# 600 INCIDENTALS

## Item 601 Slope and Channel Protection

**601.08 Dumped Rock Fill.** Add the following sentence to the first paragraph:

Complete the dumped rock fill to the thickness shown on the Plans.

**601.09 Rock Channel Protection.** Add the following sentence to this section:

Complete the rock channel protection to the thickness shown on the Plans.

## Item 602 Masonry

**602.01 Description.** Add after the word "headwalls":

"key blocks,"

**602.02 Materials.** Replace the requirements for "Water for grout mortar" with:

Water for grout, mortar and wetting blocks/bricks…….Cincinnati hydrant water or equal

**602.03 Construction Requirements.** Add to the end of the third paragraph:

After the excavation has been made, and the sides securely supported where necessary, hand trim and shape the bottom of the excavation to conform to the outside of proposed structure. The foundation must be solid and entirely free from mud and water before commencing with block or brick laying.

Change the fourth paragraph as follows:

Excavate deeper if the material found at grade is not suitable for foundation. Excavate to provide a suitable foundation, and fill with suitable material. Payment for additional excavation and backfill is to be as specified in 603.05.

Change the eighth paragraph as follows:

Construct concrete headwalls, concrete cradles and other concrete masonry using the materials and by the methods as described under 499 and 511, and of the Class shown on the Standard Drawings, or of Class C if no class is specified. Reinforcing steel shall be placed as prescribed under 509.

Change the last paragraph as follows:

Construct block or brick walls to the thickness called for on the plans. Thoroughly wet blocks or bricks before placing in mortar. All block or brick used in the Work must be clean and entirely

free from dirt, paint, grease and all other foreign substances. Lay up with full mortar joints. Use mortar consisting of one part Portland cement to two parts of sand by volume. Mix the materials dry until the color is uniform, add water and continue mixing until a stiff homogeneous mass is produced. Thoroughly mix all mortar in suitable water-tight boxes or in approved mechanical mixers. Mix mortar in small quantities so that each batch may be used before it has taken its initial set. Absolutely no lime may be used in the mortar. Retempered mortar is that which has been remixed with or without the addition of water after the initial set has taken place. Do not retemper mortar under any circumstances.

Add the following paragraphs:

Spread a layer of mortar 1/2 inch (12 mm) thick upon the prepared foundation, in which clean wet block or brick shall be set. Lay each successive course of block or brick in a full bed of mortar. Lay all block or brick truly horizontal except in such structures that are built to a fixed grade.

In general, lay block or brick with joints pushed closely together, and filled entirely with mortar. Lay all block or brick with broken joints both on the sides and with the course below, and with the masonry thoroughly bonded together. Only whole block or brick may be used in the masonry, with bats being used only to fill interstices and to effect closures. Exposed surfaces must be smooth and even with joints neatly pointed up and thoroughly cleaned of all surplus mortar except where they are to be plastered. First, clean and wet surfaces that are to be plastered, then plaster before the masonry has set, and trowel to a dense, even finish.

## Item 603 Pipe Culverts, Sewers, and Drains

**603.01 Description.** Delete the first paragraph and add:

Perform work in accordance with City of Cincinnati, MSD Rules and Regulations. Make taps into existing pipes with a plumber licensed by MSD.

This work consists of the construction or reconstruction of pipe culverts, sewers, and drains hereinafter referred to as Type A, Type B, Type C, Type D, Type E, Type F, Type G, Type H and Type I Conduits. Work in accordance with these specifications and in conformity with the lines and grades shown on the Plans or established by the Engineer. This work includes: Excavating for pipes and foundations for same, including clearing and grubbing and the removal of all materials necessary for placing the pipe except removals listed separately; furnishing and placing granular or concrete bedding and CDF or granular backfill as required; constructing and subsequently removing all necessary cofferdams, cribs and sheeting; pumping and dewatering; sealing or banding all pipe joints where required; furnishing and installing all necessary pipe bends and branches of a type at least equal to the conduit of which they become a part; joining to existing and proposed appurtenances as required; and restoration of disturbed facilities and surfaces.

Add:

**603.011 General.** Conduct operations so as to maintain any sewage flow uninterrupted throughout the construction period. Subsurface structures encountered in the prosecution of the work shall be protected and maintained in complete operation unless permission for their removal or relocation is given.

Handle sewerage, where existing sewers are to be removed, in the trench or through closed conduits, and not pumped, bailed or flumed over the street surface or in the gutters. Include any additional costs involved in maintaining this flow by pumping or by any other approved method, in the Contract unit price bid for the respective Items of 603 Conduit.

Locate the existing pipe at the places where the Plans provide for proposed drainage pipe to be connected to existing pipes both as to line and grade, before starting to lay the proposed pipe. Include the cost of this operation, and the cost of connecting proposed sewers to existing manholes or sewers in the Contract unit bid for the pertinent 603 Conduit Item.

Seal the pipe joint where connections are made between rigid and flexible pipe sections or between pipe sections of different kind or type of end fabrication whether; required by the Plans, arising from permissible use of optional materials, or encountered in connection to existing facilities, as required by the specifications by means of a concrete collar, Type A or Type B as shown on Standard Drawing Acc. No. 49031. Use adaptive couplings if the Engineer approves or requires them.

When bell and spigot pipe is used, any necessary pipe cut-offs will be made at the spigot end of the length of pipe adjacent to the end length. When tongue and groove pipe is used, the length of pipe adjacent to the end length shall be cut and butt joint formed with a concrete collar, Type A or Type B as shown on Standard Drawing Acc. No. 49031.

Include payment for concrete collars, Type A and Type B under 602 Concrete Masonry, unless otherwise provided in the Contract.

Plug or seal new pipes where required, in accordance with the requirements outlined in 202.041 "Abandoned Sewers and Drainage Structures." Include payment for this work in the Contract unit price bid for the pertinent 603 Conduit Item.

**603.013 Building Sewers.** At the property owner's sole cost, furnish all material and labor required to install the building sewers from either an existing sewer that is to remain or to a proposed carrier sewer, to a point beyond the limits of roadway construction.

Cooperate with the property owner to give ample opportunity to extend sewer connection from the existing sewer to a point beyond roadway construction limits. Include cost in the Contract unit price bid for the various 603 Conduit Items.

Replace all existing building sewers including; sanitary, yard, roof, basement or other similar pipe drains now in use, that are disturbed because of the improvement. Provide a satisfactory building sewer if the existing sewer is to be abandoned. Include payment for this work in the Contract unit price bid for the pertinent 603 Conduit Item.

Reconnect any unrecorded active connection to a sewer encountered in construction, to the existing or proposed sewers as directed by the Engineer. Include payment for this work in the Contract unit price bid for the pertinent 603 Conduit Item.

Construct building sewers, either by agreement with the property owner or under the Contract, in accordance with all applicable provisions of 603.

Under usual conditions, lay the drain on a grade of not less than two percent, and where it crosses the property line, a minimum depth of seven feet (2.1 m) measured down from the curb grade to the flow line. Building sewers are deeper than the usual case cited above when it is intended that the building sewers serve low lying lots or deep cellars. The Contractor's attention is called to the requirements of the Cincinnati Building Code concerning building sewers.

In case the depth of the main sewer or the grade of the cellar is such that the depth of the house drain must be varied from the above figure of seven feet (2.1 m), special directions will be given regarding construction of the house drain. Construct building sewers as illustrated on Standard Drawing Acc. No. 49033. Excavate for the stack or riser beyond the sewer trench into firm ground in a trench or slot, which shall be a minimum of 20 inches square (500 mm x 500 mm).

Encase the stack or riser a minimum of six inches (150 mm) of Class C concrete or four inches (100 mm) of brick masonry.

Defer backfilling building sewers until the Inspector obtains the elevation at the end of the building sewer or the vertical distance from the invert of the building sewer to the invert of the main sewer.

Seal the open ends of all unconnected building sewers with stoneware stoppers properly cemented into place. Mark the location of the ends of building sewers with wood strips not less than two inches by six inches (50 mm x 150 mm) in cross section and extending vertically from the end of the drain to a point 24 inches (610 mm) above the sidewalk grade. If at any time during construction the wood strips are broken or not apparent, uncover and replace them. When the sidewalk spaces and slopes are fine graded, cut strips to two inches (50 mm) below the finished grade. When the sewer branches are installed as part of a private improvement, as in the development of a subdivision, install the wood strips as above and protect in place until final inspection has been made of the improvement, at which time they may be cut down to ground level.

**603.014 T and Y Branches.** Construct straight pipe with T-branches where directed by the Engineer in strict accordance with the provisions of Section 603. In laying the pipe, incline T-branches upward at an angle of about 45 degrees. Seal unconnected T-branches with stoneware stoppers properly cemented into place or seal using a stub and cap.

Keep an accurate record of the locations of all T-branches and furnish to the Engineer upon request.

The use of a Y-branch is encouraged when it is necessary that a branch leave the main sewer at an angle of more than 20 degrees from the perpendicular. When there is a head end manhole at the terminus of a street requiring several branches to enter the sewer at various angles, the use of Y-branches will be required. Do not connect building sewers to a manhole unless the Engineer has granted specific permission. Enter the sewer through the bench the same as other sewers, when such permission is granted.

Use wye fittings or approved saddles for all six inch (150 mm) connections to plastic pipe.

**603.015 Bends.** Install vitrified clay, plastic, or concrete bends, curves and elbows where required or as directed in laying or reconnecting building sewers and in the construction of stacks. Furnish and install in strict conformance with the applicable provisions of 603. Include payment for this work in the Contract unit price bid for the various 603 conduit items.

**603.016 Plastic Pipe.** Meet the applicable ASTM specification requirements in all Pipe Manufacturer certification. Provide the inspector/engineer with certification forms, together with a report of the test results with pipe deliveries. Include project name, location, Contractor, and the test lot number on certification forms. The Engineer approval is required for the lot size.

Suitably mark all pipe and fittings to provide manufacturer's name, lot or production number, ASTM designation, ABS or PVC, and nominal diameter. Label all pipe with a "home" mark. Fittings need not contain lot or production number.

Flexible manhole joints are used with this pipe type.

**603.017 Backfilling Plastic Pipe.** Install pipe in full compliance with the Recommended Practice for "Underground Installation of Flexible Thermoplastic Sewer Pipe," ASTM Designation D-2321 - latest edition.

In addition to the construction and testing procedures outlined in other sections of the specifications, install the pipe with deflection of the pipe less than five percent and the materials surrounding the pipe compacted to not less than 90 percent Proctor. The area requiring compaction includes the bed and side fill material and also the material placed above the pipe for a distance of 12 inches (305 mm) over the top of the pipe. The Engineer may require random compaction tests to be conducted by an independent laboratory.

If any of these tests indicate that the material has not been compacted to the required density, recompact material at no additional cost to the Owner. The Engineer then has the right to require additional compaction to the proper density without any additional cost to the owner.

**603.018 Allowable Bedding and Initial Backfill Types for Plastic Pipe.**

**Class I -** Angular 1/4 inch to 1-1/2 inch (6 to 40 mm) graded stone, including a number of fill materials such as coral, slag, cinders, crushed stone, crushed shells, and shells. Where any ungraded (one size aggregate) crushed stone, coral, or slag is used, limit size to 3/4 inch (20 mm) maximum. Use this material when the depth of cover on the conduit is between 14 feet and 35 feet (4 and 11 meters).

**Class II** - Coarse sands and gravels with maximum particle size of 1-1/2 inch (40 mm) including various graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil Type GW, GP, SW and SP are included in this class as spelled out in ASTM D-2487. Use this material for conduits when the depth of cover is 14 feet (4 meters) or less.

**603.019 Deflection Testing for Plastic and Flexible Pipe.** Provide all equipment (including mandrel) and materials and do all work necessary to conduct tests to determine any structural problems with the installed gravity sewer line.

Perform a pipe deflection test on all gravity sewer pipe installed. The maximum limit of ring deflection is five percent of the base inside diameter. In any area where deflections exceed five percent, re-excavate the trench, the pipe zone backfill and embedment and replace in accordance with the original specifications. If in the opinion of the Engineer, the pipe has been damaged, remove and replace with new pipe installed in full accordance with the specifications.

Measure all pipelines for vertical ring deflection no earlier than 30 days after completion of the backfill.

Provide deflection probes in accordance with the respective ASTM Specification dimensions.

Use a nine-arm mandrel having a diameter equal to 95 percent of the base diameter of the pipe as established in ASTM-D-3034. Perform the test without mechanical pulling devices.

**603.02 Materials.** Add after the second paragraph:

The Proposal and Plans show the pipe size and kind specified to meet the requirements of the pertinent sections of 706 and 707. Use any of the kinds listed herein under the specified conduit type when the kind of pipe is not specifically itemized. Higher strength 706.01 pipe may be furnished where lower strength 706.01 pipe is specified, higher strength 706.02 pipe may be furnished where lower strength 706.01 or 706.02 pipe is specified, 706.03 pipe may be furnished where 706.02 pipe is specified, higher strength 706.04 may be furnished where lower strength 706.04 is specified, and higher strength 706.08 pipe may be furnished where lower strength 706.08 pipe is specified. A thicker steel of the same corrugation profile may be furnished for 707.01, 707.02, 707.03, 707.04, 707.05, 707.06, 707.07, 707.13, or 707.14 conduits where a lesser thickness is permitted or specified.

**Specific materials shall be as follows:**

Concrete for bedding, collars
and encasement (Class C)..... 499 & 511
Reinforcing steel ..... 509.02
Sand for mortar ..... 703.03
Bituminous pipe joint filler..... 706.10
Granular material for bedding and
backfilling shall be durable
gravel, sand, slag or crushed stone
meeting grading requirements of..... 703.17

or granulated slag ..... 703.08
or bank run gravel..... 703.20
Resilient and Flexible gasket joints
(concrete, sewer and culvert)..... 706.11
Vitrified clay, B and S..... 706.12

The kinds of pipe permitted for each of the designated types of conduit shall be as follows:

**Type A Conduits**

Non-reinforced concrete pipe (Class 3)..... 706.01
Reinforced concrete pipe (Class II minimum)..... 706.02
Reinforced concrete pipe with S stirrups..... 706.15
Reinforced concrete elliptical pipe
(Class II minimum)..... 706.04
Reinforced concrete pipe, vitrified clay lined. ..... 706.05
Vitrified clay pipe (extra strength only)..... 706.08
Structural plate corrugated steel structures ..... 707.03

**Type B Conduits**

Non-reinforced concrete pipe (Class 3)..... 706.01
Reinforced concrete pipe (Class II minimum)..... 706.02
Reinforced concrete pipe with S stirrups..... 706.15
Reinforced concrete elliptical pipe
(Class II minimum)..... 706.04
Vitrified clay pipe (extra strength only)..... 706.08
Plastic Pipe ..... 707.41*
Plastic Pipe ..... 707.52*

*Use this material for sanitary and combined sewer only when depth of cover is less than 35 feet (10 meters).

**Type C Conduits**

Non-reinforced concrete pipe (Class 3)..... 706.01
Reinforced concrete pipe (Class II minimum)..... 706.02
Reinforced concrete pipe with S stirrups..... 706.15
Reinforced concrete elliptical pipe
(Class II minimum)..... 706.04
Vitrified clay pipe (extra strength only)..... 706.08
Plastic Pipe ..... 707.41*
Plastic Pipe ..... 707.52*

*Use this material for sanitary and combined sewer only when depth of cover is less than 35 feet (10 meters).

**Type D Conduits**

Non-reinforced concrete pipe (Class 3)..... 706.01
Reinforced concrete pipe (Class II minimum)..... 706.02
Reinforced concrete pipe with S stirrups..... 706.15
Reinforced concrete elliptical pipe
(Class II minimum)..... 706.04
Vitrified clay pipe (extra strength only)..... 706.08
Galvanized corrugated steel conduits,
Type I and II ..... 707.01
Galvanized corrugated (3 x 1) steel conduits..... 707.02
Structural plate corrugated steel structures ..... 707.03

**Type E Conduits**

Non-reinforced concrete pipe (Class 3)..... 706.01
Reinforced concrete pipe (Class II minimum)..... 706.02
Reinforced concrete elliptical pipe
(Class II minimum)..... 706.04
Concrete drain tile (12" [0.3 m] and under),
extra quality ..... 706.07
Vitrified clay pipe (extra strength)..... 706.08
Clay drain tile (12" [0.3 m] and under), extra quality..... 706.09
Galvanized corrugated steel conduits,
Type I and II ..... 707.01
Galvanized corrugated (3 x 1) steel conduits..... 707.02
Corrugated aluminum pipe underdrains,
without perforations ..... 707.21 or 707.22

**Type F Conduits**

Galvanized corrugated (2-2/3 x 1/2) steel
conduits, Type I and II ..... 707.01
Galvanized corrugated (3 x 1) steel conduits..... 707.02
Corrugated aluminum alloy pipe underdrains,
without perforations ..... 707.21 or 707.22

**Type G Conduits**

Cast Iron Pipe..... 707.18
Ductile Iron Pipe ..... 707.20

**Type H Conduits (Inlet Connections)**

Non-reinforced concrete pipe (Class 3)..... 706.01
Vitrified clay pipe (extra strength only)..... 706.08
Reinforced concrete pipe (Class II minimum)..... 706.02

**Type I Conduits (House Drains)**

Non-reinforced concrete pipe (Class 3)..... 706.01
Vitrified clay pipe (extra strength only)..... 706.08
Plastic Pipe ..... 707.45*
Plastic Pipe ..... 707.52*

*Use this material for sanitary and combined sewer only when depth of cover is less than 35 feet (10 meters).

Add:

**603.05 Excavation.** Delete this section and replace with:

Excavation includes the loosening, handling, re-handling, removal, filling and disposal of any and all materials, wet or dry, including gumbo, quicksand, hardpan, shale, rock, roadway pavement and all unforeseen obstacles.

**Construction In or Under Embankments.** Where pipe sewers are to be placed within or beneath an embankment, and the upper extremity of the pipe will be less than three feet (914 mm) below the surface of the original ground, construct the embankment to an elevation of at least three feet (914 mm) above the upper extremity of the pipe, or to the surface of the completed embankment if less than three feet (914 mm) above the upper extremity of the pipe, before trenching for the pipe. Then excavate the trench to the minimum width necessary for placing the pipe and backfilling properly. Lay the pipe and backfill the trench before additional embankment is placed thereon.

**Open Cuts.** Open cut or trench all excavations except where trench-less construction is required on the Plans. Unless so required, no trench-less construction will be permitted except by written permission or order obtained from the Engineer before beginning the work. The City reserves the right to rescind such order at any time during the progress of the Work.

**Widths and Depths.** Excavate sufficient width and depth to permit and facilitate construction to the lines, grades and dimensions shown on the Plans, and for sheeting, bracing, pumping, draining and other construction operations. In construction of pipe sewers, excavate trenches to the widths and depths governed by control dimensions for typical trenches shown on Standard Drawing Acc. No. 49032.

**Extra Excavation and Refill.** If any excavation is carried below the required depth, remove the loosened material and fill the extra space with concrete of the same class as that to be used in the bottom of the structure or as specified for bedding on Standard Drawing Acc. No. 49032 without additional cost to the City.

The foundation for the conduit bed shall be firm for its full length. Where unstable material is encountered below the foundation, remove to the depth directed by the Engineer under the conduit and for a width on each side equal to the diameter or span of the conduit and replace with granular material. Remove rock or boulders encountered at the conduit bed at least six inches (150 mm) below the bottom of the conduit and replace with granular material.

The proposed elevations of manholes and pipes and the estimated lengths of pipe may be adjusted by the Engineer during construction.

Change the flow line, not to exceed one foot (305 mm), or remove unsuitable material at the direction of the Engineer in an amount not to exceed one foot (305 mm), at the same Contract bid price.

When the flow line is lowered more than one foot (305 mm) or if it becomes necessary to remove more than one foot (305 mm) of unsuitable material below the bottom of the trench, compensation will be provided therefore under 210 and 211.

**Length of Openings.** Conform the length of all openings to the limits shown on the Plans. The lengths of all openings is subject to the review and approval of the Engineer.

**Sheeting and Bracing.** Furnish, place and maintain such sheeting and bracing as may be required by the **Site Safety Plan, OSHA requirements**, or the opinion of the Engineer, to securely support the sides and ends of the excavations, and to prevent injury to the structure being built or to persons or property. If at any time the City so orders, install such additional sheeting and bracing as the Engineer may consider necessary. Compliance with such orders or failure on the part of the City to issue such orders does not release the Contractor from liability for damages resulting from weak or insufficient sheeting, nor from responsibility for protecting The Work and adjacent property from damage. Immediately and compactly fill the voids appearing outside the sheeting with suitable material in a satisfactory manner. Sheeting and bracing may be left in place unless otherwise ordered by the Engineer. Never remove sheeting and bracing until sufficient backfill has been placed to provide ample support to the sides of the excavation as determined by the Engineer. When sheeting is left in place, cut it off at least six feet (1.83 m) below the proposed finished surface if within the roadway or at least three feet (914 mm) below the proposed finish surface if beneath the sidewalk space. Sheeting and bracing ordered left in place is paid for under 504.

**Disinfection.** If a portion of the excavation consists of decomposed or obnoxious material, thoroughly and satisfactorily disinfect or deodorize the objectionable material where consideration of the health, safety or convenience of the public, or the workers requires such action, or when so directed by the Engineer.

Add:

**603.051 Tunneling.** Construct sewer tunnels only when tunneling is shown on the Plans. Unless so indicated, do not tunnel except by written permission or order obtained from the Engineer before beginning the tunneling work. The City reserves the right to rescind such order or permit at any time during the progress of the work. All of the details of tunnel construction are subject at all times to the approval of the Engineer.

Conform the length of open tunnel at any time to the limits shown on the Plans or determined by the Engineer. Do not commence excavation for tunneling until lumber for sheeting and bracing, or liner plates, have been delivered to the work site. The liner plate diameter shown on the Plans has been determined to permit a maximum mining deviation of

three inches (75 mm) from true line and grade. Correct any deviation greater than three inches (75 mm) by reaming, so that the pipe may be laid to true line and grade in the tunnel.

Tap one plate in each course of liner plates for a two-inch (50 mm) grout nipple closed by a screw plug. Stagger grout nipples circumferentially. Grout as necessary to back up liner plates and fill voids. Carry out all grouting as directed by the Engineer.

Construct tunnels in strict conformity with the details shown on the Plans or approved by the Engineer. Keep the width or height of the tunnel a minimum of 54 inches (1.4 m). Firmly hold the sides and roof of the tunnel in place by such sheeting and timbering or liner plates as may be required to fully protect the structures and the workers, and prevent settlement of pavements, walks, curbs, buildings, or other structures. If at any time the City so orders, install additional sheeting, bracing or other supports as the Engineer may consider necessary, but compliance with such orders or failure on the part of the City to issue such orders in no case releases the Contractor from liability for damages resulting from weak or insufficient supports, nor responsibility for protecting The Work and adjoining property from damage. Immediately and compactly fill voids between the tunnel lining and top and sides of the excavation with suitable material in a satisfactory manner. Wedge sheeting boards tightly against the top and sides of the excavation. The haphazard sheeting and bracing of tunnel walls and roof is not permitted. Keep the completed tunnel lining as near as practicable to the working face and at no time more than six feet (2 m) from the face of the tunnel. Keep the face sheeted and braced and the main sheeting ahead of the excavation when soft or running material is encountered in excavation. Under such conditions, it may be necessary to install liner plates with the use of a needle beam. Under extreme conditions, it may be necessary for the Contractor to furnish and use a tunnel shield.

Leave in place the liner plates or sheeting and bracing of all tunnels without extra compensation.

Ventilate all tunnels adequately and light sufficiently to insure proper construction and inspections.

Backfill tunnel entirely with concrete containing a maximum of 12 $ft^3$ (0.34 $m^3$) of aggregate per sack of cement, mixed to a zero slump and well compacted after placing. Use a minimum of three sacks of cement per cubic yard (4 sacks per $m^3$) of concrete. Ram the top portion of the concrete backfill tightly against the top and sides of the tunnel lining.

Payment for sewers constructed in tunnel is made in accordance with the provisions of the pertinent 603 Conduit item, and in addition, the price bid per linear foot covers and includes furnishing and placing sheeting and bracing or liner plates, tunnel shafts, and furnishing and placing concrete for tunnel backfill.

Add:

**603.059 Video Taping of installed Sewers.** This item shall be used for verifying the integrity and water tightness of the final installed main line sewers following the leakage and deflection testing. Complete the required videotape after deflection testing, if required, and

receive MSD approval prior to placement of the final pavement course. Perform this work as listed below:

**A. General.** Visually inspect the mainline sections of the newly installed conduit by means of closed-circuit television. Inspect one section at a time while suitably controlling the flow in the section being inspected. Dewater and suitably isolate by plugs sections not replaced in-line with active sewer flow in order to eliminate flow during video inspection.

Use a television camera specifically designed and constructed for such inspection with minimum capabilities of color, pan and tilt rotating head. Provide sufficient lighting for the camera to allow a clear picture of the entire periphery of the pipe. Provide camera that is capable of operating in 100 percent humidity conditions. Provide camera, television monitor, and other components of the video system capable of producing picture quality to the satisfaction of the Sewer Department (MSD or SMU) representative.

Move the camera through the line in either direction at a moderate rate, stopping when necessary to permit proper documentation of the sewer's condition. Do not exceed camera pulling speed of 30 feet per minute. Move the camera through the sewer line using manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions.

When manually operated winches are used to pull the television camera through the line, utilize telephones or other suitable means of communication between the two manholes of the section being inspected to insure good communications between members of the crew.

The importance of accurate distance measurements is emphasized. Use above-ground means (meter device) for measurement for location of defects. Do not mark on the cable, or the like, which would require interpolation for depth of manhole. Verify accuracy of the distance meter using a walking meter, roll-a-tape, or other suitable device satisfactory to the MSD or SMU representative. Accuracy of distance meter is subject to approval by MSD or SMU representatives.

**B. Documentation.** Conform to the following guidelines for videotapes that are submitted to MSD or SMU:

1. Video Tape. The final project videotapes must be continuous and metered from manhole to manhole.

2. Log Sheet. All tapes must be accompanied by written log sheets using the same format shown on "MSD TV Investigation" log sheets.

3. Audio. All tapes must include an audio track, stating conditions in the mainline such as sewer service connections, infiltration/exfiltration, cracked pipe, open joints, condition of manholes, bellies, ponding, or other conditions encountered during the filming.

4. Drawing. A drawing must be included on the log showing street location, names, houses and house numbers, and other topography of interest. The drawing must show approximate north arrow.

5. Location of Lines. The log sheet must show the location of sewer lines and diameter of lines and location of manholes in relation to other site features (roads, houses, etc.).

6. Flow Direction. Must indicate direction of flow in line (when in service) being televised.

7. Depths. Must show depth of each manhole.

8. Weather. Note the weather conditions at the time of the work; this could affect the flow conditions.

9. Location of Job. Must give accurate location of job, including area of County or City (e.g., City of Silverton).

10. Pipe. Must give pipe diameter, pipe material type, length of pipe, and section being televised.

11. Name of Person Doing Video Work. Identify person actually doing the video work as well as the name of the Contractor.

12. Manhole Terminations. The post construction video must show the end of the completed line at each manhole.

**C. Submittals.** Submit the project tape documenting the condition of all sections of main line sewer after corrections have been addressed. Submit prior to final payment for sewer pipe installed.

**D. Photographs.** Take photographs at the request of the District. Take instant developing, 35 mm, or other standard-size photographs of the television picture of representative problems.

**E. Purpose.** The purpose of video tape recording shall be to supply a visual and auditory record of problem areas of the lines that may be re-played. Videotape recording playback shall be at the same speed that it was recorded. Slow motion or stop-motion playback features may be supplied at the option of the Contractor. Have all videotapes and necessary playback equipment readily accessible for review by the District representative during the project.

**603.06 Bedding.** Delete this Section and substitute:

Conform the conduit bedding to one of the classes specified. When no bedding class is specified, conform the conduit bedding to Class B.

**Class A. Bedding** - consists of a continuous concrete cradle conforming to the plan details.

**Class B. Bedding** - consists of a bed of granular material having thickness as shown on Standard Drawing Acc. No. 49032.

Shape the layer of bedding material to fit the conduit for at least ten percent of the vertical diameter of the conduit and shape recesses to receive the bell of bell-and-spigot pipe.

**603.07 Laying Conduit.** Add:

Lay the lower segment of the conduit so that it is in full contact with the shaped bedding throughout its full length. Orient longitudinal laps or seams to the sides in metal conduits. Lap the circumferential seams on the inside of the pipe in the direction of flow.

Begin and end all Type A conduits with pipe ends as normally fabricated by the Manufacturer. If field cutting is found to be necessary, locate the cut end at an interior joint and provide a cradle, collar, or band to assure a stable joint.

Erect 707.03 structural plate corrugated steel structures in accordance with the requirements of 522.03.

Place 706.02 reinforced concrete pipe with elliptical reinforcement and 706.04 reinforced concrete horizontal elliptical pipe with single cage reinforcement, with the reinforcement markings along a vertical plane. Place 706.03 reinforced concrete pipe with auxiliary supports along the centerline of the auxiliary support system, in a vertical plane.

Where called for on the plan, encase conduits with specified thickness of Class C concrete meeting the requirements of 511. Include furnishing and placing the concrete encasement and any forming and/or additional excavation required in the unit price bid for the conduit to which it applies.

Lay pipe in a dry trench. Lay pipe only when the Inspector is present.

Curves having a radius of ten or more times the internal diameter of the pipe for sewers 30-inch (760 mm) and larger may be built of radius pipe cast to fit the curve. The center of the first radius pipe must come within one foot (305 mm) of the point of curvature even if it requires the cutting of pipe.

Conduct operations so as to maintain at all times sewer flows through existing facilities to be replaced until new facilities are completed and placed in use.

**603.08 Joining Conduit.** Delete everything after first sentence and add:

Provide water-tight joints for all types of conduit, except as noted below. Provide seal with resilient and flexible compression joints, or approved equal, as determined by the Director. Joint seals shall meet ASTM C-443 and C-361. Bituminous pipe joint filler is not permitted.

Where Aluminized Type 2, corrugated metal pipe is permitted to be used for driveway culvert, provide coupling bands having corrugations matching those of the pipe ends.

Type E Conduits have open joints.

Remove all dirt or cement from the inside of the pipe and leave joints smooth after placement is complete. Test to insure proper alignment and grade with a straight edge before placing if two or more joints are jointed and sealed into units. Use push-on type joints; Tyton, Super Bell-tite, or approved equal when cast iron or ductile iron pipe is used for gravity sewers.

Use mechanical joints when cast iron or ductile iron pipe is used for force mains or pressure sewers.

Follow specification 706.11 or 706.12 for resilient and flexible gaskets.

Protect completed joints against rapid drying by suitable covering material when Portland cement mixtures are used.

Inspection of the conduit is required before any backfill is placed. Re-lay or replace any pipe found to be out of alignment, unduly settled, or damaged.

**603.10 Backfilling.** Add:

Backfilling covers the replacing of the excavated materials after the sewers and other structures have been built, and the proper grading and shaping of the surface of the backfill. Do not backfill over completed sewers and structures until they have been inspected and approved. Do not backfill without permission from the Engineer. Backfill pipe sewers immediately after they have been inspected and approved. Prosecute backfilling operation as The Work progresses and keep completed as near to the end of the completed sewer as practicable.

Rubbish, muck, or other unsuitable materials will not be permitted for backfilling material. Do not use stones and shale exceeding one-half cubic foot (0.0034 $m^3$) in volume in the backfill and separate stones and shale that are in the backfill by at least six inches (150 mm) of earth.

Do not use fill material consisting of rocks, frozen lumps, foreign matter and particles in excess of three inches (75 mm) in size when corrugated metal pipe is used. Local site material is adequate if sufficiently compacted at controlled moisture content. Do not use highly plastic silts and clays, organic silts or peats as backfill materials. Place backfill material below the haunches of the pipe and tamp to the specified density. Place an additional six to eight inch (150 mm to 200 mm) layer on each side of the pipe and compact. Backfill all conduits, except Type E, evenly on both sides of the pipe and to a minimum depth of one foot (305 mm) above the pipe for the full width of the trench with granular material placed in layers and pneumatically tamped. In placing and tamping the initial backfill around the pipe sewer, exercise care so as to not disturb the line and grade of the pipe. Hold stepping on or working over pipe sewers to an absolute minimum until they have been covered with the initial backfill.

When the top of the trench is above the top of a Type A, Type B, Type H, or Type I conduit, use granular backfill material above the initial backfill, and compact it to the top of the trench in layers not to exceed four inches (100 mm) in thickness with mechanical tampers.

Use Controlled Low Strength Material (CLSM) above the initial granular backfill to the top of the trench when:

1) The trench is located anywhere in the existing or proposed Right-of-Way.

2) Any part of the trench is within two feet (610 mm) of the edge of the future or proposed Right-of-Way; and

3) In crossings of street pavement or driveway extending at the angle of repose, but at least two feet (610 mm) beyond the street or driveway pavement.

For areas outside these limits, water may be used to compact granular material if satisfactory drainage is provided for the free water. When compacting with water, place the granular material in layers not exceeding 12 inches (305 mm) loose depth. Saturate each layer thoroughly with water by flooding or jetting. In lieu of the above requirement for backfilling the full depth of the trench with granular material, backfill portions of deep trenches more than four feet (1.2 m) above the top of the conduit with suitable soil or granular embankment material, provided that such portions of the trench are sufficiently wide to accommodate the use of heavy compaction equipment. Meet the requirements of 203 pertaining to embankment construction for such equipment.

Place and compact proper embankment material for a width on each side of the conduit, equal to at least twice the diameter of the conduit, or 12 feet (3 m), whichever is less, and for a minimum depth of three feet (914 mm) over the top of the conduit when the top of a Type A or Type B conduit is above the top of the trench and is not in a proposed embankment. Place granular material one diameter or four feet (1.2 m), whichever is less, on each side of the conduit. Compact in layers not exceeding four inches (100 mm) in thickness with mechanical tampers. Place the remainder of the embankment material in accordance with the requirements of 203.

Follow the procedure outlined above when the top of a Type C, Type D, Type F or Type G conduit is above the top of the trench and is not in a proposed embankment, except that granular material will not be required.

Use suitable soil or granular material placed in layers not exceeding four inches (100 mm) in thickness, and compact with mechanical tampers above the initial backfill for Type D, Type F and Type G conduits. Compact the soil as required by 203.

Use suitable soil or granular material above the initial backfill for Type C conduit. Consolidate by thoroughly jetting with water. Consolidate trenches over 14 feet (4.3 m) in depth by jetting in two equal layers.

For jetting other than granular material, insert a hose not smaller than 1-1/2 inch (40 mm) in diameter and a nozzle not smaller than one inch (25 mm) diameter and not shorter than 2/3 the depth of the trench carrying water at a minimum pressure of 40 pounds per square inch (300 KPa) into the backfill in a uniform pattern to obtain maximum consolidation. After the final jetting of the trench, leave the backfill to settle and to permit drainage of impounded water. Include a water removal system, either natural or mechanical, in the typical jetting procedure.

Place at intervals not exceeding 500 linear feet (152.4 m) of trench. Raise settled trench surfaces to grade by filling with approved fill material and compacting to a density equal to that of adjacent ground.

Use suitable granular material to backfill above the bedding for Type E conduits. Compact with mechanical tampers. Tamp solidly under and around the pipe to a height above the flow line, equal to two-thirds of the diameter by the use of proper tools. Place the backfill to a depth of 12 inches (305 mm) above the top of the pipe carefully with shovels. Do not dump or shove directly into the trench. Do not use stones larger than four inches (100 mm) in diameter in this part of the backfill. If the granular material, in the judgment of the Engineer, is of a composition such that it will enter the joints of the pipe, wrap the joints with strips of tarred paper or tarred burlap, four inches (100 mm) in width. Pack backfill material around the paper or burlap to prevent its displacement. The above operation will generate no additional compensation for the Contractor.

Construct a uniform embankment over the sewer to a minimum depth of three feet (914 mm) above the crown, when the crown of the sewer is less than three feet (914 mm) below the ground surface. Excess excavated material may be used for this purpose. If there is not enough excess material, the Contractor shall furnish additional approved material without cost to the City.

Grade the surface of all backfill neatly and evenly to conform to the existing ground.

Place sufficient backfill to provide ample support for the sides of the excavation as directed by the Engineer before removing sheeting and bracing. Backfill with suitable material any cavities and voids exposed by, and resulting from, the removal of sheeting.

Do not operate heavy earth moving and compaction equipment closer than one pipe diameter, or six feet (1.8 m), whichever is greater, on each side of the conduit until placing and properly compacting a cover of four feet (1.2 m) over the top of the conduit. Lightweight dozers and graders may be operated over culverts having two feet (610 mm) of compacted cover.

Include payment for backfilling in the unit price bid for various 603 items.

**603.12 Clearing Site and Restoring Damaged Surfaces.** Add:

Immediately remove and dispose of all surplus materials including dirt and rubbish after the backfilling has been completed, as prescribed in 105.16 and 105.17. Unless otherwise called for on the plans, replace all pavement, sidewalks, sod or other surfaces disturbed, to a condition equal to or better than that existing before the work was started, or as specified in the "Street Restoration Book", furnishing all materials, labor, equipment, etc.

Perform the work where construction crosses private property in conformity with all agreements between the City and the owners. The Contractor is presumed to have examined these agreements before submitting the Proposal. Whether or not such an agreement exists,

replace or restore in a good and professional manner, all property removed, damaged, or destroyed in accordance with the following provisions:

A. Fulfill all work or requirements as noted on the Plans or called for in the Special or Detail Provisions, or the General Notes.

B. Replace or restore all fences, walks, driveways, utility or sewer lines, buildings or other structures removed, damaged or destroyed. Protect, replace, or restore all trees, shrubs, bushes, and other landscaping improvements, except where noted otherwise on the plans. Take into consideration existing shrubs or hedges crossing a permanent right-of-way or fence. Restore these as provided in the first sentence of this paragraph.

C. Where the work is in an area maintained as a lawn, garden, play field, fairway, etc., remove the top soil and keep separate. For restoration, grade the surface of the area disturbed. Remove any stones, harrow, and cover with a minimum of four inches (100 mm) of acceptable topsoil. Hand rake and fine grade the topsoil then restore with similar cover vegetation.

D. Where the work is in an area such as a pasture, meadow, or cultivated field, remove the top soil and keep separate. For restoration, grade the surface of the area disturbed, remove any stones, harrow, and replace topsoil.

E. When the work is in a ravine or other rough terrain, leave the premises in a neat and orderly condition Remove rubbish, construction materials and equipment. Grade, remove, or level off surplus excavation.

Perform all work under this item at no additional cost to the City by including it in the price bid for the various items of work.

**603.14 Methods of Storm Sewer Measurement.** Add:

Change the location of an appurtenance or an open-end pipe with the approval of the Engineer to accommodate full conduit sections, by measuring the length to the planned location or the changed location, then implementing whichever results in less cost to the City. When repairing a conduit on storm sewers, the length of conduit to be paid for shall be the actual number of linear feet (m) measured from the internal face of the appurtenant structure to the point of connection with the existing conduit. When changing the location of an appurtenance, measure the length of conduit to the internal face of the appurtenance.

The City will pay for video taping sewers on a lump sum basis for all sanitary or combination main line sewers video taped complete, including any retaping, all repairs, and final report preparation and submittal.

**603.15 Basis of Payment.** Add:

The number of tee branches ordered and accepted will be paid for at the Contract unit prices bid. The video taping of installed sewers, will be paid at the Contract unit price.

Payments will be made under:

| Item | Unit | Description |
|---|---|---|
| 603 | Each | T-branches |
| 603.029 | Lump Sum | Video Taping of Installed Sewers |

## Item 604 Manholes, Catch Basins, Inlets, Inspection Wells, Junction Chambers, Precast Reinforced Concrete Outlets, or Monuments

**604.02 Materials.** Add:

The City will furnish replacement of castings broken and/or needing replacement due to no fault of the Contractor. Obtain replacements at the appropriate City Storage Yard. Include the cost of hauling castings in the unit price bid for this item.

**604.03 Construction Methods, General.** Add in the first paragraph, fifth sentence after the word "manholes" the words ", except where the manhole is located within the street,"

Delete the second paragraph and add:

There will be no additional payment for any inlets or manholes where the structure elevation is changed four feet (1.2 m) or less. If the structure elevation is changed more than four feet (1.2 m), compensation or deductions for the work involved, whether increased or decreased, will be paid for under 602. Where it is necessary to construct catch basins or inlets over four feet (1.2 m) in depth, changes in the depth of walls will be paid or credited for under 602.

Add:

Supply all castings. Submit as directed by the Engineer. In addition to other requirements, provide only bicycle safe-type inlet castings.

Properly slope and set castings in conformity with the existing pavement surface, or so the new pavement and curbs may be constructed as shown on the Standard Drawings.

Fasten manhole frames to the manhole using at least four stainless steel anchors-3/4" x 4" or 4-3/4" x 3/4" (20 x 125 mm) expansion bolts.

Furnish grills for wing wall inlets. Fabricate from single refined wrought iron bars (ASTM A-189) as shown on the Standard Drawings. Place two coats of good quality black asphaltic paint on the grills. Apply one coat immediately after fabrication, and the other coat after installation.

Replace any existing walks disturbed during the construction of manholes, catch basins, and inlets at no additional cost to the City and in such manner as to conform in all details to their original construction unless the building of new walk is included in the work.

All connections for existing sewers, including drops and leads, except pipe included in 603, are considered a part of manholes, inlets and catch basins. Furnish and place six inch or eight inch (150 or 200 mm) drain tile, 706.07 or 706.09 in manholes, catch basins, and inlets for sub-grade drainage, where and as directed by the Engineer. Consider said tile a part of all manholes, inlets and catch basins.

Use Butyl mastic seals at manhole joints and at adjusting rings. See Acc. No. 49037.

When reconstruction of a manhole is specified, remove the domed section of the existing manhole and reconstruct the manhole to the new grade, conforming as nearly as practicable to the existing dimension and type of construction. Reuse the salvaged castings provided they are the latest version castings or use new castings.

When remodeling the bottom of existing manholes is specified, construct a new manhole invert to facilitate a change in pipe size, slope, elevations or sewer alignment. Construct the new bottom of brick or formed concrete masonry, as shown on Standard Drawing Acc. No. 49004. Brick Masonry is not permitted for concrete manhole construction.

Remove and haul away any construction material or other debris that may drop into the inlet chamber or manhole during Contractor's operation. Do not permit or cause any debris or construction material to enter the main sewer system. No separate payment shall be made for this work; therefore, include all costs in the price bid for these items.

**604.04 Excavation and Backfill.** Add to first paragraph:

Remove any obstruction necessary at no additional cost to the City.

Take all necessary precautions to protect the work already completed and the adjacent property. Should it be necessary to resort to blasting, be responsible for any and all damage to the work or to adjacent property. Before blasting, apply, pay for and receive for a permit from the City Engineer.

Delete the second and third paragraphs and substitute:

If the material found at grade is not suitable for foundation, excavate to a further depth and fill with suitable material. Payment shall be as provided in 210 and 211.

The Engineer may adjust the proposed locations of manholes, catch basins, and inlets during construction. If the flow line is changed more than one foot (305 mm) horizontally, provide for compensation or deductions under 109.05. The City Engineer must review and approve any changes in such facility locations before deviating from plans.

The backfilling shall follow the completion of the work as closely as the type of construction will permit. Take special care not to disturb the work. Use Controlled Low Strength Material (see Hamcin specification) for all backfilling within six feet (2 m) of all manholes and inlets unless otherwise approved by the Engineer.

Backfill excavations in streets which are paved or are to be paved using Controlled Low Strength Materials as specified in 613. Granular fill of the type specified for Type B conduits is prohibited.

Backfill excavations not located within two feet (610 mm) of the street pavement as specified for backfill above the initial backfill for Type C Conduit in 603.10.

Dispose of all waste surplus from excavation in accordance with 105.16 and 105.17 before laying in the mortar.

**604.05 Brick and Block Masonry.** Add:

Form channels in the bottom of manholes as shown on the Standard Drawings or as directed by the Engineer. Line both the channels and benches with vitrified brick or formed concrete masonry. Brick Masonry is not permitted for concrete manholes.

In constructing walls of storm manholes, lay the brick radially in a full bed of mortar with interior joints not more than 1/4 inch (6 mm) wide. Lay every seventh course as stretchers. Lay the intervening courses as headers. As the wall is laid up, anchor the manhole steps in the masonry as shown on the Standard Drawings. Place stubs in the wall of the manhole to accommodate inlet and other pipes entering the manhole. Support these stubs with brick masonry corbelled out from the side of the manhole, as shown on the Standard Drawing. In lieu of this corbelling, the pipe may be supported with brick or concrete masonry extending down to the bottom of the excavation. Dome the upper portion of the manhole as shown on the Standard Drawings. Draw in the walls gradually until the inside diameter is two feet (610 mm). Neatly point up the interior joints and clean the surface of all surplus mortar. Outside joints shall be entirely filled with mortar and the surface plastered with a mortar coat 1/2 inch (12 mm) in thickness. Manhole steps are not required in manholes.

Protect masonry joints from freezing for a period of five days.

Brick masonry is not permitted in junction chambers.

Add:

**604.056 Precast Solid Concrete Block.** Lay concrete blocks as specified for brick masonry under 604.05. Do not, however, use concrete blocks in construction of manholes and junction chambers.

Add:

**604.064 Precast Concrete Rings.** Seal joints in precast rings as prescribed under 604.03.

**604.08 Method of Measurement.** Add:

"Monument Boxes" after the words "Monument Assemblies."

**604.09 Basis of Payment.** Add:

The work included in this item, including excavation, backfill, hauling and setting castings, furnishing interceptor inlet castings and grills for wing wall inlets, reinforcing steel, where specified, restoration not included under conduit installation and for other incidentals necessary for completion of the items, shall be paid for at the Contract price, complete in place.

| Item | Unit | Description |
|---|---|---|
| 604 | Each | Remodel Bottom of Existing Manholes |

## Item 608 Walks, Curb Ramps, and Steps

**608.01 Description.** Add after the words "curb ramps" the words "detectable warning strips".

**608.02 Materials.** Add:

Base Course Concrete Walk.....608
Edge Restraint (Concrete Walk).....608
Bedding and Joint Sand ..... 703.02.A
Type "B" Clay Unit Pavers ..... 704.04
Type "O" Surface Applied Polymer Domes ..... 712.12
Type "F" Flat Plate..... 712.13

**608.03 Concrete Walks.**

**A. Excavation.** Add:

Saw and trim the existing sidewalk (at a joint) to a neat line wherever the proposed concrete sidewalk adjoins or abuts an existing sidewalk.

**C. Placing and Finishing.** Revise as follows:

Immediately before placing concrete, thoroughly moisten the subgrade. Deposit concrete in a single layer, strike it off with a template. Provide an even and uniform broom finish placed perpendicular to the curb line. Do not plaster the concrete. Use a 1/4-inch (6 mm) radius edging tool to edge all outside edges and joints. Divide the surface of the walks into equally spaced rectangular blocks at approximately 5-foot (1.5 m) intervals. Saw or form transverse joints to a depth of not less than one-fourth the thickness of the slab and to a width of approximately 1/8 inch (3 mm). Install 1/2-inch (13 mm) thick expansion joint filler between the walk and any fixed structure that extends the full depth of the walk. Install 1-inch (25 mm) thick expansion joint filler between the walk and the back of curb that is on a 250-foot (75 m) or smaller radius, such as at street intersections. Install 1/2-inch thick expansion joint filler at driveways as shown in the City Standard Drawings. Expansion joints shall be provided in sidewalks at such intervals, not exceeding 30 feet, as the Engineer may direct. These expansion joints shall be made of 1/2-inch thick and 5 inch wide preformed material.

Expansion joint filler shall be placed flush with the surface of the walk. Joint filler that is more than ¼ inch below the sidewalk surface shall be filled with caulk in accordance with Item 611- Caulking and Sealant.

Add:

**608.071 Detectable Warning Strip.** Furnish all labor, material and equipment necessary for the placement of detectable warning devices at curb ramps or other walking surfaces, complete and ready for service at the locations shown on the plans. The work includes but is not be limited to: layout, maintenance of pedestrian traffic, saw-cutting, removals, concrete and cement base materials, bedding, surface preparation, surface sealant, and repair of adjoining areas disturbed by the installation of the detectable warning surface.

Type "B" New Detectable Warning installations includes the forming of the recessed space required to accept the new pavers into the concrete ramp as a monolithic placement. See standard drawings, for typical details. Perform the work in accordance with Sections 4.1 and 4.7 of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) as amended through January 1998 and with Section 1108 of the Architectural and Transportation Barriers Compliance Board's "Draft Guidelines for Accessible Public Rights-of-Way", dated June 17, 2002 as amended, supplemented and adopted.

Ensure all detectable warning materials conform to ANSI A117.1—1998 Specifications. Submit manufacturer's certification of compliance with all applicable standards and drawings and/or catalog cutsheets to the City Engineer for approval at least three working days prior to installation. Submit four copies of the Manufacturer's technical data for each manufactured product.

Detectable warning surfaces contrast visually with adjacent walking surfaces either light-on-dark, or dark-on-light. Furnish textured surfaces to provide slip resistance. Submit color samples for approval by the City Engineer at least three working days prior to installation. Color submittals include manufacturer's statement of percentage of visual contrast provided according to ADAAG A4.29.2. Submit three samples made up of actual unit pavers – color and texture required. Include in each set of samples the full range of exposed color and texture that to be expected in the completed work. Brick red is the preferred color of a detectable warning used with a light background. Safety yellow or light granite is the preferred color of a detectable warning used with a dark background. The City Engineer may approve other colors.

Protect unit pavers and aggregate during storage and construction against wetting by rain, snow or ground water and against soilage or intermixture with earth or other types of materials.

**A. Types.** Material type of detectable warnings includes the following classifications:

**Type "B"—** Pre-Cast clay/ceramic paving bricks.

**Type "O"—** Surface Applied Polymer Domes.

**Type "F"—**Flat Plates applied to wet concrete.

**B. Sub-Base Course**. Compact sub-base to 8-1/2 inches (216 mm) below final grade. Provide base course material to bring the sub-base up to the appropriate level.

**C. Base Course.** The base course consists of five-inch (125 mm) thick plain concrete walk. Construct the top of concrete base course 3-1/2 inches (89 mm) below final grade. Shape the base course to grade and cross section with an allowable local tolerance of 1/4 inch (6 mm). Provide smooth trowelled finish and at least two weep holes at the low points in the depression. Fill weep holes with pea gravel and cover with filter fabric to prevent sand migration out of the depression.

**D. Edge Restraint.** Restrain Type B detectable warning strip bricks on all edges by six inch thick by nine inch wide (150 mm by 225 mm) cast in place concrete walk conforming to the requirements of 608. Do not place expansion joints immediately adjacent to brick pavers or through the edge restraint. Taper the transition between 9 inches (225 mm) thick walk and five inches (150 mm) thick walk over a distance of five inches (150 mm) as shown on the Standard Drawings.

**E. Size, Location and Alignment.** Detectable warning surfaces extend 24 inches (610 mm) minimum in the direction of travel and the full width of the curb ramp, landing, or blended transition. Locate the detectable warning surface so that the edge nearest the curb line is six inches (150 mm) minimum and eight inches (205 mm) maximum from the face of the curb line. Align the domes on a square grid, in rows parallel and perpendicular to the predominant direction of travel. Do not skew domes diagonally to the direction of travel.

**F. Application.** Prepare the surface of existing conforming ramps and install the detectable warning devices in accordance with Manufacturer's specifications and in accordance with this specification, or as otherwise specified on the plans. The finished surface is uniformly profiled to completely match the adjoining surfaces without lips, obstructions and drains completely.

If there is a delay of more than 24 hours in installing the pavers, before the depressed base is open to pedestrian traffic, fill the hole with clean stone conforming to ODOT Item 304. Remove all stone prior to placement of the sand bedding course.

Obtain approval of the finished base course before placement of the sand bedding course. Cover the weep holes with filter fabric to prevent migration of sand bedding. Spread the sand bedding evenly over the areas to be paved and screened to a level that will produce the required 2-1/4 inches (56 mm) thickness when the paving bricks have been placed and vibrated. Do not disturb the sand bedding course once it has been screened and leveled.

Lay the paver units in the approved pattern. Lay the bricks in such a manner that the desired pattern is maintained and the joints between the bricks do not exceed 1/8 inch (3 mm). Fill the gaps at the edge of the paved surface with standard edge pieces or cut the bricks to fit. Cut the bricks to a straight even surface without cracks or chips. All cuts to be within 1/16 inch (1.5 mm).

Protect the paving bricks with mechanical protection (carpet, rubber material, etc.) and vibrate to their final level by two or three passes of a vibrating plate compactor. After the first

vibration, brush sand containing at least 30 percent 1/16 inch (1.5 mm) particles over the surface and vibrate it into the joints with additional passes of the plate vibrator so as to completely fill the joints. Sweep the surplus material from the surface and leave the entire site clean. After the final vibrating, test the surface with a four foot (1.2 m) board to verify that the surface is true to grade and does not vary by more than 1/4 inch (6 mm) at any location.

**Detectable Warning, Type B Retrofit.** To install Type "B" Retrofit Detectable Warnings, remove existing sidewalk, replace with no less than the lower three feet of concrete curb ramp and install a new concrete ramp with recess to allow for the new bricks and sand bedding per 608.07. See standard drawings, for typical details.

**Detectable Warning, Type O.** Install Type "O" Detectable Warning installations, on pre-existing concrete curb ramp installations conforming to ADAAG. Do not use on new construction. Install the detectable warnings in accordance with the Manufacturer's installation instructions.

**Detectable Warning, Type F.** Install Type "F" Detectable Warning installations in new, wet concrete in accordance with the Manufacturer's published installation instructions.

**G. Warranty/Guaranty.** Provide a warranty that the application by the Manufacturer to last no less than five years without losing more than two percent of the truncated domes. Also provide a warranty by the Manufacturer for five years against fading, chipping, peeling, cracking, or loss of original shade due to sunlight, salt or exposure to weathering.

**608.08 Method of Measurement.** Add after the third paragraph:

The City will measure the actual square feet of detectable warning devices, furnished and in place, complete and accepted measured from center-to-center of the outer-most domes parallel and perpendicular to the ramp centerline, with both measurements each increased by two inches (50 mm) and then multiplied together. Round the square footage (square meter) calculation to the nearest one-tenth square foot (0.1 $m^2$). Complete this item and include all work necessary to provide a complete and useable detectable warning device

**608.09 Basis of Payment.** Add:

| Item | Unit | Description |
|---|---|---|
| 608 | Square Foot (Square Meter) | Detectable Warning, Type "B" |
| 608 | Square Foot (Square Meter) | Detectable Warning, Type "B" Retrofit |
| 608 | Square Foot (Square Meter) | Detectable Warning, Type "O" |
| 608 | Square Foot (Square Meter) | Detectable Warning, Type "F" |

## Item 609 Curbing, Concrete Medians, and Traffic Islands

**609.01 Description** Add:

Construct curbing in strict accordance with the following Standard Drawings on file in the City Engineer's office, which show the details of construction for the following various types of curbs.

Type A-1, Asphaltic Concrete Curb (Acc. No. 21429)
Type B-1, B-2 and B-3, concrete Curbs Integral with Concrete Base (Acc. No. 21431)
Type L-1, Standard Lug Concrete Curb (Acc. No. 21430)
Type P-1, P-2 and P-3, Concrete Curb Integral with Concrete Pvmt (Acc. No. 21432)
Type P-4 and R-2, Standard Concrete Combined Curb and Gutter (Acc. No. 21433)
Type R-1, Standard Conc. Roll Curb Integral with Concrete Pvmt (Acc. No. 21434)
Type S-1, S-2 and S-3, Standard Separate Concrete Curbs (Acc. No. 21435)

**609.04 Cast-in-Place Concrete Curb and Combination Curb and Gutter.** Add:

The finished curb form must measure precisely to the curb dimensions. Forms of greater or lesser height will not be permitted. Include backfill, compaction, and soil renovation consistent with Item 654 and Sodding, consistent with Item 660 for restoration adjacent to the curb. Adhere to the provisions of Item 660.09 Watering.

**609.08 Basis of Payment.** Add at the end of the first sentence of this section:

"regardless of whether the curb depth is of uniform or varying height."

| Item | Unit | Description |
|---|---|---|
| 609 | Foot (Meter) | Concrete Curb Repair, Type R-2 (Acc. No. 21511) |
| 609 | Foot (Meter) | Concrete Curb Repair, Type P-4 (Acc. No. 21511) |
| 609 | Foot (Meter) | Concrete Curb, Type S-1 (Acc. No. 21435) |
| 609 | Foot (Meter) | Concrete Curb, Type L-1 (Acc. No. 21430) |
| 609 | Foot (Meter) | Concrete Combined Curb & Gutter (Acc. No. 21433) |

Add:

## Item 611 Caulking and Sealants

**611.01 Description.** This item consists of caulking all joints in concrete to match existing, caulking around all metal accessories in concrete or brick paving, and all other caulking shown or required by any drawings and not included with another section or as designated by the Engineer.

**611.02 Materials.** Provide only products, that are recommended and approved by the Manufacturer for the specific use to which they are put and that comply with all requirements of the Contract Documents. For each generic product, use materials from only one Manufacturer. Provide only materials that are compatible with each other and with joint substrates. Provide colors of exposed sealers as selected by the Engineer. Provide materials conforming to:

Pavement Joint Sealant ..... 713.01
Primer ..... 713.02
Backer Rod ..... 713.03

**611.03 References.**

A. ASTM C 719 - 83 -- Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants under Cyclic Movement (Hockman Cycle); 1993.

B. ASTM C 920 - 87 -- Standard Specification for Elastomeric Joint Sealants; 1987

C. ASTM C 1193 - 91 -- Standard Guide for Use of Joint Sealants; 1991.

D. FS A-A-272 -- Caulking Compounds; 190.

E. FS SS-S-200E -- Sealants, Joint, Two-Compound, Jet-Blast-Resistant, Cold-Applied, for Portland Cement Concrete Pavement; 1984 (Amended 1988).

**611.04 Inspection.** Inspect all surfaces to receive caulking and sealant materials and report all defects. Starting work implies acceptance of surfaces as satisfactory. Verify that joints and spaces to be caulked or sealed are of proper width. Cure all concrete surfaces thoroughly. Do not apply caulking or sealants to surfaces contaminated with grease, oil, bituminous materials, form release agents, bond breakers, deleterious curing compounds, water repellants, and other special surface treatments

**611.05 Submittals.** Submit Product Data, Manufacturer's Installation/Application instructions and Cut Sheets for each joint sealer, including instructions for substrate cleaning and preparation, to the Engineer. Submit color selection samples consisting of cured samples of actual products showing the manufacturer's full range of colors available (products exposed to view only). Submit a Substrate Test Report for each Sealer as well as a Certified Test Report from an independent testing agency showing compliance with all specified requirements. Reports may be on tests conducted up to 24 months before submission, provided the products tested were aged specimens of the same formulation as to be used. Submit field inspection test

reports. Certificates for each sealer are required. Provide Manufacturer's certificate stating the product complies with the specifications and is appropriate for the use it is being put to. Submit Installer's preconstruction inspection report, listing all conditions detrimental to performance of the joint sealer work. Submit a schedule showing maximum joint spacing allowable for each sealant compound. Submit this schedule for all joint sizes within 30 calendar days after award of the general Contract. This schedule will be reviewed along with shop drawings to verify conformity with job requirements and Manufacturer's current technical bulletins.

**611.06 Preparation.** Review all materials abutting sealant joints to determine whether form release materials etc., will have a detrimental effect on adhesion of this project. Thoroughly clean all joints, removing all foreign matter and protective coatings. Do not use any cleaning solvent which may leave a residue.

Clean out joints in accordance with the recommendations of the sealer manufacturers and as follows: Remove all material that could impair adhesion, including dust, dirt, coatings paint, oil, and grease before starting sealer installation; Exception: materials tested to show acceptable adhesion and compatibility; Dry out damp and wet substrates thoroughly; Clean M-Type (mortar) and O-Type (Other) substrates by suitable mechanical or chemical methods; Remove loose particles by vacuuming or blowing with oil-free compressed air; Remove laitance and form release agents; Clean A-Type (Aluminum) and G-Type (Glass) substrates by chemical or other methods which will not damage the substrate; Use methods which will not leave residues that will impair adhesion.

**611.07 Substrate Test.** Furnish samples of actual substrate materials tested by the sealer product manufacturer. The substrate sample will be tested to determine what preparation procedures (if any) are necessary to make sealers adhere properly under environmental conditions that may occur during installation. Test to determine compatibility with substrates, backers, and secondary seals, if any. Use Manufacturer's standard test methods. Report the sealant Manufacturer's recommendations for substrate preparation and sealer installation and identify specific primers required. The requirement for testing will be waived if test reports based on previous testing of the product and substrates to be used are acceptable to the Architect/Engineer.

**611.08 Field Installation Tests.** Test the adhesion of all sealers to actual substrates before installation. Seal five foot (1.5 meter) lengths of joints and cure properly. Try to pull sealer out of the joint by hand, using a method recommended by the Manufacturer. Select test joints representative of joints to be sealed by the product to be tested. Perform this test for each type of sealer. Perform tests in the presence of the Architect/Engineer and the technical representative of the sealer's Manufacturer.

Peel Adhesion: Install samples in the field on various substrates with appropriate primers. Test samples at least ten days prior to commencing sealant work and inspect closely for adequacy of adhesion.

Primer Discoloration: Take special precautions to guard against primer being applied over any surface to remain exposed if discoloration is indicated and considered a factor.

Soundness of Substrates: Be responsible for providing sound, strong substrates of the dimensions shown on the drawings. Perform all subsequent work using the exact procedures established above.

Bear full responsibility for any decline in performance level of subsequent work, as compared to initial sample installations.

Mock-ups: Before beginning installation, install sealants in joints in actual construction as directed by the Architect, to show color, materials, and installation. Keep the Mock-ups intact as the standard for evaluating the completed work.

Pre-installation Meeting: Have the sealer installer, sealant manufacturer's representative, and other affected installer's meet to review sealer installation and protection procedures and the sequencing of related work.

**611.09 Installation.** Deliver materials in their original, un-opened containers or bundles with Manufacturer's label intact showing name of Manufacturer, product name, shelf life, date manufactured, and installation instructions.

Do not install sealers if any of the following conditions exist: air or substrate temperature exceeds the range recommended by the Manufacturer or is below 40° F (5° C); or if the substrate is wet, damp, or covered with snow, ice, or frost. Do not install sealers if joint dimensions are less than or greater than that recommended by the Manufacturer – notify the Engineer and get Manufacturer's recommendations for alternate products.

Examine joints for characteristics that may affect sealer performance, including configuration and dimensions. Do not begin sealer work until satisfactory conditions have been corrected.

Prime substrates as recommended by the sealer manufacturer. Use masking tape to keep primers and sealers off adjacent surfaces which would be damaged by contact or clean-up. Remove the tape as soon as practical. Prime all porous substrates for maximum adhesion. Check the recommended primer for possible yellowing, discoloration and dirt pick-up. Take adequate precautions to prevent the primer from being applied over the face of porous substrates by masking, etc., when dirt pick-up occurs after exposure. Apply the primer before installation of the backer rod.

Install fillers to provide proper joint depth or support for sealant backers.

Perform the initial work under the supervision of representative of the sealant Manufacturer. Maintain established job procedures, methods, and results for the duration of the project. Do not apply sealant below the temperature that is recommended by the Manufacturer in their published literature, and in no case under 40° F (5° C). When temperatures are between 40° F. and 50° F (5° and 10° C), check material for prolonged tack and cure rate. Where installation below 50° F (10° C) is unavoidable, use Manufacturer's paving joint low temperature catalyst. Do not use catalysts when temperatures remain above 60° F (16° C).

Job mix multi component sealants with suitable power operated equipment. Prior to mixing any sealants for the project, the sealant Manufacturer's authorized representative must inspect and approve all equipment, and approve all mixing procedures. Furnish a letter to the Owner's representative verifying such approval. During the course of caulking and sealing operations, conduct periodic inspections to insure that all equipment is functioning properly and approved procedures are being adhered to.

Retain on an approved preprinted card a button or plug from each cartridge of sealant. Cross-reference the card to the location on the project where the sealant from the cartridge is applied. Show the date of mixing and application, material, manufacturer's batch number, and cartridge numbers on plug cards. Protect filled cards from damage until plugs are cured and then turned over to the Owner's Representative. Retain cards until the completion of all caulking and sealing work and use to isolate and identify potential areas of defective sealant, material.

For joints 1/2 inch wide, make depth equal to width but not less than 1/2 inch. For joints 1/2 inch to one inch wide, make depth 1/2 inch. For joints over one inch wide, follow the Manufacturer's published recommendations. Do not twist or stretch the preformed bead type or rope type back up materials during installation.

Use release material between the back-up material and sealant to confine adhesion to surfaces of materials being joined at joints subject to movement, where required by nature of the back-up material used, or where sealant contacts the back of the joint. Follow Manufacturer's published recommendations exactly. Furnish release material over support backing for all traffic bearing joints (not required over polyurethane backing).

Neatly tool joints slightly concave using the tooling agents recommended by the sealant Manufacturer. Repair any air pockets exposed during tooling. Tool the joint so as to compress the seal material and improve adhesion to surfaces joined.

**611.10 Patching.** Patch or replace defective or damaged sealants. Be responsible for damage to adjacent surfaces caused by caulking and sealing operations, and repair or replace same as directed by the Engineer.

**611.11 Cleaning.** Clean adjacent surfaces soiled by caulking and sealing operations. Remove wet material before it "sets". Follow Manufacturer's recommendations for cleaning procedures. Use non-staining or injuring cleaning agents on exposed surfaces. Use cleaning agents that are not potentially dangerous to metal surfaces to wash-off by rain.

**611.12 Guarantee/Warranty.** Provide a guarantee on an approved form, warranting all sealant work against defective material or workmanship for five years. Guarantee must further state that all sealants are guaranteed against: adhesive or cohesive failure where joint spacing is within the limits called for on Manufacturer's data sheets; any crazing developing on the surface of the material; for five years of outdoor exposure; any staining of adjacent surfaces by the sealant and/or primer (yellowing, etc.); any puncture, abrasion or tear failures in self leveling sealants installed on grade; excessive dirt pick up, chalking or color change on surface or cured sealers; any increase or decrease in Shore A durometer in excess of 25 percent of

readings taken one month after cure. Supply an agreement to repair or replace all sealant defects, as listed above, which develop during the guarantee period at no cost to the City.

Add:

## Item 612 Tree Grates and Guards

**612.01 Description.** This work consists of furnishing all materials, equipment, and labor necessary to clean and paint tree grates and guards, enlarge tree grates including removing the tree grate, notching the radial spokes, breaking off the unwanted portions, and resetting the grate, and/or installing a new tree grate or half of a tree grate into an existing tree grate frame. Additionally, it may include adding washed pea gravel, if gravel settling has occurred.

**612.02 Materials.** Furnish materials conforming to:

Paint..... 708.05
Cast Iron Tree Grates..... 711.121
Pea Gravel .....703.01 - #8 Gradation

**612.03 Painting Tree Grates and Guards.**

**A. Preparation.** Prepare surfaces to be painted in accordance with the paint Manufacturer's published recommendations. Submit six copies of paint technical data, as well as thinning instructions and MSDS to the Engineer at least fourteen days prior to beginning paint preparation work. Deliver materials to the site in their original, unopened containers.

**B. Application.** Apply paint in accordance with the paint Manufacturer's published recommendations. Paint only surfaces that are clean and dry. Do not apply paint in rain, snow, fog, or mist, or to frosted or ice coated surfaces. Apply materials smoothly, spread or flow on evenly, free from runs, sags, brush marks, or other defects. Treat defective surfaces and sand all surfaces between coats of paint. Allow preceding coat to dry thoroughly before applying succeeding coat. Minimum time between coats is 24 hours, if faces are of uniform texture, color, and sheen.

Thin no coating more than specifically recommended in the Manufacturer's published literature. Use thinner of highest type of those recommended. Do not thin ready-prepared coating without the approval of the Engineer. Use pure, highest quality auxiliary materials, such as linseed oil, shellac, turpentine, etc., approved by the Engineer. Identifying labels must be placed on the material containers.

Apply all coatings by brush or roller unless spray application is specifically named as acceptable in description of required treatment. Thoroughly stir coatings and keep at a uniform consistency during application. Dispose of excess paint, thinner, and/or other auxiliary materials offsite in a lawful manner.

**612.04 Enlarging Expandable Tree Grates.**

**A. Construction.** Remove both halves of the tree grate and, using a pneumatic or electric cutting wheel or grinder, notch halfway through the surface of the grate where it is intended to be enlarged. When notching is completed, support useable portion of grate on a solid surface with notched areas approximately one half inch off the edge of solid surface. Strike the unusable portion of the grate with a hammer and fracture each notch separately. After the unusable portion is removed, use a grinder to smooth rough edges. Reinstall grate to original position. Take special care to protect tree and surrounding surface. Any tree or grate damage caused by this work must be corrected or compensated for as determined by the Urban Forest Manager.

**612.05 Installing New Tree Grate Into Existing Tree Grate Frame.**

**A. Preparation.** Furnish cast iron tree grates conforming to ASTM A-48-83 Class 35 or better, manufactured by Neenah Foundry Company, or approved equal. Furnish pea gravel washed and free of all debris.

**B. Paint and Primer.** Furnish new grates with paint and primer, if indicated on the plans or directed by the Engineer.

**C. Installation.** Backfill to one inch below grate seat with washed pea gravel. Clear all debris from grate seat prior to setting grate. Set grate flush with the top of the frame. Grate halves must be bolted together on the underside when bolt slots are provided. Do not damage the tree. Any tree damage caused by this work must be corrected or compensated for by as determined by the Urban Forest Manager.

**612.06 Method of Measurement Tree Grates.** The City will measure the number of tree grates and tree guards painted by each half grate. The City will measure enlarging expandable tree grates by each half grate enlarged. The City will measure furnishing and installing tree grates by the number by each half grate installed and accepted, complete.

**612.07 Basis of Payment.** Payment for the painting of grates and guards is full compensation for all labor, material, and equipment necessary to perform work described above. Payment for the enlarging of the tree grates is full compensation for all labor, material and equipment necessary to perform work described above. Payment for furnishing and installing tree grates is full compensation for all labor, tools, material, and equipment necessary, including proper backfilling for each grate.

| Item | Unit | Description |
|---|---|---|
| 612 | Each | Painting Tree Grates and Guards |
| 612 | Each | Enlarging Expandable Tree Grates |
| 612 | Each | Installing New Tree Grate into Existing Frame |

## Item 613 Low Strength Mortar Backfill

Delete the contents of this Item and substitute:

Use the current version of the HAMCIN: CLSM – CDF specifications that are on file with the Office of the City Engineer.

## Item 614 Maintaining Traffic

**614.01 Description.** Add at the end of this section:

Keep a copy of these notes available at the site anytime work is in progress.

All subcontractors must adhere to the same MOT (Maintenance of Traffic) requirements as the General Contractor.

**614.02 Traffic Facilities.** Add after the second sentence in Subsection "A":

Maintain Police and Fire Access at all times.

**614.03 Traffic Control General.** Add after the first paragraph:

Perform the required work with the maximum safety of, and the least inconvenience to the traveling public and the Contractor. The Engineer must approve any proposed variance from the Maintenance of Traffic notes in advance, in writing. Except as modified below, the requirements for maintaining traffic, as indicated in the "State of Ohio Department of Transportation Construction and Material Specification", Item 614; "The Ohio Manual of Uniform Traffic control Devices" (OMUTCD or the Ohio Manual), Part 6; and the City of Cincinnati "Traffic Safety Handbook" (Blue Book) current editions, latest revisions and pertinent items of Specifications and proposal shall apply.

To assure maintenance of adequate traffic control at all times, do not install or remove any traffic control devices without the approval of the City Traffic Engineer, his or her designee and the Engineer. Submit a Maintenance of Traffic Plan 14 days prior to the start of construction. The MOT plan is subject to review before implementation. Include a drawing accurately depicting the alignment of the roadway, and indicating all traffic control devices and their alignment, (north direction arrow, street names, travel direction, sign spacing, signs wording, device placement, lane widths, barricades, lights, pavement markings, etc.).

At the Pre-Construction Meeting, submit to the Engineer the name and telephone number of a person(s) who can be contacted 24 hours a day by the City of Cincinnati and all interested Police agencies. This person(s) shall be responsible for replacing and maintaining necessary traffic control devices per the approved traffic control plan.

Add after the last paragraph:

Keep all equipment clean and in proper working condition. Use only retroreflectorized or illuminated signs of the most recent color and type as specified in the Ohio Manual.

The Contractor is required to obtain prior approval from the Engineer for any work on the weekend or nights.

Add:

**614.031 Notifications.** Notify the following, five working days prior to the start of work and any street closure with the approval of the City Traffic Engineer or his or her designee and the Engineer:

A. Local Police District
B. Local firehouses
C. Queen City Metro/SORTA
D. TANK (for work in the CBD)
E. Local schools.
F. Local hospitals
G. Abutting property owners
H. Additional contacts as required by the Engineer.

If temporary signs to restrict parking are installed, notify the local Police District 24 hours prior to installation and post the signs at least 14 hours before the parking restriction listed on the signs. Use properly worded temporary signs with legible dates and times.

Contact the Traffic & Road Operations Division Supervisor at 200-5212 or TSB (Traffic Services Bureau) Controller Service Section at 352-4391 or 378-6200 at least one week prior to any grinding or curb repair operations near vehicle loop detectors. Coordinate an acceptable date with them to begin grinding work in order to save the existing loops or to arrange for proper signal operation if the loops must be destroyed. Coordinate with them to ensure that the existing pavement markings are documented and the proposed pavement marking drawing is ready prior to beginning grinding operations and/or paving operations.

**614.04 Work Zone Marking Signs.** Add after the third paragraph:

C. Erect a ROAD WORK AHEAD sign and a END ROAD WORK sign on permanent mountings on all project streets and all side streets leading into or out of the project area for the length of the project. Mount signs between 100 feet (30.5 m) and 200 feet (61 m) from the project area. These signs are not to be considered replacements for any advanced warning signs used for lane closures.

Remove all signs no later than 15 days after the completion of the project.

**614.07 Traffic Maintained.** Add after the first paragraph:

Replace any traffic control device that becomes moved or damaged during the duration of the project. Assign a competent person to check the work zone on a daily basis to correct any deficiencies. Make checks before work is to start for the day and continuously throughout the

day. Make a final check before leaving the site for the day to assure all devices are in place or, if not needed, are covered, turned or removed from the site. Cover, turn sideways or remove from the site any unnecessary signs when no work is being performed and no roadway hazards are present.

Add after the fifth paragraph:

Use flashing arrow panels for all lane closures. Flashing arrow panels may be required at any time during the job or project by the Right of Way Management Inspector or a Traffic Engineering official. Use arrow panels in the CBD for any work in a travel lane. Conform to the Ohio Manual Part 6, Section 6F.53, "Arrow Panels". For a stationary lane closure, locate the arrow panel on the shoulder at the beginning of the merging taper. Where the shoulder is narrow, locate the arrow panel in the closed lane. Use arrow panels in combination with appropriate signs, channelizing devices and other temporary traffic control devices. Locations which will require a flashing arrow panel will be as directed by the Engineer, as approved in the MOT notes and drawings, or as specified in the Detailed Specifications, General Notes, and/or Special Provisions for the Project.

Use properly weighted 36 inch (914 mm) drums or 36 inch (914 mm) grabber cones for standard channelizing devices for closing any lane to traffic. Use 36 inch drums or 36 inch grabber cones for tapers for lane closures. 28 inch (710 mm) cones may be used for daytime only, short duration closures. Do not exceed the distance equal to the posted speed limit for the spacing between all channelizing devices in the taper and transition area (example: if the posted speed is 25 MPH, make the spacing 25 feet). Do not exceed two times the posted speed limit as the maximum space between channelizing devices in the tangent area. Use channelizing devices that are orange in color with two or three retroreflective bands. Use only retroreflective material on channelizing devices that has a smooth sealed surface that will display approximately the same color day and night. Keep all retroreflective materials on devices in good condition, maintaining their retroreflective properties.

Restrict all vehicles, equipment, workers and their activities to one side of the pavement at all times, unless otherwise approved by the Engineer. Do not park or stop vehicles or equipment except within designated areas. Enter and leave work areas in a manner that will not be hazardous to, or interfere with, the normal flow of traffic. Do not park personal vehicles within the right-of-way, except in specific areas designated by the Engineer.

Maintain pedestrian protection and pedestrian access at all times in conformance with the Ohio Manual part 6D.01. “Pedestrian Consideration”. Pedestrian safety is of utmost importance throughout the life of the Contract. Do not lead pedestrians into conflicts with work site vehicles, equipment or operations. Do not lead pedestrians into conflicts with vehicles moving through or around the work site. Provide pedestrians with a safe, convenient path that replicates as nearly as practical the most desired characteristics of the existing sidewalk(s) or a footpath(s). If the pedestrian pathway is to be closed, post signs and direct pedestrians to the safest crossing point. If the pathway is to be closed between safe crossing points, post signs in advance of the closed area at a safe crossing point or make arrangements for safe pedestrian passage. Provide approved type pedestrian barriers if required by Traffic Engineering or the Engineer. The safety of pedestrians is the responsibility of the Contractor.

Add after the last paragraph:

Unless additional requirements are cited in the Contract Documents, conduct construction operations so that all lanes are open and available for the movement of traffic between the hours of 7 A.M. and 9 A.M. and between 4 P.M. and 6 P.M., Monday through Friday. During all other working times, close only one lane at a time unless prior approval is obtained from the City Traffic Engineer or his or her Designee and the Engineer.

Failure to comply with the provisions of all Maintenance of Traffic items will result in liquidated damages being assessed against the Contractor at the rate listed in the Contract Documents for failure to complete on time. Liquidated damages will be assessed for each violation, each day.

Maintain work zone and other maintenance of traffic control as required by the Engineer in order to perform any materials testing or other related work at no additional cost to the City. Do not remove or modify the work zone pattern(s) until the Engineer has given his or her consent to do so.

**614.09 Law Enforcement Officer.** Add:

The use of a police officer(s) with a marked police vehicle is encouraged and may be required by Traffic Engineering or the Engineer when work is done within a signalized intersection. The hiring of a police officer is for traffic control assistance with traffic and pedestrian control, for the safety of the traveling public, pedestrians and for the safety of the workers. Make arrangements and pay for the services of an off-duty police officer and cruiser, as needed. The Cincinnati Police Department (564-1880) requires advance notice for these services. Discuss the duties of the police officer before the work is started.

Obtain approval from Traffic Engineering in advance of the closing of any road for the purpose of the proposed work. Provide advance notification in accordance with the Plans and Section 107.22.

**614.10 Work Zone Traffic Signals.** Add:

Refer to Section 1314 of this supplement for the requirements of Maintenance of Existing Traffic Signals and Street Lighting Circuits.

**614.11 Work Zone Pavement Markings.** Add:

Perform all permanent pavement markings under a separate pay item (See Item 640 – Pavement Marking and related sections). This does not relieve the Contractor from the responsibility to maintain visible markings after each workday.

Following both the grinding operation and the placement of the intermediate course of pavement, install Class I (full pattern) work zone pavement markings per the Pavement Marking Plans no later than the end of the work day and maintain them until the intermediate course or the surface course (whichever is applicable) of pavement is complete. Machine apply paint and glass beads. Do not spray paint markings using aerosol cans.

If areas of the roadway are opened to traffic after grinding and/or leveling operations, place temporary reflectorized foil tape following the Pavement Marking Plans immediately after both the grinding and the paving operations and maintain it until the full striping pattern is installed at or before the end of the work day. Place the foil tape as follows:

| | |
|---|---|
| Centerline | 1 foot yellow dash every 20 feet |
| Lane Line | 1 foot white dash every 20 feet |
| Stop Line | 1 foot white dash every 5 feet |
| Crosswalk Line | 1 foot white dash every 5 feet |

Following the placement of the surface course of pavement, install Class I (full pattern) work zone pavement markings per the Pavement Marking Plans no later than the end of the work day and maintain them until the permanent pavement markings are complete. Machine apply paint and glass beads. Do not spray paint markings using aerosol cans. Place temporary **removable** reflectorized tape (per the Pavement Marking Plans) immediately after paving utilizing the spacing listed above and maintain it until the work zone pavement markings or the permanent markings are complete. Use "Scotch Lane" 5710 Series Detour Grade tape manufactured by the 3M Company or an approved equal. **Do not use foil tape on the final or surface course**. Complete Work Zone or permanent pavement markings at or before the end of the work day the final or surface course is placed.

Install markings with the same professional alignment and general positive guidance that is utilized with the permanent pavement markings. The installation and maintenance of the work zone and other temporary markings are considered subsidiary obligations under the maintenance of traffic work items and separate payment for performing this work will not be made unless the bidding documents state otherwise.

Add:

## Item 627 Driveways

**627.01 Description.** This work consists of the construction of Portland cement concrete driveways, or Portland cement concrete base and asphaltic concrete surface driveways, and full-depth hot-mix asphalt driveways, including all the labor, materials, and equipment required to construct the driveways complete including excavation, preparation of the sub-grade, construction of the base if applicable, construction of expansion joints, curing of concrete and placing asphaltic concrete surface. Construct concrete driveways seven inches (178 mm) thick. Sidewalks that cross the driveway shall be seven inches thick. Construct concrete base and asphaltic concrete surface driveways with a seven inch (178 mm) base and a two inch (51 mm) surface course.

**627.02 Materials.** Furnish materials conforming to:

| | |
|---|---|
| Aggregate Base | 304.01 and 304.02 |
| Asphalt Concrete – Type 1 | 448 |
| Concrete – Class C | 499 and 511 |
| Expansion Joint Material | 705.03 |

**627.03 Driveways.** Construct driveways in accordance with the applicable standard drawings and as follows. Construct to the length and width approved by the Engineer.

**627.04 Excavation.** Excavate to the required depth and to a width that allows installation, bracing and subsequent removal of forms. Fine grade and solidly compact the subgrade with a five ton roller. Compact the subgrade by heavy tamping where the use of a roller is impractical. Excavate to allow for installation of base where required by the Plans or standard drawings.

**627.05 Forms.** Use forms made of either steel or sound two-inch plank, straight, true and clean. Set the forms true to line and grade, firmly staked down and well braced.

**627.06 Placing and Finishing.** Place concrete in accordance with the requirements of 451.06. Provide an even and uniform broom finish placed parallel to the curb in the apron portion and perpendicular to the curb in the sidewalk portion. Place preformed expansion joint filler 1/2 inch thick on both sides between the driveway and the curb. If the driveway is over 30 feet long, use one inch thick joint filler along the curb. Install expansion joint filler and depress 1/4 inch and seal as provided in 451.15. Place expansion joint filler in the sidewalk portion as shown on the City Standard Drawings. Concrete shall be seven inches thick between these expansion joints.

**627.07 Curing.** Cure concrete driveways in strict accordance with the provisions of 451.10.

**627.08 Asphalt Surface Course.** Construct the asphalt surface course, where applicable, in accordance with the requirements of 448. Do not place asphalt surface course until the concrete driveway has cured sufficiently to support paving operations without damage.

**627.09 Asphalt Driveway**. This work consists of repairing/replacing asphalt driveways and asphalt aprons. Sawcut a neat perpendicular joint across the driveway at the limit of removal. Remove the necessary existing asphalt pavement and compact the subgrade. Place and compact full-depth 448 Type 1 hot-mix asphalt. Match the new pavement thickness with the existing driveway section. Seal the joint with an asphalt binder material meeting the requirements of 702.01 of the ODOT CMS.

**627.10 Method of Measurement.** The City of Cincinnati will measure driveways by the square foot of finished surface complete in place.

**627.11 Basis of Payment.** Payment for driveways is full compensation for excavation, backfill, base course material where required, expansion joint material and incidentals required to complete the driveway.

The City will pay for accepted quantities at the Contract price as follows:

| Item | Unit | Description |
|---|---|---|
| 627 | Square Foot | Concrete Driveway |

| | | |
|---|---|---|
| | (Square Meter) | |
| 627 | Square Foot | Concrete Base and Asphaltic |
| | (Square Meter) | Concrete Surface Driveway |
| 627 | Square Foot | Asphalt Driveway Repair |
| | (Square Meter) | |

Add:

## Item 628 Sawing Concrete

**628.01 Description.** This work consists of providing all necessary labor, materials and equipment to perform sawing of concrete work except when sawing is included under other items of the work. Using a diamond saw blade, saw to a minimum depth of 1-1/2 inch (40 mm). Make the saw cuts carefully and in a neat manner with an approved concrete saw. No Vermeer™ concrete cutter or similar type of equipment utilizing a wide rotary cutting wheel will be permitted for this work. Provide layout of proposed sawcutting and obtain approval from the Engineer prior to starting work. Repair concrete not to be removed but damaged by the sawing operation without cost to the City and to the Engineer's satisfaction.

**628.02 Method of Measurement.** The City will measure the actual number of linear feet of concrete sawed to the required depth.

**628.03 Basis of Payment.** Payment for Sawing Concrete includes the costs of providing sawblades, traffic control, and subsequent clean-up of saw slurry and/or debris and disposal of same in a lawful manner. The City will pay for accepted quantities at the Contract prices as follows:

| Item | Unit | Description |
|---|---|---|
| 628 | Foot (Meter) | Sawing Concrete |

Add:

## Item 629 Curbs Reset

**629.01 Description.** This work consists of resetting and trimming existing curbs to line and grade with the face vertical. This work also consists of excavating, backfilling and installing concrete base and restoring adjacent surfaces. Reset only curbs in good condition as designated by the Engineer.

**629.02 Materials.** Furnish materials conforming to:

Aggregate Base.....304.01 and 304.02
Asphalt Concrete Surface Course .....448
Concrete Base.....451
Concrete – Class C .....499 and 511
Expansion Joint Material ..... 705.03

**629.03 Excavation**. Excavate the trench for the curb to a depth of 24 inches (610 mm) below top of curb grade and to a width of 12 inches (305 mm) back from the curb line unless otherwise indicated on the plans or directed by the Engineer. Fill any areas of over-excavation with compacted aggregate base meeting the requirements of 304.

**629.04 Curb Preparation.** Re-dress the ends of the old curbs to make a joint not exceeding 1/4 inch (6 mm) wide for a distance of 12 inches (305 mm) down from the top.

**629.05 Concrete Base for Curb.** Spread a layer of stiff concrete on the bottom of the trench after the trench has been thoroughly cleaned of all loose material. Adjust and tamp concrete to correct line and grade.

**629.06 Resetting Curb.** Set the curb true to line and grade with the face vertical after the subgrade of the street has been roughly finished, Place additional concrete in back of the curb to a depth of eight inches (200 mm) from the top of the curb and spade well and tamp. Where driveways are required, lower the curbs as directed. Trim off the projecting ends of the adjoining curbs as shown on Standard Drawing Acc. No. 21508.

**629.07 Backfilling.** After the concrete has cured, fill the remaining space behind the curb with fine earth tamped to solid compaction where sod space adjoins curb. Where walk or driveway adjoins curb, backfill with aggregate base meeting the requirements of 304.

**629.08 Restoration.** Restore the Portland cement concrete walks, driveways and concrete base disturbed in the resetting of the curbs, as directed. Where directed, place expansion joint material behind the curb and between sections of curb.

**629.09 Method of Measurement.** The City will measure the linear feet of curb reset, complete in place.

**629.10 Basis of Payment.** The additional costs associated with excavation, moving the curbs (if required), concrete for bedding, backfill, and restoration of sod space, and roadway are incidental to the completion of this item. Disturbed concrete walks and driveways shall be removed and restored to the nearest joint. Concrete walk and driveway restoration will be paid at the unit bid price of Item 608 or 627.

The City will pay for the accepted quantities of curb reset at the Contract price per linear foot as follows:

| Item | Unit | Description |
|---|---|---|
| 629 | Foot (meter) | Curbs Reset |

## Item 630 Traffic Signs and Sign Supports

**630.03 Certified Drawings.** Add after the first paragraph:

Submit to the City Traffic Engineer for review and approval seven sets of drawings, catalog cuts and specifications for all traffic control signs. Do not purchase or install any signs without written approval from the City Traffic Engineer.

**630.04 Sign Fabrication.** Add after the second sentence in the fifth paragraph:

Cut blanks of the thickness, size and shape as specified in the drawings. Ensure that all corners are properly rounded and free from rough edges.

Add in the last sentence of the fourth paragraph the word "green" after the word "reflective".

Add after the fifth paragraph:

Use the official highway alphabet and letter series as shown on drawings that will be provided for all sign legends. Match existing signs and samples that may be provided for all inks and colors for the reflective sheeting. The City will not accept signs with improper color schemes or non standard fonts. The Contractor is advised to make sample signs for review and approval by the City before producing large runs of signs.

Add to the eighth paragraph under the list of signs to be fabricated using fluorescent yellow green reflective sheeting:

| | |
|---|---|
| CITY #63PL & #63P | SCHOOL |
| CITY #63 & 63L | ADVANCE SCHOOL WARNING |
| CITY #65 & #65L | ADVANCE SCHOOL WARNING |
| CITY #66 & #66L | SCHOOL CROSSWALK |
| CITY #159, #169I & #169R | BACKGROUND FOR WORD "SCHOOL" |

Add**:**

**C. Curb Control (Parking) Sign Erection.**

Mount at a 45 degree angle from the curb. Mount all other signs at a 90 degree angle from the curb (perpendicular). See City standard drawings ES-6-1 and ES-6-2 for sign mounting and post installation details.

**D. Parking Meter/Post Erection.** Parking meter heads shall be removed and installed by city forces only as directed by the Engineer. Do not remove any meter posts until City forces have removed the meter heads. See City standard drawing ES-6-2 for sign mounting and post specifications and installation requirements.

**E. Street Sign Erection.** Maintain and keep erect all existing street signs during construction. When necessary due to construction conflicts or activities, relocate the existing if possible or remove the existing for storage and pick-up by City forces. Provide a minimum of seven days notice to the Division of Traffic Engineering prior to the final traffic sign installations to arrange for city forces to erect the final street name signs unless otherwise noted on the

Plans. Payment for the above work shall be included in the lump sum price for Item 614 Maintenance of Traffic.

**F. Pole Mounted Sign Erection.** Meet the requirements of Item 630 including the exceptions shown on city standard drawing number ES-6-1 for the pole mounted sign support assembly. Include in the unit bid price the necessary labor, brackets, banding, hardware and equipment to mount each assembly.

Add:

## Item 634 Project Sign

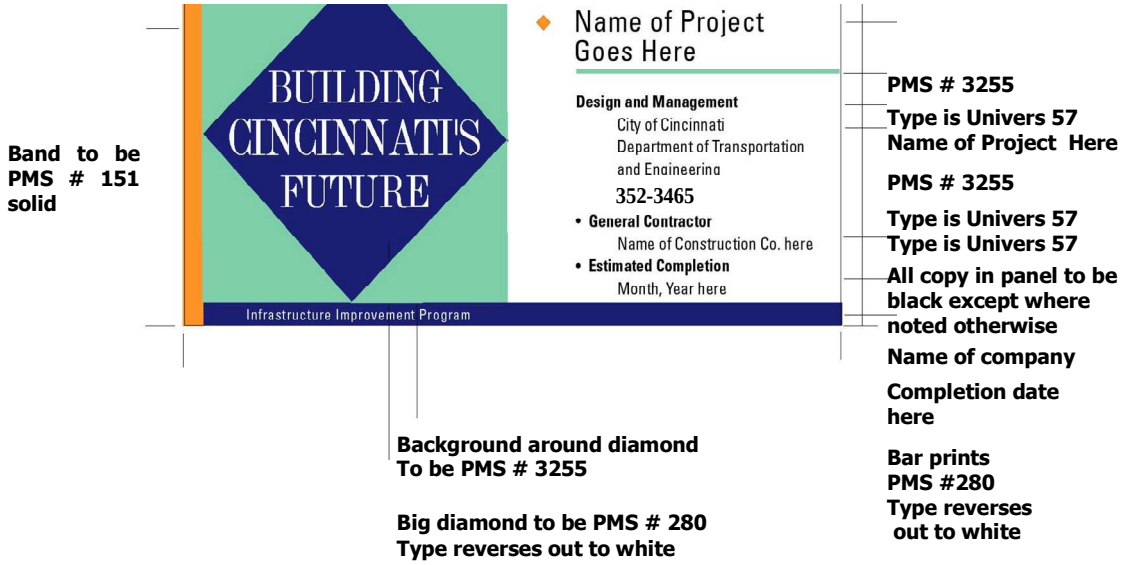
**634.01 Description.** This work consists of providing all labor, materials and equipment necessary to furnish, erect, maintain for the duration of the project, and subsequently remove a new, professionally painted, project sign. This work also includes any necessary restoration of surfaces after removal to return the area(s) disturbed to as good as or better condition than originally existed.

**634.02 Materials.** Furnish materials conforming to:

| | |
|---|---|
| Anchors (if required) | Stainless Steel Epoxy Type, UNO |
| Concrete, Class C (if required) | 499 |
| Sign Board | MDO Board – Size 4′ x 8′ UNO |
| Sign Posts | 4″ x 4″ Treated, UNO |
| Stainless Steel Hardware (if required) | 730.10 |

**634.03 Construction.** Manufacture sign in accordance with the graphic shown below, including colors, fonts, and graphics. Add the project name, general contractor's name and completion date to the sign. Provide proposed sign layout diagram to Engineer for approval at least 10 working days prior to project start. Erect sign using sign posts set firmly into the soil and braced as necessary, unless noted otherwise in the bidding documents. Maintain sign until project completion or as otherwise directed by the Engineer. Locate signs in accordance with the bidding documents or as directed by the Engineer.

**Diamond to be PMS # 151**




Direct questions regarding sign to Laura Martin, Department of Transportation and Engineering, at (513) 352-5268, (513) 352-5336 (fax), or laura.martin@cincinnati-oh.gov.

**634.04 Method of Measurement.** The City will measure Project Signs by the number of signs provided and satisfactorily installed, maintained for the duration of the project, and subsequently removed, including the posts and any hardware necessary to provide for a complete installation, and any work necessary to restore disturbed surfaces after sign removal.

**634.05 Basis of Payment.** The City will pay for the accepted quantity at the Contract price for:

| Item | Unit | Description |
|---|---|---|
| 634 | Each | Project Sign |

## Item 635 Cutting and Trimming Old Granite Curbs

**635.01 Description.** This work consists of the cutting and trimming of old granite curbs which are spalled or otherwise damaged, so that they will be acceptable to be reset in the new improvement. When so ordered, cut and form new ends on damaged curbs. Square and dress ends to afford joints not exceeding 1/4 inch (6 mm) wide for a distance of 12 inches (305 mm) down from the top of the curb.

**635.02 Method of Measurement.** The number of newly dressed ends will be the actual number of cuts made regardless of whether a cut produces one or two new ends.

**635.03 Basis of Payment.** The City will pay for the accepted quantity at the Contract price for:

| Item | Unit | Description |
|---|---|---|

| | | |
|---|---|---|
| 635 | Each | Cutting and Trimming Old Granite Curbs |

Add:

## Item 636 Bicycle Rack

**636.01 Description.** This work consists of furnishing all labor, materials and equipment necessary to construct and erect the completed bicycle rack of the type specified. Include all anchors, foundations, connections, shimming, and finishes necessary to complete this work. See the standard drawings for additional information.

**636.02 Materials.** Furnish materials conforming to:

Concrete – Class C ..... 499
Concrete pad ..... 608
Foundations.....630.05
Steel pipe .....707.70
Powder Coating.....708.06
Galvanizing .....711.02
Steel Base Plates.....ASTM A36, 730.09
Anchor bolts .....ASTM A36
Stainless Steel Pipe.....730.09
Stainless Steel Hardware.....730.10

**636.03 General.** Make the line and grade of the bicycle rack true to that shown on the plans. Shim vertically flange mounted racks. Designate Rack Types as "Type A/B/C/D/E – Capacity-Mounting-Finish" where:

Type is .....A, B, C, D or E
Capacity is either: .....2 or 4
Mounting is either: ..... Flange (F) or Embedded Post Foundation (X)
Finishes are: Galvanized (G), Stainless (S) TGIC Powder Coated (T) or Powder Coat over Galvanized (G+T)

**636.04 Fabrication.** Fabricate bicycle racks out of steel pipe, nominal diameter, Schedule 40. Bend the pipe in one piece as shown on the standard drawing. Do not weld the bicycle rack in sections. Fabricate the base plate and cross bar in accordance with the standard drawing and continuously welded to the steel pipe prior to finishing. Finish the entire unit as specified.

**636.05 Finishes.** Clean steel to near white steel and treat with iron phosphate pre-treatment when TGIC powder coat finish (T) is specified.

Hot-dip galvanized racks after fabrication in accordance with 711.02 when galvanized finish is specified.

Powder Coat over Galvanized (G+T) – Galvanize per 711.02, but do not quench (water, chromate, phosphating) or apply any other post treatments prior to powder coat finish (T).

Polish stainless steel racks to #4 Architectural or satin finish after fabrication when stainless finish is specified.

**636.06 Construction.** Locate foundations for bicycle racks and stake at the proper location in accordance with the plans. The City will provide the staking where no locations or dimensions are given on the plans.

Prior to excavation, check for underground obstructions. After stakeout, notify the Engineer at least three days before the scheduled work so that the rack locations may be field checked by the Engineer for approval. The Engineer may change the bicycle rack location due to underground obstructions or lateral clearance requirements. After approval, take responsibility for the correct location and orientation for all rack foundations.

Perform excavation for foundations by earth auger; however, in areas of underground utilities, excavation must be by hand labor.

Use internally threaded epoxy system anchors, 1/2 inch (12 mm) (bolt size as manufactured by Epcon or approved equal). Conform installation to the Manufacturer's instructions. Anchors must be capable of developing an ultimate load capacity in tension of 2,000 pounds (900 kg). Install anchors in structural slabs to a depth not to exceed 75 percent of the thickness of the slab.

Core drill existing walks and structural slabs for flange mounting, using anchors and prepared in accordance with the Manufacturer's instructions. Shim flange mounted racks vertically, perpendicular to the rack.

**636.07 Shipping and Storage.** For bicycle racks, furnish only. Package all parts in protective plastic material and cardboard to protect finishes during shipping and storage.

Deliver packaged racks to:

Fred Anderton, Manager, Lunken Airport
City of Cincinnati, Division of Aviation
262 Wilmer Avenue, Cincinnati, Ohio 45226
513-352-6340

**636.08 Method of Measurement.** The quantity of bicycle racks will be for each type of bicycle rack installed. Do not measure anchors, excavation and concrete for foundations separately. Measure and pay for walk removal, concrete pads and concrete pavers installed for bicycle racks separately.

**636.09 Basis of Payment.** Payment will be made at the Contract unit price bid for each Furnish Bicycle Rack Type, which will be full compensation for all labor, equipment, tools, and incidentals necessary for each item furnished complete, in place, and accepted.

| Item | Unit | Description |
|---|---|---|
| 636 | Each | Bicycle Rack – Type A, B, C, D or E |

| | | |
|---|---|---|
| 636 | Each | Furnish Bicycle Rack – Type A, B, C, D or E |

## Item 637 Sheeting and Bracing Ordered Left in Place

**637.01 Description.** This item provides for payment only for sheeting and bracing left in place if shown on the Plans or in compliance with a written order from the Engineer. Cut off all sheeting and bracing left in place on a line six feet below the existing or proposed street surface, or three feet below the existing or proposed ground surface if not within the street right-of-way.

No payment will be made for waste material, for material cut off, for the excess size of unnecessarily large timbers. Sheeting and bracing left in place at the option of the Contractor, and sheeting and timbering left in tunnel will not be paid for under this item.

The right of the City to order sheeting or bracing left in place cannot be construed as an obligation upon the City to issue such orders, nor does the compliance with such orders or failure on the part of the City to exercise its right to issue such orders, release the Contractor from the responsibility for any damage caused by its operations, nor from its responsibility to protect the work and adjacent property.

**637.02 Method of Measurement.** The quantity measured is the number of board feet of sheeting and bracing ordered left in place or left in place as shown on the Plans. Sheeting will be considered to be two inches thick, unless heavier sheeting is ordered.

**637.03 Basis of Payment**. Payment for accepted quantities left in place in accordance with this specification will be made at the Contract price bid per 1,000-board foot measure (MBFM) which includes all the labor, materials and equipment required to furnish, install and cut off the sheeting and bracing for:

| Item | Unit | Description |
|---|---|---|
| 637 | MBFM | Sheeting and Bracing Ordered Left in Place |

Add:

## Item 639 Architectural Poles and Accessories

**639.01 Description.** This item consists of providing all labor, materials and equipment necessary to fabricate, finish, transport, store, and erect architectural poles, hardware, accessories, attachments, meter arm holders and foundations complete and ready for service, including cleaning and preparing all exposed steel and aluminum surfaces (including the poles), and subsequently powder coating them. This item also includes the necessary excavation and backfill and disposal of excavated materials lawfully offsite and restoration of disturbed surfaces to a condition equal to or better than existing.

**639.02 Materials.** Furnish materials conforming to:

Bolts, Nuts, Washers (High Strength Unless Noted Otherwise) .....ASTM A 325
Concrete – Class C ..... 499
Fabricator Prequalification ..... 513.03 – Level UF and/or AWS
Foundations.....630.05
Galvanizing (Hot Dip Process).....711.02
Powder Coating.....708.06
Shop Drawings.....501.04
Steel Pipe or Tube (Standard Weight and Seamless) .....ASMT A 501
Structural Steel Shapes, Plates, Connection Material.....ASTM A 36

**639.03 Fabrication.** Weld all connections throughout, unless bolting is specified or detailed. Grind all welded connections smooth. Bolt all field connections.

**639.04 Finishing.** Hot Dip Galvanize. Do not quench (water, chromate, phosphating) or apply any other post treatments since posts will be painted. Apply Federal Color specified on drawings per City Supplement Item 708.06 Powder Coating.

**639.05 Shipping and Storage and Erection.** Package all parts properly in protective plastic material and cardboard to protect finishes during shipping and storage. Store parts (if necessary) off of the ground and protected from the elements until such time as they can be installed. Erect and/or install in such a manner as to avoid damage to the finished surfaces. Repair any damage to the satisfaction of the Engineer.

**639.06 Guaranty Period.** Replace at no additional cost any part that fails in any manner by reason of defective material or workmanship for a period of 2 years unless a longer period is specified in the Bidding Documents.

**639.07 Method of Measurement.** The City will measure Architectural Poles by type, each, Architectural Pole Extensions by type, each, Poles Caps by Type, each, Pole Boots by type, each, Pole Foundations by type, each, Bike Rings by each and Meter Arm and Holder by each.

**639.08 Basis of Payment.** The City will pay for the accepted quantities at the contract prices as follows:

| Item | Unit | Description |
|---|---|---|
| 639 | Each | Architectural Pole – Type __ |
| 639 | Each | Architectural Pole Extension – Type __ |
| 639 | Each | Pole Cap – Type __ |
| 639 | Each | Pole Boot – Type __ |
| 639 | Each | Architectural Pole Foundation – Type __ |
| 639 | Each | Bike Ring |
| 639 | Each | Meter Arm and Holder |

## 640 PAVEMENT MARKING

### Item 641 Pavement Marking – General

**641.01 Description.** Add before the first paragraph:

For temporary work zone pavement markings, see Item 614.11 of the City Supplement.

**641.02 Materials.** Add after the last paragraph:

All permanent pavement marking materials shall comply with the latest ODOT specifications and proposal notes located on the ODOT website under "Design Resource Reference Center".

**641.06 Layout and Premarking.** Add to the first paragraph:

Layout the locations of all pavement markings to assure their proper placement.

Call the Division of Traffic Engineering five working days in advance for approval of the layout and premarking lines before starting marking operations.

**641.10 Removal of Pavement Markings.** Add:

Remove all existing pavement markings that conflict with the final pavement markings. Cost for this work is incidental to the cost of the new pavement markings.

## 650 ROADSIDES

### Item 657 Riprap for Tree Protection

**657.02 Materials.** Delete limestone.

**657.03 Tree Wells in Fill.** Replace the words "12 inches (310 mm)" with the words "4 inches (100 mm)".

Add after the last paragraph:

In addition to the requirements of this section, when a tree well is constructed:

1. Aerate the soil in accordance with 658.
2. Prune trees in accordance with ANSI 300 – 1995.
3. Fertilize trees according to National Arborist Association Standards (666.011).

### Item 658 Tree Root Aeration

**658.02 Materials.** Add at the end of the first sentence "…and a neutral pH.

**658.03 Preparation.** Add after the end of the first sentence:

Do not use mechanized equipment, other than a hand or small riding lawn mower – do this work by hand. Do not disturb the topsoil and humus layer. Prune and fertilize trees as per 657.03.

**658.041 Installation of Tile.** Earth fills greater than 12 inches (305 mm), require the construction of a tile aeration/watering system. Construct tile lines at the base of the aggregate aeration course radiating from the well wall to the periphery of the tree branches in a pattern similar to the spokes in a wagon wheel. Install eight tile lines per tree in a fill that completely surrounds the tree. Tile will penetrate the well wall. At the periphery end of each tile line, angle the line on a right angle to the surface of the fill and terminate with a bell shaped tile with vented cover at grade. Hold the vertical column in place with a sufficient amount of cobble sized stone to hold it securely until the aggregate aeration course and earth fill are properly in place.

**658.05 Aeration with Tree Wells.** Add:

Earth filled greater than four inches (100 mm) requires tree root aeration. The four inch (100 mm) fill requires a two inch (50 mm) aggregate aeration course. At no time must fill or aggregate be placed within a tree well or touching the trunk of the tree. Aggregate must be one half depth of fill up to fills of 12 inches (305 mm).

**658.07 Method of Measurement.** Add to the end of the last sentence:

"…and the tile lines by the linear foot (m) including vertical line and bell tile with cover."

**658.08 Basis of Payment.** Add:

| Item | Unit | Description |
|---|---|---|
| 658 | Foot (meter) | Tile Line Aeration System |

## Item 660 Sodding

**660.04 Preparation of Areas to be Sodded.** Delete the first two sentences and replace with:

Before placing the sod, excavate the sod bed to such a depth so as to allow the placement of a layer of topsoil at least three inches (80 mm) in depth when compacted. Spread the topsoil at a grade which will assure that the surface of the sod after tamping will conform to the grade indicated on the plans, or as directed by the Engineer. Topsoil must meet the requirements of Item 653.

**660.10 Method of Measurement.** Add the words "sodding with topsoil," after the word "measure".

**660.11 Basis of Payment.** Add after the first sentence:

The City will pay for accepted quantities including the furnishing and placing of topsoil at Contract price for:

| Item | Unit | Description |
|---|---|---|
| 660 | Square Yard (Square Meter) | Sodding with Topsoil |

## Item 661 Planting Trees, Shrubs, and Vines

**661.13 Mulch.** Delete the first sentence of the second paragraph.

**661.14 Pruning.** Delete the first sentence.

Add:

## Item 663 Ornamental Light Attachments in Trees

**663.01 Description.** This work consists of installating ornamental light strands to trees. The lights must be attached to the tree trunk and main limbs by screw eyes. Screw the eyes into the trunk at intervals of four feet (1.2 m). Attach electrical wire to the screw eyes with plastic bands or ties.

**663.02 Materials.** The materials consist of one inch (25 mm) long stainless steel screw eyes and plastic ties.

**663.03 Basis of Payment.**

| Item | Unit | Description |
|---|---|---|
| 663 | Each | Ornamental Light Attachments |

Add:

## Item 664 Structural Soil Mix

**664.01 Description.** This work consists of installing structural soil mix in direct proximity to trees below sidewalks when specified by the City Engineer.

**664.02 Materials.** Furnish materials conforming to:

Aggregate..... 703.-1 - #57 Gradation
Topsoil ..... 653.02

**664.03 Composition.** Create blend of materials consisting of #57 graded aggregate, topsoil and peat with the following characteristics:

**A. Mixture Ratio:** #57 Aggregate to filler, = 2.7:1.0 (by volume).

**B. Filler consists of:** 70 percent loamy topsoil (by Volume) and 30 percent peat (by volume).

**C. Voids in # 57 Aggregate:** 30.7 percent.

**D. Specific Gravity:** 1.89.

**E. Air Void/Porosity of Mixture at 100 percent compaction:** 27 percent.

**664.04 Method of Measurement.** The City will measure the volume of the space filled with the structural soil mix in its compacted state.

**664.05 Basis of Payment.**

| Item | Unit | Description |
|---|---|---|
| 664 | Cubic Yard (Cubic Meter) | Structural Soil Mix |

Add:

## Item 665 Planting Salvaged Plants

**665.01 Description.** This item consists of excavating, transporting and re-installing salvaged plants.

**665.02 Materials and Construction Methods.** Prior to digging, mark each tree on the north side of the trunk with a small spot of paint. During transplanting, orient each tree to due north per the mark. Dig and handle each plant salvaged in full compliance with A.N.S.I. Z60.1 standards adhering to the earth ball size stated therein being considered the minimal acceptable size.

**665.03 Method of Measurement and Basis of Payment.** The City will measure and pay for this item in accordance with the provisions included in the Plans or elsewhere in the Contract Documents.

## Item 666 Pruning Existing Trees

**666.01 Description.** Add after the first sentence:

All pruning and other tree work must conform to the following standards:

A. National Arborist Association standards and ANSI 300 - 1995 for pruning of shade trees, guying of shade trees, fertilizing of shade and ornamental trees, lightening protection installation systems for shade trees and pesticide application procedures.

B. A.N.S.I. Z133.1 - Safety Requirements for Tree Care and Removing Trees and Cutting Brush.

Copies of both of these standards are currently on file at the City's Park Board Operations Division Office.

Add:

**666.015 Permits.** Obtain a Public Tree Work Permit from the Park Board before any work is undertaken within 15 feet (5 meters) of any tree within the right-of-way under any Contract or Permit. Bring any conflict between the Contract requirements and the Park Board's requirements to the attention of the Engineer for resolution.

**666.02 Wound Dressing.** Delete this section and replace with:

Do not use tree wound dressing unless a designated brand is specified to reduce sucker sprouting stimulated by recent pruning on certain tree species.

**666.03 Pruning.** Add after the last paragraph:

Perform all pruning in conformance with the two standards specified in 666.01. In addition, the Engineer may order that specific branches be removed to minimize interference with traffic or pedestrians. Pruning also includes the removal of any plant material including vines within a three-foot (914 mm) radius of trunk.

**666.04 Painting.** Delete this section and replace with:

Perform any painting operations in conformance with 666.02.

**666.05 Removal of Foreign Materials from Trees.** Delete the end of the last sentence after the word "tree" and replace with "…and prune in accordance with 666.01."

**666.06 Removal of Rubbish.** Add after the first sentence:

Complete this work within two hours of the time the tree is pruned.

Add:

## Item 667 Large Trees Moved and Reset

**667.01 Description.** This item consists of digging, moving and resetting trees six inches (150 mm) or larger in diameter, including the digging of the necessary tree holes and drain pits, furnishing and placing the necessary topsoil, aggregate, peat, commercial fertilizer, mulch, water and other incidentals necessary to complete this item.

**667.02 Material.** Furnish materials conforming to:

Topsoil ..... 653.02
Commercial Fertilizer..... 659.04
Backfill Mix..... 661.11
Mulch ..... 661.13
Wrapping, Guying and Anchoring ..... 661.15, 661.16

**667.03 Preliminary Wrapping.** Securely and properly wrap the tree with layers of burlap, and tie in the branches to prevent injury during digging, moving and planting.

**667.04 Digging Trees.** Dig each tree in such a manner that it may be lifted with the necessary roots enclosed in an earth ball having a minimum diameter 12 times the diameter of the tree. In all cases, ensure that the earth ball is of sufficient size to meet the requirements of ANSI Z 60.1.

Dig and/or move and/or reset only dormant trees unless otherwise directed by the Engineer.

**667.05 Moving.** Move trees with a root ball using only approved, standard tree-moving equipment.

**667.06 Tree Holes.** Dig tree holes for this item to a minimum depth of three feet (914 mm) with a minimum diameter of eight feet (2.4 m). In no case dig the tree hole less than 1-1/2 feet (460 mm) deeper than the depth of the root ball or the diameter less than the diameter of the root ball plus four times the diameter of the tree.

Slope the bottom of the tree hole toward the drain pit or as indicated on the Plans.

**667.07 Drain Pits.** When called for on the plans, provide drain pits in accordance with ODOT standard drawings or as directed by the Engineer.

**667.08 Backfill Mix.** Provide backfill mix for all trees reset. Do not use backfill mix in a frozen or muddy condition. Mix backfill on the project site unless otherwise directed by the Engineer.

**667.09 Pipe Drains.** Drain specified tree holes into a drain pit by pipe laid on the bottom of the tree holes, or as directed by the Engineer. Such drainage installation, including the necessary pipe, will be paid for in accordance with 603.

**667.10 Surplus Material.** Dispose of any surplus materials in accordance with 105.16 and 105.17.

**667.11 Pruning.** Prune the ends of all broken and/or damaged roots 1/4 inch (6 mm) or larger with a clean cut removing no more than the injured portion. Prune the tops of all trees in compliance with the standards set forth in ANSI 300 - 1995 and ANSI Z 133.1 Safety Standards. Remove specified branches directly interfering with traffic or pedestrians, or as directed by the Engineer.

**667.12 Wrapping.** Wrap all trees in accordance with 661.15.

**667.13 Bracing.** Brace all trees in accordance with 661.16. Whenever the tripod guy type system is used in areas of pedestrian traffic, make the wires conspicuous to prevent accidents and liability to the City. Place yellow plastic tubing of uniform and sufficient length over the doubled wires to serve as a pedestrian warning or take other precautions as directed by the Engineer.

**667.14 Mulching.** Mulch in accordance with 661.13.

**667.15 Period of Establishment.** Place and care for all trees in accordance with 661.17.

**667.16 Removal of Stakes and Wrapping.** Remove in accordance with 661.18.

**667.17 Method of Measurement.** The City will measure the number, size and species of trees moved and reset, completed and accepted in place.

The City will measure aggregate for drain pits by the cubic yard (cubic meter) of drain pit constructed including all labor, materials and incidentals necessary to construct the pits.

**667.18 Basis of Payment.** The City will pay 80 percent of the bid price when the trees are delivered and reset at the project site and the remaining 20 percent if the trees are still living after the period of establishment. The City will not pay the remaining 20 percent if the trees have not survived the period of establishment or if the Contractor has not maintained the trees in accordance with the requirements of 661.17.

The City will pay for accepted quantities at the Contract prices as follows:

| Item | Unit | Description |
|---|---|---|
| 667 | Each | Large Trees moved and Reset, (*Size*), (*Species*) |

Add:

## Item 669 Seeding and Other Matting Materials

**669.01 Description.** This work consists of furnishing, placing, and maintaining seeding and other matting materials on areas as shown on plans and as directed by the Engineer.

**669.02 Materials.** All materials must meet Manufacturer's specifications and be approved by the Engineer.

**669.03 Construction.** Apply all materials following the Manufacturer's specifications.

**669.04 Maintenance.** Maintain the matting areas as described in 659.18.

**669.05 Method of Measurement.** The yardage of the other matting materials must be the number of square yards (soil surface area) of the seeding (if required) and matting placed in accordance with the manufacturer's specifications, completed and accepted.

**669.06 Basis of Payment.** Payment for accepted quantities placed will be made at Contract price for:

| Item | Unit | Description |
|---|---|---|
| 669 | Square Yard (Square Meter) | Seeding (if required) and other matting materials |

## Item 670 Erosion Protection

**670.01 Description.** Add the following:

An Erosion Control Plan is to be submitted and approved by the Engineer prior to beginning construction. No construction may begin until all appropriate erosion control measures are in place.

**670.02 Materials.** Add the following line:

Seeding and other matting materials.....669

**670.03 Construction.** Add the following to the first sentence:

and in addition, cover at least 75 percent of slope, ditch or swale with matting material.

**670.06 Basis of Payment.** Add the following to this sub-section:

New matting material, straw, coconut, fiberglass and paper strip matting, each requiring slightly different installation procedures, is now in place in Hamilton County. Some include their own grass seed and fertilizer incorporated in the material. Before placement, the Engineer must review and approve the use of any material other than as specified.

No specific item may be included for payment of erosion control measures. Erosion control measures are to be paid as part of other construction item.