IN WITNESS WHEREOF, this instrument is executed in 7 counterparts, each one of

(number)

which shall be deemed an original, this the 19th day of March, 2015.

ATTEST:

The Allen Company Inc.
(Principal)

(Principal) Secretary

(SEAL)

BY: JB Exec VP
3009 Atkinson Ave, Ste 300
(Address)
Lexington KY 40509

(Witness to Principal)
3009 Atkinson Ave Ste 300
(Address)
Lexington KY 40509

Hartford Fire Insurance Company
(Surety)

ATTEST:

BY: Kim Watson
Kim Watson (Attorney-in-Fact)

WR Beam
(Surety) Secretary

(SEAL)

Witness as to Surety
2250 Thunderstick Dr Ste 1104
(Address)
Lexington KY 40505

One Hartford Plaza
(Address)
T-4-47
Hartford, CT 06155

NOTE: The number of executed counterparts of the bond shall coincide with the number of executed counterparts of the Contract.

END OF SECTION

POWER OF ATTORNEY

Direct Inquiries/Claims to:
THE HARTFORD
BOND, T-4
One Hartford Plaza
Hartford, Connecticut 06155
call: **888-266-3488** *or fax:* **860-757-5835**

KNOW ALL PERSONS BY THESE PRESENTS THAT: **Agency Code: 14-732355**

- [X] **Hartford Fire Insurance Company**, a corporation duly organized under the laws of the State of Connecticut
- [X] **Hartford Casualty Insurance Company**, a corporation duly organized under the laws of the State of Indiana
- [X] **Hartford Accident and Indemnity Company**, a corporation duly organized under the laws of the State of Connecticut
- [ ] **Hartford Underwriters Insurance Company**, a corporation duly organized under the laws of the State of Connecticut
- [ ] **Twin City Fire Insurance Company**, a corporation duly organized under the laws of the State of Indiana
- [ ] **Hartford Insurance Company of Illinois**, a corporation duly organized under the laws of the State of Illinois
- [ ] **Hartford Insurance Company of the Midwest**, a corporation duly organized under the laws of the State of Indiana
- [ ] **Hartford Insurance Company of the Southeast,** a corporation duly organized under the laws of the State of Florida

having their home office in Hartford, Connecticut, (hereinafter collectively referred to as the "Companies") do hereby make, constitute and appoint, ***up to the amount of unlimited:***

Kim Watson, John W. Hampton, Russell Griffith, Tina Carpenter of Lexington KY, Theresa S. Stump of Roanoke VA, Robert M. Coon of Greensboro NC, Lindsey M. DeJarnette of Lynchburg VA

their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign its name as surety(ies) only as delineated above by ☒, and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

In Witness Whereof, and as authorized by a Resolution of the Board of Directors of the Companies on August 1, 2009 the Companies have caused these presents to be signed by its Vice President and its corporate seals to be hereto affixed, duly attested by its Assistant Secretary. Further, pursuant to Resolution of the Board of Directors of the Companies, the Companies hereby unambiguously affirm that they are and will be bound by any mechanically applied signatures applied to this Power of Attorney.

Wesley W. Cowling, Assistant Secretary

M. Ross Fisher, Vice President

STATE OF CONNECTICUT
COUNTY OF HARTFORD } ss. Hartford

On this 12th day of July, 2012, before me personally came M. Ross Fisher, to me known, who being by me duly sworn, did depose and say: that he resides in the County of Hartford, State of Connecticut; that he is the Vice President of the Companies, the corporations described in and which executed the above instrument; that he knows the seals of the said corporations; that the seals affixed to the said instrument are such corporate seals; that they were so affixed by authority of the Boards of Directors of said corporations and that he signed his name thereto by like authority.

Kathleen T. Maynard
Notary Public
My Commission Expires July 31, 2016

CERTIFICATE

I, the undersigned, Vice President of the Companies, DO HEREBY CERTIFY that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is still in full force effective as of March 19, 2015 .

Signed and sealed at the City of Hartford.

Gary W. Stumper, Vice President

Bond #14BCSGW0747

Payment Bond

CONTRACTOR (Name and Address):
The Allen Company, Inc.
3009 Atkinson Ave., Suite 300
Lexington, Kentucky 40509

SURETY (Name and Principal Place of Business):
Hartford Fire Insurance Company
One Hartford Plaza, T-4-47
Hartford, Connecticut 06155

OWNER (Name and Address):
Lexington-Fayette Urban County Government
200 East Main Street
Lexington, Kentucky 40507

CONSTRUCTION CONTRACT
Date: March 19, 2015
Amount: $4,287,750.91
Description (Name and Location): Bid 196-2014 Clays Mill Road Improvements Section 2C, Lexington KY

BOND
Date (Not earlier than Construction Contract Date): March 19, 2015
Amount: $4,287,750.91
Modifications to this Bond: ☐None ☐See Page 6

CONTRACTOR AS PRINCIPAL
Company: (Corporate Seal)
The Allen Company, Inc.
Signature: Exe VP
Name and Title: Jason B. Gabbard
Executive Vice President

SURETY
Company: (Corporate Seal)
Hartford Fire Insurance Company
Signature: Kim Watson
Name and Title: Kim Watson
Attorney-In-Fact

(Any additional signatures appear on page 6)

(FOR INFORMATION ONLY - Name, Address and Telephone)
AGENT or BROKER: GCH Insurance Group
2250 Thunderstick Drive
Lexington, Kentucky 40505

OWNER'S REPRESENTATIVE (Architect, Engineer or other party):

1 The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference.

2 With respect to the Owner, this obligation shall be null and void if the Contractor:

2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2 Defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity whose claim, demand, lien or suit is for the payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, provided the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 12) of any claims, demands, liens or suits and tendered defense of such claims, demands, liens or suits to the Contractor and Surety, and provided there is no Owner Default.

3 With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.

4 The Surety shall have no obligation to Claimants under this Bond until:

4.1 Claimants who are employed by or have a direct contract with the Contractor have given notice to the Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2. Claimants who do not have a direct contract with the Contractor:

.1 Have furnished written notice to the Contractor and sent a copy, or notice thereof, to the Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed; and

.2 Have either received a rejection in whole or in part from the Contractor, or not received within 30 days of furnishing the above notice any communication from the Contractor by which the Contractor has indicated the claim will be paid directly or indirectly; and

.3 Not having been paid within the above 30 days, have sent a written notice to the Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the Contractor.

5 If a notice required by Paragraph 4 is given by the Owner to the Contractor or to the Surety, that is sufficient compliance.

6 When the Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:

6.1 Send an answer to the Claimant, with a copy to the Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2 Pay or arrange for payment of any undisputed amounts.

7 The Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

8 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any Construction Performance Bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and the Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

9 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract

or to related subcontracts, purchase orders and other obligations.

11 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the work or part of the work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Subparagraph 4.1 or Clause 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the signature page. Actual receipt of notice by Surety, the Owner or the Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

14 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15 DEFINITIONS

15.1 Claimant: An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

15.2 Construction Contract: The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3 Owner Default: Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Construction Contract or to perform and complete or comply with the other terms thereof.

MODIFICATIONS TO THIS BOND ARE AS FOLLOWS:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		SURETY	
Company:	(Corporate Seal)	Company:	(Corporate Seal)
Signature:		Signature:	
Name and Title:		Name and Title:	
Address:		Address:	

Performance Bond

CONTRACTOR (Name and Address):
The Allen Company, Inc.
3009 Atkinson Ave., Suite 300
Lexington, Kentucky 40509

SURETY (Name and Principal Place of Business):
Hartford Fire Insurance Company
One Hartford Plaza, T-4-47
Hartford, Connecticut 06155

OWNER (Name and Address):
Lexington-Fayette Urban County Government
200 East Main Street
Lexington, Kentucky 40507

CONSTRUCTION CONTRACT
Date: March 19, 2015
Amount: $4,287,750.91
Description (Name and Location): Bid 196-2014 Clays Mill Road Improvements Section 2C, Lexington KY

BOND
Date (Not earlier than Construction Contract Date): March 19, 2015
Amount: $4,287,750.91
Modifications to this Bond: ☐ None ☐ See Page 3

CONTRACTOR AS PRINCIPAL
Company: The Allen Company, Inc. (Corporate Seal)
Signature: JB EXEC VP
Name and Title: Jason B. Gabbard
Executive Vice President

SURETY
Company: Hartford Fire Insurance Company (Corporate Seal)
Signature: Kim Watson
Name and Title: Kim Watson
Attorney-In-Fact

(Any additional signatures appear on page 3)

(FOR INFORMATION ONLY - Name, Address and Telephone)
AGENT or BROKER: GCH Insurance Group
2250 Thunderstick Drive
Lexington, Kentucky 40505

OWNER'S REPRESENTATIVE (Architect, Engineer or other party):

1 The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except to participate in conferences as provided in Subparagraph 3.1.

3 If there is no Owner Default, the Surety's obligation under this Bond shall arise after:

3.1 The Owner has notified the Contractor and the Surety at its address described in Paragraph 10 below that the Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with the Contractor and the Surety to be held not later than fifteen days after receipt of such notice to discuss methods of performing the Construction Contract. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default; and

3.2 The Owner has declared a Contractor Default and formally terminated the Contractor's right to complete the contract. Such Contractor Default shall not be declared earlier than twenty days after the Contractor and the Surety have received notice as provided in Subparagraph 3.1; and

3.3 The Owner has agreed to pay the Balance of the Contract Price to the Surety in accordance with the terms of the Construction Contract or to a contractor selected to perform the Construction Contract in accordance with the terms of the contract with the Owner.

4 When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

4.1 Arrange for the Contractor, with consent of the Owner, to perform and complete the Construction Contract; or

4.2. Undertake to perform and complete the Construction Contract itself, through its agents or through independent contractors; or

4.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and the contractor selected with the Owner's concurrence, to be secured with performance and payment bonds, executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by the Owner resulting from the Contractor's default; or

4.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, tender payment therefor to the Owner; or

.2 Deny liability in whole or in part and notify the Owner citing reasons therefor.

5 If the Surety does not proceed as provided in Paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond fifteen days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Subparagraph 4.4, and the Owner refuses the payment tendered or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

6 After the Owner has terminated the Contractor's right to complete the Construction Contract, and if the Surety elects to act under Subparagraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. To the limit of the amount of this bond, but subject to commitment by the Owner of the Balance of the Contract Price to mitigation of costs and damages on the Construction Contract, the Surety is obligated without duplication for:

6.1 The responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

6.2 Additional legal, design professional and delay costs resulting from the Contractor's Default, and

PART VIII

TECHNICAL SPECIFICATIONS

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TECHNICAL SPECIFICATIONS

GENERAL PROVISIONS

A.1 KENTUCKY DEPARTMENT OF HIGHWAYS - SPECIFICATIONS

Except as otherwise indicated on the Plans, and in the Contract Documents and Specifications, all items of Work including materials, construction methods, method of measurement and basis of payment shall comply with the current edition of the *Kentucky Department of Highways (KDOH) Standard Specifications for Road and Bridge Construction* and all current revisions.

With regard to the incorporation *Standard Specifications of KDOH* into these Technical Specifications, the following should be noted:

- Unless either the content implicitly or the Plans and Contract Documents and Specifications explicitly indicate otherwise, all KDOH references to "the Department" should be construed as being references to the Lexington-Fayette Urban County Government (LFUCG).

- Any discrepancy between the *Standard Specifications of KDOH* and the express intentions of Lexington-Fayette Urban County Government (i.e., Plans, Contract Documents and Specifications, and Lexington-Fayette Urban County Government Standard Drawings) shall be resolved in favor of the latter. (An example of one of the more common types of discrepancy is that which sometimes occurs with regard to the measurement of and payment for Work items.)

A.2 ABBREVIATIONS

Abbreviations of standards, codes, and publications used within these Specifications are as follows:

ASTM	American Society of Testing and Materials
ANSI	American National Standard Institute
KDOH	Kentucky Department of Highways, "Standard Specifications for Road and Bridge Construction", Current Edition

A.3 SCOPE

It is the intent that the CONTRACTOR, in accordance with the Plans, Contract Documents and Specifications, and other mutually acknowledged informational materials shall perform everything required to be performed and to furnish a complete, fully operating Work, and shall provide and furnish all labor, materials, necessary tools, expendable and non-expendable equipment and all transportation services required for the entire, proper, substantial completion of the Work, the cost of all of which shall be included in his bid.

The CONTRACTOR shall make all requisite excavations and foundation preparation for constructing sidewalks, incidental drainage structures, and retaining walls. The CONTRACTOR shall, where required, excavate and prepare subgrade for pavement widening and replacement. The CONTRACTOR shall provide all signs, lighting, barricades, flagmen and watchmen, and make provisions necessary to protect and maintain buildings, fences, trees, shrubs, poles, existing utility fixtures, watercourses, surface drains, or other structures in, on, across, or adjacent to the Work and repair all damage done to them where and as required. The CONTRACTOR shall perform all backfilling, restore walks, grass plots, flowers, shrubs, trees, paved surfaces, etc., damaged or disturbed and clear away all rubbish and surplus materials. The CONTRACTOR shall put in complete and acceptable working order the items covered by the Contract.

This Specification sets forth several items of Work or conditions which are required as integral parts of the successful completion of the Project. All items discussed herein under General Provisions are considered incidental to the overall accomplishment of the Project and no separate payment shall be made therefore unless otherwise noted elsewhere in these specifications.

A.4 CONTRACTOR'S FACILITIES

A.4.1 Sanitary Facilities: The CONTRACTOR shall provide and maintain all necessary sanitary facilities at the site, in accordance with all applicable regulations, and shall properly remove same at completion of the Project.

A.4.2 Utilities: The obtaining of all utilities which may be required for construction shall be the responsibility of the CONTRACTOR.

A.5 CONTRACTOR'S FIELD OFFICE

A CONTRACTOR'S Field Office is not required for this project.

A.6 UTILITIES

The CONTRACTOR is to notify all utility companies prior to beginning construction operations.

It shall be the CONTRACTOR'S responsibility to locate all utilities, make appropriate arrangements regarding relocation, maintain utility service throughout the construction period, and make final relocations at the completion of the Work. The CONTRACTOR shall be responsible for any injury or damage to the existing utilities due to his operations whether shown or not shown in the plans. Where utilities are shown or indicated on the plans, the information given is in accordance with the best information in possession of the OWNER but is approximate only. The data is not warranted to be either complete or correct, and the CONTRACTOR shall assume all risks resulting from the conditions arising from the approximations shown.

The CONTRACTOR shall confer with the utility companies to inform them of the proposed construction schedule, verify the location and elevation of existing utilities and arrange for the

relocation and adjustment of any facilities to avoid interference with the proposed construction. All such activities are to be performed under the direction of and with the approval of the ENGINEER.

When the various utility owners find it necessary to make adjustments to their lines where the CONTRACTOR is presently working, the CONTRACTOR is to move his operations to another area of Work so as not to interfere in any way with the utility company's Work.

Any utilities covered up or lost by the construction operations of the CONTRACTOR shall be uncovered and found by the CONTRACTOR and the new construction repaired and/or replaced as directed by the ENGINEER. No additional compensation will be allowed for such Work nor shall any additional payment be allowed for the relocation and adjusting of any utility but shall be considered Incidentals to other Work.

The CONTRACTOR shall make a concerted effort to prevent any disruption of utility services, and if an unintended disruption occurs, the CONTRACTOR shall immediately and safely restore service. If disruption of any of the utility services covered in this section is unavoidable, it will be the responsibility of the CONTRACTOR to notify affected property owners. The CONTRACTOR shall also make every effort to restore said services before quitting Work for the day. In the event this cannot be done, the CONTRACTOR shall provide temporary service to the property owners until permanent service can be restored.

A.7 TESTING

From time to time during the progress of the Work, the ENGINEER may require that testing be performed to determine the materials provided meet the specified requirements. The Lexington-Fayette Urban County Government will select a testing laboratory to perform the testing services. The cost of such services shall be the responsibility of the OWNER. If testing reveals defective materials or Work, the cost of said testing will become the responsibility of the CONTRACTOR.

A.7.1 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.

A.7.2 Cooperation with the Testing Laboratory: Representatives of the testing laboratory shall have ready access to the Work at all times. The CONTRACTOR shall provide facilities for such access in order that the laboratory may properly perform its functions.

A.7.3 Materials: All materials used for construction shall meet the requirements of the Kentucky Department of Highways (KDOH) Standard Specifications, current edition.

A.8 INSTALLATION REQUIREMENTS

Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned as suggested by the respective manufacturers, unless otherwise specified herein or directed by the ENGINEER.

A.9 PROOF OF COMPLIANCE

Whenever the Contract Documents require that a product be in accordance with Federal Specifications, ASTM Designations, ANSI Specifications, or other associations' standards, the CONTRACTOR shall present a certification from the manufacturer that the product complies therewith. When requested or specified, the CONTRACTOR shall submit supporting test data to substantiate compliance.

A.10 DUST CONTROL

The CONTRACTOR shall be responsible for minimizing the generation of dust resulting from his operations at all times. The CONTRACTOR shall be required to maintain all excavations, embankments, stockpiles, roads, permanent access roads, plant sites, waste areas, and all other Work areas within or without the project boundaries free from dust which would cause a hazard or nuisance to others. Approved temporary methods of stabilization consisting of sprinkling, chemical treatment, light bituminous treatment, or similar methods will be permitted to control dust. Dust control shall be performed as the Work proceeds, and whenever a dust nuisance or hazard occurs.

A.11 REPAIR OF DAMAGE

Any damage done to structures, fills, roadways, or other areas shall be repaired at the CONTRACTOR'S expense before final payment is made.

A.12 PROJECT EXTENT

The CONTRACTOR shall be responsible for satisfying himself as to the construction limits for the Project. The CONTRACTOR shall not establish Work, storage, or staging area outside the Project limits, unless otherwise directed or approved by the ENGINEER.

A.13 WORKING HOURS

All Work on this Project shall be restricted to daylight hours, but may be further restricted by the ENGINEER if required; except emergency Work, such as any necessary pumping, which may require 24-hour operation. If the CONTRACTOR elects to Work beyond the normal work week, he shall notify the ENGINEER of his intent as far in advance as possible. Lane closures for all streets with a functional classification above local shall occur only between the hours of 9:00 a.m. and 3:00 p.m., except as approved by the ENGINEER.

A.14 GUARANTEE

The CONTRACTOR shall assume responsibility for all workmanship and materials for a period of one year from final payment. Any Work found to be defective due to failure to comply with the provision and intent of the Contract Documents, Specifications, and Plans shall be replaced at the CONTRACTOR'S expense.

A.15 PROPERTY CONSIDERATION

Materials having a salvage value shall remain the property of the OWNER. Salvageable material rejected by the OWNER shall become the responsibility of the CONTRACTOR to dispose of in a proper manner subject to the approval of the ENGINEER.

A.16 BLASTING

Blasting is addressed in the Special Conditions.

A.17 HAZARDOUS MATERIAL - GAS LINES

The CONTRACTOR is advised to exercise caution in his operations on this project, regardless of whether the plans indicate or do not indicate the presence of any gas or hazardous materials carrying lines.

A.18 DIVERSION OF STORM WATER

Appropriate measures must be taken to sandbag the necessary manholes and to pump drainage around the area under construction. The CONTRACTOR is responsible for developing a plan to divert storm drainage around the construction area with the approval from the ENGINEER. Materials, labor, and all incidentals necessary to accomplish this diversion of storm drainage will be considered incidental to the contract.

A.19 SEWER SERVICE MAINTENANCE

This Work shall consist of maintaining existing sanitary sewer service to residents in the area during construction. Sewage is to be maintained by whatever means necessary. No surcharge of manholes will be allowed.

No separate payment will be made for Sewer Service Maintenance. Sewer Service Maintenance shall include all materials, equipment and labor necessary to maintain sewer service to residents during construction.

A.20 PROJECT SIGNS

Prior to construction, Project Signs shall be installed in accordance with the Standard Drawings. The exact location shall be established prior to the beginning of the work and shall remain visible during the entire length of the Project. After all Work is complete and prior to final inspection, the signs shall be removed and disposed of properly. The cost and installation of the Project Signs shall be paid per each installed.

TECHNICAL SPECIFICATIONS

SECTION A-2: GENERAL PROVISIONS (NON-PAYMENT ITEMS)

A2.1 WORK SEQUENCE

The Drawings contain details for tie-ins at existing manholes, etc. The Contractor shall make tie-ins and provide pipe plugs to allow the LFUCG to take existing lines out of service and divert flow into the new gravity sewers as construction is completed.

A2.2 EXCAVATION

No separate payment for solid rock excavation, with the exception of the bridge widening construction, will be made under this Contract.

A2.3 DEWATERING

Furnish all labor and equipment required to dewater all excavations. Dewatering of all excavations shall be the responsibility of the CONTRACTOR, and no additional compensation will be allowed for same unless specifically included as a bid item. The CONTRACTOR shall protect inlets from muddy water discharge.

Dewatering equipment shall be of adequate size and quantity to assure maintaining proper conditions for installing pipe, concrete, backfill or other material or structure in the excavation. Dewatering shall include proper removal of any and all liquid, regardless of its source, from the excavation and the use of all practical means available to prevent surface runoff from entering any excavation.

A2.4 INDUSTRY STANDARDS

Applicability of Standards: Except where more explicit or more stringent requirements are written into the Contract Documents, applicable construction industry standards have the same force and effect as if bound into or copied directly into the Contract Documents. Such industry standards are made a part of the contract documents by reference. Individual specification sections indicate which codes and standards the Contractor must keep available at the project site for reference.

Referenced standards (standards referenced directly in the Contract Documents) take precedence over non-referenced standards that are recognized in the industry for applicability to the Work.

Non-referenced standards are defined as not being applicable to the Work, except as a general requirement of whether the Work complies with recognized construction industry standards.

Publication Dates: Except as otherwise indicated, where compliance with an industry standard is required, comply with standard in effect as of date of Contract Documents.

Conflicting Requirements: Where compliance with two (2) or more standards is specified, and where these standards establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced, unless the Contract Documents specifically indicate a less stringent requirement. Refer requirements that are different, but apparently equal, and uncertainties as to which quality level is more stringent to the Engineer for a decision before proceeding.

Minimum Quantities or Quality Levels: In every instance the quantity or quality level shown or specified is intended to be the minimum for the work to be provided or performed. Unless otherwise indicated, the actual work may either comply exactly, within specified tolerances, with the minimum quantity or quality specified, or may exceed the minimum within reasonable limits. In complying with these requirements, the indicated numeric values are either minimum or maximum values, as noted, or as appropriate for the context of the requirements. Refer instances of uncertainty to the Engineer for decision before proceeding.

Copies of Standards: The Contract Documents require that each entity performing work be experienced in that part of the Work being performed. Each entity is also required to be familiar with industry standards applicable to that part of the Work. Copies of applicable standards are not bound with the Contract Documents.

Where copies of standards are needed for proper performance of the Work, the Contractor is required to obtain such copies directly from the publication source.

Although certain copies of standards needed for enforcement of the requirements may be required submittals, the Engineer reserves the right to require the Contractor to submit additional copies of these standards as necessary for enforcement of the requirements.

A2.5 CUTTING AND PATCHING

Description of Requirements

Definition: "Cutting and patching" includes cutting into existing construction to provide for the installation or performance of other Work and subsequent fitting and patching required to restore surfaces to their original condition.

"Cutting and patching" is performed for coordination of the work, to uncover work for access or inspection, to obtain samples for testing, to permit alterations to be performed, or for other similar purposes upon written instructions of the Engineer.

"Cutting and patching" is performed during the manufacture of products, or during the initial fabrication. Erection or installation processes are not considered to be "cutting and patching" under this definition. Drilling of holes to install fasteners and similar operations is also not considered to be "cutting and patching".

"Cutting and patching" includes the removal and replacement of Work not conforming to requirements of the Contract Documents, the removal and replacement

of defective Work, and uncovering Work to provide for installation of ill-timed Work.

No Work shall be endangered by the cutting or altering of Work or any part of it.

Quality Assurance

Requirements for Structural Work: Do not cut and patch structural Work in a manner that would result in a reduction of load-carrying capacity or of load-deflection ratio.

Operational and Safety Limitations: Do not cut and patch operational elements or safety related components in a manner that would result in a reduction of their capacity to perform in the manner intended, including energy performance, or that would result in increased maintenance, or decreased operational life or decreased energy.

Submittals

Prior to cutting which affects structural safety of Project, submit written notice to the ENGINEER, requesting consent to proceed with cutting, including:

Identification of Project.

Description of affected work.

Necessity for cutting.

Effect on structural integrity of Project.

Description of proposed work. Designate:

Scope of cutting and patching.
Trades to execute work.
Products proposed to be used.
Extent of refinishing.

Alternatives to cutting and patching.

Should conditions of work, or schedule, indicate change of materials or methods, submit written recommendation to the Engineer, including:

Conditions indicating change.

Recommendations for alternative materials or methods.

Submittals as required for Substitutions.

Submit written notice to the Engineer, designating time Work will be uncovered, to provide for observation.

Materials

For replacement of work removed: Comply with Specifications for type of work to be done.

Inspection

Before cutting, examine the surfaces to be cut and patched and the conditions under which the Work is to be performed. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding with the Work.

Preparation

Temporary Support: To prevent failure, provide temporary support of Work to be cut. Provide shoring, bracing and support as required to maintain structural integrity of project.

Protection: Protect other Work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for the part of the project that may be exposed during cutting and patching operations.

Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
Take precautions not to cut existing pipe, conduit or duct serving the building but scheduled to be relocated until provisions have been made to bypass them.

Performance

General: Employ skilled workmen to perform cutting and patching Work. Except as otherwise indicated or as approved by the Engineer, proceed with cutting and patching at the earliest feasible time and complete Work without delay.

Cutting: Cut the Work using methods that are least likely to damage work to be retained or adjoining Work. Where possible, review proposed procedures with the original installer; comply with original installer's recommendations.

In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut through concrete and masonry using a cutting machine such as a carborundum saw or core drill to insure a neat hole. Cut holes and slots neatly to size required with minimum disturbance of adjacent work. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces. Temporarily cover openings when not in use.

Comply with requirements of other applicable sections where cutting and patching requires excavating and backfilling.

By-pass utility services such as pipe and conduit, before cutting, where such utility services are shown or required to be removed, relocated or abandoned. Cut-off

conduit and pipe in wall or partitions to be removed. After by-pass and cutting, cap, valve or plug and seal tight remaining portion of pipe and conduit to prevent entrance of moisture or other foreign matter.

Patching: Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the Work.

1. Where feasible, inspect and test patched areas to demonstrate integrity of work.

2. Restore exposed finishes of patched areas and where necessary, extend finish restoration into retained adjoining Work in a manner that will eliminate evidence of patching and refinishing.

3. Execute fittings and adjustment of products to provide finished installations to comply with specified tolerances.

4. Restore work which has been cut or removed; install new products to provide completed work in accord with requirements of Contract Documents.

5. Refinish entire surfaces as necessary to provide an even finish.
   a. Continuous Surfaces: To nearest intersection.
   b. Assembly: Entire refinishing.

Cleaning: Thoroughly clean areas and spaces where Work is performed or used as access to work. Remove completely point, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

A2.6 INITIAL START-UP AND OPERATION

The initial operation period provided for herein is to check and provide the satisfactory mechanical operation of the facilities. These requirements for start-up and operation in no way relieve the Contractor of his responsibility with respect to warranty of work as specified in the "General Conditions." The manufacturer's representatives shall be present during this period to instruct the operators in the care, operation and maintenance of the equipment. When the shakedown period is completed, the Owner will assume responsibility for maintenance and operation, provided that all major items of the Work are operating satisfactorily. If any or all of the facilities are not operating satisfactorily at the end of the shakedown period, the Contractor shall continue to maintain those facilities that are incomplete or not operating satisfactorily until they are complete and acceptable to the Owner. Maintenance by the Contractor shall include all mechanical facilities such as pumps and like equipment. Prior to start-up, the Contractor will be required to prepare an operating schedule detailing the proposed start-up and his plans for manpower and auxiliary facilities to be provided.

A2.7 RESPONSIBILITY FOR TRENCH SETTLEMENT

The CONTRACTOR shall be responsible for any settlement caused by the construction that occurs within one (1) year after the final acceptance of this Contract by the OWNER. Repair of any damage caused by settlement shall meet the approval of the OWNER.

A2.8 EXISTING CONDITIONS

The existing piping shown on the Contract Drawings is based on the best available information. The Engineer makes no warranty as to the accuracy of the locations.

A2.9 SILT CONTROL

The work shall be conducted such that disturbed material is contained within the construction site. In addition to erosion control facilities included in the Contract Documents, silt and mud shall be prevented from being tracked onto public roads. Construction entrances consisting of 6" of No. 2 Stone (min. 50'x10') shall be installed as necessary to control silt/mud.

TECHNICAL SPECIFICATIONS

SECTION B - MAINTENANCE OF TRAFFIC

SCOPE

The CONTRACTOR shall maintain all local vehicular and pedestrian traffic along the project during construction. The CONTRACTOR shall follow the maintenance of traffic plans or present a plan for maintenance of traffic, detours and traffic signs subject to the approval of the Lexington-Fayette Urban County Government Traffic Engineer prior to the beginning of Work. To the extent that it does not conflict with the content of the Plans, Contract Documents, and Specifications, Subsection 104.04 of KDOH Standard Specifications, current edition, is incorporated into this Technical Specification.

MATERIALS

The CONTRACTOR shall furnish bridging plates or provide other means of maintaining safe access for pedestrians and service traffic to all businesses during normal working hours. Adequate personnel shall be available during daylight hours to assure maintenance. Metal trench covers, granular backfield or other suitable methods shall be utilized to maintain vehicular traffic through areas disturbed by construction operations.

SIGNING

The CONTRACTOR shall furnish and erect suitable barricades, signs and other necessary devices to control, guide and safeguard traffic passing through or around the construction project. All such devices shall conform in all respects to the requirements of the Manual on Uniform Traffic Control Devices for Highway Construction and Maintenance Projects. The CONTRACTOR, before erecting any barricades or changing the location of one already placed, shall notify the ENGINEER at least three days prior to such contemplated erection or change, except in case of an emergency. In case of an emergency, the ENGINEER may direct the CONTRACTOR to immediately provide safety and warning devices to safeguard traffic. All night-time control devices requiring illumination shall be lighted every night during the entire period from sunset to sunrise. The CONTRACTOR will be held responsible for all damage to Work due to failure to provide barricades, signs, lights, and watchmen to protect it; and whenever evidence of such damage is found prior to acceptance, the ENGINEER may order the damaged portion removed and replaced by the CONTRACTOR at the CONTRACTOR'S expense. The responsibility remains the CONTRACTOR'S until the project is accepted. The LFUCG Road Improvement Signs shall also be included in this item.

MEASUREMENT AND PAYMENT

Payment will be included in the Maintain and Control Traffic item of the bid for all elements related to the maintenance of traffic to include the installation and removal of temporary pavement and also for all materials, signage, labor, etc., and shall be per lump sum.

TECHNICAL SPECIFICATIONS

SECTION C - FINAL CLEANUP

SCOPE

The Work will not be considered as complete, and final payment will not be made, until the right-of-way and all ground occupied by the CONTRACTOR in connection with the Work has been cleared of all rubbish, equipment, excess materials, temporary structures, and weeds. Rubbish and all waste materials of whatever nature shall be disposed of in waste areas provided by the CONTRACTOR. All property, both public and private, which has been damaged in the execution of the Work, shall be replaced or restored in an acceptable manner. All ditches shall be drained and all space shall be left unobstructed and in such condition as acceptable to the ENGINEER.

PAYMENT

No direct payment will be made for final cleanup.

TECHNICAL SPECIFICATION

SECTION 1 - CONSTRUCTION STAKING

SCOPE

The CONTRACTOR will furnish and be responsible for all staking, including the initial staking. The CONTRACTOR shall bear the cost of all staking necessary to control and complete the Work according to the specifications to the lines and grades shown on the plans.

The survey baseline has been previously established. Should, prior to beginning Work on this project, part or all of the baseline be destroyed, it will be the CONTRACTOR'S responsibility to re-establish this baseline from the reference points shown on the plans. It will be the CONTRACTOR'S responsibility to establish all office projection centerlines shown on the plans. Should, during the course of construction of this project, any construction stakes be destroyed by others, it will be the CONTRACTOR'S responsibility to reset the stakes at no additional cost to the OWNER.

The CONTRACTOR'S staking party shall be under the general supervision of a Registered Land Surveyor. It shall be definitely understood that supervision of the resetting of construction staking is solely the responsibility of the CONTRACTOR and any errors or inaccuracies resulting from the operations of the construction staking party shall be corrected at no cost to the OWNER.

It will be the OWNER'S responsibility to make all measurements for determining final quantities to be used for basis of final payment on items of Work.

To the extent that it does not conflict with the content of the Plans and Contract Documents and Specifications, Section 201 of KDOH Standard Specifications, current edition, is incorporated into this technical specification.

PAYMENT

Payment for Construction Staking will be paid for at the Contract Unit Price per lump sum as quoted and this shall be full compensation for all Work required under this Section. All labor, materials, equipment, and excavation shall be included in this Work.

TECHNICAL SPECIFICATIONS

SECTION 2 - EARTHWORK

SCOPE

The work shall consist of the required removal and proper utilization or disposal of all excavated materials, forming embankments, and the shaping and finishing to the required lines and grades as shown on the Plans.

MATERIALS

All material removal shall be unclassified except for solid rock excavation. This includes removal of all pavements, curbs, gutters, concrete and bituminous driveway entrances, and concrete sidewalks. It shall be distinctly understood that any reference to earth, concrete, or any other material on the plans or cross-sections whether in numbers, words, letters, or lines is solely for the OWNER'S information and is not to be taken as an indication of classified excavation or the quantity of any material involved. The Bidder must draw his own conclusions as to the conditions to be encountered. The OWNER does not give any guarantee as to the accuracy of the data and no claim will be considered of additional payment if the materials are not in accord with classification shown.

For embankment, only acceptable materials from sources approved by the ENGINEER shall be used. No frozen material or perishable materials of any kind will be allowed in the embankment. No stone or masonry fragment greater than four inches in any dimension will be allowed in the top 12 inches of the finished elevation.

GENERAL

Excavation and grading shall be done in a neat and workmanlike manner to form smooth and uniform subgrades and surfaces for all subsequent operations and once the surfaces have been shaped to the proper template and compacted to the satisfaction of the ENGINEER and in accordance with current edition of the Kentucky Department of Highways Standard Specifications, it shall be maintained in such condition until covered by subsequent construction operations.

Material removed shall include excavation to the designated depths, transporting of removed materials from points to final use, disposal of surplus materials, and the shaping and finishing of all areas to the required lines and grades as shown on the Drawings.

Surplus material will become the responsibility to the CONTRACTOR to dispose of off the project limits at a site acquired by the CONTRACTOR at no expense to the OWNER and approved by the ENGINEER.

Material removal carried below the indicated depths, except when directed by the ENGINEER, shall be replaced with material satisfactory to the ENGINEER. Additional

payment will not be necessitated thereby. All areas of fill shall be constructed to the lines and grades indicated on the Drawings, unless otherwise directed by the ENGINEER.

PREPARATION OF SUBGRADE

Preparation of subgrade for pavements, bases, curbs, gutters, sidewalks, and retaining walls shall conform to the required grades and the specified depth below the designated surface of the particular item for which it is intended. All soft and spongy places in the subgrade shall be excavated and backfilled with No. 2 coarse aggregate below the base course level, then brought to grade with dense graded aggregate. Once the subgrade has been shaped to the proper template and compacted to the satisfaction of the ENGINEER and in accordance with the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction, current edition, it shall be maintained in such condition until covered by subsequent construction operations. Any portion of the subgrade which, cannot be shaped and compacted by the use of machinery shall be prepared by the use of hand tools.

UTILIZATION OF REMOVED MATERIALS

All suitable material removed shall be used, insofar as it is practicable, in constructing the fill and embankments shown on the Drawings provided that the ENGINEER approves. The contractor shall dispose of any material in excess or unsatisfactory for such use.

CONSTRUCTION TOLERANCES

The CONTRACTOR shall make every reasonable effort to construct the project uniformly. Tolerances which will be allowed will be according to the KDOH Standard Specifications for Road and Bridge Construction, current edition.

No payment will be made for any earthwork performed outside the limits shown on the Drawings or those approved by the ENGINEER. No extra material shall be removed or placed outside of these limits without permission.

STANDARD SPECIFICATIONS

To the extent that they do not conflict with the content of the Plans and Contract Documents and Specifications, Sections 109, 203, 204, 205, 206, 207, 212, and 213 of KDOH Standard Specifications, current edition, are incorporated into this Technical Specifications.

PAYMENT

Payment for Work under this Section will be based on acceptable quantities and paid for at the Contract Unit Price per cubic yard as quoted and this shall be full compensation for all Work required under this Section. All labor, materials, equipment, and excavation shall be included in this Work.

TECHNICAL SPECIFICATIONS

SECTION 3 – SAW CUTTING WALK, CURB, PAVEMENT, ETC.

SCOPE

When saw cutting of sidewalks, curb/curb and gutter, pavement, etc. is called for in these Specifications it shall require the use of an approved saw in order to obtain a smooth, straight line. Any existing facility that is not marked for removal by the Engineer, but is nevertheless removed, shall be replaced at the Contractor's expense.

PAYMENT

Work under this Section shall be considered incidental to the removal of the pavement, concrete, etc., and no direct payment will be made for saw cutting.

TECHNICAL SPECIFICATIONS

SECTION 4 - CLEARING AND GRUBBING

SCOPE

This item includes the clearing and grubbing of any trees, stumps, brush, bushes, cement concrete and/or stone masonry, steps, fences, walls, and structures within the construction limits **not otherwise removed by the excavation and grading operations or included in the bid items.** Also, included is the proper removal and disposal of such materials in a manner acceptable to the ENGINEER and in a manner not detrimental to the inhabitants of the area. The CONTRACTOR will be responsible for determining and complying with local ordinances regarding disposal and/or burning of such materials. Trees, shrubbery, fences, retaining walls, and other such items not specifically noted on the plans to be removed or saved in place, or not shown on the plans, but suspected of being within the project construction limits shall not be disturbed until so directed by the ENGINEER. Clearing and grubbing shall not commence without approval of the ENGINEER.

Work shall not be performed outside the construction limits and existing vegetation outside the limits shall not be disturbed unless authorized by the ENGINEER.

The CONTRACTOR shall reset any street and traffic signs disturbed by the Work at locations selected by the ENGINEER. The CONTRACTOR shall carefully remove and stockpile for pickup by the OWNER all signs, grates, manhole frames and covers, and other such salvageable and reusable items, not intended to be reset on the job. The CONTRACTOR is responsible for maintenance of signs until final acceptance by the OWNER.

Vegetated areas on which excavation or fill operations are to be performed shall be stripped of all vegetation, topsoil, and other organic material as directed by the ENGINEER.

Stripped topsoil material shall be utilized in the general area it came from in a manner directed by the OWNER. Stockpiling of topsoil-type material will be required.

To the extent that it does not conflict with the content of the Plans and Contract Documents and Specifications, Section 202 of KDOH Standard Specifications, current edition, is incorporated into this Technical Specification. Topsoil shall not be removed from the site.

BASIS OF PAYMENT

Clearing and Grubbing will be paid for at the Contract Unit Price per lump sum as quoted and this shall be full compensation for all Work required under this Section. All labor, materials, equipment, and excavation, etc. shall be included in this Work.

Separate payment will be made for tree removal where specifically annotated on the plans, see Technical Specification, Section 42.

TECHNICAL SPECIFICATIONS

SECTION 5 – SIDEWALK & SHARED USE PATH REMOVAL

SCOPE

Work for this Section shall conform to the applicable sections of the Kentucky Department of Highways Standard Specifications, current edition and shall include all labor, materials, equipment, excavation, disposal, and incidentals necessary to complete Work.

PAYMENT

Payment for this work shall only be authorized for accepted quantities for removal of sidewalks and shred use paths in this Section that are specifically annotated on the plans (Sheet R-6). Payment will be made at the appropriate Contract Unit Price per linear foot, square yard, etc. as quoted and this shall be full compensation for all Work required under this Section. All labor, materials, equipment, excavation, refilling areas to final grades, etc. shall be included in this Work.

No separate payment for the Work under this Section shall be made when the work is performed as "Clearing and Grubbing" or when this Work is incidental to excavation and grading for proposed construction of roadways, sidewalks, driveways, etc.

TECHNICAL SPECIFICATIONS

SECTION 6 - ROCK EXCAVATION (MECHANICAL)

SCOPE OF WORK

Work under this Section shall be accomplished by accepted methods of drilling, grinding, trenching, jack hammering, or hoe ramming of rock. Any property damage caused by operations under this section is the responsibility of the Contractor. Blasting will not be allowed on this project. Rock shall be defined as solid bedrock that cannot be removed by conventional excavation.

BASIS OF PAYMENT

Excavation on this project is unclassified. Rock excavation will be incidental to any construction activity in which it is encountered, with the exception of culvert construction. No separate payment for rock excavation will be made other than what is required for the culvert construction.

TECHNICAL SPECIFICATIONS

SECTION 7 – NO. 2 STONE BASE

SCOPE

Work for this Section shall consist of furnishing and placing No. 2 Stone in locations as determined by the Engineer and shall include all labor, materials, equipment, excavation, and incidentals necessary to complete the Work in place, ready for use and constructed in conformance with all applicable sections of the Kentucky Department of Highways (KDOH) Standard Specifications, current edition.

Where soft, undesirable soil material is encountered at or below the desired subgrade elevation, undesirable material will be removed and/or bridged using No. 2 Stone to develop a sufficient platform to support compaction of DGA. The depth and extent of this work shall be determined based on conditions observed and performance of compaction equipment on the subgrade. Work shall be as directed by the Engineer.

No. 2 Stone will be dumped or pushed into place and walked in until support is developed for heavy equipment. The ultimate test will be the ability to provide an adequate compaction platform for the DGA base.

No. 2 Stone is a contingency item and is only to be employed as directed by the Engineer.

BASIS OF PAYMENT

Payment for this Section will be at the Contact Unit Price per ton of No. 2 Stone shall be full compensation for all Work required under this section. Payment for No. 2 Stone shall be based on weight tickets for stone delivered and accepted for the work. All labor, materials, equipment, excavation, proof testing, and disposal of excavated material shall be incidental to the placement of No. 2 Stone.

TECHNICAL SPECIFICATIONS

SECTION 8 – HEADWALLS

SCOPE

Work for this Section shall conform to all applicable Kentucky Department of Highways Standard Specifications, current edition and the Lexington-Fayette Urban County Government Standard Drawings and shall include labor, excavation, materials, equipment and necessary incidentals.

BASIS OF PAYMENT

Payment for headwalls will be based on acceptable quantities and paid for at the Contract Unit Price per each as quoted and this shall be full compensation for all Work required under this Section. All labor, materials, equipment, and excavation, etc. shall be included in this Work.

TECHNICAL SPECIFICATIONS

SECTION 9 - TEMPORARY EROSION CONTROL

SCOPE

Work for this Section shall include all labor, excavation, materials, equipment, and incidentals necessary to temporary erosion control (silt fence, silt trap, etc.), bituminous material, mulch and temporary seeding in accordance with the Lexington-Fayette Urban County Government Standard Drawings and shall conform to applicable Kentucky Department of Highway Standard specifications, current edition. Application of Temporary Erosion Control shall be per the BMP Plan and will generally be on disturbed areas which may be left unfinished for periods longer than 14 days.

PAYMENT

Temporary erosion control will be based on acceptable quantities and paid for silt fence and silt traps as shown on the erosion control plans. Erosion control will be paid for at the Contract Unit Price per linear foot, or each, as quoted and this shall be full compensation for all Work required under this Section. All labor, materials, equipment, maintenance and excavation, etc. shall be included in this Work.

Insuring that silt fences and silt traps are functioning properly shall be the responsibility of the Contractor. Any maintenance or cleaning of erosion control facilities shall be considered incidental to the construction of silt fences and silt traps. No separate payment will be made for the maintenance and cleaning of silt fences and silt traps.

TECHNICAL SPECIFICATIONS

SECTION 10 – CURB & DROP BOX INLETS

SCOPE OF WORK

Work for this Section shall include all labor, excavation, materials, equipment, and incidentals to construct Curb and Drop Box Inlets in accordance with the applicable Kentucky Department of Highways Standard Drawings or Lexington-Fayette Urban County Government Standard Drawings and shall conform to applicable Kentucky Department of Highways Standard specifications, current edition.

BASIS OF PAYMENT

Accepted quantities will be based on acceptable quantities and paid for at the Contract Unit Price per each as quoted as in the Bid Schedule and shall be full compensation for all Work under this Section. All labor, materials, equipment, and excavation, connections to existing pipes, etc. shall be included in the placement of Curb and Drop Box Inlets.

TECHNICAL SPECIFICATIONS

SECTION 11 - SURFACE INLETS

SCOPE

Work for this Section shall include all labor, excavation, materials, equipment, and incidentals necessary to construct Surface Inlets in accordance with the Lexington-Fayette Urban County Government Standard Drawings and shall conform to applicable Kentucky Department of Highway Standard specifications, current edition.

BASIS OF PAYMENT

Accepted quantities will be based on acceptable quantities and paid for at the Contract Unit Price per each as quoted as in the Bid Schedule and shall be full compensation for all Work under this Section. All labor, materials, equipment, and excavation, connections to existing pipes, etc. shall be included in this Work.

TECHNICAL SPECIFICATIONS

SECTION 12 – MANHOLES, STORM SEWER (TYPE A & B) AND ADJUST MANHOLES

SCOPE

Work for this Section shall consist of manhole construction, or adjustments, for manholes as shown on the plans.

At the option of the Contractor, manholes may be constructed of precast concrete manhole rings and cores. Manholes shall be constructed to conform to Lexington-Fayette Urban County Government Standard Drawings unless otherwise noted or directed by the Engineer. Bases for manholes shall be poured in place using Class "A" concrete and shall have a minimum thickness of eight inches (8").

MATERIALS

Precast Concrete Rings: Precast concrete rings for manholes shall conform to ASTM C-478, with a minimum concrete strength of 3,500 psi, except that rings for manholes over twelve (12) feet deep shall be Class III. Rings shall be of the tongue and groove type and shall be in a proper combination of height. Bricks may not be used for leveling and adjusting height.

Precast Concrete Cones: Precast concrete cones shall be of the size and shape shown on the plans and shall conform to the ASTM Standard Specification C-76 for the reinforced concrete sewer pipe, Class II and as specified above for Precast Concrete Rings.

Sealant for Concrete Rings: Conseal or its equal shall be used as sealant.

Manhole Steps: Manhole steps shall be coated cast iron or polypropylene plastic coated steel rod or of a type and size approved by the engineer. Steps shall be spaced approximately 12" to 16" o.c. vertically so as to form a continuous ladder. Steps shall be required in manholes when the structure is 4 feet and greater in depth. The threads of all steps shall have anti-skid properties for hand and foot grips. Manhole steps shall be installed in a vertical line and shall comply with OSHA standards in all respects.

Manhole Frames and Covers:
Standard Circular Manhole Frame and Cover-Manhole frame and lid assembly shall have a minimum lid weight of 150 lbs. and a total minimum frame and lid weight of 385 lbs. with all steel in accordance with ASTM A-48 Class 35 spec.

Standard Watertight Manhole Frame and Cover- Manhole frame and lid assembly shall be Neenah#R-1916-D or approved equal, have a minimum lid weight of 150 lbs. and a total minimum frame and lid weight of 335 lbs. with all steel in accordance with ASTM A-48 Class 30 spec or higher.

Manhole covers must set neatly in the rings with contact edges machined for even bearings and tops set neatly in the rings with contact edges machined for even bearings and tops flush with ring edge. They shall have sufficient corrugations to prevent slipperiness and be marked in large letters, "SANITARY" or "STORM SEWER, LEXINGTON, KENTUCKY". The lids shall have two pick holes about 1-1/2 inches wide and 1/2-inch deep with 3/8-inch undercut all around. The contact surfaces of covers and corresponding rings in the rims shall be machined to provide full perimeter contact.

CONSTRUCTION METHODS

Width and Depth of Excavation of Structure:

Earth Excavation: In excavating for concrete structures, the required width shall be such as to permit forms to be constructed in the proper manner and to permit proper backfilling on completion of the structures. Depth of excavation for base shall be as shown on the Standard Drawings and/or as directed by the Engineer to obtain sufficient bearing.

Rock Excavation: Rock excavation for structures will be measured between the vertical planes passing eighteen (18) inches beyond the outside of the base and from the surfaces of the rock to the neat lines of the bottoms of the structures or the actual bottom on the rock ledge.

Laying Concrete Rings: Mortar joints shall not be more than 3/8 inch thick horizontally and not less than 3/8 inch wide vertically at the inside face of the manhole.

Precast concrete manhole rings shall be set level and plumb. Joints between sections shall not be less than 3/8 inch thick and the entire joint space between sections shall be completely filled with mastic, or other material approved by Engineer.

In sanitary sewer manholes, masonry shall be carefully and neatly constructed around the inlet and outlet pipes so that there will be no leakage around the outer surface. Extreme care will be exercised to construct watertight manholes with particular care around inlet and outlet pipe.

Manhole Inverts: Manhole inverts shall be formed from Class "A" concrete as shown on the plans. Inverts for a "straight-through" manhole may be formed by laying the pipe straight through the manhole and carefully removing the upper portion of the pipe after the bottom is completed. Curved inverts shall be constructed of concrete and shall form a smooth, even, half-pipe section. The inverts shall be constructed when the manhole is being built using prefabricated forms. Changes in direction of flow through the invert shall be made to a true curve with as large a radius as the size of manhole or inlet will permit. Invert slabs which are situated at depths in excess of 12 feet shall be reinforced per Lexington-Fayette Urban County Government Standard Drawings.

Casting: The cast iron steps shall be included in the wall of the manhole at the proper locations and elevations as the work progresses and shall be securely embedded (per Lexington-Fayette Urban County Government Standard Drawings). The cast iron frame for the manhole cover shall be set at the required elevation and properly anchored. Where manholes are constructed in

paved areas, the top surface of the frame and cover shall be tilted to conform to the exact slope, crown and grade of the existing adjacent pavement. Frames shall be in full cement mortar beds or other approved material. Castings shall be ASTM A-48, Class 35

Backfilling: Masonry Work shall be allowed to set for a period of not less than twenty four (24) hours. Outside holes shall be backfilled and compacted in the same manner as provided for backfilling of pipeline trenches. All loose or waste material shall be removed from the interior of the manhole or inlet. The manhole cover or inlet grating then shall be placed and the surface in the vicinity of the Work cleaned off and left in a neat and orderly condition. No backfilling shall be performed until the manhole has been inspected and approved for backfilling by the Engineer.

Vacuum Testing for Sanitary Sewer Manholes: All sanitary sewer manholes must pass the application of a vacuum test (in accordance with the LFUCG Sanitary Sewer and Pump Station Manual and Section 26) prior to acceptance by the Lexington-Fayette Urban County Government.

BASIS OF PAYMENT

Accepted quantities for Manhole Construction with frame and lid will be based on acceptable quantities and paid for at the Contract Unit Price per each as quoted and this shall be full compensation for all Work required under this Section. All labor, materials, equipment, connections to existing pipes, excavation, testing, and incidentals, etc. shall be included in this Work.

TECHNICAL SPECIFICATIONS

SECTION 13 - SIGNALS

SCOPE

This Work consists of the construction as shown on the Plans, and in accordance with current Lexington-Fayette Urban County Government (LFUCG) specifications. Work in this section shall also conform to applicable sections of the Kentucky Department of Highways (KDOH) Standard Specifications, current edition, but only to the extent that these KDOH sections do not conflict with the content of the Plans, Contract Documents and Specifications, and LFUCG specifications.

Overhead flashing lights at Clays Mill Rd - Vincent Way - This Work shall consist of replacing the two poles on the west side of Clays Mill Road with two 28' strain poles (KYTC spec's). Existing box spans can remain in place. All other wiring, control cabinets, etc. can also remain in place.

Pole specifications for overhead flashers – Height = 28', pole base = 14.25", top = 7.25", thickness = .1875", sides = 12, allowable moment (lbs/ft) = 140,214, tension (lbs) = 5175, deflection rate 9in/100lbs) = 0.3, bolt diameter = 1.75", bolt circle = 21", shape factor = 3.29, concrete base = 3' diameter and 12' deep.

BASIS OF PAYMENT

Payment for this Section will be paid at the Contract Unit Price per lump sum, as quoted which shall be full compensation for all Work under this Section. All labor, materials, equipment, excavation, and backfilling shall be incidental to this Work.

TECHNICAL SPECIFICATIONS

SECTION 14 - REINFORCED CONCRETE PIPE

SCOPE

This Work shall consist of the furnishing, bedding, laying, and jointing of all storm sewer pipe shown on the Construction Plans or otherwise required by the Contract Documents. The work shall also include the trenching and backfill, removal and relocation of disturbed utilities, and the necessary pavement repairs unless otherwise indicated on the plans. Repair of concrete curb, sidewalks, and entrances will be covered under separate sections. The Contractor shall limit active pipe installation to assure clean up following such work. This Work includes new storm drainage lines and all connections to new and existing storm drain structures and pipes.

MATERIALS

Pipe strength classes listed are the minimum acceptable classes for each type of pipe. Any pipe found defective, or otherwise not meeting the Specifications shall be rejected and replaced by pipe meeting these Specifications at no additional cost to the OWNER.

The CONTRACTOR shall furnish three copies of the supplier's certification to the ENGINEER stating that pipe materials were manufactured, sampled, tested and inspected in accordance with the standards listed in this Section and have been found to meet those requirements.

Reinforced Concrete Pipe. Circular reinforced concrete pipe shall meet the requirements of ASTM C 76, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Storm Pipe. Unless shown otherwise on the Plans or in the Contract Documents, Class III pipe shall be used.

Rubber, plastic, and mastic joints shall meet the requirements of AASHTO M 198, Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets, for Type A (Rubber Gaskets), Type B (Flexible Plastic Gaskets) gaskets, or Forsheda Rubber Gaskets. Bituminous mastic joint sealing material shall meet the requirements of KDOH Standard Specifications Section 807.02.04, Joint Sealer for Rigid Pipe, except that asbestos fibers shall not be allowed as a filler.

Bedding and Backfill. Bedding materials shall be provided as indicated on the Plans and LFUCG's Standard Drawings. When crushed stone is required it shall conform to Section 805 of the Kentucky Department of Highways (KDOH) Standard Specifications, current edition.

EXECUTION

In all operations such as placing the pipe, jointing, bedding and backfiling, care shall be exercised and it shall be the Contractor's responsibility to see that pipes are not damaged during transportation, unloading, or placement during compaction of the backfill by

movement of excessively heavy equipment over the backfill; or any other force that may cause damage.

TRENCHING

Classification. Excavation shall be unclassified except for rock excavation.

Trench Dimensions. No more than 300 feet of trench shall be opened at any time in advance of the pipe, nor shall more than 25 feet be left unfilled overnight. Excavations for pipe shall display a width between the minimum and maximum allowable width, below a level 1-foot above the outside top of pipe, as shown on the Plans and LFUCG's Standard Drawings.

Sheeting and Bracing. Sheeting and bracing or other devices and methods as may be required to safely support the sides of excavations shall comply with current OSHA requirements and the safety precautions as outlined in current and accepted safety manuals, such as "Associated General Contractors Manual of Accident Prevention in Construction". When sheeting and bracing are necessary to prevent caving of the walls of excavation and to safeguard the workmen, the excavations shall be dug to such widths that proper allowance is made for the space occupied by the sheeting and bracing.

The Contractor shall perform the additional excavation required and furnish and put in place the necessary sheeting and bracing and shall remove the same as the excavation is filled.

Saw Cuts. Prior to excavating beneath pavement, sidewalks, curbs, etc., pavement or concrete shall be saw cut. The final saw cut shall be set back at least twelve inches beyond the edge of the excavation and bridged with concrete in accordance with LFUCG Standard Drawing 318. Trench backfill shall include concrete bridge as shown in LFUCG Standard Drawing 205 or others.

Excess Material. Excess material generated from the trench excavation and not utilized as backfill shall be properly disposed of off-site by the CONTRACTOR

CRADLE AND ENCASEMENT

Cradle and encasement shall be of crushed stone and shall be installed as specified and within the limits shown on the Plans or directed by the ENGINEER.

Crushed Stone Cradle. Crushed No. 9 stone cradle shall mean the placement of crushed stone from the subgrade level (six-inches below the outside of the pipe) up to the springline of the pipe. The crushed stone shall be deposited in the trench to grade, allowing for the thickness of the pipe wall. Bell holes shall be dug to relieve the bells of all concentrated loads and to provide uniform support throughout the pipe section. For larger pipes, the crushed stone shall be shoveled and shovel-sliced beneath the haunches of the pipe to assure uniform support.

Crushed Stone Encasement. Crushed No. 9 stone encasement shall mean the placement of additional crushed stone above the crushed stone cradle to a level at least 12-inches above the outside top of the pipe. Crushed No. 9 stone is required under pavement and elsewhere as

indicated on the drawings. The additional stone shall be placed in such manner to prevent damage to the pipe.

PIPE INSTALLATION

Inspection and Handling. All pipe shall be inspected on delivery and such pipe sections that do not conform to these Specifications and which are not suitable for use shall be rejected and immediately removed from the work site. Equipment used to handle, lay, and joint pipe shall be so used to prevent damage to the pipe and its jointing materials. All pipe and fittings shall be carefully handled and lowered into the trench. The pipe shall not be rolled, dropped, or thrown into the trench. Damaged pipe or jointing material shall not be installed.

Pipe Laying and Jointing. The laying of pipe shall begin at the lowest point and proceed upstream with the bell or groove ends pointing up-stream. Prior to making pipe joints, all joint surfaces shall be clean and dry and free from gravel or other extraneous materials. All necessary lubricants or adhesives shall be used as recommended by the pipe manufacturer. Suitable means shall be used to force the spigot or tongue end of the pipe the proper distance into the bell or groove end without damage to the pipe and its jointing materials and without disturbing previously laid pipe sections. Special care shall be taken to ensure that the pipe is solidly and uniformly cradled or encased in accordance with these Specifications. No section of pipe shall be brought into position for jointing until the preceding section has been bedded and secured in place.

Line and Grade. Each section of pipe shall be checked for vertical and horizontal alignment immediately after being laid. All adjustments to line and grade must be made by scraping away or filling in under the barrel of the pipe and not by wedging or blocking up any portion of the pipe or striking the pipe in an effort to drive it down.

Protection of Installed Pipe. As the work progresses, the interior of the pipe shall be protected from and cleaned of all dirt, cement, extruded joint materials, debris, and other extraneous material. Wherever pipe laying is stopped for any significant length of time, such as at the end of a workday, the unfinished end shall be protected from displacement, floatation, cave-in, and in-wash of soil or debris. A suitable temporary tight-fitting plug, stopper or bulkhead shall be placed in the exposed bell or groove end of the pipe.

Water shall not be allowed to rise in the excavation until the joint material and/or concrete cradle or encasement has hardened and cannot be damaged by the water. Particular care shall be used to prevent disturbance or damage to the pipe and the joints during backfilling or at any other time. No walking or working over the pipe, except as necessary for placing and compacting backfill, or operating compaction equipment directly over the pipe shall be allowed until a minimum of 24-inches of cover over the outside top of the pipe has been placed. Mechanical compaction in this zone shall be with manual pneumatic tampers or other hand-operated methods which will not damage the pipe.

Connection of Proposed Pipe to Existing Pipe. Once the connection of proposed pipe to existing pipe is made, the excess crack between the pipes shall be filled with grout and the entire area around the connection shall be filled with cement concrete. No fill shall be placed on the concrete before hardening has occurred.

BACKFILL

The pipe trench shall be backfilled utilizing the material types and zones shown on the Plans and LFUCG's Standard Drawings. No. 9, No. 57 or No. 78 shall be placed in 12-inch maximum lifts and compacted with two passes of a vibratory plate compactor. Dense graded aggregate shall be compacted to 84 percent solid volume. The surface should be raked or lightly roughened. Where the Standard Drawings require a concrete cap, it shall be constructed according to KDOH Section 501 for consolidated unfinished concrete.

Repair of Surface Features. After completion of storm sewer pipe construction, surface features such as sod, street pavement, sidewalks, curbs, etc., shall be restored to at least the condition which existed prior to construction. Finished grades of pavement and sidewalks shall match existing grades. Pavement restoration shall meet the requirements of LFUCG Standard Drawings. Concrete thickness and reinforcement shall conform to the existing sections. The edges of concrete repairs shall be turned down 12 inches and asphalt or other approved expansion joint material shall be placed between the existing and new concrete.

INSPECTION OF STORM SEWERS

A television survey of all installed sewer pipe shall be performed. The television survey shall be performed by a CCTV Contractor approved by the Kentucky Transportation Cabinet.

The CCTV inspections should be performed by the approved contractor a minimum of thirty (30) days after the pipe trench has been backfilled, or as approved by the Engineer. Two (2) copies of the videoed sewer pipes shall be provided to the OWNER. The television survey shall be at the Contractor's expense and is incidental to the installation of the pipe.

MEASUREMENT AND PAYMENT

Payment under this Section will be based on acceptable quantities and paid for at the Contract Unit Price per linear foot for the appropriate size of reinforced concrete pipe. No allowances will be made for fittings. Payment as specified above shall be considered full compensation for furnishing, transportation, and installation, including excavation, backfill material, connections to existing and proposed storm drain structures, backfilling and pavement, pavement saw cuts, concrete bridge, sod, fertilizer, and lime, and all necessary material, labor, excavation, equipment and incidentals necessary to complete the work as required.

TECHNICAL SPECIFICATIONS

SECTION 15 – STORM SEWER PIPE

SCOPE FOR STORM SEWER PIPE

Storm Sewer Pipe shall be either Reinforced Concrete Pipe (RCP) and High Density Polyethylene (HDPE) Pipe. Refer to Section 14 for RCP

SCOPE FOR HDPE STORM SEWER

Work under this Section shall include all labor, trenching, excavation, materials, equipment, bedding and backfilling in accordance to the Plans, Contract Documents and Specifications and all incidentals necessary to place HDPE Storm Sewer to the sizes indicated. Only ADS N-12 or Hancor Sure-Lok HDPE materials are approved at this time. Submit in writing the proposed Manufacturer's name at time of bid or at pre-construction meeting The CONTRACTOR shall be certified by the Pipe Manufacturer to install HPDE pipe and provide proof thereof. All pipe delivered to the site shall be certified through the Plastic Pipe Institute (PPI) Third Party Certification program and shall bear the Third Party Administered seal. Only an approved Adapter, as manufactured by the pipe manufacturer, shall be used to connect HDPE pipe with existing pipe of dissimilar material.

Installation
Pipe installation must conform to all manufacturer's instructions or to Engineer's design requirements, whichever is more stringent, and is to be installed at the required line and grade as indicated on the plans. The Manufacturer must certify that the completed installation has met the installation requirements, which requires a representative of the Manufacturer to be on site during construction.

Trench width must conform to ASTM D2321 Section 6.3 or manufacturer's recommendation. Once the trench is excavated on line, the pipe bedding should be placed to proper thickness. The top of the bedding should be adjusted to allow for the difference between the plan invert and pipe profile. For 42" through 60" N-12HC, a shallow (1 inch) "bell hole" shall be provide so the pipe is fully supported.

Dewatering
Excessive groundwater hinders proper placement and compaction of bedding and backfill. HDPE pipe will float in standing water, therefore, it is imperative that a dry trench be provided. It may be necessary to provide sumps pumps, underdrains or a diversion ditch to insure a dry trench.

Joints and Joint Assembly
All joints are to be installed as per manufacturer's specifications.

Embedment Material
Shall be in accordance with LFUCG Standard Drawings.

Foundation
Shall be in accordance with LFUCG Standard Drawings.

Bedding
Shall be in accordance with LFUCG Standard Drawings.

Haunching
Shall be in accordance with LFUCG Standard Drawings.

Initial Backfill
Shall be in accordance with LFUCG Standard Drawings.

Final Backfill
Shall be in accordance with LFUCG Standard Drawings.

Manhole Connections
Consideration should be given to the project performance specified when selecting manhole connections. When connecting to concrete manholes or inlets grouting the pipe to the manhole or inlet using non-shrink grout provides a soil tight installation. A gasket placed in a pipe corrugation at the approximate center of the manhole or inlet wall will act as a water stop. This water-stop should provide a silt tight installation. Watertight installations may require flexible rubber connections such as rubber boots or adapters. When connecting to manholes, insure backfill is placed under the pipe adjacent to the manhole to prevent differential settlement.

Specifications
The following list is a common material, design and performance specification for N-12, N-12HC, or Sure-Lok Pipe:

ASSHTO M-252	ASTM F 405
AASHTO M-294	ASTM F 667
AASHTO MP 7-97	ASTM D 2321
AASHTO Section 12, 18, 30	ASTM F 477, ASTM 1417

INSPECTION OF STORM SEWERS

A television survey of all installed sewer pipe shall be performed. The television survey shall be performed by a CCTV Contractor approved by the Kentucky Transportation Cabinet.

The CCTV inspections should be performed by the approved contractor a minimum of thirty (30) days after the pipe trench has been backfilled, or as approved by the Engineer. Two (2) copies of the videoed sewer pipes shall be provided to the OWNER. The television survey shall be at the Contractor's expense and is incidental to the installation of the pipe.

In addition to CCTV post-installation inspections, HDPE pipe shall undergo deflection testing using industry-standard 9-fin mandrels. The mandrels shall be set at diameter 5-percent less than AASHTO nominal inside diameters. Testing can be performed either by the contractor with an LFUCG Representative witness, or conducted by an approved, independent, third-party contractor. The mandrel testing shall be at the expense of the Contractor and is considered incidental to the installation of the pipe.

BASIS OF PAYMENT FOR HDPE STORM SEWER

Payment for HDPE Storm Sewer will be based on acceptable quantities (see below) and paid for at the Contract Unit Price per linear foot as quoted for various sizes (which shall be full compensation for all work required under this Section) and paid per linear foot of specified HDPE Storm Sewer satisfactorily placed. Any removal of pavement and any rock encountered shall be incidental to the installation of HDPE Storm Sewer piping.]

Accepted quantities for HDPE Storm Sewer shall pass a 5-percent mandrel. HDPE pipe found to be between 5- and 10-percent deflected shall be evaluated by a professional engineer for structural integrity and hydraulic performance. Any HDPE pipe at or above 10-percent deflected shall be removed and replaced. Any remove and replace effort shall be considered incidental to the installation of the HDPE Storm Sewer Pipe.

Payment under this Section will be based on acceptable quantities and paid for at the Contract Unit Price per linear foot for the appropriate size of reinforced concrete pipe. No allowances will be made for fittings. Payment as specified above shall be considered full compensation for furnishing, transportation, and installation, including excavation, backfill material, connections to existing and proposed storm drain structures, backfilling and pavement, pavement saw cuts, concrete bridge, sod, fertilizer, and lime, and all

necessary material, labor, excavation, equipment and incidentals necessary to complete the work as required.

TECHNICAL SPECIFICATIONS

SECTION 16 – NO. 9 STONE

SCOPE

Work for this Section shall consist of furnishing and placing No. 9 Stone in locations as determined by the Engineer and shall include all labor, materials, equipment, excavation, and incidentals necessary to complete the Work in place, ready for use and constructed in conformance with KDOH Standard Specifications. No. 9 Stone shall meet the requirements of applicable KDOH specifications and should be used for backfill in areas where specified.

Stone will be dumped or pushed into place and worked in until support is developed for heavy equipment. The ultimate test will be the ability to provide an adequate compaction platform for the reconstructed pavement.

PAYMENT

No. 9 Stone is incidental to this project and no separate payment will be made for this work.

TECHNICAL SPECIFICATIONS

SECTION 17 - DGA BASE

SCOPE

This Work consists of the construction of Dense Graded Aggregate (DGA) base in accordance with the Plans, Contract Documents and Specifications, and Lexington-Fayette Urban County Government (LFUCG) Standard Drawings, current edition. Work in this section shall also conform to applicable sections of the Kentucky Department of Highways (KDOH) Standard Specifications, current edition, but only to the extent that these KDOH sections do not conflict with the content of the Plans, Contract Documents and Specifications. The requirements of KDOH Standard Specifications, Section 302, apply with the following changes:

(1) Control strips will not be required or utilized for compaction control.

(2) Test sections and target density, as prescribed in paragraph 302.03.04, will not be established.

(3) Density measurements will be made at locations designated by the Engineer or his/her representative.

(4) Additional tests requested by the Contractor will be at the CONTRACTOR'S expense.

(5) The average of dry density measurements in a lift shall be equal to or better than 144 pounds per cubic foot (pcf). No individual measurement shall be less than 140 pcf.

(6) In the event the dry density measurements are not met, laydown operations will be stopped in the substandard area identified by the Engineer or his/her representative. The Contractor will either continue compaction effort or rework the designated section until the requirements for dry density are satisfied.

PAYMENT

DGA installation will be based on acceptable quantities and paid for at the Contract Unit Price per ton as quoted and this shall be full compensation for all Work required under this Section. All labor, materials, equipment, and excavation, etc. shall be included in this Work.

TECHNICAL SPECIFICATIONS

SECTION 18 - CONCRETE AND UNFINISHED CONCRETE

SCOPE

Various Class A, Class AA, Concrete and Unfinished Concrete for bridge construction, encasement, capping sewer trenches at locations of pavement restoration, fill for cavities or voids and mass footings shall conform to all applicable sections of the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction, current edition, and shall include all labor, materials, equipment and incidentals necessary to complete the Work. Concrete work for pavement restoration and capping shall conform to LFUCG Standard Drawings.

BASIS OF PAYMENT

Payment for Concrete and Unfinished Concrete will be based on acceptable quantities and paid for at the Contract Unit Price per cubic yard as quoted and this shall be full compensation for all Work required under this Section. All labor, materials, equipment, applicable materials testing, and excavation, etc. shall be included in this Work.

TECHNICAL SPECIFICATIONS

SECTION 19 – CLASS 2 BITUMINOUS CONCRETE SURFACE

SCOPE

This Work consists of the construction of Bituminous Concrete Surface in accordance with the Plans, Contract Documents and Specifications, and Lexington-Fayette Urban County Government (LFUCG) Standard Drawings, current edition. Work in this section shall also conform to applicable sections of the Kentucky Department of Highways (KDOH) Standard Specifications, current edition, but only to the extent that these KDOH sections do not conflict with the content of the Plans, Contract Documents and Specifications, and LFUCG Standard Drawings.

PAYMENT

Payment for Bituminous Concrete Surface will be based on acceptable quantities and paid for at the Contract Unit Price per ton as quoted and this shall be full compensation for all Work required under this Section. All labor, materials, equipment, and excavation, etc. shall be included in this Work.

TECHNICAL SPECIFICATIONS

SECTION 20 - CLASS 2 BITUMINOUS BASE

SCOPE

This Work consists of the construction of Bituminous Base in accordance with the Plans, Contract Documents and Specifications, and Lexington-Fayette Urban County Government (LFUCG) Standard Drawings, current edition. Work in this section shall also conform to applicable sections of the Kentucky Department of Highways (KDOH) Standard Specifications, current edition, but only to the extent that these KDOH sections do not conflict with the content of the Plans, Contract Documents and Specifications, and LFUCG Standard Drawings.

PAYMENT

Payment for Bituminous Base will be based on acceptable quantities and paid for at the Contract Unit Price per ton as quoted and this shall be full compensation for all Work required under this Section. All labor, materials, equipment, and excavation, etc. shall be included in this Work.

TECHNICAL SPECIFICATIONS

SECTION 21 – CONCRETE CURB AND GUTTER & HEADER CURB

SCOPE

This Work consists of the construction of Curb and Gutter on a thoroughly prepared subgrade in accordance with the Plans, Contract Documents and Specifications, and applicable Lexington-Fayette Urban County Government Standard Drawing, current edition. Header Curb shall be constructed similarly, but with modifications to the LFUCG standard drawings as shown on the plans. Work in this section shall also conform to applicable sections of the Kentucky Department of Highways (KDOH) Standard Specifications, current edition, but only to the extent that these KDOH sections do not conflict with the content of the Plans, Contract Documents and Specifications, and Lexington-Fayette Urban County Government Standard Drawings.

The work includes the placement of "transition" curb & gutter at storm water inlets in the gutter line and when matching existing curb & gutter. A minimum (unless otherwise noted on the plans) of five (5) feet of transition curb shall be constructed on each side of all existing and/or proposed inlets in the gutter line. A minimum of three (3) feet of transition curb will be constructed when matching existing curb & gutter.

If required, the work also includes the placement of entrance curb & gutter at all access points in accordance with the applicable Lexington-Fayette Urban County Government Standard Drawings, current edition.

Any placement of concrete must be immediately preceded by inspection and approval of the Resident Inspector.

PAYMENT

Payment for Concrete Curb & Gutter will be based on acceptable quantities and paid for at the Contract Unit Price per linear foot as quoted and shall be full compensation for all Work required under this Section. All labor, materials, equipment, and excavation, etc. shall be included in this Work.

Incidental to the construction of Concrete Curb & Gutter is all labor, materials, equipment, and excavation, etc. required to construct "transition" curb and entrance curb.

There will be no separate payment for "transition" or entrance curb.

TECHNICAL SPECIFICATIONS

SECTION 22 – WATER

SCOPE

Work for this section shall conform to all applicable Kentucky Department of Highways Standard Specifications, current edition, and shall include all labor, materials, equipment and incidentals to complete the Work. All work shall be as shown on the plans and contract documents.

BASIS OF PAYMENT

Payment for this Section will be incidental to all construction activities. There will be no separate payment for this Work.

TECHNICAL SPECIFICATIONS

SECTION 23 – 4 ½" CONCRETE SIDEWALK

SCOPE

This item involves the construction of a concrete sidewalk as shown on the plans, and as directed by the ENGINEER. This Work consists of the construction of sidewalks (4 1/2 inches thick) on a thoroughly compacted subgrade in accordance with the Plans, Contract Documents and Specifications and applicable Lexington-Fayette Urban County Government Drawings, current edition. Work in this section shall also conform to applicable sections of the Kentucky Department of Highways (KDOH) Standard Specifications, current edition, but only to the extent that these KDOH sections do not conflict with the content of the Plans, Contract Documents and Specifications and LFUCG Standard Drawings.

All concrete used shall be Class A concrete on which Type 2 (white pigmented) curing compound is used. Any placing of concrete must be immediately preceded by inspection and approval of the Engineer.

Expansion joints shall be placed at 32-foot intervals. Expansion joint material shall be of approved quality and of 1/2 inch thickness. Expansion joints shall extend entirely and continuously through the concrete and all excess expansion joint material shall be trimmed to conform to the surface of the concrete.

Place sidewalk by use of side forms or an approved slip form method according to KDOH Subsection 601.03.12. Deposit concrete on a moistened subgrade strike, and compact to the required thickness, and tamp sufficiently to bring mortar to the surface. Then, finish the surface smooth and even with wooden floats and brushes and broom for texturing. Before giving the concrete sidewalk the final finish and brooming, check the surfaces with a 10-foot straightedge and eliminate all irregularities of more than ¼ inch. Edges and division marks shall be finished in a neat and workmanlike manner through use of the proper concrete finishing tools. Division joints in sidewalks shall be 3/4 inch in depth, at four foot intervals.

When replacing portions of existing concrete sidewalks and entrance pavements, next to portions that will not be remove; the concrete will be removed to the nearest transverse joint or division mark beyond the matching point indicated on the Plans. The existing concrete shall be sawed by an approved concrete saw. In the absence of a transverse joint or division mark, the sawing shall be performed as directed by the Engineer. It will not be permissible to place new concrete against the ragged edges of concrete caused by removal devices such as hand tools and air hammers.

Work for this sections shall include all labor, materials, equipment, excavation and incidentals necessary to complete the Work.

PAYMENT

Payment for Concrete Sidewalks will be based on acceptable quantities and paid for at the Contract Unit Price per square yard as quoted and this shall be full compensation for all Work required under this Section. All labor, materials, equipment, and excavation, etc. shall be included in this Work.

TECHNICAL SPECIFICATIONS

SECTION 24 – SODDING

SCOPE

This work consists of the application of sod to disturbed surfaces in accordance with the Plans and Contract Documents and Specifications. Work in this section shall also conform to applicable sections of the Kentucky Department of Highways (KDOH) Standard Specifications, current edition, but only to the extent that these KDOH sections do not conflict with Technical Specifications, Attachment B – Landscaping, Subsection 02920. Work for this section shall include all labor, materials, equipment, excavation and incidentals necessary to complete the Work.

PAYMENT

Payment for Sodding will be based on acceptable quantities and paid for at the Contract Unit Price per square yard as quoted and this shall be full compensation for all Work required under this Section. All labor, materials, equipment, and excavation, etc. shall be included in this Work.

TECHNICAL SPECIFICATIONS

SECTION 25 - SEEDING AND PROTECTION, TEMPORARY SEEDING

SCOPE

This work consists of the application of seeding and protection to disturbed surfaces in accordance with the Plans and Contract Documents and Specifications. Work in this section shall also conform to applicable sections of the Kentucky Department of Highways (KDOH) Standard Specifications, current edition, but only to the extent that these KDOH sections do not conflict with Technical Specifications, Attachment B – Landscaping, Subsection 02920. Work for this section shall include all labor, materials, equipment, excavation and incidentals necessary to complete the Work.

In addition, all areas of construction that are to be left as exposed soil prior to permanent seeding or sodding for a period of fourteen (14) days or greater, shall be temporarily seeded in accordance with the applicable sections of the Kentucky Department of Highways Standard Specifications, current edition.

BASIS OF PAYMENT

Payment for Seeding & Protection will be based on acceptable quantities and paid for at the Contract Unit Price per square yard as quoted and this shall be full compensation for all Work required under this Section. All labor, materials, equipment, and excavation, etc. shall be included in this Work.

Temporary Seeding shall be incidental to the project and separate payment will be made for this Work.

TECHNICAL SPECIFICATIONS

SECTION 26 – PUBLIC IMPROVEMENT SIGN

SCOPE

Work for this Section shall consist of furnishing, placing and removing Project Sign(s) at locations as directed by the Engineer in accordance with Lexington-Fayette Urban County Government (LFUCG) Standard Drawing 323.

BASIS OF PAYMENT

Payment for Public Improvement Signs will be based on acceptable quantities and paid for at the Contract Unit Price per each as quoted and this shall be full compensation for all Work required under this Section. All labor, materials, equipment, and excavation, etc. shall be included in this Work.

TECHNICAL SPECIFICATIONS

SECTION 27 – SAFELOAD EXISTING PIPE

SCOPE

Work for this Section shall conform to applicable Kentucky Department of Highways Standard Specifications, current edition, and shall include all labor, materials, equipment, and incidentals necessary to complete the Work.

The Work consists of construction of safeloading existing storm sewer lines which are to be abandoned once the corresponding new lines have been put into operation. Pipes to be safeloaded are labeled as (TBA-SAFELOAD). Such Work shall be performed where indicated on the Drawings and shall conform to standard practices acceptable to the Lexington-Fayette Urban County Government, Division of Engineering.

BASIS OF PAYMENT

Payment for Safeload Existing Pipe will be based on acceptable quantities and paid for at the Contract Unit Price per cubic yard as quoted and this shall be full compensation for all Work required under this Section. All labor, materials, equipment, and excavation, etc. shall be included in this Work.

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TECHNICAL SPECIFICATIONS

SECTION 28 – LEVELING AND WEDGING

SCOPE

Work for this Section shall conform to applicable sections of the Kentucky Department of Highways Standard Specifications, current edition. Leveling & Wedging shall be performed as needed to meet the final grades as shown on the plans.

BASIS OF PAYMENT

Payment for Leveling and Wedging will be based on accepted quantities and paid for at the Contract Unit Price per ton as quoted and this shall be full compensation for all Work required under this Section. All labor, materials, equipment, and excavation, etc. shall be included in this Work.

TECHNICAL SPECIFICATIONS

SECTION 29 – STREET LIGHTING - UNDERGROUND FEED

SCOPE

Work for this Section shall include all labor, excavation, materials, equipment and incidentals for the installation of 2" PVC pipe, 2" steel conduit, and junction boxes (electrical & fiber optic).

INSTRUCTIONS FOR UNDERGROUND FEED FOR STREET LIGHTS

The Contractor is to provide all conduit with a pull string for underground feed lighting applications.

The ditch shall be 18 inches deep to the bottom of the ditch.

The conduit shall be Schedule 40 electrical PVC. The conduit shall be run up to and butt up against the concrete pad on the front right side in the instance where an underground pad mount transformer is being utilized for the power source. If it is an overhead transformer, then the conduit will be run up to the base of the pole, if standoff brackets are to be used then clearances from the pole should be 6" offset.

Pole stud ups must be positioned so that there will be no interference with the conduit-run up the pole for this feed.

The light base will be installed where the conduit stub is located. K.U. will not adjust these locations after the conduit is in the ground.

The street light ditch shall be left open for inspection by K.U. before backfilling by the Contractor. Contact K.U. at 1-800-981-0600 (office) for an inspection of this light ditch. Light will not be installed prior to this ditch inspection.

The contractor shall ensure that Kentucky Utilities Company specifications are applied to this project. If there are any questions related to these instructions, please call Scott Shelton at 367-4262.

BASIS OF PAYMENT

Payment for this work will be based on accepted quantities and will be paid for at the Contract Unit Price per linear foot, or each, as quoted and this shall be full compensation for all Work required under this Section. All labor, materials, equipment, excavation, and incidentals shall be included in this Work.

TECHNICAL SPECIFICATIONS

SECTION 30 - PAVEMENT STRIPING & MARKING

SCOPE

Work for this section shall conform to all applicable Kentucky Department of Highways Standard Specifications, current edition, and shall include all labor, materials, equipment and incidentals to complete the Work. All work shall be as shown on the plans and contract documents. Work under this section shall also be for temporary striping and pavement markings employed in conjunction with diversions and the maintenance of traffic plan.

BASIS OF PAYMENT

Payment for this Section will be based on acceptable quantities and paid at the Contract Unit Price per each, linear foot, square foot, etc. as quoted which shall be full compensation for all Work under this Section. All labor, materials, equipment, excavation, and backfilling shall be incidental to the construction of this item.

TECHNICAL SPECIFICATIONS

SECTION 31 – MILL EXISTING PAVEMENT

SCOPE

This Work shall consist of the milling of existing pavement as shown on the Plans. Work in this section shall conform to the Kentucky Department of Highways (KDOH) Standard Specifications, current edition.

In performing this Work, the CONTRACTOR shall furnish a neat edge along the pavement, obtained by using an approved saw to cut a smooth and straight line (approximately two inches deep) in the existing pavement surface prior to milling away the adjacent pavement. The milling will be at a minimum depth of 1.5 inches so as to allow a smooth transition from existing pavement to proposed pavement and concrete. Any existing pavement which is not marked for removal on the plans, but is nevertheless removed, shall be replaced at the CONTRACTOR's expense.

BASIS OF PAYMENT

Payment for this Section will be based on acceptable quantities and paid at the Contract Unit Price per square yard, as quoted which shall be full compensation for all Work under this Section. All labor, materials, equipment, excavation, and backfilling shall be incidental to the construction of this item.

TECHNICAL SPECIFICATIONS

SECTION 32 - SIDEWALK RAMP

SCOPE

This Work consists of the construction of Sidewalk Ramps on a thoroughly compacted subgrade in accordance with the Plans, Contract Documents and Specifications, and Lexington-Fayette Urban County Government (LFUCG) Standard Drawings, current edition. Work in this section shall also conform to applicable sections of the Kentucky Department of Highways (KDOH) Standard Specifications, current edition, but only to the extent that these KDOH sections do not conflict with the content of the Plans, Contract Documents and Specifications, and LFUCG Standard Drawings.

Expansion joints shall be placed at 32-foot intervals. Expansion joint material shall be of approved quality and of one-half (½) inch thickness. Expansion joints shall extend entirely and continuously through the concrete, and all excess expansion joint material shall be trimmed to conform to the surface of the concrete.

Concrete shall be sufficiently vibrated to assure removal of air voids. Concrete sidewalks shall be struck off by use of a screed, and they shall be floated and brushed. Edges and division marks shall be finished in a neat and workmanlike manner through use of the proper concrete finishing tools. Division joints in sidewalks shall be three-fourths (3/4) inch in depth, at four foot intervals.

All concrete used shall be Class A concrete on which Type 2 (white pigmented) curing compound is used. Any pouring of concrete must be immediately preceded by inspection and approval of Engineer.

Tactile warning strips (see Appendix A for details) shall be placed on all ramps. Tactile warning strip dimensions shall 4' by 2' (8 SF). The color of tactile warning strips to be selected by the Lexington-Fayette Urban County Government.

Work for this section shall include all labor, materials, equipment, excavation, and incidentals necessary to complete the Work.

BASIS OF PAYMENT

Payment for this Section will be based on acceptable quantities and paid at the Contract Unit Price per each, as quoted which shall be full compensation for all Work under this Section. All labor, materials, equipment, excavation, and backfilling shall be incidental to the construction of sidewalk ramps.

TECHNICAL SPECIFICATIONS

SECTION 33 – SIGNAGE AND REMOVE & RESET SIGNS

SCOPE

Work for this section shall conform to all applicable Kentucky Department of Highways Standard Specifications, current edition, and shall include all labor, materials, equipment and incidentals to complete the Work.

BASIS OF PAYMENT

Payment for this Section will be based on acceptable quantities and paid at the Contract Unit Price per lump sum or each, as quoted which shall be full compensation for all Work under this Section. All labor, materials, equipment, excavation, and backfilling shall be incidental to the construction of this item.

TECHNICAL SPECIFICATIONS

SECTION 34 – TEMPORARY SIGNS

SCOPE

Work for this section shall conform to all applicable Kentucky Department of Highways Standard Specifications, current edition, and shall include all labor, materials, equipment and incidentals to complete the Work. All work shall be as shown on the plans and contract documents.

BASIS OF PAYMENT

Payment for this Section will be included in payment for Maintenance of Traffic, Technical Specification, Section B. There will be no separate payment for this Work.

TECHNICAL SPECIFICATIONS

SECTION 35 – BARRIER MEDIAN

SCOPE

This Work consists of the construction of Barrier Median's Types 2 and 4 in accordance with the Plans, Contract Documents and Specifications, and shall conform to applicable sections of the Kentucky Department of Highways (KDOH) Standard Specifications and Standard Drawings, current edition. The proposed barrier median is to be constructed on differing surfaces (existing and proposed flexible pavement) and under differing methods of construction (milling & overlay, full depth, etc.). The Contractor shall construct the proposed barrier median using the applicable median type as shown on KDOH Standard Drawing RPM-010-05.

PAYMENT

Payment for Barrier Median will be based on acceptable quantities and paid for at the Contract Unit Price per square yard as quoted and this shall be full compensation for all Work required under this Section. All labor, materials, equipment, and excavation, etc. shall be included in this Work.

TECHNICAL SPECIFICATIONS

SECTION 36 – MOBILIZATION AND DEMOBILIZATION

SCOPE

Work for this Section shall include all labor, materials, equipment, and incidentals necessary to complete the Work.

BASIS OF PAYMENT

Payment for this Section will be paid at the Contract Unit Price per lump sum, as quoted which shall be full compensation for all Work under this Section. All labor, materials, equipment, excavation, and backfilling shall be incidental to this Work.

TECHNICAL SPECIFICATIONS

SECTION 37 – RETAINING WALLS

SCOPE

Work for this Section shall be for the construction of retaining walls using Redi Rock International products, or an approved equal. Work for this Section shall be as shown on the plans and conform to the manufacturer's specifications for materials and construction techniques. The CONTRACTOR shall be responsible for the retaining wall structural designs. The retaining walls shall be designed to accommodate the 42" guardrail in the areas designated on the plans.

Once a contract is awarded the Contractor shall submit to the Owner and Engineer a retaining wall design and construction package (shop drawings, etc.) for review. The Contractor shall make the initial wall design submittal in as timely a manner as possible. The Owner will then notify the Contractor of either acceptance, or rejection, of the wall design submittal within a reasonable amount of time. It shall be clearly understood that all liability for the retaining wall designs and construction will be the Contractor's responsibility.

The retaining walls shall match, to include top cap stones and guardrail, the recently constructed walls on the Clays Mill corridor between Higbee Mill Road and Cromwell Way.

Work for this Section shall be as shown on the plans and as described above. The work shall include all labor, materials, equipment, excavation & backfill, structural designs, and all other incidentals necessary to complete the Work.

TECHNICAL SPECIFICATIONS

SECTION 38 – LANDSCAPING

SCOPE

Work for this Section shall be as shown on the plans and shall include all labor, materials, equipment, and incidentals necessary to complete the Work.

Additional specifications for Landscaping are detailed in Technical Specifications, Attachment B

BASIS OF PAYMENT

Payment for this Section will be based on acceptable quantities paid at the Contract Unit Price per lump sum as quoted which shall be full compensation for all Work under this Section. All labor, materials, equipment, excavation, and backfilling shall be incidental to this Work.

TECHNICAL SPECIFICATIONS

SECTION 39 – GUARDRAILS (RETAINING WALLS & CULVERT)

SCOPE

Work for this Section shall be as shown on the plans and shall include all labor, materials, equipment, and incidentals necessary to complete the Work as shown and detailed in the plans.

Additional specifications for handrails are detailed in Technical Specifications, Attachment A.

BASIS OF PAYMENT

Payment for this Section will be based on acceptable quantities paid at the Contract Unit Price per linear foot as quoted which shall be full compensation for all Work under this Section. All labor, materials, equipment, excavation, core drilling, backfilling, etc. shall be incidental to this Work.

TECHNICAL SPECIFICATIONS

SECTION 40 – STEEL REINFORCEMENT

SCOPE

Work for this Section shall be as shown on the plans and conform to all applicable sections of the Kentucky Department of Highways Standard Specifications, current edition and shall include all labor, materials, equipment, and incidentals necessary to complete the Work.

BASIS OF PAYMENT

Payment for this Section will be paid at the Contract Unit Price per pound, as quoted which shall be full compensation for all Work under this Section. All labor, materials, equipment, excavation, testing, backfilling, etc. shall be incidental to the construction of this item.

TECHNICAL SPECIFICATIONS

SECTION 41 – STONE VENEER

SCOPE

Work for this Section shall be as shown on the plans and conform to all applicable sections of the Kentucky Department of Highways Standard Specifications, current edition, to which it applies and shall include all labor, materials, equipment, and incidentals necessary to complete the Work.

WALL TREATMENTS

Three alternates, or an approved equal, for the stone veneer wall treatments are:

Mountain Stone Products 4301 Industrial Road Bowling Green, KY 42101 (270) 796-6123	Coronado Stone Products 4306 Charlestown-Jeff Road Jeffersonville, IN 47130 (812) 284-2845	Owens Corning One Owens Corning Prkwy Toledo, OH 43659 (800) 255-1727

Other stone veneer alternates will be considered but are subject to the approval of the Owner.

The stone veneer shall have multi colored (earthtones – light brown, tan, grey, etc.) and varying size (typical sizes = 1¼"–6" height, 4"–16¾" length) "stones". A sample representative of the how the stone veneer will look is "Kentucky CSV-20024" manufactured by Owens Corning. The appearance of the stone veneer will be approved by the Owner.

Depending on which alternate of stone veneer is chosen, the Contractor will apply the veneer in strict compliance with the manufacturer's specifications and the details as shown on the plans.

During the initial application of the stone veneer to the retaining walls, a representative from the selected manufacturer of the stone veneer will be required to be on site to verify that the veneer application is being performed properly.

BASIS OF PAYMENT

Payment for this Section will be paid at the Contract Unit Price per square foot, as quoted which shall be full compensation for all Work under this Section. All labor, materials, equipment, excavation, testing, backfilling, and all other incidentals shall be incidental to the construction of this item.

TECHNICAL SPECIFICATIONS

SECTION 42 – FOUNDATION PREPARATION (STRUCTURE EXCAVATION COMMON)

SCOPE

"Foundation Preparation" is currently referred to as "Structure Excavation Common" in the Kentucky Department of Highways Standard Specifications. Work for this Section shall be as shown on the plans and conform to all applicable sections of the Kentucky Department of Highways Standard Specifications, current edition and shall include all labor, materials, equipment, and incidentals necessary to complete the Work.

BASIS OF PAYMENT

Payment for this Section will be paid at the Contract Unit Price per lump sum, as quoted which shall be full compensation for all Work under this Section. All labor, materials, equipment, excavation, testing, backfilling, etc. shall be incidental to the construction of this item.

TECHNICAL SPECIFICATIONS

SECTION 43 – STRUCTURE EXCAVATION – SOLID ROCK

SCOPE

Work for this Section shall be as shown on the plans and conform to all applicable sections of the Kentucky Department of Highways Standard Specifications, current edition and shall include all labor, materials, equipment, and incidentals necessary to complete the Work.

BASIS OF PAYMENT

Payment for this Section will be paid at the Contract Unit Price per cubic yard, as quoted which shall be full compensation for all Work under this Section. All labor, materials, equipment, excavation, testing, backfilling, etc. shall be incidental to the construction of this item. Payment for this section is only for rock excavation required for the bridge widening construction.

TECHNICAL SPECIFICATIONS

SECTION 44 – CYCLOPEAN STONE (RIP RAP)

SCOPE

Work for this Section shall be as shown on the plans and conform to all applicable sections of the Kentucky Department of Highways Standard Specifications, current edition and shall include all labor, materials, equipment, and incidentals necessary to complete the Work.

BASIS OF PAYMENT

Payment for this Section will be paid at the Contract Unit Price per ton, as quoted which shall be full compensation for all Work under this Section. All labor, materials, equipment, excavation, testing, backfilling, etc. shall be incidental to the construction of this item.

TECHNICAL SPECIFICATIONS

SECTION 45 – EDGE KEY

SCOPE

This Work shall consist of the construction of all edge keys in accordance with the Plans, Contract Documents and Specifications, and Lexington-Fayette Urban County Government (LFUCG) Standard Drawings, current edition. Work in this section shall also conform to the Kentucky Department of Highways (KDOH) Standard Specifications, current edition, but only to the extent that this KDOH section does not conflict with the content of the Plans, Contract Documents and Specifications, and LFUCG Standard Drawings.

In performing this Work, the CONTRACTOR shall furnish a neat edge along the pavement, obtained by using an approved saw to cut a smooth and straight line (approximately two inches deep) in the existing pavement surface prior to breaking away the adjacent pavement. Any existing facility which is not marked for removal by the ENGINEER, but is nevertheless removed, shall be replaced at the CONTRACTOR's expense.

BASIS OF PAYMENT

Payment for this Section will be based on acceptable quantities and paid at the Contract Unit Price per linear foot, as quoted which shall be full compensation for all Work under this Section. All labor, materials, equipment, excavation, and backfilling shall be incidental to the construction of this item.

TECHNICAL SPECIFICATIONS

SECTION 46 – STORMWATER TREATMENT SYSTEM

GENERAL

A. Work included:

The Contractor, and/or a manufacturer selected by the Contractor and approved by the Engineer, shall furnish all labor, materials, equipment and incidentals required and install all precast concrete stormwater treatment systems and appurtenances in accordance with the Drawings and these specifications.

QUALITY CONTROL INSPECTION

A. The quality of materials, the process of manufacture, and the finished sections shall be subject to inspection by the Engineer. Such inspection may be made at the place of manufacture, or on the work site after delivery, or at both places, and the sections shall be subject to rejection at any time if material conditions fail to meet any of the specification requirements, even though sample sections may have been accepted as satisfactory at the place of manufacture. Sections rejected after delivery to the site shall be marked for identification and shall be removed from the site at once. All sections which have been damaged beyond repair during delivery will be rejected and, if already installed, shall be repaired to the Engineer's acceptance level, if permitted, or removed and replaced, entirely at the Contractor's expense.

B. All sections shall be inspected for general appearance, dimensions, soundness, etc. The surface shall be dense, close textured and free of blisters, cracks, roughness and exposure of reinforcement.

C. Imperfections may be repaired, subject to the acceptance of the Engineer, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final acceptance. Cement mortar used for repairs shall have a minimum compressive strength of 4,000 psi (28 MPa) at the end of 7 days and 5,000 psi (34 MPa) at the end of 28 days when tested in 3 inch (76 mm) diameter by 6 inch (152 mm) long cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs.

SUBMITTALS

A. Shop Drawings

The Contractor shall be responsible for selecting the storm water treatment system to be constructed at Rt. Station 27+81.21 and Rt. Station 30+08.00. Storm water treatment systems shall be capable of demonstrating 80% capture of particles in a size range of 2 mm (very coarse sand) to 0.125 mm (very fine sand). Storm water treatment systems will also meet the Design Treatment Capacity in Table 1.

Accepted manufacturers, or approved equals, are as follows:

Contech (Vortechs)

CrystalStream Technologies

Suntree Technologies

Other alternates may be considered, but are subject to approval by the Owner.

Table 1

Location	Design Treatment Capacity (cfs)/(l/s)	Sediment Storage (yd3)/(m3)
Rt STA 95+50	11 - 14 (315-400)	4.8 (3.67)
Lt STA 96+46	1.6 – 2.8 (45-80)	1.2 (0.91)
Rt STA 96+95	2.8 – 4.5 (80-125)	1.8 (1.38)

The Contractor shall submit detailed shop drawings to the Engineer for review. The shop drawings must:

Demonstrate that the submitted storm water treatment systems meet the design requirements and also demonstrate that the storm water treatment systems are compatible for construction with adjacent storm sewers (pipes, inlets, headwalls, etc.), existing topography, and proposed final grades.

Show details for construction, reinforcing, joints and any cast-in-place appurtenances. Shop drawings shall be annotated to indicate all materials to be used and all applicable standards for materials, required tests of materials and design assumptions for structural analysis.

Be in accordance with items listed under "Materials" and "Performance", this section.

MATERIALS

A. Concrete for precast stormwater treatment systems shall conform to ASTM C 857 and C 858 and meet the following additional requirements:

1. The wall thickness shall not be less than 6 inches (152 mm) or as shown on the dimensional drawings. In all cases the wall thickness shall be no less than the minimum thickness necessary to sustain HS20-44 (MS18) loading requirements as determined by a Licensed Professional Engineer.

2. Sections shall have tongue and groove or ship-lap joints with a butyl mastic sealant conforming to ASTM C 990.

3. Cement shall be Type II Portland cement conforming to ASTM C 150.

4. All sections shall be cured by an approved method. Sections shall not be shipped until the concrete has attained a compressive strength of 4,000 psi (28 MPa) or until 5 days after fabrication and/or repair, whichever is the longer.

5. Pipe openings shall be sized to accept pipes of the specified size(s) and material(s), and shall be sealed by the Contractor with a hydraulic cement conforming to ASTM C 595M

B. Internal aluminum plate components shall be aluminum alloy 5052-H32 in accordance with ASTM B 209.

C. Sealant to be utilized at the base of the swirl chamber shall be 60 durometer extruded nitrile butadiene rubber (Buna N) and shall be provided to the concrete precaster for installation.

D. Brick or masonry used to build the manhole frame to grade shall conform to ASTM C 32 or ASTM C 139 and shall be installed in conformance with all local requirements.

E. Casting for manhole frames and covers shall be in accordance with ASTM A48, CL.30B and AASHTO M105. The manhole frame and cover shall be in accordance with Lexington Fayette Urban County Government Standard Drawing #103.

F. A bitumen sealant in conformance with ASTM C 990 shall be utilized in the sealing of the joint between the swirl chamber and the vault at the long wall tangent points. The butyl material shall be 3/4-inch thick by 3/4-inch wide.

PERFORMANCE

Each stormwater treatment system shall be of a hydraulic design that includes flow controls designed and certified by a professional engineer using accepted principles of fluid mechanics that raise the water surface inside the tank to a pre-determined level in order to prevent the re-entrainment of trapped floating contaminants.

Individual stormwater treatment systems shall not resuspend trapped sediments or re-entrain floating contaminants at flow rates up to and including the specified Design Treatment Capacity.

Individual stormwater treatment systems shall have usable sediment storage capacity of not less than the corresponding volume listed in Table 1. The systems shall be designed such that the pump-out volume is less than ½ of the total system volume. The systems shall be designed to not allow surcharge of the upstream piping network during dry weather conditions.

Direct access shall be provided to the sediment and floatable contaminant storage chambers to facilitate maintenance. There shall be no appurtenances or restrictions within these chambers. Stormwater treatment systems shall be completely housed within one rectangular structure.

INSTALLATION

A. Each Stormwater Treatment System shall be constructed according to the models selected and in accordance with the manufacturer's specifications. Install at elevations and locations that are compatible with adjacent storm sewer systems (pipes, inlets, headwalls, etc.), existing topography, and proposed final grades.

B. Holes made in the concrete sections for handling or other purposes shall be plugged with a nonshrink grout or by using grout in combination with concrete plugs.

C. Where holes must be cut in the precast sections to accommodate pipes, do all cutting before setting the sections in place to prevent any subsequent jarring which may loosen the mortar joints. The Contractor shall make all pipe connections.

BASIS OF PAYMENT

Payment for this Section will be based on acceptable quantities and paid at the Contract Unit Price per each as quoted which shall be full compensation for all Work under this Section. All labor, materials, equipment, excavation, backfilling, and all other incidentals shall be incidental to the construction of this item.

TECHNICAL SPECIFICATIONS

SECTION 47 – CONCRETE STEPS & HANDRAIL

SCOPE

Work under this Section shall be in conformance to Lexington-Fayette Urban County Government specifications and standard drawings. Work for this Section shall include all labor, materials, equipment, and incidentals necessary to construct the steps and handrail.

BASIS OF PAYMENT

Payment for this Section will be based on accepted quantities and paid at the Contract Unit Price per lump sum as quoted which shall be full compensation for all Work under this Section. All labor, materials, excavation, and all other incidentals shall be included in this item.

TECHNICAL SPECIFICATIONS

SECTION 48 - REMOVING AND RESETTING FENCE, TEMPORARY FENCE

SCOPE

Should fence need to be removed for the construction of the project, the CONTRACTOR shall remove such designated fence and shall reset once construction is complete. If the fence is damaged during construction, the CONTRACTOR shall replace the fence in accordance with the requirements of KDOH Section 722. The Engineer or Owner must approve quantities of replacement fence prior to installation.

The Contractor is responsible for installing temporary fencing as noted on the plans, and as necessary to maintain the existing fence purpose (contain pets, delineate property, boundary, etc.) during construction and remove when no longer needed. Any variance from this provision must be with the approval of the landowner and the Engineer.

APPLICABLE KENTUCKY DEPARTMENT OF HIGHWAYS (KDOH) STANDARD SPECIFICATIONS

To the extent that they do not conflict with the content of the Plans, Contract Documents and Specifications, and Lexington-Fayette Urban County Government Standard Drawings (current editions), applicable sections of KDOH Standard Specifications, current edition, are incorporated into this Technical Specification.

BASIS OF PAYMENT

Remove and reset fence, and temporary fence, will be based on acceptable quantities and paid for at the Contract Unit Price per linear foot as quoted and this shall be full compensation for all Work required under this Section. All labor, materials, equipment, and excavation, incidentals, etc. shall be included in this Work.

TECHNICAL SPECIFICATIONS

SECTION 49 – BONDS (PERFORMANCE & PAYMENT)

SCOPE

Work under this Section shall be in conformance to Lexington-Fayette Urban County Government requirements as detailed in the Contract Documents and Specifications.

BASIS OF PAYMENT

Payment for this Section will be based on accepted bonds and paid at the Contract Unit Price per lump sum as quoted which shall be full compensation for all Work under this Section. All labor, materials, fees, and all other incidentals shall be included in this item.

TECHNICAL SPECIFICATIONS

SECTION 50 – REMOVE STRUCTURE

SCOPE

Work for this Section shall be as shown on the plans and conform to all applicable sections of the Kentucky Department of Highways Standard Specifications, current edition and shall include all labor, materials, equipment, and incidentals necessary to complete the Work.

BASIS OF PAYMENT

Payment for this Section will be based on the removal of the existing culvert at Station 96+31. Removal of the culvert shall be such to facilitate the construction of the proposed culvert. This work will be paid for at the Contract Unit Price per lump sum as quoted which shall be full compensation for all Work under this Section. All labor, materials, excavation, transportation, disposal, associated fees, and all other incidentals shall be included in this item.

TECHNICAL SPECIFICATIONS

SECTION 51 – SAFELOAD PIPE

SCOPE

Work for this Section shall be as shown on the plans and conform to all applicable sections of the Kentucky Department of Highways Standard Specifications, current edition and shall include all labor, materials, equipment, and incidentals necessary to complete the Work.

The Work consists of safeloading existing storm sewer lines which are to be abandoned once the corresponding proposed storm sewer lines have been put into operation.

BASIS OF PAYMENT

Payment for this Section will be paid at the Contract Unit Price per cubic yard as quoted which shall be full compensation for all Work under this Section. All labor, materials, fees, and all other incidentals shall be included in this item.

TECHNICAL SPECIFICATIONS

SECTION 52 – CEMENT CONCRETE ENTRANCE PAVEMENT (6")

SCOPE

This Work consists of the restoration of Driveway Slabs and Aprons in accordance to applicable Lexington-Fayette Urban County Government Standard Drawings, current edition. Work in this section shall also conform to applicable sections of the KDOH Standard Specifications, current edition. The entrance pavement shall be placed in one continuous pour.

Any placing of concrete must be immediately preceded by inspection and approval of the Engineer. Concrete for Driveway Restoration shall include contraction joints at maximum 16' spacing.

Concrete shall be sufficiently vibrated or compacted to assure removal of air voids. Concrete driveways shall be struck off by use of a screed, and they shall be floated and broomed. Edges and division marks shall be finished in a neat and workmanlike manner through use of the proper concrete finishing tools.

When it is necessary to replace portions of existing concrete driveways, such existing features will be removed to the nearest transverse joint or division mark beyond the matching point indicated on the Drawings. The existing concrete shall be sawed by an approved concrete saw. In the absence of a transverse joint or division mark, the sawing shall be performed as directed by the Engineer. It will not be permissible to place new concrete against the ragged edges of concrete caused by removal devices such as hand tools and air hammers.

All concrete used shall be Class A concrete on which Type 2 (white pigmented) curing compound is used. Any placing of concrete must be immediately preceded by inspection and approval of the Engineer.

Work for this section shall include all labor, materials, equipment, excavation, and incidentals necessary to complete the Work.

PAYMENT

Payment for Driveway and Apron Restoration shall be based on acceptable quantities and paid for at the Contract Unit Price per square yard as quoted and shall be full compensation for all Work required under this Section. Measurement for Driveway Apron Restoration will be as shown on plans. All labor, materials, equipment, and excavation shall be incidental to the placement of Driveway Aprons.

TECHNICAL SPECIFICATIONS

SECTION 53 - REMOVE AND RESET SHED

SCOPE

Should the existing shed at Lt. Station 109+75 need to be temporarily relocated for the construction of the proposed retaining wall (Lt. Station 109+50 - 113+25), the Contractor shall move the shed enough distance to provide working room for the wall construction. After the retaining is constructed, the shed shall be moved back to its original position. All movements of the shed will be coordinated with the property owner. The Contractor shall be responsible for any damage to the shed or any damage to the property resulting from this work.

BASIS OF PAYMENT

Remove and reset shed will be incidental to the cost of the retaining wall. No separate payment shall be made for this work.

TECHNICAL SPECIFICATIONS

Attachment A – Retaining Walls

Index

SECTION 05521 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel railings.

1.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design railings, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails and Top Rails of Guards:

a. Uniform load of 50 lbf/ ft. applied in any direction.
b. Concentrated load of 200 lbf applied in any direction.
c. Uniform and concentrated loads need not be assumed to act concurrently.

2. Infill of Guards:

a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
b. Infill load and other loads need not be assumed to act concurrently.

C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.3 SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of mechanically connected railings.
2. Railing brackets.
3. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each type of exposed finish required.

D. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Steel Pipe and Tube Railings:

a. Pisor Industries, Inc.
b. Wagner, R & B, Inc.; a division of the Wagner Companies.
c. Or approved equals

2.2 METALS, GENERAL

A. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

2.3 STEEL AND IRON

A. Recycled Content of Steel Products: Provide products with average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.

B. Tubing: ASTM A 500 (cold formed) or ASTM A 513.

C. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.

D. Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.4 MISCELLANEOUS MATERIALS

A. Fasteners: Provide the following:

1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5 for zinc coating.

B. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

D. Shop Primers: Provide primers that comply with Division 9 painting Sections.

E. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

F. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

G. Epoxy Intermediate Coat: Complying with MPI #77 and compatible with primer and topcoat.

H. Polyurethane Topcoat: Complying with MPI #72 and compatible with undercoat.

I. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

J. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 FABRICATION

A. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

B. Form work true to line and level with accurate angles and surfaces.

C. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

D. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

E. Form changes in direction by bending.

F. Bend members in jigs to produce uniform curvature without buckling or otherwise deforming exposed surfaces.

G. Close exposed ends of railing members with prefabricated end fittings.

H. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated.

I. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

SECTION 05721 - ORNAMENTAL RAILINGS

PART 4 - GENERAL

4.1 SUMMARY

A. Section Includes:
   1. Steel and iron decorative railings.

B. Related Sections:
   1. Division 5 Section "Pipe and Tube Railings" for railings fabricated from pipe and tube components.

4.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design railings, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

   1. Handrails and Top Rails of Guards:

      a. Uniform load of 50 lbf/ft. applied in any direction.
      b. Concentrated load of 200 lbf applied in any direction.
      c. Uniform and concentrated loads need not be assumed to act concurrently.

   2. Infill of Guards:

      a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
      b. Infill load and other loads need not be assumed to act concurrently.

   3. Glass-Supported Railings: Support each section of top rail by a minimum of three glass panels or by other means so top rail will remain in place if any one panel fails.

C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

4.3 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on laboratory mockups.

   1. Build laboratory mockups at testing agency facility; use personnel, materials, and methods of construction that will be used at Project site.
   2. Test railings according to ASTM E 894 and ASTM E 935.

4.4 SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of railings assembled from standard components.
2. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each type of exposed finish required.

D. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data and calculations signed and sealed by the qualified professional engineer responsible for their preparation.

E. Qualification Data: For qualified testing agency.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.

G. Preconstruction test reports.

4.5 QUALITY ASSURANCE

A. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval.

B. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockups for each form and finish of railing consisting of two posts, top rail, infill area, and anchorage system components.

PART 5 - PRODUCTS

5.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Steel and Iron Decorative Railings:

a. Architectural Iron Designs, Inc.
b. Artezzi.
c. Bavarian Iron Works Co.; TT Triebenbacher.

d. Blum, Julius & Co., Inc.
e. Braun, J. G., Company; a division of the Wagner Companies.
f. Indital USA; a division of Ind.i.a. SPA.
g. Lawler Foundry Corporation.
h. Livers Bronze Co.
i. Olin Wrought Iron.
j. Regency Railings.
k. Wagner, R & B, Inc.; a division of the Wagner Companies.
l. Wiemann Ironworks.
m. Or approved equals

5.2 METALS, GENERAL

A. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.

5.3 STEEL AND IRON

A. Tubing: ASTM A 500 (cold formed) or ASTM A 513.

B. Bars: Hot-rolled, carbon steel complying with ASTM A 29/A 29M, Grade 1010.

5.4 FASTENERS

A. Fastener Materials: Unless otherwise indicated, provide the following:
1. Uncoated Steel Components: Plated-steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating where concealed; Type 304 stainless-steel fasteners where exposed.
2. Dissimilar Metals: Type 304 or Type 316 stainless-steel fasteners.

B. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

5.5 MISCELLANEOUS MATERIALS

A. Shop Primers: Provide primers that comply with Division 9 painting Sections.

B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

C. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

D. Epoxy Intermediate Coat: Complying with MPI#77 and compatible with primer and topcoat.

E. Polyurethane Topcoat: Complying with MPI#72 and compatible with undercoat.

F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

G. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

5.6 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Connections: Fabricate railings with welded connections unless otherwise indicated.

C. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 welds: no evidence of a welded joint.

D. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings.

E. Form changes in direction by bending.

F. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

G. Close exposed ends of hollow railing members with prefabricated end fittings.

H. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated.

I. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

5.7 STEEL AND IRON FINISHES

A.

B. Preparing Nongalvanized Items for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning

C. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1.

D. High-Performance Coating: Apply epoxy intermediate and polyurethane topcoats to prime-coated surfaces. Comply with coating manufacturer's written instructions and with requirements in SSPC-PA 1.

1. Color: As selected by Engineer / Landscape Architect from manufacturer's full range.

PART 6 - EXECUTION

6.1 INSTALLATION

A. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
2. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

B. Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with grout.

C. Form or core-drill holes not less than 6 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with grout.

D. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

END OF SECTION 05721

TECHNICAL SPECIFICATIONS

Attachment B – Landscaping

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c. Certified Turfgrass Professional of Cool Season Lawns, designated CTP-CSL.

5. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
6. 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 unamended 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 three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
3. Report suitability of tested soil for turf growth.

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. (92.9 sq. m) or volume per cu. yd. (0.76 cu. m) 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.

7.6 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.

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.

7.7 PROJECT CONDITIONS

A. Planting Restrictions: Plant during one of the following periods, unless otherwise authorized by the Owner/Landscape Architect. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of planting completion.

1. Spring Planting: March 1st to May 15th.
2. Fall Planting: September 15th to October 30th.

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.

7.8 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. Seeded Turf: 60 days from date of planting completion.

    a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.

2. Sodded Turf: 60 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 [**60**] days from date of planting completion.

C. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 8 - PRODUCTS

8.1 Turf Grass

A. Turf Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.

B. Seed Species: Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than .5 percent weed seed:

1. Full Sun: Proportioned by weight as follows

   a. 80 percent turf type tall fescue blend containing a minimum of three cultivars acceptable to the Owner/Landscape Architect.
   b. 20 percent Kentucky bluegrass (Poa pratensis).

2. Full Sun: Kentucky bluegrass (Poa pratensis), a minimum of three cultivars.
3. Sun and Partial Shade: Proportioned by weight as follows:

   a. 50 percent Kentucky bluegrass (Poa pratensis).
   b. 30 percent chewings red fescue (Festuca rubra variety).
   c. 10 percent perennial ryegrass (Lolium perenne).
   d. 10 percent redtop (Agrostis alba).

4. Shade: Proportioned by weight as follows:

   a. 50 percent chewings red fescue (Festuca rubra variety).
   b. 35 percent rough bluegrass (Poa trivialis).
   c. 15 percent redtop (Agrostis alba).

8.2 TURFGRASS SOD

A. Turfgrass Sod: Sod, 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. No mesh of any kind shall be permitted within sod.

B. 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:

1. Full Sun: Proportioned by weight as follows

   a. 80 percent turf type tall fescue blend containing a minimum of three cultivars acceptable to the Owner/Landscape Architect.
   b. 20 percent Kentucky Bluegrass (Poa pratensis).

2. Full Sun: Kentucky bluegrass (Poa pratensis), a minimum of three cultivars.

3. Sun and Partial Shade: Proportioned by weight as follows:

   a. 50 percent Kentucky bluegrass (Poa pratensis).
   b. 30 percent chewings red fescue (Festuca rubra variety).
   c. 10 percent perennial ryegrass (Lolium perenne).
   d. 10 percent redtop (Agrostis alba).

4. Shade: Proportioned by weight as follows:

   a. 50 percent chewings red fescue (Festuca rubra variety).
   b. 35 percent rough bluegrass (Poa trivialis).
   c. 15 percent redtop (Agrostis alba).

8.3 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

   1. Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.
   2. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.
   3. Provide lime in form of ground dolomitic limestone.

B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Aluminum Sulfate: Commercial grade, unadulterated.

E. Perlite: Horticultural perlite, soil amendment grade.

F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 sieve.

G. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

8.4 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 3/4-inch sieve; soluble salt content of 5 to 10 decisiemens/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. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture, with a pH range of 3.4 to 4.8.

C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.

D. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.

1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft. of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft. of loose sawdust or ground bark.

E. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

8.5 FERTILIZERS

A. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural and/or synthetic 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.

8.6 PLANTING SOILS

A. Planting Soil for trees and shrubs: 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. Weight of Lime per 1000 Sq. Ft.: 150 lbs.
3. Volume of Sand (Plus 10 Percent Diatomaceous Earth) per 10CY:1CY (10% total volume)
4. Weight of Commercial Fertilizer per 1000 Sq. Ft.: 28 lbs.

8.7 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, or threshed straw of wheat, rye, oats, or barley.

B. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

C. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.

D. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

8.8 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.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

8.9 EROSION-CONTROL MATERIALS

A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a degradable 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., with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches 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 nominal mat thickness. Include manufacturer's recommended anchorage system for slope conditions.

1. Products: Subject to compliance with requirements available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Invisible Structures, Inc.; Slopetame 2.
    b. Presto Products Company, a business of Alcoa; Geoweb.
    c. Tenax Corporation - USA; Tenweb.
    d. Or approved equals

PART 9 - EXECUTION

9.1 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.

9.2 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 hydromulching 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.

9.3 TURF AREA PREPARATION

A. Limit turf subgrade preparation to areas to be planted.

B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 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 superphosphate fertilizer directly to subgrade before loosening.
2. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.

a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
b. Mix lime with dry soil before mixing fertilizer.

3. 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.

a. Spread approximately 1/2 the thickness of planting soil over loosened subgrade. Mix thoroughly into top 2 inches of subgrade. Spread remainder of planting soil.
b. Reduce elevation of planting soil to allow for soil thickness of sod.

C. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:

1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
2. Loosen surface soil to a depth of at least 6 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches of soil. Till soil to a homogeneous mixture of fine texture.

a. Apply superphosphate fertilizer directly to surface soil before loosening.

3. Remove stones larger than 1 inch in any dimension and sticks, roots, trash, and other extraneous matter.
4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.

D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine granular texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

E. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

F. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

9.4 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.

9.5 SEEDING

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.

1. Do not use wet seed or seed that is moldy or otherwise damaged.
2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.

B. Sow seed at a total rate of 5 to 8 lb/1000 sq. ft.

C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

D. Protect seeded areas with slopes exceeding 1:4 with erosion-control blankets and 1:6 with erosion-control fiber mesh installed and stapled according to manufacturer's written instructions.

E. Protect seeded areas with erosion-control mats where shown on Drawings; install and anchor according to manufacturer's written instructions.

F. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.

G. Protect seeded areas from hot, dry weather or drying winds by applying compost mulch or planting soil within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch, and roll surface smooth.

9.6 HYDROSEEDING

A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

1. Mix slurry with fiber-mulch manufacturer's recommended tackifier. Slurry to be nonasphalitc.
2. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than 1500-lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate.
3. Apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry coat at a rate so that mulch component is deposited at not less than 500-lb/acre dry weight, and seed component is deposited at not less than the

specified seed-sowing rate. Apply slurry cover coat of fiber mulch (hydromulching) at a rate of 1000 lb/acre.

9.7 SODDING

A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant, if ground is frozen or muddy, or if temperatures exceed 85 degrees Fahrenheit.

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 wood pegs 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 below sod.

9.8 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, loosen surface, 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 4-6" inches.

I. Apply soil amendments and initial fertilizers required for establishing new turf and mix thoroughly into top 4 inches of existing soil. Install new planting soil to fill low spots and meet finish grades.

J. Apply seed and protect with straw mulch as required for new turf.

K. Water newly planted areas and keep moist until new turf is established.

9.9 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, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
3. 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.

B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment 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. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.

C. 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. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

1. Mow turf-type tall fescue to a height of 2 to 3 inches.

D. Turf Postfertilization: Apply fertilizer after initial mowing and when grass is dry.

1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq. ft. to turf area.

9.10 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Architect:

1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.
2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.
3. Satisfactory Plugged Turf: At end of maintenance period, the required number of plugs has been established as well-rooted, viable patches of grass, and areas between plugs are free of weeds and other undesirable vegetation.
4. Satisfactory Sprigged Turf: At end of maintenance period, the required number of sprigs has been established as well-rooted, viable plants, and areas between sprigs are free of weeds and other undesirable vegetation.

B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

9.11 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.

9.12 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 02920

SECTION 02930 - EXTERIOR PLANTS

PART 10 - GENERAL

10.1 RELATED DOCUMENTS

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

10.2 SUMMARY

A. Section Includes:

1. Plants.
2. Planting soils.
3. Tree stabilization.

10.3 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than sizes indicated; wrapped with natural or untreated burlap, tied, rigidly supported, and drum laced with natural biodegradable twin, jute and or wire basket with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.

C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than sizes indicated.

D. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than minimum root spread according to ANSI Z60.1 for type and size of plant required.

E. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

F. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.

G. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.

H. Finish Grade: Elevation of finished surface of planting soil.

I. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

J. Pesticide: A 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.

K. 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.

L. Planting Area: Areas to be planted.

M. 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.

N. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.

O. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

P. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.

Q. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

R. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

S. 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.

T. Planting Completion: The date of completion of all work related to a specific project including installation of plants, lawns and grasses, etc.

10.4 SUBMITTALS

A. Product Data: For each type of product indicated, including soils.

1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
2. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to the Project.

3. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to the Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 20 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

B. Samples for Verification: For each of the following:

1. Trees and Shrubs: Three samples of each variety and size delivered to the site for review. Maintain approved samples on-site as a standard for comparison.
2. Organic Mulch: 1-pint volume of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.

C. Qualification Data: For qualified landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.

D. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:

1. Manufacturer's certified analysis of standard products.
2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

E. Material Test Reports: For imported topsoil.

F. Maintenance Instructions: Recommended procedures including watering, fertilizer, pruning, disease control, etc. to be established by Owner for maintenance of plants during a calendar year. Submit before start of required maintenance periods.

G. Warranty: Sample of special warranty.

10.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful establishment of plants.

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: Five years' experience in landscape installation similar in scale and scope to the requirements of this Project
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 and maintenance, specialty area(s), designated CLT-Exterior.
    b. Certified Ornamental Landscape Professional, designated COLP.
    c. Certified ISA Arborist

5. Pesticide Applicator: State licensed, commercial.
6. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

B. Soil-Testing Laboratory Qualifications: An independent 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 unamended 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 Landscape Architect. A minimum of five representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
3. Report suitability of tested soil for plant growth.

    a. Based upon 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. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

E. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.

1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

F. Plant Material Observation: Landscape Architect shall observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Landscape Architect retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.

1. Notify Landscape Architect of sources of planting materials seven days in advance of delivery to site.

G. Pre-installation Conference: Conduct conference at Project site unless otherwise advised.

10.6 DELIVERY, STORAGE, AND HANDLING

A. 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 if applicable.

B. 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.

C. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

D. Handle planting stock by root ball.

E. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F until planting.

F. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1. Heel-in bare-root stock. Soak roots that are in dry condition in water for two hours. Reject dried-out plants.
2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
3. Do not remove container-grown stock from containers before time of planting.

4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.

10.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

B. Interruption of Existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of each service or utility.
2. Do not proceed with interruption of services or utilities without Owner's written permission.

C. Planting Restrictions: Plant during one of the following periods unless otherwise authorized by Owner/Landscape Architect. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.

1. Spring Planting: March 1st to May 15th.
2. Fall Planting: October 15th to December 1st.

D. 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.

E. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.

1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

10.8 WARRANTY

A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner, or incidents that are beyond Contractor's control.
b. Structural failures including plantings falling or blowing over.
c. Faulty performance of tree stabilization.

d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Periods from Date of Planting Completion:

a. Trees, Shrubs, Vines, and Ornamental Grasses: 24 months.
b. Ground Covers, Biennials, Perennials, and Other Plants: 24 months.
c. Annuals: Three months.

3. Include the following remedial actions as a minimum:

a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
b. Replace plants that are more than 10-15% percent dead or in an unhealthy condition at end of warranty period.
c. A limit of one replacement of each plant will be required except for losses or replacements due to failure to comply with requirements.
d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

10.9 MAINTENANCE SERVICE

A. Initial Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period: 24 months from date of planting completion.

B. Initial Maintenance Service for Ground Cover and Other Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period: 24 months from date of planting completion.

C. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 11 - PRODUCTS

11.1 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched,

healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots will be rejected.
2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
3. All plant material shall be grown in zone 5 or zone 6.

B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.

C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

D. Labeling: Label each plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.

E. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

11.2 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.
2. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.
3. Provide lime in form of ground dolomitic limestone.

B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent sulfur, with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Aluminum Sulfate: Commercial grade, unadulterated.

E. Perlite: Horticultural perlite, soil amendment grade.

F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 sieve.

G. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.

I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

11.3 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 3/4-inch sieve; soluble salt content of 5 to 10 decisiemens/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. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or granular texture, with a pH range of 3.4 to 4.8.

C. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

11.4 FERTILIZERS

A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 1 percent nitrogen and 10 percent phosphoric acid.

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.

11.5 PLANTING SOILS

A. Planting Soil: Imported topsoil complying with ASTM D5268, a pH range of 5.5 to 7, a minimum of 4 percent organic content and from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from agricultural land, bogs, or marshes.

1. Additional Properties of Imported Topsoil: Screened and free of stones 1 inch 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 quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and bromegrass; not infested with nematodes; grubs; or 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 capacity of at least 15 percent on a dry weight basis.

2. Stones may comprise no more than 10 percent of the total soil volume
3. Mix imported topsoil with the following soil amendments[**and fertilizers**] in the following quantities to produce planting soil:

    a. Refer to Section 02920 – Lawns & Grasses.

11.6 MULCHES

A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:

1. Type: Shredded hardwood bark.
2. Size Range: 2 inches maximum, 1/2 inch minimum.
3. Color: Natural.

11.7 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.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

11.8 TREE STABILIZATION MATERIALS

A. Stakes and Guys:

1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated, pointed at one end.
2. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes or turnbuckles.

3. Tree-Tie Webbing: UV-resistant polypropylene.
4. Retain first subparagraph below for tall and large-caliper trees.
5. Proprietary Staking-and-Guying Devices: Proprietary stake and adjustable tie systems to secure each new planting by plant stem; sized as indicated and per manufacturer's written recommendations.

    a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

        1) Arborbrace; ArborBrace Tree Guying System.
        2) Decorations for Generations, Inc.; Reddy Stake or Mega Stake System.
        3) Or approved equal.

PART 12 - EXECUTION

12.1 EXAMINATION

A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and 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.

12.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

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 in accordance with all applicable provisions of the LFUCG engineering manual.

C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.

D. Apply anti-desiccant to trees and shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.

1. If deciduous trees or shrubs are moved in full leaf, spray with anti-desiccant at nursery before moving and again two weeks after planting.

E. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

12.3 PLANTING AREA ESTABLISHMENT

A. Loosen sub-grade of planting areas to a minimum depth of 6 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. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.

a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
b. Mix lime with dry soil before mixing fertilizer.

2. Spread planting soil to a depth of 12 inches but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

a. Spread approximately one-half the thickness of planting soil over loosened subgrade. Mix thoroughly into top 2 inches of subgrade. Spread remainder of planting soil.

B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

C. Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

12.4 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 30-45 degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root

ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

1. Excavate approximately three times as wide as ball diameter for balled and burlapped, balled and potted or container-grown stock.
2. Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
4. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
5. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
6. Maintain supervision and protection of excavations at all times during the project.
7. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
8. If drain tile is shown on Drawings or required under planting areas, excavate to top of porous backfill over tile.

B. Subject to the acceptance of the Landscape Architect or Owner, subsoil and topsoil removed from excavations may be used as planting soil.

C. Obstructions: Notify Landscape Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

1. Hardpan Layer: Drill 6-inch- diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.

D. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

E. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

12.5 TREE, SHRUB, AND VINE PLANTING

A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Remove stem girdling roots and kinked roots on bare rooted plant material. Remove injured roots by cutting cleanly; do not break.

C. Set balled and burlapped stock plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.

1. Use planting soil for backfill.

2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts specified in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
5. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Set balled and potted or container-grown stock plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.

1. Use planting soil for backfill.
2. Carefully remove root ball from container without damaging root ball or plant.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
5. Continue backfilling process. Water again after placing and tamping final layer of soil.

E. Set fabric bag-grown stock plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.

1. Use planting soil for backfill.
2. Carefully remove root ball from fabric bag without damaging root ball or plant. Do not use planting stock if root ball is cracked or broken before or during planting operation.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
5. Continue backfilling process. Water again after placing and tamping final layer of soil.

F. Set and support bare-root stock in center of planting pit or trench with root flare 1 inch above adjacent finish grade.

1. Use planting soil for backfill.
2. Spread roots without tangling or turning toward surface, and carefully work backfill around roots by hand. Puddle with water until backfill layers are completely saturated. Plumb before backfilling, and maintain plumb while working backfill around roots and placing layers above roots.
3. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside soil-covered roots about 1 inch from root tips; do not place tablets in bottom of the hole or touching the roots.
4. Continue backfilling process. Water again after placing and tamping final layer of soil.

G. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

12.6 MECHANIZED TREE SPADE PLANTING

A. Trees may be planted with an approved mechanized tree spade at the designated locations. Do not use tree spade to move trees larger than the maximum size allowed for a similar field-grown, balled-and-burlapped root-ball diameter according to ANSI Z60.1, or larger than the manufacturer's maximum size recommendation for the tree spade being used, whichever is smaller.

B. When extracting the tree, center the trunk within the tree spade and move tree with a solid ball of earth.

C. Cut exposed roots cleanly during transplanting operations.

D. Use the same tree spade to excavate the planting hole as was used to extract and transport the tree.

E. Plant trees as shown on Drawings, following procedures in "Tree, Shrub, and Vine Planting" Article.

F. Where possible, orient the tree in the same direction as in its original location.

12.7 TREE AND SHRUB PRUNING

A. Remove only dead, dying, or broken branches. Do not prune for shape.

B. Prune, thin, and shape trees, shrubs, and vines as directed by Landscape Architect.

C. Prune, thin, and shape trees, shrubs, and vines according to professional horticultural and arboricultural practices. Unless otherwise indicated by Landscape Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.

D. Do not apply pruning paint to wounds unless authorized by Owner/Landscape Architect.

12.8 TREE STABILIZATION

A. Install trunk stabilization as follows unless otherwise indicated:

1. Upright Staking and Tying: Stake trees of 2- through 5-inch caliper. Stake trees of less than 2-inch caliper only as required to prevent wind tip out. Use a minimum of two stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend to the dimension shown on Drawings above grade. Set stakes and space to avoid penetrating root balls or root masses.
2. Use two stakes for trees up to 12 feet high and 2-1/2 inches or less in caliper; three stakes for trees less than 14 feet high and up to 4 inches in caliper. Space stakes equally around trees.
3. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

B. Staking and Guying: Stake and guy trees more than 14 feet in height and more than 3 inches in caliper unless otherwise indicated. Securely attach no fewer than three guys to stakes 30 inches long, driven to grade.

1. Site-Fabricated Staking-and-Guying Method:

a. For trees more than 6 inches in caliper, anchor guys to wood deadmen buried at least 36 inches below grade. Provide turnbuckle or compression spring for each guy wire and tighten securely.
b. Support trees with bands of flexible ties at contact points with tree trunk and reaching to turnbuckle or compression spring. Allow enough slack to avoid rigid restraint of tree.
c. Support trees with strands of cable or multiple strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk and reaching to turnbuckle or compression spring. Allow enough slack to avoid rigid restraint of tree.
d. Attach flags to each guy wire, 30 inches above finish grade.
e. Paint turnbuckles or compression springs with luminescent white paint.

2. Proprietary Staking and Guying Device: Install staking and guying system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

12.9 PLANTING AREA MULCHING

A. Mulch backfilled surfaces of planting areas and other areas indicated.

1. Trees in Turf Areas: Apply organic mulch ring of 2-inch average thickness, with 12-inch radius around trunks or stems. Do not place mulch within 3 inches of trunks or stems.

12.10 PLANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to

proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.

B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

D. Remove tree stabilization devices after 1 year from date of installation.

E. Water trees as required to provide 1" of water per week on average.

12.11 CHEMICAL APPLICATION

A. Apply pesticides and other chemical products and biological control agents in accordance with 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. Pre-Emergent Herbicides (Selective and Non-Selective): Apply to tree, shrub, and ground-cover areas in accordance with manufacturer's written recommendations. Do not apply to seeded areas.

C. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.CLEANUP AND PROTECTION

D. During planting, keep adjacent paving and construction clean and work area in an orderly condition.

E. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

F. After installation and before the final inspection for completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

12.12 DISPOSAL

A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION 02930

PART IX

ADDENDA

Addendum Number	Title	Date
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____

APPENDIX A

STANDARD DRAWINGS INDEX

LFUCG

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KDOH

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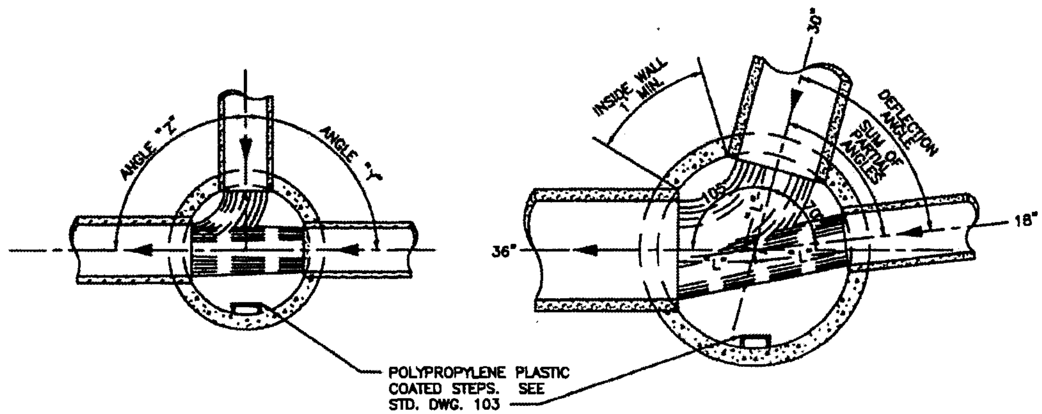
MISCELLANEOUS

1. Curb Inlet Type A (Modified)
2. Truncated Dome Detail

TABLE I
OF
MINIMUM PARTIAL ANGLE

PIPE	MANHOLE SIZE									
	4'-0"		5'-0"		6'-0"		7'-0"		8'-0"	
SIZE	P. ANGLE	L. DIST.	P. ANGLE	L. DIST.	P. ANGLE	L. DIST.	P. ANGLE	L. DIST.	P. ANGLE	L. DIST.
15"	38°	1'-10"	30°	2'-4"	25°	2'-11"	22°	3'-5"	19°	3'-11"
18"	45°	1'-9"	34°	2'-4"	28°	2'-10"	24°	3'-4"	21°	3'-11"
24"	53°	1'-7"	41°	2'-2"	34°	2'-9"	29°	3'-3"	25°	3'-10"
27"	—	—	45°	2'-1"	37°	2'-8"	32°	3'-3"	28°	3'-9"
30"	—	—	49°	2'-0"	40°	2'-7"	34°	3'-2"	30°	3'-8"
33"	—	—	54°	1'-10"	44°	2'-6"	37°	3'-1"	37°	3'-8"
36"	—	—	—	—	47°	2'-4"	40°	3'-0"	34°	3'-7"
42"	—	—	—	—	55°	2'-1"	46°	2'-9"	39°	3'-5"
48"	—	—	—	—	63°	1'-9"	52°	2'-6"	44°	3'-2"
54"	—	—	—	—	—	—	59°	2'-3"	50°	2'-11"
60"	—	—	—	—	—	—	67°	1'-10"	56°	2'-8"



TYPE "A" MANHOLE – CIRCULAR WALLS
CAST-IN-PLACE OR PRECAST CONCRETE

GENERAL NOTES:

1. ALL DIMENSIONS ARE BASED ON SIZE OF LARGEST PIPE IN MANHOLE.
2. MANHOLES FOR PIPE LARGER THAN 60" SHALL BE SPECIALLY DESIGNED.
3. IN CASES WHERE DEFLECTION ANGLES EXCEED MAXIMUM SHOWN IN TABLES, MANHOLE SHALL BE INCREASED IN SIZE OR SPECIALLY DESIGNED.
4. BOTTOM SLAB OF MANHOLES SHALL BE SPECIALLY DESIGNED WITH REGARD TO AREA, THICKNESS, AND REINFORCING IN SITUATIONS WHERE HIGH WATER TABLE OR UNSTABLE SOIL CONDITIONS EXIST.
5. MANHOLE BENCH SHALL SLOPE AT LEAST 1" PER FT. FROM WALLS TO CHANNELS AND SHALL HAVE SMOOTH FLOAT AND BRUSH FINISH.
6. ELEVATIONS OF PIPES IN MANHOLES SHALL BE SUCH THAT THE TOP OF ALL INFLUENT PIPES WILL BE AT AN ELEVATION EQUAL TO OR GREATER THAN THE TOP OF THE EFFLUENT PIPE.
7. INFLUENT PIPES MAY ENTER MANHOLES AT AN ELEVATION ABOVE THE CHANNELS AS REQUIRED TO AVOID CONFLICT WITH LARGER PIPES IN THE MANHOLE.

NOTES:

1. PRECAST CONCRETE MANHOLE BARREL SHALL BE ASTM C-478, CLASS II PIPE TO 12' DEPTH AND C-76 CLASS III GREATER THAN 12' DEPTH.
2. BASE SECTION OF CIRCULAR MANHOLES MAY BE CAST-IN-PLACE CONCRETE, OR CUSTOM PRECAST CONCRETE WITH OPENINGS FOR PIPE.
3. BASE SECTIONS MAY BE SIMILAR TO SANITARY SEWER MANHOLE.
4. PROVIDE STEPS WITHIN 18" OF BENCH.

CIRCULAR MANHOLE NOTES:

1. THE ANGLE BETWEEN ANY TWO PIPES (e.g. ANGLE "Y" OR "Z") MUST BE GREATER THAN THE SUM OF THE PARTIAL ANGLES FROM TABLE I FOR THE MANHOLE SIZE SELECTED. FOR SMALLER ANGLES BETWEEN PIPES, LARGE MANHOLES MUST BE SELECTED. (SEE EXAMPLE BELOW)
2. THE MAXIMUM DEFLECTION ANGLE BETWEEN ANY INCOMING PIPE AND THE DISCHARGE PIPE SHALL BE NO MORE THAN 90° FOR PIPES UP TO 24" IN DIAMETER. THE MAXIMUM DEFLECTION ANGLE FOR 27" TO 42" PIPES SHALL BE 75° AND FOR PIPES LARGER THAN 42" THE MAXIMUM DEFLECTION ANGLE SHALL BE 60°.

EXAMPLE FOR MANHOLE SIZE SELECTION:

FOR MANHOLE SHOWN ABOVE, THE ANGLE BETWEEN 18" AND 30" PIPE IS 70° AND THE ANGLE BETWEEN 30" AND 36" PIPE IS 110°. THE TABLE INDICATES THAT FOR A 6'-0" DIAMETER MANHOLE THE MINIMUM PARTIAL ANGLE FOR AN 18" PIPE IS 28° AND FOR A 30" PIPE IS 40°. THE SUM OF THE PARTIAL ANGLES IS 68° THIS SUM IS LESS THAN THE 70°. THEREFORE, A 6'-0" MANHOLE DIAMETER IS ACCEPTABLE.

NO.	DATE	REVISION DESCRIPTION	BY

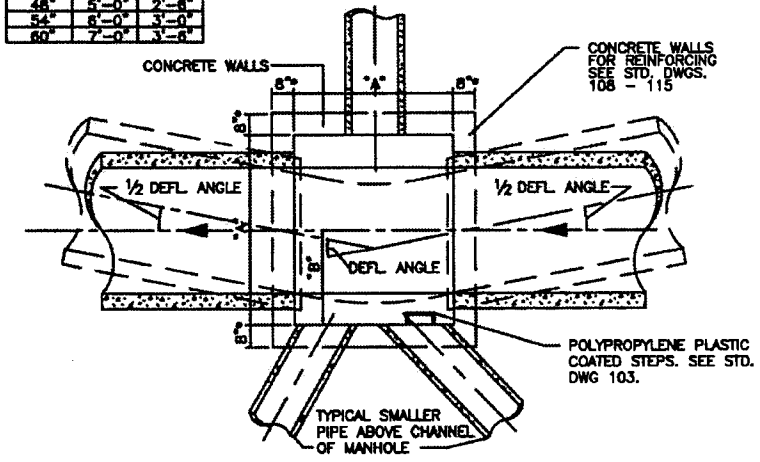
DIVISION OF ENGINEERING

STORM SEWER
MANHOLE TYPE "A"–
CIRCULAR WALLS

STANDARD DRAWING NO. 100
APPROVED: URBAN COUNTY ENGINEER — DATE 5/1/08
COMMISSIONER — DATE 5/1/08

LEXINGTON–FAYETTE URBAN COUNTY GOVERNMENT, DEPARTMENT OF PUBLIC WORKS AND DEVELOPMENT

PIPE SIZE	DIM. "A"	DIM. "B"
12"	5'-0"	2'-6"
15"-42"	5'-0"	2'-6"
48"	5'-0"	2'-6"
54"	6'-0"	3'-0"
60"	7'-0"	3'-6"

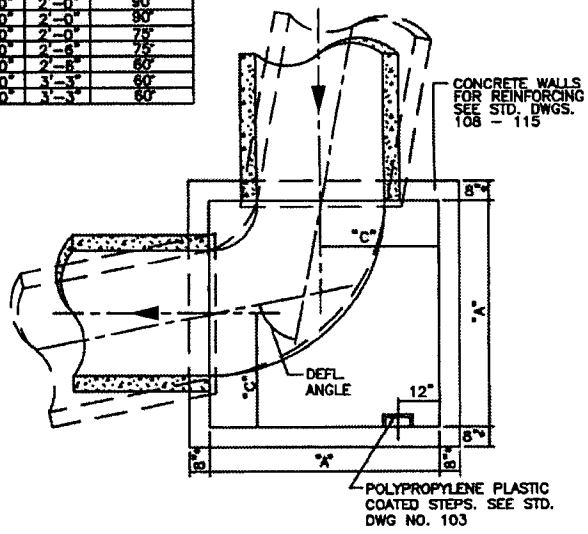


0°–22° DEFLECTION ANGLE

* WALL THICKNESS FOR MANHOLES

DEPTH TO INV.	A=5'-0"	A=6'-0"	A=7'-0"
UP TO 10'	8"	8"	8"
10' TO 15'	8"	8"	10"
15' TO 20'	8"	10"	10"

PIPE SIZE	DIM. "A"	DIM. "C"	MAXIMUM DEFL. ANGLE
12"	5'-0"	2'-0"	90°
15"-33"	5'-0"	2'-0"	90°
36"	5'-0"	2'-0"	75°
42"	6'-0"	2'-6"	75°
48"	6'-0"	2'-8"	60°
54"	7'-0"	3'-3"	60°
60"	7'-0"	3'-3"	60°

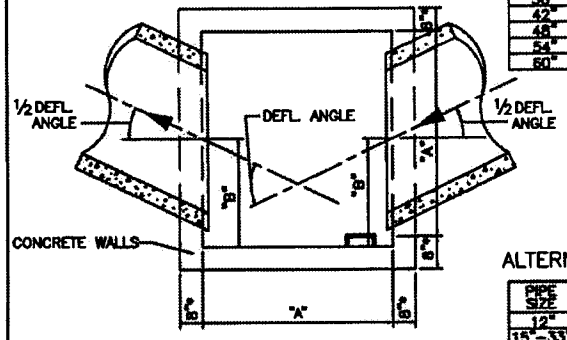


GREATER THAN 68° DEFLECTION ANGLE

TYPE "B" MANHOLE – NON–CIRCULAR WALLS, CAST–IN–PLACE CONCRETE

ALTERNATE–22°–50°

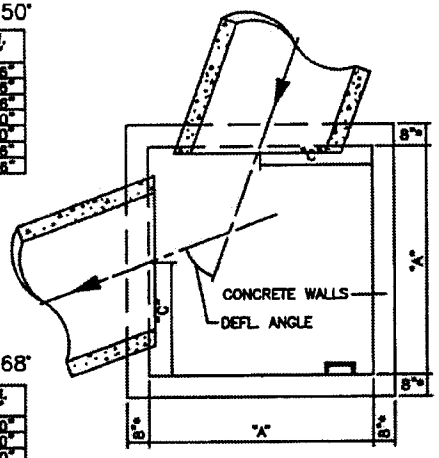
PIPE SIZE	DIM. "A"	DIM. "B"
12"	5'-0"	2'-6"
15"-33"	5'-0"	2'-6"
36"	5'-0"	2'-6"
42"	6'-0"	3'-0"
48"	6'-0"	3'-0"
54"	7'-0"	3'-6"
60"	7'-0"	3'-6"



22°–50° DEFLECTION ANGLE

ALTERNATE–50°–68°

PIPE SIZE	DIM. "A"	DIM. "C"
12"	5'-0"	2'-0"
15"-33"	5'-0"	2'-0"
36"	5'-0"	2'-0"
42"	6'-0"	2'-6"
48"	6'-0"	2'-8"
54"	7'-0"	3'-3"
60"	7'-0"	3'-3"



50°–90° DEFLECTION ANGLE

NOTES:

1. ALL DIMENSIONS ARE BASED ON SIZE OF LARGEST PIPE IN MANHOLE.
2. MANHOLES FOR PIPE LARGER THAN 60" SHALL BE SPECIALLY DESIGNED.
3. PIPES SHALL ENTER MANHOLE WALLS, NOT CORNERS. ALLOW 2" MINIMUM TO INSIDE CORNER FOR WALL CUT.
4. IN CASES WHERE DEFLECTION ANGLES EXCEED MAXIMUM SHOWN IN TABLES, MANHOLE SHALL BE SPECIALLY DESIGNED.
5. BOTTOM SLAB OF MANHOLES SHALL BE SPECIALLY DESIGNED WITH REGARD TO AREA, THICKNESS, AND REINFORCING IN SITUATIONS WHERE HIGH WATER TABLE OR UNSTABLE SOIL CONDITIONS EXIST.
6. MANHOLE BENCH SHALL SLOPE AT LEAST 1" PER FT. FROM WALLS TO CHANNELS AND SHALL HAVE SMOOTH FLOAT AND BRUSH FINISH.
7. THE TOP OF ALL INFLUENT PIPES WILL BE AT AN ELEVATION EQUAL TO THE TOP OF THE EFFLUENT PIPE.
8. INFLUENT PIPES MAY ENTER MANHOLES AT AN ELEVATION ABOVE THE CHANNELS AS REQUIRED TO AVOID CONFLICT WITH LARGER PIPES IN THE MANHOLE.
9. THE MAXIMUM DEFLECTION ANGLE BETWEEN ANY INCOMING PIPE AND OUT GOING PIPE SHALL BE NO MORE THAN 90° FOR PIPES UP TO 24" IN DIAMETER. THE MAXIMUM DEFLECTION ANGLE FOR 27" TO 42" PIPES SHALL BE 75° AND FOR PIPES LARGER THAN 42" THE MAX. DEFLECTION ANGLE SHALL BE 60°.
10. FOR REINFORCING SEE STD. DWGS. 108 – 115.

NO.	DATE	REVISION DESCRIPTION	BY

DIVISION OF ENGINEERING

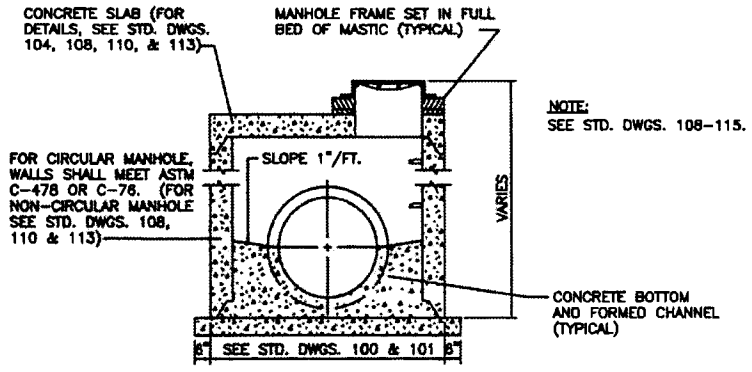
STORM SEWER
MANHOLE TYPE "B"–
NON–CIRCULAR WALLS

STANDARD DRAWING NO. 101

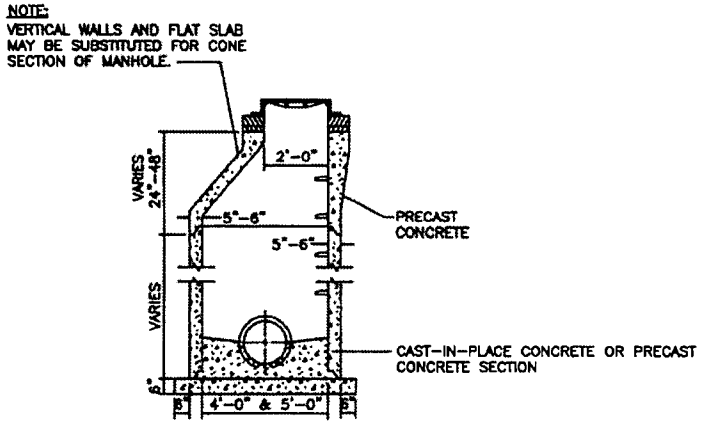
APPROVED: 5/1/08
URBAN COUNTY ENGINEER
COMMISSIONER
DATE: 5/1/08

TYPE "B" MANHOLE FOR DEFLECTION ANGLES BETWEEN 22° & 90°

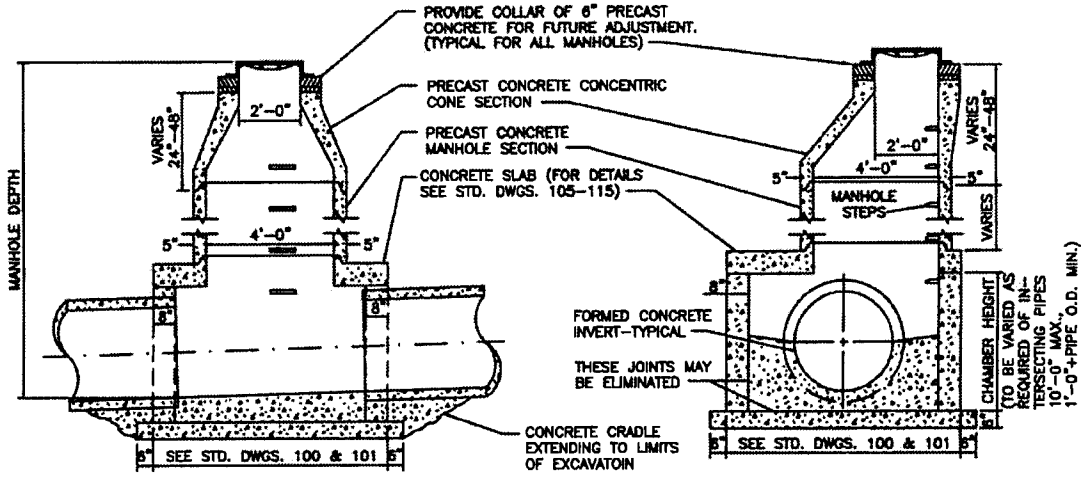
LEXINGTON–FAYETTE URBAN COUNTY GOVERNMENT, DEPARTMENT OF PUBLIC WORKS AND DEVELOPMENT



CIRCULAR AND NON-CIRCULAR WALLS (TYPE "A" & TYPE "B")



STANDARD 4'-0" DIA. & 5'-0" CIRCULAR WALLS (TYPE "A")



TYPICAL LONGITUDINAL SECTION

TYPICAL TRANSVERSE SECTION

NOTES:

1. BASE SECTION OF CIRCULAR MANHOLES MAY BE CAST-IN-PLACE CONCRETE OR CUSTOM PRECAST CONCRETE WITH OPENINGS FOR PIPE.
2. 6" OVERHANG IN BOTTOM SLAB IS NOT REQUIRED IF PRECAST MANHOLES ARE USED.
3. FLAT SLABS IN PAVED AREAS SHALL BE USED ONLY AS APPROVED BY ENGINEER.

STANDARD CIRCULAR MANHOLE - 6'-0" DIAMETER & LARGER TYPE "A" AND NON-CIRCULAR WALL MANHOLE - ALL SIZES TYPE "B"

NO.	DATE	REVISION DESCRIPTION	BY

DIVISION OF ENGINEERING

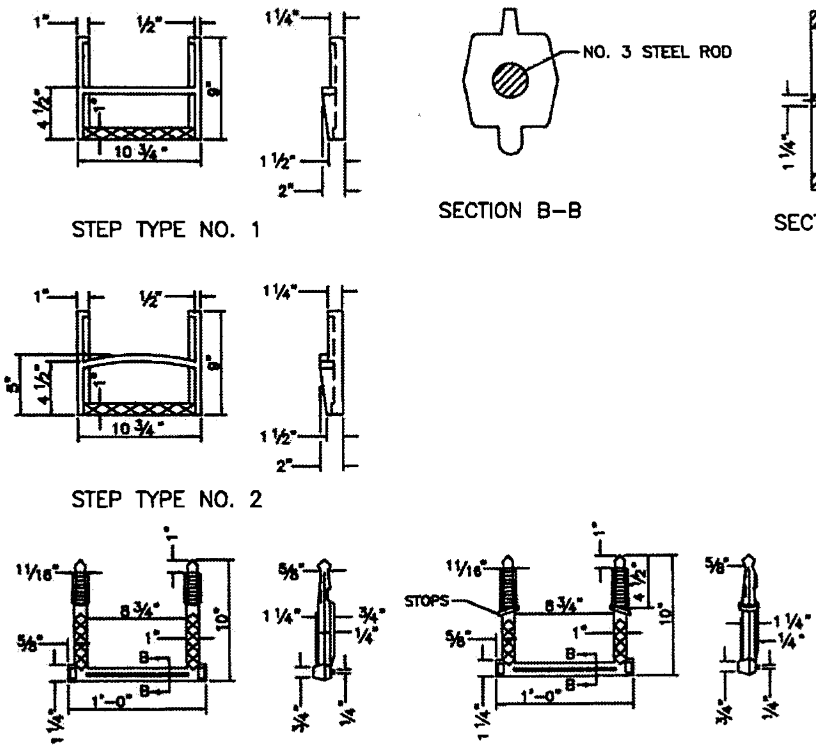
STORM SEWER MANHOLE DETAILS

STANDARD DRAWING NO. 102

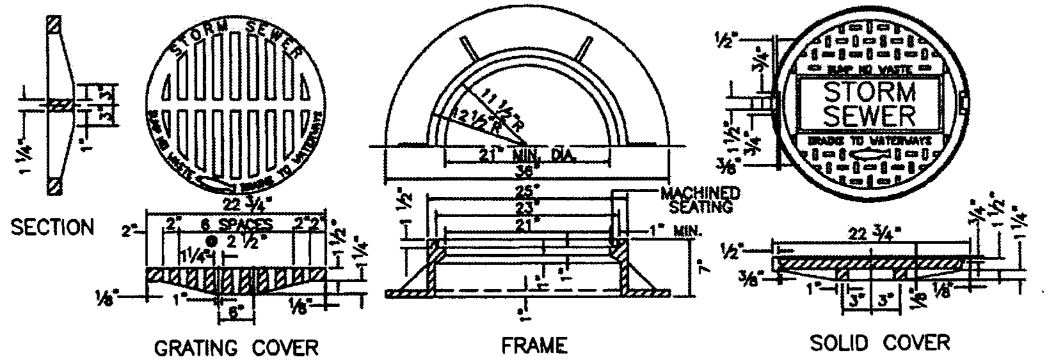
APPROVED: URBAN COUNTY ENGINEER — DATE 5/1/08

COMMISSIONER — DATE 5/1/08

LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT, DEPARTMENT OF PUBLIC WORKS AND DEVELOPMENT



MANHOLE STEPS



MANHOLE FRAME AND COVERS

NOTES:

1. MINIMUM WEIGHT FOR THE 7" FRAME SHALL BE 185 LBS.
2. MINIMUM WEIGHT FOR THE SOLID COVER SHALL BE 120 LBS.
3. CASTINGS TO MEET ASTM A-48 CLASS 35.

NOTES:

1. STEPS SHALL BE ASPHALT COATED CAST IRON OR POLYPROPYLENE PLASTIC COATED STEEL ROD OR OF A TYPE AND SIZE APPROVED BY THE ENGINEER.
2. STEPS SHALL BE SPACED APPROXIMATELY 12" TO 16" O.C. VERTICALLY SO AS TO FORM A CONTINUOUS LADDER.
3. STEPS SHALL BE REQUIRED IN MANHOLES WHEN THE STRUCTURE IS 4 FEET AND GREATER IN DEPTH. (MEASURE FROM FLOWLINE OF LOWEST PIPE TO TOP OF STRUCTURE.)
4. THE TREADS OF ALL STEPS SHALL HAVE ANTI-SKID PROPERTIES FOR HAND AND FOOT GRIPS.
5. MANHOLE STEPS SHALL BE INSTALLED IN A VERTICAL LINE AND SHALL COMPLY WITH OSHA STANDARDS IN ALL RESPECTS.
6. FOR CAST-IN-PLACE OR PRECAST CIRCULAR AND NON-CIRCULAR MANHOLES.
7. FIRST STEP SHALL BE NO MORE THAN 18" FROM TOP OF RIM.

NO.	DATE	REVISION DESCRIPTION	BY

DIVISION OF ENGINEERING

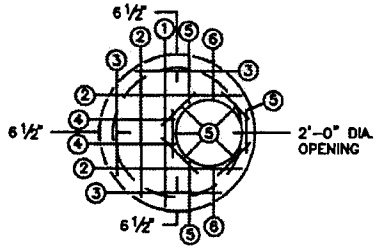
MANHOLE FRAMES,
COVERS, & STEPS

STANDARD DRAWING NO. 103

APPROVAL: URBAN COUNTY ENGINEER — DATE 5/1/08

COMMISSIONER — DATE 5/1/08

LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT, DEPARTMENT OF PUBLIC WORKS AND DEVELOPMENT

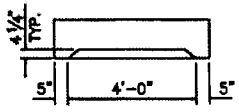


MARK	NO.	SIZE	LENGTH	TYPE
1	1	4	4'-5"	STR.
2	3	"	4'-0"	"
3	3	"	2'-8"	"
4	2	"	2'-0"	"
5	8	"	1'-6"	"
6	2	"	1'-0"	"

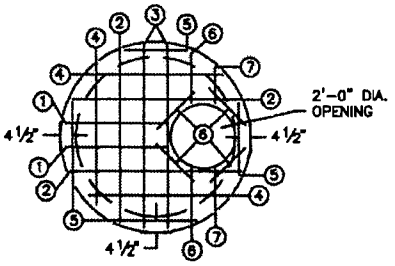
4'-0" DIA. SHALLOW MANHOLES

NOTES:

1. FOR PIPE SIZES 15" TO 24".
2. 9" O.C. SPACING EACH WAY.
3. 8" THICK SLAB.
4. 4'-10" O.D.
5. 2" MIN. STEEL REINFORCEMENT COVER ALL FACES.
6. CIRCULAR REBAR MAY BE USED, OR MARK 5 BARS AS SHOWN.



SIDE VIEW

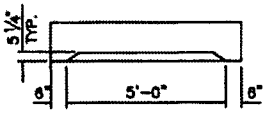


MARK	NO.	SIZE	LENGTH	TYPE
1	2	4	3'-2"	STR.
2	3	"	5'-3"	"
3	2	"	5'-8"	"
4	3	"	4'-2"	"
5	4	"	2'-2"	"
6	6	"	1'-6"	"
7	2	"	1'-0"	"

5'-0" DIA. SHALLOW MANHOLES

NOTES:

1. FOR PIPE SIZES 21" TO 33".
2. 9" O.C. SPACING EACH WAY.
3. 8" THICK SLAB.
4. 6'-0" O.D.
5. 2" MIN. STEEL REINFORCEMENT COVER ALL FACES.
6. CIRCULAR REBAR MAY BE USED, OR MARK 6 BARS AS SHOWN.



SIDE VIEW

NOTE:
SLAB OUTER DIAMETER TO VARY WITH MANHOLE WALL THICKNESS, TO COMPLETELY COVER MANHOLE WALLS.

NO.	DATE	REVISION DESCRIPTION	BY

DIVISION OF ENGINEERING

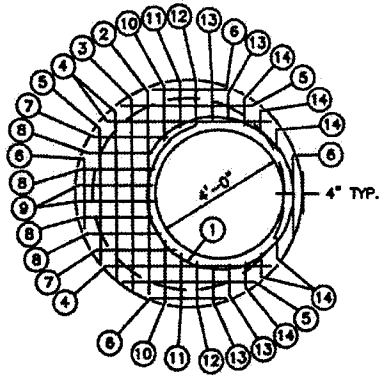
STORM SEWER
MANHOLE CIRCULAR SLABS
4'-0" & 5'-0" DIAMETER

STANDARD DRAWING NO. 104

APPROVED _____ DATE 5/1/02

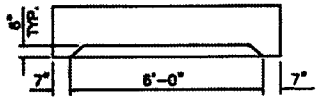
URBAN COUNTY ENGINEER / COMMISSIONER _____ DATE 5/1/02

LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT, DEPARTMENT OF PUBLIC WORKS AND DEVELOPMENT



MARK	NO.	SIZE	LENGTH	TYPE
1	1	6	15'-10"	A
2	1	6	6'-6"	STR.
3	1	"	5'-11"	"
4	3	"	5'-3"	"
5	3	"	4'-3"	"
6	4	"	2'-6"	"
7	2	"	2'-7"	"
8	4	"	2'-3"	"
9	2	"	2'-2"	"
10	2	"	1'-10"	"
11	2	"	1'-6"	"
12	2	"	1'-3"	"
13	4	"	1'-0"	"
14	6	"	0'-10"	"

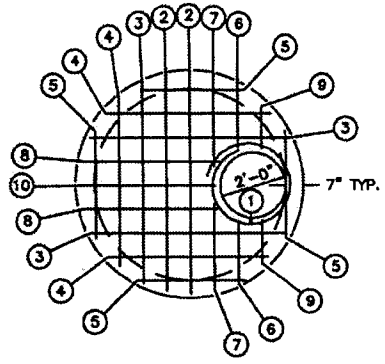
6'-0" DIA. STANDARD MANHOLES



SIDE VIEW

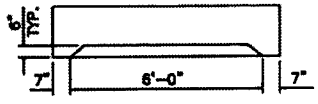
NOTES:

1. FOR PIPE SIZES 15" TO 48".
2. 6" O.C. SPACING EACH WAY.
3. 12" THICK SLAB.
4. 7'-2" O.D.
5. 2" MIN. STEEL REINFORCEMENT COVER ALL FACES.



MARK	NO.	SIZE	LENGTH	TYPE
1	1	6	9'-6"	A_1
2	2	5	6'-9"	STR.
3	3	"	6'-3"	"
4	3	"	5'-3"	"
5	4	"	3'-3"	"
6	2	"	1'-10"	"
7	2	"	2'-9"	"
8	2	"	4'-4"	"
9	2	"	1'-5"	"
10	1	"	4'-3"	"

6'-0" DIA. SHALLOW MANHOLES

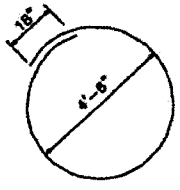


SIDE VIEW

NOTES:

1. FOR PIPE SIZES 15" TO 36".
2. 9" O.C. SPACING EACH WAY.
3. 8" THICK SLAB.
4. 7'-2" O.D.
5. 2" MIN. STEEL REINFORCEMENT COVER ALL FACES.

SPECIAL BAR BENDS



TYPE A

TYPE A_1

NOTE:
SLAB OUTER DIAMETER TO VARY WITH MANHOLE WALL THICKNESS, TO COMPLETELY COVER MANHOLE WALLS.

NO.	DATE	REVISION DESCRIPTION	BY

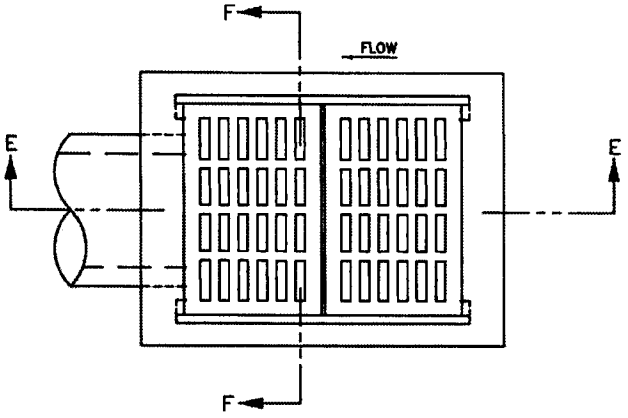
DIVISION OF ENGINEERING

STORM SEWER
MANHOLE CIRCULAR SLABS
6'-0" DIAMETER

STANDARD DRAWING NO. 105

APPROVED: URBAN SEWER ENGINEER — DATE 5/1/08
COMMISSIONER — DATE 5/1/08

LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT, DEPARTMENT OF PUBLIC WORKS AND DEVELOPMENT

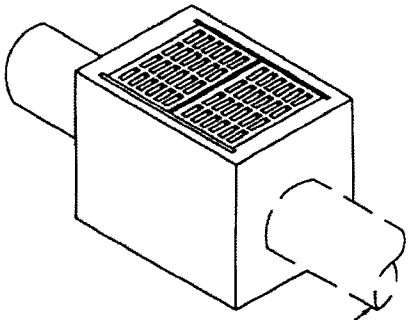


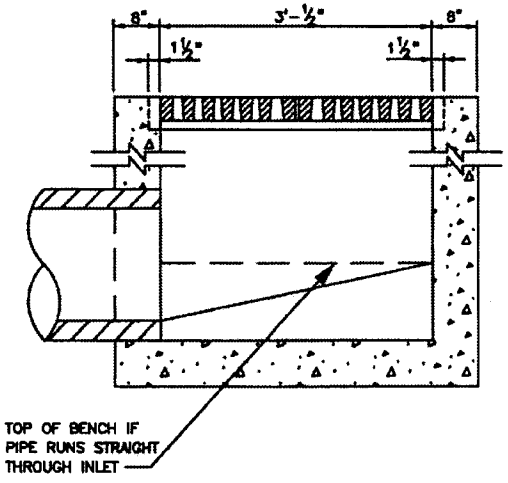
PLAN VIEW

NOTES:

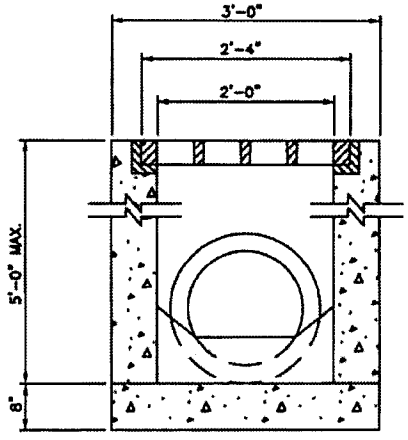
1. NO. 5 STEEL SHALL BE USED THROUGHOUT ON 12" CENTERS.
2. ALL STEEL SHALL HAVE A 2" MINIMUM CLEARANCE TO ANY CONCRETE FACE.
3. NO STEEL IS REQUIRED IN THE BOTTOM SLAB.
4. ALL VERTICAL STEEL SHALL EXTEND 4" INTO BOTTOM SLAB.
5. FOR USE IN PAVED AREAS ONLY.
6. PROVIDE MINIMUM 0.1' SLOPE THROUGH STRUCTURE FOR PIPES IN SERIES. CARRY TROUGH THROUGH. ONLY STRAIGHT THROUGH CONNECTIONS ARE ALLOWED.

ISOMETRIC VIEW

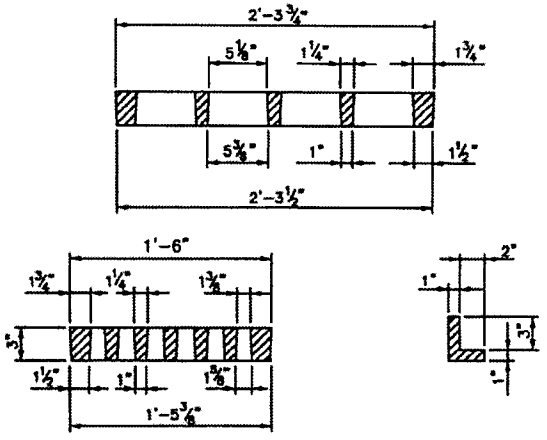




SECTION E–E



SECTION F–F



GRATE DETAILS

NO.	DATE	REVISION DESCRIPTION	BY

DIVISION OF ENGINEERING

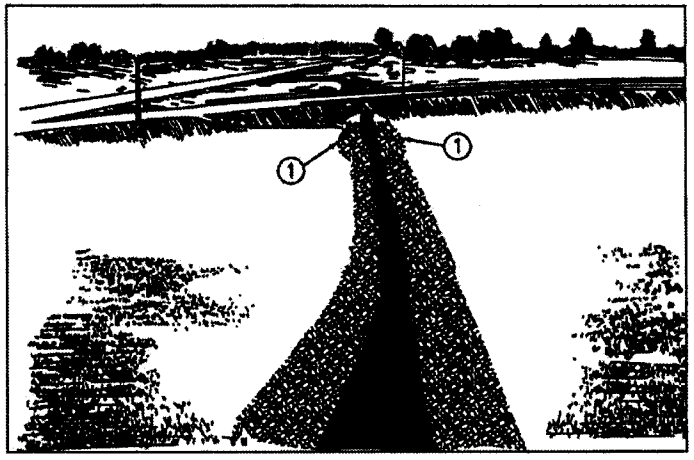
SURFACE INLET TYPE "B"

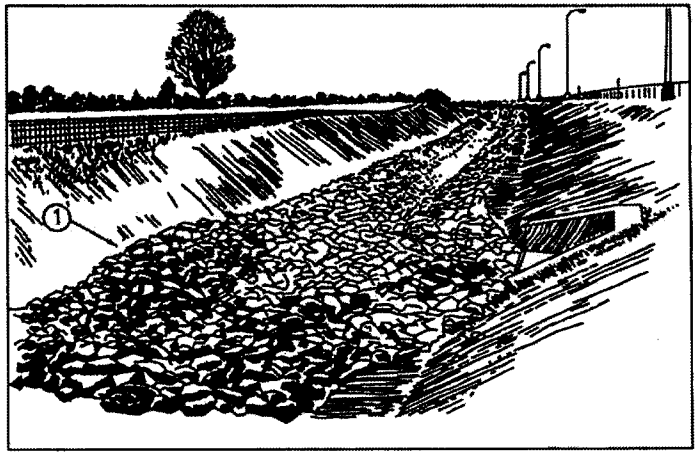
STANDARD DRAWING NO. 121

APPROVED: URBAN COUNTY ENGINEER — DATE 5/1/08

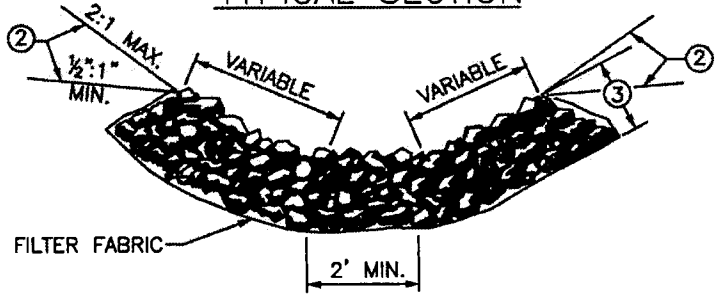
APPROVED: COMMISSIONER — DATE 5/1/08

LEXINGTON–FAYETTE URBAN COUNTY GOVERNMENT, DEPARTMENT OF PUBLIC WORKS AND DEVELOPMENT





TYPICAL SECTION



NOTES:

1. AGGREGATE CHANNEL LINING WILL NOT BE REQUIRED IN THE BOTTOM OF THE DITCH WHERE SOLID ROCK IS ENCOUNTERED. SIDE SLOPES SHALL BE LINED.
2. AGGREGATE ESTIMATED ON THE BASIS OF 0.50 TON/SQ. YD. PER FOOT OF DEPTH.

SHEET NOTES:

① WIDEN CHANNEL LINING AT STRUCTURES TO PREVENT EROSION.

② ALTERNATE LOCATION OF GROUNDLINE.

③ MINIMUM DEPTH OF CHANNEL LINING SHALL BE 24". LESSER DEPTHS SHALL HAVE APPROVAL FROM THE ENGINEER. STONE SHALL BE WELL GRADED SO THAT OPENINGS BETWEEN LARGER STONES ARE FILLED WITH SMALLER STONES.

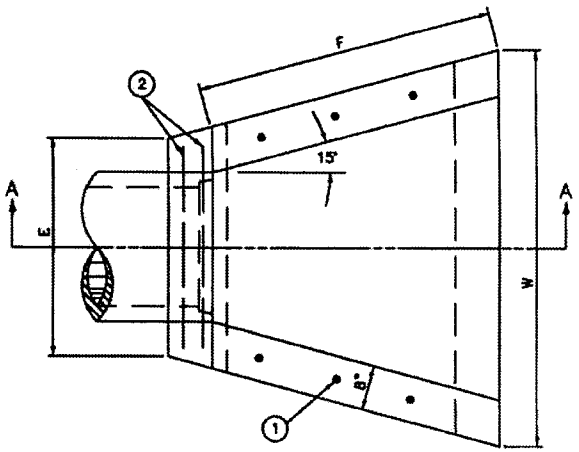
NO.	DATE	REVISION DESCRIPTION	BY

DIVISION OF ENGINEERING

AGGREGATE
CHANNEL LINING

STANDARD DRAWING NO. 130-1

APPROVED _____ 5/1/08
DIRECTOR
COMMISSIONER _____ 5/1/08
DATE



PLAN VIEW

PIPE DIA.	DIMENSIONS							CLASS "A" CONC.	REINF. STEEL
	B	C	E	F	L	W	T	C.Y.	LBS.
15"	0'-7½"	2'-0"	2'-9"	3'-5⅜"	4'-0"	4'-10¾"	2¼"	0.90	10
18"	0'-9"	2'-3"	3'-0"	3'-11 9/16"	4'-6"	5'-4 15/16"	2½"	0.97	11
21"	0'-10½"	2'-6"	3'-3"	4'-5 13/16"	5'-0"	5'-11⅛"	2¾"	1.17	12
24"	1'-0"	2'-9"	3'-6"	5'-0"	5'-6"	6'-5⅜"	3"	1.38	12
27"	1'-1½"	3'-0"	3'-9"	5'-6 3/16"	6'-0"	6'-11 9/16"	3 ¼"	1.62	13

SHEET NOTES: ◯

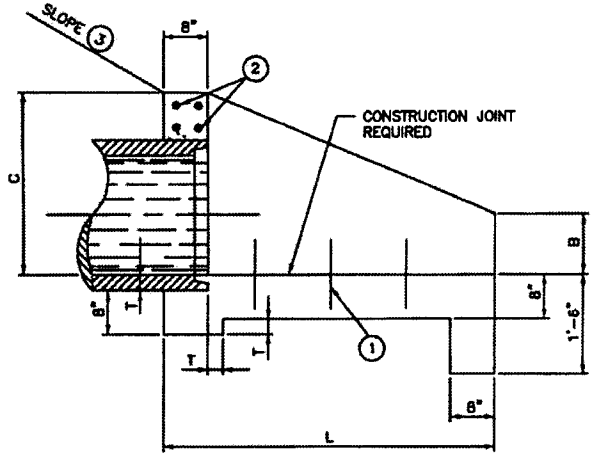
(1) 6 #4 x 1'-0" DOWELS

(2) 4 #4 x ("E" DIMENSION MINUS 4")

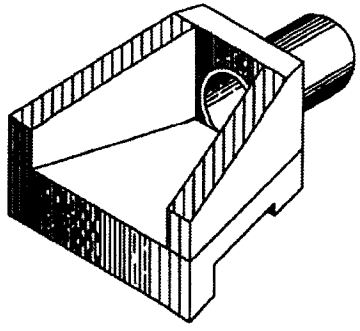
(3) SLOPE SHALL BE WARPED TO FIT HEADWALL WHEN PIPE IS SKEWED AND / OR NORMAL SLOPE VARIES FROM 2:1.

NOTES:

1. REINFORCING STEEL MINIMUM GRADE 40, EVENLY SPACED (MIN. SPACING 12" O.C.)
2. VOLUME DISPLACED BY PIPE COMPUTED USING INSIDE DIAMETER OF PIPE.
3. WING ANGLES AND / OR DIMENSIONS MAY BE ALTERED DURING CONSTRUCTION TO ACCOMMODATE FLOW OF WATER.
4. APRON BETWEEN WINGS SHALL BE SLOPED IN DIRECTION OF FLOW EQUAL TO SLOPE OF PIPE, BUT NOT TO EXCEED 5%. FRONT FACE OF HEADWALL SHALL REMAIN VERTICAL.
5. CHAIN LINK FENCE IS REQUIRED ON ALL HEADWALLS WHEN VERTICAL FACE "C" IS GREATER THAN 30°.
6. ALL EXPOSED EDGES ARE TO HAVE ¾" CHAMFER.
7. SKEWED PIPE REQUIRES SPECIAL DESIGN.



SECTION A–A



ISOMETRIC VIEW

NO.	DATE	REVISION DESCRIPTION	BY

DIVISION OF ENGINEERING

PIPE CULVERT HEADWALLS
0° SKEW
15"–27" CIRCULAR PIPE

STANDARD DRAWING NO. 153

APPROVED: 5/1/08 DATE

URBAN COUNTY ENGINEER / COMMISSIONER 5/1/08 DATE

LEXINGTON–FAYETTE URBAN COUNTY GOVERNMENT, DEPARTMENT OF PUBLIC WORKS AND DEVELOPMENT