Project Limits. The project limits for this project are defined as follows:

FROM: STA 1128+24.81  South of Gaylord Parkway
TO:    STA 1224+00.00  North of John Hickman Road

### SPECIFICATION DATA TEST TO BE IN ACCORDANCE WITH TEXAS DEPARTMENT OF TRANSPORTATION STANDARD TEST METHODS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>GRADING REQUIREMENTS</th>
<th>CONSTANTS</th>
<th>BALL MILL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>% RETAINED, SIEVES</td>
<td>LL</td>
<td>PI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MAX</td>
<td>MAX</td>
<td>MIN</td>
</tr>
<tr>
<td>132</td>
<td>EMBK (DENS CONT) (TY C) (CL 3)</td>
<td>24</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

Notes: (1) Embankment material shall consist of suitable earth material such as loam, clay, or other materials that will form a stable embankment and be free from vegetation or other objectionable matter.

(2) Type C embankment shall be composed of crushed limestone containing no more than 20% fines (passing No. 40 sieve) from excavation within the project limits. The above PI requirements apply only to imported material.

### MINIMUM COMPACTION REQUIREMENTS FOR BASE COURSES

<table>
<thead>
<tr>
<th>ITEM</th>
<th>MATERIAL</th>
<th>COURSE</th>
<th>DENSITY</th>
<th>COURSE</th>
<th>DENSITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>260</td>
<td>LIME TREAT SUBGR</td>
<td>ALL</td>
<td>95%</td>
<td>ALL</td>
<td>95%</td>
</tr>
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</table>

### BASIS OF ESTIMATE FOR TEMPORARY EROSION CONTROL ITEMS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>RATE</th>
<th>UNIT</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>164</td>
<td>DRILL SEED</td>
<td>SEE GEN NOTES</td>
<td>----</td>
<td>32,000 SY</td>
</tr>
<tr>
<td>168</td>
<td>VEGETATIVE WATERING</td>
<td>SEE GEN NOTES</td>
<td>MG</td>
<td>See Table below</td>
</tr>
<tr>
<td>204</td>
<td>SPRINK (DUST CONT)</td>
<td>70 MG/STA</td>
<td>MG</td>
<td>4,940 MG</td>
</tr>
<tr>
<td>5012</td>
<td>EARTHWORK (EROSN CONT)(CL 3)</td>
<td>2.0CY/INLET</td>
<td>CY</td>
<td>150 CY</td>
</tr>
</tbody>
</table>
GENERAL NOTES AND SPECIFICATION DATA

### BASIS OF ESTIMATE FOR PERMANENT CONSTRUCTION

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>RATE</th>
<th>UNIT</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>162</td>
<td>BLOCK SOD</td>
<td>SEE SPECS</td>
<td>----</td>
<td>54,519 SY</td>
</tr>
<tr>
<td>166</td>
<td>FERT</td>
<td>400#/AC</td>
<td>AC</td>
<td>2.3 TON(1)</td>
</tr>
<tr>
<td>168</td>
<td>VEGETATIVE WATERING</td>
<td>SEE GEN NOTES</td>
<td>----</td>
<td>3,710 MG</td>
</tr>
<tr>
<td>260</td>
<td>LIME (TYA (SLRY), TYB OR TYC (SLRY))</td>
<td>36#/SY</td>
<td>SY</td>
<td>426 TON</td>
</tr>
<tr>
<td>314</td>
<td>EMULS ASPH (SS-1)</td>
<td>0.1-0.25 GAL/SY</td>
<td>SY</td>
<td>5,630 GAL</td>
</tr>
<tr>
<td>340</td>
<td>ASPH CONC (TY B)(BASE) (PG 64-22)</td>
<td>110 LB/SY/IN</td>
<td>VARIES</td>
<td>22.983 TON</td>
</tr>
</tbody>
</table>

Note: (1) For Contractor information only.

### GENERAL:

All project specific submittals required for this contract, except for the submittals stated in the NTTA Special Provisions SP-5 and SP-8, shall be submitted to the Engineer's office located at North Texas Tollway Authority, 5900 West Plano Parkway, Suite 100, Plano TX 75093 for further processing.

The following firms are consultants to the Authority responsible for the design and construction management of this project:

- **Section Engineer**             Chiang Patel & Yerby, Inc.
- **Consulting Engineer**         HNTB Corporation
- **Construction Manager**        Kellogg, Brown & Root, Inc.

Questions prior to letting may be submitted by e-mail or fax and will be answered by e-mail or fax (e-mail: nibrahim@ntta.org, fax: 972-930-2659). A file containing these questions and answers will be available for review at the Engineer's office located at North Texas Tollway Authority, 5900 West Plano Parkway, Suite 100, Plano TX 75093.

As specified in NTTA Special Provision SP-0.14, "Important Notice To Contractors – Utilities," the following list indicates the entities controlling known existing utility structures within the limits of the work and the persons the Contractor should contact in connection therewith.

<table>
<thead>
<tr>
<th>UTILITY COMPANY</th>
<th>CONTACT PERSON</th>
<th>PHONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC (Telephone, Fiber Optic, Cable)</td>
<td>Kelli Germann</td>
<td>972-569-4755</td>
</tr>
<tr>
<td>Comcast (Fiber Optic)</td>
<td>Warren Fyffe</td>
<td>817-557-8296</td>
</tr>
<tr>
<td>Grande (Fiber Optic)</td>
<td>Greg Pepper</td>
<td>512-220-3269</td>
</tr>
<tr>
<td>Oncor (Electric)</td>
<td>Steve Walker</td>
<td>972-699-2920</td>
</tr>
<tr>
<td>TXU Electric/Oncor Group (Electric Transmission)</td>
<td>Allan Keller/Tod Whiteley</td>
<td>817-215-6165</td>
</tr>
</tbody>
</table>

Bench marks and horizontal control points shown on Plans will be verified by the Construction Manager forces prior to the beginning of construction.

The construction, operation and maintenance of this proposed project will be consistent with the State Implementation Plan as prepared by the Texas Commission on Environmental Quality.

The Contractor shall be responsible for maintaining an accurate vertical and horizontal control throughout the term of the contract. The Contractor shall furnish the Engineer the surface coordinates and the elevation of set monuments and an azimuth from the monument to some prominent physical feature, preferably another survey monument on the project. This work will not be paid for directly but shall be considered subsidiary to the bid items provided.

The Contractor acknowledges that the use of the phrase "subsidiary to the bid items" and similar phrases elsewhere in this contract signify that the work, materials and/or equipment described in connection with the referenced item or items shall not be separately compensated by the Authority, but shall be deemed to be included in the bidder's proposal for that item.

If at any time during the construction of this project the Contractor falls more than 30 days behind his schedule submitted under provisions of article 8.2, he shall furnish the Engineer with an updated realistic construction schedule.

Existing roads within the limits of the project, which are to remain open temporarily or permanently for the purpose of handling traffic through the project, will be maintained by the Contractor in a manner that is acceptable to the Engineer. This work will not be paid for directly, but shall be considered subsidiary to the various bid items.

Erection of poles, luminaries and structures located near any overhead or underground...
utilities shall be accomplished using established industry and utility safety practices. The Contractor shall consult with the appropriate utility company prior to beginning such work.

The Contractor shall make every effort to preserve existing trees designated by the Engineer to remain following construction. The Contractor is requested to follow the Texas Department of Transportation's pruning guidelines and observe recognized tree surgery practices. Additionally, care shall be taken to minimize disruption or damage to the root system of designated trees.

The Contractor is responsible for stabilizing all unpaved disturbed areas of the project with a minimum 100% density of vegetative cover. This is to be accomplished utilizing the items in this contract prior to final acceptance.

The following standard detail sheets have been modified:
1. RW (MSE) (MOD)
2. MH-M(MOD)
3. SCP-5 (MOD)
4. SCP-6 (MOD)
5. SCP-8 (MOD)
6. SCP-10 (MOD)
7. SEJ-A (MOD)

Plywood will not be allowed as a material for permanent sign installations along the project.

Subsurface boring information is provided in the plans and it is solely for use in establishing design controls for the project. The accuracy of this information is not guaranteed. It is the bidder's responsibility to inquire as to whether additional information is required. Each bidder is responsible for making its own determinations as to all subsurface conditions and limits.

A Geotechnical Investigation Report No. EO3-0710-R4, dated June 10, 2004, has been prepared by Mas-Tek Engineering & Associates, Inc., a sub-consultant of Chiang Patel & Yerby, Inc., a consultant of the North Texas Tollway Authority, providing additional information on geotechnical data is available for review and make copies, upon request, at the Engineer's office located at North Texas Tollway Authority, 5900 West Plano Parkway, Suite 100, Plano TX 75093.

The Contractor is advised that hauling and travel of its materials, equipment and personnel through the adjacent sections of the Tollway outside the limits of this contract may be restricted by construction activities and/or detours being performed or effectuated by others.

If sweeping, planning or other cleanup operations result in dust becoming an environmental problem, the Engineer may require the Contractor to use vacuum type sweeper equipment to replace conventional sweepers.

The Contractor shall not allow litter, debris, excess materials, and other discarded materials to be dumped or stockpiled within the right-of-way area.

The Contractor shall be required to pay for all necessary electrical installations, and energy consumed until project acceptance. These charges will not be paid for directly, but shall be considered subsidiary to various bid items.

Prior to acceptance of the completed project by the Authority, the Engineer will inspect the project for adherence to the following requirements:
- No edge drop-offs from shoulder to ground greater than two (2) inches;
- No vegetation is allowed in pavement, structure, and shoulder joints;
- Cross road and side road drainage structures shall be maintained with a maximum of 1/5 of the cross sectional area silted;
- All culverts, pipes, channels, inlets, storm drain systems, ditches, etc. and their appurtenances shall be clear and functioning and free of debris.
- All unpaved areas shall be covered with 100% density of established vegetative cover.

Any corrective work necessary to bring the project in full conformance to these requirements will be done at no additional cost to the Authority.

The Contractor shall call 1-800-DIG-TESS before commencing construction.

SPECIFIC ITEMS IN THE STANDARD SPECIFICATIONS AND/OR SPECIAL SPECIFICATIONS THAT ARE HEREBY MODIFIED OR SUPPLEMENTED BY THESE GENERAL NOTES AND SPECIFICATION DATA ARE AS FOLLOWS:

ITEM 100
All existing roadway signs, if there is any, to be removed and/or reset, will be removed and stored properly by the Contractor during construction, or as directed by the Engineer.

The limits of preparing right-of-way will be measured from Sta. 1128+25 to Sta. 1224+00 along the centerline of the Tollway.

All mailboxes within the proposed construction shall be removed and reset by the Contractor. This work will not be paid for directly, but shall be considered subsidiary to this Item.

ITEMS 100 AND 104
Payment for removal of all areas of existing concrete (curbs, sidewalks, driveways, parking areas, foundations, etc.), within the right-of-way limits that are not included on the "Removal Item" sheets but are directed to be removed by the Engineer, shall be subsidiary to Item 100, "Preparing Right-Of-Way".

*Remov Conc (Curb or C&G)* will be paid for along existing concrete roadways only. All other curb and gutter removal will be considered as subsidiary to Item 100, "Preparing Right-Of-Way".
approved sources outside the project site secured by the Contractor. Fertile soil obtained from on-site sources may be stockpiled within the project site at approved locations or placed directly in its final position where areas are ready for its placement. The cost for furnishing, salvaging, hauling, stockpiling, and placing of the fertile soil shall be considered subsidiary to these items.

When the top of the pavement subgrade lies with the limestone formation for the mainlanes or ramps and the Contractor can establish a uniform solid surface of rock at the top of subgrade, undercutting the top of the subgrade to provide the 8-inch base of Type C embankment (crushed limestone) may be omitted with the approval of the Engineer. Excavation and embankment quantities will be reduced accordingly.

ITEM 132

The embankment material shall consist of suitable earth material such as loam, clay or other materials that will form a stable embankment and be free from vegetation or other objectionable matter and, when tested by Texas Department of Transportation methods, shall meet the soil constant requirements shown in Table "Specification Data Test To Be In Accordance With Texas Department of Transportation Standard Test Methods" of the General Notes and Specification Data in its natural state or after the addition of lime. The amount of lime to be added will be equal to the quantity shown in test method TEX-121-E, figure I, page 5. Lime shall be placed by the "Sturly Placing" method. Furnishing, application, and mixing of lime will not be paid for directly but will be considered subsidiary to this item.

For this project, the Type C embankment shall be tan weathered or gray crushed limestone available from excavation sources approved by the Engineer within the project limits. Removal of all other structures encountered shall be included under Item 100, "Preparing Right-of-Way".

Suitable excess excavation within the construction project limits, shall be salvaged as requested by the Engineer, shall be placed in areas where directed by the Engineer. All suitable excess material shall meet the requirements as specified in Item 132, "Embankment". The materials, equipment, and labor for this work shall not be paid for separately but shall be considered subsidiary to these items.

Suitable excess excavation within the construction project limits, that shall be salvaged as requested by the Engineer, shall be placed in areas where directed by the Engineer. All suitable excess material shall meet the requirements as specified in Item 132, "Embankment". The materials, equipment, and labor for this work shall not be paid for separately but shall be considered subsidiary to these items.

The top four inches (4") of the completed cross-section shall consist of fertile soil capable of supporting the growth of planting, seeding, or sodding. The fertile soil consisting of loam or clay from not more than 12 inches (12") below natural ground, free from objectionable material and with relatively high erosion resistance, may be obtained from the sites of proposed embankment or excavation within the project right of way or from approved sources outside the project site secured by the Contractor. Fertile soil obtained from on-site sources may be stockpiled within the project site at approved locations or placed directly in its final position where areas are ready for its placement. The cost for furnishing, salvaging, hauling, stockpiling, and placing of the fertile soil shall be considered subsidiary to these items.

When the top of the pavement subgrade lies with the limestone formation for the mainlanes or ramps and the Contractor can establish a uniform solid surface of rock at the top of subgrade, undercutting the top of the subgrade to provide the 8-inch base of Type C embankment (crushed limestone) may be omitted with the approval of the Engineer. Excavation and embankment quantities will be reduced accordingly.

ITEM 132

The embankment material shall consist of suitable earth material such as loam, clay or other materials that will form a stable embankment and be free from vegetation or other objectionable matter and, when tested by Texas Department of Transportation methods, shall meet the soil constant requirements shown in Table "Specification Data Test To Be In Accordance With Texas Department of Transportation Standard Test Methods" of the General Notes and Specification Data in its natural state or after the addition of lime. The amount of lime to be added will be equal to the quantity shown in test method TEX-121-E, figure I, page 5. Lime shall be placed by the "Sturly Placing" method. Furnishing, application, and mixing of lime will not be paid for directly but will be considered subsidiary to this item.

For this project, the Type C embankment shall be tan weathered or gray crushed limestone available from excavation sources approved by the Engineer within the project limits. The limestone shall be crushed on-site to a maximum size of 6 inches, and placed in the embankment in lifts of 8” maximum loose thickness and compacted at or above optimum moisture content to not less than 95% density determined in accordance with test method TEX-113-E. All lifts shall be visibly inspected by the Engineer to determine that they are uniformly and consistently well graded prior to acceptance.

When the moisture content of the embankment exceeds the specified optimum content, as determined by the Engineer, it shall be aerated bydisking, harrowing, blading or other means satisfactory to the Engineer to reduce the moisture content to the optimum condition before rolling commences. The Contractor will not be permitted to aerate wet material with compaction equipment such as sheepsfoot rollers or other devices that tend to over-compact the previous layer of material. Such aeration will be considered as subsidiary to this item and will not be paid for directly.

Unless otherwise specified, no rock or other materials used in Type B Embankment shall be over 9 inches (9") in its greatest dimension. All oversized rock which is suitable for construction shall be broken to the required dimensions and utilized in embankment construction where proposed by the plans. Excess excavated rock not broken down or rock that cannot be broken down to the required size shall be considered waste, and shall become the property of the Contractor to be properly disposed of by the Contractor at his own expense, at off-site locations.
Unless approved by the Engineer, stones and rocks in the upper or final layer of the embankment shall be broken down to smaller than 4 inches (4") in their greatest dimension. The density and uniformity of the surface layer shall meet the requirements of the "Density Control" method specified in the Compaction Methods of this item.

In areas to receive less than 8 feet of embankment (measured from top of pavement), the Contractor shall first scarify and compact the upper 8 inches of the existing soil at +1% to +4% above optimum moisture content to not less than 95% nor more than 98% TEX-114E density. The Engineer may waive this requirement if stable rock material exists. This work will be subsidiary to this item.

Embankments constructed below retaining walls shall be constructed in lifts not to exceed 12 inches (12") loose and 8 inches (8") compacted depth. Each lift shall be compacted to no less than 98% density as determined by test method TEX-114-E. These requirements shall apply to the area from ten feet (10') in front of the face of the wall to twenty feet (20') behind the face of the wall.

Type B embankment operations shall comply with the following for the purposes of limiting desiccation:

- Embankments must be constructed concurrently with MSE walls when the adjacent Type B material has a PI over 24.
- The final 5 feet of completed Type B embankment material shall have layers placed with not more than 4 days of dry weather between successive lifts. Regardless, all materials shall be maintained at the specified moisture content prior to placement of the proceeding lift.
- Utility trenches under paved areas shall not remain open for more than 36 hours of dry weather.
- Specified moisture content in the completed embankments shall be maintained until asphaltic concrete Type B (Base) is complete. The Contractor may use continuous routine watering or emulsion seal to maintain moisture but no separate payment will be made.

Additional fill material has been placed by others in the mainlane embankment zone south of Gaylord Parkway. The additional fill was placed as a controlled fill and will be left-in-place except as may be required for the construction of Culvert C1.

ITEM 162

Bermudagrass block sod shall be used as permanent erosion control for this project. Permanent sodding shall be placed on all un-surfaced disturbed areas within the limits of the right-of-way, as directed by the Engineer.

The areas to be sodded shall present a firm, smooth, uniform surface true to line and cross section, free of rocks (greater than 1 ½" in any dimension), weeds and debris. Any fine grading, raking and rolling required to accomplish this shall be done immediately prior to the placing of the sod at no additional cost. Apply herbicide to eradicate all existing weeds and grasses that may be present in the areas to be sodded. Allow adequate time for herbicide to take effect. The cost of herbicide work shall be subsidiary to the cost for sodding. Live, growing, nursery cultivated Texas common Bermudagrass sod, secured from sources approved by the Engineer, shall be used in this project. Sod shall be healthy, free of diseases, nematodes, and soil borne insects, and shall have a virile root system of dense, thickly matted roots throughout the soil of the sod for a minimum thickness of one inch (1”). Sod shall be uniform in color, leaf, texture, and density and shall be free of noxious, grassy or broadleaf weeds, undesirable grasses, stones, roots, thatch, and other extraneous material, which would be deleterious to its growth or which might affect its subsistence or hardiness when transplanted. Sod shall be viable and capable of growth and development when planted.

The furnished sod shall be installed within 24-hours of delivery to site and within 48-hours of harvest. Do not harvest or transport sod when the moisture content or air temperature may adversely affect sod survival. The Contractor shall protect the sod from sun, wind, and dehydration prior to installation. Sod shall be transported and installed without breaking, tearing, or loss of soil.

All sod planting shall be done between March 1 and October 1, or as otherwise directed by the Engineer.

The Contractor can substitute roll sod for block sod as approved by the Engineer.

Block sod shall be laid in rows with tightly fitted joints, butt ends and sides of sod strips. Cracks are prohibited between sod pieces. Do not overlap edges. Stagger strips to offset joints in adjacent courses. The first row of sod shall be installed at the toe of slope, parallel to the direction of the sloped area and additional rows parallel to the previously installed row shall be placed as indicated on the plans or as directed by the Engineer. All sod shall be tamped or rolled after placing to close the seams between the sod pieces and to press the sod tight to against the ground with a roller designed for landscape use. When placing sod in drainage ditches, the length of the strip shall be laid parallel to the direction of the flow of the water. Each strip or section of sod placed in drainage swales, steep slopes and other areas subject to movement shall be staked securely with pegs driven flush with the top of the sod. Pegs shall be spaced adequately to protect sod from movement. Any slipping of sod shall be corrected by the Contractor at no additional cost.

Each section of sod shall be thoroughly watered immediately after the sod is placed and shall wet the soil to a depth of 3 inches below the sod. The Contractor shall constantly monitor the water needs of the sod to maintain adequate moisture to ensure proper growth and establishment of the sod. Watering of sod shall be in accordance with Item 168.

Successful establishment of sodded grasses will be determined by inspection of all sodded areas prior to project acceptance. Sodded areas shall be mowed no more than two days in advance of the inspection or as directed by the Engineer. Sodded grass shall be thriving and show evidence of healthy growth in all sodded areas with no dead spots. Areas found unacceptable by the Engineer shall be resodded by the Contractor within 48
hours of discovery at no additional cost. Areas requiring repairs shall be resodded, watered until established and maintained, until accepted by the Engineer. The cost for vegetative watering, beyond the estimated quantity, which is required because of the need to resod shall be paid for by the Contractor. Sodded grass shall be maintained to allow it to be virtually weed free at time of acceptance (no more than 1 weed or undesirable grass per 400 square feet). The cost to maintain the sod in a virtually weed free condition shall be subsidiary to the cost for sodding.

ITEM 164

Drill seeding shall be used as temporary erosion control in this project. Drill seeding shall be placed on all un-surfaced disturbed areas within the limits of the right-of-way, as directed by the Engineer. Prepare soil with fertilizer prior to seeding in accordance with Item 166.

The areas to be seeded shall present a firm, smooth, uniform surface true to line and cross section, free of rocks (greater than 1 ½” in any dimension), weeds and debris. Any fine grading, raking and rolling required to accomplish this shall be done immediately prior to the placing of the seed at no additional cost. Apply herbicide to eradicate all existing weeds and grasses that may be present in the areas to be seeded. Allow adequate time for herbicide to take effect. The cost of herbicide work shall be subsidiary to the cost for seeding.

The Contractor will be required to arrange his seeding operation after the completion of each construction stage dependent upon the planting date requirements stipulated by this item. No additional compensation will be granted to the Contractor for the additional move-ins.

The seed mixtures used in drill seeding for erosion control shall conform to the following requirements:

<table>
<thead>
<tr>
<th>Seeding period</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 1 thru August 15</td>
<td>30 lbs. PLS /Acre Foxtail Millet</td>
</tr>
<tr>
<td>August 16 thru November 30</td>
<td>30 lbs. PLS /Acre Wheat (Red)(Triticum Aestivum)</td>
</tr>
</tbody>
</table>

All seeding shall be accomplished by use of equipment with multiple seeder bins for specific seed types and culti-packer rollers for shallow seed placement with tight rows.

Mulch shall be spread uniformly over the seeded areas at the rate of approximately 1.5 to 2.0 tons of hay mulch or 2.0 to 2.5 tons of straw mulch per acre after each drill seeding operation. The cost of mulch shall be subsidiary to the cost of drill seed.

Seedlings shall show evidence of healthy growth on all areas seeded. Any seeding areas that do not take root and grow shall be re-seeded at 10-day intervals until, as approved by the Engineer, a solid stand of the target vegetation is established. No additional payment shall be made for reseeding, which shall be considered subsidiary to this item. The cost for vegetative watering beyond the estimated quantity which is required because of the need to reseed shall be paid for by the Contractor.

ITEM 166

Fertilizer shall be applied in accordance with Item 166. Fertilizer shall be applied at the approved rate prior to incorporating compost into topsoil. Refer to Item 1058.

ITEM 168

Watering applications shall constantly maintain the seedbed or sod in a condition favorable for the growth of grass. Watering can be postponed immediately after a rainfall on the site of one-half inch (½”) or greater, but shall be resumed before the soil dries out and as directed by the Engineer. Watering shall continue until the Engineer accepts the grass or the Engineer directs the watering to be suspended.

Vegetative watering shall begin immediately following application of all seed or sod and shall continue for a minimum period as shown in the following table or as directed by the Engineer. The rate of water shall be applied in multiple applications during the week, however many is necessary to maintain conditions favorable for the growth of grass and its establishment. The watering rate or duration shall not be exceeded without approval by the Engineer.

<table>
<thead>
<tr>
<th>Month</th>
<th>Rate</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>March thru May, and October</td>
<td>28,000 gal/ac/wk (1”)</td>
<td>6 weeks minimum</td>
</tr>
<tr>
<td>June thru September</td>
<td>42,500 gal/ac/wk (1 1/2”)</td>
<td>6 weeks minimum</td>
</tr>
<tr>
<td>November thru February</td>
<td>7,000 gal/ac/wk (1/4”)</td>
<td>4 weeks minimum</td>
</tr>
</tbody>
</table>

If the Contractor proposes to use water from the nearby existing river (or lake) for irrigation purposes, he will be responsible for obtaining all required permits and/or permissions from the organization owning water rights, and the U.S. Army Corps of Engineers.

The Contractor shall provide bored conduits in all locations where water piping must cross under paved areas. The bored conduits shall be of sufficient strength to withstand the load of existing material and traffic and shall be installed using materials and methods acceptable to the approving authority having jurisdiction for the paving structure being crossed. The cost to provide and abandon bored conduits for temporary irrigation shall be subsidiary to the unit cost for Vegetative Watering.
When watering operations have been completed, the Contractor shall abandon bored conduits in a manner acceptable to the approving authority. When directed, the Contractor shall fill the conduits with grout, cap and abandon in place. Grout shall be in accordance with Item 421, “Portland Cement Concrete.” Upon acceptance of the grass, all other irrigation components shall be removed from the project and remain the property of the Contractor.

When water is supplied from non-municipal sources such as wells or surface impoundments, the Contractor shall provide an accurate meter acceptable to the Engineer.

WATERING OF SEEDING FOR TEMPORARY EROSION CONTROL:

Prior to beginning any lime treatment, the roadbed shall be constructed and shaped to conform to the typical sections, lines, and grades shown on the plans or established by the Engineer, and rolled to ensure stability of the secondary subgrade (proposed bottom of lime treatment) to the satisfaction of the Engineer. Any wet or unstable materials at or below the secondary subgrade shall be corrected, as directed by the Engineer, by scarifying, adding lime, and compacting, or by other methods until satisfactory stability is obtained.

The Contractor shall use a cutting and pulverizing machine that will pulverize the subgrade material accurately within a tolerance of not less than one-half inch (1/2") nor more than one inch (1") greater than the depth specified on the plans.

ITEMS 260 AND 340

Patchings of subgrade sections will not be allowed, but shall be filled with extra depth asphaltic concrete pavement or be reworked completely by scarifying, adding material, applying lime slurry and recompacting. No additional compensation will be made for the work required to rework a section of subgrade.

All mixtures shall be evaluated for susceptibility to moisture.

When lime is used as an antistripping agent, all moisture susceptibility testing requirements for mixture design will be waived. Production testing, when required by the Engineer, will remain in effect. Test method TEX-530-C shall be the evaluation procedure during production. The produced mixture shall not strip more than five (5) percent.

When liquid antistripping agent is used, test method TEX-531-C will be the evaluation procedure during mixture design. The produced mixture shall not strip more than the percentage established during mixture design correlation testing with test method TEX-530-C. Effectiveness of the antistripping agent will be evaluated according to Item 4.2.18 of the General Notes and Specification Data.
GENERAL NOTES AND SPECIFICATION DATA (Continue)

ITEM 314
The emulsified asphalt material shall be blended in the ratio of 20% emulsion to 80% water, well mixed in a calibrated, self-propelled sprinkler and applied to the various base materials at a rate as shown in the "Basis of Estimate for Permanent Construction" of the General Notes and Specification Data. The rate of application may be varied as instructed by the Engineer, depending on the degree of absorption of the emulsified asphalt mixture by the particular base material being treated. Additional applications of emulsified asphalt may be required, if requested by the Engineer, to achieve an effective seal of the various base materials.

Emulsified asphalt shall be applied to the various base materials at a rate of 0.1 to 0.25 gallon per square yard. Emulsified asphalt treatment will be measured at the point of delivery on the road, which volume shall include emulsified asphalt and water, at whatever ratio and amounts in which they are blended at the time of measurement.

ITEM 340
Use of Reclaimed Asphalt Pavement (RAP) will not be allowed on this project. All references to the use of RAP in the Standard Specifications will be disregarded. Surface test Type A shall be used on the finished surface of the pavement in accordance with Special Specification, "Ride Quality for Pavement Surfaces".

The type of performance grade binder shall be PG 64-22 for base material and PG76-22 for surface material.

Laydown operations for hot mix asphaltic concrete shall be performed in such sequence that the center joint will be carried along without excess distance of uneven surface (lapback), not to exceed one day’s operation.

Ride quality will not be required for base courses that are under concrete pavement.

ITEM 360
In narrow (nine feet (9') or less) and/or non-uniform width concrete pavement sections where hand finishing is permitted by the plans and specifications, and with the specific approval of the Engineer, an approved power screed, supplemented by hand vibrators as specified, may be used in lieu of the finishing methods required herein.

The slipform paver shall be equipped with automatic vertical grade and transverse slope control mechanisms. The automatic grade control equipment shall include a pavement joint matching shoe and a 30-foot, three-piece, two-joint, continuous grade contact traveling stringline. The standard operating weight of the machine, with mold, shall be not less than 50,000 lbs. for lane placement wider than nine feet (9').

The slipform paver shall be operated under automatic horizontal control following a preset longitudinal alignment stringline, automatic vertical grade control, and automatic slope control. The automatic vertical grade control shall be controlled by the traveling stringline or the pavement joint matching shoe specified herein. Unusual pavement grade warps may require different controls, as directed by the Engineer.

In placing the first longitudinal pavement slab run, the automatic grade control shall be controlled by the traveling stringline attached to one side of the slipform paver with automatic slope control run transversely to the opposite side of the slab at the design slope specified. On abutting longitudinal slabs, the automatic grade control shall be controlled by the pavement joint shoe riding the previously poured slab surface and the automatic slop control will be set to run transversely to the opposite side.

Use of a self-propelled concrete spreader to place concrete ahead of the slipform paver is required for all lane placements wider than nine feet (9').

The Contractor shall furnish, operate, and maintain at least one steel, magnesium, or aluminum 16-foot straightedge, with 2" by 4" dimensions.

The Contractor shall furnish, operate, and maintain at least one steel, magnesium, or aluminum 16-foot straightedge, with 2" by 4" dimensions.

The Contractor shall furnish drawings or samples of the joint assemblies proposed for use for examination and approval by the Engineer. Joint assembly locations shall be clearly and semi-permanently marked on the finished surface of the pavement in accordance with Special Specification, "Ride Quality for Pavement Surfaces".

Calcium chloride will not be permitted and accelerating admixtures will not be used.

All poorly aligned joint assemblies shall be corrected even if it is necessary to stop paving operations. Warped or defective joint assemblies shall be removed from the job. Prior to the placement of any concrete pavement, the Contractor shall furnish drawings or samples of the joint assemblies proposed for use for examination and approval by the Engineer. Joint assembly locations shall be clearly and semi-permanently marked on the finished surface of the pavement. ITEM 360

approved of the Engineer, an approved power screed, supplemented by hand vibrators as specified, may be used in lieu of the finishing methods required herein.
outside of the forms or the edge of pavement to ensure correct placing of the joint assemblies and correct location of the sawed joint.

After finishing is complete and the concrete still workable, the pavement surface shall be tested for trueness with the approved 10-foot (10') and 16-foot (16') straightedges. The Contractor shall provide mobile bridges from which the Contractor and Authority personnel may operate the straightedges and/or observe and correct the trueness of the roadway surface.

Threaded connector tiebars shall be chaired and/or tied to the pavement reinforcing steel.

The pavement widening joint, as detailed in the plans, is to be used at all locations where concrete pavement is to be placed adjacent to existing concrete pavement. Payment for installation of these joints will not be made directly, but will be considered subsidiary to this item.

Construction, sawed, and contraction joints shall be placed in accordance with the pavement detail sheet and as directed by the Engineer. Joint locations, other than as shown on the plans, shall be subject to approval of the Engineer.

The Contractor will be allowed to use a dowel inserter of a design that has been proven effective and performs in a manner acceptable to the Engineer. The Contractor, if he elects to use such a dowel inserter, will provide a device to measure the depth of the inserted dowel in place.

Pavement leaveouts will be required on this project as necessary to provide for traffic at driveways and side streets as shown in the plans or as directed by the Engineer. The cost of providing these leaveouts, including the construction of a suitable crossover connection at each site, will not be paid for directly but shall be considered subsidiary to this item.

Tie bars used in longitudinal joints shall not be placed within 15 inches (15") of transverse joints.

The Contractor shall saw transverse joints across pavement through curbs. Except where noted in the plans, all curbs shall be constructed monolithically with the concrete pavement. If continuous monolithic curb has to be temporarily omitted for any reason, the proposed curbs will be dowelled. The Contractor will be required to dowel the proposed curbs with ½" x 9" dowels on 12" centers and one number 4 bar shall be placed in the curb and tied or welded to the dowel bars. An approved epoxy resin shall be applied to the pavement to receive the curb as directed the Engineer. The cost of work and materials will be subsidiary to this item.

Curb placed in conjunction with roadway pavement, whether monolithic or dowelled, shall have sawed and/or formed joints to match those provided for the pavement.

The dowelled curb shall have grooved joints placed at 10-foot (10') intervals and three-quarter inch (¾") expansion joint material provided at the same locations as on the existing pavement.

The installation of curb openings shall not be paid for directly, but shall be considered subsidiary to this item.

Joints in curb and gutter sections shall be sawed at the same location as on existing pavement.

Curb transitions will be paid for as the type of adjoining curb of the highest dimension. All extra labor and materials necessary to complete these transitions will not be paid for directly but will be considered subsidiary to this item.

**ITEM 360 AND 421**

The coarse aggregate from each source must comply with the specified quality tests.

**ITEM 400**

Bedding shall be in accordance with Class B granular foundation, bedding unless otherwise shown on the plans. Fine/granular material shall consist of sand, silty or clayey sands, fine rock cuttings, or crushed gravel. Maximum size shall be 2 inches (2") with 90% passing a #4 sieve and no more than 25% passing a #200 sieve. Shaped subgrade options are not allowed.

Concrete sewer pipe placed on slopes of greater than ten percent (10%) shall be bedded and backfilled with cement-stabilized backfill to a depth shown on the plans. The mix shall conform to Item 400.6, "Cement Stabilized Backfill". The aggregate shall conform to the requirements of Item 421.2 (5), "Portland Cement Concrete".

Backfill compaction shall meet the requirements of "Density Control" as specified in Item 132, "Embankment".

Cutting and restoring pavement shall be similar and consistent with existing adjacent pavement as directed by the Engineer.

**ITEM 403**

The Contractor may elect to remove all, or a portion of, the temporary shoring material or leave such entirely in place. The removal shall be effected in such a manner as not to disturb the retained soil or adjacent structures. Any portion of the temporary shoring left in place shall be removed to minimum depth of one (1) foot below the finished subgrade to two (2) feet below finished ground.

**ITEM 416**
Where the plans designate a penetration depth for shafts into the design foundation material, the portion of the shaft within the foundation material shall not be cased. Any required casing shall be set into the foundation material only to such a depth as is necessary to prevent caving and effect a seal against water entering the excavation, and the shaft then be drilled into the foundation material to a depth below the bottom of the casing, as set, equal to the specified penetration depth.

Unless otherwise specified on the plans, the exposed portion of all drilled shaft foundations for signs, signals, and lights shall be formed to provide a smooth finish satisfactory to the Engineer.

A minimum of one core per bent will be required, regardless of placement method.

**ITEMS 416 AND 420**

Columns shall be formed to a point one foot (1') below the future or existing bottom of channel elevation indicated on the bridge layouts by a method acceptable to the Engineer. No additional payment will be made for forming columns below the existing or future ground line as this work will be considered subsidiary to this item.

**ITEM 420**

Accelerating admixtures will not be permitted.

**INTERIM MEMBRANE CURING**

Bearing seat build-ups or pedestals for concrete units as shown in Item 420.18, "Treatment and Finishing of Horizontal Surfaces Except Roadway Slabs", shall be cast integrally with the cap.

Wet mat curing facilities for top surfaces of bridge slabs shall remain in place for a period of sixteen (16) days for any slabs placed between May 1 and October 1 unless otherwise specifically directed by the Engineer.

Bridge slabs shall be cured by the "Wet Mat Method". If forms are removed from concrete columns, cap beams, abutments, or walls before curing is complete, these structure units shall be cured by cotton mats and be kept continuously wet for the remainder of the curing period.

Concrete structures (Bent) shall be paid for as "plans quantity" item.

**ITEMS 420 AND 422**

After finishing is complete and the concrete still workable, the slab surface shall be tested for trueness with approved 10-foot and 16-foot steel straightedges. The straightedge shall be operated from the side of the bridge, placed parallel to the bridge centerline and passed across the slab to reveal any high spots or depressions. The straightedge shall be advanced along the bridge slab in successive stages of not more than one-half its length. Uniform contact of the straightedge with the surface will be required and the slab shall be leveled to this condition, in order to ensure conformity with the surface test required below, after the slab has fully hardened. All high spots shall be removed and all depressions over one-sixteenth (1/16) inch in depth shall be filled with fresh concrete and floated. The checking and floating shall be continued until the surface is true to grade and free of depressions, high spots, voids, or rough spots. The Contractor shall provide mobile bridges from which the Contractor and Authority personnel may operate the straightedges and/or observe and correct the trueness of the bridge slab surface.

**ITEM 421**

The Contractor shall use a high range water reducer (superplasticizer) in all concrete for thin wall sections and form liner applications, where concrete vibration and consolidation could be difficult, as directed by the Engineer.

Fly ash will not be permitted in concrete containing high range water reducer (superplasticizer).

Independent engineering testing laboratories, under separate contract with the Authority, will provide all personnel and sampling equipment, take all samples and specimens, and deliver all samples and specimens to the laboratories for testing.

Concrete for bridge slabs and slabs of direct traffic box culverts shall be Class S concrete and shall contain a "high range water reducing admixture (superplasticizer)".

Type II cement will be required in Class ‘S’ and ‘C’ concrete.

**ITEMS 421 AND 437**

The use of the superplasticizer, alone or in combination with a water-reducing/retarding admixture, shall be such as to reduce the water-cement ratio to a maximum of 4.25 gal/sack. The superplasticizer shall be either a sulphonated melamine/formaldehyde condensate or a sulphonated naphthalene/formaldehyde condensate. The superplasticizer shall be free of chlorides. The addition of the superplasticizer to the concrete mix shall be metered to assure proper dosage, either at the plant or in the truck.

The Contractor will be required to run trial batches prior to construction to determine the proper dosage of the superplasticizer and/or the water-reducing/retarding admixture. A slump-loss curve acceptable to the Contractor as well as other test results shall be submitted to the Engineer for approval. The Engineer and/or the testing laboratory shall witness the trial batches.

Redosing at the job site will not be permitted without prior approval of the Engineer. This approval will be at the job site on a case-by-case basis.

**ITEM 423**
Drilled shafts, of the length specified in the plans for all types of retaining walls, will not be measured separately for payment.

Refer to attached list of approved Mechanically Stabilized Earth (MSE) wall systems on this project.

<table>
<thead>
<tr>
<th>Wall Type</th>
<th>Company</th>
<th>Address</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reinforced Earth Walls</td>
<td>Reinforced Earth Company</td>
<td>1331 Airport Freeway, Suite 302</td>
<td>(817) 267-1755</td>
</tr>
<tr>
<td>Retained Earth Walls</td>
<td>Foster Geotechnical</td>
<td>125 Windsor Dr., Ste 122 Oak Brook, IL 60523</td>
<td>(630) 954-1450</td>
</tr>
<tr>
<td>Strengthened Earth Walls</td>
<td>Building Materials-Amer</td>
<td>3500 Maple Ave. Dallas, Texas 75219</td>
<td>(214) 525-5677</td>
</tr>
<tr>
<td>Reinforced Soil Embankment Walls</td>
<td>Texas Welded Wire, Inc.</td>
<td>645 W. Hurst Blvd. Dallas, Texas 76053-7603</td>
<td>(817) 282-4506</td>
</tr>
<tr>
<td>Tricon Retained Soil Walls</td>
<td>Tricon Precast, Inc</td>
<td>15055 Henry Road Houston, Texas 77080</td>
<td>(281) 931-9832</td>
</tr>
<tr>
<td>Tensar Retaining Wall System</td>
<td>Tensar Earth Technology</td>
<td>5883 Glenridge Drive, Ste 200 Atlanta, Georgia 30328</td>
<td>(404) 250-1290</td>
</tr>
<tr>
<td>Strengthened Soil Walls</td>
<td>Shaw Technologies Inc</td>
<td>2625 Spinks Rd Flower Mound, TX 75022-4336</td>
<td>(972) 874-2758</td>
</tr>
<tr>
<td>VP Wall System</td>
<td>Valley Prestressed Products, Inc.</td>
<td>2 N. Abram Rd Mission, Texas 78572</td>
<td>(956) 584-5701</td>
</tr>
<tr>
<td>MSE Plus</td>
<td>Ssl Retaining Walls</td>
<td>4740 Scotts Valley Dr, Ste E Scotts Valley, California 95066-4240</td>
<td>(831) 430-9300</td>
</tr>
</tbody>
</table>

The Contractor has the option of constructing any of the types of retaining walls for which details and specifications are included in the plans. However, whichever option or options is chosen, the facia pattern must be the same throughout the entire project and must be in conformance with the details shown on the plans, including cast in place full height retaining type abutments.

Ensure that panels have connectors and soil reinforcement panels with appropriate embedment length.

Allow no gaps between the wall panels such that the filter fabric can be seen.

Cement stabilized backfill will not be permitted for retaining walls in this project.

All damage, such as chips, to the precast units must be repatched at the Contractor’s expense and match the facia pattern.

The subgrade for MSE walls shall be excavated to the planned grade in cut areas. The subgrade shall be stripped of surface vegetation, topsoil, and any other deleterious materials in the planned fill areas and then proof rolled with a heavy (25 ton or greater total weight) rubber-tired piece of construction equipment, such as a loaded tandem-axle dump truck. Weak or pumping subgrade soils shall be removed to a very stiff subgrade, as directed by the Engineer. Following proof rolling operations, the subgrade shall be scarified to a minimum depth of 8 inches (8”) and re-compacted to at least 98 percent (98%) of the maximum density determined by TxDOT test method TEX-113-E at moisture content between –2 and +3 percentage points of the optimum moisture content.

After completion of the subgrade preparation operations, undercut areas requiring fill shall be raised to the planned finish grades. The fill shall be placed in uniform, horizontal lifts of 8 inches and compacted to at least 98 percent of the TxDOT test method TEX-113-E maximum dry density at moisture content between –2 and +3 percentage points of the optimum moisture content. The compacted fill shall have an unconfined compressive strength of at least 3,500 psf and a PI no greater than 50. The unconfined compressive strength of the compacted fill shall be checked by performing laboratory compressive strength tests on the material used as fill beneath the MSE walls.

For MSE retaining walls NOT subject to inundation:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Inches</td>
<td>100%</td>
</tr>
<tr>
<td>½ Inch</td>
<td>0-50%</td>
</tr>
<tr>
<td>No. 40</td>
<td>0-10%</td>
</tr>
</tbody>
</table>

For MSE retaining walls subject to periodic inundation:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Inches</td>
<td>100%</td>
</tr>
<tr>
<td>3/8 Inch</td>
<td>0-15%</td>
</tr>
</tbody>
</table>

Particles larger than ¼ inch shall be angular or crushed. Rounded rock or gravel will not be allowed.

Sulfate resistant concrete mix design for soil nail walls:

- Type I/II cement with a minimum of 20% to 25% type F fly ash shall be used for the grout in the soil nail anchors, and for the shotcrete on the soil nail walls. Strength of concrete for the grout and shotcrete shall be verified by mix design.

**ITEMS 423 AND 556**

For this Project, Types 1, 2, 4, 6, and 7 underdrain pipe will not be permitted. Type 5 underdrain pipe will not be permitted for retaining walls.

All labor, equipment, materials and incidentals for pipe underdrains, connections to other...
drainage systems closed or open, filter material, and granular material used in conjunction with retaining walls will not be paid separately but what shall be considered subsidiary to Item 423, "Retaining Wall".

The filter material intended for use with the retaining wall shall conform to the requirements of Item 421, Table 1, Grades 3, 6, or 7 aggregate.

The material for Type 10 underdrain pipe shall conform to the specifications used for perforated pipe.

ITEM 424

When special surface finishes are required by the plans, general notes, and/or specifications, form liners or other means shall be utilized in accordance with ITEM 427, "Surface Finishes for Concrete", to provide the required surface finish.

Reinforcing steel provided to bond cast-in-place concrete with a precast member shall be positioned within one-half inch (1/2") of the plan location and shall not be positioned such that it will require a reduction in detailed and/or specified concrete clear cover dimensions of the composite member.

ITEMS 427 AND 785

Special Surface Finish will be used in this project, beyond the requirements of an Ordinary Surface Finish. All work to achieve Ordinary Surface finish shall be complete 14 days prior to application of special surface finish.

The stain coating material, concrete surface preparation and application of the stain coating shall be in accordance with Item 785, "Surface Finishes For New Concrete".

The applicator of site-applied finish material shall conduct a field test by applying finish material on an inconspicuous ... Engineer to determine the best coverage rate to achieve the desired appearance and results.  This approved sample area shall be used by the Engineer as a basis for comparison and acceptance of the Contractor's finished coatings for the remainder of the Work.  The following items shall receive a tinted surface finish to match, as nearly as practicable, the color "Gris".

• Railing (including the parapet types) and traffic barrier;
• Exterior vertical faces of slabs, slab spans, arches and box girders (including prestressed members)
• The underside of overhanging slabs to the point of juncture of the supporting beam;
• The entire width of the underside of the slab of slab spans;
• All exposed vertical surfaces of bents, piers, and bottom surfaces of bent caps;
• All surfaces of tie beams, abutments, bridge wingwalls, screen walls, culvert headwalls and wingwalls, and retaining walls exposed to view after all construction is completed and backfill and embankment is placed.

Bridge Beam (only the outside and bottom surface of fascia beams or girders) shall receive a tinted surface finish to match, as nearly as practicable, the color "NTTA Blue".

Gris color is defined as a gray color generated by the Sherwin-Williams Company. Gris is a standard color with reference code of SW-2114 and has the following mixing formula:

Base: B97W10  DOT Concrete Stain
53 gallon drum formula:
LB - 49 oz. 22/32
BU - 9 oz. 30/32
YO - 33 oz. 4/32
NTTA Blue is a custom blue color created for the Authority by The Sherwin-Williams Company and has the following mixing formula:
Base: H&C Silicone Acrylic Pearl Gray
Five gallon formula:
P6 - 20 oz.
LB - 35 oz.
QV – 5 oz.

The applicator of site-applied finish material shall conduct a field test by applying finish material on an inconspicuous ... Engineer to determine the best coverage rate to achieve the desired appearance and results.  This approved sample area shall be used by the Engineer as a basis for comparison and acceptance of the Contractor's finished coatings for the remainder of the Work.  The following items shall receive a tinted surface finish to match, as nearly as practicable, the color "Gris".

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• The entire width of the underside of the slab of slab spans;
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• All surfaces of tie beams, abutments, bridge wingwalls, screen walls, culvert headwalls and wingwalls, and retaining walls exposed to view after all construction is completed and backfill and embankment is placed.

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• The entire width of the underside of the slab of slab spans;
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Base: H&C Silicone Acrylic Pearl Gray
Five gallon formula:
P6 - 20 oz.
LB - 35 oz.
QV – 5 oz.

The record file(s) of the above color(s) can be obtained at The Sherwin-Williams store located at 1220 Leo Lane, Dallas, TX 75229. Telephone: 972-243-5671. Fax: 972-243-0807.

ITEM 432

Pneumatically placed concrete riprap or cement stabilized riprap will not be allowed on this Project.

Concrete for concrete riprap, concrete mow strip and concrete flume shall be Class B, or as directed by the Engineer.  Concrete riprap shall be reinforced using deformed bar reinforcement.

Unless otherwise shown on the plans, stone shall be twelve (12) inches thick.

Placement of ACP around the structure columns within the concrete riprap area shall be subsidiary to riprap.

ITEM 433

Class 1 and 2 joint sealants will not be allowed on this project.

Transverse expansion and construction joints in reinforced concrete pavement shall be sealed in accordance with longitudinal expansion or construction joints, as shown on TxDOT Standard JS-94.

Method B joint sealing compound, per TxDOT Standard JS-94, is to be used on this
An "air-entraining admixture" is defined as a material which, when added to a concrete mixture in the correct quantity, will entrain uniformly dispersed microscopic air. The admixture shall meet the requirements of ASTM C-260. The cement used in any series of tests shall be either the cement proposed for the specific work or a "reference" Type I cement from one mill.

A "water-reducing admixture" is defined as a material which, when added to a concrete mixture in the correct quantity, will reduce the quantity of mixing water required to produce concrete of a given consistency. The admixture shall meet the requirements of Type A admixture as specified in ASTM C-494, modified as follows:

- The cement used in any series of tests shall be either the cement proposed for the specific work or a "reference" Type I cement from one mill.
- All concrete being tested will contain entrained air.

A "water-reducing/retarding admixture" is defined as a material which, when added to a concrete mixture in the correct quantity, will reduce the quantity of mixing water required to produce concrete of a given consistency and will retard the initial set of the concrete. The admixture shall meet the requirements of Type D admixture as specified in ASTM C-494, modified as follows:

- The water-reducing retarder shall retard the initial set of the concrete a minimum of 2 hours and a maximum of 4 hours, at a specified dosage rate, at an ambient temperature of 90°F.
- The cement used in any series of tests shall be either the cement proposed for the specific work or a "reference" Type I cement from one mill.
- All concrete being tested will contain entrained air.

A "high-range water reducing admixture" (superplasticizer) is defined as a material which, when added to a concrete mix in the correct quantity, will produce the results required herein. The admixture shall meet the requirements of Type F admixture as specified in ASTM C-494, modified as follows:

- The cement used in any series of tests shall be either the cement proposed for the specific work or a "reference" Type I cement from one mill.
- All concrete being tested will contain entrained air.
- It shall reduce the required water by a minimum of fifteen percent (15%).
- It shall retard the set sufficiently so as to allow delivery, proper placement, and finishing of concrete.
- It shall contain no chlorides, air entraining agents, or urea.

The manufacturer shall certify that the material to be furnished meets the requirements of this item, and of ASTM C-260 or C-494, as modified herein, and shall furnish test reports from an approved laboratory, as defined by Item 1, "Definition of Terms". At the time of original request for approval of admixtures, the manufacturer shall state in writing the chloride content of the admixtures. No admixture to which chlorides have been added during manufacture will be permitted to be used.

The calibrated container shall be constructed in such a manner that the level of the admixture is visible at all times. A strip gauge shall be securely attached to the measuring apparatus. The increments on the strip gauge shall be such that the admixture can be measured to within three percent (3%) of the specified dosage.

Calcium chloride will not be permitted and accelerating admixtures will not be used.

All bar reinforcement to be welded shall conform to ASTM A-706, Grade 60, and be identified as such when delivered to the project site.

Mechanical butt splices will be made using standard exothermic welds and shall be subject to the requirements specified herein. Not more than one-third of the total number of bars shall be spliced at any one cross section. Splices in adjacent bars shall be staggered at least 70 bar diameters.

Exothermic welds for mechanical butt splicing shall be made by an approved proprietary process whereby molten filler metal, contained by a high-strength steel sleeve of larger inside diameter than the bars, is introduced into the annular space between the bars and the sleeve and also between the ends of the bars. Upon cooling and hardening of the filler metal, the splice shall develop at least 125% of the minimum yield strength of the bars spliced. The splice shall not depend upon fusion of the filler metal with the bars nor shall the bars be heated to their melting point during the splicing process. The degree of heat required to effect the mechanical butt splice shall not decrease the structural qualities of the bars or significantly affect their hardness. Exothermic weld splices will be subject to the testing specified below.

Bars to be spliced by exothermic weld mechanical butt splicing may be sawed, sheared or flame cut, providing the sheared ends are reshaped, if necessary, to enable bar ends to fit into the sleeve and providing flame cut ends are cleaned of all slag prior to splicing. All surfaces to be enclosed within the splice sleeve shall be free of burrs, paint, oil, rust, scale, etc., by wire brushing or other means just prior to splicing. Splices shall be made as recommended by the manufacturer using the manufacturer's standard jigs, clamps, ignition devices and other required accessories.

No separate payment will be made for the costs of mechanical butt splicing. All costs shall be considered subsidiary to the price paid for items listed in the contract.

As a condition of approval, three (3) horizontal tension test splices for each bar size to be spliced shall be made in the field by the Contractor to represent the first 25 permanent splices. Subsequently, one tension test specimen shall be made at the job site by the Contractor for each 25 splices made. The specimens shall be tested by the Authority's testing laboratory to at least 125% of specified yield strength and the test results submitted to the Authority for approval. If any one test specimen fails to meet the tensile strength requirements of ASTM A-615, two production splices from the lot
represented by the specimen shall be cut out and tension tested by the testing laboratory. If both retests meet tensile strength requirements, all splices in the lot will be accepted. If one or both retests fail to meet the requirements, all splices in the lot will be rejected. All costs of removal, retesting, and re-splicing shall be borne by the Contractor.

All butt splices will be visually examined and shall be subject to additional non-destructive testing, at the Engineer's option, at no expense to the Contractor. No splice shall be encased in concrete until approved by the Engineer. All splices having visible defects judged injurious by the Engineer shall be removed and replaced.

ITEM 441

When structural members are to be fabricated by welding, a welding procedure in accordance with this Item, shall be submitted. Upon approval, the welding procedure will be assigned a Welding Procedure Number. The shop drawings, when submitted, shall include this number adjacent to the appropriate welding symbol.

Contract plans indicate details of joints to be used with the shielded metal arc welding process. When the use of submerged arc welding, gas metal-arc welding or flux cored arc welding processes are anticipated, the shop drawings shall state the correct joint details and welding procedure number.

ITEM 444

Vertical clearance dimensions shall be determined from field surveys performed by the Authority's Construction Manager after initial erection of the beams, for the temporary signs, and after placement of the bridge slab, for the permanent signs. Final vertical clearance dimensions will be provided to the Contractor by the Construction Manager for use in the fabrication of permanent sign faces. The Contractor shall furnish and install TMUTCD compliant, temporary bridge vertical clearance signs, at the earliest possible time subsequent to the erection of the beams.

Temporary bridge vertical clearance signs shall not be paid for directly but shall be subsidiary to this Item.

Bridge protective assembly not required for clearances greater than 20 feet.

ITEM 445

All galvanizing shall be done after fabrication and punching or drilling of any holes that may be permitted by the plans or the Engineer.

Repairs shall be made with zinc-rich paints based on organic binders, premixed and formulated specifically for use on steel surfaces and which will provide a dried film containing a minimum of 94% zinc dust, by weight.

ITEM 449

All anchor bolts and anchor bolt clusters provided for roadway lighting shall be furnished with threads, two nuts, and two washers.

The steel of the nuts and washers for roadway lighting units shall be in accordance with Standard Specification Article 449.4, "High Strength Steel Anchor Bolts".

Anchor bolts shall be set in the concrete forms with a steel plate template, and concrete shall be poured to the required bearing seat elevation or to the finished line and grade of the parapet, traffic rail, or other member.

ITEM 450

Fence posts mounting atop of rail on the underpass bridge, as shown on the NTTA-BPF standard, shall receive a powder coating to match, as nearly as practicable, the color "Gray Blue".

ITEMS 450 AND 618

Conduit for lighting on bridges shall be rigid metal and be embedded in the bridge rail as shown on the NTTA standard SSR-002(3), "Light Standard Support Detail on Structure".

ITEMS 450 AND 781

Gray Blue color is a polyester thermosetting powder coating color for exterior use created by Spraylat Corporation. The product number is PRPL95008. The powder coating has the following characters:

<table>
<thead>
<tr>
<th>Character</th>
<th>Value</th>
</tr>
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<tr>
<td>Cure schedule</td>
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</tr>
<tr>
<td>Gloss @ 60 (per ASTM#D523)</td>
<td>85 +/- 5</td>
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<td>Film thickness (per ASTM#D1186)</td>
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<td>Depth of field</td>
<td>smooth</td>
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The record file of the above color can be obtained at Spraylat Corporation, 3333 N. Interstate 35, P.O. Box 1337, Gainesville, TX 76241. Telephone: (940) 665-9590. Fax: (940) 665-8867

ITEM 454

Sealed expansion joints shall receive "Protective System I – Prime coat, epoxy".

ITEM 462

When sections are laid on a skew or slope, full compensation for sawcutting the ends, when required by field conditions, shall be included in the unit price bid per linear foot and measured in accordance with "Measurement".

ITEM 464

Where storm sewers dead-end, they shall be plugged with a concrete plug of thickness.
equal to 1-1/2 inches per foot of diameter of pipe with a minimum thickness of three (3) inches. The cost of the plugs shall be included in the unit price bid per foot of the various sewer pipes.

Pipe wye connection shall not be field made if the lateral pipe is more than two-third (2/3) the size of the main pipe. Field made connection must maintain the plan angle of the wye.

**ITEM 465**
The cost of furnishing and installing of concrete cap atop the inlet or manhole, when required by the Plans, will be considered as subsidiary to this item.

**ITEM 496**
When a portion of an existing pipe is removed, the pipe shall be removed to a minimum of two feet (2') below subgrade. The open ends of the remaining pipe shall be plugged with a water-tight, two-course brick plug, or a precast concrete plug. The precast concrete plug shall have a thickness equal to 1-1/2 inches per foot of diameter of pipe with a minimum thickness of three (3) inches. This plugging shall be considered subsidiary to this item.

When a portion of an existing inlet or manhole is removed, the remaining portion of the inlet or manhole shall be filled with Class D concrete. This will be considered subsidiary to this item.

Where the removal of a concrete box culvert is required by the plans, the top of the box shall be broken into sizes not larger than one (1) cubic foot. The reinforcement shall be cut off close to the concrete, permitting the broken concrete to fall to the bottom of the box. Walls shall be removed in accordance with other provisions of the standard Specifications.

The removal of any section of sewer pipe attached to a structure shall be considered a part of the structure. “Small Structures” and “Large Structures” shall be classified as shown on the plans.

Existing box culverts to be abandoned shall be plugged with a precast concrete plug with minimum thickness equal to 6 inches. Prior to plugging the culvert, curb shall be removed so as to prevent encroachment into proposed base and pavement areas. Plugging of box culverts and curb removal shall be considered subsidiary to this item.

Except as otherwise provided, existing structures or parts of structures to be removed shall become the property of the Contractor and shall be disposed of by him outside the limits of the right-of-way at his own expense.

**ITEM 502**
Special signs necessary or desirable for the project, but not shown in the plans, shall be fabricated and erected in conformance with the general requirements of the Texas MUTCD and the “Standard Highway Sign Designs for Texas”. Special sign messages should be brief, legible, and clearly understandable. For requirements and details not shown in the plans, compliance with Texas MUTCD will be required.

When excavation is required next to a pavement lane carrying traffic and widening is not completed within forty-eight (48) hours, sufficient backfill of the type acceptable to the Engineer shall be placed against the edge of the pavement to provide a usual 3:1 slope. When the pavement is to be constructed, this shall be carefully removed and disposed of by the Contractor. Materials and labor for this work will not be paid for directly but shall be considered subsidiary to this item.

Barricades and warning signs, as appropriate, are to be placed at stockpiles to adequately warn motorists. At all stockpile sites that are less than 30 feet from the edge of any traveled lane, a type III barricade shall be erected immediately in front of or at each end if required. When a stockpile site equals or exceeds 100 feet in length, an object marker (OM-2VP) per 100 feet shall be placed alongside the stockpile. Materials and labor for this work will not be paid for directly but shall be considered subsidiary to this item.

The Contractor shall plan his work sequence in a manner that will cause the minimum interference with traffic during construction operations and no machinery or equipment shall be stored closer than 30-feet to the traveled roadway after sunset.

If at any time during construction the Contractor’s proposed plan of operation for handling traffic does not provide for safe, comfortable movement, the Contractor shall immediately change his operations to correct the unsatisfactory condition.

The sequence of work as outlined in the plans is a guide only. If Contractor decides to revise or deviate from the Engineer’s Sequence of Construction plans, he must submit revised Sequence of Construction and Traffic Control plans (signed, sealed, and dated by a Registered Professional Engineer) for approval prior to beginning work on this project.

Subject to the approval of the Engineer, portions of this project which are not affected by or in conflict with the proposed method of handling traffic or utility adjustments can be constructed during any phase.

Barricades and signs shall be placed in such a manner as not to interfere with the sight distance of drivers entering the highway from ramps. To facilitate shifting, barricades and signs used in lane closures or traffic staging may be erected and mounted on portable supports. The design of these supports is subject to the approval of the Engineer.

Type “C” flashing arrow panel shall be used in connection with the lane closure signing. The Contractor shall be responsible for furnishing, maintaining, and operating these devices in a manner acceptable to the Engineer.

Temporary flexible-reflective tabs will be required on top of the portable concrete traffic barrier used during stage construction to improve nighttime visibility. The tabs shall be placed and maintained at not less than 50-foot spacing. No separate payment for this item will be made.
During construction, the Contractor will be required to erect accurate clearance signs in accordance with the “Texas Manual on Uniform Traffic Control Devices for Streets and Highways”, on underpass structures. Final clearance signs shall be in accordance with Item 444, “Bridge Protective Assembly”. Temporary clearance signs will not be paid for directly but shall be considered as subsidiary to the various bid items.

Permanent pavement markings are to be placed during each construction sequence, where appropriate, prior to opening the roadway to traffic.

The Contractor shall keep traveled surfaces used in his hauling operation clear and free of dirt or other material.

The use of rubber-tired equipment will be required for moving dirt or other materials along or across paved surfaces.

Where the Contractor desires to move any equipment not licensed for operation on public highways on or across any pavement, he shall protect the pavement from all damage using a method acceptable to the Engineer.

Signs will be required during construction to replace existing signing which interferes with the construction. The existing sign faces on portable supports may be used for these signs as long as they are removed and erected on portable mounts on the same day. The warning and regulatory signs must be in place at all times.

All barricades shall have TY C – High Specific Intensity Sheeting.

The Contractor is responsible for maintaining existing drainage facilities in good working order until those facilities are replaced by permanent construction or the flows are rerouted. The Contractor shall install and maintain these temporary facilities for as long as may be required for permanent drainage facilities to be completed. The Contractor shall also provide and maintain interim drainage in areas that may be affected by detour or other construction that were not specifically anticipated herein. Positive drainage shall be provided and maintained for all detours and affected areas by the use of cross slope, ditches, temporary inlets or other methods whether specifically shown herein or not. Temporary drainage work and materials necessary to complete the work will not be paid for directly, but shall be subsidiary to the various bid items.

Permanant signs and construction signs that are incorrect or that do not apply to the current situation for a particular phase, shall be covered or removed as so not to confuse the traveling public.

In general, work on bridges shall not be carried out over traffic. Such work as setting beams or girders, placing forms or precast panels, deck pours and other work above existing roadways shall be done while traffic is rerouted using detours or lane closures. Redirection of traffic shall be subject to the approval of the Engineer.

The Contractor may temporarily close traffic lanes on the cross streets, as approved by the Engineer, in order to complete bridge construction, using appropriate traffic control devices. The Contractor shall submit a written request to the Engineer a minimum of 72 hours prior to any lane closure.

Lights, where required, shall be Type A, low intensity, battery operated flashers.

Some standard warning signs and barricades may be erected and maintained by other adjacent Contractor for the duration of this Contract. If required and not provided by other adjacent Contractor, this Contractor shall erect and maintain all required barricades and warning signs within the project limit, as directed by the Engineer, in conformance with the general requirements of the Texas MUTCD.

The Contractor shall provide supplemental barricades and signs, as requested by the Engineer, to provide safety for: (i) Work continues after the roadway is opened to traffic, (ii) special traffic situations as might develop as the construction operations proceed, and (iii) separating work areas from the traffic. The supplemental signs and barricades shall conform to the requirements of the latest edition of the Texas MUTCD and be left in place only for so long as the operations for which they are provided continue in progress.

Flaggers shall be provided and maintained, as directed by the Engineer, in areas where interaction between construction operations and the traveling public must be regulated. Flaggers shall be neat, courteous, well-informed, and English-speaking.

Before beginning the Work on this project, the Contractor shall submit, for approval by the Engineer, a plan of construction operations outlining, in detail, (i) a sequence of work to be followed; (ii) and a method of handling traffic on construction roadway, cross-streets, and driveways along, across, and adjacent to the Work.

All streets, driveways, and alleys shall remain open to traffic as far as practicable throughout the construction operations.

Ditches across traffic lanes for signalization construction will be kept covered with a portable bearing surface at all times unless work in the ditch is in progress. No ditching across paved surfaces will be allowed for roadway lighting construction. Only one lane of traffic may be closed at a time when work is in progress in a ditch.

The Engineer may require the use of uniformed, off-duty police officers and squad cars for assistance with traffic control for lane or ramp closures, night time work, or other situations that dictate the need for additional traffic control for the protection of the traveling public or the construction workforce. The Contractor will be reimbursed for this cost. Certified documentation such as payroll, log sheets with signatures, badge number of the officers, or invoices from the government entity providing the officers and vehicles will be required for payment.

Reimbursement will not be made for coordination fees charged by the Police Department.

ITEM 504
The Contractor shall construct and maintain a parking area and an all-weather walkway...
between the parking lot and the field office. The parking area shall be sufficient for twelve (12) cars and be enclosed in a 6-foot high fence. A lockable vehicle gate and a security light within the parking area shall be provided. The walkway location, width, and composition shall be as approved by the Engineer.

Furniture for the field office shall include the following as a minimum:

- appliances and electronic equipment,
- one (1) electrified bottled cold water drinking fountain,
- one (1) plain paper fax machine with its own line,
- one (1) copier machine with two paper trays capable of producing 8.5" x 11" and 11" x 17" copies and collating,
- three (3) phone lines
- four (4) phone sets connecting to phone jacks,
- six (6) desks with six (6) chairs,
- two (2) drafting tables with two (2) drafting stools,
- two (2) four-drawer filing cabinets with locks,
- two (2) mobile vertical file plan racks,
- and two (2) eight-foot folding tables with eight (8) chairs.

The Contractor shall provide and pay the cost of weekly janitor service and local and facsimile telephone service. Charges for long distance phone calls will be paid by the person and/or firm making the calls.

The computer system, to be supplied by the Authority, for the field office shall include the following as a minimum standard:

- Two (2) new desk top personal computers (PC), each equipped with a seventeen (17) inches color monitor, a PS/2 keyboard and 2-button optical mouse with scroll.
- The personal computer shall have the following requirements as a minimum: Pentium 4 Processor, with 2.0 GHZ, 512 MB RAM, 20 GB hard drive, one (1) CD-ROM drive, one (1) 1.44 MB 3.5" Floppy Drive, one (1) 24X CDRW, 56k internal modem fax, Microsoft Office XP Professional Operating System, and fax software,
- and one (1) networking laser printer for business that is capable of printing 11"x17" paper (HP LaserJet 5000 series or equivalent).

The Contractor shall adequately furnish and maintain the field office, as required by this item and as directed by the Engineer.

The Contractor shall furnish one (1) Type E Field Office for this project. The "Type E" field office shall provide a minimum of nine-hundred and fifty (950) square feet of gross floor area. The field office shall not be less than twelve (12) feet wide and shall have a ceiling height of not less than eight (8) feet. The floor area will be partitioned into a minimum of three (3) rooms, furnished with doors and locks, and a minimum of two (2) windows in each room. The building shall have two exterior doors.

A substantial lock shall be furnished for the doors and all keys placed in the possession of the Engineer.

The Contractor shall maintain all equipment in the field office and shall furnish the supplies for the fax machine, copier, and printer.

Upon the completion of the project, the Contractor shall remove the field building and its appurtenances and restore the surrounding site to the satisfaction of the Engineer. Unless otherwise directed by the Engineer, the Contractor shall be required to maintain the field office until the final acceptance of the work.

ITEM 512
Portable concrete traffic barriers (both CTB and low profile barrier) and hardware assemblies furnished by the Contractor will remain the property of the Contractor upon completion of need and be removed from the project site.

Damaged PCTB, as determined by the Engineer, will be removed from the project site by the Contractor and shall be replaced with undamaged PCTB. This will not be paid for directly but shall be considered subsidiary to Item 512.

ITEM 514
All materials and labor required for placement of the bondbreaker between the barrier and the concrete pavement will not be paid for directly but shall be considered subsidiary to this item.

ITEMS 520 AND 522
All portland cement concrete plants, including portable plants, shall be equipped to proportion by weight, the aggregates, the bulk cement, the fly ash, the admixtures, and the water by means of approved fully automatic proportioning devices. The scales shall be automatic as well.

ITEM 522
All classes of plants shall be located in close enough proximity to the project site to ensure meeting of time requirements for hauling and placing concrete.

ITEM 534
Support slabs at approach slabs shall be measured and paid for in accordance with this item. Structural excavation encountered in the construction of support slabs shall not be paid for directly, but shall be considered subsidiary to this item.

ITEM 536
Concrete medians and directional islands shall be Class ‘B’ concrete. ¾” asphalt board expansion joint material shall be placed adjacent to all curbs.

ITEM 540
Threaded dowel rods shall conform to the requirements of ASTM A-36. Nuts shall conform to the requirements of ASTM A-563. Threaded rods and nuts shall be tapped or chased after galvanizing.

In areas where concrete riprap or median pavement has been previously placed, the Contractor shall neatly saw and remove the pavement material from the planned post locations and replace it in accordance with TxDOT Standard MS-03. The placement or replacement surfacing material shall be considered subsidiary to the other work of this item.

Steel posts with block-out shall be used in this project.

MBGF posts which fall on curb inlets shall be installed in accordance with the low fill culvert post mounting option detail on MBGF-03A. If only one post falls within the limits of the inlet, the engineer may elect to allow the Contractor to nest an additional MBGF rail section in lieu of placing one post. All work required to comply with this note shall be subsidiary to this item.

ITEM 542
Removal of all MBGF terminals shall be included in the measurement of this item.

Metal beam guard fence and extruder terminals removed from this project shall be salvaged, hauled to, and neatly stored at the NTTA Maintenance Facilities as directed by the Engineer. All extruder terminal equipment and accessories, including, but not limited to the guardrail extruder, posts, offset ground strut, breakaway-cable assembly, cable anchor, bearing plate, and attachment bolts, nuts, and washers, shall be stored in such a manner to prevent loss of any components. The work involved in hauling this material will not be paid for directly, but shall be considered subsidiary to this item.

ITEM 556
The filter material intended for use with pipe underdrains under the pavement shall conform to the following gradation:
- Retained on ½" sieve – 0%
- Retained on 3/8" sieve – 0-2%
- Retained on No. 4 sieve – 40-85%
- Retained on No. 10 sieve – 95-100%

The cost of making connections of underdrain pipes to storm sewer lines will be considered as subsidiary to this item.

ITEM 580
Removal of debris from construction is not covered under this item.

The Contractor shall utilize rotary mowing equipment with a maximum rigid frame width of 65" for turf grass mowing. Deck wings are acceptable. No equipment exceeding 5,000 pounds will be allowed. Blades shall be maintained in such a manner that grass cuts are clean and sharp. Trimming equipment shall be accomplished with nylon line trimmers or other method approved by the Engineer. Trimming shall be completed immediately following mowing.

Vacuum type sweeping equipment may be required if rotary type equipment creates a hazard or nuisance to the public. No request for additional compensation will be allowed.

Mowing, sweeping, and litter pickup are required as part of this contract. The Engineer will direct the areas to be mowed, swept, and litter picked-up. The following are the estimated mowing cycles per month and hours per month for the sweeping, and litter pickup:
- Mowing: 2 cyc/month
- Sweeping: 2 hrs/month
- Litter pickup: 10 hrs/month

The Contractor shall perform the last mowing, sweeping, and litter pickup throughout the project prior to project acceptance.

ITEM 610
The Contractor shall provide shop drawings for luminare poles in accordance with this item and Item 441.

An Engineer licensed in the State of Texas shall seal the shop drawings for illumination poles that were not pre-approved by TxDOT.

In addition to the requirements for lamps shown on the RID standards, high pressure sodium lamps for this project shall meet ANSI C78 requirements and shall be the type that extinguishes at the end of usable lamp life and remains extinguished without cycling. 400-Watt lamps shall contain less than 4.0 mg of mercury. 250-Watt lamps shall contain less than 3.0 mg of mercury. Lamp shall be lead free and shall pass the Federal Toxic Characteristic Leachate Procedure (TCLP).

The Contractor shall complete the proposed lighting in the associated phases of construction. Existing lighting shall not be de-energized before new lighting is operational without prior approval of the Engineer.

Under bridge lighting luminaires will be Holophane Model #WL2K 15AHF 48 GR F2U wall packs or approved equivalent.

Luminaire ballasts shall be rated for operation at 480 volts.

Lighting system components shall be completed in accordance with TxDOT Test Method "TEX-1110-T, Sampling Lighting Assemblies."

For this contract, the Contractor shall furnish (but not install) the illumination poles with...
mast arms as shown on the plans under Estimated and Final Quantity Summary and in the Proposal book under Unit Description and Bid Price Schedule tables. The bid item descriptions for these units will include “FURN” or “FURNISHER ONLY”. Poles with mast arms will be delivered and neatly stored by the Contractor at the NTTA Oaklawn facility located at 2155 Oaklawn Ave., Dallas, TX 75219. The Contractor shall contact Mr. Doug Martin, NTTA Warehouse supervisor, by telephone at 214-325-0049 a minimum of 72 hours in advance of the delivery.

ITEM 616
The Contractor shall be responsible for fixture testing costs.

ITEM 618
All exposed conduits shall be rigid metal.
All conduits in structures shall be galvanized rigid metal conduits and shall be furnished with expansion couplings, deflection couplings, and drain tubes of the sizes and types specified on the plans.
Conduit expansion joint fittings shall provide for a minimum of 2 inches of total movement.
All underground conduit bends for roadway illumination and ITS shall be rigid metal. The bends shall be protected with anti-corrosion tape, epoxy coated fitting or PVC coated fitting extending a minimum of 2” onto the non-metallic portion of the PVC conduit systems.
All conduit elbows and rigid metal extensions required to be installed on PVC conduit systems will not be paid for separately, but will be considered subsidiary to various bid items.
The locations of conduits and ground boxes are diagrammatic only and may be shifted by the Engineer to accommodate field conditions.
A colored cleaner-primer shall be used on all PVC to PVC joints before application of PVC cement.
High-density polyethylene (HDPE) pipe may be threaded and used with threaded PVC connectors or couplings.
PVC conduit systems that snap or lock together without glue that are designed and UL listed to be used for bored PVC electrical conduit applications will be allowed for bored PVC Schedule 40 or Schedule 80, when approved by the Engineer. No additional compensation will be paid to the Contractor when these specific purpose conduit systems are substituted for this purpose.
Conduit shall be placed under existing pavement by an approved boring method unless otherwise directed by the Engineer. Pits for boring shall not be closer than 2 feet from the edge of the pavement unless otherwise directed by the Engineer. Water jetting will not be permitted.
When boring is used for under pavement conduit installations, the maximum allowable over-cut shall be 1 inch in diameter.
When conduits are bored, the vertical and horizontal tolerances shall not exceed 18 inches as measured from the intended target point.
The use of a pneumatically driven device for punching holes beneath the pavement (commonly known as a "missile") will not be permitted on this project.
The Contractor shall install a non-metallic pull rope in conduit runs in excess of 50 feet.
The Contractor shall place foam at the ends of all conduit where conductors and/or cables are present and required for the intended operation of the traffic signals.

ITEM 620
All electrical connectors for breakaway poles shall be breakaway (Buchanan 65U, Bussmann HEBW, Littlefuse LEB, HLC Flood-Seal SLK-MD & Ferraz-Shawmut GEB, or equal) in accordance with current and applicable RID standard sheets. All electrical connections for neutrals shall be breakaway and shall have a white color marking and a permanently installed solid neutral (Buchanan 20U, Bussmann HET, Littlefuse LET, HNC Flood-Seal SKD-MD & Ferraz-Shawmut GEBN, or equal).
Grounding conductors that share the same conduit, junction box, ground box or structure shall be bonded together at every accessible point in accordance with the electrical detail sheets, and the latest edition of the National Electrical Code.

ITEM 624
Cast iron junction boxes shall be furnished and installed, where shown on the plans and where required, flush with the face of the concrete barrier, parapet, abutment face, or wall. All boxes shall contain threaded bosses and adapters to galvanized flexible or rigid metal conduit, as indicated on the plans. Cast iron junction boxes shall be sized as indicated on the plans.
Boxes shall be galvanized cast iron not less than 1/4 inch thick, of the inside dimensions indicated, and complete with plain covers, mounting flanges, bosses with drilled and tapped holes, neoprene gaskets, brass cover screws, and 1/2 inch screwed copper drains to below or to the outside face of concrete, where shown.
Cast iron boxes shall conform to the requirements of ASTM A-48 and shall be galvanized in accordance with the requirements of ASTM A-123.
Junction boxes shall be inside flanged, recessed cover having an interior, blind drilled and tapped mounting button to be used for grounding purposes.
Concrete-tight galvanized steel boxes shall be furnished and installed, where shown on the plans and where required, flush with the surface of the concrete. Mounting boxes shall have all standard knockouts and accessories necessary for fixture mounting.

Underground signalization conduit ground boxes, as detailed on the plans, shall be furnished and installed, where shown on the plans and where required, flush with the surface of the ground. They shall be founded on a gravel sump at least 18" deep over the area of the ground box.

Enclosures and covers shall be constructed of light polymer concrete for portions of the box under compression stress and fiber reinforced polymer for portions under tension stress. Boxes shall be stackable for extra height.

Ground box design shall be in accordance with Standard 6.3 of the Western Underground Committee for AASHTO H-20 traffic loading. They shall be tested for side loads of 600 pounds per square foot as generated by traffic load or soil compaction during installation. All components shall be designed and tested to withstand temperatures as low as -20°F.

Signalization ground boxes and covers shall be sized, furnished and installed in accordance with the details shown on the plans. Ground box covers shall have a minimum coefficient of friction of 0.5 and be imprinted with the words “Traffic Signal”. They shall be equipped with a locking mechanism to prevent access without the use of tools, and shall be constructed with aprons where required by the plans.

Pre-cast ground boxes used in traffic conditions shall be capable of withstanding H20-44 loading per AASHTO specifications.

All ground boxes used for illumination shall have “NTTA ILLUMINATION” and “HIGH VOLTAGE” imprinted on the cover.

All ground boxes used for CCTV electrical power shall have “NTTA CCTV” and “HIGH VOLTAGE” imprinted on the cover.

For all type B and D ground boxes, the end of all conduits within these ground boxes shall be between 10 and 15 inches measured from the bottom of the ground box cover as installed. These measurements are in lieu of measurements shown on Electrical Detail Sheet- ED (3).

ITEM 628
Silk screening or other acceptable method shall be used to label the service enclosures indicating that the power provided is for CCTV, DMS or illumination. Labeling service enclosures will be considered subsidiary to the bid Item 628 and will not be paid for directly.

The (disconnect) operating handle for the service enclosure shall be flange mounted, not door mounted, and will latch the door when the switch is in the closed position. The handle shall be lockable in both open and closed positions.

All neutral wire used in the electrical service center for traffic signal shall be white insulated wire only.

ITEM 636
Screen processing ink used for sign messages on small signs shall not be used in this project. All signs shall be fabricated with reflecting sheeting.

The sign manufacturer shall provide a minimum warranty of performance periods of three (3) years for all Type E reflective sheeting, ten (10) years for all Type C reflective sheeting except orange, and three (3) years for all orange Type C reflective sheeting.

Route markers or any panel for attachment to large overhead guide signs shall be fabricated with Type IX (Non-fluorescent Prismatic) as specified in the North Texas Tollway Authority Sign Policy.

All ground mounted small signs, except for warning signs, shall be fabricated with Type C (High Specific Intensity) reflective sheeting. Route markers or any panel for attachment to large roadside signs shall be fabricated with Type IX (Non-fluorescent Prismatic) reflective sheeting.

ITEM 642
All overhead signs with blue, brown, green, orange, and yellow backgrounds shall be fabricated with Type IX (Non-fluorescent Prismatic) as specified in the North Texas Tollway Authority Sign Policy. The prismatic reflective sheeting (Type IX) shall be 3M VIP Diamond Grade, or approved equal.

Clearview fonts shall be used on all overhead guide signs.

ITEMS 642 AND 650
After sign supports with signs attached have been erected, individual units requiring cleaning shall be washed with a cleaning solution, approved by the Engineer, to remove all grease, oil, dirt, smears, streaks, or other foreign particles.

ITEMS 644, 647, AND 650
The locations of all signs and/or sign support structures shall be verified by the Engineer prior to the Contractor taking elevations to determine lengths for sign posts and sign support towers for fabrication.

ITEMS 646 AND 647

ITEMS 646 AND 647
Sign supports shall be erected so that the sign faces will be vertical and, if necessary, angled sufficiently away from a normal to the roadway when attached to the supports in order to prevent specular glare or to reduce confusion in areas of ramp/service road gores. If specular glare is apparent on the mounted signs under nighttime inspection, corrective adjustments in the sign orientation shall be made at the direction of the Engineer.

**ITEM 649**

Existing sign faces, when required, shall be erected on new sign supports where shown and in accordance with the details shown on the plans.

**ITEM 650**

The tower and column heights shown in the Sign Summaries and on the plans are to be used for bidding purposes only. Prior to fabrication, the Contractor, in cooperation with the Engineer, shall take finished grade elevations at the tower and column locations and shall determine their exact heights for fabrication in accordance with the details shown on the plans.

**ITEM 656**

The Contractor shall probe before drilling foundations to determine the locations of all utilities and structures.

Class A sulfate resistant concrete shall be required for non-reinforced foundations. Class C sulfate resistant concrete shall be required for reinforced foundations.

For traffic signal foundations, the top 2 inches of drill shafts shall be formed or provided a smooth finish satisfactory to the Engineer. A ¾ inch chamfer shall be formed on the top edge of each signal pole foundation.

**ITEM 680**

City of Frisco will furnish the following equipment and the Contractor will install:

1. Traffic signal controller cabinets
2. Internally Lighted Street Name (ILSN) signs
3. Video Detection Cameras
4. And Opticom Equipment (Cables, Detectors with mounting brackets, Detector Card Rack, and Discriminator Modules)

The Engineer shall notify Mr. Brian Moen, P.E., City of Frisco Transportation Manager at (972) 335-5580 (EXT 196) at least seven (7) days prior to picking up the equipment. The City of Frisco Traffic Engineer will provide the address of the warehouse, within the City limits, where the equipment will be picked-up.

The Contractor shall seal the cabinet (inside and out) to the base using silicone caulk.

All signal pole and controller cabinet locations shall be staked by the Contractor and approved by the Engineer prior to drilling foundations.

Installation of the Internally Lighted Street Name (ILSN) signs will be measured and paid for as each intersection regardless of the number of street name signs. The price shall be full compensation for installing and testing the completed installation including labor, tools, equipment, and incidentals necessary to complete the work.

Installation of Video Detection Cameras on the 10 ft luminaire arm and Opticom system at each signalized intersection will not be paid for directly but shall be considered as subsidiary to this item.

The Contractor shall have a qualified technician on the project site when the traffic signal is placed in operation.

During the thirty-day test period, the Contractor shall utilize qualified personnel to respond to and diagnose all trouble calls. Contractor shall repair any malfunctions to signal equipment he supplied on the project. A local telephone number (not subject to frequent changes) where trouble calls are to be received on a 24-hour basis shall be provided to the Engineer by the Contractor. The Contractor's response time to reported calls shall be within a reasonable travel time from a Frisco address, but not more than two (2) hours maximum. Appropriate repairs shall be made within 24 hours. The Contractor shall place a log book in each controller cabinet and keep a record of each trouble call reported. He shall notify the Engineer of each trouble call.

**ITEMS 682, 1201, AND 8230**

All signal head attachments shall be designed such that the wiring to each signal head shall pass from the mast arm through the signal head bracing or attachment hardware to the signal head. No exposed cable or wiring will be permitted except on span wire mounted signals.

The signal head-to-mast arm connection must allow for adjustment about the horizontal and vertical axis.

For this project, a pedestrian signal head assembly having a one-piece reflector assembly and a flush, "Egg-Crated" or "Z" pattern visor will be required.

Traffic signal heads shall be black polycarbonate with one-piece black plastic back plates.

All mast arm mounted signal heads shall be turned down and all other signal heads shall be covered with burlap or other material approved by the Engineer until placed into operation.

Signal heads mounted on poles and mast arms shall be level and plumb and aimed as directed by the Engineer.
ITEM 684

The conductors in the traffic signal cable shall be stranded for this project. Individual conductors shall be No. 14 AWG.

The multi-conductor signal cable shown on the plans shall be terminated on the terminal strip in the hand hole of mast arm signal poles.

Unless otherwise shown on the plans, a separate multi-conductor cable (14 AWG) shall be used inside pedestal poles and mast arm signal poles from the terminal strip to each signal head as follows:

<table>
<thead>
<tr>
<th>Head Type</th>
<th>Conductor Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>H3 / V3 Series</td>
<td>5 Cndr</td>
</tr>
<tr>
<td>H5 / V5 Series</td>
<td>7 Cndr</td>
</tr>
<tr>
<td>PED</td>
<td>5 Cndr</td>
</tr>
</tbody>
</table>

Splices in the conductors from the terminal strip at the hand hole to the signal heads will not be permitted in the pole shaft or in the mast arm.

All signal cables and power conductors shall be checked for insulation resistance upon installation and prior to termination. The tests shall be made with a test set operating at a minimum of 500 volts DC applied to the conductors.

Each conductor in the multi-conductor signal cables shall be tested for insulation resistance relative to each other and to the outer covering of the cable. The minimum acceptable value for insulation resistance shall be 50 mega ohms.

ITEM 686

For traffic signal installation with luminaire, a photocell, lighting contactor, and lighting control unit will be required.

ITEM 688

Pedestrian push buttons shall be in compliance with the Americans with Disabilities Act (ADA).

The push button shall be activated by a minimum of 2 inch convex plunger. A protective shroud shall encircle the plunger to deter vandalism. The shroud shall be cast as part of the housing cover. The plunger shall protrude beyond the protective shroud a distance adequate to accommodate the switch travel.

While staking the pole locations, the Contractor, along with the Engineer, shall verify the location of the push buttons and the direction of the arrows on the signs prior to installation.

ITEM 763

Water line construction shall conform to the City of Frisco “Water System Construction Specifications Section W”.

Water line connections to existing mains shall be limited to low flow periods from November to March, unless otherwise noted on the Plans. These connections shall be coordinated with the City of Frisco prior to beginning any of the work.

All water line fitting shall be ductile iron of the mechanical joint type with a minimum rated working pressure of 250 PSI and shall be restrained with mega-lug or approved equal.

Water lines shall be encased in rust resistant steel casings (1/4 inch thick) at locations shown on the Plans using RACI patented spacers. Wood spacers are not acceptable.

Thrust blocking is required on all points of deflection of the water lines (tees, bends, plugs, fire hydrants, etc.) and shall be concrete with a minimum 28-day compressive strength of 3000 PSI.

Approved manufacturers of tapping sleeves are Mueller, American Flow Control and U.S. Pipe.

Approved valve manufacturers are Mueller, M&H and American Flow Control.

Valve boxes are required with concrete pads and shall be three piece screw type cast iron of the extension type similar to Mueller No. H-10360 or approved equal.

Sanitary sewer line construction shall conform to the City of Frisco “Sanitary Sewer Construction Specifications Section S”.

ITEM 784

The Contractor shall install a sign transponder to every new sign as shown on the plans or as directed by the Engineer. The sign transponders will be provided by the NTTA. It is the Contractor’s responsibility to install the correct transponder to the proper sign as shown on the plans. If a sign is relocated, the Contractor shall request a new transponder from the Engineer for the relocated sign and record the proper data to the Asset Collection Data form. The Engineer will verify the transponder data against the sign text and the identification number shown on the plans and the Asset Collection Data form. The installation of the transponders will not be measured or paid for directly, but will be considered as subsidiary to this Item.

ITEM 1058

Compost shall be blended on-site. One inch (1”) compost will be applied in a uniform layer and tilled or disked into existing topsoil to a 4” depth.

ITEM 5788
Concrete pavers shall be "Hollandstone" pavers, or approved equal. The paver manufacturer shall furnish the Engineer certification that the pigment used in the paving units is synthetic iron oxide, alkali resistant, light-fast, water insoluble, chemically inert and weather resistant.

Concrete paving unit thickness shall be 3 1/8". Color shall be “Frisco Maroon & Frisco Charcoal” random mix and the laying pattern shall be “Herringbone” placed as shown on the plans with a soldier course.

The final elevation of the paving stones shall be ¼” higher than the adjacent curb to allow for any minor settling which may occur with the base.

Once screeded and leveled to the desired elevation, this sand laying course shall not be disturbed in any way. If the sand laying course is in place for over 24 hours without pavers in place, the Contractor must relevel the sand base.

After vibration, clean masonry sand shall be spread over the concrete paver surface, allowed to dry, and vibrated into joints with additional vibrator passes and brushing so as to completely fill the joints.

Surplus sand shall be left on the surface during construction to insure complete filling of joints during initial use. Upon completion of all construction work, the paver surface shall be swept and cleaned of all excess soil, foreign material, and/or stains.

**ITEM 6995**

The Contractor shall not place pedestrian crosswalk pavement markings until pedestrian signals and push buttons have been installed and are operating.

**ITEM 8288**

The Contractor shall provide separate lightning protection (Polyphasers IS-50NX-C2 or equal) for all radio units. This shall not be paid for directly, but considered subsidiary to this item.

The heliax cable running from the antenna to the controller shall not be exposed to the outdoor environment.

**ITEM 8970**

City of Frisco will furnish the following equipment and the Contractor will install:

1. VIVDS Processor System
2. VIVDS Camera Assembly
3. and VIVDS Set-up System

The Engineer shall notify Mr. Brian Moen, P.E., City of Frisco Transportation Manager at (972) 335-5580 (EXT 196) at least seven (7) days prior to picking up the equipment. The City of Frisco Traffic Engineer will provide the address of the warehouse, within the City limits, where the equipment will be picked-up.