# HARTSVILLE/TROUSDALE COUNTY GOVERNMENT

**328 BROADWAY, RM 6**
**HARTSVILLE, TN 37074**

# REQUEST FOR BIDS

| **PROJECT NAME** |
| --- |
| RFP 2024-001<br>LPRF GRANT 2020 – TREY PARK PLAYGROUND |

DATE: December 30, 2023

**JACK MCCALL, MAYOR**
HARTSVILLE/TROUSDALE COUNTY GOVERNMENT

**CLIFF SALLEE, DIRECTOR**
PUBLIC WORKS DEPARTMENT

**BIDDING AND CONTRACT REQUIREMENTS**



**TECHNICAL SPECIFICATIONS**



**END OF SECTION 000000**

**COVER & GENERAL NOTES**



**EXISTING CONDITIONS & DEMOLITION SHEETS**



**SITE SHEETS**



**GRADING SHEET**



**LANDSCAPE SHEETS**



**END OF SECTION 000115**

## INVITATION TO BID

The Hartsville/Trousdale County Government (HTCG) is accepting separate bids for the following LPRF Grant – Trey Park Playground. Specifications may be obtained by email request to contact@trousdalecountytn.gov or by online submission through www.bidnetdirect.com//hartsvilletrousdalecounty. Bids must be submitted by Tuesday, January 16, 2024, for opening at 4pm in the Mayor's Office. HTCG reserves the right to refuse any and all bids.

**END OF SECTION 001116**

Sealed bids will be received by Hartsville/Trousdale County Mayor's Office, for the furnishing of all materials and supplying of all labor necessary to provide for the LPRF Grant – Trey Park Playground. Copies of the specifications and contract documents may be examined and obtained at the HTC Mayor's Office, located at the Hartsville/Trousdale County Administration Building, 328 Broadway, Hartsville, TN 37074. For further information, contact Mr. Cliff Sallee, Public Works Director, cliff.sallee@trousalecountytn.gov, 615-374-9574.

BIDDING REQUIREMENTS

1) Bid Proposals will be received at the Hartsville/Trousdale County Mayor's Office until Tuesday, January 16, 2024, for opening at 4pm, at which time they shall be publicly opened and read aloud. Bids must be submitted in the format shown below. Bids received after this time and/or bids improperly submitted shall be returned to the bidder unopened. Telegraphic bids will not be accepted.

2) The following information shall be clearly noted on the bid:

| | | |
|---|---|---|
| 1.) | Project Name: | **RFP 2024-001 LPRG: Trey Park Playground** |
| 2.) | Bidder's Name: | |
| 3.) | Business Address: | |
| 4.) | Business Telephone: | |
| 5.) | Contractor's License No. and Classification: | |
| 6.) | License Expiration Date: | |

3) Bidder shall be a business properly licensed by the State of Tennessee.

4) The contractor shall supply proof of insurance prior to commencing work.

5) All bidders must submit their qualifications and list of relevant equipment with their bids. Failure to do so may be cause for the rejection of the bid.

6) Bidder agrees, if awarded the contract to:
   a) Commence work within ten (10) days of the issuance of a Notice to Proceed.
   b) Complete the work in within the agreed upon number of contract days.
   c) Accept the conditions for liquidated damages in the amount of $250 per day.

7) Contract/Project Administration: The Public Works Director, or their designated representative(s), shall serve as the owner's representative. All requests, correspondence and submittals pertaining to this contract shall be addressed, in writing, to the attention of:

Mr. Cliff Sallee, Director
Public Works Department
328 Broadway, Rm 6
Hartsville, TN 37074

8) Hartsville/Trousdale County reserves the following rights: To waive any informalities, to reject any or all bids, and/or to award this contract to the bidder that best meets the needs of the Hartsville/Trousdale County.

9) **NOTE**: The cost of required insurance is not a separate bid item and as such must be included within the bid at an appropriate rate applied to all items.

10) Hartsville/Trousdale County reserves the right to make multiple awards of this contract if it is deemed to be in the best interest of the County.

11) Unless otherwise agreed; successful bidder will be responsible for obtaining **all** necessary permits for completion of work.

12) The performance bond shall be the contract's annual amount for the service chosen by the County.

13) Addenda issued to Contractors prior to deadline shall become part of the Contract Documents, and all bids shall include the work described in the Addenda. No inquiry received within seven (7) days of the date fixed for the submission of bids will be given consideration. Any and all such interpretations and any supplemental instructions will be in the form of written Addenda. It is the Bidder's responsibility to check the website for any Addenda that may be issued.

14) Bidder agrees that prices will be held good for 120 days to allow review of the submittal.

**SPECIFICATIONS**

***GENERAL***

**QUALITY ASSURANCE:**

A) The project is funded by TDEC, and all installations will be required to be approved by TDEC staff before contractor is complete. Special attention will be required for ADA compliance requirements.

B) All procedures shall be performed in accordance with the manufacturer's product specifications and requirements.

C) Contractor shall be responsible for ensuring compatibility of all products.

**SUBMITTALS:**

PART 1 - The contractor shall submit cut sheets as necessary to adequately describe any part of the material that may detail beyond the plans and specifications provided.

**END OF SECTION 0021113**

## BID PROPOSAL SUBMITTAL FORM

| | |
|---|---|
| PROJECT NAME: | **RFP 2024-001 LPRG: Trey Park Playground** |
| BIDDER'S NAME: | |
| TELEPHONE NUMBER: | |
| COMPANY NAME: | |
| COMPANY ADDRESS: | |
| | |
| | |

| | |
|---|---|
| LICENSE NUMBER: | |
| CLASSIFICATION: | |

Bidder agrees: To perform all work described in these Bid Documents. To furnish all necessary materials, labor, tools, and equipment, as specified, to complete the work in accordance with the Standards as set forth by the Hartsville/Trousdale County Parks Department; for the sum listed on the bid form.

Hartsville/Trousdale County may accept partial proposals if contractors are not able to complete every line item in the bid table. Please mark N/A for Total Price for items that are not being proposed.

**Notes:**

## BID PROPOSAL SUBMITTAL FORM - PAGE 2

| PROJECT NAME: LPRF GRANT – TREY PARK PLAYGROUND | | | | |
|---|---|---|---|---|
| **ITEM DESCRIPTION** | **UNIT** | **ESTIMATED QUANTITY** | **UNIT COST** | **TOTAL** |
| MOBILIZATION | LS | 1 | | |
| REMOVAL OF RIGID PAVEMENT, SIDEWALK, ETC. | SF | 650 | | |
| EROSION CONTROL MEASURES | LS | 1 | | |
| EXCAVATE, REDISTRIBUTE, & RECOMPACT SOIL ON SITE | CY | 500 | | |
| LIGHT DUTY CONCRETE (4" DEPTH) | SF | 650 | | |
| MOUNTABLE CONCRETE CURB | LF | 40 | | |
| 1.5" MILL & RESURFACE EXISTING PARKING SPACES | SF | 600 | | |
| ADA PARKING SIGNAGE | EA | 2 | | |
| REMOVAL OF CONCRETE CURB | LF | 40 | | |
| PLASTIC PAVEMENT MARKING (HANDICAP SYMBOL) | EA | 2 | | |
| PAINTED PAVEMENT MARKINGS (4" LINE) | LF | 150 | | |
| WHEEL STOPS | EA | 2 | | |
| GRASS SEED | SF | 7,000 | | |
| | | | | **TOTAL** |
| | | | **PROJECT TOTAL** | **$** |

**Total Bid =** _____

**Total Bid (Written) $** _____ **Dollars and** _____ **Cents**

**Description:** Unit Bids are installed (complete) and should include all improvements.

Print Bidders Name _____

Bidders Signature _____

Title of Above _____

Date: _____

Attest: _____

**TITLE VI COMPLIANCE**

It is the policy of Hartsville/Trousdale County to ensure compliance with Title VI of the Civil Rights Act of 1963; 49 CFR, Part 21; related statutes and regulations to that end that no person shall be excluded from participation in or be denied benefits of or be subjected to discrimination under any program or activity receiving federal financial assistance or any other funding source on the grounds of race, color, sex, national origin, or ancestry. By virtue of submitting a response to this solicitation, bidders agree to comply with the same non-discrimination policy.

For Title VI compliance, we ask for voluntary disclosure of the following information:

| | | |
|---|---|---|
| GENDER: | Male | |
| | Female | |

| | | |
|---|---|---|
| RACE: | Black/African American | |
| | American Indian and Alaskan Native | |
| | Asian | |
| | Caucasian | |
| | Native Hawaiian/other Pacific Islander | |
| | Other (please specify) | |

This information, if provided, must be given to the City who shall maintain records of those ethnic and gender groups who are awarded bids on projects.

**END OF SECTION 004100**

BID BOND

Any singular reference to Bidder, Surety, Owner, or other party shall be considered plural where applicable.

BIDDER (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER: Hartsville/Trousdale County
328 Broadway, Rm 6
Hartsville, Tennessee
37074

BID DUE DATE: Tuesday, January 16, 2024 at 4pm

PROJECT: RFP 2024-001 LPRF: Trey Park Playground

BOND:
Bond Number:
Date (Not later than Bid due date):

Penal sum _____ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

| **BIDDER** | **SURETY** |
|---|---|
| _____ (Seal) | _____(Seal) |
| Bidder's Name and Corporate Seal | Surety's Name and Corporate Seal |
| By:_____ | By: _____ |
| Signature and Title | Signature and Title<br>(Attach Power of Attorney) |
| Attest:_____ | Attest: _____ |
| Signature and Title | Signature and Title |

Note: Above addresses are to be used for giving required notice.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Surety's liability.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2. All Bids are rejected by Owner, or

3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to

6. issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award, including extensions, shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

7. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

8. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

9. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

10. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

11. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

12. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

**END OF SECTION 006100**

**SECTION 004500 - Certificate of Drug Free Workplace**

As Bidder, Contractor, or Subcontractor on Hartsville/Trousdale County Construction Contract,

**LPRF Grant – Trey Park Playground**

The undersigned states that it acknowledges and adheres to Hartsville/Trousdale County Drug Free Workplace policy and if awarded a contract for this project, agrees in performance of work:

1. To require drug and alcohol screening (urine testing, breath analysis, or other testing procedures) in the following situations: Pre-Employment; Department of Transportation Commercial Drivers, Reasonable Suspicion; Post Accident and Follow Up Drug Testing as part of Substance Abuse Rehabilitation.

2. To operate a drug free workplace program or alcohol testing program with requirements at least as stringent as Hartsville/Trousdale County.

_____
Contractor's Name

_____
Date

_____
Signature

_____
Printed or Typed Name and Title

As Bidder, Contractor, or Subcontractor on Hartsville/Trousdale County Contract,

**LPRF Grant – Trey Park Playground**

The undersigned states that it does not discriminate against any subcontractor, employee, or applicant for employment on the grounds of race, color, national origin or sex and, if awarded a contract for this project, agrees in performance of work:

1. Not to discriminate against any subcontractor, employee, or applicant for employment on the grounds of race, color, national original or sex;

2. To maintain payrolls of laborers and mechanics employed on this contract until five (5) years after final release and final payment by the Owner;

3. To require a similar certificate to be executed by each Sub-contractor at the time a subcontract is executed under the contract with the requirement that such Sub-contractor agrees to require a similar certificate of requirement on any lower tiers of subcontracts.

4. To conform with federal law, state statutes, executive orders, and local ordinances identified and listed under the Certification of Non-discrimination.

_____
Contractor's Name

_____
Date

_____
Signature

_____
Printed or Typed Name and Title

**END OF SECTION 004500**

**CONTRACT FOR:** LPRF Grant – Trey Park Playground

This Agreement made and entered into as of this_____day of_____, 20____by and between _____(hereafter "Contractor"), and HARTSVILLE/TROUSDALE COUNTY, a METROPOLITAN GOVERNMENT organized under the laws of the State of Tennessee (hereafter "Owner").

Whereas Hartsville/Trousdale County published a legal Notice to Bidders pursuant to LPRF Grant – Trey Park Playground and issued drawings and specifications for the construction and performance of specified incidental work; and

Whereas Contractor submitted a proposal dated _____, 202_, in accordance with such Notice to Bidders, drawings and specifications; and such proposal was accepted by Hartsville/Trousdale County as the best bid;

NOW, THEREFORE, in consideration of the mutual covenants, conditions, and promises herein contained, the receipt and sufficiency of which is hereby acknowledged, the parties hereby agree as follows:

Contractor hereby agrees to construct the project in accordance with the drawings and specifications bid upon and provided hereto, and in accordance with all other documents incorporated herein as set forth in this Section, at the stipulated Lump Sum Amount of:

_____ $ (_____)

Contractor shall promptly begin construction on the date specified hereafter in the written Notice to Proceed provided by Hartsville/Trousdale County's Consultant and shall fully complete all work within one- hundred eighty (180) calendar days.

Should Contractor fail to complete all work within one-hundred eighty (180) calendar days, Contractor shall pay Hartsville/Trousdale County $250 per day as liquidated damages for each calendar day required for the completion of the contract beyond the time stipulated. Additionally, Contractor shall pay Hartsville/Trousdale County $250 per day as liquidated damages for each calendar day that all punch-list work and submission of all close-out documents remain incomplete beyond thirty (30) days from the date of substantial completion.

A. Contractor agrees to execute a Performance Bond in an amount equal to 100% of the contract sum with Surety to be approved by the Mayor and City Attorney, or their designated representatives, as security for full and faithful performance of the contract and for the payment of labor and material furnished.

B. Hartsville/Trousdale County reserves the right to require that Contractor provide an additional bond or bonds in such form and amount, and with such surety or sureties as approved by Hartsville/Trousdale County, should Hartsville/Trousdale County determine that the surety or sureties provided by Contractor to be insufficient to cover the performance of Contractor's work. In such event, no further payment shall be due Contractor until such new or additional bonds shall be provided in the manner and form satisfactory to Hartsville/Trousdale County. This Contract shall not take effect until such Bond has been executed and approved.

C. Contractor agrees to maintain the different types of insurance deemed appropriate by Hartsville/Trousdale County as expressly set forth in the Contract Specifications with insurance companies acceptable to Hartsville/Trousdale County at Contractor's sole cost and expense and shall provide evidence of such insurance to Hartsville/Trousdale County contemporaneous with the commencement of this Agreement.

If, in the opinion of the Contractor, it is entitled to an extension of time based on circumstances outside of the Contractor's control, then the Contractor shall immediately make a request in writing for such extension and provide documentation of the following: (i) the number of additional days being requested, (ii) the nature of the circumstance necessitating the extension, and (iii) the diligent efforts the Contractor has made to resolve the circumstance. Such written request by the Contractor will not be unreasonably denied.

Upon completion of all work to be performed under this Agreement, Contractor shall provide a written statement of all work performed. Any outstanding balance owed by Hartsville/Trousdale County shall be paid to Contractor or Contractor's successors or assigns out of the funds designated by Hartsville/Trousdale County for this project, excepting therefrom any sum to be lawfully retained under the terms of this Agreement, and all such funds as may be due Hartsville/Trousdale County,

The Project Manager of Hartsville/Trousdale County or his/her designated representative shall have the right to suspend the work provided for herein due to any default by Contractor, and such suspension shall not affect the right of Hartsville/Trousdale County to any damages for such breach.

The Mayor of Hartsville/Trousdale County or his/her designated representative reserves the right to discharge the Contractor for breach of any provision of this Contract, and such discharge shall not affect the right of Hartsville/Trousdale County against Sureties on the bond provided.

It is agreed an enumeration of drawings, specifications and addenda which form a part of this Contract, as set forth in Article 2 of the General Conditions, "Contract Documents", is as follows:

**Project Manual**



**Technical Specifications**

Witness the signatures of the parties hereto, by their duly authorized officers, on the day and year first written.

**CONTRACTOR:**

_____ _____
Contractor's Company Name Corporate Secretary - Signature

_____ _____
Signature Printed or Typed Name

_____
Title

**HARTSVILLE/TROUSDALE COUNTY:**

_____ _____
Signature Printed or Typed Name

_____
Title

**ATTESTED:**

_____ _____
Signature Printed or Typed Name

_____
Title

**END OF SECTION 005000**

**STATE OF TENNESSEE (SUMNER COUNTY)**

KNOW ALL MEN BY THESE PRESENTS, THAT:

We,_____(Herein called the "Contractor")

of_____(Partnership or Corporation) organized and existing under, and by virtue of the Laws of the State of Tennessee, as principal, and

_____

as surety, do hereby acknowledge ourselves indebted and firmly bound and held unto Hartsville/Trousdale County, Tennessee (Hereinafter called the "Owner"), a corporation existing under and by virtue of the laws of Tennessee, for the use and benefit of those entitled thereto, in the sum of:

_____ and no/100_____($ _____) (Dollars) for the payment of which well and truly to be made, in lawful money of the United States we do hereby bind ourselves, successors, assigns, heirs and personal representatives.

**BUT THE CONDITION OF THE FOREGOING OBLIGATION OR BOND IS THIS:**

Whereas, the Owner has engaged the said Contractor, for the sum of:

_____ and no/100____($_____) (Dollars) to construct: LPRF Grant – Trey Park Playground as more fully appears in a written agreement or contract bearing date of_____, a copy of which said agreement or contract is by reference hereby made a part hereof, and it is the desire of the said Owner that the said Contractor shall assume all undertaking under said agreement or contract, and shall assure and protect all laborers and furnishers of material on said work both as required by Tennessee Code Annotated Section 12-4-201 ET. SEQ., as amended, and also, independently of said statutes.

NOW, THEREFORE, if the said Contractor shall fully and faithfully perform all undertakings and obligations under the said agreement or contract herein before referred to and shall fully indemnify and save harmless the said Owner from all costs and damage whatsoever which it may suffer by reason of any failure on the part of said Contractor so to do, and shall fully reimburse and repay the said Owner any and all outlay and expense which it may incur in making good any such default, and shall fully pay for all of the labor, materials and work used by said Contractor or any immediate or remote Contractor or Furnisher of material under him in the performance of said Contract, in lawful money of the United States, as the same shall become due, then this obligation or bond shall be null and void, otherwise to remain in full force and effect.

AND, for value received, it is hereby stipulated and agreed that no change, extension of time, alteration or addition to the terms of the said agreement or contract or to the work to be performed thereunder or the specifications accompanying the same shall in anywise affect the obligations under this obligation or bond, and notice is hereby waived of any such change, extension of time, alteration or addition to the terms of the agreement or contract or to the work or to the specifications.

IN WITNESS WHEREOF, the said Contractor has hereunder affixed its signature and said surety has hereunto caused to be affixed its corporate signature and seal, by its duly authorized officers, on this
_____day of_____, 202_.

**CONTRACTOR:**

_____
Contractor's Company

_____

Name Signature

_____
Printed or Typed Name and Title

**SURETY:**

_____
Surety

_____
Attorney in Fact

(Signed) Printed or

_____
Typed Name

**HARTSVILLE/TROUSDALE COUNTY:**

Signature

Title

Printed or Typed Name

**ATTEST:**

Signature

Title

Printed or Typed name

**COUNTERSIGNED**:

Tennessee Agent

Title

Printed or Typed Name

ADDRESS & TELEPHONE NUMBER:

**END OF SECTION 006113**

**AFFIDAVIT AND PARTIAL WAIVER OF CLAIMS AND LIENS AND RELEASE OF RIGHTS FOR SUBCONTRACTORS**

The undersigned, who is the _____ designate title) of _____ which is the _____ (designate whether subcontractor, supplier or otherwise) for the _____ _____ (designate the type of work, supplies or services rendered) on the improvements constructed on the premises hereafter identified, declares that his contract with _____ (General Contractor) is in the total amount of $ _____, which includes extras and all change orders to the date hereof.

The undersigned further states that as of _____ (date) the total value of work completed, and material stored is $_____. Of this amount $_____ has been received (the receipt and sufficiency of which is hereby acknowledged by the undersigned including $_____ in payment of Payment Application or Invoice Number _____. A total of $_____ is being held as retainage.

In consideration of the amounts and sums received, the undersigned does hereby waive and release to **HARTSVILLE/TROUSDALE COUNTY (Owner)** and to _____ (General Contractor) any and all claims and liens and rights to liens upon the premises described below and upon improvements now thereon, and upon the monies or other considerations (due as of the date of the aforesaid payment application or invoices from **HARTSVILLE/TROUSDALE COUNTY (Owner)** or _____ _____ (General Contractor) or from any other person, firm or corporation), said claims and liens and rights to liens being on account of labor, services, materials, fixtures or apparatus heretofore furnished by or at the request of the undersigned. The premises as to which said claims and liens and rights to liens are hereby released are identified as follows:

**Project Name: LPRF Grant – Trey Park Playground**

**Address of Project: 268 Marlene Street**

**City: Hartsville County: Trousdale State: TN Zip Code: 37074**

The undersigned further represents and warrants that he is duly authorized and empowered to sign and execute this waiver on his own behalf and on behalf of the company or business for which he is signing; that he has properly performed all work and furnished all the materials of the specified quality per plans and specifications and in a good and workmanlike manner through the date of said payment application or invoice; that he has paid for all the labor, materials, equipment, and services that he has used or supplied to the above premises through the date of said payment application or invoice; that he has no other outstanding and unpaid payment applications, invoices, retentions, holdbacks, chargebacks or unbilled work or materials against _____ (General Contractor) as of the date of

the aforementioned payment application; and that any materials which have been supplied or incorporated into the above premises were either taken from his fully-paid or open stock or were fully paid for and supplied as stated on the payment application or invoice.

The undersigned further agrees to reimburse and does hold harmless and fully indemnify **HARTSVILLE/TROUSDALE COUNTY (Owner)** and_____
(General Contractor) for any losses or expenses should any such claims, lien or right to a lien be asserted (by the undersigned or by any laborer, materialman or subcontractor of the undersigned), including, without implied limitation, attorneys' fees incurred in the defense thereof.

The undersigned further accepts and acknowledges the receipt of the aforesaid sums in full accord and satisfaction for the aforementioned claims with full knowledge that the contractors, **HARTSVILLE/TROUSDALE COUNTY (Owner)** and_____(General Contractor), their successors and assigns, are relying thereon; and furthermore, the undersigned agrees to perform, now and in the future, each and every covenant and provision of this written contract or supplier's agreement (as the case may be) as modified or changed in writing with _____(General Contractor) or any subcontractor of _____(General Contractor) hereby acknowledging that said contract or supplier's agreement is now in full force and effect.

In addition, for and in consideration of the amounts and sums received, the undersigned hereby waives, releases and relinquishes any and all claims, rights or causes of action whatsoever arising out of or in the course of the work performed on the above-mentioned project, contract or event transpiring prior to the date hereof, excepting the right to receive payment for work performed and properly completed and retainage, if any, after the date of the above-mentioned payment application or invoices.

Signed and delivered the_____day of_____, 202_.

Company_____

By:_____
(Printed Name)

_____

(Signature)

_____
(Title)

Before me, the undersigned Notary Public in and for the said County and State, personally appeared _____, and acknowledged execution of the foregoing affidavit as his voluntary act and deed and further stated that the facts recited are true of his personal knowledge.

My Commission Expires:_____

_____

Notary Public

Residence County/State:_____

## AFFIDAVIT AND FINAL WAIVER OF CLAIMS AND LIENS AND RELEASE OF RIGHTS FOR SUB-CONTRACTORS

The undersigned, who is the _____ designate title) of _____ which is the _____ (designate whether subcontractor, supplier or otherwise) for the _____ (designate the type of work, supplies or services rendered) on the improvements constructed on the premises hereafter identified, declares that his contract with _____ (General Contractor) is in the total amount of $_____, which includes extras and all change orders to the date hereof.

The undersigned further states that as of _____ (date) all work on said project has been performed and completed in accordance with the plans and specifications for the project, and said work has been accomplished in accordance with the terms and conditions of his subcontract and those documents which, by reference, are a part of said subcontract. The total value of work completed and material stored is $__. Of this amount $_____ has been received (the receipt and sufficiency of which is hereby acknowledged by the undersigned including $_____ in payment of Payment Application or Invoice Number _____. A total of $_____ is being held as retainage.

In consideration of the amounts and sums received, the undersigned does hereby waive and release to **HARTSVILLE/TROUSDALE COUNTY (Owner)** and to _____ (General Contractor) any and all claims and liens and rights to liens upon the premises described below and upon improvements now thereon, and upon the monies or other considerations (due as of the date of the aforesaid payment application or invoices from **HARTSVILLE/TROUSDALE COUNTY (Owner)** or _____ (General Contractor) or from any other person, firm or corporation), said claims and liens and rights to liens being on account of labor, services, materials, fixtures or apparatus heretofore furnished by or at the request of the undersigned. The premises as to which said claims and liens and rights to liens are hereby released are identified as follows:

**Project Name: LPRF Grant – Trey Park Playground**

**Address of Project: 1693 Avant Lane (Rugby) & 250 Conway Twitty Lane (Soccer Field)**

**City: Hartsville County: Trousdale State: TN Zip Code: 37074**

The undersigned further represents and warrants that he is duly authorized and empowered to sign and execute this waiver on his own behalf and on behalf of the company or business for which he is signing; that he has properly performed all work and furnished all the materials of the specified quality per plans and specifications and in a good and workmanlike manner as required by the contract; that he has paid for all the labor, materials, equipment, and services that he has used or supplied to the above premises as required by the contract; that he has no other outstanding and unpaid payment applications, invoices, retentions, holdbacks, chargebacks or unbilled work or materials against _____ (General Contractor); and that any materials which have been supplied or incorporated into the

above premises were either taken from his fully-paid or open stock or were fully paid for and supplied as stated on the payment application or invoice.

The undersigned further agrees to reimburse and does hold harmless and fully indemnify **HARTSVILLE/TROUSDALE COUNTY (Owner)** and_____(General Contractor) for any losses or expenses should any such claims, lien or right to a lien be asserted (by the undersigned or by any laborer, materialman or subcontractor of the undersigned), including, without implied limitation, attorneys' fees incurred in the defense thereof.

The undersigned further accepts and acknowledges the receipt of the aforesaid sums in full accord and satisfaction for the aforementioned claims with full knowledge that the contractors, **HARTSVILLE/TROUSDALE COUNTY (Owner)** and_____(General Contractor), their successors and assigns, are relying thereon; and furthermore, the undersigned agrees to perform, now and in the future, each and every covenant and provision of this written contract or supplier's agreement (as the case may be) as modified or changed in writing with _____(General Contractor) or any subcontractor of _____ (General Contractor) hereby acknowledging that said contract or supplier's agreement is now in full force and effect.

In addition, for and in consideration of the amounts and sums received, the undersigned hereby waives, releases and relinquishes any and all claims, rights or causes of action whatsoever arising out of or in the course of the work performed on the above-mentioned project, contract or event transpiring prior to the date hereof, excepting retainage, if any, after the date of the above-mentioned payment application or invoices.

Signed and delivered the_____day of_____, 202_.

Company_____

By:_____
(Printed Name)

_____

(Signature)

_____
(Title)

Before me, the undersigned Notary Public in and for the said County and State, personally appeared _____, and acknowledged execution of the foregoing affidavit as his voluntary act and deed and further stated that the facts recited are true of his personal knowledge.

My Commission Expires:_____

_____

Notary Public

Residence County/State:_____

## AFFIDAVIT AND FINAL WAIVER OF CLAIMS AND LIENS AND RELEASE OF RIGHTS FOR GENERAL CONTRACTORS

The undersigned, who is the_____(designate title) of _____which is the_____General Contractor for the improvements constructed on the premises hereafter identified, declares that his contract with **Hartsville/Trousdale County** is in the total amount of $_____ , which includes extras and all change orders to the date hereof.

The undersigned further states that as of_____(date) all work on said project has been performed and completed in accordance with the plans and specifications for the project, and said work has been accomplished in accordance with the terms and conditions of his contract and those documents which, by reference, are a part of said contract. The total value of work completed and material stored is $_____. Of this amount $_____ has been received (the receipt and sufficiency of which is hereby acknowledged by the undersigned including $_____in payment of Payment Application or Invoice Number_____. A total of $_____ is being held as retainage.

In consideration of the amounts and sums received, the undersigned does hereby waive and release to **Hartsville/Trousdale County (Owner)** any and all claims and liens and rights to liens upon the premises described below and upon improvements now thereon, and upon the monies or other considerations (due as of the date of the aforesaid payment application or invoices from **Hartsville/Trousdale County (Owner)** or from any other person, firm or corporation), said claims and liens and rights to liens being on account of labor, services, materials, fixtures or apparatus heretofore furnished.

The premises as to which said claims and liens and rights to liens are hereby released are identified as follows:

**Project Name: LPRF Grant – Trey Park Playground**

**Address of Project: 268 Marlene Street**

**City: Hartsville County: Trousdale State: TN Zip Code: 37074**

The undersigned further represents and warrants that he is duly authorized and empowered to sign and execute this waiver on his own behalf and on behalf of the company or business for which he is signing; that he has properly performed all work and furnished all the materials of the specified quality per plans and specifications and in a good and workmanlike manner as required by the contract; that he has paid for all the labor, materials, equipment, and services that he has used or supplied to the above premises as required by the contract; that he has no other outstanding and unpaid payment applications, invoices, retentions, holdbacks, chargebacks or unbilled work or materials against **Hartsville/Trousdale County**; and that any materials which have been supplied or incorporated into the above premises were either taken from his fully-paid or open stock or were fully paid for and supplied as stated on the payment application or invoice.

The undersigned further agrees to reimburse and does hold harmless and fully indemnify **Hartsville/Trousdale County (Owner)** for any losses or expenses should any such claims, lien

or right to a lien be asserted (by the undersigned or by any laborer, material, man or subcontractor of the undersigned), including, without implied limitation, attorneys' fees incurred in the defense thereof.

The undersigned further accepts and acknowledges the receipt of the aforesaid sums in full accord and satisfaction for the aforementioned claims with full knowledge that **Hartsville/Trousdale County (Owner)** is relying thereon; and furthermore, the undersigned agrees to perform, now and in the future, each and every covenant and provision of this written contract or supplier's agreement (as the case may be) as modified or changed in writing with **Hartsville/Trousdale County (Owner).**

In addition, for and in consideration of the amounts and sums received, the undersigned hereby waives, releases and relinquishes any and all claims, rights or causes of action whatsoever arising out of or in the course of the work performed on the above-mentioned project, contract or event transpiring prior to the date hereof, excepting retainage, if any, after the date of the above-mentioned payment application or invoices.

Signed and delivered the_____day of_____, 202_.

Company_____

By:_____
(Printed Name)

_____

(Signature)

_____
(Title)

Before me, the undersigned Notary Public in and for the said County and State, personally appeared _____, and acknowledged execution of the foregoing affidavit as his voluntary act and deed and further stated that the facts recited are true of his personal knowledge.

My Commission Expires:_____

_____

Notary Public

Residence County/State:_____

**END OF SECTION 006500**

## GENERAL CONDITIONS

### *A. CONTRACTOR'S DUTIES*

All work performed under this contract shall be performed in accordance with all provisions of the specifications. Any deviations from the specifications must be approved in writing by the owner or his representative, prior to performance. The contractor in writing shall, immediately upon discovery, bring to the attention of the owner any conflicts which may occur among the various provisions of the specifications. The owner shall resolve such conflicts as soon as possible. Failure of the contractor to bring conflicts or exceptions to the attention of the owner shall allow the owner to require any changes deemed necessary before acceptance by the owner.

### *B. MATERIALS*

All materials supplied by the Contractor under the provisions of these specifications shall be new materials of the kind and character called for by the specifications. Materials not matching the specifications shall be replaced, in a manner satisfactory to the owner, at the Contractor's sole cost. All materials to be furnished under these specifications shall be the standard product of a manufacturer regularly engaged in the production of such material and shall be the manufacturer's current standard product and shall be delivered to the site with appropriate tickets given to the owner.

### *C. CONTRACT DURATION*

Prices shall remain in effect for two years.

**Extension Clause**: The extension option shall be exercised, at least, thirty days prior to the expiration of the Contract.

### *D. DISPUTES*

For the purpose of this contract, all disputes arising from this contract, or its interpretation shall be in writing address to the Parks Director. The Parks Director's decision shall be final. All contract documents are subject to final review and amendment by the City Attorney.

### *E. UNIT PRICES*

The unit price for each of the several items in the proposal of each bidder shall include its pro-rata share of overhead and incidental costs; so that the sum of the products obtained by multiplying the quantity shown for each item by the unit price bid represents the total bid. Any bid not conforming to this requirement may be rejected as incomplete. Special attention of all bidders is called to this provision, should conditions make it necessary to revise the quantities, no limit will be fixed for such increased or decreased quantities; no extra compensation allowed.

*F. INSURANCE REQUIREMENTS*

Contractors must possess the following insurance to be considered as a responsive bidder:

**Worker's Compensation**: $1,000,000

**Employer's Liability**:

| | |
|---|---|
| Each accident: | $1,000,000 |
| Disease, policy limit | $1,000,000 |
| Disease, each employee | $1,000,000 |

**General Liability:**

| | |
|---|---|
| Each occurrence: | $1,000,000 |
| Aggregate: | $2,000,000 |

**Automobile liability:** $1,000,000

**Professional Liability**:

| | |
|---|---|
| Each claim: | $1,000,000 |
| Aggregate: | $2,000,000 |

*G. PAYMENT TO THE CONTRACTOR*

Contractor shall as soon as practical, after final acceptance by the City, submit an invoice for the amount of work done and the value thereof. The invoice shall contain the following information: Purchase order number, location of work, quantities of each item in place, cost of each unit of work, and total amount due, on the Contractor's invoice form. Final quantities for each individual work assignment shall be checked, approved, and signed by the Parks Director and/or an official representative of Hartsville/Trousdale County. After such approval, Hartsville/Trousdale County shall pay, or cause to be paid the contractor, in the manner provided by law, the entire sum so found to be due hereunder.

*H. GENERAL*

Successful bidder shall obtain a valid Hartsville/Trousdale County business license, prior to beginning any work. It is the responsibility of the successful bidder to obtain any and all necessary permits for the completion of the work and must follow all rules and procedures as dictated by the State of Tennessee and all other applicable local and federal laws.

**Time for Completion**: The Contractor shall perform its services in a timely manner and as outlined in the BID PROPOSAL. The Contractor once started will complete each assignment in a timely manner and will maintain a work force consistent to accomplish the project from start to finish.

The City reserves the right to reject all or portions of any project which contains defective materials and/or workmanship. Final inspection of the materials and workmanship shall be made as promptly as practicable, but failure to inspect and accept or reject materials or workmanship shall not impose liability on

Hartsville/Trousdale County for such materials or workmanship which are not in accordance with specifications. Prior approval must be obtained in the event necessity requires the use of materials or supplies not conforming to the specifications. Payment may be made at a proper adjustment in price.

**Protection of Persons and Property**: The Contractor shall be responsible for any/ all injuries or damages to persons or property that may occur in connection with the performance of work under this contract. He shall take all necessary precautions and exercise adequate diligence to prevent injuries or damages of any nature to persons or to property of others during the prosecution of this contract. The Contractor shall defend Hartsville/Trousdale County against any and all claims which may arise from the performance of this contract.

**EPSC:** All work performed under this contract shall be performed in such a way to prevent stormwater pollution.

**END OF SECTION 007200**

## PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 PROJECT DESCRIPTION

A. The Project name:

**LPRF Grant – Trey Park Playground**

B. The work consists of, but is not limited to:
1. Demolition
2. Excavation and Grading
3. Stormwater Drainage
5. Concrete, Asphalt, and Hardscapes

C. GENERAL: During the construction period, the Contractor shall stay within the construction area. Contractor is not allowed on adjacent private property. Other than these restrictions, the Contractor's use of the premises is limited only by the Owner's right to perform construction operations with its own forces or to employ separate contractors on portions of the project.

## PART 2 - PRODUCTS

(Not applicable)

## PART 3 - EXECUTION

(Not applicable)

**END OF SECTION 011000**

## PART 1 - GENERAL

1.01 EXTENSIONS OF CONTRACT TIME

If the basis exists for an extension of time in accordance with paragraph 8.3 of the Conditions, an extension of time on the basis of weather may be granted only for the number of Weather Delay Days in excess of the number of days listed as the Standard Baseline for that month.

1.02 STANDARD BASELINE FOR AVERAGE CLIMATIC RANGE

A. The Owner has reviewed data available from the National Oceanic and Atmospheric Administration (NOAA) and determined a Standard Baseline of average climatic range from the State of Tennessee.

B. Standard Baseline is defined as the normal number of calendar days for each month during which construction activity exposed to weather conditions is expected to be prevented and suspended by cause of adverse weather.

C. Standard Baseline is as follows:

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 11 | 8 | 7 | 7 | 6 | 7 | 5 | 4 | 5 | 6 | 11 |

1.03 ADVERSE WEATHER AND WEATHER DELAY DAYS

A. Adverse Weather is defined as the occurrence of one or more of the following conditions within a twenty-four (24) hour day that prevents construction activity exposed to weather conditions or access to the site:

a. Precipitation (rain, snow, or ice) in excess of one-tenth inch (0.10” liquid measure;

b. Temperatures that do not rise above that required for the day’s construction activity, if such temperature requirement is specified or accepted as standard industry practice; and/or;

c. Sustained wind in excess of twenty-five (25) miles per hour.

B. Adverse Weather may include, if appropriate, “dry-out” or “mud” days:

a. Resulting from precipitation days that occur beyond the standard baseline;

b. Only if there is a hindrance to site access or sitework and Contractor has taken all reasonable accommodations to avoid such hindrance; and,

c. At a rate no greater than one (1) make-up day for each day or consecutive days of precipitation beyond the standard baseline that total one (1) inch or more, liquid measure, unless specifically recommended otherwise by Consultant.

C. A Weather Delay Day may be counted if adverse weather prevents work on the project for fifty percent (50%) or more of the Contractor’s schedule work day and

critical path construction activities were included in the day's schedule, including a weekend day or holiday if Contractor has scheduled construction activity that day.

D. Contractor shall take into account that certain construction activities are more affected by adverse weather and season conditions than other activities, and that "dry-out" or "mud" days are not eligible to be counted as a Weather Delay Day until the standard baseline is exceeded. Hence, Contractor should allow for an appropriate number of additional days associated with the Standard Baseline days in which such applicable construction activities are expected to be prevented and suspended.

1.04 DOCUMENTATION AND SUBMITTALS

A. Submit daily jobsite work logs showing which and to what extent critical path construction activities have been affected by weather on a bi-weekly basis.

B. Submit actual weather data to support claim for time extension obtained from nearest NOAA weather station or other independently verified source approved by Consultant at beginning of project.

C. Use Standard Baseline data provided in this Section when documenting actual delays due to weather in excess of the average climatic range.

D. Organize claim and documentation to facilitate evaluation on a basis of calendar month periods and submit in accordance with the procedures for Claims established in paragraph 3.3 off the General Conditions of the Contract (Section 007200).

E. If an extension of the Contract Time is appropriate, such extension shall be made in accordance with the provisions of Article 3 of the General Conditions, of the Contract (Section 007200).

**END OF SECTION 012620**

## PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements for submittals required for Performance of the Work, including:

Contractor's Construction
Schedule Submittal Schedule
Shop Drawings
Product Data
Samples

B. Administrative Submittals: Refer to other Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:

Permits
Applications for Payment
Performance and Payment Bonds
Insurance Certificates
List of Sub-contractors

C. The Schedule of Values submittal is included in Section "Applications for Payment."

D. Inspection and test reports are included in Section "Quality Control Services."

1.03 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.

2. Coordinate transmittal of different types of submittals for related elements of the work so processing will not be delayed by the need to review submittals concurrently for coordination.

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

B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.

1. Include the following information on the label for processing and recording action taken.

Project name
Date
Name and address of Landscape Architect
(Consultant) Name and address of Contractor
Name and address of Sub-contractor Name and address of Supplier Name of Manufacturer
Number and title of appropriate Specification Section
Drawing number and detail references, as appropriate

2. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Consultant using a transmittal form. Submittals received from sources other than the Contractor will be returned without action. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's certification “Approval” that information complies with Contract Document requirements.

1.04 SHOP DRAWINGS

A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.

B. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:

Dimensions
Identification of products and materials included
Compliance with specified standards
Notation of coordination requirements
Notation of dimensions established by field measurement.

C. Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8 1/2" x 11" but no larger than 24" x

36".

D. Final Submittal: Submit four (4) black line prints. Two (2) prints will be retained; the remainder will be returned.

E. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.

1.05 LANDSCAPE ARCHITECT/ENGINEER'S (CONSULTANT) ACTION

A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Landscape Architect/Engineer will review each submittal, mark to indicate action taken, and return promptly.

1. Compliance with specified characteristics is the Contractor's responsibility.

B. Action Stamp: The Landscape Architect/Engineer will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken.

C. APPROVED AS SUBMITTED: Where submittals are marked "Approved as Submitted", that part of the work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.

D. APPROVED AS NOTED: When submittals are marked "Approved as Noted", that part of the work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.

E. RETURNED FOR CORRECTION - RESUBMIT: When submittal is marked "Returned for Correction - Resubmit", do not proceed with that part of the work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with notations; resubmit without delay. Repeat if necessary to obtain a different action mark.

1. Do not permit submittals marked "Not Approved, Revise and Resubmit" to be used at the Project site, or elsewhere where work is in progress.

F. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked "Action Not Required."

## PART 2 - PRODUCTS

(Not Applicable)

## PART 3 - EXECUTION

(Not Applicable)

**END OF SECTION 013000**

## PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This section specifies administrative and procedural requirements for quality control services.

B. Quality control services include inspections and tests and related actions including reports performed by independent agencies, governing authorities, and the Contractor. They do not include contract enforcement activities performed by the Landscape Architect/Engineer.

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

D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.

1. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and tests, cover production of standard products as well as customized fabrication and installation procedures.

2. Inspections, test and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Document requirements.

3. Requirements for the Contractor to provide quality control services required by the Landscape Architect/Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.03 RESPONSIBILITIES

**A.** Contractor Responsibilities: The Contractor shall provide inspections, tests and similar quality control services, specified in individual Specification Sections and required by governing authorities, except where they are specifically indicated to be the Owner's responsibility, or are provided by another identified entity; these services include those specified to be performed by an independent agency and not by the Contractor. **Costs for these services shall be included in the Contract Sum.**

1. The Contractor shall coordinate with an independent agency, to perform specified quality control services.

2. If the Owner engages a testing agency or other entity for testing and inspection of a part of the Work, and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner, unless otherwise agreed in writing with the Owner.

B. Retesting: The Contractor is responsible for retesting where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements, regardless of whether the original test was the Contractor's responsibility.

1. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.

C. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to:

1. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.

2. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.

3. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.

4. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.

5. Security and protection of samples and test equipment at the Project site.

D. Duties of the Testing Agency: The independent testing agency engaged to perform inspections, sampling and testing of materials and construction

specified in individual Specification Sections shall cooperate with the Landscape Architect/Engineer and Contractor in performance of its duties and shall provide qualified personnel to perform required inspections and tests.

1. The agency shall notify the Landscape Architect/Engineer and Contractor promptly of irregularities or deficiencies observed in the work during performance of its services.

2. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.

3. The agency shall not perform any duties of the Contractor.

E. Coordination: The Contractor and each agency engaged to perform inspections, tests and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition, the Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

1. The Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.

1.04 SUBMITTALS

A. The independent testing agency shall submit a certified written report of each inspection, test or similar service to the Landscape Architect/Engineer, in duplicate, unless the Contractor is responsible for the service. If the Contractor is responsible for the service, submit a certified written report of each inspection, test or similar service through the Contractor, in duplicate.

1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.

2. Report Data: Written reports of each inspection, test or similar service shall include, but not be limited to:

- Date of issue
- Project title and number
- Name, address and telephone number of testing agency
- Dates and locations of samples and tests or inspections
- Names of individuals making the inspection or test
- Designation of the Work and test method
- Identification of product and Specification Section
- Complete inspection or test data
- Test results and an interpretation of test results
- Ambient conditions at the time of sample-taking and testing
- Comments or professional opinion as to whether inspected

or tested work complies with Contract Document requirements
- Name and signature of laboratory inspector
- Recommendations on retesting

1.05 QUALITY ASSURANCE

A. Qualification for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, which are pre-qualified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.

1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the State in which the Project is located.

## PART 2 - PRODUCTS

(Not Applicable)

## PART 3 - EXECUTION

3.01 REPAIR AND PROTECTION

A. General: Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrate and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for "Cutting and Patching."

B. Protect construction exposed by or for quality control service activities and protect repaired construction.

C. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

**END OF SECTION 014000**

## PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included

From time to time during progress of the work, the Owner may require that testing be performed to determine that materials provided for the work meet the specified requirements. Such testing includes, but is not necessarily limited to the following:

The Contractor will employ and pay for services of an independent testing laboratory, acceptable to the Owner/Landscape Architect/Engineer to perform specified services.

1. Soil Compaction Tests
2. Concrete Tests

B. Related Work Described Elsewhere:

Requirements for testing may be described in various sections of these specifications. Where no testing requirements are described but the Owner decides that testing is required, the Owner may require testing to be performed under current pertinent standards for testing.

1.02 QUALITY ASSURANCE

A. Qualifications of Testing Laboratory

The testing laboratory will be qualified to the Owner's approval in accordance with ASTM E 329-70 "Recommended Practice for Inspection and Testing Agencies for Concrete and Steel Used in Construction."

B. Codes and Standards

Testing, when required, will be in accordance with all pertinent codes and regulations and with selected standards of the American Society for Testing and Materials.

1.03 PRODUCT HANDLING

Promptly process and distribute all required copies of test reports and related instructions to ensure all necessary retesting and/or replacement of materials with the least possible delay in progress of the work.

1.04 AUTHORITY AND DUTIES OF LABORATORY PERSONNEL

A. Inspectors shall inspect the materials and the manufacture of concrete as specified and shall report to the Landscape Architect/Engineer the progress thereof.

B. When it appears that the material furnished, and the work performed by the Contractor, fails to fulfill the Contract and specification requirements, the inspector shall direct the attention of the Contractor to such failure or infringement. Such inspector shall not relieve the Contractor of any obligation to furnish acceptable materials. The inspectors are not authorized to revoke, alter, relax, enlarge, or release any requirements of the specifications, nor to approve or accept any portion of the work, but in case of any dispute arising between the inspector and the Contractor as to materials furnished or in the manner of performing the work, the inspector shall have the authority to reject materials or suspend the work until the question at issue can be referred to the Landscape Architect/Engineer. The inspector shall not act as foreman or perform other duties for the Contractor. In no case shall any advice or omission on the part of the inspector relieve the Contractor of responsibility for completing the work in accordance with the plans and specifications and the fulfillment of the Contract. The work will be inspected as to progresses, but failure to reject any defective work or materials shall not in any way prevent later rejections when such defect is discovered or obligate the Landscape Architect/Engineer for final acceptance. Any expense incident to the investigation and the determination of actual quality of any questionable materials shall be borne by the Contractor.

## PART 2 - PRODUCTS

2.01 PAYMENT FOR TESTING SERVICES

A. Initial Services

1. The Contractor will pay for all testing services required by these specifications.

B. Retesting

1. When initial tests indicate non-compliance with the Contract Documents, all subsequent retesting occasioned by the non-compliance shall be performed by the same testing laboratory and the costs thereof will be paid by the Contractor.

C. Pay laboratory travel and labor costs if laboratory personnel come to the job site and find work not ready for testing.

2.02 CODE COMPLIANCE TESTING

Inspections and tests required by codes and ordinances, or by a plan approval authority, and made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Owner, unless otherwise provided in the Contract Documents.

2.03 CONTRACTOR'S CONVENIENCE TESTING

Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

## PART 3 - EXECUTION

3.01 COOPERATION WITH TESTING LABORATORY

Representatives of the testing laboratory shall have access to the work at all times; provide facilities for such access in order that the laboratory may properly perform its functions.

3.02 CONCRETE TESTS

A. Prior to starting concrete operations, the Contractor shall submit his materials list, as called for in Section 321600 of these specifications, and shall submit representative samples for testing.

B. Preliminary Mix Design:

1. For each class of concrete specified, a preliminary mix design shall be made.
2. The Contractor shall submit copies of the mix designs he proposed to use to the Landscape Architect/Engineer for his approval.
3. The laboratory service in no way relieves the Contractor of his responsibility for the quality of the concrete.

C. Concrete Testing Services:

1. Cement and Aggregates:

   a. Test cement and aggregates in accordance with ASTM physical test requirements.
   b. One test shall be made for each carload of cement (no cement shall be used until a satisfactory 3-day physical test has been made).

2. Cylinders:

   a. Cast and test a set of at least three (3) field and three (3) control cylinders for each day's pour and for each 25 cubic yards or major fraction thereof.
   b. Cylinders shall be cured and tested in accordance with ASTM Specifications for "field" and "control" tests and shall be tested at ages 7 and 28 days, or as otherwise directed by the Landscape Architect/Engineer. Tests shall be judged according to ACI 318-77 and appropriate ASTM tests.

3. Immediately submit two (2) copies of laboratory reports on all strength tests

to the Landscape Architect/Engineer, the local building authority, if required, and the concrete contractor and supplier. Reports shall be made on a form acceptable to the Landscape Architect/Engineer and shall indicate strength, slump, air entrainment, concrete temperature, pour location, date, age, remarks on properties changes, yardage of pour, proportions, class of concrete used and the weather conditions.

4. Determine air content of concrete twice per day's pour.

5. Perform slump tests once per day's pour and when directed.

6. Storage of test Cylinders: The Contractor shall provide insulated storage room with head when necessary to store control cylinders, and a protected, fenced-in space for storage of field cylinders, which approximates the condition of curing of the concrete being sampled.

3.03 SOIL TESTS

A. General

All gradation and compaction tests shall be in accordance with the latest ASTM standards.

All compaction tests that fail will be retested at the Contractor's expense.

3.04 SCHEDULE FOR TESTING

A. Establishing Schedule

1. By advance discussion with the Testing Laboratory selected by the Owner, determine the time required for the laboratory to perform its tests and to issue each of its findings.
2. Provide all required time within the construction schedule.

B. Revising Schedule

When changes of construction schedule are necessary during construction, coordinate all such changes of schedule with the testing laboratory as required.

3.05 TAKING SPECIMENS

All specimens and samples for testing, unless otherwise provided in these Contract Documents, will be taken by the Testing Laboratory; all sampling equipment and personnel will be provided by the Testing Laboratory.

**END OF SECTION 014100**

## PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, security and protection.

1.03 QUALITY ASSURANCE

A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:

Building Code Requirements
Health and Safety Regulations
Utility Company Regulations
Police, Fire Department and Rescue Squad
Rules Environmental Protection Regulations

B. Standards: Comply with NEPA Code 241, "Building Construction and Demolition Operations," ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."

1.04 DRAINAGE

A. Prevent mud, cement, concrete and other building materials from getting into major water bodies during the period of construction. Erect and maintain erosion control PER TDEC’s requirements.

1.05 MAINTENANCE OF SANITARY SEWER LINES

A. Clean any permanent piping in places that may become clogged. Under no condition, deposit in or about sanitary sewer lines such water used in flushing concrete or other cement mixes.

1.06 PROTECTION

A. Continually maintain adequate protection of all work from injury due to weather, frost, accident or other cause, and protect the Owner’s property from injury arising in connection with this contract.

## PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. General: Provide new materials; if acceptable to the Landscape Architect/Engineer, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.

B. Temporary Offices: Provide prefabricated or mobile units or similar job-built construction with lockable entrances, operable windows, no advertising and serviceable finishes. Provide a heated and air conditioned unit on a foundation adequate for normal loading. It shall be located at a place agreeable to Owner and Contractor. Contractor's option.

C. Temporary Toilet Units: Provide self-contained single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell o r similar nonabsorbent material. Contractor's option.

D. First Aid Supplies: Comply with governing regulations.

E. Fire Extinguishers: Provide hand-carried, portable UL-rated, class "A" fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, UL rated, class "ABC" dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.

## PART 3 - EXECUTION

3.01 INSTALLATION

A. Provide each facility ready for use when needed to avoid delay. Locate facility where it will not interfere with the construction of the project of the normal operations of any adjacent uses. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.02 TEMPORARY UTILITY INSTALLATION

A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where the company provides only part of the service, provide the remainder with matching, compatible materials and equipment; comply with the company's recommendations.

1. Arrange with the company and existing users for a time when service can be interrupted, where necessary, to make connections for temporary services.

2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.

3. Obtain easements to bring temporary utilities to the site, where the Owner's easements cannot be used for that purpose.

4. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner and will not be accepted as a basis of claims for a Change Order.

B. Water Service: Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use. Contractor's option.

1. Sterilization: Sterilize temporary water piping prior to use.

C. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Contractor's option.

D. Temporary Telephones: Provide temporary telephone service for all personnel engaged in construction activities throughout the construction period. Pay all costs of installation, maintenance, and removal. Mobile/cell phones are acceptable.

3.03 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION

A. Locate field offices, storage sheds, sanitary facilities and other temporary construction and support facilities for easy access and as approved by the Owner.

B. Field Offices: Provide insulated, weathertight temporary offices of sufficient size to accommodate required office personnel at the Project site. Keep the office clean and orderly for use for small progress meetings. Keep on file in this office copies of all drawings, including all shop drawings, letters, specifications, and other records pertaining to this project.

C. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted.

D. Temporary enclosures: Provide temporary enclosures for protection of construction in progress and completed, from exposure, foul weather, other construction operations and similar activities.

E. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NEPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than seven (7) days during normal weather or three (3) days when the temperature is expected to rise above 80 degrees F (27 degrees C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner.

3.04 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Barricades, Warning Signs and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Cover all hazardous openings at night and non-working hours. Paint with appropriate colors, graphics and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting including flashing amber lights.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and bay methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site.

C. All Contractors to become responsible for security of site, equipment, and materials stored on site. Any damage to site and newly installed materials or equipment due to vandalism or neglect will be the Contractor's responsibility and the Contractor will bear all costs. It is the Contractor's option to install security fencing.

3.05 OPERATION, TERMINATION AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.

B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.

1. Protection: Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

C. Termination and Removal: Unless requested by the Owner that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Return affected areas to original condition or as indicated by the Contract Documents.

D. Materials and facilities that constitute temporary facilities are property of the Contractor.

E. Pedestrian Traffic: Coordinate work so that pedestrian access is controlled at all times.

F. Parking: Do not permit own or Subcontractor's employees to park on the Owner's property, except in such areas as assigned by the Owner. Permit no parking on adjacent property.

**END OF SECTION 015000**

## PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. General: This Section specified administrative and procedural requirements for field engineering services, including, but not necessarily limited to, the following:

Land Survey work
Civil Engineering services

B. Contractor shall provide all necessary field and engineering surveying required.

## PART 2 - PRODUCTS

(Not Applicable)

## PART 3 - EXECUTION

3.01 EXAMINATION

A. Existing utilities and equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, the Contractor must investigate and verify the existence and location of underground utilities and other construction.

3.02 PERFORMANCE

A. The Contractor will be responsible for protecting all survey stakes throughout the duration of construction. Should stakes be damaged or removed, the Contractor will be responsible for either replacing the stakes at his expense or compensating the Owner's engineer for replacing the stakes.

**END OF SECTION 017123**

# 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. Form-facing material for cast-in-place concrete.
2. Form liners.
3. Insulating concrete forms.
4. Shoring, bracing, and anchoring.

B. Related Requirements:
1. Section 033000 “Cast-in-Place Concrete” for information related to cast-in-place concrete.

## 1.3 DEFINITIONS

A. Form-Facing Material: Temporary structure or mold for the support of concrete while the concrete is setting and gaining sufficient strength to be self-supporting.

B. Formwork: The total system of support of freshly placed concrete, including the mold or sheathing that contacts the concrete, as well as supporting members, hardware, and necessary bracing.

## 1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at either the Project Site or virtually. If conducted virtually, the meeting organize shall ensure that the application used for the meeting allows for sharing of screens.

1. Review the following:

a. Special inspection and testing and inspecting agency procedures for field quality control.
b. Construction joints, expansion joints, isolation joints, and control joints
c. Forms and form-removal limitations.
d. Shoring and reshoring procedures.
e. Anchor rod and anchorage device installation tolerances.

1.5 ACTION SUBMITTALS

A. Product Data: For each of the following:

1. Exposed surface form-facing material.
2. Concealed surface form-facing material.
3. Forms for cylindrical columns.
4. Pan-type forms.
5. Void forms.
6. Form liners.
7. Insulating concrete forms.
8. Form ties.
9. Waterstops.
10. Form-release agent.

B. Shop Drawings: Prepared by, and signed and sealed by, a qualified professional engineer responsible for their preparation, detailing fabrication, assembly, and support of forms.

1. For exposed vertical concrete walls, indicate dimensions and form tie locations.
2. Indicate dimension and locations of construction and movement joints required to construct the structure in accordance with ACI 301.

    a. Location of construction joints is subject to approval of the Design Team.

    b. When post-tensioning reinforcing is also present, location of construction joints is subject to post-tensioning tendon drape profiles.

3. Indicate location of waterstops.
4. Indicate form liner layout and form line termination details.
5. Indicate proposed schedule and sequence of stripping of forms, shoring removal, and reshoring installation and removal.
6. Indicate layout of insulating concrete forms, dimensions, course heights, form types, and details.

C. Samples (to be submitted to the Project Architect):

1. For waterstops.
2. For Form Liners: 12-inch by 12-inch sample, indicating texture.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing and inspection agency.

B. Research Reports: For insulating concrete forms indicating compliance with International Code Council Acceptance Criteria AC353.

C. Field quality-control reports.

D. Minutes of preinstallation conference.

1.7 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

B. Mockups: Formed surfaces to demonstrate typical joints, surface finish, texture, tolerances, and standard of workmanship.

1. Build panel to dimensions provided by the Owner, in the location indicated or, if not indicated, as directed by Owner.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Form Liners: Store form liners under cover to protect from sunlight.

B. Insulating Concrete Forms: Store forms off ground and under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

C. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.

1. Design wood panel forms in accordance with APA's "Concrete Forming Design/Construction Guide."
2. Design formwork to limit deflection of form-facing material to 1/240 of center-to-center spacing of supports.

B. Design, engineer, erect, shore, brace, and maintain insulating concrete forms in accordance with ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.

1. Design cross ties to transfer the effects of the following loads to the cast-in-place concrete core:

a. Wind Loads: As indicated on Drawings.

## 2.2 FORM-FACING MATERIALS

A. As-Cast Surface Form-Facing Material:

1. Provide continuous, true, and smooth concrete surfaces.
2. Furnish in largest practicable sizes to minimize number of joints.
3. Acceptable Materials: As required to comply with Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete, and as follows:

    a. Plywood, metal, or other approved panel materials.
    b. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

        1) APA HDO (high-density overlay).
        2) APA MDO (medium-density overlay); mill-release agent treated and edge sealed.
        3) APA Structural 1 Plyform, B-B or better; mill oiled and edge sealed.
        4) APA Plyform Class I, B-B or better; mill oiled and edge sealed.

B. Concealed Surface Form-Facing Material: Lumber, plywood, metal, plastic, or another approved material.

1. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class, and without spiral or vertical seams.

1. Provide forms with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

D. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation, with straight end forms.

E. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.

F. Form Liners:
1. Size: As approved by the project Architect.
2. Face Pattern: As approved by the project Architect.

## 2.3 INSULATING CONCRETE FORMS

A. Insulating Concrete Forms: Concrete-forming system complying with ASTM E2634, consisting of two panels of insulation connected with cross ties.
1. Amvic R22 ICF by Amvic Building Systems, Inc.

2. Amvic R30 ICF by Amvic Building Systems, Inc.
3. BuildBlock Insulated Concrete Forms by BuildBlock Building Systems
4. Or Equal, as approved by the Design Team
5. Insulation: ASTM C578, Type II, expanded polystyrene.

    a. Thickness: Not less than 2-1/2 inches each face.
    b. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

        1) Flame Spread: 25 or less.
        2) Smoke Developed Index: 450 or less.

6. Cross Ties: Polypropylene, with integral reinforcement supports, designed to allow passage of concrete during placement.
7. Core Thickness: As indicated in the project Drawings.

## 2.4 WATERSTOPS

A. Flexible Rubber Waterstops: U.S. Army Corps of Engineers CRD-C 513, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
    1. Profile: As indicated in the project Drawings.
    2. Dimensions: As indicated in the project Drawings.

B. Chemically Resistant Flexible Waterstops: Thermoplastic elastomer rubber waterstops with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints; resistant to oils, solvents, and chemicals. Factory fabricate corners, intersections, and directional changes.
    1. Profile: As indicated in the project Drawings.
    2. Dimensions: As indicated in the project Drawings.

C. Flexible PVC Waterstops: U.S. Army Corps of Engineers CRD-C 572, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
    1. Profile: As indicated in the project Drawings.
    2. Dimensions: As indicated in the project Drawings.

D. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.

E. Self-Expanding Rubber Strip Waterstops: Manufactured rectangular or trapezoidal strip, bentonite-free hydrophilic polymer-modified chloroprene rubber, for adhesive bonding to concrete, 3/8 by 3/4 inch.

2.5 RELATED MATERIALS

A. Reglets: Fabricate reglets of not less than 0.022-inch-thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

B. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch-thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

E. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
2. Form release agent for form liners shall be acceptable to form liner manufacturer.

F. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

PART 3 - EXECUTION

3.1 INSTALLATION OF FORMWORK

A. Comply with ACI 301.

B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 and to comply with the Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete" for as-cast finishes

C. Limit concrete surface irregularities as follows:

1. Surface Finish-1.0: ACI 117 Class D, 1 inch.
2. Surface Finish-2.0: ACI 117 Class B, 1/4 inch.
3. Surface Finish-3.0: ACI 117 Class A, 1/8 inch.

D. Construct forms tight enough to prevent loss of concrete mortar.

1. Minimize joints.
2. Exposed Concrete: Symmetrically align joints in forms.

E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.

1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
3. Install keyways, reglets, recesses, and other accessories, for easy removal.

F. Do not use rust-stained, steel, form-facing material.

G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.

1. Provide and secure units to support screed strips
2. Use strike-off templates or compacting-type screeds.

H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.

1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.
2. Locate temporary openings in forms at inconspicuous locations.

I. Chamfer exterior corners and edges of permanently exposed concrete.

J. At construction joints, overlap forms onto previously placed concrete not less than 12 inches.

K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.

1. Determine sizes and locations from trades providing such items.
2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.

L. Construction and Movement Joints:

1. Construct joints true to line with faces perpendicular to surface plane of concrete.
2. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
3. Place joints perpendicular to main reinforcement.
4. Locate joints for beams, slabs, joists, and girders in the middle third of spans.

    a. Offset joints in girders a minimum distance of twice the beam width from a beam- girder intersection.

5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
6. Space vertical joints in walls as indicated on the project Drawings.

a. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

M. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.

1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.
2. Close temporary ports and openings with tight-fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.

N. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

O. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

P. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

## 3.2 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
4. Install dovetail anchor slots in concrete structures, as indicated on Drawings.
5. Clean embedded items immediately prior to concrete placement.

## 3.3 INSTALLATION OF WATERSTOPS

A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm.

1. Install in longest lengths practicable.
2. Locate waterstops in center of joint unless otherwise indicated on Drawings.
3. Allow clearance between waterstop and reinforcing steel of not less than 2 times the largest concrete aggregate size specified in Section 033000 "Cast-In-Place Concrete."
4. Secure waterstops in correct position at 12 inches on center.
5. Field fabricate joints in accordance with manufacturer's instructions using heat welding.

a. Miter corners, intersections, and directional changes in waterstops.

b. Align center bulbs.

6. Clean waterstops immediately prior to placement of concrete.
7. Support and protect exposed waterstops during progress of the Work.

B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated on Drawings, according to manufacturer's written instructions, by adhesive bonding, mechanically fastening, and firmly pressing into place.

1. Install in longest lengths practicable.
2. Locate waterstops in center of joint unless otherwise indicated on Drawings.
3. Protect exposed waterstops during progress of the Work.

## 3.4 INSTALLATION OF INSULATING CONCRETE FORMS

A. Comply with ACI 301 and manufacturer's instructions.

B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Install forms in running bond pattern.

1. Align joints.
2. Align furring strips.

D. Construct forms tight to prevent loss of concrete mortar.

E. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.

1. Determine sizes and locations from trades providing such items.
2. Obtain written approval of the project Structural Engineer of Record (SEOR) and project Architect prior to forming openings not indicated on the project Drawings.

F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.

1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.
2. Close temporary ports and openings with tight fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.

G. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

H. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

I. Shore insulating concrete forms to ensure stability and to resist stressing imposed by construction loads.

3.5 REMOVING AND REUSING FORMS

A. Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form- removal operations, and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 75 percent of its 28-day design compressive strength, or when written direction to remove formwork has been provided by the project Structural Engineer of Record (SEOR).
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work.

1. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.
2. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints.

1. Align and secure joints to avoid offsets.
2. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.6 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.

B. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
1. Testing agency shall immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
2. Testing agency shall report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.

C. Inspections:

1. TDEC will inspect and need to approve all concrete installed to meet ADA.
2. Inspect formwork for shape, location, and dimensions of the concrete member being formed.
3. Inspect insulating concrete forms for shape, location, and dimensions of the concrete member being formed.

**END OF SECTION 031000**

## 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 reinforcement bars.
2. Welded-wire reinforcement.

B. Related Requirements:

1. Section 031000 "Concrete Forming and Accessories" for concrete formwork and non-prestressed steel reinforcement, except for non-prestressed reinforcement.
2. Section 033000 “Cast-in-Place Concrete” for information related to cast-in-place concrete.

### 1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at either the Project Site or virtually. If conducted virtually, the meeting organize shall ensure that the application used for the meeting allows for sharing of screens.

1. Review the following:

a. Special inspection and testing and inspecting agency procedures for field quality control.
b. Construction joints, expansion joints, isolation joints, and control joints
c. Steel reinforcement installation.
d. Coordination with installation of post-tensioning reinforcing

### 1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Each type of steel reinforcement.
2. Epoxy repair coating.
3. Zinc repair material.

4. Bar supports.
5. Mechanical splice couplers.

B. Shop Drawings: Comply with ACI SP-066:

1. Include placing drawings that detail fabrication, bending, and placement.
2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.

C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.

1. Location of construction joints is subject to approval of the Design Team.

2. When post-tensioning reinforcing is also present, location of construction joints is subject to post-tensioning tendon drape profiles.

## 1.5 INFORMATIONAL SUBMITTALS

A. Qualification Statements: For testing and inspection agency.

B. Welding certificates.

1. Reinforcement To Be Welded: Welding procedure specification in accordance with AWS D1.4/D1.4M

C. Material Certificates: For each of the following, signed by manufacturers:

1. Epoxy-Coated Reinforcement: CRSI's "Epoxy Coating Plant Certification."
2. Dual-Coated Reinforcement: CRSI's "Epoxy Coating Plant Certification."

D. Material Test Reports: For the following, from a qualified testing agency:

1. Steel Reinforcement:

a. For reinforcement to be welded, mill test analysis for chemical composition and carbon equivalent of the steel in accordance with ASTM A706/A706M.

2. Mechanical splice couplers.

E. Field quality-control reports.

F. Minutes of preinstallation conference.

## 1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

B. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.4/D 1.4M.

C. Mockups: Reinforcing for cast-concrete formed surfaces, to demonstrate tolerances and standard of workmanship.

1. Build panel to dimensions provided by the Project Architect, in the location indicated or, if not indicated, as directed by Architect.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage and to avoid damaging coatings on steel reinforcement.

1. Store reinforcement to avoid contact with earth.
2. Do not allow epoxy-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
3. Do not allow dual-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
4. Do not allow stainless steel reinforcement to come into contact with uncoated reinforcement.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design insulated connection system, including attachment to building construction.

B. Structural Performance of Insulating Connection System: Insulated connection system shall withstand the following loads and stresses:

1. Dead Loads: As indicated on Drawings.

a. Shear Load: As indicated on Drawings.
b. Bending Moment: As indicated on Drawings.

2. Live Loads: As indicated on Drawings.

a. Shear Load: As indicated on Drawings.
b. Bending Moment: As indicated on Drawings.

C. Seismic Performance of Insulated Connection System: Insulated connection system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. Component Importance Factor: As indicated in the project Drawings.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A615/A615M, Grade 60 for bars up to #10; Grade 75 for #11 and larger bars, deformed.

B. Low-Alloy Steel Reinforcing Bars: ASTM A706/A706M, deformed.

C. Headed-Steel Reinforcing Bars: ASTM A970/A970M.

D. Galvanized Reinforcing Bars:

1. Steel Bars: ASTM A615/A615M, Grade 60 for bars up to #10; Grade 75 for #11 and larger bars, deformed bars.
2. Zinc Coating: ASTM A767/A767M, Class I zinc coated after fabrication and bending.

E. Epoxy-Coated Reinforcing Bars:

1. Steel Bars: ASTM A615/A615M, Grade 60 for bars up to #10; Grade 75 for #11 and larger bars, deformed deformed bars.
2. Epoxy Coating: ASTM A775 or[ASTM A934 with less than 2 percent damaged coating in each 12-inch bar length.

F. Steel Bar Mats: ASTM A184/A184M, fabricated from ASTM A615/A615M, Grade 60 deformed bars, assembled with clips.

G. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as- drawn steel wire into flat sheets.

H. Deformed-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, flat sheet.

I. Galvanized-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from galvanized-steel wire into flat sheets.

J. Epoxy-Coated Welded-Wire Reinforcement: ASTM A884/A884M, Class A coated, Type 1, deformed steel.

2.3 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A615/A615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.

B. Epoxy-Coated Joint Dowel Bars: ASTM A615/A615M, Grade 60, plain-steel bars, ASTM A775/A775M epoxy coated.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.

1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

a. For concrete surfaces exposed to view, where legs of wire bar support contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
b. For epoxy-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.
c. For dual-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.
d. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.
e. For stainless steel reinforcement, use CRSI Class 1 plastic-protected steel wire, all- plastic bar supports, or CRSI Class 2 stainless steel bar supports.

D. Mechanical Splice Couplers: ACI 318 Type 1, same material of reinforcing bar being spliced; compression-only type, tension-compression type, dowel-bar type, and mechanical-lap type, as referenced in the project Drawings.

E. Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch in diameter.

1. Finish: Plain.

F. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A775/A775M.

G. Zinc Repair Material: ASTM A780/A780M.

## 2.4 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

# PART 3 - EXECUTION

## 3.1 PREPARATION

A. Protection of In-Place Conditions:

1. Do not cut or puncture vapor retarder.
2. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

## 3.2 INSTALLATION OF STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.

B. Accurately position, support, and secure reinforcement against displacement.

1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.

2. Do not tack weld crossing reinforcing bars.

C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.

D. Provide concrete coverage in accordance with ACI 318.

E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

F. Splices: Lap splices as indicated on Drawings.

1. Bars indicated to be continuous, and all vertical bars shall be lapped not less than 36 bar diameters at splices, or 24 inches, whichever is greater.
2. Stagger splices in accordance with ACI 318.
3. Mechanical Splice Couplers: Install in accordance with manufacturer's instructions.
4. Weld reinforcing bars in accordance with AWS D1.4/D 1.4M, where indicated on Drawings.

G. Install insulated connection system in accordance with manufacturer's instructions.

H. Install welded-wire reinforcement in longest practicable lengths.

1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."

a. For reinforcement less than W4.0 or D4.0, continuous support spacing shall not exceed 12 inches.

2. Lap edges and ends of adjoining sheets at least one mesh spacing plus 2 inches for plain wire and 8 inches for deformed wire.
3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
4. Lace overlaps with wire.

I. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating in accordance with ASTM D3963/D3963M.

J. Zinc-Coated Reinforcement: Repair cut and damaged zinc coatings with zinc repair material in accordance with ASTM A780/A780M.

## 3.3 JOINTS

A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by the Design Team.

1. Place joints perpendicular to main reinforcement.
2. Continue reinforcement across construction joints unless otherwise indicated.
3. Do not continue reinforcement through sides of strip placements of floors and slabs.

B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

A. Comply with ACI 117.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Inspections:

1. Steel-reinforcement placement.
2. Steel-reinforcement mechanical splice couplers.
3. Steel-reinforcement welding.

C. Manufacturer's Inspections: Engage manufacturer of insulated connection system to inspect completed installations prior to placement of concrete, and to provide written report that installation complies with manufacturer's written instructions.

**END OF SECTION 032000**

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes the requirements for site grading, trenching, erosion control, placing topsoil, and geotechnical testing.

1.02 PAYMENT

A. Earthwork is unclassified.

B. The total volume of cut and fill for this project does not necessarily balance.

C. The Contractor is solely responsible for required additional fill or stockpiling of excess material.

D. Additional or alternate payment for earthwork will not be made for this work unless:

1. Additional excavation other than that bid is required due to unsuitable material found below or around proposed utilities, roads, structures and fills. This does not include soil with high water content.

2. The Owner's Representative requests additional excavation or backfill over and above that which is shown on the Drawings.

1.03 REFERENCE STANDARDS

A. ASTM: American Society for Testing and Materials

B. AASHTO: American Association of State and Highway Transportation Officials.

1.04 SUBMITTALS

A. The Contractor shall submit data in accordance with the Project's General Conditions for the following earthwork products:

1. Crushed stone material.
2. Erosion Control Products

B. Upon request from the Landscape Architect/Engineer, the Contractor shall submit an erosion control plan as identified in this specification prior to construction.

1.05 JOB CONDITIONS

Use all means necessary to control dust on and near the work and on and near all off- site

borrow areas if such dust is caused by the Contractor's operations during performance of the work or is resulting from the condition in which the Contractor leaves the site.

1.06 SOILS TESTING

A. Refer to Section 014100.

B. The Contractor shall be responsible for the protection of all disturbed areas to prevent erosion and sedimentation until final acceptance by the Consultant. Additional grading and erosion control measures may be required throughout the duration of the project, at no additional cost to the Owner.

C. If the Contractor allows water to pond in any area of the project, and if that ponding saturates or degrades the soils so they are not workable, and/or compaction cannot be obtained, it is the contractor's responsibility to amend the soils, based on the recommendations of a Geotechnical Engineer, and with the approval of the Landscape Architect/Engineer, so that work will continue on schedule, without undue delay to the project or additional cost to the Owner. Testing of these areas will be required to verify compaction.

1.07 PROTECTION

A. Protect excavations and grounds from water ponding and water damage. Construct and maintain temporary drainage pumping if required to keep excavations free of water. Maintain site in well-drained condition at all times.

B. Protect, maintain and restore benchmarks, monuments, and other reference points affected by this work. If bench marks, monuments or other permanent reference points are displaced or destroyed, points shall be re-established and markers reset under supervision of a licensed surveyor who shall furnish the Landscape Architect/Engineer with certification of his work, at no additional cost to the Owner.

C. Protect utilities, trees, and other items designated to remain in place.

1.10 TOPSOIL

A. Strip and stockpile all topsoil in cut and fill areas.

B. Provide silt fence or equivalent siltation barrier on downhill side of any topsoil stockpiles.

C. The topsoil stockpile shall be on site in an area approved by the Landscape Architect, Engineer, and/or Owner.

1.11 SUBGRADES

A. If rock is encountered in the grading operation where the proposed surface is to be pervious, remove it to a minimum of 12" below grade, or as determined by an on-site Geotechnical Specialist. Leave the final surface of the rock so that complete drainage will be provided and so that no water will be pocketed at any point.

PART 2 - PRODUCTS

2.01 TOPSOIL

A. Topsoil material shall be a natural, fertile, fine sandy loam possessing the characteristics of representative topsoil in the vicinity, which produce heavy growths of vegetation. The topsoil shall be free from subsoil, noxious weeds, stones, lime, cement, ashes, slag, or other deleterious matter. Topsoil shall be well drained from its original position and free from toxic quantities of acid or alkaline elements.

B. Topsoil shall be earth material containing at least 5 percent organic material by weight.

C. Topsoil shall be capable of supporting the vegetation planned for the project.

D. Topsoil shall be free from stones, rocks and foreign objects.

E. Topsoil shall have a clay content of 25 percent or less.

F. Topsoil removed during earthwork operations may be used providing it meets these requirements.

G. Topsoil obtained off site must be approved in writing by the Landscape Architect/Engineer.

2.02 CRUSHED STONE

A. Crushed stone products shall meet the requirements of AASHTO M-43, Size No. 57 unless noted differently on the plans, or called for by an on-site Geotechnical Specialist.

2.03 SOIL FILL

A. Soil fill shall consist of natural, fine-grained soils (clays and silts).

B. Soil fill shall be free of and rocks over 2 inches in their longest dimension.

C. Soil fill shall not contain more than 10 percent rock material by weight.

D. Soil fill shall have a having a plasticity index of not more than 20.

E. Soil fill shall have a liquid limit of 45.

F. Soil shall be free of organic matter and debris.

G. On-site material removed during earthwork operations may be used for earth fill providing it meets these requirements.

2.04 SELECT TRENCH BACKFILL

A. Select trench backfill shall include earth material removed during trenching operations free from organic and foreign material and rocks over 2 inches in their longest dimension.

PART 3 - EXECUTION

3.01 GENERAL

A. The Contractor shall obtain and pay for the permits required for this work.

B. The Contractor is solely responsible for the protection and replacement of benchmarks, property corner markers and other physical reference points.

C. Replacement of benchmarks and property corner markers shall be performed by a Surveyor licensed in the State of Tennessee.

D. The Owner's Representative reserves the right to alter the grades, lines and elevations found on the Drawings during construction. The contractor shall notify the Landscape Architect/Engineer of any grade discrepancies or problems where grade changes are required for the good of the project.

E. Except for structure excavations, earthwork shall be kept free from standing water at all times.

F. The Contractor shall utilize all practical precautions to control dust.

G. Necessary precautions shall be taken to protect all construction against flooding and/or floatation from hydrostatic uplift.

H. Familiarization:
Prior to all work of this section, become thoroughly familiar with the site, the site conditions, and all portions of the work falling within this section.

I. Backfilling Prior to Approvals

1. Do not allow or cause any of the work performed or installed to be covered up or enclosed by work of this section prior to all required inspections, tests, and approvals.

2. Should any of the work be so enclosed or covered up before it has been approved, uncover all such work at no additional cost to the Owner.

3. After the work has been completely inspected, and approved, make all repairs and replacements necessary to restore the work to the condition in which it was found at the time of uncovering, all at no additional cost to the Owner.

J. Over-excavation

Backfill and compact all over-excavated areas as specified for fill below and at no additional cost to the Owner.

3.02 PRELIMINARY AND LAYOUT WORK

A. All layout work shall meet or exceed current industry standards. Contractor shall stake out proposed utilities and adjust as necessary to avoid utility conflict, or route around trees designated to remain.

B. The Contractor shall have local utility companies inspect the site and locate existing utilities they own or operate prior to construction.

C. The Contractor shall locate utilities shown on the Drawings prior to construction.

3.03 EROSION CONTROL

A. The temporary and permanent erosion control measures shown on the Drawings are believed to be the minimum devices necessary to establish an erosion control plan for this project.

B. If requested, the Contractor shall submit an additional erosion control plan to the Engineer and Landscape Architect/Engineer prior to construction that identifies the following:
1. Additional erosion control measures that will be required for this project to prevent soil material from exiting the project site.
2. A schedule of when erosion control devices will be installed and removed.
3. A contingency plan to be implemented if the erosion control plan fails.

C. The Contractor is responsible for maintaining erosion control devices throughout construction.

D. The Landscape Architect/Engineer has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing.

E. The Contractor shall check and report in writing the condition of each erosion control devise and corrective measures taken on a bi-weekly basis, and after each rain event. These reports shall be made available to the Landscape Architect/Engineer/ Owner at their request.

3.04 REMOVAL OF TOPSOIL

A. Where earthwork will occur, existing topsoil shall be stripped to its entire depth.

B. Topsoil shall be stockpiled for future on-site use.

C. The Contractor shall not remove any topsoil from the project site without the approval from the Landscape Architect/Engineer/ Owner.

3.05 SITE GRADING

A. Site grading includes the removal and or placement of earth material as required to achieve the proposed contours, lines, spot elevations and foundation elevations as indicated on the Drawings with the necessary allowances for topsoil placement, surfacing, construction of structures and construction of buildings.

B. Unless otherwise noted on the Drawings, fill material shall be earth fill as described in this section.

C. Areas to receive fill shall be striped of topsoil or unsuitable material prior to fill placement.

D. Unsuitable material shall include materials not meeting the soil fill material requirements found in this specification.

E. Fill shall not be placed in water or on muddy or frozen areas.

F. Fill work shall be performed when soil moisture will permit optimum compaction.

G. Soil fill material shall be compacted in accordance with the soil compaction section of this specification.

H. Existing sub-grades resulting from topsoil or unsuitable material removal shall be compacted to comply with the density requirements of the soil compaction section of this specification.

I. Over-excavation not authorized in writing by the Landscape Architect/Engineer shall be backfilled with suitable soil fill or compacted crushed stone at the Landscape Architect/Engineer's discretion, at no additional cost to the Owner.

J. Outside of building and structure areas, the finish grade resulting from site grading, with the necessary allowance for topsoil and or surfacing shall not deviate more than 0.10 feet from the proposed lines, contours, spot elevations shown on the Drawings.

K. Within building and structure areas, the finish grade resulting from site grading shall not deviate more than 0.05 feet from the required foundation or slab base elevations shown on the drawings.

L. Graded surfaces shall drain surface water away from buildings and structures.

M. Site grading shall be approved by the Landscape Architect/Engineer prior to placement of topsoil and or surfacing. Site grading within areas of structure or building footprints shall be approved by the Landscape Architect/Engineer prior to construction of those structures.

N. Finished Condition of Graded surfaces

1. Upon completion of grading, all surfaces shall have a smooth, continuous grade, free of depressions, bumps and ruts. Uneven surfaces will be worked by the contractor, at the direction of the Landscape Architect/Engineer, and at no additional cost to the Owner, until considered acceptable by the Landscape Architect/Engineer.

2. All areas shall be kept free of rocks and gravel. Contractor shall remove any and all rocks, gravel or miscellaneous debris from graded areas, prior to seeding or sodding.

3. Contractor shall use any and all means, and/or equipment, necessary to achieve smooth finished grades, including hand raking.

A. Treatment after completion of grading

1. After grading is completed and the Landscape Architect/Engineer has finished his inspection, permit no further excavation, filling, or grading except with the approval of and inspection of the Landscape Architect/Engineer.

2. Use all means necessary to prevent the erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.

3.06 SOIL FILL COMPACTION

A. Soil fill shall be placed in layers having a depth of 0.5 feet or less such that the required compaction can be obtained.

B. Fill and compaction activities shall occur only when the affected soil's moisture content will permit optimum compaction.

C. Existing sub-grades and each layer of placed fill shall be compacted to meet the requirements of this specification.

D. Lawn areas shall be compacted to a minimum degree of compaction of 85% maximum density.

3.07 BACKFILL FOR STRUCTURES AND BUILDINGS

A. Backfilling shall not commence until the adjacent concrete and or masonry has attained sufficient strength to withstand pressure of backfill material and compacting operation.

B. Backfill material for structures shall be crushed stone unless otherwise indicated otherwise on the Drawings.

C. Backfill material shall be placed in lifts having a thickness such that the required

density can be obtained.

D. Backfill operations shall not commence until forms and debris have been removed and required foundation drains, waterproofing, and damp proofing has been examined and approved by the Landscape Architect/Engineer.

E. The Contractor shall use precaution when backfilling against walls to prevent damage to foundation drains, waterproofing and foundation drains.

3.10 TRENCHING

A. Trenching shall include the excavation, bedding and backfilling of trenches and excavations necessary for the installation of the utility and drainage improvements.

B. Trenches shall be excavated to the line and grade with an allowance for the pipe envelope as identified on the Drawings.

C. The Contractor shall remove material that the Landscape Architect/Engineer may deem unsuitable below the pipe envelope and refill the void crushed stone.

D. Pipe bedding material shall not be placed until the Landscape Architect/Engineer has determined that the foundation is sufficient to support the proposed construction.

E. In soil, the bottom of the trench shall be compacted to 95% of its maximum proctor density.

F. Any excavation carried below the required elevations not being due to unsuitable material shall be refilled with a compacted crushed stone at the Contractor's expense.

G. The pipe bedding material shall be placed, graded and compacted to 100%of its maximum proctor density prior to pipe installation as determined by ASTM D698, Method D.

H. The pipe envelope and trench backfill shall be as placed as shown on the drawings and compacted to 98%of the materials maximum proctor density as determined by ASTM D698, Method D.

I. When required by the Landscape Architect/Engineer, pipe bedding, pipe installation, pipe envelope placement shall not occur until it has been approved by the Landscape Architect/Engineer.

J. Trenches shall be backfilled with select trench backfill or crushed stone as noted on the drawings.

K. Trench backfill shall be compacted to 98% maximum proctor density as determined by ASTM D698, Method D.

L. The Contractor shall be responsible for any damages to any utility caused by

backfill and compaction activities.

3.11 TOPSOIL PLACEMENT

A. Areas disturbed by construction operations excluding surfaced, structure and building areas shall be covered with topsoil.

B. The topsoil layer shall have minimum depth of at least 4".

C. When the topsoil has been placed to the required depth, the area shall be graded to match the proposed contour lines and spot elevations or to match the original ground surface, whichever is applicable.

D. The final surface shall then be fine raked to remove all vegetable matter, stones, or other objectionable material and smoothed ready for fertilizing, seeding and mulching or installation of erosion control materials.

E. The finished surface of the topsoil layer shall not vary more than 0.05 feet from the proposed contours, lines, and elevations shown on the Drawings or to the original ground surface, whichever is applicable.

F. When requested by the Landscape Architect/Engineer, the finished grade of the entire site or any portion of it after topsoil placement is completed shall be surveyed by a Surveyor licensed in the State of Tennessee in a manner satisfactory to the Landscape Architect/Engineer to determine compliance with this specification and the Drawings.

G. Once the site topsoil is placed, the Contractor shall check random and representative samples of the material for pH.

H. Topsoil shall have a pH level between 6.0 and 6.5.

I. Lime or sulfur shall be added to topsoil as needed to achieve the necessary pH level.

J. During the warranty period the Contractor shall correct settlement within topsoil areas with additional topsoil.

3.12 RIP RAP INSTALLATION

A. N/A

3.13 ON-SITE DISPOSAL OF EXCESS AND UNSUITABLE MATERIAL

A. Excess and unsuitable materials may be deposited on site if approved by the Owner and Landscape Architect/Engineer.

B. Material shall not be taken from the project site without the approval of the Landscape Architect/Engineer.

C. Materials shall be transported and spread or stockpiled by the Contractor in locations identified by the Owner's Representative.

1. The material shall be graded to establish uniform slopes having a maximum grade of 20% and a minimum grade of 2%.
2. Topsoil below designated waste areas shall be stripped, stockpiled and re-spread over the final graded area.
3. Once the topsoil is placed in its final location, it shall be seeded, fertilized and mulched to establish in the planting section of these specifications.

3.14 SITE PROOF ROLLING

A. The Contractor shall proof roll the following areas:

1. Areas to receive fill once the topsoil or unsuitable materials are stripped and prior to fill placement.
2. Each level of fill prior to placing the following layer of fill.
4. Pavement and or surfacing sub-grades prior to placement of the pavement or surfacing stone base.
5. Pavement and or surfacing stone bases.

B. The Contractor shall provide a heavily-loaded tandem axle dump truck (minimum 80,000# total weight) and operator.

C. The truck shall travel in uniform and adjacent rows such that the area to be tested is tested in its entirety.

D. Noticeable soft or weak spots shall be corrected by a method acceptable to the Landscape Architect/Engineer.

A. Corrected soft or weak spots shall be proof rolled.

B. The Geotechnical Specialist, and or Project Engineer and Consultant will determine areas to be undercut, based on proof rolling and compaction test.

3.15 UNDERCUTTING

A. All undercutting shall consist of removing and disposing of unsatisfactory materials below subgrade elevation as shown on the plans, in cut sections, from areas upon which embankments and/or base are to be placed and may also include material excavated below the foundation elevation for pipe. Undercutting does not include the stripping, stockpiling, processing of soil with high water content, and placing of topsoil if required. Undercutting limits, along with remediation procedure shall be determined by the on-site Geotechnical Representative.

3.16 GEOTECHNICAL TESTING

A. The Owner may choose to employ and pay for a qualified and experienced independent Geotechnical Engineering Firm for geotechnical testing.

B. The Contractor shall cooperate fully with the Geotechnical Engineering Firm.

C. The Contractor shall notify the Geotechnical Engineering Firm a minimum of two working days in advance when work is to be tested.

D. The Geotechnical Engineering Firm shall report all findings in writing to the Landscape Architect/Engineer.

E. The Geotechnical Specialist shall inspect all excavations that will receive concrete slabs or footings and report the findings in writing.

F. The Geotechnical Specialist shall observe and check the density of each layer of fill placement at a rate of one test per 500 square feet for building and roadway areas and report the findings in writing.

G. The Geotechnical Specialist shall observe and check the density of each layer of fill placement at a rate of one test per 2,500 square feet for non-building or roadway areas and report the findings in writing.

H. The Geotechnical Specialist shall observe structural backfill operations and report the findings in writing.

I. The Geotechnical Specialist shall witness and report in writing the results of proof roll testing performed by the Contractor.

J. The Geotechnical Engineering Firm shall perform any other Geotechnical test it believes is necessary to help insure that the earthwork related to this project is performed in accordance with the Construction Documents and in accordance with current industry standards.

**END OF SECTION 310000**

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section Includes:

1. Preparing subgrades for walks and pavements.
2. Subbase course for concrete walks and pavements.
3. Subbase course and base course for asphalt paving.
4. Excavating and backfilling for utility trenches.
5. Preparing and installing bioretention areas.
6. Soil course for bioretention areas.

### 1.2 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

F. Fill: Soil materials used to raise existing grades.

G. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

H. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

I. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

## 1.3 QUALITY ASSURANCE

A. A geotechnical engineer familiar with the requirements of the geotechnical engineering study, selected and paid by the Owner, shall be retained to perform construction inspection on site based on density testing, visual observation, and judgment. This inspection will not relieve the Contractor from his responsibility to complete the work in accordance with the drawings and specifications.

B. Visual field confirmation and density testing of subgrade preparation and fill placement procedures shall be performed by the field geotechnical engineer as part of the construction testing requirements. The Contractor shall be informed as soon as possible of the test results.

C. The geotechnical engineer shall prepare field reports that indicate compaction test location, elevation data, testing results and acceptability. The Owner and Contractor shall be provided with written copies of the results within 24 hours of time test was performed.

D. All costs related to re-inspection, due to failures, shall be paid for by the Contractor at no additional expense to Owner. The Owner reserves the right to direct any inspection that is deemed necessary. Contractor shall provide free access to site for inspection activities.

## 1.4 RELATED DOCUMENTS

A. Geotechnical Engineering Study (Soils Report) - If the Owner employed a geotechnical engineer to investigate sub-surface soil conditions and make recommendations regarding sitework construction procedures. Perform all work in accordance with the recommendations and requirements therein. If conflicts exist between the geotechnical engineering study and the construction drawings and specifications, the more stringent requirements shall apply.

B. Contract documents.

## 1.5 SUBMITTALS

A. Bioretention Soil:

1. Bioretention soil shall be submitted at least four (4) weeks in advance of bioretention soil fill use.

2. Submit the name of each material supplier and specific type and source of each material. Any change in source or soil type requires the approval of the Civil Engineer.

1.6 PROJECT CONDITIONS

A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations. Contractor to allow for removal and/or relocation of any utilities that are in conflict with the proposed improvements.

B. Do not commence earth moving operations until plant-protection measures specified in Division 01 Section "Temporary Tree and Plant Protection" are in place.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Satisfactory soils are specified in other documentation such as a Geotechnical report. Soils should be free of rock or gravel 4-in (100-mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.

E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.

G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.

H. On-site fill

1. On-site materials for use as fill shall consist of excavated soil from other portions of the site;

2. The Contractor shall use the on-site soil judiciously to facilitate the construction schedule including the use of the most readily compactable soil for fill in building areas and as fill within 2 feet of pavement subgrade;

3. Topsoil shall not be utilized as engineered fill;

4. Excavated material containing rock, stone or masonry debris smaller than 2 feet in its largest dimension, may be mixed with suitable material and utilized inside the building limits up to 6 feet below proposed subgrade; up to 3 feet below proposed subgrade outside the building limits;

5. Excavated material containing rock, stone or masonry debris smaller than 6 inches in its largest dimension may be mixed with suitable material and utilized inside the building limits up to 3 feet below proposed subgrade; up to 18 inches below proposed subgrade outside the building limits;

6. No material greater than 2 inches in its largest dimension may be utilized inside the building limits within 3 feet of proposed subgrade; within 18 inches of proposed subgrade for all other areas;

7. No material greater than 3 inches in its largest dimension may be utilized as backfill for storm drainage or utility trenches;

8. Prior to placement, on-site material to be used as fill shall not contain:

   a. Debris other than crushed concrete and brick meeting the above requirements.

   b. Timber or railroad ties.

   c. Other deleterious materials such as steel rails, rebar, trash, etc.

   d. Hazardous material - Unsuitable and deleterious materials and debris shall be disposed of off-site in accordance with all applicable regulations.

9. Fill shall be clean, well graded granular soil which is non-expansive and non-collapsible and shall have less than 20% by weight passing the #200 sieve. The portion passing the #200 shall be non-plastic. Fill with less fines (less than #200) may be required on project specific bases and as required by geotechnical engineer. Likewise, fill with more than 20% fines may be acceptable on a project specific basis or as identified in the geotechnical engineering study.

I. Off-site imported fill

1. If necessary, off-site fill shall be obtained and provided by the Contractor;

2. Fill shall be clean, well graded granular soil which is non-expansive and non-collapsible and shall have less than 20% by weight passing the #200 sieve. The portion passing the #200 shall be non-plastic. Fill with less fines (less than #200) may be required on project specific basis and as required by geotechnical engineer. Likewise, fill with more than 20% fines may be acceptable on a project specific basis or as identified in the geotechnical engineering study;

3. Imported fill shall be free of all hazardous substances. Certification of compliance and, if requested, test results substantiating compliance shall be furnished to the Owner and geotechnical engineer by the Contractor not less than one week prior to its intended use;

4. The Owner reserves the right to test off-site fill material for conformance with these specifications; and,

5. The Contractor shall be responsible for all permits and regulatory requirements associated with offsite borrows sources.

J. Bioretention Soils

1. Itsaul Natural Bioretention Growing Media shall be used as indicated on the plans as the bioretention soil.
   a. Any proposed substitutes must be submitted to the engineer four (4) weeks in advance of placement for review and shall include the following information:
      1) Composition of soil media
      2) Permeability
      3) pH range
      4) Magnesium, phosphorus, and potassium levels

2. Soil shall be permeable enough to allow runoff to filter through the media, while having characteristics suitable to promote and sustain a robust vegetative cover crop.

3. A permeability of at least 1.0 feet per day (0.5”/hr) is required.

4. The soils should be free of stones, stumps, roots, or other woody material over 1” in diameter. Brush or seeds from noxious weeds (such as Johnson Grass, Mugwort, Nutsedge, and Canadian Thistle) should not be present in the soils.

5. Do not add N-P-K fertilizer to the soil.

6. Soil characteristics are presented below:

| **Parameter** | **Value** |
|---|---|
| pH range | 5.2 to 7.0 |
| P Index | 10 – 30 |
| Magnesium | 35 lbs per acre, min |
| Phosphorus | 75 lbs per acre, min |
| Potassium | 85 lbs per acre, min |
| Soluble salts | 500 ppm |

| | |
|---|---|
| Permeability | 0.5 inch/hour, min |
| Clay/silt content | <8% |

2.2 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility; colored to comply with local practice or requirements of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prior to bidding of all work within this section, the Contractor shall become thoroughly familiar with the geotechnical engineering study and construction documents as well as the site, site conditions, and all portions of the work falling within this section.

B. The Contractor shall refer to the erosion control drawings for staging of earthwork operations and for erosion control measures to be implemented prior to commencement of earthwork.

C. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

D. Notify utility companies to allow removal and/or relocation of any utilities that are in conflict with the proposed improvements.

E. Protect and maintain erosion and sedimentation controls during earth moving operations.

F. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

G. Protect benchmarks, property corners and all other survey monuments from damage or displacement. If a marker needs to be removed/relocated it shall be referenced by a licensed land surveyor and replaced, as necessary, by the same at no additional cost to the Owner

H. When performing grading operations during periods of prolonged wet or dry weather, provide adequate measures for surface drainage and ground water control, and moisture control of soils (i.e., wetting or drying, scarify and discing) so as to place and compact the soil within the moisture content range a few percentage points of its optimum water content. Any disturbed areas should be proof-rolled at the end of each day.

I. Any material imported or exported from the site shall be hauled or to a site that has obtained a permit.

J. The Contractor shall obtain a permit from Hartsville/Trousdale County prior to hauling of dirt or demolition materials.

3.2 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

B. Excavations at Edges of Tree and Plant Protection Zones:

1. Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

2. Cut and protect roots according to requirements in Division 01 Section "Temporary Tree and Plant Protection."

3.4 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit unless otherwise indicated.

1. Clearance: 12 inches (300 mm) each side of pipe or conduit or as otherwise indicated in the plans.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material, 4 inches (100 mm) deeper elsewhere, to allow for bedding course.

D. Trenches in Tree and Plant Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.

3. Cut and protect roots according to requirements in Division 01 Section "Temporary Tree and Plant Protection."

## 3.6 BIORETENTION AREAS

A. Bioretention areas shall be protected during construction from traffic, debris and sediment.

B. All sediment and debris shall be removed prior to installation.

C. Bioretention areas shall be installed after permanent stabilization of the site.

D. Bioretention cross section and soil material shall be placed over native, un-compacted subgrade unless the bioretention area is in a location of fill material. Do not over-compact the subgrade.

E. Install bioretention soils to the depth and area indicated on the construction documents.

F. Placement of the planting soil shall be in lifts of 12-18-inches, loosely compacted (tamped lightly with a dozer or backhoe bucket or by hand). Bioretention soil not to be over-compacted or mechanically compacted.

G. Install plant material and mulch as shown on the civil and/or landscape construction documents following soil installation.

H. After installation of bioretention soil, the area shall be protected from concentrated flow or direct runoff until permanent vegetation is established.

## 3.7 SUBGRADE INSPECTION

A. Proof-roll subgrade below pavements and sidewalks with a pneumatic-tired dump truck to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

## 3.8 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi (17.2 MPa), may be used when approved by Architect.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

## 3.9 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

## 3.10 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Place and compact initial backfill of subbase material, free of particles larger than 1 inch (25 mm) in any dimension, to a height of 12 inches (300 mm) over the pipe or conduit.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

D. Place and compact final backfill of satisfactory soil to final subgrade elevation.

E. Install warning tape directly above utilities, 12 inches (300 mm) below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.

3.11 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.

2. Under walks and pavements, use satisfactory soil material.

3. Under steps and ramps, use engineered fill.

4. Under building slabs, use engineered fill.

5. Under footings and foundations, use engineered fill.

3.12 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.

2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.13 PROOFROLLING

A. The work covered by this subsection consists of furnishing and operating, proof-rolling equipment at the direction of the Owner's representative and/or geotechnical engineer.

B. Proof-rolling shall be under the observation of the Owner's representative and/or the geotechnical engineer as described herein and under the following schedule:

1. Immediately following the completion of excavation to proposed subgrades in cut areas, proof-rolling shall be performed as specified; and,

2. Immediately prior to and following stone base course placement, in pavement and building pad areas for final floor slab preparation, all subgrade and stone base areas shall be proof-rolled. Any areas which deflect, rut or pump under the loaded dump truck shall be undercut and replaced with compacted fill material or

stone base course as directed by the geotechnical engineer and approved by the Owner, at no additional cost to the Owner.

C. Proof-rolling shall be done with 1 pass of a fully loaded tandem dump truck equal to or exceeding 50,000 lbs or other construction equipment if approved by the geotechnical engineer.

D. Construction methods shall be as follows:

1. After the subgrade or stone base course has been completed the subgrade or stone base course shall then be proof-rolled. The coverage areas and methods will be identified by the geotechnical engineer;

2. The equipment shall be operated at a speed that the geotechnical engineer can comfortably and slowly walk alongside the equipment;

3. If it becomes necessary to take corrective action, such as but not limited to underdrain installation, undercut and backfill of an unsuitable material, and aeration of excessively wet material in areas that have been proof-rolled, see Article 3.03. These areas shall be proof-rolled again following the completion of the necessary corrections. If the corrections are necessary due to the negligence of the Contractor, the corrective work and additional proof-rolling shall be performed by the Contractor at no cost to the Owner; and,

4. The Contractor shall protect all structural facilities on the project, such as but not limited to box culverts, pipe culverts, and utilities, from damage by the proof- rolling equipment.

## 3.14 COMPACTION OF SOIL BACKFILLS, FILLS AND SUBGRADE

A. Place backfill and fill soil materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698 or ASTM D 1557 according to the Geotechnical engineering study or as indicated in the following table:

| Location or Area | Standard Proctor Density ASTM D698 (AASHTO T 99) | Testing Frequency 1 per lift per |
|---|---|---|
| Structures and Walkways | 95% | 20,000 sf |
| Retaining Walls | 95% | 1,000 sf |
| Trenches | 95% | 150 lf |

| Location or Area | Standard Proctor Density ASTM D698 (AASHTO T 99) | Testing Frequency 1 per lift per |
|---|---|---|
| Lawn or Unimproved Areas | 92% | 20,000 sf |
| Building and Pavement Sub-grades (Top 18 inches) | 100% | 10,000 sf |
| Building and Pavement Sub-grades (Below Top 18 inches) | 95% | 15,000 sf |
| Bioretention and infiltration areas | do not overcom-pact | n/a |

D. Any soft areas exhibiting excessive weaving or unsatisfactory material identified during excavation, fill placement, compaction and proof testing shall be removed, replaced with suitable fill, and compacted as specified in the table above.

3.15 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch (25 mm).

2. Walks: Plus or minus 1 inch (25 mm).

3. Pavements: Plus or minus 1/2 inch (13 mm).

3.16 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:

1. Shape subbase course and base course to required crown elevations and cross-slope grades.

2. Place subbase course and base course that exceeds 6 inches (150 mm) in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick.

3. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.17 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

C. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable.

D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; re-compact and retest until specified compaction is obtained. Subgrade to be Minimum 95% Proctor.

3.18 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

D. Remove areas of finished subgrade judged to be unsatisfactory to the depth necessary and replace in a manner that will comply with compaction requirements by use of material equal to or better than the best subgrade material on site. Surface of subgrade after compaction shall be hard, uniform, smooth, stable, and true to grade and cross-section.

3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

**END OF SECTION 312000**

## PART 1 - GENERAL

### 1.01 DESCRIPTION

This item shall consist of a base course composed of crushed, partially crushed or uncrushed coarse aggregate bonded with either soil or fine aggregate or both. It shall be constructed on a prepared underlying course in accordance with these specifications and shall conform to the dimensions and typical cross sections shown on the Plans and with the lines and grades established by the Landscape Architect/Engineer.

## PART 2 - PRODUCTS

### 2.01 AGGREGATE BASE COURSE MATERIALS

A. Base coarse material shall meet the requirements of the TDOT Standard Specifications for Road and Bridge Construction, Current Edition.

### 2.02 EQUIPMENT

All equipment necessary for the proper construction of this work shall be on the project, in first-class working condition, and approved by the Landscape Architect/Engineer before construction is permitted to start.

## PART 3 - EXECUTION PROCEDURES

### 3.01 PREPARING UNDERLYING COURSE

A. The underlying course shall be checked and accepted by the Engineer before placing and spreading operations are started. Any ruts or soft, yielding places due to improper drainage conditions, hauling, or any other cause, shall be corrected and rolled to the required density before the base course is placed thereon.

### 3.02 METHOD SPREADING

A. Base course shall be placed and compacted in accordance with the TDOT Standard Specifications for Road and Bridge Construction, Current Edition.

B. The aggregate base material that is correctly proportioned, or has been processed in a plant, shall be placed on the prepared underlying course, and compacted in layers of thickness shown on the Plans or as directed by the Landscape Architect/Engineer. The depositing and spreading of the material shall commence where designated and shall progress continuously without breaks. The material shall be deposited and spread in a uniform layer and without segregation of size to such loose depth that, when compacted, the layer shall have the required thickness.

C. In spreading, care shall be taken to prevent cutting into the underlying layer. The material shall be bladed until a smooth, uniform surface is obtained, true to line and grade.

3.03 FINISHING AND COMPACTING

A. After spreading, the aggregate shall be thoroughly compacted by rolling. Compacting shall continue until the base material has been compacted to not less than 95% density as determined in accordance with AASHTO T-99, Method D.

B. The course shall not be compacted when the underlying course is soft or yielding or when tamping causes undulation in the base course. When the rolling develops irregularities that exceed 3/8 inch when tested with a 16-foot straightedge, the irregular surface shall be loosened, refilled with the same kind of material as that used in constructing the course, and rolled again as required.

C. After the course has been completely compacted, the surface shall be tested with a stringline for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified, reshaped, recompacted, and otherwise manipulated as the Landscape Architect/Engineer may direct until the required smoothness and accuracy is obtained. The finished surface shall not vary more than 3/8 inch from a 16-foot straightedge when applied to the surface parallel with, and at right angles to, the centerline.

**END OF DOCUMENT 321123**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cold milling of existing hot-mix asphalt pavement.

2. Hot-mix asphalt patching.

3. Hot-mix asphalt paving.

4. Hot-mix asphalt paving overlay.

5. Pavement-marking paint.

B. Related Sections:

1. Division 31 Section "Earth Moving" for aggregate subbase and base courses and for aggregate pavement shoulders.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

1. Job Mix Designs: Contractor shall submit a mix design per TDOT Standard Specifications for Road and Bridge Construction, latest edition. Include in this specification, for each pavement course proposed for construction for the Owner's review and approval 45 days prior to schedule production and lay down of the mix.

2. Material Certificates: Contractor shall submit certificates stating that asphalt mix to be supplied complies with the specifications of the Tennessee DOT or regulatory authority having jurisdiction, as well as copies the regulatory specifications corresponding to the asphalt mix formula and material. The certificates shall be signed by the asphalt mix producer and the Contractor.

B. Material Certificates: For each paving material, from manufacturer.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall be registered with and approved by Tennessee DOT and product must be on Qualified Product List.

B. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of Tennessee DOT for asphalt paving work.

1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

C. Asphalt-Paving Publication: Comply with Asphalt Institute Manual MS-22, "Construction of Hot Mix Asphalt Pavements," unless more stringent requirements are indicated.

1.4 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:

1. Tack Coat: Minimum surface temperature of 50 deg F.

2. Revise temperature in first subparagraph below to suit Project. Thicker asphalt base courses may be placed if surface temperature exceeds freezing.

3. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.

4. Asphalt Surface Course: Minimum surface temperature of 50 deg F at time of placement.

B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F (4.4 deg C) for oil-based materials 55 deg F (12.8 deg C) for water-based materials, and not exceeding 95 deg F (35 deg C).

PART 2 - PRODUCTS

2.1 AGGREGATES

A. Coarse Aggregate: ASTM D 692, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.

B. Fine Aggregate: ASTM D 1073 or AASHTO M 29, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.

2.2 ASPHALT MATERIALS

A. Asphalt Binder: The type and grade of asphalt cement for the paving mixture shall comply with the applicable requirements of AASHTO Specification M226, Table 2, and meet governing DOT specifications.

1. Performance graded binder: PG 67-22 or 76-22

B. Tack Coat: AASHTO M 140 and Tennessee DOT specifications emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

2.3 AUXILIARY MATERIALS

A. Herbicide: Commercial chemical for weed control, registered by the EPA. Provide in granular, liquid, or wettable powder form.

B. Pavement-Marking Paint: Thermoplastic unless otherwise noted

1. Color: As indicated

2.4 MIXES

A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction by Tennessee DOT and designed according to procedures in AI MS-2, "Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types" and complying with the following requirements unless otherwise required by DOT:

1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

B. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 COLD MILLING

A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.

1. Mill to a depth of 2 inches (50 mm).

3.3 PATCHING

A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches (300 mm) into adjacent sound pavement, unless otherwise

indicated. Cut excavation faces vertically. Remove excavated material. Re-compact existing unbound-aggregate base course to form new subgrade.

B. Portland Cement Concrete Pavement: Break cracked slabs and roll as required to reseat concrete pieces firmly.

1. Remove disintegrated or badly cracked pavement. Excavate rectangular or trapezoidal patches, extending into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Re-compact existing unbound-aggregate base course to form new subgrade.

C. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.15 gal./sq. yd. (0.2 to 0.7 L/sq. m).

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.

2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

D. Patching: Fill excavated pavements with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

## 3.4 SURFACE PREPARATION

A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.

C. Prime Coat: Apply uniformly to non-asphalt surfaces when specified on the drawings at a rate of 0.20 gal/sq. yd.

D. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd. (0.2 to 0.7 L/sq. m).

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.

2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

## 3.5 HOT-MIX ASPHALT PLACING

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Spread mix at minimum temperature of 250 deg F (121 deg C).

2. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet (3 m) wide unless infill edge strips of a lesser width are required.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

## 3.6 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.

2. Offset longitudinal joints, in successive courses, a minimum of 6 inches (150 mm).

3. Offset transverse joints, in successive courses, a minimum of 24 inches (600 mm).

4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."

## 3.7 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F (85 deg C).

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

G. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.8 INSTALLATION TOLERANCES

A. Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Base Course: ±1/4 inch;

2. Binder (Intermediate) Course: ±1/4 inch; and,

3. Surface Course: ± 1/8 inch.

B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base Course: 1/2 inch;

2. Binder (Intermediate) Course: 1/4 inch; and,

3. Surface Course: 1/4 inch.

C. Contractor's duties relating to testing include:

1. Notify Owner 72 hours prior to asphalt paving;

2. Notifying laboratory of conditions requiring testing; and,

3. Coordinate with laboratory for field testing.

3.9 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.

B. Allow paving to age for 30 days before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils (0.4 mm).

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections. Testing agency shall be paid by the Owner.

B. The Owner shall, if desired, pay for and have testing agency take two 4-inch diameter cores per 5,000 sq. yds. of intermediate course, at locations selected by Owner, for thickness tests. Contractor shall repair holes resulting from coring to match existing paving. The Owner reserves the right to take additional testing, and should these tests show insufficient thickness, all areas shall be remediated as prescribed by the Owner.

C. The Owner shall, if desired, provide on-site nuclear density testing at random locations during paving operations for all proposed asphalt courses. The nuclear density gauge is to be calibrated with the cores noted above.

D. The Contractor may be required to remove and replace hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements, at no cost to the Owner.

3.11 DISPOSAL

A. Cleaning of asphalt paving equipment and tools is not permitted on site.

B. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.

**END OF SECTION 321216**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Driveways.

2. Roadways.

3. Parking lots.

4. Curbs and gutters.

5. Sidewalks.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Other Action Submittals:

1. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. The General Contractor and the Subcontractor shall execute the Conformance Submittal(s) at the end of this section.

1.3 QUALITY ASSURANCE

A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. ACI Publications: Comply with ACI 301 (ACI 301M) unless otherwise indicated.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

A. The type of steel reinforcement shall be shown on the drawings.

B. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.

C. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.

D. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420); deformed.

E. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.

F. Deformed-Steel Wire: ASTM A 496/A 496M.

G. Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420) plain-steel bars; zinc coated (galvanized) after fabrication according to ASTM A 767/A 767M, Class I coating. Cut bars true to length with ends square and free of burrs.

H. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified.

2.2 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:

1. Portland Cement: ASTM C 150 Portland cement Type I, IA or Type III, IIIA

2. Cementitious material may be supplemented with the following:

a. Fly Ash: ASTM C 618, Class C or Class F.
b. No more than 20% of cementitious material by weight

B. Normal-Weight Aggregates: ASTM C 33. Combined aggregate gradation for concrete pavement and other designated concrete shall be 8% - 18% for large top size aggregates (1½") or 8% - 22% for smaller top size aggregates (1" or ¾") retained on each sieve below the top size and above the No. 100 sieve. Concrete pavements shall have a maximum aggregate size of 1½". Provide aggregates from a single source.

C. Water: Potable and complying with ASTM C 94/C 94M.

D. Admixtures: Certified by manufacturer to contain not more than 0.1 % water-soluble chloride ions by mass of cement and to be compatible with other admixtures, as follows:

1. Air-Entraining Admixture: ASTM C 260;

2. Water-Reducing Admixture: ASTM C 494, Type A;

3. Water-Reducing and High-Range Admixture: ASTM C 494, Type F;

4. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E; and,

5. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

E. Calcium Chloride: The use of calcium chloride or admixtures containing more than 0.05% chloride ions is prohibited.

F. Curing Materials:

1. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry;

2. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet;

3. Water: Potable;

4. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete;

5. Clear Solvent-Borne Liquid-Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B;

6. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B;

7. White Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B

G. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.

1. Color: As indicated on the plans.

## 2.3 JOINTS, FILLERS, AND SEALANTS

A. Joint-Sealant Backer Materials: ASTM D5249, Non-Staining, compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by joint sealant manufacturer based on field experience and laboratory testing.

B. Joint Sealant: Non-priming, pourable self-leveling silicone sealant for concrete and asphalt.

1. Cold-Applied Joint Sealant ASTM D5893, self-leveling silicone sealant. Crafco Inc. “Roadwaver Silicone-SL”; Dow Corning “888, or 890-SL”; Sonneborn “Sonomeric 1 Sealant”; Tremco “Vulkem 45”; and,

2. Hot-Applied Joint Sealant: ASTM D3405, Polymeric sealant. Crafco Inc. “ROADSAVER 22”; W.R. Meadows, Inc. “SEALTIGHT HI-SPEC”.

C. Joint Fillers: Resilient pre-molded bituminous impregnated fiberboard units complying with ASTM D 1751, asphalt-saturated cellulosic fiber, ASSHTO M 153, Type I: or ASTM D 1752, cork or self-expanding cork.

D. Exterior Concrete Sealant: Sonneborn “Kure-N-Seal 30” exterior acrylic sealer, or Euclid “Super Rez-Seal”.

## 2.4 FIBER REINFORCEMENT

A. Synthetic Fiber: Monofilament or fibrillated polypropylene fibers engineered and designed for use in concrete paving, complying with ASTM C 1116/C 1116M, Type III, 1/2 to 1-1/2 inches (13 to 38 mm) long.

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

F. White, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B, dissipating.

2.6 RELATED MATERIALS

A. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, non-glazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.

2.7 PAVEMENT MARKINGS

A. Pavement-Marking to be thermoplastic unless otherwise noted.

1. Color: As indicated.

2.8 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301 (ACI 301M), with the following properties:

1. Compressive Strength (28 Days): 4000 psi (27.6 MPa) or as otherwise indicated.

2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.

3. Slump Limit: maximum of 5 inches at time of placement for pavement, 3 inches for curb and sidewalk, plus or minus 1 inch (25 mm).

4. Air Content: Target: 5%, delivered to -1 to +2 percent of target.

B. Chemical Admixtures: Use admixtures according to manufacturer’s written instructions.

C. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.0 lb/cu. yd. (0.60 kg/cu. m).

D. Coloring Agent: When required, add coloring agent to mix according to manufacturer's written instructions.

1. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork; and,

2. Coloring Agent: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, nonfading, and resistant to lime and other alkalis. Integral colors shall be selected by the Landscape Architect and shown within the approved Landscape Architecture Plans.

E. Integral Color Concrete: Mix pigments in accordance with manufacture’s written instructions. Mix until pigments are uniformly dispersed throughout mixture and disintegrating bags, if used, have disintegrated.

## 2.9 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M. Furnish batch certificates for each batch discharged and used in the Work.

# PART 3 - EXECUTION

## 3.1 EXAMINATION AND PREPARATION

A. Proof-roll prepared subbase surface below concrete paving and sidewalk to identify soft pockets and areas of excess yielding.

B. Remove loose material from compacted subbase surface immediately before placing concrete.

## 3.2 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

## 3.3 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and

supporting reinforcement.

3.4 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, to match jointing of existing adjacent concrete paving:

E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch (6-mm) radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

F. Joint Fillers: Extend joint fillers full-width and depth of joint, and not less than ½inch or more than 1inch below finished surface where joint sealer is indicated. Furnish joint fillers in one-piece lengths for full width being placed, wherever possible. Where more than one length is required, lace or clip joint filler sections together: and,

G. Joint Sealants: All joints shall be sealed with approved exterior pavement joint sealants and shall be installed per manufacturer's recommendations.

3.5 CONCRETE PLACEMENT

A. Moisten subbase to provide a uniform dampened condition at time concrete is placed.

B. Comply with ACI 301 (ACI 301M) requirements for measuring, mixing, transporting, placing, and consolidating concrete.

C. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

D. Screed paving surface with a straightedge and strike off.

E. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

3.6 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared, and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.

2. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch (1.6 to 3 mm) deep with a stiff-bristled broom, perpendicular to line of traffic.

C. Slip-Resistive Aggregate Finish: Before final floating, spread slip-resistive aggregate finish on paving surface according to manufacturer's written instructions were indicated on drawings.

1. Cure concrete with curing compound recommended by slip-resistive aggregate manufacturer. Apply curing compound immediately after final finishing.
2. After curing, lightly work surface with a steel wire brush or abrasive stone and water to expose nonslip aggregate.

## 3.7 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Moisture cure concrete by water, continuous fog spray, continuously wet absorptive cover, or by moisture-retaining-cover curing. Keep surfaces continuously moist for not less than 7 days.

## 3.8 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:

1. ACI 117 establishes few paving tolerances; those in subparagraphs below are based on ACI 330.1.

2. Elevation: 3/4 inch (19 mm).

3. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).

4. Surface: Gap below 10-foot- (3-m-) long, unleveled straightedge not to exceed 1/2 inch (13 mm).

5. Joint Spacing: 3 inches (75 mm).

6. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.

7. Joint Width: Plus 1/8 inch (3 mm), no minus.

## 3.9 PAVEMENT MARKING

A. Allow concrete paving to cure for a minimum of 28 days and be dry before starting pavement marking.

B. Sweep and clean surface to eliminate loose material and dust.

C. Apply paint with mechanical equipment to produce markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils (0.4 mm).

## 3.10 REPAIRS AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.

B. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

C. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

## 3.11 CLEANING AND DISPOSAL

A. Concrete wash down shall be performed in accordance with Hartsville/Trousdale County and State of Tennessee requirements.

## 3.12 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

B. ACI Publications: Comply with ACI 301R-99 and ACI330R-92, unless modified by the requirements of the Contract Documents.

C. The owner shall provide and pay for testing services. A slump test and air test shall be performed for each load delivered. Four standard test cylinders shall be taken for each 55 cubic yards of concrete or each day's pour, whichever is more frequent. Two cylinders shall be broken at 7 days and two cylinders shall be broken at 28 days.

**END OF SECTION 321313**

**SECTION 321373 - Concrete Paving Joint Sealants**

PART 1—GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Expansion and contraction joints within Portland Cement concrete pavement.
   2. Joints between Portland Concrete and asphalt pavement.

1.3 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.
   1. Samples for Verification: For each type and color of joint sealant required. Install joint- sealant samples 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.
   2. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.
   3. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

      a. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
      b. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
      c. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for sealants.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

C. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

D. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.

E. Submit not fewer than 2 pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.

F. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.

G. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.

H. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

I. Product Testing: Obtain test results for "Product Test Reports" Paragraph in "Submittals" Article from a qualified testing agency based on testing of current sealant products within a 36-month period preceding the Notice to Proceed with the Work.

J. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 for testing indicated, as documented according to ASTM E 548.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multi-component materials.

B. Store and handle materials to comply with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.6 PROJECT 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.
   2. When ambient and substrate temperature conditions are outside limits permitted by joint- sealant manufacturer or are below 40 deg F.
   3. When joint substrates are wet or covered with frost.
   4. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
   5. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2—PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

## 2.2 MATERIALS, GENERAL

K. Compatibility: Provide joint sealants, backing materials, 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.

L. Colors of Exposed Joint Sealants: As selected by Project Manager from manufacturer's full range.

## 2.3 COLD-APPLIED JOINT SEALANTS

A. Multicomponent Jet-Fuel-Resistant Sealant for Concrete: Pourable, chemically curing elastomeric formulation complying with the following requirements for formulation and with ASTM C 920 for type, grade, class, and uses indicated:

B. Urethane Formulation: Type M; Grade P; Class 12-1/2; Uses T, M, and, as applicable to joint substrates indicated, O.

C. Products: Pecora Corporation; Urexpan NR-300.

D. Bitumen-Modified Urethane Formulation: Type M; Grade P; Class 25; Uses T, M, and, as applicable to joint substrates indicated, O.

E. Products: Tremco Sealant/Waterproofing Division; Vulkem 202.

F. Single-Component Jet-Fuel-Resistant Urethane Sealant for Concrete: Single-component, pourable, coal-tar-modified, urethane formulation complying with ASTM C 920 for Type S; Grade P; Class 25; Uses T, M, and, as applicable to joint substrates indicated, O.

G. Products: Sonneborn, Div. of ChemRex, Inc.; Sonomeric 1.

H. Type NS Silicone Sealant for Concrete: Single-component, low-modulus, neutral-curing, nonsag silicone sealant complying with ASTM D 5893 for Type NS.

I. Products:

1. Crafco Inc.; RoadSaver Silicone.
2. Dow Corning Corporation; 888.
3. Type SL Silicone Sealant for Concrete and Asphalt: Single-component, low-modulus, neutral-curing, self-leveling silicone sealant complying with ASTM D 5893 for Type SL.

J. Products:

1. Crafco Inc.; RoadSaver Silicone SL.
2. Dow Corning Corporation; 890-SL.

## 2.4 HOT-APPLIED JOINT SEALANTS

A. Elastomeric Sealant for Concrete: Single-component formulation complying with ASTM D 3406.

B. Products:

1. Crafco Inc.; Superseal 444/777.
2. Meadows, W. R., Inc.; Poly-Jet 3406.
3. Sealant for Concrete and Asphalt: Single-component formulation complying with ASTM D 3405.

C. Products:
   1. Koch Materials Company; Product No. 9005.
   2. Koch Materials Company; Product No. 9030.
   3. Meadows, W. R., Inc.; Sealtight Hi-Spec.

## 2.5 JOINT-SEALANT BACKER MATERIALS

A. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.

B. Round Backer Rods for Cold- and Hot-Applied Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

C. Backer Strips for Cold- and Hot-Applied Sealants: ASTM D 5249; Type 2; of thickness and width required to control sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

D. Round Backer Rods for Cold-Applied Sealants: ASTM D 5249, Type 3, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

## 2.6 PRIMERS

A. Primers: Product 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.

# 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 joint-sealant performance.

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.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on 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

## 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 backer materials of type 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.

D. Do not leave gaps between ends of backer materials.

E. Do not stretch, twist, puncture, or tear backer materials.

F. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.

G. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

H. Place sealants so they directly contact and fully wet joint substrates.

I. Completely fill recesses provided for each joint configuration.

J. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

K. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified 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.

L. Remove excess sealants from surfaces adjacent to joint.

M. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.

N. Provide joint configuration to comply with joint-sealant manufacturer's written instructions, unless otherwise indicated.

O. Provide recessed joint configuration for silicone sealants of recess depth and at locations indicated.

3.4 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved 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 and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations with repaired areas are indistinguishable from the original work.

**END OF SECTION 321373**

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. General
2. Products
3. Execution

1.2 DEFINITIONS

A. Duff Layer: Surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.

B. Finish Grade: Elevation of finished surface of planting soil.

C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

D. Pesticide: Substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

F. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

G. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.

H. Subsoil: All soil beneath the topsoil layer of the soil profile and typified by the lack of organic matter and soil organisms.

I. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

1. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this Project.

B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

1. Certification of each seed mixture for turfgrass sod. Include identification of source and name and telephone number of suppliers.

C. Qualification Data: For qualified landscape installer.

D. Product Certificates: For soil amendments and fertilizers, from manufacturer.

E. Material Test Reports: For standardized ASTM D 5268 topsoil and existing native surface topsoil.

F. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of grass areas during a calendar year. Submit before expiration of required initial maintenance periods.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Qualified landscape installer whose work has resulted in successful lawn establishment.

1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.

2. Experience: 5 years' experience in turf installation in addition to requirements in 01 40 00 Quality Requirements.

3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network:

a. Certified Landscape Technician - Exterior, with installation specialty area(s), designated CLT-Exterior.

b. Certified Turfgrass Professional, designated CTP.

c. Certified Turfgrass Professional of Cool Season Lawns, designated CTP-CSL.

5. Pesticide Applicator: State licensed, commercial.

B. Soil-Testing Laboratory Qualifications: An independent laboratory or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

C. Soil Analysis: For each un-amended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of the soil.

1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
2. The soil-testing laboratory shall oversee soil sampling, with depth, location, and number of samples to be taken per instructions from Architect. A minimum of 3 representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
    a. Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
    b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

D. Pre-installation Conference: Conduct conference at Project site.

## 1.5 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable. Protect from deterioration.

B. Sod: Harvest, deliver, store and handle sod according to requirements in “Specifications for Turfgrass Sod Materials” and “Specifications for Turfgrass Sod Transplanting and Installation” In TPI’s “Guideline Specifications to Turfgrass Sodding.” Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying.

C. Bulk Materials:
1. Do not dump or store bulk materials near structures, utilities, walkways, and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

## 1.6 PROJECT CONDITIONS

A. Planting Restrictions: Plant during one of the following periods: Spring Planting or Fall Planting. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of planting completion. For each type of landscape architectural work required, place or install material during normal plant seasons of the project locale.
1. Spring Planting: February 15 to April 1.

2. Fall Planting: September 15 to November 30.

3. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

1.7 MAINTENANCE SERVICE

A. Initial Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable turf is established but for not less than the following periods:

1. Sodded Turf: 30 days from date of planting completion.

B. Initial Meadow Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable meadow is established, but for not less than 40 days from date of planting completion.

PART 2 - PRODUCTS

2.1 TURFGRASS SOD

A. Turfgrass Sod: Certified, Number 1 Quality, Premium including limitations on thatch, weeds, diseases, nematodes, and insects, complying with “Specifications for Turfgrass Sod Materials” in TPI’s “Guideline Specifications to Turfgrass Sodding.” Furnish viable sod of uniform density, color, and texture, strongly rooted and capable of vigorous growth and development when planted. ALL AREAS NOT COVERED BY HARDSCAPE OR PLANTINGS SHALL BE COVERED IN SOD.

B. Turfgrass Species: ‘Tifway 419’ Bermudagrass. Not less than 95 percent germination, not less than 85 percent pure seed and not more than 0.5 percent weed seed.

C. Turfgrass Species: Sod of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed

2.2 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 5 to 10 Deci siemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.

## 2.3 FERTILIZERS

A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

## 2.4 PLANTING SOILS

A. Planting Soil: Existing, in-place surface soil. Verify suitability of existing surface soil to produce viable planting soil. Remove stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix surface soil with the following soil amendments and fertilizers in the following quantities to produce planting soil:

1. Ratio of Loose Compost to Surface Soil by Volume: 1:4.
2. Volume of Sand Plus 10 Percent Diatomaceous Earth per 1000 Sq. Ft..
3. Weight of Bonemeal per 1000 Sq. Ft.: 10 lbs.
4. Weight of Commercial Fertilizer per 1000 Sq. Ft.: 10 lbs.

B. Planting Soil: Imported topsoil or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches (100 mm) deep; do not obtain from agricultural land, bogs or marshes.

1. Additional Properties of Imported Topsoil or Manufactured Topsoil: Screened and free of stones 1 inch (25 mm) or larger in any dimension; free of roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of obnoxious weeds and invasive plants including quack grass, Johnsongrass, poison ivy, nutsedge, nimble will, Canada thistle, bindweed, bent grass, wild garlic, ground ivy, perennial sorrel, and bromegrass; not infested with nematodes, grubs, other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens;

friable and with sufficient structure to give good tilth and aeration. Continuous, air-filled, pore-space content on a volume/volume basis shall be at least 15 percent when moisture is present at field capacity. Soil shall have a field capaat least 15 percent on a dry weight basis.

2.5 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

B. Sphagnum Peat Mulch: Partially decomposed sphagnum peat moss, finely divided or of granular texture, and with a pH range of 3.4 to 4.8.

2.6 PESTICIDES

A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

2.7 EROSION-CONTROL MATERIALS

A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long.

B. Erosion-Control Fiber Mesh: Biodegradable burlap or spun-coir mesh, a minimum of 0.92 lb/sq. yd. (0.5 kg/sq. m), with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches (150 mm) long.

C. Erosion-Control Mats: Cellular, non-biodegradable slope-stabilization mats designed to isolate and contain small areas of soil over steeply sloped surface, of [3-inch (75-mm)] [4-inch (100-mm)] [6-inch (150-mm)] <Insert dimension> nominal mat thickness. Include manufacturer's recommended anchorage system for slope conditions.

1. Products: Subject to requirements, provide products by one of the following:

a. Invisible Structures, Inc.; Slopetame 2.

b. Presto Products Company, a business of Alcoa; Geoweb.

c. Tenax Corporation - USA; Tenweb.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils,

gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.

2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.

3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.

4. Uniformly moisten excessively dry soil that is not workable, and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

## 3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect adjacent and adjoining areas from hydroseeding and hydro mulching overspray.

2. Protect grade stakes set by others until directed to remove them.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

## 3.3 TURF AREA PREPARATION

A. Limit turf subgrade preparation to areas to be planted

B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 4 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Apply fertilizer directly to subgrade before loosening.

2. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.

3. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.

4. Mix lime with dry soil before mixing fertilizer.

C. Spread planting soil to a depth of 6 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

3.4 PREPARATION FOR EROSION-CONTROL MATERIALS

A. Prepare area as specified in "Turf Area Preparation" Article.

B. For erosion-control mats, install planting soil in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.

C. Fill cells of erosion-control mat with planting soil and compact before planting.

D. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

E. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.5 SODDING

A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

1. Lay sod across angle of slopes exceeding 1:3.

2. Anchor sod on slopes exceeding 1:6 with steel staples spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.

C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches (38 mm) below sod.

3.6 TURF RENOVATION

A. Renovate existing turf.

B. Renovate existing turf damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.

1. Reestablish turf where settlement or washouts occur or where minor regrading is required.

2. Install new planting soil as required.

C. Remove sod and vegetation from diseased or unsatisfactory turf areas; do not bury in soil.

D. Remove topsoil containing foreign materials such as oil drippings, fuel spills, stones, gravel, and other construction materials resulting from Contractor's operations, and replace with new planting soil.

E. Mow, dethatch, core aerate, and rake existing turf.

F. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.

G. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.

H. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches (150 mm).

I. Apply soil amendments and initial fertilizers required for establishing new turf and mix thoroughly into top 4 inches (100 mm) of existing soil. Install new planting soil to fill low spots and meet finish grades.

J. Apply sod as required for new turf.

K. Water newly planted areas and keep moist until new turf is established.

## 3.7 TURF MAINTENANCE

A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, re-grade, and replant bare or eroded areas and re-mulch to produce a uniformly smooth turf.

B. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

C. Watering: Install irrigation to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.

1. Schedule watering to prevent wilting, puddling, erosion and displacement of seed or mulch.

2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.

3. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Do not delay mowing until grass blades bend over and become matted. Schedule initial and subsequent mowing to maintain the following grass height:

a. ‘Tifway 419’ Bermudagrass: height of 1 inch to 1.5 inches

## 3.8 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.9 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

C. Remove non-degradable erosion-control measures after grass establishment period.

**END OF SECTION 329200**

# PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

A This Section includes the following:

1. Surface preparation and joint and crack treatment.
2. Heavy duty vehicular traffic coatings for exterior applications.

B. Related Sections: The following Sections contain requirements related to this Section:

1 Division 3 Section "Cast-in-Place Concrete" for concrete placement, curing, and finishing.
2 Division 3 Section "Concrete Toppings" for concrete toppings applied over base slabs or precast concrete units.
3 Division 7 Section "Joint Sealants" for joint sealant materials and installation.

## 1.3 SYSTEM DESCRIPTION

A. Traffic coatings are defined to include single-component, elastomeric, crack-bridging, waterproofing traffic membranes with integral wearing surfaces for application to building decks not subject to hydrostatic pressure in areas housing equipment or subject to pedestrian or vehicular traffic.

## 1.4 SYSTEM PERFORMANCE REQUIREMENTS

A. General: Provide traffic coatings that are watertight and that will not deteriorate upon exposure to normal ice- and snow-melting compounds, sun, weather, normal traffic, and manufacturer-recommended cleaning procedures.

B. Traffic coatings shall not deteriorate upon spillage of motor oil, transmission fluids, or other motor vehicle operating compounds.

1. Deterioration of traffic coatings includes but is not limited to:

a. Adhesive or cohesive failures.
b. Abrasion or tearing failure resulting from normal traffic.
c. Surface crazing or spoiling.
d. Intrusion of water, oils, gasoline, grease, salt, deicer chemicals, or acids into deck substrate.

C. Provide traffic coatings that comply with ASTM C 957 and that meet or exceed the following physical requirements.

1. Low-Temperature Flexibility and Crack Bridging (ASTM C 957): No cracking.
2. Adhesion-in-Peel after Water Immersion (ASTM C 957): 5 lbf/inch (875 N/m) on concrete; 3 lbf/inch (525 N/m) on plywood.

3. Chemical Resistance [ASTM C 957): Tensile retention of base, intermediate, and topcoats; minimum 70 percent in water, 70 percent in ethylene glycol, and 45 percent in mineral spirits.
4. Weathering Resistance and Recovery from Elongation [ASTM C 957): Average recovery from elongation not less than 90 percent; average tensile retention not less than 80 percent; average elongation retention not less than 90 percent.
5. Abrasion Resistance (ASTM C 957): Weight loss no greater than 50 mg.

1 .5 SUBMITTALS

A General: Submit the following according to the Conditions of the Contract and Division Specification Sections:

B. Product data consisting of manufacturer's printed instructions for evaluating, preparing, and treating the substrate, technical data, and tested physical and performance properties of traffic coatings.

C. Certification by traffic coating manufacturer that products comply with local regulations controlling use of volatile organic compounds (VOC's).

D. Shop drawings showing extent of each duty category of traffic coating. Include details for substrate joints and cracks, flashings, deck penetration, and other termination conditions.

1. Include layout of traffic striping and markings.

E. Samples for initial selection purposes in the form of manufacturer's color charts showing a full range of colors and finishes available.

F. Samples for verification purposes on a rigid backing, in color, texture, and finish required for traffic coatings.

1. Provide stepped samples on backing large enough to illustrate build-up of traffic coatings.
2. Include integral aggregate wearing course in samples.

G. Product test reports from a qualified independent testing agency showing compliance of traffic coatings with requirements based on comprehensive testing of current product formulations within the last 2 years.

H. Material certificates, in lieu of independent testing agency test reports, signed by manufacturer certifying that each traffic coating material complies with requirements.

I. Maintenance data for traffic coatings to include in the "Operating and Maintenance Manual" specified in Division l. Identify substrate and type of traffic coatings applied. Include recommendations for periodic inspections, cleaning, care, maintenance, and repair of traffic coatings.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Installer certified in writing by traffic coating manufacturer as a licensed or approved applicator.

B. Single-Source Responsibility: Obtain primary traffic coating materials, including primers and aggregates, from a single manufacturer regularly engaged in manufacturing traffic coatings. Provide secondary materials including sheet flashings, joint sealants, and substrate repair materials of type and from source recommended by traffic coating manufacturer.

C. Field Samples: Apply traffic coating field sample to 200 sq. ft. of deck to demonstrate surface preparation, joint and crack treatment, thickness, texture, color, and standard of workmanship.

1. When Architect determines that field sample does not meet requirements, reapply traffic coating until the field sample is accepted.
2. Keep the accepted field sample undisturbed during construction as a standard for judging completed traffic coating. An undamaged field sample may be incorporated into the Work.

D. Fire-Test-Response Characteristics: Provide traffic coatings that comply with the following requirements:

1. Fire tests are performed by a qualified testing and inspecting agency that is acceptable to authorities having jurisdiction, such as UL, Warnock Hersey, or another agency that performs testing and follow-up services.
2. Provide materials identical to those of traffic coatings tested according to ASTM E 108 for deck type and slopes indicated and for the following class of exterior fire test exposure:

a. Class A.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

1. Before installing traffic coatings, meet with representatives of authorities having jurisdiction, Owner, Architect, consultants, independent testing agency, and other concerned entities. Review requirements for traffic coatings. Notify participants at least 3 working days before conference.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers with seals unbroken and bearing manufacturer's labels containing brand name and type of material, directions for storage and mixing with other components, and the following label information:

1. Date of manufacture and shelf life.
2. Lot or batch number.
3. Application instructions.
4. Color.

B. Store materials in a clean, dry, protected location and within the temperature range required by the manufacturer. Protect stored materials from exposure to direct sunlight.

C. Remove and replace material that cannot be applied within its stated shelf life.

1.8 PROJECT CONDITIONS

A. Environmental Conditions: Apply traffic coatings within the range of ambient and substrate temperatures recommended by the manufacturer. Do not apply traffic coatings to a damp or wet substrate, when relative humidity exceeds 85 percent, or when temperatures are less than 5 deg F (3 deg C) above dew point.

I. Do not apply traffic coatings in snow, rain, fog or mist, or when such weather conditions are imminent during the application and curing period.

1.9 WARRANTY

A. General: Warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and are in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

B. Warranty: Submit written warranty signed by traffic coatings manufacturer and installer agreeing to repair or replace traffic coatings that do not meet requirements or that deteriorate as defined in this Section within the warranty period indicated below. Warranty does not include deterioration or failure of traffic coating due to unusual weather phenomena, failure of prepared and treated substrate, formation of new joints and cracks in excess of 1 /16 inch wide, fire, vandalism, or abuse by snowplows, truck traffic, or maintenance equipment

1. Warranty Period: 5 years after date of Substantial Completion.

PART 2 - PRODUCTS

2.1 TRAFFIC COATINGS, GENERAL

A. Material Compatibility: Provide primers, base, intermediate, and top coats, and miscellaneous materials that are compatible with one another and with substrate under conditions of service and application, as demonstrated by the manufacturer based on testing and field experience.

B. Colors: Provide color selections of traffic coatings made by the Architect from the manufacturer's full range of standard colors.

2.2 MODIFIED POLYURETHANE TRAFFIC COATING SYSTEM

A. Provide modified, polyurethane traffic coating system complying with system performance requirements and manufacturer's printed physical requirements for each coat as certified by a qualified independent testing agency.

B. Primer: Manufacturer's standard factory-formulated epoxy primer as required by manufacturer's written system specifications.

C. Preparatory Coat: As required by manufacturer's written system specifications

D. Base Coat: Vulkem 350NF as manufactured by Tremco Commercial Sealants & Waterproofing, or approved equal.

E. Intermediate Coat #1: Vulkem 346 as manufactured by Tremco Commercial Sealants & Waterproofing, or approved equal.

F. Intermediate Coat #2: Vulkem 346 as manufactured by Tremco Commercial Sealants & Waterproofing, or approved equal.

G. Topcoat: Vulkem 346 as manufactured by Tremco Commercial Sealants & Waterproofing, or approved equal.

H. Products: Subject to compliance with requirements, provide one of the following traffic coatings.

1. Vehicular Traffic Coatings:
   a. Vulkem 350 NF/346/346; Tremco Commercial Sealants & Waterproofing.
   b. Or approved equal.

2.3 MISCELLANEOUS MATERIALS

A. Joint Sealants: Sealant systems complying with ASTM C 920 as recommended by manufacturer for substrate and joint conditions, and for compatibility with the following traffic coatings: Type M, Class 25, Grade NS for sloping and vertical applications or Grade P for deck applications and Use T where subject to traffic or Use NT elsewhere.

B. Aggregate: Uniformly graded washed silica sand of particle sizes and shape as recommended by traffic coating manufacturer, with minimum hardness of 6 on the Moh Scale.

C. Sheet Flashing: 50-mil minimum non staining uncured sheet neoprene.

D. Adhesive: Manufacturer's recommended contact adhesive.

E. Reinforcing Strip: Manufacturer's recommended fiber-glass mesh.

F. Traffic Paint: Alkyd-resin ready-mixed, complying with AASHTO M 248, Type S.

1. Color: White.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrate and conditions under which traffic coating systems will be applied for compliance with requirements. Do not proceed with installation until unsatisfactory conditions have been corrected.

1. Do not proceed with installation until after the minimum concrete curing period recommended by traffic coating manufacturer.
2. Verify substrate is visibly dry and free of moisture. Test for capillary

moisture by the plastic sheet method according to ASTM D 4263.

3. Notify the Architect in writing of anticipated problems using traffic coatings over substrate.

## 3.2 SURFACE PREPARATION

A. Clean and prepare substrate according to manufacturer's recommendations and as specified. Provide clean, dust-free, and dry substrate for traffic coating application.

B. Mask off adjoining surfaces not receiving traffic coatings and close off deck drains and other deck penetrations to prevent spillage and migration of liquid coatings.

C. Concrete Surfaces: Remove grease, oil, paints, or other penetrating contaminants from concrete. Remove concrete fins, ridges, or other projections. Abrasive-blast clean concrete surfaces to a uniform profile according to ASTM D 4259 with a self -contained recirculating blast-cleaning apparatus. Remove material to provide a sound surface free of laitance, glaze, efflorescence, curing compounds, concrete hardeners, or form release agents. Remove remaining loose material and clean surfaces according to ASTM D 4258.

   l. Surface Profile: Lightly blast the concrete surface to expose the top surface of the fine aggregate. Prep the deck surface per traffic coating manufacturer's specifications.

## 3.3 PREPARATION AT TERMINATIONS AND PENETRATIONS

A. Prepare vertical and horizontal surfaces at terminations and penetrations through traffic coatings and at expansion joints, drains, and sleeves according to ASTM C 1127 and manufacturer's recommendations.

B. Provide sealant cants at penetrations and reinforced and nonreinforced deck-to-wall butt joints.

C. Prime substrates and apply preparatory base coat. Embed joint reinforcing strip in coating when recommended by traffic coating manufacturer.

D. Terminate edges of deck-to-deck expansion joints with preparatory base coat strip.

## 3.4 JOINT AND CRACK TREATMENT

A. All joints shall be formed. No saw-cut joints shall be permitted

B. Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C1127 and traffic coating manufacturer's recommendations. Remove dust and dirt from joints and cracks complying with ASTM D 4258 prior to coating surfaces.

1. Prime substrate and apply a 20-mil minimum dry film preparatory base coat strip extending a minimum of 2 inches each side of joint. Embed joint reinforcing strip in base coat when recommended by traffic coating manufacturer.
2. Apply bond-breaker tape between sealant and preparatory base coat strip when required by traffic coating manufacturer.
3. Comply with recommendations of ASTM C 1193 for joint sealant installation.

## 3.5 SHEET FLASHING

A. Deck-to-Wall Expansion Joints and Dynamic Joints: Install sheet flashing and bond to deck and wall substrates according to manufacturer's recommendations.

## 3.6 TRAFFIC COATINGS APPLICATION

A. General: Apply each traffic coating material according to ASTM C 1127 and manufacturer's recommendations.

1. Start installation of traffic coatings in presence of manufacturer's technical representative.
2. Mix materials according to manufacturer's instructions.
3. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
4. Apply coatings by spray, roller, notched squeegee, or other applicators according to manufacturer's recommendations.
5. Apply total dry film thickness of traffic coating as indicated, but to not less than the minimum thickness recommended by the manufacturer. Apply each coating to the thickness recommended by the manufacturer.
6. Apply aggregate into wet coating according to manufacturer's recommendations.
7. Verify wet film thickness of each component coat every 100 sq. ft.

B. Vehicular Traffic Coating: Apply base, intermediate, and topcoats and aggregate according to manufacturer's recommendations.

1. Heavy Duty: Apply a minimum dry film system thickness of 65 mils or as recommended by the traffic coating manufacturer (67 mils w/base, intermediate, and topcoats), excluding substrate primer and aggregate.

    a. Aggregate: Apply silica aggregate at manufacturer's recommended rate.

C. Wall Terminations and Vertical Surfaces: Apply traffic coatings to prepared wall terminations and vertical surfaces to height indicated according to manufacturer's recommendations and details.

1. Omit aggregate on vertical surfaces.

D. Traffic Paint: Apply traffic paint for striping and other markings with mechanical equipment to produce uniform straight edges. Apply at manufacturer's recommended rates to provide a 15- mil minimum wet film thickness.

## 3.7 FIELD QUALITY CONTROL

A. In-Place Testing: Test each near-level deck area for leaks immediately after nominal cure of completed traffic coatings. Flood each area for 24 hours and examine underside of decks for evidence of leaks. Repair any leaks observed. Repeat test and make repairs until no leaks remain.

B. Owner reserves the right to invoke the following testing procedures during and following traffic coatings application.

1. Owner will employ a qualified independent testing agency to sample materials being used. Samples of material delivered to the Project site will be taken, identified, sealed, and certified in the presence of the Contractor.
2. Testing agency will perform tests for any of the characteristics specified, using applicable referenced testing procedures or, when not referenced, using tests cited in manufacturer's product data.
3. Testing agency will verify thickness of coatings during the traffic coating installation.

C. If test results show traffic coating materials do not comply with requirements, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply traffic coating materials.

## 3.8 CURING, PROTECTION, AND CLEANING

A. Cure traffic coating according to manufacturer's recommendations taking care to prevent contamination and damage during application stages and curing.

B. Protect traffic coatings from damage and wear during remainder of construction period.

C. Cleaning: Remove temporary covering and clean traffic coatings just before final inspections. Use cleaning materials and procedures recommended by manufacturer.

**END OF SECTION 07570**