors, subject to the following:

1. The Contractor shall not assign, transfer, convey, sublet, or otherwise dispose of the Contract or his rights, title or interest in or to the same or any part thereof, without the written consent of the Owner. Such consent shall not release or relieve the Contractor or his Surety form any obligation or liability under the Contract. In no case will the Contractor be permitted to sublet more than fifty percent (50%) of the total Contract cost.
2. The Contractor shall not award subcontracts to any subcontractor without prior written approval of the Owner.
3. The Contractor shall be fully responsible for the acts or omissions of any of its subcontractors. Nothing contained in the Contract or the Contract Documents shall create any contractual relationship between the Owner and any subcontractors.
4. The Contractor shall cause appropriate provisions to be inserted in all subcontracts that bind the subcontractor to the Contractor under the same terms of any provisions of the Contract Documents that are applicable to the Work of the subcontractor, and that give the Contractor the right to terminate the subcontractor for any violation of those provisions by the subcontractor.

5.3 Insurance

The Contractor shall not commence Work under the Contract until it has obtained all insurance required under this paragraph. The policies shall also protect the Owner, its officers, agents, and employees as additional insured, and shall be in a form approved by the Owner. Certified copies of the insurance policies, fully executed by officers of the insurance company, shall be submitted with the executed Contract and must be submitted before the Notice to Proceed will be sent. Coverage will be provided through insurance companies licensed to do business in the State of Kentucky.

During the term of the Contract, the Contractor will agree to provide evidence of insurance in the amounts stated below. The Contractor may also be required to submit the original insurance policies for inspection and approval of the Owner before Work is commenced. Said policies shall provide that they cannot be cancelled, permitted to expire, or be changed without fifteen
(15) days advanced written notice to the Owner. The Contractor shall provide all insurance required by this Contract.

Required Insurance: The Contractor shall take out, and maintain during the life of the Contract, Comprehensive General Liability Insurance, Automobile Liability Insurance and an Excess Liability

Umbrella Form. Such policies shall protect the Contractor and the Owner from any and all claims or damages for bodily injury, including accidental death, as well as any and all claims for property damage, during the performance of any and all Work under the Contract, whether such performance be by the Contractor, any subcontractor, or by anyone directly or indirectly employed by either of them or in any such manner as would impose liability on the Owner. The **minimum** required limits for each type of policy are as follows:

A.	Comprehensive General Liability:		
	(1)	General Aggregate	$1,000,000
	(2)	Bodily Injury/Wrongful Death	$1,000,000 per person
			$1,000,000 per occurrence
			$2,000,000 aggregate liability
	(3)	Property Damage*	$1,000,000 per occurrence
			$2,000,000 aggregate liability
B.	Comprehensive Automobile Liability:		
	(1)	Bodily Injury/Wrongful Death	$1,000,000 per occurrence $1,000,000 aggregate liability
	(2)	Property Damage*	$1,000,000 per occurrence
			$1,000,000 aggregate liability

*Including any damage caused by blasting or underground excavation.

C.	Excess Liability Umbrella Form:		
	(1)	General Aggregate	$3,000,000
	(2)	Each Occurrence	$1,000,000

Owner's Protective Liability Insurance: The Contractor shall take out, and maintain during the life of the Contract, an Owner's Protective Liability Insurance policy in the name of the Owner. The primary insurance policy shall not be less than a minimum combined single limit of $1,000,000. In addition, a $1,000,000 excess policy will be required. The policy shall protect the Owner from any claims or damages that may arise out of or result from the performance of any Work or from any operations, either directly or indirectly, by the Contractor or its subcontractors under the Contract.

Subcontractor's Insurance: The Contractor shall require subcontractors not protected under the Contractor's insurance policies to take out and maintain insurance of the same nature and kind and in the same amounts as required of the Contractor.

Workers' Compensation Insurance: Before any Work is commenced, the Contractor shall take out, and maintain during the life of the Contract, Workers' Compensation Insurance for all of its employees, in accordance with the laws of the State of Kentucky. In case any Work is subcontracted, the Contractor shall require the subcontractor similarly to provide Workers' Compensation Insurance for all of the latter's employees, unless such employees are covered by the protection afforded by the Contractor. In case any class of employees engaged in Work under this Contract is not protected under the Workers' Compensation statute, the Contractor shall provide Employee Liability Insurance for any such employees and shall provide or cause each subcontractor to provide the same.

5.4 Antidiscrimination Clause

The Contractor hereby agrees to the following:

1. That in the hiring of employees for the performance of the Work under this Contract or any subcontract, neither the Contractor nor any subcontractor, nor any persons acting on behalf of the same, will discriminate against any citizen in the employment of or laborers or workers who are qualified and available to perform the Work, for reasons of race, creed, color, national origin, religion, age, sex, handicap, or familial status; and
2. That neither the Contractor nor any subcontractors, nor any persons acting on behalf of the same, shall in any manner discriminate or intimidate any employee hired for the performance of the Work on account of race, creed, color, national origin, religion, age, sex, handicap, or familial status.

5.5 Preconstruction Conference And Partnering

A preconstruction conference with the Owner will be required of the successful Bidder/Contractor. Said conference will be held for the purpose of reviewing the Specifications, Plans, and execution of the Work. The Engineer will arrange the meeting between the Contractor, the Owner, and representatives of the utility companies, and all parties shall be notified of the time, date, and location of the conference by the Engineer. The Agenda for the conference shall include, as a minimum, the following items:

1. Status of Contract and Notice to Proceed
2. Utility company requirements, BUD notification
3. Designation of emergency 24-hour Contractor contacts
4. Discussion of critical items
5. Required permits.
6. Notice to property owners
7. Maintenance of Traffic
8. Review of testing requirements and inspection procedures
9. Operations schedule and completion date
10. Listing of haul roads
11. Confirmation of subcontractors and suppliers
12. Review of the Change Order process
13. Payment Request submittal procedures
14. Payroll submittal procedure

5.6 Haul Roads

The Contractor shall also provide at the preconstruction conference, a list of the local roads to be used for the purpose of hauling equipment and/or material to or from the Project site. Only the local roads in the vicinity of the Project have to be listed; state and/or Federal roads do not have to be included. Where necessary, the list shall include the extent of the roads to be affected and any special restrictions, such as height or weight restrictions, which may be applicable. Construction shall not commence until the Owner has reviewed the haul roads list and approved the same. The submission of the list and approval of the same do not relieve the Contractor the responsibility for conforming to and obeying all applicable height and weight restriction on the haul roads, nor from responsibility for any damages done to, on or along said haul roads. The Contractor is referred KTC Standards and Specifications for Road and Bridge Construction Section 105.10 concerning restrictions.

5.7 Permits

The Contractor will be required to obtain all permits necessary in connection with the Work. All permits shall be subject to the inspection of the Owner.

5.8 Operations/Progress Schedule and Coordination

At the preconstruction meeting, the Contractor shall submit to the Engineer a schedule showing the method and manner which the Contractor proposes to pursue so as to complete the proposed Work in such a manner that it will be ready for final acceptance within the time stated in the Proposal. Said schedule will show location, sequence, equipment, manpower, and estimated calendar days to complete each segment of Work required. Upon approval by the Engineer of the starting point of the various phases of the construction, the method and manner of performing the Work and the sequence of operations shall not be altered except with the approval of the Owner. Changes to said schedule are to be issued in writing and approved by the Engineer and Owner before operations are changed or rescheduled.

The Contractor shall use all practical means to make the progress of the Work conform to that shown on the progress schedule which is in effect. No payment will be made to the Contractor while he is delinquent in the submission of a progress schedule. Should the prosecution of the Work, for any reason, be discontinued, the Contractor shall notify the Owner at least twenty-four (24) hours in advance of resuming operations.

5.9 Coordination of Specifications, Plans and General Provisions

The specifications, the supplemental specifications, the plans, general provisions, and all supplementary documents are essential parts of the Contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary to each other and to describe and provide for a complete project. In case of discrepancy, calculated dimensions will govern over scaled dimensions, plans will govern over specifications, proposals and special provisions will govern over both specifications and plans.

The Contractor shall take no advantage of any apparent error or omission in the plans or specifications. In the event the Contractor discovers such an error or omission, he shall immediately notify the Engineer. The Engineer will then make such corrections and interpretations as may be deemed necessary for fulfilling the intent of the plans and specifications. See "Extra Work" and "Modification of Contract or Change Orders".

All items salvaged as part of this Contract shall be removed by the Contractor without damage as excavation and work progresses and placed within the right-of-way where they may be conveniently picked up by the Owner's forces. Old materials not reserved by the Owner and not being used in the work will become property of and must be disposed of by the Contractor.

5.10 Plans

If applicable, the plans illustrate the general character and scope of the Work covered by the Specifications and Contract Documents. Additional detailed drawings and other information deemed necessary by the Engineer will be furnished to the Contractor when and as required by the Work. Shop

drawings, when approved by the Engineer, shall govern all details of the Work and shall take precedence over all other drawings. Figured dimensions on drawings shall take precedence over general drawings and shall be considered as explanatory and not as indicating extra work.

5.11 Notice To Proceed

Once the Contract has been entered into and the preconstruction conference held, the Owner will provide the Contractor a Notice to Proceed. Said Notice shall state the beginning date the Contractor shall commence the Work and the date by which the Work is to be completed.

5.12 Safety Standard And Accident Prevention

With respect to all Work performed under the Contract, the Contractor shall comply with all safety standard provisions of (1) all applicable building and construction codes; (2) the *Manual of Accident Prevention in Construction*, published by the Associated General Contractors of America; (3) the requirements of the Occupational Safety & Health Act, and the requirements of Title 29 of the Code of Federal Regulations, Chapter 15.

The Contractor shall maintain at the job site all medical items and equipment necessary for administering first aid to the injured, and shall make standing arrangements for the immediate removal to a hospital or doctor's care of all persons injured on the job site. In no case shall the -Contractor permit any employee to work at the job site before it has made arrangements for the immediate removal of injured persons to a hospital or doctor's care.

The Contractor shall at all times exercise every precaution for the protection of persons, including its employees, and property, and shall guard against creating any unnecessarily hazardous conditions. This protection shall include, but is not limited to, sheeting and shoring, barricades, and warning lights as needed.

The Contractor shall be responsible for all accidents arising out of or connected with its performance under the Contract and Contract Documents, and shall indemnify and hold harmless the Owner and the Engineer from all liability, costs, suits, claims or actions brought against it for any injury or alleged injury to any person or property. All loss or damage to the Work arising from fire, floods, storms or other natural causes, or from any detention, obstruction or difficulties which may be encountered in the prosecution of the Work shall be borne by the Contractor.

No blasting of any kind will be permitted on this Project.

5.13 Cooperation By Contractor

The Contractor will be supplied with three (3) copies of the specifications and three (3) sets of approved plans and contract assemblies including special provisions, one (1) set of which the Contractor shall keep available on the Work site at all times.

The Contractor shall give the Work the constant attention necessary to facilitate the progress thereof. He shall cooperate with the Engineer, his inspectors, and all other Contractors of any agency in every way possible.

5.14 Cooperation Between Contractors

The Contractor shall coordinate his work with other Contractors within or adjacent to the Project area. All completed Work shall meet the line and grade of other work in an acceptable manner.

5.15 Warranty

The Contractor warrants to the Owner that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations, to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Engineer, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

5.16 Control Of Material

The materials used on the Work shall meet all requirements of the Contract. In order to expedite the inspection and testing of materials, the Contractor shall notify the Engineer of his proposed sources prior to delivery. **All materials supplied shall meet KTC requirements or as otherwise specified in these Contract Documents**.

Unless otherwise specified, all materials shall be new, and both workmanship and material shall be of proper quality and sufficient for the purpose contemplated. The Contractor shall furnish, if requested by the Owner or Engineer, satisfactory evidence as to type and quality of materials and workmanship.

All items of equipment and/or material proposed by the Contractor for substitutions must be pre-approved by the Engineer, in writing, and shall be equal or superior to the items specified in the Contract Documents. If substitutions proposed by the Contractor for a specified item requires engineering revisions, the total expense of said revisions shall be paid by the Contractor.

Any items of labor or materials required but not shown as a separate pay item in the Proposal, shall be furnished and installed as incidental to the Contract, except as noted in the plans and specifications.

5.17 Storage Of Materials

The Contractor shall obtain prior written approval from the Owner for any locations proposed for use for the temporary storage of construction materials, tools and/or equipment. All such materials shall be neatly and compactly maintained in a manner as to cause the least inconvenience to adjacent property owners and to traffic. Under no circumstances shall existing drainage courses be blocked or water hydrants, valves, or meter pits covered in storing materials. All materials stored upon public thoroughfares must be provided with warning lights and reflective striping at nighttime and on weekends in a manner to alert traffic of such obstructions.

Private property shall not be used for storage purposed without written permission of the owner or lessee, and if requested by the Engineer, copies of such written permission shall be furnished him.

Any additional space required must be provided by the Contractor at their expense.

5.18 Sanitary Measures

The Contractor shall construct and maintain sanitary conveniences for use by its employees at the site of the Work. Such conveniences shall be of sufficient number and shall be placed in locations approved by the Engineer. The Contractor shall require all employees and persons connected with the Work to use said conveniences, and any employee or person who violates this rule shall not again be employed at the site of the Work by the Contractor. Such conveniences shall be in compliance with all State and local health department regulations, and the Contractor shall promptly and fully comply with all health department orders and regulations regarding said conveniences.

5.19 Public Convenience And Safety

The Contractor shall at all times so conduct his work as to assure the least possible obstruction to traffic. The safety and convenience of the general public and the residents along the highway and the protection of persons and property shall be provided for by the Contractor as specified under subsection Maintenance of Traffic.

The Contractor shall provide and maintain safeguards, safety devices and protective equipment and take any other needed actions as may be necessary to protect the public and property in connection with the work. The Contractor shall notify the Chiefs of the Police Department and Fire Department of the temporary blocking of any street.

The presence of barricades, lights or other traffic control devices provided and maintained by any party other than the Contractor, shall not relieve the Contractor of this responsibility.

5.20 Protection And Restoration Of Property

The Contractor shall be responsible for the preservation of all public and private property. The Contractor shall be responsible for all damage or injury to property of any character, during the prosecution of the work, resulting from any act, omission, neglect or misconduct in his manner or method of executing the work, or at any time due to defective work or materials, and said responsibility will not be released until the project shall have been completed and accepted.

Dust nuisance originating from any work shall be controlled by the Contractor at the sole expense of the Contractor.

When and where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work, or in consequence of the nonexecution thereof by the Contractor, he shall restore, at his own expense, such property to a condition equal or better to that existing before such damage or injury was done, by repairing, rebuilding or otherwise restoring as may be directed, or he shall make good such damage or injury in an acceptable manner.

When mailboxes, road or street name signs and supports interfere with construction, the Contractor shall remove and erect them in a temporary location during construction in a manner satisfactory to and as directed by the Engineer. After completion of the construction and before final acceptance of the project, the Contractor shall erect the mailboxes, road or street name signs and supports in a permanent location in

accordance with the plans unless otherwise directed by the Engineer. This shall be considered a subsidiary obligation of the Contractor under the affected items. The Contractor shall cooperate with the Engineer in protecting and preserving cornerstones and monuments that are within the work area. Monuments, cornerstones and land markers unexpectedly encountered shall be protected, referenced and preserved in the same manner.

5.21 Clean Up During Construction

The Contractor shall at all times maintain the job site and working areas in an orderly condition, reasonably clean and free of accumulations of dirt and debris. If the Contractor fails to maintain the job site and working area in a satisfactory condition, the Owner shall have the right to employ others to do so at the Contractor's expense, commencing 24 hours after the Contractor has been notified that the job site and/or working areas require clean-up.

5.22 Final Clean-Up

As s soon as portions of the work are ready for use, they shall be thoroughly cleaned by the Contractor of all dirt and rubbish, and cleared of all materials, forms, falsework, temporary structures and equipment.

The Contractor shall also clean out all sewer drains, inlets, manholes, and other underground lines and structures affected by his work and restore all disturbed areas to their original or better condition.

As soon as portions of the work are ready for use, they shall be thoroughly cleaned by the Contractor of all dirt and rubbish, and cleared of all materials, forms, falsework, temporary structures and equipment.

The Contractor shall also clean out all sewer drains, inlets, manholes, and other underground lines and structures affected by his work and restore all disturbed areas to their original or better condition.

5.23 Final Inspection

When the work has been entirely completed and final cleanup has been performed, the Engineer will inspect the improvement. If items remain which must be completed or remedied by the Contractor, he shall perform the work immediately upon being notified by the Engineer. When such items have been corrected by the Contractor, final inspection will be made. The work must pass final inspection before it will be accepted by the Owner.

5.24 Utilities

Any utility, such as telephone, electricity or water, required by the Contractor for the performance of the Work shall be the responsibility of the Contractor, who shall be responsible for the cost of the same.

5.25 Sewage, Surface, and Floor Flows

The Contractor shall furnish all the necessary equipment, shall take all necessary precautions, and shall assume the entire cost of handling and properly disposing of any sewage, seepage, storm, surface, flood or underground flows which may be encountered at any time during the performance of the Work. The manner of providing for these flows shall meet with the approval of the Engineer, and the entire cost of

same shall be included in the unit prices stipulated for the various items of the Work. As applicable, all work must comply with the municipality or County storm water regulations.

5.26 Use Of Existing Facilities

The Owner, upon written notice to and with the approval of the Contractor, shall have the right to connect any sewers, conduit, or pipeline with any existing similar facilities or appurtenances, or to grant permits to make connections therewith at any time before the Work is completed. The Contractor shall not interfere with any such connections and no extra compensation shall be made to the Contractor on account thereof. The performance of the Work shall be planned in such a manner as to allow the use of all existing facilities during the construction period.

5.27 Underground Utility Facilities/Cooperation with Utilities

The Owner will notify all utility companies, all pipeline owners, or other parties affected and endeavor to have all necessary adjustments of the public or private utility fixtures, pipelines, and other appurtenances within or adjacent to the limits of construction made as soon as practicable.

Within ten (10) days of the award of the Contract, the Owner shall notify the utility companies listed in the Utility Ownership section of these documents of the name, address, and phone number of the Contractor. The Contractor shall notify the Registered Underground Utility Protection Service and nonmember owners of the starting date at least two (2) working days prior to starting the Work. The utility shall mark, stake, or otherwise designate the location of the underground facilities within 48 hours of receiving the Contractor's notice of the starting date. The marking or locating shall be coordinated to stay approximately two (2) days ahead of the planned construction.

The Identification of underground facilities, any necessary relocation thereof, and the protection of the same shall be undertaken in conformance with KTC Standards and Specifications for Road and Bridge Construction Section 107.15. At least two (2) working days prior to commencing Work in an area that may involve underground utility facilities, as shown on the plans, the Contractor shall notify the Engineer, the registered utility protection service, and the owners of the underground utility facility who are not members of the registered utility service.

The existing underground utilities are shown as accurately as possible on the plans, based on the information available. The Owner and/or Engineer do not assume any liability for location of underground service lines. Any utility services damaged that were previously marked in the field shall be replaced at the Contractor's expense.

Where the plans provide for conduit to be connected to, or to cross either over or under, or close to an existing underground structure, it shall be the responsibility of the Contractor to locate the existing structure, both as to line and grade, before starting to lay the proposed conduit, in order to assure compatibility with line and grade of the conduit. Payment for all such operations shall be included in the unit price bid for the pertinent conduit item.

The Contractor shall make arrangements with the utility company if adjustments to proposed grade of existing facilities (e.g. manholes, catch basins, valves, boxes, etc.) are to be made prior to the commencement of any paving operations. This shall include utility facilities not shown on the plans but that are located within the pavement area. Work performed on utility facilities shall be in strict accordance with the specifications of the applicable utility company and shall be performed under the direction, supervision and inspection of said company.

At points where the Contractor's operations are adjacent to properties of telephone and power companies, or are adjacent to other property, damage to which might result in considerable expense, loss, or inconvenience, work shall not be commenced until all arrangements necessary for the protection thereof have been made.

The Contractor shall cooperate with the owner of any underground or overhead utility lines in their removal and rearrangement operations in order that these operations may progress in a reasonable manner, that duplication of rearrangement work may be reduced to a minimum, and that services rendered by those parties will not be unnecessarily interrupted.

In the event of interruption to underground or overhead utility services as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall immediately alert the occupants of nearby premises as to any emergency that the Contractor may create or discover at or near such premises. The Contractor shall then notify the Engineer and the owner or operator of the utility facility of the disruption and shall cooperate with said utility owner or operator in the restoration of service. If water service is interrupted, repair work shall be continuous until the service is restored. No work shall be undertaken around fire hydrants until the local fire authority has approved provisions for continued service.

5.28 Maintenance During Construction

The Contractor shall maintain the work during construction and until the project is accepted. This maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and forces to the end that the roadway or structures are kept in satisfactory condition at all times.

In the case of a contract for the placing of a pavement course upon other pavement courses or a subgrade previously constructed, the Contractor shall maintain the previous pavement course or subgrade during all construction operations.

5.29 Failure To Maintain Roadway or Structure

If the Contractor, at any time, fails to comply with the provisions of the above-reference section, the Engineer will immediately notify the Contractor of such non-compliance. If the Contractor fails to remedy unsatisfactory maintenance within 24 hours after receipt of such notice, the Engineer may immediately proceed to maintain the Project and the entire cost of this maintenance will be deducted from monies due or to become due to the Contractor on his Contract.

5.30 Protection of Existing Structure

It shall be the responsibility of the Contractor to perform the Work in such a manner as not to damage or destroy any existing feature which is not marked for replacement or removal. The Contractor shall, at its own expense, protect and maintain any bridges, curbs, gutters, sidewalks, roadways, or any other private or public structures that may be endangered in the prosecution of the Work. The Contractor shall also exercise due care during the Work so as not to destroy any trees, plants, shrubs, or structures not specifically marked for removal or relocation within the area of the Project site. The Contractor hereby agrees to repair and make good any damages caused to any such property by reason of its prosecution of the Work.

In some instances, the Contractor will be required to excavate under and around existing utilities. The Contractor shall exercise extreme care so as not to damage the utility during the Work.

The Contractor shall schedule his operations so that the improved areas have had sufficient time to cure, set and/or harden before the area is opened to traffic or other use. The Contractor shall be responsible for the immediate repair of all improved areas if damage is done by traffic or other use. The Contractor shall also be responsible for the immediate rectification of problems created in areas outside of the improved areas, which are attributable to the failure of the improved area, such as, but not limited to, the tracking of materials into unimproved areas.

The Contractor shall be responsible for the protection of areas outside of the limits of the designated Project site, but which are adjacent to those limits. This will include those areas used by construction traffic for access to and from the Project site. Where the Engineer and/or the Owner determine that he Contractor's operations have been responsible for damage to areas outside of the Project site limits, the Contractor shall be responsible for the repair of the area, subject to the approval of the Engineer. No additional compensation will be due the Contractor for any such repairs.

5.31 Construction Videos and Photographs

Contractor shall document existing site conditions, progress of the work and the completed project through the use of videos and photographs. Videos and photographs shall be taken along the length of the project area and all areas of egress to the site pre-construction, during construction and post-construction. Pictures shall be taken at all property affected by the Work and at least every 50 feet along the project area. All existing structures or facilities affected by the Work shall also have videos and photographs taken of their before and after conditions. The OWNER shall be present during the pre-construction and post construction videotaping and photograph work and shall determine the limits at each location. All photographs shall be in digital format with a time and date stamp. All videos shall be provided in digital format.

Before starting work, take a minimum of two photographs to show existing conditions at and adjacent to each driveway, landscaped area, fence and any other permanent structure that could potentially be affected by construction. Areas of particular concern or currently damaged areas adjacent to the work area shall be documented and reported to the OWNER.

CONTRACTOR shall audibly record a brief description of each video and the date and time of the recording.

Provide digital files of each photograph and video to the OWNER and ENGINEER as soon as they are available. Each digital file shall be labeled with the following information:

i. Date photograph or video taken.
ii. Title of Project.
iii. Description of view shown in photograph or video.
iv. Numbered identification of exposure.

All work for the above shall be incidental to the Contract.

5.32 Monuments and Landmarks

The Contractor shall not remove, relocate or in any way damage any monuments, survey pins or landmarks without the approval of the Engineer. Any monument, survey pin or landmark so removed without approval of the Engineer may be replaced by the Owner and the expense of the survey and replacement charged to the Contractor.

5.33 Base Lines and Benchmarks

The Contractor shall carefully preserve all base lines and benchmarks which have been set by the Owner or its agent. The Contractor shall be charged with the expense of resetting any base lines or benchmarks caused by the loss or disturbance of such by the Contractor.

5.34 Restoration of Disturbed Areas

In all cases where the Work requires the restoration of areas with topsoil, seeding and mulching, the Contractor shall not seed and mulch until directed to do so by the Engineer. The Engineer shall not so direct the Contractor until he has assured that the site is properly graded and topsoiled.

Upon completion of the seeding and mulching, the Contractor shall immediately notify the Engineer of the same. Upon receipt of notice from the Engineer that the restoration is complete, the Owner shall notify the property owners of their maintenance duties.

In cases where the Engineer determines the seeding and mulching should not be performed until after the designated completion date for the Work, the Engineer shall notify the Contractor of the same, in writing. Suspension of the seeding and mulching at the direction of the Engineer shall not count against the Contractor as a delay.

5.35 Supervision of The Work

The Engineer or upon the authorization of the Engineer, the Owner's Public Works Director, shall in all cases, determine the amount, quality acceptability and fitness of the kinds of labor and material, which are to be paid for under the Contract. The Owner or the Owner's agent shall determine all questions related to the Work and the performance thereof, and decide every question which may arise relative to the fulfillment of the Contract on the part of the Contractor.

The Engineer will evaluate the materials furnished and the labor to be performed under the Contract, and is authorized by the Owner to reject all labor or materials, or any part thereof, that does not comply in kind, quality, quantity, time, place or manner with the Contract or Contract Documents. The approval or acceptance or any part of the Work, or any payment on account thereof, shall not prevent the rejection of said labor or materials at any time thereafter during the term of the Contract, if said labor or materials are found to not be in accordance with the requirements of the Contract or the Contract Documents.

5.36 Defective or Unacceptable Work

All materials and each part or detail of the Work shall be subject to evaluation by the Engineer. The Engineer shall be allowed access to all parts of the Work and shall be furnished with such information and assistance by the Contractor, as is required to make a complete and detailed review.

Any work done or materials used without direct observation by an authorized representative may be ordered removed and replaced at the Contractor's expense.

All work, which does not conform to the requirements of the Contract, will be considered unacceptable unless otherwise determined acceptable.

Should defective or unacceptable labor or materials be suspected, and the Engineer so require, the Contractor shall uncover, take down or make openings in the finished work for the purpose of examination at such points as the Engineer designates.

If the Work so exposed or examined is satisfactory, the cost of uncovering, taking down or making openings shall be paid by the Owner to the Contractor as a change in Work; however, should the Work thus exposed or examined be unsatisfactory, the cost of uncovering, taking down or making openings shall be borne by the Contractor.

If the exposed or examined labor or materials are found to be unacceptable or defective by the Engineer, he shall serve on the Contractor written notice of his rejection of the unsatisfactory labor or materials, his instructions for remedying the same, and a time within which the defective material or labor is to be remedied. If the Contractor neglects or refuses to remove and/or replace the defective labor or materials within the time limit given, the Owner may remedy the situation and charge the expense thereof to the Contractor. The expense so charges shall be deducted out of the monies due to the Contractor under the Contract. If the amounts still due the Contractor under the Contract are insufficient to meet the expense, the additional monies shall be paid by the Contractor, and if the Contractor refuses or neglects to pay, the monies shall be paid by his Surety or shall be deducted from its Performance/Contract Bond.

If, in the opinion of the Owner, an emergency arises that jeopardizes the continuity of water service and/or the public health, safety or welfare of the residents of the Owner, the Owner shall give notice of the emergency to the Contractor by telephone or in person. If the Contractor is unable to remedy the situation at the time it exists, the Owner reserves the right to immediately take steps to have the situation remedied. If, in the opinion of the Owner, the emergency was created through the carelessness or recklessness of the Contractor, then the Contractor and its Surety shall be liable to the Owner for all expenses incurred by the Owner in correcting the situation.

5.37 Intent of Contract

The intent of the Contract is to provide for the construction and completion in every detail of the Work described. The Contractor shall perform all items of work covered and stipulated in the proposal and perform altered and extra work, furnish all labor, materials, equipment, tools, transportation and supplies required to complete the work in accordance with the plans, specifications and terms of the Contract. Should any misunderstanding arise as to the intent or meaning of the plans, specifications, special provisions or proposal, or any discrepancy appear, the decision of the Engineer shall be final and conclusive.

5.38 Measurement of Quantities

For all contracts, except lump sum contracts, after an item of the Work is completed and before final payment is made, the Engineer will determine the quantities of various items of work performed, as the basis for final settlement. The Contractor, in case of unit price items, will be paid for the actual amount of work performed in accordance with these specifications as provided under the various items.

5.39 Plans and Estimated Quantities

The Plans and Bid Proposal quantities prepared by the Owner are intended to outline the Work to be done by the Contractor. The estimated quantities shall be used in determining the total amount of the bid and for the purpose of determining the lowest and best bid. It is understood and agreed, however, that the Plan is subject to minor changes from time to time during the progress of the Work, that the estimated quantities listed in the Proposal are approximate only, that the Contractor has no claim for damage and is not entitled to extra pay above and beyond the agreed unit prices on account of increasing or decreasing the quantities, and that in measuring the work for payment to the Contractor, the Owner shall consider only the number, length, area and solid contents of the various items of Work incorporated in the improvement in accordance with the Plans or as ordered placed by the Owner.

5.40 Prices

The Owner will pay to the Contractor the prices herein stipulated as full compensation for everything furnished and work completed by the Contractor under the Contract, including all incidental work required but not specifically mentioned, and for any work arising from any unforeseen obstruction or difficulty encountered in the prosecution of the work, and for all risks of every description connected with the work, and for all expenses incurred by or in consequence of the suspension or discontinuance of the work, as herein specified and for well and faithfully completing the work, together with remedying all defects developing during the guarantee period.

5.41 Alternation of Plans Or Character of Work

The Owner reserves the right to make, at any time during the progress of the Work, such increases or decreases in quantities and such alterations in details of construction as may be found to be necessary or desirable. Increases in quantities may include work on facilities named in the contract and/or additional facilities not named in the contract as additional work at unit prices contained in the contract. Such increases or decreases and alterations shall not invalidate the Contract nor release the Surety, and the Contractor agrees to perform the Work as altered, as if it had been a part of the original Contract.

Unless such alterations and increases or decreases materially change the character of the work to be performed or the cost thereof, the altered work shall be paid for at the same unit prices as other parts of the Work. No claim shall be made by the Contractor for any loss of anticipated quantities and the quantities of work as done. Payments shall be in accordance with Section 109 of the KTC Standard and Specifications for Road and Bridge Construction. If, however, the character of the Work of the unit costs thereof are materially changed, an allowance shall be made on such basis as may have been agreed to in advance of the performance of the Work, or in case no such basis has been previously agreed upon, then an allowance shall be made, either for or against the Contractor, in such amount as the Owner may determine to be fair and equitable.

Should the Contractor encounter or discover during the progress of Work, subsurface or latent physical conditions at the site differing materially from those indicated in this Contract, or unknown physical conditions at the site of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract, the Engineer shall be promptly notified in writing of such conditions before they are disturbed. The Engineer will thereupon promptly cause the investigation of said conditions, and if they are found to so materially differ and cause an increase or decrease in the cost of, or the time required for performance of the Contract, an equitable adjustment will be made.

Any adjustment in compensation because of a change or changes resulting from one or more of the conditions described in the previous paragraph will be made in accordance with the provisions of Extra Work. Any adjustments in Contract time because of changes will be made in accordance with the provisions in 108.07 of the Kentucky Standard Specification for Road and Bridge Construction.

5.42 Additional Work of a Similar Nature

The Owner reserves the right, at any time during the progress of the Work, to add construction work of a similar nature to that included in the original Contract. Such work may include extensions of the project limits, additional locations requiring the same work items, or separate facilities requiring substantially similar work methods, materials and performance expectations.

Added work of a similar nature shall be paid at the unit prices established in the Contractor's original Bid Proposal, provided the added work is similar in scope, type and complexity to the work described in the original contract; requires substantially the same materials, means and methods; and can be executed under the same regulatory, safety and traffic control requirements.

Added work shall only be performed after issuance of a written Change Order executed by both the Owner and Contractor. The Change Order shall identify a description of added work, applicable unit prices, required modifications to contract time and any associated conditions of performance.

Nothing in this section guarantees the addition of similar nature work. The Owner may, at its sole discretion, elect to procure additional work separately or not at all.

5.43 Extra Work

Items of work with unit prices included in the estimate of the original Contract, in an amount less than $10,000 may be authorized as Extra Work by the Engineer.

5.44 Modification of Contractor or Change Orders

Items of Work not included in the estimate of the original Contract and additional units of items included in the estimate of the original Contract in an amount in excess of $10,000, may be authorized as a Modification of the Contract or Change Order. Payment shall be in accordance with Sections 109.04 of the Kentucky Standard Specification for Road and Bridge Construction. The Owner may, when necessary by ordinance, authorize alterations or modifications in the Specifications and Plans for the Work, or omit from the Work covered by this Contract any portion thereof. Before any such alteration or modification shall be effective, the price to be paid for the Work or the material, or both, under the altered or modified Contract, shall have been agreed upon in writing and signed by the Contractor and by the Contractual

Agent or Agents of the Owner. It is expressly agreed that such changes shall not, in any way, violate or annul the Contract, and the Contractor hereby agrees not to claim or bring suit for any damages, whether for loss of profits or otherwise, on account of these changes. Whenever, during the progress of the Work, any change or modification of the Work is agreed upon, such change shall be considered and treated as though originally contracted for, and shall be subject to all provisions of the original Contract.

The Contractor's Sureties will not be notified of changes in the work or cost thereof, except when by reason of any Change Orders, the total Contract price increases by more than twenty (20%) percent of the original price.

5.45 Disputes and Contractor Claims

In cases where there arises a dispute (whether over payment, claims, or quality of Work) between the Contractor and the Owner, the Contractor shall not cease Work on the Project because of said dispute, unless told to cease work by the Owner. The Contractor shall continue Work on the Project and agrees that such a dispute shall not relieve him from the requirements under "Time of Completion and Damages for Delays".

In all cases, the Contractor shall submit to the Owner any claims for disputed amounts, in writing, within seven (7) calendar days of learning of said dispute. In submitting such claim, the Contractor shall include his actual original calculations and raw cost data, along with his job cost reports and field diaries.

If the Owner makes to the Contractor an offer on a claim which the Contractor refuses, and if the Contractor then gets an amount equal to or less than the Owner's last offer in court, the Contractor shall pay all legal costs, including attorney's fees and expert witness fees, that the Owner incurs from the date of the Owner's last offer until the day the Contractor is awarded judgment.

Any claims or disputes shall be limited by the requirements of "Modification of Contract or Change Order".

5.46 Time of Completion And Damages For Delays

The Project construction time shall commence upon the date indicated in the Notice to Proceed, which shall be sent to the Contractor by the Owner. The Contractor shall agree to commence the Work on the date specified in the written Notice to Proceed, weather permitting, and to fully complete the Work by the date stated in the contract, unless such time for completion is extended, in writing, by the Owner. However, neither the Contractor nor any subcontractors shall commence any part of the work under the Contract until it has obtained all insurance required, as listed in the General Conditions, and such insurance has been approved by the Owner.

The Contractor agrees that time is of the essence, and therefore, if the Contractor neglects, fails, or refuses to complete the Work within the allotted time, or fails to secure an extension of time for delays, the Contractor does hereby agree to pay to the Owner, as liquidated damages and not as a penalty, the amount as stated in the Contract for each calendar day beyond the completion date stated in the Notice to Proceed, unless the time for completion has been extended in writing by the Owner. Such damages shall be deducted from any monies due and owing to the Contractor under the Contract. If the amounts still due the Contractor under the Contract are insufficient to meet the expense, the additional monies shall be paid by the Contractor, and if the Contractor refuses or neglects to pay, the monies shall be paid by his Surety or shall be deducted from its Performance/Contract Bond.

If the Contract is revised in any material respect and it is determined that said revision will cause delay in the completion of the work, the Engineer will postpone the completion date by the number of calendar days he determines to be equitable.

If the Contractor finds it impossible for reasons beyond his control to complete the work by the date as specified or as extended in accordance with the provisions of this subsection, he may make a written request to the Engineer for an extension of time setting forth therein the reasons which he believes will justify the granting of his request. Requests for extensions of time shall be filed in writing by the Contractor to the Engineer not later than thirty (30) days following the termination of the delay. The Contractor's plea that insufficient time was specified is not a valid reason for extension of time. If the Engineer finds that the work was delayed because of conditions beyond the control and without the fault of the Contractor, he may extend the time for completion in such amount as the conditions justify.

Delays caused by weather or seasonal conditions should be anticipated and will not be considered as the basis for an extension of time. The Engineer will not allow any extension of time for weather or resulting conditions, except for delays caused by earthquakes, tornadoes or other catastrophic forces per Section 108 of the Kentucky Standard Specification for Road and Bridge Construction.

The extended time for completion shall then be in full force and affect the same as though it were the original time for completion.

If the Owner should suspend the Work in whole or in part, the date for completion shall be extended by the number of days that the suspension directly or indirectly delays the completion of the Work.

If the Work is delayed for unforeseeable causes beyond the control and without the fault of negligence of the Contractor, such as severe or unusual climatic conditions, acts of God, acts of the Owner or interference by other contractors, extensions of time may be granted by the Owner, upon the Contractor's written request for an extension. The Contractor shall, within five (5) days from the beginning of such delay, notify the Owner in writing of the causes of the delay and request an extension. In no case shall such an extension of time exceed the time actually lost to the Contractor by reason of such delay or interference.

The Owner reserves the right to suspend the whole or any part of the Work, when in the best interest of the Owner, in its sole discretion. Without any additional compensation to the Contractor for such suspension; however, the Contractor shall be granted an extension of time for completing the Work in the same amount of time that it was delayed by such suspension, unless said suspension was necessitated by the actions or inactions of the Contractor.

5.47 Failure to Complete On Time

If the Contractor fails to complete the Work within the time or times allowed by the Contract, the Owner, if satisfied that the Contractor is carrying the Work forward with reasonable progress and deems it to be in the best interest of the Public, may allow him to continue in control of the Work. It shall be necessary for the Contractor to make written application to the Owner in order to warrant such continuance. Payments to the Contractor for work performed and materials furnished will be made.

When the work is not completed within the time or times allowed by the Contract, and the Contractor is permitted to remain in control, the Work shall be prosecuted at as many different places, at such times, and with such forces as the Owner may request.

For each calendar day that any work shall remain uncompleted after the Contract completion date or dates, the sum specified in the Contract will be deducted from any money due the Contractor, not as a penalty but as liquidated damages provided, however, that due account shall be taken of any adjustment of the completion date or dates granted under the provision of "Time of Completion and Damages for

Delays". In the event one or more interim completion dates are specified without specific separate liquidated damages, the amount set forth in the Schedule in Section 108 of the Kentucky Standard Specification for Road and Bridge Construction will separately apply to each interim date. In the event a period of liquidated damages for an interim completion date overlaps a subsequent completion date, the liquidated damages will be cumulative.

Permitting the Contractor to continue and finish the Work or any part of it after the date or dates fixed for its completion, or after the date or dates to which completion may have been extended, will in no way operate as a waiver on the part of the Owner of any of its right under the Contract.

The Owner may waive such portions of the liquidated damages as may accrue after the work is in condition for safe and convenient use by the public.

5.48 Unsatisfactory Progress and Termination of The Contract

In case the Contractor or any Subcontractor fails to furnish materials or to execute the Work in accordance with the Plans and Specifications, or if the provisions of the Contract are otherwise violated, then in any such case, upon ten days written notice to the Contractor and his Surety, the Owner shall have the right to declare the Contractor in default on the Contract. Said notice shall contain the reason for the Owner's intention to declare the Contractor in default on the Contract and, unless within ten days after service of said notice the violation shall cease or satisfactory arrangements shall have been made for its correction, the Contractor, upon the expiration of said ten days, shall be in default on the Contract and his right to proceed under the Contract shall be terminated.

In the event the Contract is thus declared to be defaulted, the Owner will immediately notify the Contractor and his Surety of such action and will at once cause the work already done to be measured and computed. The action of the Owner in the declaration of the default of the Contact shall be final and conclusive, and the Contractor shall not be entitled to claim or receive any damages for not being allowed to continue. After the default of the Contract, the Surety shall have the right to take over and complete the Work, provided, however, that the Surety shall notify the Owner in writing of its intent to do so within twenty (20) days after the notice of the default of the Contract. Such completion of the Work by the Surety shall be done in strict accordance with all the provisions of the original Contract. However, if the Surety does not take over the Contract as stated above, then the Owner shall cause the Work to be completed under a second contract. If the cost of the Work done under the second contract exceeds what it would have cost under the original Contract, the increased cost shall be paid from any money due the Contractor under the Contract, and if that is not sufficient, then the increased cost shall be paid by the Contractor and/or his Surety.

The Contractor and/or his Surety shall also pay all cost and expense of reletting the Work and all damages resulting from noncompletion of the Work within the Contract time. If, when the Work is completed, it is found that there is any money due the Contractor, it will be paid to him; but no money shall be paid to the Contractor under the Contract after it has been declared in default, until the Work has been completed and accepted and all claims and suits resulting therefrom shall have been settled.

5.49 Payments

The Owner shall pay to the Contractor the price stipulated in the Contract, by making progress payments to the Contractor during the performance of the Work, on the basis of the value of work performed.

The Contractor shall submit an invoice to the Engineer of the quantity of work performed for approval. Requests for payment shall not be made more frequently than every thirty (30) days. The Engineer shall

forward the invoice to the Owner for approval, and upon approval of the invoice by the Engineer and the Owner. The Owner shall pay the Contractor within thirty (30) days.

Partial payment may be reduced or withheld entirely if, in the opinion of the Owner, construction is not proceeding according to the Contract, or if for any other violation, or for failure of the Contractor to comply with the orders of the Owner or pending settlement of claims of liens filed against the Contractor.

The Owner shall make partial payments to the Contractor for work performed and materials delivered to the site at 95% of the value of work.

The Contractor shall submit one (1) signed and notarized copy of each Application for Payment to the Engineer either electronically or hard copy. The request shall include waivers of lien and similar attachments if required.

5.50 Waiver of Mechanic's Lien

Prior to Final Application for Payment, the Contractor shall submit waivers of mechanic's liens from subcontractors, materialmen, and suppliers for all construction to date.

1. Owner reserves the right to designate which entities involved in the Work must submit waivers.
2. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
3. Waiver Forms: Submit waivers of lien on forms provided.

5.51 Acceptance of Final Payment

After the final inspection has been made and the Owner has accepted the Work, the final estimate and Final Statement of Cost will be prepared. If any items were erroneously overestimated in any partial estimate, such errors will be corrected in any subsequent partial estimate or in the final estimate, and the Contractor shall have no right to any such excess and shall not be entitled to any damage on account of such corrections in the final estimate.

The following paperwork is necessary from the Contractor to close-out the Project:

1. Final invoice for payment.
2. Final affidavit listing all subcontractors/suppliers used on the Project and indicating the amount paid in full
3. Final Release of Liens from all subcontractors indicating the amount paid in full.
4. Prevailing Wage Affidavit, if applicable.
5. Guarantee
6. Final Release of Lien.
7. Concrete Test Reports, if applicable.
8. Asphalt tickets stamped with the Inspector's seal, if applicable.
9. Any additional testing reports as required by the Contract.

After the final estimate and Final Statement of Cost have been prepared and after the Contractor has fulfilled all of his obligations under the Contract and all the above paperwork has been accepted, the Owner will pay the entire sum found to be due the Contractor after deducting all previous payments and any liquidated damages, if applicable.

After the final estimate and Final Statement of Cost have been prepared and after the Contractor has fulfilled all of his obligations under the Contract, the Owner will pay the entire sum found to be due the Contractor after deducting all previous payments and any liquidated damages, if applicable.

The date of acceptance of the Work by the Owner shall be the date of approval of the Final Statement of Cost.

If, after physical completion of the work and acceptance of the Owner's final measurements by the Contractor, the Owner finds that the Final Statement of Cost or final estimate or both may be unavoidably delayed, he may allow a payment on one-hundred percent (100%) of the final measurements, less such estimated amount of money as the Owner may deem necessary to withhold to take care of any contingencies which may arise.

Should the Contractor have any claim against the Owner because of a variance with the Owner's final measurement, the Owner may allow payment based on the Owner's measurement pending adjustments of the disputed item or items. Acceptance of payment on such basis shall not stop the Contractor's claim nor prevent its satisfactory adjustment.

Retainage shall be paid to the Contractor within thirty (30) days from the date of the Owner's final acceptance of the Work and the completion of the Contract. Upon the Contractor's acceptance of this final payment, the Owner and the Engineer shall be released from any and all claims and any liability to the Contractor for anything further under or relating to the Contract or the Contract Documents, including any act or omission by the Owner or any of its employees or agents, including the Engineer; however, no payments, final or otherwise, shall operate as a release on the Contractor or it Sureties from any obligations under the Contract or the Contract Documents.

5.52 Termination of The Owner's Liability

No person, partnership, firm, or company other than the Contractor shall have any interest in the Contract and no claims shall be made or held valid and neither the Owner nor its agents shall be held liable for, nor shall be held to pay any money except as herein provided. The acceptance by the Contractor of the final payment made as aforesaid shall operate as, and shall constitute, a release to the Owner and its agents form any claim or liability to the Contractor for anything done or furnished for, or relating to the Work or for any act or neglect of the Owner or any person related to or connected with the Work.

5.53 Termination For Cause

A. In the event that any of the provisions of the Contract are violated by the Contractor, or by any of its subcontractors, the Owner may serve written notice upon the Contractor and its surety of its intention to terminate the Contract. Such notice shall list the act or omission causing the breach, upon the service of such notice, the Contractor shall have ten (10) business days to correct the breach or to make arrangements for correction that is satisfactory to the Owner.

B. If no such correction or arrangements are made within the allotted time, the Owner may, in its sole discretion, terminate the Contract on a date solely determined by the Owner. In the event of such termination, the Owner shall immediately serve notice thereof to the Contractor and its

surety. The surety shall then have the right to take over and perform the Contract provided, however, if the surety does not elect to continue performance, the Performance Bond will be forfeited and the Owner shall cause the Contract to be completed.

C. Upon termination for cause the payment to the Contractor of compensation earned for Work performed to the date of such termination shall be in full satisfaction of all claims against the owner under this Contract, however the Owner shall have the right to deduct from any amounts due and owing to the Contractor, including retainage, any costs, both direct and incidental, incurred by the Owner in completing the Project. The Contractor and/or surety shall be liable for any excess costs the Owner may so incur, and the Owner shall have the right to pursue any legal remedies necessary to affect the same.

5.54 Termination for Convenience

A. The Contractor hereby acknowledges that as the Owner is a public entity, due to unforeseen circumstances, funding restraints, or changes in the nature of the Work, it may become necessary for the Owner to terminate the Contract for convenience.

B. In the event the owner finds it necessary to terminate the Contract for convenience, the Owner shall serve notice upon the Contractor and its surety of its intention to terminate the Contract ten (10) business days prior to the termination date.

C. Upon termination for convenience, the Owner shall pay to the Contractor all compensation due for Work performed to the date of termination, including all costs for materials that were to be incorporated into the Project that cannot be returned; all restocking fees for materials that were to be incorporated into the Project that can be returned only upon the payment of a restocking fee. The Contractor shall submit to the
Owner detailed invoices and proof of restocking fees, if any, within ten (10) business days of his receipt of notice of termination from the Owner. In addition, the Owner will negotiate compensation with the Contractor for actual costs incurred as a result of the termination.

5.55 Contractors Right to Terminate Contract

The Contractor may terminate the Contract, upon ten (10) days written notice to the Owner if any public authority should stop the work for three (3) months, or if the Owner should fail to issue a Certificate of Payment, or if the Owner should fail to pay in accordance with this agreement.

5.56 Guarantee of Work

The Contractor hereby guarantees all work performed for a period of one (1) year from the date of completion, against all defects resulting from the use of inferior materials or equipment (unless said materials or equipment were provided by the Owner) or inferior workmanship. The Contractor hereby agrees that during the guarantee period, it shall make all repairs, corrections, replacements or changes that, in the opinion of the Engineer, are necessary due to the use of materials, equipment or workmanship which are inferior, defective or not in accordance with the Contract or Contract Documents. The Contractor shall, promptly upon receipt of written notice from the Owner, remove and replace all unsatisfactory work with suitable materials, equipment or workmanship, without additional expense to the Owner.

If the Contractor fails to proceed with these terms of the guarantee in a timely manner, the Owner shall have the right to have the defects corrected, and the Contractor and its sureties shall be liable to the Owner for all expenses incurred by the corrections.

Any or all special guarantees applicable to any definite parts of the Work, including the materials or equipment, shall also be subject to the terms of this section during the first year of the life of such special guarantees.

Customary manufacturer's guarantees in excess of one year shall be turned over to the Owner. If the terms and conditions as set forth are met to the satisfaction of the Owner and Contractor, the Owner may reduce the Performance Bond to ten percent (10%) of the total amount paid the Contractor in the performance of this Contract as a Guarantee bond.

5.57 Notice

Any written notice required to be served under the Contract or the Contract Documents shall be served by certified mail, or by personal service at the parties' places of business.

5.58 No Estoppel

At no time shall the Owner be precluded or estopped by any provisions of the Contract, from demanding and recovering from the Contractor any damages sustained because of the Contractor's failure to comply with the Contract or the Contract Documents. The final inspection of the Work shall not be binding or conclusive upon the owner if it subsequently appears that the Contractor willfully, fraudulently, or through collusion with an agent of the Owner, supplied inferior materials or workmanship, or departed from the terms of the Contract or Contract Documents, notwithstanding the acceptance of the Work and payment for the same by the Owner.

5.59 Assignment

Neither the Contract or any part thereof, nor any funds to be received there under, by the Contractor shall be assigned, except upon the prior written permission of the Owner, upon any conditions that may be imposed by the Owner, and upon the prior written permission of any sureties who executed the Performance Contract Bond on behalf on the Contractor.

5.60 Independent Contractor Status

At all times during the term of the Contract, the Contractor shall be and remain as an Independent Contractor with respect to all services performed under the Contract, The Contractor agrees that all income reporting requirements to the U.S. government, the State of Kentucky, and any local governments are its responsibility and not that of the Owner. The Contractor shall be responsible for the payment of all taxes including, but not limited to, Federal, state, and local taxes, Social Security taxes, unemployment insurance taxes, and other taxes or license fees required by law, for its officers, agents, and employees. The Contractor agrees that neither it, nor any of its officers, agents, nor employees is entitled to receive workers' compensation, unemployment compensation, vacation leave, sick leave, or any other fringe benefits provided to the employees of the Owner or any other Owner agency, under this Contract.

Contractor acknowledges that under this Contract, the Owner is not required to contribute to the Kentucky Public Employees Retirement System on behalf of the Contractor, its officers, agents, or employees, nor is the Contractor eligible to contribute to or receive benefits from said system.

5.61 Other Contracts

The Owner reserves the right to allow other work or to enter into other contracts for work or materials to be constructed or placed in or about the Work to be performed under this Contract, and to order the starting and progress of such other contracts at any time prior to the completion of this Contract. The Contractor hereby agrees to allow the construction or progress of other such work, under such arrangements for the joint occupation for the site of the Work as the Engineer may establish. The Contractor hereby waives any claim for damages or extra compensation by reason of any real or supposed interference with his performance of the Work; however, if in the judgment of the Engineer, the joint occupation of the site has unreasonably impeded the progress of the Contractor's work under the Contract, then the time for completion of the Work may be extended by the Owner.

5.62 Patents

The Contractor shall indemnify and hold harmless the Owner, its officers, employees, and agents from all liabilities, judgments, costs, damages, or claims arising from the infringement of any patent, patent rights or royalty rights by reason of the use of any patented materials, machinery, devices, and equipment furnished or used in the performance of the Work, or by reason of the use of patented designs furnished and incorporated into the Work by the Contractor and accepted by the Owner, excepting any materials or equipment furnished by the Owner. In the event that any claim, suit, or action in law or equity of any kind whatsoever is made or brought against the Owner involving any such patents, then the Owner shall have the right to retain, from the money due and owing to the Contractor, an amount the Owner deems sufficient to protect the Owner against loss until such claim, suit, or action has been settled and evidence of such settlement has been satisfactorily presented to the Owner's Law Director.

5.63 Laws, Ordinances and Regulations

The intent of the Contract and the Contract Documents is to include each and every provision and clause required by law to be inserted herein, and they shall be read and enforced as though there were included herein. The Contractor shall keep itself fully informed of, and shall strictly observe and comply with, all applicable Federal, State, County, and local laws, rules and regulations, and ordinances; building code

requirements; permit requirements; licensing requirements; inspection requirements; all laws, rules, and regulations regarding the employment of and payment of all laborers, the legal rights of all laborers employed under the Contract; all orders or decrees that exist or that may be enacted by anybody or tribunal having jurisdiction or authority over any aspect of the Work. The Contractor shall also insure that its subcontractors are also informed of and strictly comply with and observe all applicable laws, rules, regulations, and ordinances.

The Contract shall be required to give all notices and pay all fees for any required permits, licenses, or inspection, unless the Owner assumes the responsibility for giving such notices or paying such fees. The Engineer will discuss any special permits that may be required for the Project at the preconstruction conference.

The Contractor shall indemnify and hold harmless the Owner, the Owner's officers, employees and agents, including the Engineer, against any claim or liability arising from or based upon any violation of any such law, rule, regulations, ordinance, order, decree or requirement, whether by the Contractor itself, its employees or agents, or any of its subcontractors.

Should the Contractor at any time find that any requirement of the Contract of the Contract Documents is at variance with any applicable law, rule, regulation, requirement, order, or decree, it shall promptly notify the Engineer.

5.64 Environmental Protection

The Contractor shall observe and comply with all Federal, State, and local laws and regulations controlling pollution of the environment and shall comply with provisions of Section 107 of the Kentucky Standard Specification for Road and Bridge Construction.

5.65 Taxes

The Contractor will be required to pay, without additional expense to the Owner, all Federal, State, local and other taxes which may be applicable to the Work, excepting any taxes and assessments on the real property comprising the site of the Work.

The Contractor hereby agrees to withhold all City income taxes due or payable under the provisions of the Codified Ordinances of the City for wages, salaries, and commission paid to its employees who will work within the City limits for more than 12 workdays and further agrees that any of its subcontractors shall be required to withhold any such City income taxes due under said Code for services performed under this Contract. The Contractors are advised to get full information from the Tax Office prior to bidding.

6. Utility Ownership

Gas (Duke Energy)	Scott Pfefferman 617 Todhunter Road Monroe, Ohio 45050
Electric (Duke Energy)	Matt Coleman 2010 Dana Ave-EF 324 Cincinnati, Ohio 45207
Water (Northern Kentucky Water District)	Kyle Ryan P.O. Box 18640 Erlanger, Kentucky 41018
Telephone (Cincinnati Bell/) Alta Fiber)	Breck Cowan/Underground Jodi Geiman/Overhead Altafiber 221 E. Fourth St., M.L. 121-900 Cincinnati, Ohio 45201
Cable TV (Spectrum)	Chris Gapinski 10920 Kenwood Road Cincinnati, Ohio 45252
Sanitary and Storm Sewer (SD1)	Zach Atkerson 1045 Eaton Drive Fort Wright, Kentucky

7. Specifications For Construction

In general, unless specifically set forth herein, the work, material, and methods of measurement and payment shall conform to the applicable divisions and paragraphs (as noted on the Bid Proposal or in the plans) of the most current edition of the:

Commonwealth of Kentucky
Transportation Cabinet
Department of Highways, Frankfort

Standard Specifications
for
Road and Bridge Construction

8. Special Provisions

8.1 Items 105.07 / 107.15 - Cooperation With Utilities

All portions of Item 105.07 and Item 107.15 of the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction shall apply.

At least two (2) working days prior to commencing construction operations in an area which may involve underground utility facilities as shown on the plans, the Contractor shall notify the Engineer, the registered utility protection service, and the owners of each underground utility facility not members of the registered utility protection service.

The existing underground utilities are shown as accurately as possible on the plans, based on information available. The Owner and/or the Engineer do not assume any liability for location of these underground utility service lines. Any utility services damaged that were previously marked in the field shall be replaced at the Contractor's expense.

Where the plans provide for conduit to be connected to, or to cross either over or under, or close to an existing underground structure, it shall be the responsibility of the Contractor to locate the existing structure, both as to line and grade, before he starts to lay the proposed conduit, in order to assure compatibility with line and grade of the proposed conduit. Payment for all operations described above shall be included in the unit price bid for the pertinent conduit item.

The Contractor shall adjust or arrange with utility company to adjust to proposed grade all existing utility facilities, i.e., manholes, catch basins, valves, boxes, etc., prior to the commencement of paving operations. This shall include utility facilities not shown on the plans, which may be found to be located within the pavement area. Work performed on the utility facilities shall be in strict accordance with the specifications of the applicable utility company and shall be performed under the direction, supervision, and inspection of said company.

8.2 Coordination With Utilities

Coordination of work schedules with affected utilities will be required. Upon the contract award, the coordination of all necessary relocations or adjustment of all utility facilities becomes the responsibility of the Contractor.

8.3 Item 105.06 – Cooperation Between Contractors

The Contractor shall coordinate his work with other Contractors within or adjacent to the project limits. All improvements completed under this contract shall meet the line and grade of other work in an acceptable manner.

8.4 Item 106 – Control Of Material

Unless otherwise specified, all materials shall be new, and both workmanship and materials shall be of proper quality and sufficient for the purpose contemplated. The Contractor shall furnish, if so required, satisfactory evidence as to type and quality of materials and workmanship.

All items of equipment and/or material proposed by the Contractor for substitutions must be approved by the Engineer in writing and shall be equal or superior to the items specified in the contract documents. If said substitution proposed by the Contractor for a specified item requires engineering revisions, the total expense of said revisions shall be paid by the Contractor.

Any items of labor and materials required, but not shown as a separate pay item in the proposal, shall be furnished and installed as incidental to the contract, except as noted in the plans and specifications.

8.5 Item 106.08 - Storage Of Materials

The Contractor shall obtain prior approval in writing from the Owner for the locations to be used for the temporary storage of construction materials, tools, and/or machinery. All such materials, tools, and machinery shall be neatly and compactly piled in such a manner as to cause the least inconvenience to the property owners and to traffic. Under no circumstances shall existing drainage courses be blocked or water hydrants, valves, or meter pits covered. All materials, tools, machinery, etc., stored upon public thoroughfares must be provided with warning lights and reflective sheeting at nighttime and weekends to alert traffic of such obstructions.

8.6 Item 108.02 - Preconstruction Conference

Prior to the commencement of construction activities, the Engineer will arrange a meeting between the Contractor, the representatives of the Owner, and the representatives of each of the utility companies. The time, date, and location of said meeting will be determined after the awarding of the contract, and the parties will be notified by the Engineer.

The agenda for the preconstruction meeting shall include the following items:

1. Announcement of Award
2. Utility Company Requirements
3. Designation of Emergency 24-hour Contractor Contacts
4. Discussion of Critical Plan Items
5. Review of Testing and Inspection Procedures
6. Operations Schedule
7. Listing of Haul Roads
8. Identification of Subcontractors
9. Review of Change Order Process
10.. Payment Request Submittal Procedure

The Contractor shall coordinate all work with the Engineer. A detailed schedule of operations shall be furnished by the Contractor to the Engineer at the preconstruction meeting and shall list the order of operations and the time frame for the completion of each item of work. The schedule of operations shall be approved by the Engineer and the Owner in writing prior to the beginning of the work. Changes to said schedule are to be issued in writing and approved by the Engineer and the Owner before operations are

changed or rescheduled. No payment will be made to the Contractor while he is delinquent in the submission of a progress schedule.

The Contractor shall supply to the Engineer at the preconstruction meeting, a list of the local roads to be used for the purpose of hauling equipment and/or material to or from the job site. Only the local roads in the vicinity of the project have to be listed; state and/or federal roads do not have to be included. Where necessary, the list shall include the extent of the roads to be affected and any special restrictions, such as height or weight restrictions, which may be applicable along said roads. Construction shall not commence until the Engineer and/or Owner has reviewed the haul road list and approved the haul roads in writing.

The submission of the list to and the review and approval of the list by the Engineer do not relieve the Contractor of the responsibility for the conforming to and the obeying of all applicable height and weight restrictions on the haul roads and of the responsibility for any damage done to and/or along said haul roads. The Contractor is referred to Item 105.10 concerning load restrictions.

8.7 Item 107.04 - Permits, Licenses And Taxes

The Contractor shall insure that all required notices are given and all permits acquired before the commencement of work. The Engineer will discuss any special permits required for this project at the preconstruction meeting.

8.8 Item 107.14 - Contractor's Responsibility For Work

It shall be the responsibility of the Contractor to perform his work in such a manner as not to damage or destroy any existing feature (i.e., existing inlets, conduits, etc.), which is not marked for replacement or removal. The Contractor shall exercise due care during construction so as not to destroy any trees, plants, shrubs or structures not specifically marked for removal or relocation within the work limits. In some instances, the Contractor will be required to excavate under and around the existing utilities. Extreme care should be used not to damage the utility during this operation. The Contractor shall schedule his operations so that the improved areas have had sufficient time to cure, set and/or harden before the area is opened to traffic or use. The Contractor shall be responsible for the immediate repair of the improved area if any damage is done by traffic. The Contractor shall also be responsible for the immediate rectification of problems created in areas outside of the improved areas which are attributable to the failure of the improved area, i.e., the tracking of materials into unimproved areas.

The Contractor shall be responsible for the protection of areas outside of the designated work limits, but which may be adjacent to those work limits. This will include those areas used by construction traffic for access to and from the work areas. Where the Engineer and/or the Owner determine that the Contractor's operations have been responsible for damage to areas outside of the work limits, the Contractor shall be responsible for the repair of the area subject to the approval of the Engineer. No additional compensation will be due to the Contractor for any such repairs as described above.

8.9 Temporary Traffic Control Devices

Temporary traffic control devices and facilities shall be furnished, erected maintained and paid for in accordance with the provision of Section 112 – Maintenance and Control of Traffic During Construction. All traffic control devices shall conform to the current standards found in the Manual of Uniform Traffic Control Devices for Streets and Highways. The provisions of this item and this section shall not in any way relieve the Contractor of any of his legal responsibilities or liabilities for the safety of the public.

8.10 Stake Out

Construction stakeout shall be provided by the **Contractor** to establish line and grade as shown on the plans.

8.11 Testing

Contractor shall be responsible for all code required testing and special inspections for earthwork and concrete.

8.12 Items 202 / 203 Removals

When a bid item is to include the cost of removal of a classified or unclassified material, it shall be the responsibility of the Contractor to verify in the field the type of material and the thickness of the material to be removed prior to submitting his bid. No additional allowance will be due the Contractor for added expense of removals due to unknown materials or thickness.

Cost shall also include excavation to proposed subgrade elevation.

8.13 Items 202 / 203 - Debris Removal

The Contractor will be responsible for removal of all construction debris from the site. All debris shall be disposed of in a proper manner and shall be as directed by all applicable local, state, or federal regulations.

8.14 Item 204 – Excavation To Proposed Subgrade

Excavation outside of the pavement area required to bring yards or driveways to the proposed curb elevation shall be incidental to this item.

8.15 Item 206 / 207 / 302 / 701 - Testing Of Compacted Materials

Compaction testing of embankment, granular backfill, and/or subgrade shall be done by an independent qualified testing laboratory under a contract with the Contractor. Testing shall be done in the presence of the Engineer at locations specified by the Engineer and shall meet standards as specified in Items 206, 207, 302 and 701. The Contractor shall include the cost of all required tests in the unit price bid for the pertinent item and no separate compensation is to be made for said testing.

8.16 Item SPL - Yard Restoration (4" Topsoil, Seed And Mulch)

The Contractor shall provide all labor, materials, tools, and equipment required to grade, fertilize, seed, and mulch in good, workmanlike manner the areas where shown on the plans or where directed by the Engineer and as specified herein. All yard areas disturbed during construction shall be restored per this section.

A. Materials

1. Topsoil – Topsoil shall be per ASTM D5268 with a Ph range of 5.5 to 7. Topsoil shall not contain more than 40% clay in that portion passing a No.10 sieve, shall contain not less than 5% or more than 20% organic matter as determined by loss on ignition of samples oven dried to constant weight at 212 degrees Fahrenheit, and shall be free of rock and other foreign material greater than 1 inch in any dimension and other extraneous materials harmful to plant growth.
2. Fertilizer –
   a. Fertilizer shall be lawn or turf grade 12-12-12
   b. Agricultural ground limestone when used shall have a minimum total neutralizing power of 90 and at least 40 percent passing a No. 100 sieve, and at least 95% passing a No. 8 sieve.
3. Seed – All areas to be seeded shall be seeded with the following mixture:

By Weight	Name of Grass	Purity	Germination
40%	Fine Lawn Turf-Type Fescue	95%	90%
40%	Creeping Red Fescue (Festuca Rubra)	95%	90%
20%	Annual Ryegrass (Lolium Multiflorm)	95%	90%

Weed seed content not over 0.25 percent and free of noxious weeds.

4. Mulch – Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats or barley.
5. Asphalt Emulsion – ASTM D977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

B. Installation

1. Preparation of Seed Bed
   a. Topsoil – If suitable topsoil is available as part of the excavated material it shall be removed, stored and used to backfill the top 4 inches of the excavation. If sufficient material is not available on site it shall be imported on site at no additional cost to the Owner. All grass, weeds, roots, sticks, stones, and other debris are to be removed and the topsoil carefully brought to the finish grade by **hand raking.** The topsoil shall be sufficiently compacted, by tracking in the material, to prevent significant settlement. Promptly and thoroughly remove topsoil and other materials dropped on pavement surfaces before being compacted by traffic. Before any fertilizer or seed is placed the topsoil shall be inspected and approved by the Engineer.

2. Fertilizing – Fertilizing shall be uniformly applied to all areas to be seeded at the rate of 1 pound per 100 square. The fertilizer shall be thoroughly disked, harrowed or raked into the soil to a depth of not less than 2 inches. Immediately before sowing the seed, the Contractor shall rework the surface until it is a fine, pulverized, smooth seed bed, varying not more than 1 inch in 10 feet. A second application of fertilizer shall be applied at the same rate once the grass has been established or within 6 weeks of seeding.

3. Seeding – Immediately after the preparation and fertilization of the seed bed the Engineer shall inspect and approve the site prior to seeding. The seed shall be thoroughly mixed and then evenly sown over the prepared areas at the rate of 3 to 4 pounds per 1000 square feet. Seed shall be sown dry or hydraulically. After sowing, the area shall be raked, dragged, or otherwise treated to cover the seed to a depth of approximately ¼ inch.

4. Mulching – Within 24 hours after any given area is seeded, mulching material shall be evenly placed over all seeded areas at the rate of approximately 2 tons per acre, when seeding is performed between the dates of March 15 and October 15, and at the approximate rate of 3 tons per acre when seeding is performed between the dates of October 15 and March 15 of the succeeding year. Mulching material shall be removed once a good turf has been established.

   A. Emulsion – Mulching materials shall be kept in place with asphalt emulsion applied at a minimum rate of 10 to 13 gallons per 1000 square feet of mulch or by methods as approved or may be otherwise required to prevent displacement of material. Mulching which is displaced shall be replaced at once but only after the seeding or other work which preceded the mulching and which work was damaged as a result of displacement of mulching material has been acceptably repaired.

5. Maintenance – Contractor shall water, mow, weed and otherwise maintain all seeded areas as necessary to secure a good turf. Settled areas shall be filled, graded, and re-seeded. Seeded areas shall be free of weeds and other debris. The Contractor shall be responsible for the condition of the seeded areas for a period of 1 year from the date of Final Acceptance. A satisfactory lawn shall consist of a healthy uniform, close stand of grass, free of weeds, rocks and surface irregularities, with coverage exceeding 95% over any 10 square feet, and bare spots not exceeding 2 by 2 inches.

8.17 Item 212 / 213 - Erosion Control And Water Pollution Control

The Contractor shall take extreme care to prevent unnecessary erosion, water pollution and siltation at all points of the project. Temporary seeding and mulching, straw bales, slope drains, etc., shall be used as necessary or as directed by the Engineer. The cost of all temporary erosion control measures shall be paid for as a lump sum bid item.

8.18 Full-Depth Pavement Sawing

All existing pavement to be widened and/or removed shall be sawed full depth at the limits of removal, using a diamond saw blade to provide a uniform edge and prevent damage to pavement that is to remain in place. The cost of the sawing shall be incidental to the contract.

8.19 Existing Pipe

The location, size, type and depth of all existing pipes are shown as nearly exact as available information will permit. The Engineer will not be responsible for any variations found during construction.

Where the plans provide for conduit to be connected to, or to cross either over or under, or close to an existing underground structure, it shall be the responsibility of the Contractor to locate the existing structure, both as to line and grade, before he starts to lay the proposed conduit, in order to assure compatibility of line and grade of the proposed conduit.

Payment for all operation described above shall be included in the unit price bid for the pertinent conduit item.

8.20 Item 701 – Grading At Inlets And Outfalls Of Proposed Conduits

The cost of the necessary reconstruction and/or regrading of swales or disturbed areas at the inlets and outfalls of all proposed conduits shall be included in the price bid for the pertinent conduit and inlet items.

8.21 Item 701 – Review of Drainage Facilities

Before any work starts on the project and again before final acceptance by the Owner, the Contractor, with the Engineer, shall make an inspection of the existing sewers within the work limits, which are to remain in service and which may be affected by the work. The condition of the existing conduits and their appurtenances shall be determined from field observations. Written records of the inspection and/or photographic documentation shall be kept by the Engineer.

All existing sewers inspected initially by the above-mentioned parties shall be maintained and left in a condition reasonably comparable to that determined by the original inspection. Any change in the condition resulting from the Contractor's operations shall be corrected by the Contractor to the satisfaction of the Engineer. All existing and/or new conduits, inlets, catch basins, and manholes constructed and/or cleaned as a part of the project shall be free of all foreign matter and in a clean condition before the project will be accepted by the Owner. Payment for all operations described above shall be included in the unit prices bid for the pertinent item.

8.22 Item 701 – Removal of Water

The Contractor shall keep all excavations free from water while the excavation for or the construction of conduits is in progress; shall build all dams, bulkheads, underdrains, sumps, and other work necessary for this purpose; and shall provide and keep the excavation dry and free from water at all times.

The Contractor shall provide for the disposal of all water removed from the excavations in such manner as to prevent injury to the public, the public health, public or private property, or to any portion of the work completed or in progress, or the surface of the streets, and to prevent any inconvenience to the public. No ground and/or surface water shall be diverted into existing sanitary sewers.

No conduits shall be laid or built in water, and waste shall not be allowed to flow over to rise upon any concrete, brick masonry or conduit until the work has been observed and has set for at least twenty-four (24) hours.

The flow of water in all existing sewers, drains, gutters, or watercourses encountered during the construction period shall be adequately maintained by the Contractor at his expense.

8.23 Item 704 – Under Drain

Payment for Item 704 - Under Drain will be made at the contract unit price per linear foot for all materials, equipment and labor to complete the work per Kentucky Standard Specifications for Road and Bridge Construction Section 704 and these plans and specifications.

Payment for underdrain shall include 4" rigid perforated PVC pipe, Non-Woven Geotextile (Mirafi 140N or Approved Equal), No. 57 Stone backfill and trench as shown and noted on the provided plans/details.

Payment shall also include any connections/taps to drainage structures.

8.24 Shoring and Trench Box

Trenches and excavations for appurtenances shall be adequately shored and braced or a trench box utilized whenever the trenches and excavations cannot be opened up to a sufficient width to maintain natural soil stability and sloped per current OSHA regulations. All shoring shall meet safety codes in effect at the time of the work; and, if none are in effect, they shall meet the requirements of Employers Mutual, Factory Mutual, Associated General Contractors safety manuals or OSHA guidelines.

The Contractor is fully responsible at all times for the safety of their excavators and total compliance with OSHA regulations.

Shoring and sheeting, when used, that does not extend below the top of the sewer pipes may be removed at the Contractor's option after the trench backfill has been placed and compacted to a point one foot above the top of the pipes. Following removal of the shoring and sheeting, the space left shall be filled immediately with backfill material and compacted.

Shoring and sheeting that extends below the top of the sewer pipes shall be left in place below a point one foot above the top of the pipes and not be disturbed. The Contractor may remove the portion of shoring and sheeting above this point at his option.

When shoring and sheeting is not removed, the portion to a point two feet (2′) below finished grade shall be removed. Bracing shall not be removed until after the trench backfill has been placed and compacted to a point one foot (1′) above the top of the sewer pipes.

The cost for shoring and trench boxes shall be incidental to the overall contract and no additional payment will be made specifically for this item unless otherwise specified.

8.25 Item SPL – Sheeting and Shoring

The Contractor shall furnish, put in place, and maintain such piling, sheeting, bracing, etc., as is required by the State of Kentucky. The Contractor shall furnish, put in place, and maintain and remove such sheeting, shoring, planking and bracing as may be required to support the sides of the excavations and to prevent any movement which could in any way injure the work, human life, or adjacent structures and property, obstruct surface drainage channels or waterways, or otherwise injure or delay the work. If required at any time by the Engineer, the Contractor shall furnish and install such additional sheeting,

shoring and bracing as may be necessary to protect the work, but compliance with such orders or failure on the part of the Engineer to give such orders shall in no case release the Contractor from liability for any damages or injuries caused by weak or insufficient sheeting, shoring and bracing, nor from his responsibility to protect the work or adjacent property.

Except when ordered left in place, all wood sheeting above the top of the pipe, steel sheet piling, braces, shoring, walers or stringers, shall not be withdrawn until the backfill is practically complete. As the backfill progresses to the elevation of a set of walers and braces, such bracing shall be removed. All sheeting and bracing specified, shown on the plans, or directed by the Engineer to be left in place shall not be removed. All sheeting left in place shall be cut off at least two (2) feet below final finish grade. During the removal of sheeting, care must be taken to prevent movement of the sides of the excavation. All voids left by the withdrawal of sheeting shall immediately be carefully refilled by ramming with tools adapted to the purpose, pneumatic or other approved type, or by flushing sand into the voids.

The cost for sheeting and shoring shall be incidental to the overall contract and no additional payment will be made specifically for this item unless otherwise specified.

8.26 Control Of Work

Construction work shall take place between the hours of 7:00 A.M. to 7:00 P.M., Monday through Saturday unless otherwise restricted by the Encroachment Permit.

8.27 "Or Approved Equal" Items

In the preparation of these documents and plans, several proprietary products may have been specified. In all such cases, it is to be understood that the Contractor may offer a substitute for the specified product, as indicated by the words "Or Approved Equal." However, the Contractor must be aware that, before commencement of construction, he must provide information to the Engineer concerning the substituted product, and that the Engineer must approve in writing the offered product as being equal to the specified product before use or incorporation into the work.
Unless otherwise modified by the Engineer, proprietary products are to be installed and/or constructed in strict compliance with the pertinent Manufacturer's specifications.

8.28 Payment

No adjustments to unit prices shall be due to the Owner or the Contractor for increases or decreases in the Engineer's approximate unit quantities shown in the proposal resulting from changes in the amount of work performed.

THE OWNER RESERVES THE RIGHT TO AWARD OR DELETE ANY OR ALL COMBINATIONS.

BID FORMS

The bid forms are not available online. The bid forms are available only by purchasing a set of plans and specifications at the location indicated in the Legal Notice.

Appendix - GEOTECHNICAL DATA

SECTION 003132 - GEOTECHNICAL DATA

PART 1 - GENERAL

1.1 GEOTECHNICAL DATA

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

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

C. Soil-boring data and geotechnical investigation report for Project, obtained by Verdantas LLC, dated May 7, 2026, is available for viewing as appended to this Document.

1. The opinions expressed in this report are those of a geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by a geotechnical engineer. Owner is not responsible for interpretations or conclusions drawn from the data.
2. Any party using information described in the geotechnical report shall make additional test borings and conduct other exploratory operations that may be required to determine the character of subsurface materials that may be encountered.

D. Related Requirements:

1. Refer to complete Procurement and Contracting Requirements for the Bidder's responsibilities for examination of Project site and existing conditions.

END OF SECTION 003132

Geotechnical Subsurface Investigation

Fort Wright Salt Dome
Fort Wright, Kentucky

Prepared for:

City of Fort Wright, Kentucky
Fort Wright, Kentucky

Prepared by:

Verdantas, LLC
300 Buttermilk Pike, Ste. 322
Ft. Mitchell, Kentucky 41018
1 859-525-0544

Verdantas Project No.: 39973

May 7, 2026

300 Buttermilk Pike, Ste. 322
Ft. Mitchell, Kentucky 41018
1 859-525-0544

May 7, 2026

Ms. Jill Cain Bailey, City Administrator
City of Fort Wright, Kentucky
409 Kyles Lane
Fort Wright, Kentucky 41011
(859) 331-1700
jcbailey@fortwrightky.gov

Geotechnical Subsurface Investigation
Fort Wright Salt Dome
Fort Wright, Kentucky
Project No. 39973

Dear Ms. Miller:

Following is the report of the geotechnical subsurface investigation performed by Verdantas, LLC. (Verdantas) for the referenced project. The study was performed in accordance with proposal No. 39973, dated December 19, 2025, and authorized March 20, 2026

Should you have any questions regarding this report or require additional information, please contact our office.

Sincerely,
Verdantas LLC

Andrew S. Dingler, EI
Project Manager

Curtis Roupe, PE
Associate Vice-President

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1. PROJECT SUMMARY

1.1 Introduction

This report summarizes Verdantas LLC's (Verdantas) Geotechnical Engineering Services for the proposed salt dome project located in Fort Wright, Kentucky. This report includes information regarding the document review, field and laboratory testing programs, and conclusions and recommendations related to the salt dome project. This work has been performed according to our proposal dated December 19, 2025 and authorized on March 20, 2026.

1.2 Project Description

We understand that a new salt dome has been proposed to be constructed adjacent to the existing Fort Wright City Building. The salt dome will be approximately 42 feet in diameter with 10 foot high concrete perimeter walls with a wood framed roof structure and asphalt shingles; having a rated capacity of 800 tons of salt. The project will be public bid, with the "basis of design" building package from Bulk Storage, Inc. Based on conversations with Bulk Storage, we understand that footings will not be provided beneath the walls and that the dome walls are generally constructed directly on an asphalt pad due to the degradation of concrete due to the continuous exposure to salt. Grades are expected to be near Elev. 868 to match the adjacent parking lot. Portions of the surrounding building are planned to have soil slopes surrounding the building to better obscure the structure; however, no grades were available for this at the time of this report. Based on discussions with Bulk Storage, Inc., we understand that the required allowable bearing pressures for the structure and salt to be stored in the dome is 2,500 pound per square foot.

1.3 Project Research

The following list of readily available historic information was reviewed for this project:

- USGS Geologic Map of Covington Quadrangle, Northern Kentucky, Luft, Stanley J., 1971), retrieved from National Geologic Map Database's (NGMDB) website, April 2026.
- Kentucky Geological Survey Surficial Geologic map of Part of the Covington 7.5-Minute Quadrangle, Northern Kentucky (Massey, M.A., Bottoms, A.E., Hammond, M., 2018) retrieved from National Geologic Map Database's (NGMDB) website, April 2026.
- USGS Topographic Map of the Covington 7.5-Minute Quadrangle, Kentucky-Ohio, (1950), retrieved from National Geologic Map Database's (NGMDB) website, April 2026.
- USGS Topographic Map of the Covington 7.5-Minute Quadrangle, Kentucky-Ohio, (1950), retrieved from National Geologic Map Database's (NGMDB) website, April 2026.
- USGS Topographic Map of the Covington 7.5-Minute Quadrangle, Kentucky-Ohio, (2022), retrieved from National Geologic Map Database's (NGMDB) website, April 2026.

2. SITE CONDITIONS

2.1 Desktop Study of Historic Information

During our preliminary review of the historic topographic and geologic data a lake was identified within the footprint of the now demolished playground area where the salt dome has been proposed to be constructed. The site overlay with the historic topographic map is shown in Figure 1.

Figure 1. Fort Wright City Building site overlayed with the USGS Topographic Map of the Covington 7.5-Minute Quadrangle, Kentucky-Ohio

Based on the location of the lake and a review of older topographic data from 1914, 1950 and the current USGS topographic map of 2022, grades at the site appear to be between 10 and 15 feet higher from 1914 to 1950 and are similar now to those shown on the 1950 maps.

2.2 Regional Geology and Hydrogeology

The project is located within the Outer Bluegrass physiographic region of north-central Kentucky. This region is part of the broader Bluegrass Region, which is underlain predominantly by Ordovician-age limestone and shale that have been gently uplifted along the Cincinnati Arch. Long-term weathering and erosion of these interbedded carbonate and shale units have produced a rolling to moderately dissected landscape characterized by narrow ridges, incised stream valleys, and variable local relief.

The Outer Bluegrass is distinguished from the Inner Bluegrass by its greater degree of dissection and steeper valley side slopes, reflecting the more erosion-prone nature of the

interbedded limestone and shale bedrock. In the Alexandria area, surface drainage is well developed and flows toward the Ohio River system, primarily through tributaries of the Licking River. Valley bottoms commonly contain alluvial deposits, while hillslopes are mantled by residual soils derived from weathered limestone and shale, with localized colluvial deposits along steeper slopes.

Karst development within the Outer Bluegrass is generally less pronounced than in areas underlain by thick-bedded limestone of the Inner Bluegrass; however, localized solution features, joints, and bedding plane partings may influence subsurface drainage and groundwater movement where limestone units are dominant. Groundwater flow in the region is typically controlled by secondary permeability within bedrock fractures and bedding planes, as well as by stratigraphic contrasts between limestone and shale units.

2.3 Site Reconnaissance

The site location and regional topography of the area are shown on the Site Location Plan included as Plate 1.0 in Appendix A.

The subject property is located in Fort Wright, Kentucky along Highland Pike[1]. The site is situated within a residential area on the west side of the roadway. The site consists of the existing Fort Mitchell City Building with an apparatus bay and heavy duty pavement located on the south side of the building. The southern property line uses a soil berm to block sight lines from the adjacent residences into the property. The southwestern corner of the property where the proposed salt dome is to be located was previously used for a children's playset which has been recently demolished. The play area is surrounded by soil berms on the order of 3 feet high. Grades at the site generally range from Elev. 882 ft in the southeast corner, to Elev. 858 ft[2]. in the northeast corner. Within the proposed development area, grades range from Elev. 872 ft. to Elev. 868 ft.

[1] For the purposes of this report, Highland Pike is assumed to be oriented in a north-south direction.

[2] The elevations in this report are referenced to North American Vertical Datum of 1988 (NAVD 88) in units of feet, unless noted otherwise.

3. SUBSURFACE EXPLORATION

3.1 Project Exploration Program

The subsurface exploration consisted of three borings (numbered B-1 through B-3). The boring locations were selected by Verdantas and were staked in the field by our survey crew relative to the Kentucky State Plane coordinate system. The locations of the borings are shown on our Exploration Plan, which is included as Plate 2.0 in Appendix A.

Experience indicates that the actual subsoil conditions at a site could vary from those generalized on the basis of test borings made at specific locations. Therefore, it is essential that a geotechnical engineer be retained to provide soil engineering services during the site preparation and pavement construction phases of the proposed project. This is to observe compliance with the design concepts, specifications, and recommendations, and to allow design changes in the event subsurface conditions differ from those anticipated prior to the start of construction.

3.2 Boring Methods

The borings were drilled on March 20, 2026 with a CME-55 ATV mounted drill rig advancing 3¼ inch hollow-stem augers, as indicated on the boring logs presented in Appendix B.

Sampling of the overburden soils and bedrock was accomplished ahead of the augers at the depths indicated on the boring logs, with either a 2-inch-outside-diameter (O.D.) split-barrel sampler or 3-inch-O.D., thin-walled Shelby tube sampler in general accordance with the procedures outlined by ASTM D1586 and ASTM D1587, respectively. Split-spoon soil samples were obtained by the Standard Penetration Test Method (ASTM D 1586). The Standard Penetration Test (SPT) consists of driving a 2-inch outside diameter split-spoon sampler into the soil with a 140-pound weight falling freely through a distance of 30 inches. The sampler was driven in three successive 6-inch increments, with the number of blows per increment being recorded. The number of blows per increment was recorded at each depth interval, and these data are presented under the “SPT” column on the Logs of Test Borings attached to this report. The sum of the number of blows required to advance the sampler the second and third 6-inch increments is termed the Standard Penetration Resistance, or N-value, and is typically reported in blows per foot (bpf). The N-values were corrected to an equivalent rod energy ratio of 60 percent, N_{60}.

Soil conditions encountered in the test borings are presented in the Logs of Test Borings, along with information related to sample data, SPT results, water conditions observed in the borings, and laboratory test data. In conjunction with published data and typical correlations, the N_{60}-values can be evaluated as a measure of soil compactness/consistency as well as shear strength.

Field and laboratory data were incorporated into gINT™ software for presentation purposes. It should be noted that these logs have been prepared on the basis of laboratory classification and testing as well as field logs of the encountered soils.

Observations for groundwater were made in the borings during drilling, and at the completion of drilling before backfilling the boring holes.

A geologist from Verdantas provided technical direction during field exploration, observed drilling and sampling, assisted in obtaining samples, and prepared field logs of the material encountered.

Representative portions of the split-barrel samples were placed in glass jars with lids to preserve the in-situ moisture contents of the samples. The Shelby tubes were capped and taped at their ends to preserve the in-situ moisture contents and densities of the samples, and the tubes were transported and stored in an upright position. The glass jars, and Shelby tubes were marked and labeled in the field for identification when returned to our laboratory.

3.3 Laboratory Review and Testing Program

Upon completion of the fieldwork, the samples recovered from the borings were transported to our Soil Mechanics Laboratory, where they were visually reviewed and classified.

Laboratory testing was performed on selected soil and rock samples to estimate engineering and index properties. Laboratory testing of the selected soil samples included various combinations of the following tests: moisture content, Atterberg limits, gradation (particle-size) analyses, and unconfined compression in accordance with ASTM testing procedures. The results of these tests are summarized in the Tabulation of Laboratory Tests in Appendix C, along with the corresponding laboratory test forms. Additionally, the results of laboratory index tests are presented on the boring logs.

The boring logs, which are included in Appendix B, were prepared by the Project Geotechnical Engineer on the basis of the field logs, the visual classification of the soil samples in the laboratory, and the laboratory test results. A Boring Log Legend is also included in Appendix B, which describe the terms and symbols used on the boring logs. The dashed lines on the boring logs indicate an approximate change in strata as estimated between samples, whereas a solid line indicates that the change in strata occurred within a sample where a more precise measurement could be made. Furthermore, the transition between strata can be abrupt or gradual.

4. SUBSURFACE CONDITIONS

4.1 Stratification

Generally, the ground surface consisted of fill soils over native lean clay with varying amounts of sand and gravel. Native soils were encountered immediately above the limestone and shale bedrock. While not encountered in the borings, topsoil was noted to be present at the ground surface at the site surrounding the borings. More specific descriptions of the subsurface strata are provided below, and the boring logs containing detailed material descriptions are located in Appendix B.

4.1.1 Fill

Surficial soils across the site consist of fill materials extending from ground surface to depths generally ranging from approximately 5 to 10 feet below ground surface. The fill is variable in composition and consistency, which may indicate uncontrolled fill. Materials consist predominantly of lean clay (CL) with varying amounts of sand and occasional trace gravel, with localized zones of poorly graded sand. The fill is typically moist, with consistencies ranging from soft to medium stiff.

Colors are generally brown to gray, frequently mottled, and include localized iron oxide and manganese oxide staining. Trace organics and construction-related debris, including brick fragments, were encountered in some of the borings.

Table 4-1: Summary of laboratory test results of the fill.

		Samples Tested	Minimum	Maximum
Moisture Content (%)		11	14.3	25.9
Dry Unit Weight (pcf)		1	106.3	
Unconfined Compressive Strength (psf)		1	1,730	
Atterberg Limits	**Liquid Limit (%)**	1	30	
	Plastic Limit (%)		19	
	Plasticity Index (%)		11	
Particle-Size Analysis	**Gravel-Sized (%)**	1	0.0	
	Coarse Sand Sized (%)		1.0	
	Medium Sand Sized (%)		4.0	
	Fine Sand-Sized (%)		10.0	
	Silt-Sized (%)		24.0	
	Clay-Sized (%)		61.0	

4.1.2 Glacial Soils

Glacial soils (or glacial till) are soils that have been deposited, transported, or reworked in place by the advancement or retreat of a glacier across the area.

Underlying the fill, the subsurface profile includes glacial till, extending to depths between approximately 8 and 20 feet below the ground surface. These materials consist predominantly of lean clay (CL) with sand and occasional trace gravel. The soils are typically moist, with consistencies ranging from soft to medium stiff.

Colors are generally brown to gray and commonly mottled, with local iron oxide staining. The glacial soils are relatively uniform compared to the overlying fill but retain natural variability typical of till deposits. No laterally continuous granular seams or lenses were identified within the glacial unit in the borings explored. Laboratory test data from selected samples of the residual soils are provided in Table 4-2.

Table 4-2: Summary of laboratory test results of the glacial soils.

		Samples Tested	Minimum	Maximum
Moisture Content (%)		5	19.2	31.7
Dry Unit Weight (pcf)		2	98.2	102.8
Unconfined Compressive Strength (psf)		2	1,666	2,945
Atterberg Limits	**Liquid Limit (%)**	2	35	36
	Plastic Limit (%)		21	23
	Plasticity Index (%)		12	15
Particle-Size Analysis	**Gravel-Sized (%)**	2	0.0	0.0
	Coarse Sand Sized (%)		0.0	0.0
	Medium Sand Sized (%)		2.0	2.0
	Fine Sand-Sized (%)		6.0	7.0
	Silt-Sized (%)		26.0	26.0
	Clay-Sized (%)		65.0	65.0

4.1.3 Residual Soils

Residual soils (or residuum) are soils that have formed by the in-situ weathering of the underlying bedrock into a soil. Occasionally, layers of the bedrock (i.e., shale or limestone layers) may be encountered within the residual soils.

Residual soils were encountered beneath the glacial soils or directly below the fill in Boring B-3, extending to depths of approximately 15 to 25 feet below ground surface, immediately overlying bedrock. The residual materials consist primarily of lean clay (CL) with sand and trace limestone fragments derived from the in-place weathering of underlying shale and limestone.

These soils are typically moist and exhibit very stiff consistency. Colors are generally brown to gray, with localized iron oxide and calcite staining. The residual soils commonly show increasing stiffness and rock fragment content with depth, grading into the underlying highly weathered shale and limestone bedrock. Laboratory test data from selected samples of the residual soils are provided in Table 4-3 and Table 4-4.

Table 4-3: Summary of laboratory test results of the residual soils.

		Samples Tested	Minimum	Maximum
	Moisture Content (%)	3	16.7	23.0
	Dry Unit Weight (pcf)	1	99.4	
Atterberg Limits	**Liquid Limit (%)**	4	38	42
	Plastic Limit (%)		20	22
	Plasticity Index (%)		17	22
Particle-Size Analysis	**Gravel-Sized (%)**	4	11	25
	Coarse Sand Sized (%)		3	12
	Medium Sand Sized (%)		2	7
	Fine Sand-Sized (%)		4	11
	Silt-Sized (%)		17	26
	Clay-Sized (%)		34	50

Table 4-4: Summary of Consolidation test data.

Boring No.	Sample No.	Depth (ft.)	Dry Unit Weight (pcf)	Pc (tsf)	Cc	Cr	cv (ft.2/day)
B-1	ST-7	20.0 - 22.0	99.4	3.2	0.161	0.03	0.07

4.1.4 Bedrock

The overburden soils at the site are underlain by bedrock consisting of interbedded shale and limestone layers. Bedrock was encountered at depths of 15 to 25 feet below the ground surface in each of the borings.

According to the 1971 United States Geological Survey (USGS) Geologic Map of the Covington Quadrangle, Northern Kentucky, the bedrock underlying the overburden soils belongs to the Bull Fork Formation.

> *The Bull Fork Formation consists of interbedded limestone and shale, with the limestone comprising more than 50 percent of the formation. The limestone is irregularly to evenly bedded, with beds generally varying between 1 and 4 inches thick, but locally as thick as 12 inches. The shale is generally calcareous, thinly bedded to laminated, with interbeds typically less than 1 to nearly 4 inches thick.*

Bedrock in the Northern Kentucky Area is typically categorized as highly weathered, weathered, or unweathered, based on the degree of weathering of the shale component. The highly weathered zone is typically the uppermost zone, wherein the shale is brown to olive brown in color and has almost weathered to a clay. In the intermediate weathered zone, the shale is typically olive brown with occasional gray and is stronger than the shale in the highly weathered zone. In the unweathered parent zone, the shale is gray and is stronger than the shale in the weathered zones. Each zone is interbedded with limestone. It is not uncommon for one or both of the weathered bedrock zones to be absent due to differential weathering, erosion, or prior excavation.

Regarding the limestone, these layers are predominantly unweathered, and their strengths are estimated to range from medium strong to very strong (i.e., uniaxial compressive strengths ranging from 4,000 psi to upwards of 30,000 psi). Occasionally, layers are encountered within the bedrock profile where groundwater seepage is concentrated, and weathering of the limestone layers is more advanced.

Interbedded olive brown highly weathered shale and gray limestone bedrock was encountered in each of the borings. The top of the highly weathered bedrock was encountered at a depth of 15 to 25 feet below grade. The strength of the limestone was described as medium strong, with the highly weathered shale described as extremely weak. Moisture contents of three samples of the highly weathered shale yielded results ranging from 8.3 to 15.4 percent.

4.2 Groundwater Conditions

Groundwater was not encountered during drilling in the three borings. It should be noted that the boreholes were drilled and backfilled within the same day, and stabilized water levels may not have occurred over this limited time period.

Based on the soil characteristics and moisture conditions encountered in the borings, it is our opinion that the “normal” long-term groundwater table can generally be expected at depths beyond the termination depth of the borings performed for this exploration. This exploration did not include research of possible hydrological influences at the project site. It should be noted that groundwater elevations can fluctuate with seasonal and climatic influences. In particular, “perched” water may be encountered in granular soils that are underlain by relatively impermeable cohesive soils, and near the boundary between clayey overburden and bedrock. Therefore, the groundwater conditions may vary at different times of the year from those encountered during this exploration.

5. ANALYSES AND RECOMMENDATIONS

The following conclusions and recommendations are based on our understanding of the proposed construction and on the data obtained during the field investigation, as subsurface conditions appear to be generally consistent across the site. If the project information or location as outlined is incorrect or should change significantly, a review of these recommendations should be made by Verdantas. These recommendations are subject to the satisfactory completion of the recommended site and subgrade preparation and fill placement operations described in Section 6 “Construction Recommendations”.

5.1 Considerations of Existing Fill

Existing undocumented fill soils were encountered to a significant depth that would be costly and somewhat impractical to remove and replace in a controlled manner. Based on the conditions of the existing fill material encountered in the borings, the fill material appears to be suitable for foundation support with tolerable settlement; however, the presence of the existing undocumented fills increases the risk for variability between boring locations. If less favorable conditions are present between boring locations, there is risk of more total and differential settlement to occur. The following recommendations are made with the assumption that that risk is acceptable and provides recommendations to mitigate some of that risk. If that risk is unacceptable then consideration should be given to ground improvement utilizing rammed aggregate piers, that penetrate the existing fills, or removal and replacement of the existing undocumented fill soils. The ground improvements are typically designed by specialty contractors. If removal and replacement are considered, Verdantas can provide additional recommendations.

5.2 Temporary Excavations and Slopes

The sides of temporary excavations for utility installations, and other construction should be adequately sloped to provide stable sides and safe working conditions. Otherwise, the excavation must be properly braced against lateral movements. In any case, applicable Occupational Safety and Health Administration (OSHA) safety standards must be followed.

It should be noted that OSHA requires that excavations with open-cut slopes higher than 20 feet, or braced excavation support systems such as sheet-piling, be reviewed and designed by a registered professional engineer.

For permanent excavations and slopes, we recommend that grades be no steeper than 3H:1V without a more extensive geotechnical evaluation of the proposed construction plans and site conditions.

The final determination of the OHSA Soil Type is the responsibility of the contractor at the time of construction as soil conditions may differ from those encountered in the borings performed for this exploration.

5.3 Lateral Earth Pressures

Where foundation and retaining walls for this project will be subjected to unbalanced lateral earth pressures, we recommend that the lateral earth pressures be computed on the basis of equivalent fluid weights of the backfill, plus surcharges for foundation loads, pavement loads, sloping backfill, etc. Table 5-1 provides the recommended equivalent fluid weights for soil for both drained and undrained conditions, and also the recommended earth pressure coefficients for proposed surcharges. Unless a site-specific analysis is performed, we recommend that surcharges be modeled as a uniform horizontal pressure equal to the vertical intensity of the surcharge multiplied by the recommended lateral earth pressure coefficient.

Table 5-1: Lateral earth pressures for level (horizontal) ground surfaces.

	Active[a]	At-Rest[a]	Passive[a,b]
Lateral earth pressure coefficient, K	0.39	0.56	2.56
Drained equivalent fluid weight, EFW (pcf)	49	70	320
Undrained equivalent fluid weight, EFW_u (pcf)[c]	87	98	222

Notes:

[a] Parameters are based on level ground surfaces, a soil unit weight (γ) of 125 pcf, and a soil internal angle of friction (ϕ) of 26 degrees.

[b] Passive resistance may be considered where concrete is cast against free-standing vertical faces of soil; however, passive resistance should be ignored in the upper 30 inches below proposed grade due to seasonal variations in moisture and frost penetration. If the ground is sloping down and away from the foundation in the area of passive resistance, we should be contacted to provide site-specific recommendations.

[c] Includes hydrostatic pressure of 62.4 pcf.

The values provided in Table 5-1 assume that the ground surface adjacent to the wall is level and not sloping toward the wall. For ground sloping toward the wall on its active or at-rest side, we recommend that it be accounted for as a surcharge on the wall, as discussed above, unless site-specific equivalent fluid weights are computed on the basis of the backfill slope.

The decision to use active or at-rest earth pressures should be based upon the ability of the wall or structure to deflect as a result of the lateral earth pressures. In cohesionless granular backfill, active earth pressures are assumed to be applicable if the top of the wall is able to deflect a minimum of 0.002 times the height of the wall. In cohesive clayey backfill, the minimum deflection at the top of the wall for active earth pressures to develop is 0.02 times the height of the wall. If these minimum horizontal deflections at the top of the wall are restrained from occurring or unacceptable to the structure, at-rest earth pressures are applicable.

Undrained equivalent fluid weights should be used in computing the lateral loads on the wall wherever the backfill is unable to be drained by a drainage system (discussed below). For the drained equivalent fluid weights to be applicable, a drainage system should be incorporated

along the backfilled face of the wall (i.e., the high side of the wall) consisting of either a prefabricated drainage board or an approximately 18-inch width of free-draining gravel with less than 5 percent fines wrapped with a non-woven drainage geotextile. At the base of the drainage board or free-draining gravel should be a minimum 12-inch-thick by 12-inch-wide, free-draining gravel zone wrapped with a non-woven drainage geotextile. Within the wrapped gravel at its base should be a 4-inch-diameter rigid perforated plastic pipe. The plastic pipe should be connected to a suitable gravity outlet (e.g., the proposed storm sewer system). The granular backfill should be compacted to at least 75 percent relative density per ASTM D4253 and D4254. We recommend that the drainage system extend to subgrade elevation beneath pavements or floor slabs; otherwise, the drainage system should extend to within 2 feet of finished grade and be capped with at least 2 feet of compacted clayey soils to reduce the infiltration of surface water behind the wall. Clayey backfill should be compacted per the requirements presented in Section 6.2. The drainage system should not connect to interior drainage systems below floor slabs. These interior drainage systems should have separate, independent outlets.

If a pre-fabricated drainage board is used in the drainage system and the wall will be subjected to freezing temperatures, rigid, polystyrene foam board insulation at least 1 inch thick should be placed between the wall face and the drainage board to protect the moist, cohesive wall backfill from freezing, which could otherwise exert frost-induced lateral pressures against the wall.

5.4 Seismic Site Class

Based on the borings and our interpretation of the 2018 Edition of the Kentucky Building Code (2018 KBC), it is our opinion that Site Class D is applicable for this project site based on correlations to shear wave velocities for the cohesive soils encountered at the site.

5.5 Asphalt Pavement Design and Construction

Based on discussions with Bulk Storage, it is our understanding that an asphalt mat “foundation” is anticipated for the salt dome structure, and we understand that proposed new heavy duty asphalt pavement will be provided as the apron in front of the structure extending to the existing asphalt pavements. For this reason, the pavement recommendations will be based on both the expected axle loads, frequency of loading, and the properties of the subgrade for support of the 2,500psf loading of the salt dome. We estimate settlements to be on the order of 1.5 to 2 inches based on this loading and understand the tolerable settlement of the salt dome to be up to 2 inches based on discussions with Bulk Storage.

Heavy duty pavements at the site should consist of a minimum 10 inch thick pavement section, having a 2 inch surface course, 4 inch thick intermediate asphalt course, and 4 inch thick asphalt base course. The prepared subgrade soils should be covered with a layer of non-woven filter fabric (Mirafi 160N or Equivalent). A layer of 24 inches of KYTC Item 805.06 Crush Stone Base should be provided with a layer of Tensar HX-5.5 hexagonal grid at the base of the stone and at a depth of 12 inches. Aggregate should be compacted to 100 percent of the Standard

Proctor Maximum Dry Density (SPMDD). Perimeter drains consisting of #57 stone wrapped in a non-woven geotextile fabric should be provided at the edge of the proposed pavement section, and at the interface between the existing pavement and the new asphalt pavements. As no foundations will be provided for the structure and the aggregate section and asphalt are intended to act as a mat foundation for the salt dome, we are estimating settlements to be on the order of 1.5 to 2 inches and as such recommend that the perimeter drains be sloped to allow for this settlement to occur, such that drainage from the rear of the structure is not obstructed when settlement is complete. We do not recommend the use of perforated pipe within the underdrains due to this settlement and the location of the drains directly beneath the walls of the proposed salt dome. An example pavement section with underdrains is shown in Figure 2 below for clarity.

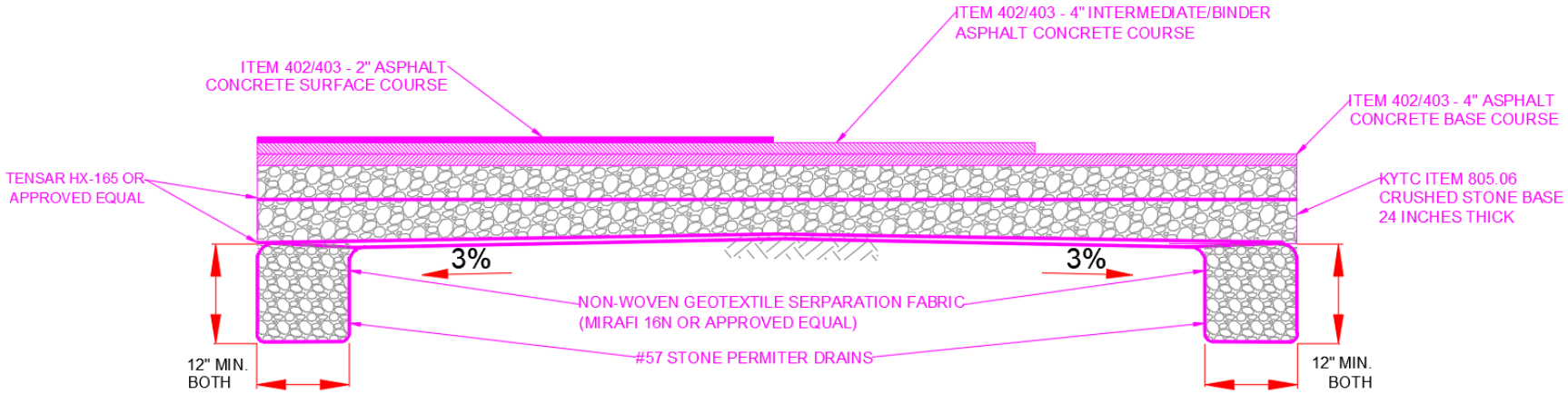


Figure 2. Pavement Section Detail

6. CONSTRUCTION RECOMMENDATIONS

Based on our engineering reconnaissance of the site, the borings, the visual examination of the recovered samples, the laboratory test results, our understanding of the proposed project, our engineering analyses, and our experience as Geotechnical Engineers in the Northern Kentucky Area, the following conclusions are presented.

6.1 Site Preparation

The initial preparation of the site for grading should include the removal of vegetation, heavy root systems, and topsoil from the proposed cut, fill, pavement, and structure areas. The topsoil may be stockpiled for future use on the completed cut and fill slopes or in landscaped areas, if permitted by specification, whereas the vegetation, including the heavy root systems, should be disposed of off-site in accordance with applicable regulations.

6.2 Fill Placement and Recommendations

Fill materials should consist of approved on-site, non-organic, clayey soils, bedrock, or approved borrow material that are relatively free of topsoil, vegetation, trash, construction or demolition debris, frozen materials, particles over 6 inches in maximum dimension, or other deleterious materials.

The fill should be placed in shallow level lifts (or layers), 6 to 8 inches in loose thickness. Each lift should be moisture-conditioned to within the acceptable moisture content range provided in **Error! Reference source not found.**, and compacted with a sheepsfoot roller or self-propelled c ompactor to at least the minimum percent compaction indicated in the same table. Moisture-conditioning may include: aeration and drying of wetter soils; wetting of drier soils; and/or thoroughly mixing wetter and drier soils into a uniform mixture.

Where fill is placed on sloping terrain that is steeper than 6H:1V, the fill should be placed on continuous horizontal benches up the sloping terrain with the initial bench having a minimum width of 15 feet and each subsequent bench being at least 5 feet wide. The initial 15-foot-wide bench should be located at the toe of the proposed fill, unless noted otherwise. The benching operations should remove surficial medium stiff or softer soils and expose stiff native soils or undisturbed, intact bedrock on the surfaces of the benches. The benches should not be made until the fill is ready to be placed. If groundwater seepage is noted on the benches, the Project Geotechnical Engineer should be contacted for underdrainage recommendations before the soils are replaced and compacted.

Table 6-1: Percent compaction and moisture-conditioning recommendations for fill and backfill.

Area	Minimum Percent Compaction[a,b]	Acceptable Moisture Content Range[c]
Structural and Pavement subgrade: ≤ 12 inches below subgrade	98% of SPMDD	0% to +2% of OMC

Notes:

[a] SPMDD = standard Proctor maximum dry density determined from ASTM D698.
[b] OMC = optimum moisture content determined from ASTM D698.
[c] Structural fill and backfill for foundations are defined as fill and backfill located within the zones of influence of structures. The zone of influence of a structure is defined as the area below the footprint of the structure and 2H:1V outward and downward projections from the bearing elevation of the structure.

6.3 Pavement Construction Recommendations

Proposed pavement subgrades should be proofrolled with a loaded tandem-axle dump truck weighing at least 40,000 pounds under the review of the Project Geotechnical Engineer, or representative thereof. Soft or yielding soils observed during the proofroll should be undercut to stiff, non-yielding soils; however, the depth of undercut below subgrade may be limited to 3 feet in light-duty traffic areas and 4 feet in heavy-duty traffic areas. The undercut should be backfilled with new compacted fill satisfying the material and compaction requirements presented in Section 6.2. We recommend that the Contract Documents include an item for undercutting unsuitable soils and replacing them with new compacted and tested fill on a “per cubic yard of compacted replacement fill” basis.

Prior to the placement of pavement or aggregate base, where provided, we recommend that the top 12 inches of clayey subgrade be scarified and recompacted per the requirements presented in Section 6.2.

We recommend that caution be exercised so that the proposed aggregate base does not become saturated during or after construction. Water trapped in the aggregate base is capable of freezing, causing it to expand within the voids it occupies. Consequently, ice lenses may form and potentially heave the pavement. Furthermore, the thawing process can soften underlying cohesive subgrades, which reduces the pavement support provided by the subgrade, giving rise to “pumping” of the pavements under loads. Preferably, the aggregate base should be a free-draining material with provisions for draining the base through a system of underdrains. Regardless, we recommend that transverse underdrains at subgrade elevations be installed at the transitions from existing pavement to new pavement.

Surface drainage should be directed away from the edges of proposed or existing pavements so that water does not pond next to pavements or flow onto pavements from unpaved areas. Such

ponding or flow can cause deterioration of pavement subgrades and premature failure of pavements. If drainage ditches are used to intercept surface water before it reaches the pavements, the ditches should have an invert at least 6 inches below the pavement subgrade, and have a sufficient longitudinal gradient to rapidly drain the ditches and prevent ponding of water. In those areas where exterior grades do not fully slope away from the edges of the proposed pavement, we recommend that edge drains be installed along the perimeter of the pavement.

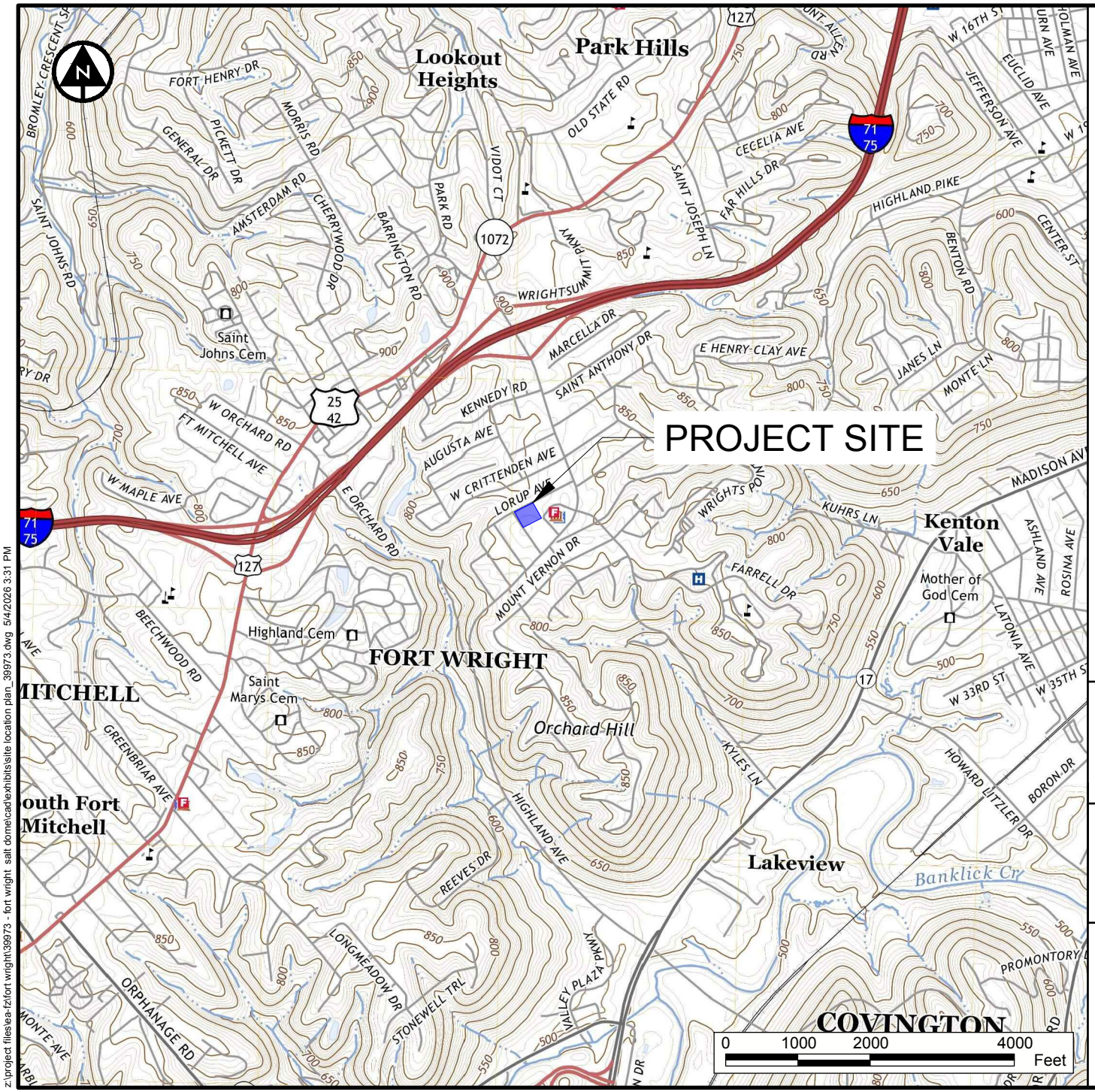
7. QUALIFICATIONS AND LIMITATIONS

The recommendations of this report have been prepared according to generally accepted soil and foundation engineering practice and are based on the conditions encountered explorations performed as part of this investigation at the site. Although soil quality has been inferred from the interpolation of the sampling data, you should explicitly note that subsurface conditions beyond the explorations, in fact, unknown. Should any conditions encountered during construction differ from those described in this report, this office should be notified immediately to review, and possibly modify these recommendations. This report applies solely to the size, type, and location of the structures described herein. If changes are proposed, this report will not be considered valid unless the changes have been reviewed and the recommendations of this report modified and re-approved in writing by Verdantas LLC.

APPENDIX A - Plates

Site Location Plan, Plate 1.0

Boring Location Plan, Plate 2.0



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FORT WRIGHT KENTUCKY
409 KYLES LANE

SITE LOCATION PLAN

FORT WRIGHT SALT DOME

Project Number	39973
Date	5/4/2026
Author	ASD
Scale	1:2000
Plate	1.0

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Produced Using Autodesk's Civil 3D Software

BORING LOCATIONS

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FORT WRIGHT, KENTON COUNTY KENTUCKY
409 KYLES LANE

EXPLORATION PLAN

FORT WRIGHT SALT DOME

Project Number	39773
Date	05/04/2026
Author	ASD
Scale	1:20
Plate	2.0

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Produced Using Autodesk's Civil 3D Software

APPENDIX B – Boring Information

Log of Borings

Legend key

BORING NUMBER B-1

verdantas
Verdantas LLC
4420 Cooper Road
Cincinnati, Ohio 45242

CLIENT City of Fort Wright
PROJECT NAME Fort Wright Salt Dome
PROJECT NUMBER 39973
PROJECT LOCATION Fort Wright, KY
DRILLING CONTRACTOR UES JB
RIG NO. TD-2
GROUND ELEVATION 873.1 ft
DRILLING METHOD 3-1/4 in. HSA
GROUND WATER LEVELS:
DATE STARTED 3/20/26
COMPLETED 3/20/26
AT TIME OF DRILLING None
LOGGED BY AD
CHECKED BY AD
AT END OF DRILLING None
NOTES Split spoon refusal encountered at 25.7 feet.
0hrs AFTER DRILLING Backfilled w/Cuttings

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UNCONF. COMP. STR. (tsf)	DRY UNIT WT. (pcf)	PL MC LL / SPT N VALUE
	0		FILL - Moist Soft Brown Sandy LEAN CLAY with Trace Organics and Occasional Construction Debris	SS 1	67	2-2-2 (4)	1.25		22
870			@2.5': w/Trace Iron Oxide Stain Seam	SS 2	89	2-2-2 (4)	2.00		19
	5		5.0' FILL - Moist Medium Stiff Brown LEAN CLAY w/Sand, Trace Gravel, and Iron Oxide Stain Seam	SS 3	78	4-4-4 (8)	3.00 1.75		21 19
865			@5.5': Gray/Brown, w/Trace Manganese Oxide and Brick Fragments 7.5' GLACIAL - Moist Medium Stiff Mottled Brown and Gray LEAN CLAY w/Sand and Trace Organics (CL)	SS 4	67	2-2-3 (5)	1.00		29
	10			SS 5	89	2-2-4 (6)	1.00		24
860			@12.5': w/Trace Sand	ST 6	67		1.47	103	19
	15								
855									
	20		20.0' RESIDUUM - Moist Very Stiff Brown LEAN CLAY w/Sand and Trace Limestone Fragments (CL)	ST 7	58		3.00	99	23
850									
	25		25.0' Moist Extremely Weak Olive Brown HIGHLY WEATHERED SHALE and Gray Medium Strong to Storng LIMESTONE (bedrock)	SS 8	100	38-50/2"			10 >>
			25.7' Bottom of hole at 25.7 feet.						

BORING NUMBER B-2

verdantas
Verdantas LLC
4420 Cooper Road
Cincinnati, Ohio 45242

CLIENT City of Fort Wright
PROJECT NAME Fort Wright Salt Dome
PROJECT NUMBER 39973
PROJECT LOCATION Fort Wright, KY
DRILLING CONTRACTOR UES JB
RIG NO. TD-2
GROUND ELEVATION 870.9 ft
DRILLING METHOD 3-1/4 in. HSA
GROUND WATER LEVELS:
DATE STARTED 3/20/26
COMPLETED 3/20/26
AT TIME OF DRILLING None
LOGGED BY AD
CHECKED BY AD
AT END OF DRILLING None
NOTES Split spoon refusal encountered at 20.8 feet.
0hrs AFTER DRILLING Backfilled w/Cuttings

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UNCONF. COMP. STR. (tsf)	DRY UNIT WT. (pcf)	PL MC LL / SPT N VALUE
870	0		FILL - Moist Very Loose Brown POORLY GRADED SAND w/Trace Gravel and Silt	SS 1	83	2-1-2 (3)	NP 0.75		23
			0.5' FILL - Moist Soft Gray/Brown LEAN CLAY w/Sand, Trace Gravel, and Calcite Stain Seam @2.5': Brown/Gray, w/Trace Iron Oxide Stain Seam	SS 2	100	2-1-3 (4)	0.25		26
	5		5.0'						
865			FILL - Moist Medium Stiff Brown/Gray LEAN CLAY w/Sand	SS 3	17	3-6-7 (13)	NI		14
				SS 4	89	2-5-8 (13)	0.75		25
	10		10.0'						
860			GLACIAL - Moist Medium Stiff Brown/Gray LEAN CLAY w/Trace Sand (CL)	ST 5	50		0.83	98	24
			12.5' GLACIAL - Moist Soft Brown LEAN CLAY w/Sand (CL)	SS 6	100	2-2-2 (4)	0.50		32
	15		15.0'						
855			RESIDUUM - Moist Very Stiff Gray LEAN CLAY w/Sand and Limestone Fragments (CL)	SS 7	22	7-7-11 (18)	NI		17
	20		20.0'						
			Moist Extremely Weak Olive Brown HIGHLY WEATHERED SHALE and Gray Medium Strong to Storng LIMESTONE (bedrock)	SS 8	33	22-50/3"			8 >>
			20.8' Bottom of hole at 20.8 feet.						

BORING NUMBER B-3

verdantas
Verdantas LLC
4420 Cooper Road
Cincinnati, Ohio 45242

CLIENT City of Fort Wright
PROJECT NAME Fort Wright Salt Dome
PROJECT NUMBER 39973
PROJECT LOCATION Fort Wright, KY
DRILLING CONTRACTOR UES JB
RIG NO. TD-2
GROUND ELEVATION 870.9 ft
DRILLING METHOD 3-1/4 in. HSA
GROUND WATER LEVELS:
DATE STARTED 3/20/26
COMPLETED 3/20/26
AT TIME OF DRILLING None
LOGGED BY AD
CHECKED BY AD
AT END OF DRILLING None
NOTES
0hrs AFTER DRILLING Backfilled w/Cuttings

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UNCONF. COMP. STR. (tsf)	DRY UNIT WT. (pcf)	PL MC LL / SPT N VALUE
870	0		FILL - Moist Soft Gray/Brown LEAN CLAY w/Sand	SS 1	78	1-2-2 (4)	2.25		22
			@2.5': Brown/Gray, w/Trace Gravel, and Organics	SS 2	67	2-2-2 (4)	0.50		24
	5		5.0'						
865			FILL - Moist Medium Stiff Brown/Gray LEAN CLAY w/Trace Sand	SS 3	89	2-2-4 (6)	1.00		26
			@7.5': Gray/Brown	ST 4	63		1.44	106	18
	10								
860			12.5'						
			RESIDUUM - Moist Very Stiff Brown LEAN CLAY w/Sand, Trace Limestone Fragments, Iron Oxide Stain Seam, and Calcite Stain Seam (CL)	SS 5	89	7-7-9 (16)	>4.5		17
	15		15.0'						
855			Moist Extremely Weak Olive Brown HIGHLY WEATHERED SHALE and Gray Medium Strong to Storng LIMESTONE (bedrock)	SS 6	67	25-27-12 (39)			15
			16.5'						
			Bottom of hole at 16.5 feet.						

LEGEND KEY

Unified Soil Classification System Soil Symbols


GW - WELL GRADED GRAVEL Includes Gravel-Sand mixtures, little or no fines.


GP - POORLY GRADED GRAVEL Includes Gravel-Sand mixtures, little or no fines.


GM - SILTY GRAVEL Includes Gravel-Sand-Silt mixtures.


GC - CLAYEY GRAVEL Includes Gravel-Sand-Clay mixtures.


SW - WELL GRADED SAND Includes Gravelly Sands, little or no fines.


SP - POORLY GRADED SAND Includes Gravelly Sands, little or no fines.


SM - SILTY SAND Includes Sand-Silt mixtures.


SC - CLAYEY SAND Includes Sand-Clay mixtures.


ML - SILT Includes Silt with Sand and Sandy Silt.


CL - LEAN CLAY Includes Sandy Lean Clay and Lean Clay with Sand and Gravel.


MH - ELASTIC SILT Includes Sandy Elastic Silt and Elastic Silt with Sand.


CH - FAT CLAY Includes Sandy Fat Clay and Fat Clay with Sand.


CL-ML - SILTY CLAY Includes Clayey Silt of low plasticity.


OL - ORGANIC SILT and ORGANIC CLAY of low plasticity.


OH - ORGANIC SILT and ORGANIC CLAY of medium to high plasticity.


Pt - PEAT Includes humus, swamp and other soils with high organic content.


FILL MATERIAL - Includes controlled and non-controlled soil and non-soil materials.


TOPSOIL


ASPHALT - Bituminous Asphalt


CONCRETE - Includes broken concrete rubble.

Sample Symbols


SS - Split Spoon


ST - Shelby Tube


RC - Rock Core


GS - Geoprobe Sleeve


AU - Auger Cuttings


GB - Grab

Notes:

1. These logs are subject to the limitations, conclusions, and preliminary recommendations in the report and should not be interpreted separate from the report.

2. The borings were located in the field by Verdantas in accordance with the proposed boring plan by a Verdantas survey crew.

3. Unconfined Compressive Strength:
   NP = Non-Plastic
   NR = No Recovery
   NI = Not Intact

APPENDIX C – Laboratory Test Data

Tabulation of Laboratory Tests

Particle-Size Analysis Test Forms

Soil Unconfined Compressive Strength Test Forms

Project: Fort Wright Salt Dome **Project No. : 39973**

verdantas

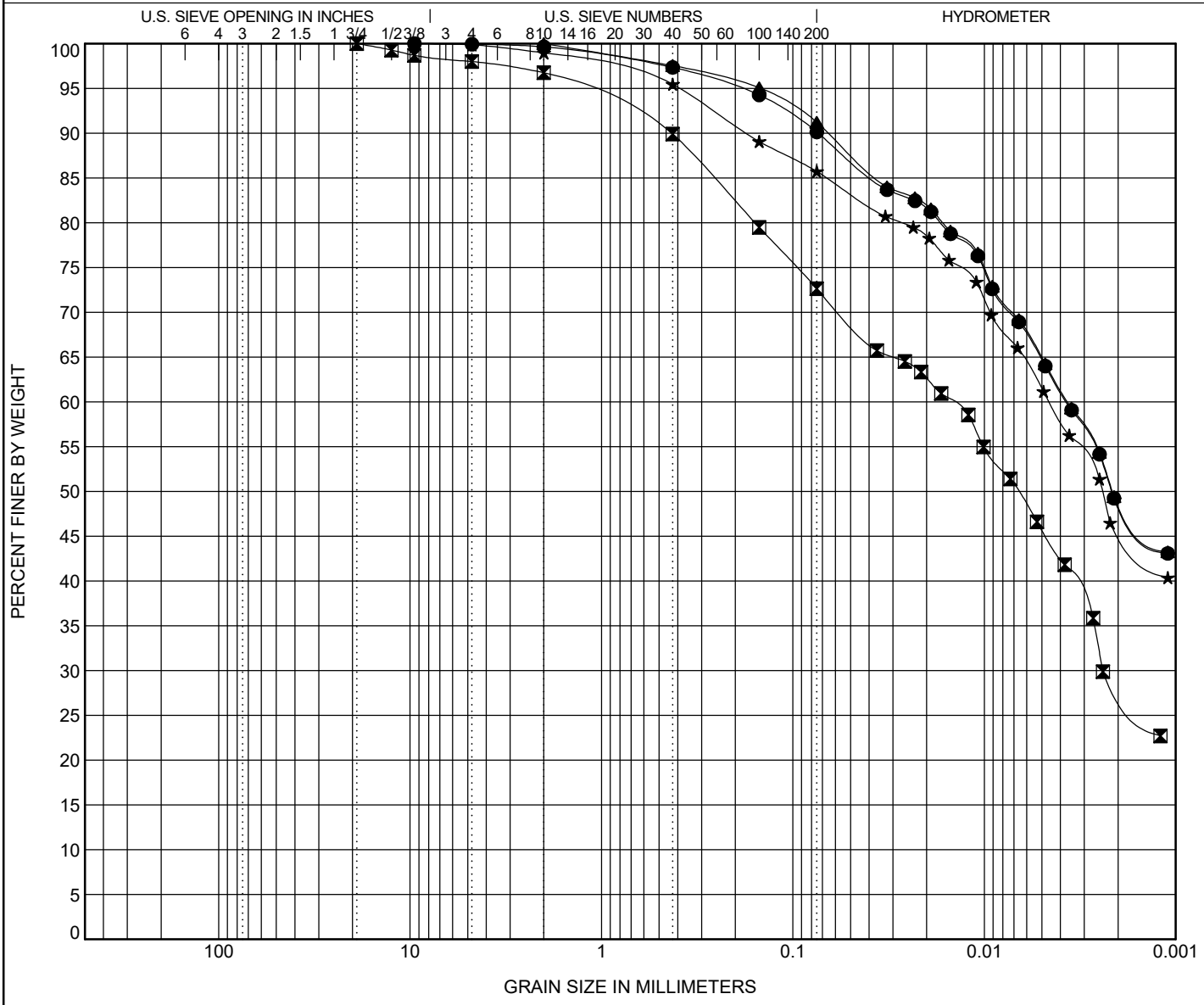
Boring No.	Sample No.	Sample Interval	Moisture Content (%)	Dry Unit Weight (pcf)	Atterberg Limits (%)			Gradation Analysis (%)						USCS Classification	Unconfined Compressive Strength (psf)	Consolidation			
					LL	PL	PI	Gravel	C. Sand	M. Sand	F. Sand	Silt	Clay			p_c (tsf)	C_c	C_r	c_v (ft.^{2}/day)
B-1	SS-1	0.0 - 1.5	21.7																
	SS-2	2.5 - 4.0	18.5																
	SS-3A	5.0 - 6.0	21.5																
	SS-3B	6.0 - 6.5	19.5																
	SS-4	7.5 - 9.0	29.2																
	SS-5	10.0 - 11.5	23.9																
	ST-6	12.5 - 14.5	19.2	102.8	36	21	15	0.0	0.0	2.0	7.0	26.0	65.0	CL	2,945				
	ST-7	20.0 - 22.0	23.0	99.4	41	23	18	2.0	1.0	7.0	17.0	27.0	46.0	CL		3.2	0.161	0.03	0.07
	SS-8	25.0 - 25.7	9.7																
B-2	SS-1B	1.0 - 1.5	22.6																
	SS-2	2.5 - 4.0	25.9																
	SS-3	5.0 - 6.5	14.3																
	SS-4	7.5 - 9.0	25.3																
	ST-5	10.0 - 12.0	24.3	98.2	35	23	12	0.0	0.0	2.0	6.0	26.0	65.0	CL	1,666				
	SS-6	12.5 - 14.0	31.7																
	SS-7	15.0 - 16.5	16.7																
	SS-8	20.0 - 20.8	8.3																
B-3	SS-1	0.0 - 1.5	22.4																
	SS-2	2.5 - 4.0	24.4																
	SS-3	5.0 - 6.5	25.6																
	ST-4	7.5 - 9.5	17.9	106.3	30	19	11	0.0	1.0	4.0	10.0	24.0	61.0	CL	2,888				
	SS-5	12.5 - 14.0	17.4																
	SS-6	15.0 - 16.5	15.4																

GRAIN SIZE DISTRIBUTION

Verdantas LLC
4420 Cooper Road
Cincinnati, Ohio 45242

CLIENT City of Fort Wright **PROJECT NAME** Fort Wright Salt Dome

PROJECT NUMBER 39973 **PROJECT LOCATION** Fort Wright, KY



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

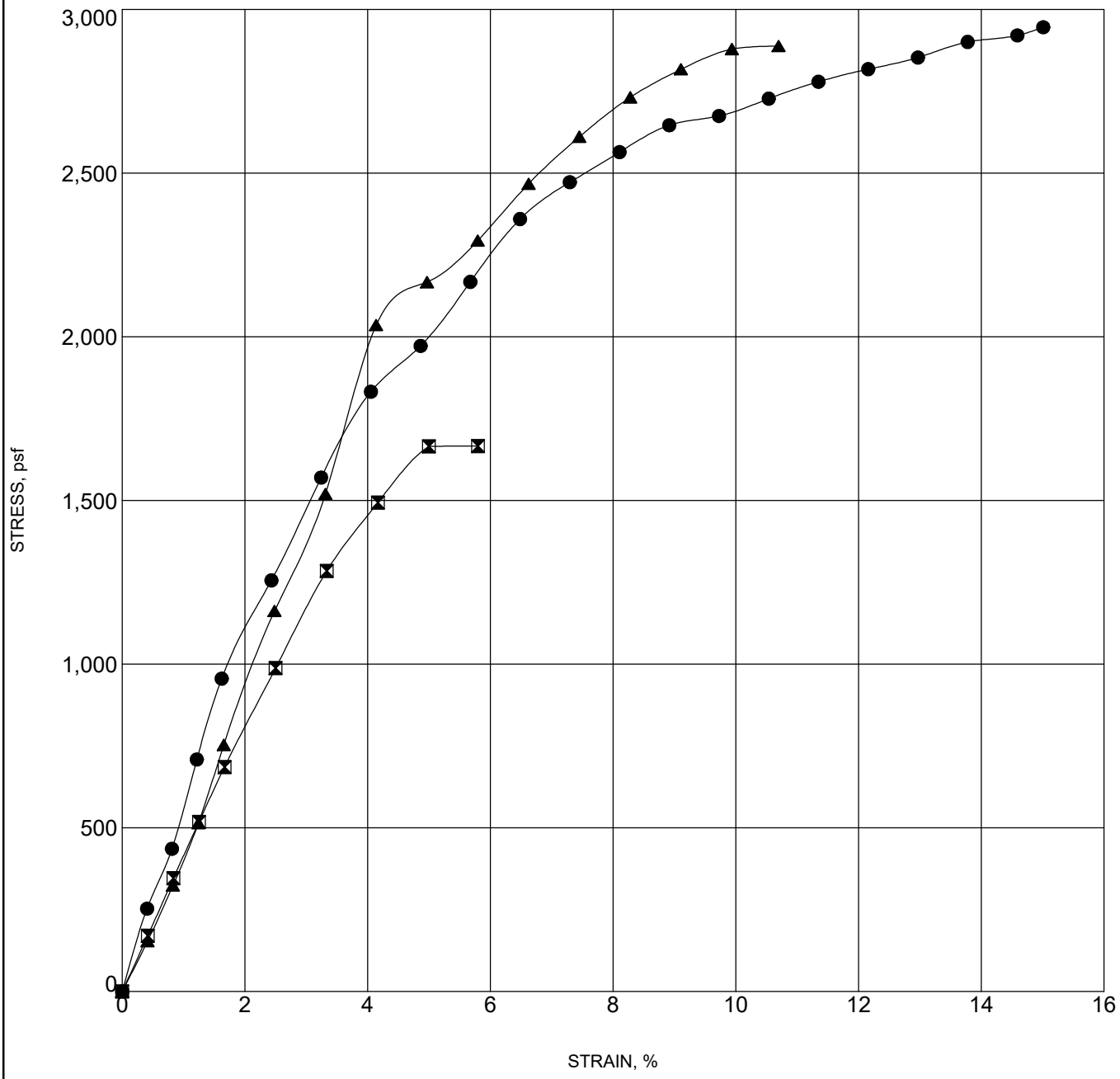
	Specimen Identification		USCS Classification	LL	PL	PI	Cc	Cu
●	B-1	12.5	LEAN CLAY (CL)	36	21	15		
⊠	B-1	20.0	LEAN CLAY with SAND (CL)	41	23	18		
▲	B-2	10.0	LEAN CLAY (CL)	35	23	12		
★	B-3	7.5	LEAN CLAY (CL)	30	19	11		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-1	12.5	9.5	0.004			0.1	9.8	25.5	64.6
⊠	B-1	20.0	19	0.015	0.002		2.0	25.4	26.9	45.8
▲	B-2	10.0	2	0.004			0.0	8.8	26.3	64.9
★	B-3	7.5	9.5	0.005			0.1	14.2	24.2	61.5

UNCONFINED COMPRESSION TEST

Verdantas LLC
4420 Cooper Road
Cincinnati, Ohio 45242

CLIENT City of Fort Wright
PROJECT NAME Fort Wright Salt Dome
PROJECT NUMBER 39973
PROJECT LOCATION Fort Wright, KY



Specimen Identification			Classification	γ_d	MC%
●	B-1	12.5	LEAN CLAY (CL)	103	19
⊠	B-2	10.0	LEAN CLAY (CL)	98	24
▲	B-3	7.5	LEAN CLAY (CL)	106	18

Project No.: 1733601
Date: 3/29/2026
Client: City of Fort Wright
Project: Fort Wright Salt Dome
Fort Wright, KY
Boring No.: B-1
Sample No.: ST-7
Depth: 20.0 - 22.0'

Initial H= 1 inches

Pressure tsf	Final Height (in)	Initial Height (in)	DH	Average H (in)	e	t50 (min)	Ave P (tsf)	Cv (in2/s)	Cv (ft2/d)
0.25	0.99720	1.00000	0.00280	0.9986	0.673	1.5	0.125	0.000541	0.324
0.5	0.99240	0.99720	0.00760	0.9948	0.665	1.2	0.375	0.000659	0.396
1	0.98155	0.99240	0.01845	0.9870	0.647	1.6	0.75	0.000502	0.301
2	0.96610	0.98155	0.03390	0.9738	0.621	3.6	1.5	0.000215	0.129
4	0.95270	0.96610	0.04730	0.9594	0.598	5.9	3	0.000128	0.077
8	0.93240	0.95270	0.06760	0.9426	0.564	6.0	6	0.000122	0.073
16	0.90350	0.93240	0.09650	0.9180	0.516	6.4	12	0.000108	0.065
4	0.91190	0.90350	0.08810	0.9077	0.530		10		
1	0.92525	0.91190	0.07475	0.9186	0.552		2.5		
0.25	0.93540	0.92525	0.06460	0.9303	0.569		0.625		

Estimated Cc: 0.161
Estimated Cr: 0.030

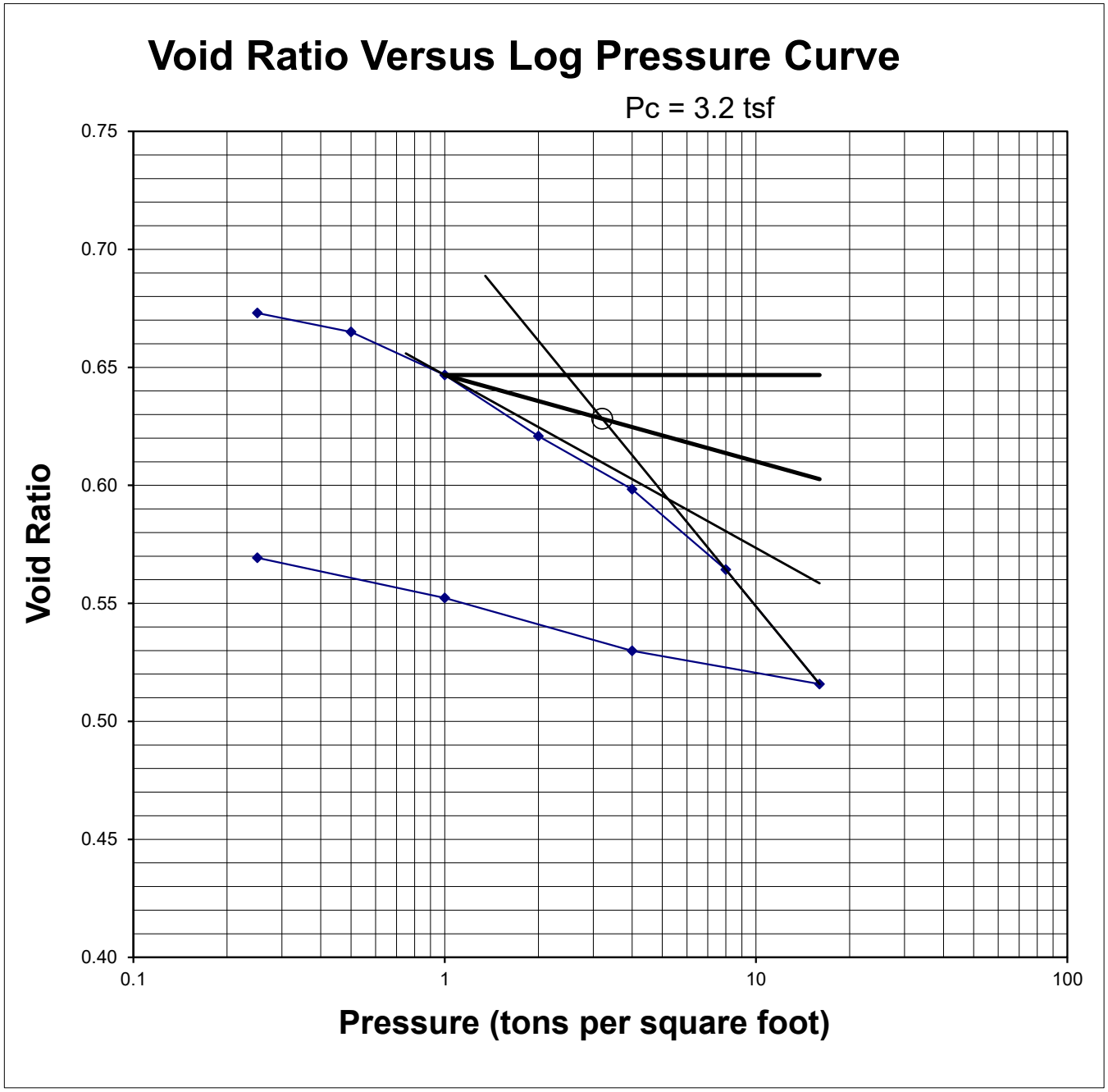
Soil Description: Brown LEAN CLAY w/Sand and Trace Gravel (CL)
Specific Gravity: 2.672
Liquid Limit: 41
Plastic Limit: 23
Plasticity Index: 18

Initial Water Content:	23.7	%	Final Water Content:	23.7	%
Inital Dry Density:	99.4	pcf	Final Dry Density:	106.3	pcf
Initial Void Ratio:	0.678		Final Void Ratio:	0.569	
Initial Degree of Saturation:	93.5	%	Final Degree of Saturation	111.3	%

Estimated Preconsolidation Pressure: 3.2 tsf

The sample for the test was trimmed from a Shelby tube sample using a cutting shoe. Test Method B was used with the specimen inundated during testing. Coefficients of consolidation were computed by log of time method.

Project No.: 1733601
Date: 3/29/2026
Client: City of Fort Wright
Project: Fort Wright Salt Dome
Fort Wright, KY
Boring No.: B-1
Sample No.: ST-7
Depth: 20.0 - 22.0'



SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction/work by Owner.
4. Contractor's use of site and premises.
5. Coordination with occupants.
6. Work restrictions.
7. Specification and Drawing conventions.

B. Related Requirements:

1. Section 011100 "Scope of Work" for delineation of Contractor’s responsibilities and project requirements.
2. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Identification: Fort Wright Salt Dome.

1. Project Location: 409 Kyles Lane, Fort Wright, Kentucky 41011.

B. Owner: City of Fort Wright, 409 Kyles Lane, Fort Wright, Kentucky 41011.

1. Owner's Representative: Jeff Bethell, Public Works Director. Phone 859-426-3106.

C. Architect/Engineer: Verdantas Inc., 300 Buttermilk Pike, Suite 332, Fort Mitchell, Kentucky 41017.

1. Engineer's Representative: Marty Hellmann, Senior Project Manager/City Engineer. Phone 859-534-9934. Email Address: mhellmann@verdantas.com.

D. Web-Based Project Software: Project software may be used for purposes of managing communication and documents during the construction stage.

1. See Section 013100 "Project Management and Coordination." for requirements for using web-based Project software.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:

1. The Work of the Project is defined by the Contract Documents for providing a new salt storage facility consisting of concrete walls, wood framed geodesic roof structure with asphalt shingles, and an overhead coiling door. There will also be minimal sitework and final grading, as well as extending an electric service to the new facility for security lighting and convenience outlets. Refer to Section 011100 "Scope of Work" for additional information on the project specifics and the method of project delivery.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.5 PHASED CONSTRUCTION/WORK BY OWNER

A. The Owner has approved a preliminary site work package to prepare the site for the construction of the new salt storage facility, and will include initial grading, storm sewer improvements, and the asphalt pad for the building.

B. Owner reserves the right to have preceding, concurrent, or subsequent work performed under separate contract(s) for construction operations at Project site. Those operations may be conducted prior to, simultaneously, or after Substantial Completion, with Work under this Contract.

1. If necessary, cooperate fully with Owner's separate contractors, so work on those contracts may be carried out smoothly, without interfering with or delaying Work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under Owner's separate contracts.

1.6 CONTRACTOR'S USE OF SITE AND PREMISES

A. Restricted Use of Site: Contractor shall have limited use of Project site for construction operations. Limit use of Project site to Work in areas indicated, so as not to impact the Owner’s daily operations. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.

    a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
    b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
    c. Streets, walks, and pavements shall be kept clean and swept at all times.

B. Condition of Existing Building: Maintain portions of existing buildings affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

C. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.7 COORDINATION WITH OCCUPANTS

A. Partial Owner Occupancy: Owner and/or the Public may occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations.

1. Maintain access to existing facilities. Do not close or obstruct drives, walkways, loading areas, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

1.8 WORK RESTRICTIONS

A. Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work to between 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction.

1. Weekend and Early Morning Hours: Obtain permission from Owner to work at these times if it becomes necessary.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:

1. Notify Architect/Owner not less than three days in advance of proposed utility interruptions.
2. Obtain Architect's/Owner's written permission before proceeding with utility interruptions.

D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.

1. Notify Architect/Owner not less than three days in advance of proposed disruptive operations.
2. Obtain Architect's/Owner's written permission before proceeding with disruptive operations.

E. Controlled Substance Restrictions: Use of illegal drugs, alcoholic beverages, and other controlled substances on Owner's property is not permitted.

F. Smoking Restrictions: Use of tobacco products on site is not permitted.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.

C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

D. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings and published as part of the U.S. National CAD Standard.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 011100 – SCOPE OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

B. THIS SCOPE OF WORK DOCUMENT AND THE DRAWINGS PROVIDED ARE INTENDED TO BE CRITERIA DOCUMENTS TO SHOW THE GENERAL INTENT OF THE PROJECT. EXCEPT FOR THE CIVIL DRAWINGS, WHICH ARE CONSIDERED CONSTRUCTION DOCUMENTS, THE BASIS OF DESIGN INFORMATION PROVIDED IS FOR INFORMATIONAL PURPOSES, AND THE CONTRACTOR SHALL PROVIDE THEIR OWN DESIGN, DRAWINGS, AND SPECIFICATIONS SPECIFIC TO THE PRODUCT THEY INTEND TO PROVIDE.

1.2 SCOPE OF WORK

A. The work described herein shall consist of furnishing and constructing a dome style salt storage building, complete as specified, for the purpose of storing 500 tons of salt. The scope includes furnishing a pre-engineered design for the construction of a 42' diameter dome-shaped salt storage building on a 10' tall concrete base wall.

1. Salt storage building shall be erected on an asphalt pad that will be provided under a separate contract prior to the start of work for this portion of the project.

1.3 PROJECT APPROACH AND DELIVERY

A. The building and all related materials shall be furnished and installed by the Contractor at the site, per the approved Construction Documents. The Contractor shall be responsible for unloading and storage of all materials, as well as making minor adjustments necessary in the foundation wall to accomplish a vertical building axis and level horizontal foundation lines.

B. Contractor shall be responsible for all code required testing and special inspections for earthwork and concrete.

C. Salt Storage Building Basis of Design: Bulk Storage, Inc., 28101 South Yates Avenue, Beecher, Illinois 60401. Contact Zack Deery at 708-946-9595 or zack@bulkstorageinc.com.

D. Drawings provided with the Bidding Documents are intended to show the general size, location, and construction of the storage building; however, the Contractor shall provide

a complete, code-compliant, turn-key solution by engaging with the basis of design building supplier, or a comparable building supplier, that will be responsible for the project in its entirety, including the following:

1. Provide complete engineered drawings, including analysis data, signed and sealed by the qualified professional engineer responsible for their preparation.
2. Contractor shall submit for, and obtain, the building permits required for the construction of the salt storage building.
3. The Contractor shall furnish all labor, material, equipment, and supervision for the complete construction of the dome style salt storage building.
4. Contractor shall provide a one-year guarantee on materials and workmanship, as well as a five-year guarantee of the roof. Roof guarantee shall include labor and materials.

1.4 DESIGN AND MATERIALS; GENERAL

A. Building Configuration:

1. Profile of the building must provide a minimum perimeter interior height of 10’-0” as measured from the inside of the concrete ring wall.
2. The rated capacity (based on 80 pcf at 33 degrees angle of repose) shall be a minimum of 500 tons.
3. Minimum radius dimension shall be 22’-0”. Overall highest point outside shall be 28' - 6".
4. Top area of domed roof structure must be “walkable”.
5. Minimum doorway size shall be 16’-0” high by 15’-0” wide. Install overhead coiling door per specifications.
6. Minimum usable floor area shall be 1,400 square feet.

B. Foundation:

1. Asphalt pad shall be provided by Owner under a separate contract prior to beginning this scope of work on site.

C. Base Wall (Tension Ring - Cast in Place):

1. Reinforced concrete wall shall be 12" thick minimum and 10' high. Provide 4” brick ledge as indicated for installation of brick veneer.
2. Reinforcing steel shall be epoxy coated deformed bars conforming to ASTM-AG 1572 grade 60.
3. Grade Beam shall be excavated to minimum of 42” below grade.
4. Anchor bolts shall be hot dipped galvanized conforming to ASTM A307 yield strength Fy = 36 KSI.
5. Concrete mix shall be per ASTM C150-74 or per local code. Minimum 28 day compressive strength of 4,000 psi. Concrete shall be air entrained 4 to 7% by volume. Grade beam mix shall be 3000 psi concrete, no air entrainment.

6. The interior walls shall be coated with a silane solution that is 40% by weight isobutyltrilkoxy silane in ethyl alcohol.

D. Pre-Fabricated Dome Structure:

1. The building shall be designed to meet a roof load of 25 psf (based on 25# ground snow load), and a wind load of 105 m.p.h.
2. The building shall be dome shaped with a clear span of 42' with no internal support.
3. The building shall be constructed of pre-engineered manufactured triangular panels. Panel frames shall be made of SPF #2 or better kiln dried to 19% moisture content. All panels shall be framed 16"on center and assembled with galvanized nails. Lumber shall conform to PS-20-LATEST.
4. Plywood sheathing shall be 1/2" CDX agency rated, conforming to PS-1-LATEST. Sheathing shall be glued to panel framing and mechanically fastened with 1 1/2", 16 galvanized staples at 6" O.C. Adhesive shall be water resistant and applied as per manufacturer's instructions.
5. Sill plates shall be pentachlorophenol treated pine or equal.
6. Hardware shall be 3/8 x 3 1/2" hot dipped galvanized carriage bolts conforming to ASTM A037. Nails shall be galvanized 16P common nails.
7. Assembly of panels must be done as per manufacturer's drawings. Triangular panels shall be bolted, glued between edges with construction adhesives, and clipped with tension clips on all common vertical edges.
8. Contractor shall frame door canopies and dormer on site with material similar to Dome panels. Door canopies shall be gambrel style with a minimum 5/12 pitch.

E. Roofing:

1. Shingles shall be self sealing tab asphalt shingles with organic or fiberglass mat and carry a 40-year manufacturer's prorated warrantee. Underlayment shall be a non-perforated 15# asphalt saturated felt conforming to ASTM D-226-68. All roofing shall be installed with large treated galvanized roofing nails as per shingle manufacturer specifications. Color selected by Owner from manufacturer's full range.
2. Flashing shall be installed where called for on Drawings and shall be 24 gauge painted aluminum.
3. Contractor shall install at edges of overhangs 24-gauge aluminum drip flashing.
4. Roofing shall be installed in strict accordance with shingle manufacturer instructions. Contractor shall apply roofing felt and shingles on the ground before panels are lifted into place. Contractor will follow building manufacturer recommendation for overlaps and seams to prevent leakage.
5. Contractor shall install gravity roof ventilators in top of building to provide net free area of 1/600th of net floor area. Roof vents shall be plastic or aluminum.

F. Finishes:

1. Contractor shall supply all labor and material to stain all exposed exterior wood surfaces. Surfaces to be stained shall be free of all dust and dirt and must be

completely dry. Stain shall be applied according to manufacturer's recommendations.

2. The stain shall be commercial grade solid color stain; Contractor shall apply 2 coats of stain.
3. Brick veneer shall be applied over concrete wall from 8" below finish grade to top of wall.
4. Fiber-cement siding and trim to be utilized at the opening of the building (the doghouse).
5. Colors to be selected by Owner from manufacturer's full range of options.

G. Electrical:

1. All work shall meet the National Electrical Code.
2. The interior of the structure shall be illuminated with three LED light fixtures equally spaced around the upper one-third of the structure. The fixtures shall be industrial moisture-proof types for use of this nature. They shall be installed so as not to be hidden or obstructed by any building construction and aligned to completely illuminate the full interior of the building. The exterior shall be illuminated by one LED wall pack over door.
3. All conduits from the panel board to and including the interior of the structure shall be Schedule 40, PVC. No conduit shall be less than 1/2 inch.
4. All pull boxes, junction boxes; inside the structure shall be PVC, weatherproof and corrosion resistant. They shall be firmly attached to the walls of the structure. The contractor shall install a flush-mounted switch for controlling interior lights and a 20-amp 120-volt rated receptacle shall be installed on the right side of the entryway just outside the door.
5. The contractor shall install a lockable weatherproof panel board rated 100-amp/120 volt with a main and circuit breakers to control lighting and outlet. The panel board shall be mounted firmly to the exterior of the concrete wall near the entrance.

END OF SECTION 011100

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:

1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer an advantage to Contractor or Owner.

1.3 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use CSI Form 13.1A.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product, fabrication, or installation cannot be provided, if applicable.
b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as

performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects with project names and addresses and names and addresses of Engineers and owners.
h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Engineer will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Engineer's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Engineer does not issue a decision on use of a proposed substitution within time allocated.

1.4 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.5 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:

    a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    b. Substitution request is fully documented and properly submitted.
    c. Requested substitution will not adversely affect Contractor's construction schedule.
    d. Requested substitution has received necessary approvals of authorities having jurisdiction.
    e. Requested substitution is compatible with other portions of the Work.
    f. Requested substitution has been coordinated with other portions of the Work.
    g. Requested substitution provides specified warranty.
    h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Engineer will consider requests for substitution if received within 30 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Engineer.

1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:

    a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities

may include compensation to Engineer for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.

b. Requested substitution does not require extensive revisions to the Contract Documents.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Substitution request is fully documented and properly submitted.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.
j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.3 MINOR CHANGES IN THE WORK

A. Engineer will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Engineer will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Engineer are not instructions either to stop work in progress or to execute the proposed change.
2. Within 10 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.
    d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

e. Quotation Form: Use forms acceptable to the Owner and/or Engineer.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Engineer.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Proposal Request Form: Use form acceptable to Owner and/or Engineer.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Change Proposal Request, Engineer will issue a Change Order for signatures of Owner and Contractor.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Engineer may issue a Construction Change Directive. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:

1. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
2. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:

    a. Items required to be indicated as separate activities in Contractor's construction schedule.

2. Submit the schedule of values to Engineer, at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

    a. Project name and location.
    b. Name of Engineer.
    c. Engineer's project number.
    d. Contractor's name and address.
    e. Date of submittal.

2. Arrange schedule of values consistent with format of AIA Document G703.
3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:

    a. Related Specification Section or Division.
    b. Change Orders (numbers) that affect value.
    c. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

        1) Labor.
        2) Materials.
        3) Equipment.

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.

    a. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.

5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

    a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.

7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

    a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.

9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Engineer and paid for by Owner.

    1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: Submit Application for Payment to Engineer by the 25th of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.

    1. Submit draft copy of Application for Payment seven days prior to due date for review by Engineer.

C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Engineer will return incomplete applications without action.

    1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
    2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
    3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
    4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

E. Retainage: Partial payments to the Contractor for work performed and materials delivered to the site shall be made at 95% of the value of the work until the project is complete.

F. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

G. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Engineer by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

H. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.

I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Products list (preliminary if not final).
5. Submittal schedule (preliminary if not final).
6. List of Contractor's staff assignments.
7. Certificates of insurance and insurance policies.
8. Performance and payment bonds.

J. Application for Payment at Substantial Completion: After Engineer issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

K. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. Contractor's Affidavits and releases for liens and prevailing wages.
5. Consent of Surety to Final Payment.
6. Evidence that claims have been settled.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General coordination procedures.
2. Requests for Information (RFIs).
3. Digital project management procedures.
4. Project meetings.

B. Related Requirements:

1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. BIM: Building Information Modeling

B. RFI: Request from Owner, Engineer, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.

2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

B. Key Personnel Names: Within 7 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list at Project site and keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its own operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.

C. Make adequate provisions to accommodate items scheduled for later installation.

D. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

E. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to

ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

F. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1.6 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Engineer will return RFIs submitted to Engineer by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Engineer.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

C. RFI Forms: On AIA Document G716, or software-generated form with substantially the same content as indicated above, acceptable to Owner.

1. Attachments shall be electronic files in Adobe Acrobat PDF format.

D. Engineer's Action: Engineer will review each RFI, determine action required, and respond. Allow five working days for Engineer's response for each RFI. RFIs received by Engineer after 1:00 p.m. will be considered as received the following working day.

1. The following Contractor-generated RFIs will be returned without action:

a. Requests for approval of submittals.
b. Requests for approval of substitutions.
c. Requests for approval of Contractor's means and methods.
d. Requests for coordination information already indicated in the Contract Documents.
e. Requests for adjustments in the Contract Time or the Contract Sum.
f. Requests for interpretation of Engineer's actions on submittals.
g. Incomplete RFIs or inaccurately prepared RFIs.

2. Engineer's action may include a request for additional information, in which case Engineer's time for response will date from time of receipt of additional information.
3. Engineer's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."

a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Engineer in writing within 5 days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log bi-weekly. Use CSI Log Form 13.2B or Software log with not less than the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Engineer.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Engineer's response was received.

F. On receipt of Engineer's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Engineer within five days if Contractor disagrees with response.

1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

1.7 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Use of Engineer's Digital Data Files: Digital data files of Engineer's BIM model or AutoCAD drawings will be provided by Engineer for Contractor's use during construction.

1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.
2. Engineer makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.

B. Web-Based Project Software: Contractor may use web-based Project software site for purposes of hosting and managing Project communication and documentation until Final Completion.

1. At completion of Project, provide digital archive in format that is readable by common desktop software applications in format acceptable to Engineer. Provide data in locked format to prevent further changes.

C. PDF Document Preparation: Where PDFs are required to be submitted to Engineer, prepare as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.8 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Engineer of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Engineer, within three days of the meeting.

B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Engineer, but no later than 10 days after execution of the Agreement.

1. Conduct the conference to review responsibilities and personnel assignments.
2. Attendees: Authorized representatives of Owner; Engineer and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress, including the following:

    a. Tentative construction schedule.
    b. Critical work sequencing and long-lead items.
    c. Designation of key personnel and their duties.
    d. Lines of communications.
    e. Procedures for processing field decisions and Change Orders.
    f. Procedures for RFIs.
    g. Procedures for testing and inspecting.
    h. Procedures for processing Applications for Payment.
    i. Distribution of the Contract Documents.
    j. Submittal procedures.
    k. Preparation of record documents.
    l. Use of the premises and existing building.
    m. Work restrictions.
    n. Working hours.
    o. Owner's occupancy requirements.
    p. Responsibility for temporary facilities and controls.
    q. Procedures for disruptions and shutdowns.
    r. Parking availability.
    s. Office, work, and storage areas.
    t. Equipment deliveries and priorities.
    u. Security.
    v. Progress cleaning.

4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Engineer and Owner of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

a. Contract Documents.
b. Options.
c. Related RFIs.
d. Related Change Orders.
e. Purchases.
f. Deliveries.
g. Submittals.
h. Possible conflicts.
i. Compatibility requirements.
j. Time schedules.
k. Weather limitations.
l. Compatibility of materials.
m. Acceptability of substrates.
n. Temporary facilities and controls.
o. Space and access limitations.
p. Regulations of authorities having jurisdiction.
q. Testing and inspecting requirements.
r. Installation procedures.
s. Coordination with other work.
t. Required performance results.
u. Protection of adjacent work.
v. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Conduct progress meetings at regular, appropriate intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from

parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

1) Review schedule for next period.

b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Progress cleaning.
10) Quality and work standards.
11) Status of correction of deficient items.
12) Field observations.
13) Status of RFIs.
14) Status of proposal requests.
15) Pending changes.
16) Status of Change Orders.
17) Pending claims and disputes.
18) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's construction schedule.
2. Construction schedule updating reports.
3. Daily construction reports.
4. Material location reports.
5. Site condition reports.
6. Special reports.

B. Related Requirements:

1. Section 013216 “Construction Progress Schedule” for Owner’s supplemental conditions and requirements that apply in addition to the requirements of this section.
2. Section 013300 "Submittal Procedures" for submitting schedules and reports.
3. Section 014000 "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file, where indicated.
2. PDF electronic file.

B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

C. Construction Schedule Updating Reports: Submit with Applications for Payment.

D. Daily Construction Reports: Submit at weekly intervals.

E. Material Location Reports: Submit at weekly intervals.

F. Site Condition Reports: Submit at time of discovery of differing conditions.

G. Special Reports: Submit at time of unusual event.

1.4 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
4. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Engineer's administrative procedures necessary for certification of Substantial Completion.

5. Punch List and Final Completion: Include not more than 15 work days for completion of punch list items and final completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and show how the sequence of the Work is affected.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.

E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and Contract Time.

F. Recovery Schedule: When periodic update indicates the Work is 7 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within 15 days of date established for the Notice to Proceed.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

2.3 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. Approximate count of personnel at Project site.
3. Material deliveries.
4. High and low temperatures and general weather conditions, including presence of rain or snow.
5. Accidents.
6. Meetings and significant decisions.

7. Unusual events (see special reports).
8. Stoppages, delays, shortages, and losses.
9. Orders and requests of authorities having jurisdiction.
10. Services connected and disconnected.
11. Equipment or system tests and startups.
12. Partial completions and occupancies.
13. Substantial Completions authorized.

B. Material Location Reports: At bi-weekly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:

1. Material stored prior to previous report and remaining in storage.
2. Material stored prior to previous report and since removed from storage and installed.
3. Material stored following previous report and remaining in storage.

C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.4 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.

1. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.

2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.

B. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

C. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Requirements:

1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
3. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
4. Section 014000 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
5. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
6. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

C. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Engineer.
4. Name of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.
7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
8. Category and type of submittal.
9. Submittal purpose and description.
10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
11. Drawing number and detail references, as appropriate.
12. Indication of full or partial submittal.
13. Location(s) where product is to be installed, as appropriate.
14. Other necessary identification.
15. Remarks.
16. Signature of transmitter.

B. Options: Identify options requiring selection by Engineer.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Engineer on previous submittals. Indicate by highlighting each submittal or noting on attached separate sheet.

D. PDF Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

1. Submittals for Web-Based Project Software: If applicable, prepare submittals as PDF files, or other format indicated and place on web-based project management system.

1.5 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Email: Prepare submittals as PDF package, and transmit to Engineer by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Engineer.

    a. Engineer will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.

2. Web-Based Project Software: Utilize web-based Project management system. If applicable, prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 10 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 10 working days for review of each resubmittal.

D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Engineer's action stamp.

E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Engineer's action stamp.

1.6 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. Mark each copy of each submittal to show which products and options are applicable.
2. Include the following information, as applicable:

a. Manufacturer's catalog cuts.
b. Manufacturer's product specifications.
c. Standard color charts.
d. Statement of compliance with specified referenced standards.
e. Testing by recognized testing agency.
f. Application of testing agency labels and seals.
g. Availability and delivery time information.

B. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of Engineers and owners, and other information specified.

C. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

1.7 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.

B. Contractor's Approval: Indicate Contractor's approval for each submittal, with indication in web-based Project software if applicable. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. Engineer will not review submittals received from Contractor that do not have Contractor's review and approval.

1.8 ENGINEER'S REVIEW

A. Action Submittals: Engineer will review each submittal, indicate corrections or revisions required, and return it.

1. PDF Submittals: Engineer will indicate, via markup on each submittal, the appropriate action.

2. Submittals by Web-Based Project Software: If applicable, Engineer will indicate, on Project software website, the appropriate action.

B. Informational Submittals: Engineer will review each submittal and will not return it, or will return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Engineer.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Engineer will discard submittals received from sources other than Contractor.

F. Submittals not required by the Contract Documents may be returned by the Engineer without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
4. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

C. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

D. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

E. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

F. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

G. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

H. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 INFORMATIONAL SUBMITTALS

A. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.

6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

B. Reports: Prepare and submit certified written reports and documents as specified.

C. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.6 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.7 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

C. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

1.8 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

    a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with Architect, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
6. Security and protection for samples and for testing and inspecting equipment at Project site.

F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

G. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.9 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Conducted by a qualified testing agency or special inspector as required by authorities having jurisdiction, as indicated in individual Specification Sections and in Statement of Special Inspections included in Contract Documents, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's, reference during normal working hours.

1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.2 USE CHARGES

A. Installation, removal, and use charges for temporary facilities to be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Engineer, testing agencies, and authorities having jurisdiction.

B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.3 INFORMATIONAL SUBMITTALS

A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

B. Implementation and Termination Schedule: Within 15 days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.

C. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.

D. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities

having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

E. Dust-Control Plan: Submit coordination drawing and narrative that indicates the dust-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:

1. Waste-handling procedures.
2. Typical dust-control measures.

F. Noise and Vibration Control Plan: Identify construction activities that may impact the occupancy and use of adjacent existing buildings, whether occupied by others, or occupied by Owner. Include the following:

1. Methods used to meet the goals and requirements of Owner.
2. Concrete cutting method(s) to be used.
3. Location of construction devices on the site.
4. Show compliance with the use and maintenance of quieted construction devices for the duration of the Project.
5. Indicate activities that may disturb building occupants and that are planned to be performed during non-standard working hours as coordinated with Owner.

1.4 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide concrete or galvanized-steel bases for supporting posts.

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service:

1. Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
2. If it becomes necessary, install water service and distribution piping in sizes and pressures adequate for construction.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Electric Power Service:

1. Connect temporary service to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

F. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

H. Telephone Service: Provide construction personnel with cellular phones.

1. In field office, post a list of important telephone numbers.

    a. Police and fire departments.
    b. Ambulance service.
    c. Contractor's home office.
    d. Contractor's emergency after-hours telephone number.
    e. Architect's office.
    f. Owner's office.
    g. Principal subcontractors' field and home offices.

3.4 SUPPORT FACILITIES INSTALLATION

A. Comply with the following:

1. Provide temporary field offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible in accordance with ASTM E136. Comply with NFPA 241.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain, including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

C. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

D. Storage and Staging: Use designated areas of Project site for storage and staging needs.

E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

F. Project Signs: Provide Project signs as required. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs and temporary signs as required to inform public and individuals seeking entrance to Project.

    a. Provide temporary, directional signs for construction personnel and visitors.

2. Maintain and touch up signs, so they are legible at all times.

G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Section 011000 "Summary."

C. Temporary Erosion and Sedimentation Control:

1. Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, in accordance with the requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

a. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
b. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
c. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
d. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

E. Pest Control: If it becomes needed, engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform

extermination and control procedures at regular intervals, so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.

F. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.

G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

H. Temporary Egress: Provide temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.

I. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
2. Supervise torch cutting operations, combustion-type temporary heating units, and similar sources of fire ignition in accordance with requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet

the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications. Submit a comparable product request, if applicable.

1.4 ACTION SUBMITTALS

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
2. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Engineer will notify Contractor of approval or rejection of proposed comparable product request within 10 days of receipt of request, or 5 days of receipt of additional information or documentation, whichever is later.

    a. Form of Approval: As specified in Section 013300 "Submittal Procedures."
    b. Use product specified if Engineer does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Engineer will determine which products shall be used.

B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on a visually accessible but

inconspicuous surface. Include information essential for operation, including the following:

a. Name of product and manufacturer.
b. Model and serial number.
c. Capacity.
d. Speed.
e. Ratings.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and

limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Engineer will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.

a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: …"

2. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, which complies with requirements.

   a. Non-limited list of products is indicated by the phrase: "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following: …"

3. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.

   a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: …"

4. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, which complies with requirements.

   a. Non-limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following: …"

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

   a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.

C. Visual Selection Specification: Where Specifications include the phrase "as selected by Engineer from manufacturer's full range" or similar phrase, select a product that complies with requirements. Engineer will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Engineer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Engineer may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of Engineers and owners, if requested.
5. Samples, if requested.

B. Submittal Requirements: Approval by the Engineer of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.

B. Related Requirements:

1. Section 011000 "Summary" for limits on use of Project site.

1.2 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.3 QUALITY ASSURANCE

A. Land Surveyor or Engineer Qualifications: A professional land surveyor or engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying and layout services of the kind indicated.

B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety. Operational elements include the following:

    a. Primary operational systems and equipment.
    b. Fire separation assemblies.
    c. Air or smoke barriers.
    d. Plumbing piping systems.
    e. Mechanical systems piping and ducts.
    f. Control systems.
    g. Communication systems.
    h. Fire-detection and -alarm systems.
    i. Electrical wiring systems.
    j. Operating systems of special construction.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity that results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:

    a. Water, moisture, or vapor barriers.
    b. Membranes and flashings.
    c. Exterior curtain-wall construction.
    d. Sprayed fire-resistive material.
    e. Equipment supports.
    f. Piping, ductwork, vessels, and equipment.
    g. Noise- and vibration-control elements and systems.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls and floors for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the existing conditions. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a land surveyor or engineer to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.

C. Site Improvements: Locate and layout site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for

mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Identification: Drawings will identify existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces and 90 inches (2300 mm) in unoccupied spaces.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

K. Repair or remove and replace damaged, defective, or nonconforming Work.

1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.6 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 011000 "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
5. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components.

B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final Completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

B. Related Requirements:

1. Section 017300 "Execution" for progress cleaning of Project site.
2. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 ACTION SUBMITTALS

A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

B. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.

5. Submit testing, adjusting, and balancing records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting review for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
6. Advise Owner of changeover in utility services.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.

8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements.
10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Review: Submit a written request for review to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final review and tests. On receipt of request, Engineer will either proceed with review or notify Contractor of unfulfilled requirements. Engineer will prepare the Certificate of Substantial Completion after review or will notify Contractor of items, either on Contractor's list or additional items identified by Engineer, that must be completed or corrected before certificate will be issued.

1. Re-review: Request re-review when the Work identified in previous reviews as incomplete is completed or corrected.
2. Results of completed review will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final review for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion review list of items to be completed or corrected (punch list), endorsed and dated by Engineer. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

B. Review: Submit a written request for final review to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final review and tests. On receipt of request, Architect will either proceed with review or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after review or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Re-review: Request re-review when the Work identified in previous reviews as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order.
2. Organize items applying to each space by major element, including categories for equipment and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Engineer.
    d. Name of Contractor.
    e. Page number.

4. Submit list of incomplete items in one of the following formats:

    a. MS Excel electronic file. Architect will return annotated file.
    b. PDF electronic file. Architect will return annotated file.
    c. Web-based project software upload. Utilize software feature for creating and updating list of incomplete items (punch list).
    d. Paper copies. Architect will return a copy.

1.9 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Engineer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

    1. Submit on digital media acceptable to Architect, by uploading to web-based project software site, or by email to Architect.

E. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting review for certification of Substantial Completion for entire Project or for a designated portion of Project:

    a. Clean Project site and grounds in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
    d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    e. Leave Project clean and ready for occupancy.

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting review for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components

that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory manuals.
2. Emergency manuals.
3. Systems and equipment operation manuals.
4. Systems and equipment maintenance manuals.
5. Product maintenance manuals.

B. Related Requirements:

1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

1.2 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.3 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Engineer will comment on whether content of operation and maintenance submittals is acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operation and maintenance manuals in the following format:

1. Submit on digital media acceptable to Engineer by uploading to web-based project software site, if applicable, or by email to Engineer. Enable reviewer comments on draft submittals.

C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Engineer will comment on whether general scope and content of manual are acceptable.

D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Engineer will return copy with comments.

1. Correct or revise each manual to comply with Engineer's comments. Submit copies of each corrected manual within 15 days of receipt of Engineer's comments and prior to commencing demonstration and training.

E. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.4 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

1.5 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.

2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Engineer.
7. Names and contact information for major consultants to the Engineer that designed the systems contained in the manuals.
8. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.6 EMERGENCY MANUALS

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Gas leak.
3. Water leak.
4. Power failure.
5. Water outage.
6. System, subsystem, or equipment failure.

D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

E. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

1.7 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Operating standards.
3. Operating procedures.
4. Operating logs.
5. Wiring diagrams.
6. Control diagrams.
7. Piped system diagrams.
8. Precautions against improper use.

C. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.

6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.8 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.

C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

    a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.

F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

I. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of maintenance manuals.

1.9 PRODUCT MAINTENANCE MANUALS

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

E. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

B. Related Requirements:

1. Section 017700 "Closeout Procedures" for general closeout procedures.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit copies of record Drawings as follows:

a. Initial Submittal:

1) Submit PDF electronic files of scanned record prints and one set of file prints.
2) Engineer will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

b. Final Submittal:

1) Submit PDF electronic files of scanned record prints and one set of file prints.
2) Print each drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

E. Reports: Submit written reports indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.
c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Locations of concealed internal utilities.
i. Changes made by Change Order or Construction Change Directive.

j. Changes made following Engineer's written orders.
k. Details not on the original Contract Drawings.
l. Field records for variable and concealed conditions.
m. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Engineer. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Annotated PDF electronic file with comment function enabled.
2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Engineer for resolution.
4. Engineer will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.

a. See Section 013300 "Submittal Procedures" for requirements related to use of Engineer's digital data files.
b. Engineer will provide data file layer information. Record markups in separate layers.

C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file with comment function enabled.
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:

a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."

d. Name of Engineer.
e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
3. Note related Change Orders, record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file or scanned PDF electronic file(s) of marked-up paper copy of Specifications.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

B. Format: Submit record Product Data as annotated PDF electronic file or scanned PDF electronic file(s) of marked-up paper copy of Product Data.

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as PDF electronic file or scanned PDF electronic file(s) of marked-up miscellaneous record submittals.

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Engineer's reference during normal working hours.

END OF SECTION 017839

SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Clay face brick.
2. Mortar and grout.
3. Ties and anchors.
4. Miscellaneous masonry accessories.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection:

1. Face brick, in the form of straps of five or more bricks.
2. Colored mortar.

C. Samples for Verification: For each type and color of the following:

1. Face brick, in the form of straps of five or more bricks.
2. Special brick shapes.
3. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.

D. Qualification Data: For testing agency.

E. Material Certificates: For each type and size of the following:

1. Masonry units:

a. Include material test reports substantiating compliance with requirements.
b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.

c. For exposed brick, include test report for efflorescence according to ASTM C 67.

2. Cementitious materials. Include brand, type, and name of manufacturer.
3. Mortar admixtures.
4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
5. Grout mixes. Include description of type and proportions of ingredients.
6. Anchors, ties, and metal accessories.

F. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

G. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.4 QUALITY ASSURANCE

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

C. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

D. Sample Panel: Build sample panel to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build panel for each type of exposed unit masonry construction, in exterior wall, in sizes approximately 60 inches (1500 mm) long by 60 inches (1500 mm) high by full thickness, including face and backup wythes and accessories.

a. Include a sealant-filled joint at least 16 inches (400 mm) long in each mockup.

2. Clean one-half of exposed faces of mockups with masonry cleaner as indicated.

3. Protect accepted mockups from the elements with weather-resistant membrane.
4. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
    a. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.6 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches (600 mm) down both sides of walls and hold cover securely in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

2.2 BRICK

A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Face Brick: Facing brick complying with ASTM C 216.

1. Grade: SW.
2. Type: FBS.
3. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3350 psi (23.10 MPa).
4. Initial Rate of Absorption: Less than 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67.
5. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
6. Size (Actual Dimensions): Modular Brick 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.
7. Application: Use where brick is exposed unless otherwise indicated.
8. Color and Texture: Match existing, adjacent Public Works building; provide face brick matching color range, texture, and size to greatest extent possible.

2.3 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Masonry Cement: ASTM C91/C91M.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Cemex S.A.B. de C.V.
b. Essroc.
c. Holcim (US) Inc.
d. Lafarge North America Inc.
e. Lehigh Hanson; Heidelberg Cement Group.

E. Mortar Cement: ASTM C1329/C1329M.

1. Products: Subject to compliance with requirements, provide the following:

a. Lafarge North America Inc.; Lafarge Mortar Cement.

F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in masonry mortar.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Davis Colors; True Tone Mortar Colors.
b. Euclid Chemical Company (The); an RPM company; Color-Crete Integral Color.
c. Lanxess Corporation; Bayferrox Iron Oxide Pigments.
d. Solomon Colors, Inc.; SGS Mortar Colors.

G. Colored Cement Products: Packaged blend made from portland cement and hydrated lime, masonry cement, or mortar cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.

1. Colored Portland Cement-Lime Mix:

a. Products: Subject to compliance with requirements, provide one of the following:

1) Essroc; Riverton Portland Cement Lime Custom Color.
2) Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.
3) Lafarge North America Inc.; Eaglebond Portland & Lime.

b. Lehigh Hanson; Heidelberg Cement Group; Lehigh Custom Color Portland/Lime Cement.

2. Colored Masonry Cement:

a. Products: Subject to compliance with requirements, provide one of the following:

1) Cemex S.A.B. de C.V.; Richcolor Masonry Cement.
2) Essroc; Brixment-in-Color or Flamingo Color Masonry Cement.
3) Holcim (US) Inc; Rainbow Mortamix Custom Color Masonry Cement.
4) Lafarge North America Inc.; U.S. Cement Custom Color Masonry Cement.
5) Lehigh Hanson; Heidelberg Cement Group; Lehigh Custom Color Masonry Cement.

3. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
4. Pigments shall not exceed 10 percent of portland cement by weight.
5. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.

H. Aggregate for Mortar: ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

I. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

1. Products: Subject to compliance with requirements, provide one of the following

a. BASF Corporation.
b. Euclid Chemical Company (The); an RPM company; Accelguard 80, Accelguard 90, or Accelguard NCA.
c. GCP Applied Technologies Inc.; Morset.

J. Water: Potable.

2.4 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.

1. Hot-Dip Galvanized, Carbon-Steel: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.

B. Corrugated-Metal Ties: Metal strips not less than 7/8 inch wide with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch made from 0.075-inch thick steel sheet, galvanized after fabrication.

2.5 MISCELLANEOUS ANCHORS

A. Anchor Bolts: Headed or L-shaped steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

2.6 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane, or PVC.

B. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

2.7 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Diedrich Technologies, Inc.
    b. EaCo Chem, Inc.
    c. ProSoCo, Inc.

2.8 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. For exterior masonry, use portland cement-lime or mortar cement mortar.
3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated.

1. For masonry below grade or in contact with earth, use Type S.
2. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type S.

D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.

1. Pigments shall not exceed 10 percent of portland cement by weight.

2. Pigments shall not exceed 5 percent of mortar cement by weight.
3. Insert materials and proportions used for sample in first subparagraph below if known.
4. Mix to match existing mortar.
5. Application: Use pigmented mortar for exposed mortar joints with the following units:

    a. Face brick.

E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.

1. Mix to match existing mortar.
2. Application: Use colored aggregate mortar for exposed mortar joints with the following units:

    a. Face brick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
2. Verify that foundations are within tolerances specified.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Thickness: Build masonry construction to full thickness shown.

B. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

C. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

1. Mix units from several pallets or cubes as they are placed.

D. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm) except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).

4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm). Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3 mm).
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch (1.5 mm) from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond for brick, to match existing brick bond pattern; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

C. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

E. Fill space between concrete and masonry solidly with mortar unless otherwise indicated.

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow brick as follows:

1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.6 ANCHORING MASONRY VENEERS

A. Anchor masonry veneers to wall with anchors to comply with the following requirements:

1. Space anchors as indicated, but not more than 16 inches (406 mm) o.c. vertically and 24 inches (610 mm)o.c. horizontally with not less than 1 anchor for each 2.67 sq. ft. (0.25 sq. m) of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 36 inches (914 mm), around perimeter.

3.7 EXPANSION JOINTS

A. General: Install expansion joint materials in unit masonry as masonry progresses.

B. Form expansion joints in brick as follows:

1. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod.

C. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod, but not less than 3/8 inch.

3.8 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20 or with a proprietary acidic cleaner applied according to manufacturer's written instructions.

3.9 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Excess Masonry Waste: Remove excess masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Steel framing and supports for overhead doors.
2. Steel framing and supports for mechanical and electrical equipment.
3. Slotted channel framing.
4. Metal bollards.
5. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.

1.3 COORDINATION

A. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Fasteners.
2. Shrinkage-resisting grout.
3. Slotted channel framing.

B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:

1. Steel framing and supports for overhead doors.
2. Steel framing and supports for mechanical and electrical equipment.
3. Metal bollards.

1.5 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

C. Stainless Steel Sheet, Strip, and Plate: ASTM A240/A240M or ASTM A666, Type 304.

D. Stainless Steel Bars and Shapes: ASTM A276/A276M, Type 304.

E. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.

F. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.

G. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.

1. Size of Channels: 1-5/8 by 1-5/8 inches.
2. Material: Galvanized steel, ASTM A653/A653M, commercial steel, Type B structural steel, Grade 33, with G90 coating; 0.108-inch nominal thickness.

H. Cast Iron: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

I. Aluminum Plate and Sheet: ASTM B209, Alloy 6061-T6.

J. Aluminum Extrusions: ASTM B221, Alloy 6063-T6.

K. Aluminum-Alloy Rolled Tread Plate: ASTM B632/B632M, Alloy 6061-T6.

L. Aluminum Castings: ASTM B26/B26M, Alloy 443.0-F.

2.2 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

1. Provide stainless steel fasteners for fastening aluminum stainless steel or nickel silver.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.

C. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 3, heavy-hex steel structural bolts; ASTM A563, Grade DH3, heavy-hex carbon-steel nuts; and where indicated, flat washers.

D. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, ASTM F593; with hex nuts, ASTM F594; and, where indicated, flat washers; Alloy Group 1.

E. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.

1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

F. Anchors, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.

G. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.

H. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless steel bolts, ASTM F593, and nuts, ASTM F594.

I. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary

filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B633, Class Fe/Zn 5, as needed for fastening to inserts.

2.3 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch

embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.4 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

1. Fabricate units from slotted channel framing where indicated.
2. Furnish inserts for units installed after concrete is placed.

C. Galvanize miscellaneous framing and supports.

2.5 METAL BOLLARDS

A. Fabricate metal bollards from galvanized schedule 40 steel pipe.

2.6 GENERAL FINISH REQUIREMENTS

A. Finish metal fabrications after assembly.

B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.7 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

2.8 ALUMINUM FINISHES

A. As-Fabricated Finish: AA-M12.

B. Clear Anodic Finish: AAMA 611, Class I, AA-M12C22A41.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

1. Cast Aluminum: Heavy coat of bituminous paint.
2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

3.3 INSTALLATION OF METAL BOLLARDS

A. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.

B. Fill bollards solidly with concrete and provide a prefabricated plastic sleeve over bollards.

3.4 REPAIRS

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 055000

SECTION 074646 - FIBER-CEMENT SIDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes fiber-cement siding and soffit.

1.3 COORDINATION

A. Coordinate siding installation with flashings and other adjoining construction to ensure proper sequencing.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Samples for Verification: For each type, color, texture, and pattern required.

1. 12-inch- long-by-actual-width Sample of siding.
2. 12-inch- long-by-actual-width Sample of soffit.
3. 12-inch- long-by-actual-width Samples of trim and accessories.

1.6 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of fiber-cement siding and soffit.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fiber-cement siding.

C. Research/Evaluation Reports: For each type of fiber-cement siding required, from ICC-ES.

D. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of product, including related accessories, to include in maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish full lengths of fiber-cement siding and soffit including related accessories, in a quantity equal to 2 percent of amount installed.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with labels intact until time of use.

B. Store materials on elevated platforms, under cover, and in a dry location.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace products that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including cracking and deforming.
b. Deterioration of materials beyond normal weathering.

2. Warranty Period: No less than 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain products, including related accessories, from single source from single manufacturer.

2.2 FIBER-CEMENT SIDING

A. General: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E 136; with a flame-spread index of 25 or less when tested according to ASTM E 84.

1. Basis-of-Design Product: Subject to compliance with requirements, provide James Hardie Building Products, Inc.; HardiePlank Lap Siding and HardieTrim Boards or a comparable product by one of the following:

a. American Fiber Cement Corporation.
b. CertainTeed Corporation; Saint-Gobain North America.
c. GAF.
d. Nichiha Architectural Panels.

B. Labeling: Provide fiber-cement siding that is tested and labeled according to ASTM C 1186 by a qualified testing agency acceptable to authorities having jurisdiction.

C. Nominal Thickness: Not less than 5/16 inch.

D. Horizontal Pattern: Boards 6-1/4 inches wide for 5 inches of exposure.

1. Texture: Wood grain (Select Cedarmill).

E. Factory Finishing: Manufacturer's standard multi-coat, baked on color finish (ColorPlus).

1. Color: As selected by Owner from manufacturer’s full range.

2.3 FIBER-CEMENT SOFFIT

A. General: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E 136; with a flame-spread index of 25 or less when tested according to ASTM E 84.

1. Basis-of-Design Product: Subject to compliance with requirements, provide James Hardie Building Products, Inc.; HardieSoffit Panels or a comparable product by one of the following:

a. American Fiber Cement Corporation.
b. CertainTeed Corporation; Saint-Gobain North America.
c. GAF.
d. Nichiha Architectural Panels.

B. Nominal Thickness: Not less than 1/4 inch.

C. Pattern: Unless noted otherwise, 24-inch wide sheets with woodgrain texture (Cedarmill).

1. Provide perforated soffit unless otherwise indicated.

D. Factory Finishing: Manufacturer's standard multi-coat, baked on color finish (ColorPlus).

1. Color: As selected by Owner from manufacturer’s full range.

2.4 ACCESSORIES

A. Siding Accessories, General: Provide starter strips, edge trim, outside and inside corner caps, and other items as recommended by siding manufacturer for building configuration.

1. Color: As selected by Owner from manufacturer’s full range.

B. Trim: Provide HardieTrim Boards; 4/4 Rustic, in sizes indicated on Drawings.

1. Factory Finishing: Manufacturer's standard multi-coat, baked on color finish (ColorPlus).

C. Flashing: Provide flashing at door heads and where indicated.

D. Fasteners:

1. For fastening to metal, use ribbed bugle-head screws of sufficient length to penetrate a minimum of 1/4 inch, or three screw-threads, into substrate.
2. For fastening fiber cement, use hot-dip galvanized or stainless-steel fasteners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of fiber-cement siding, soffit, and related accessories.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

3.3 INSTALLATION

A. General: Comply with manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.

1. Do not install damaged components.
2. Install fasteners no more than 24 inches o.c.

B. Install joint sealants as specified in Section 079200 "Joint Sealants" and to produce a weathertight installation.

3.4 ADJUSTING AND CLEANING

A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.

B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION 074646

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Nonstaining silicone joint sealants.
3. Urethane joint sealants.
4. Mildew-resistant joint sealants.
5. Butyl joint sealants.
6. Latex joint sealants.

1.3 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Product Testing: Test joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.5 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.

B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Adfast; Adseal 4580 series.
    b. Dow Corning Corporation; Dow Corning 756 SMS Building Sealant or Dow Corning 795 Silicone Building Sealant.
    c. GE Construction Sealants; Momentive Performance Materials Inc.; Silpruf NB.
    d. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex Sil 295 FPS NB.
    e. Pecora Corporation; Pecora 864NST, Pecora 895NST, or Pecora 898NST.
    f. Sika Corporation; Joint Sealants; Sikasil WS-295.
    g. Tremco Incorporated; Spectrem 2 or Spectrem 3.

2.3 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Adfast; Adseal BR 2600.
    b. Alcot Plastics Ltd.; ALCOT Soft Type Backer Rod or ALCOT Standard Backer Rod.

c. BASF Corporation; MasterSeal 920 & 921(Pre-2014: Sonolastic Backer Rod).
d. Construction Foam Products; a division of Nomaco, Inc.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

2.4 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.
    b. Glass.
    c. Porcelain enamel.
    d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

a. Construction joints in cast-in-place concrete.
b. Control and expansion joints in unit masonry.
c. Joints between fiber-cement panels.
d. Perimeter joints between materials listed above and frames of doors and louvers.

2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200

SECTION 083323 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Service doors.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for miscellaneous steel supports, door-opening framing, corner guards, and bollards.

1.3 ACTION SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory.

1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
5. Show locations of controls, locking devices, and other accessories.
6. Include diagrams for power, signal, and control wiring.

1.4 CLOSEOUT SUBMITTALS

A. Special warranty.

B. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.

1. Obtain operators and controls from overhead coiling-door manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance, Exterior Doors: Capable of withstanding the following design wind loads:

1. Design Wind Load: Uniform pressure (velocity pressure) of 20 lbf/sq. ft., acting inward and outward.
2. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.

2.3 DOOR ASSEMBLY

A. Service Door: Overhead coiling door formed with curtain of interlocking metal slats.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ACME Rolling Doors.
b. Alpine Overhead Doors, Inc.
c. C.H.I. Overhead Doors, Inc.
d. Clopay Building Products.
e. Cookson Company.

f. Cornell.
g. McKeon Rolling Steel Door Company, Inc.
h. Overhead Door Corporation.
i. Raynor.
j. Wayne-Dalton Corp.

B. Operation Cycles: Door components and operators capable of operating for not less than 50,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

C. Door Curtain Material: Aluminum.

D. Door Curtain Slats: Curved or flat profile slats of 1-7/8-inch to 3-1/4-inch center-to-center height.

E. Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch thick; fabricated from aluminum extrusions and finished to match door.

F. Curtain Jamb Guides: Aluminum or stainless steel with exposed finish matching curtain slats.

G. Hood: Match curtain material and finish.

1. Shape: Round or square as standard with manufacturer.
2. Mounting: Face of wall.

H. Manual Door Operator: Chain-hoist operator.

I. Electric Door Operator:

1. Usage Classification: Medium duty, up to 12 cycles per hour and up to 50 cycles per day.
2. Operator Location: Top of hood, front of hood, wall, or bench.
3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 feet or lower.
4. Motor Exposure: Exterior, wet, and humid.
5. Motor Electrical Characteristics:

    a. Horsepower: As required by manufacturer for door provided, but not less than ½ hp.
    b. Voltage: 115-V ac, single phase, 60 Hz.

6. Emergency Manual Operation: Chain type.
7. Obstruction-Detection Device: Automatic photoelectric sensor, electric sensor edge on bottom bar, or pneumatic sensor edge on bottom bar; self-monitoring type.

    a. Sensor Edge Bulb Color: Black.

8. Control Station(s): Exterior mounted.

J. Curtain Accessories: Equip door with weather seals and astragal.

K. Door Finish:

1. Aluminum Finish: Dark bronze anodized.
2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.4 MATERIALS, GENERAL

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.5 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

1. Aluminum Door Curtain Slats: ASTM B209 (ASTM B209M) sheet or ASTM B221 (ASTM B221M) extrusions, alloy and temper standard with manufacturer for type of use and finish indicated; thickness of 0.050 inch; and as required.
2. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with minimum aluminum thickness of 0.032 inch.

B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain, and a continuous bar for holding windlocks.

2.6 HOODS

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.

1. Aluminum: 0.040-inch thick aluminum sheet complying with ASTM B209 (ASTM B209M), of alloy and temper recommended by manufacturer and finisher for type of use and finish indicated.
2. Exterior-Mounted Doors: Fabricate hood to act as weather protection and with a perimeter sealant-joint-bead profile for applying joint sealant.

2.7 LOCKING DEVICES

A. Chain Lock Keeper: Suitable for padlock.

B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

2.8 CURTAIN ACCESSORIES

A. Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire exterior perimeter of door for a weather-resistant installation unless otherwise indicated.

1. At door head, use 1/8-inch thick, replaceable, continuous-sheet baffle secured to inside of hood or field-installed on the header.
2. At door jambs, use replaceable, adjustable, continuous, flexible, 1/8-inch thick seals of flexible vinyl, rubber, or neoprene.

B. Astragal for Doors: Equip each door bottom bar with a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene as a cushion bumper.

2.9 COUNTERBALANCE MECHANISM

A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.

C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.

D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.10 MANUAL DOOR OPERATORS

A. General: Equip door with manual door operator by door manufacturer.

B. Chain-Hoist Operator: Consisting of endless steel hand chain, chain-pocket wheel and guard, and gear-reduction unit with a maximum 30-lbf force for door operation. Provide alloy-steel hand chain with chain holder secured to operator guide.

2.11 ELECTRIC DOOR OPERATORS

A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

1. Comply with NFPA 70.
2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.

B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.

C. Door Operator Location(s): Operator location indicated for each door.

1. Top-of-Hood Mounted: Operator is mounted to the right or left door head plate with the operator on top of the door-hood assembly and connected to the door drive shaft with drive chain and sprockets. Headroom is required for this type of mounting.
2. Front-of-Hood Mounted: Operator is mounted to the right or left door head plate with the operator on coil side of the door-hood assembly and connected to the door drive shaft with drive chain and sprockets. Front clearance is required for this type of mounting.
3. Wall Mounted: Operator is mounted to the inside front wall on the left or right side of door and connected to door drive shaft with drive chain and sprockets. Side room is required for this type of mounting. Wall-mounted operator can also be mounted above or below shaft; if above shaft, headroom is required.
4. Bench Mounted: Operator is mounted to the right or left door head plate and connected to the door drive shaft with drive chain and sprockets. Side room is required for this type of mounting.

D. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated for each door assembly.

1. Electrical Characteristics: Minimum as indicated for each door assembly. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.
2. Operating Controls, Controllers, Disconnect Switches, Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
3. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.

E. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

F. Obstruction-Detection Devices: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. For fire-rated doors, activation delays closing.

1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.

    a. Self-Monitoring Type: Designed to interface with door operator control circuit to detect damage to or disconnection of sensing device. When self-monitoring feature is activated, door closes only with sustained or constant pressure on close button.

2. Electric Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.

    a. Self-Monitoring Type: Four-wire-configured device designed to interface with door operator control circuit to detect damage to or disconnection of sensor edge.

3. Pneumatic Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device.

G. Control Station: Exterior-Mounted units, full-guarded, standard-duty, surface-mounted, weatherproof type, NEMA ICS 6, Type 4 enclosure, key operated.

H. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 30 lbf.

I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

2.12 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.13 ALUMINUM FINISHES

A. Dark Bronze Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.

B. Examine locations of electrical connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

B. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.

C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with the accessibility standard.

D. Power-Operated Doors: Install according to UL 325.

3.3 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. After electrical circuitry has been energized, operate doors to confirm proper motor rotation and door performance.
3. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.

1. Adjust exterior doors and components to be weather resistant.

B. Lubricate bearings and sliding parts as recommended by manufacturer.

C. Adjust seals to provide tight fit around entire perimeter.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 083323