

**CITY OF COLUMBUS, OHIO**

**SUPPLEMENTAL SPECIFICATION 1100  
REVISIONS TO THE 2012 CONSTRUCTION  
& MATERIAL SPECIFICATIONS**

**DATED September 1, 2012**

**105.04 Coordination of the Contract Documents**

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**105.04 Coordination of the Contract Documents.** In case of discrepancy, the Engineer will resolve any discrepancies using the following descending order of precedence:

- A. ~~Contract Form~~ Addenda
- B. ~~Addenda~~ Proposal and Special Provisions
- C. ~~Proposal~~ Plans (Calculated dimensions on the Plans will govern over scaled dimensions.)
- D. ~~General Provisions (Section 100)~~ Supplemental Specifications
- E. ~~Special Provisions~~ Standard Drawings
- F. ~~Plan Notes~~ Standard Specifications
- ~~G. Plans (calculated dimensions will govern over scaled dimensions)~~
- ~~H. Supplemental Specifications~~
- ~~I. Standard Drawings~~
- ~~J. Standard Specifications (Sections 200 through 1000)~~

**207.02 Materials**

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**207.02 Materials.** Furnish commercial fertilizer, seed, and mulch materials conforming to Item 659. Furnish stabilized construction entrances, filter fabric ditch checks, rock checks, inlet protection, perimeter filter fabric fence, straw wattles, bale filter dikes, sediment basins and dams, dikes, slope drains, and rock channel protection materials as specified on the standard construction drawings.

**207.03.B.1 Construction Requirements**

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**1. Perimeter Controls.** Use perimeter filter fabric fence to protect the project from sheet flow runoff from off Right-of-Way and off construction limit locations. Use perimeter filter fabric fence to protect the following project items from sheet flow runoff: water bodies, wetlands, or other significant items shown on the plans.

Use dikes to prevent sediment flow from coming on to the project and to non-vegetated barren areas on the project.

Install perimeter filter fabric fence, stabilized construction entrances, and dikes concurrent with clearing and grubbing operations.

## **207.06 Method of Measurement**

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**207.06 Method of Measurement.** The City will measure fertilizer by the number of tons (metric tons) under 659 Commercial Fertilizer.

The City will measure Construction Seeding and Mulching by the number of square yards (square meters).

The City will measure Slope Drains by the number of feet (meters).

The City will measure Sediment Basins and Dams by the number of cubic yards (cubic meters) of excavation and embankment.

The City will measure Perimeter Filter Fabric Fence, Bale Filter Dike and Construction Fence by the number of feet (meters).

The City will measure Filter Fabric Ditch Check by the number of feet (meters).

The City will measure Inlet Protection by the number of inlets protected (each).

The City will measure Dikes by the number of cubic yards (cubic meters) of excavation and embankment.

The City will measure Construction Ditch Protection and Construction Slope Protection by the number of square yards (square meters).

The City will measure Rock Channel Protection, Type C or D (with or without) filter by the number of cubic yards (cubic meters).

The City will measure Sediment Removal by the cubic yards (cubic meters).

The City will measure Stabilized Construction Entrances by the Cubic Yard (Cubic Meter).

## **207.07 Basis of Payment**

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**207.06 Basis of Payment.** The City will not pay if temporary erosion and sediment control items are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled; install such temporary work at no expense to the City.

The City will not pay for stream crossing work specified in 207.03.B.8.b.

If erosion control items in the Contract are properly placed according to the Contract Documents, the City will pay to maintain or replace erosion control items at the unit bid prices or according to 109.05.

The City will pay for sediment removed from dams, basins, inlet protection, ditch checks, rock checks, perimeter filter fabric fence, bale filter dikes, and all other types of filter fabrics, straw or hay bales, or any other temporary sediment control items under 207 Sediment Removal.

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

<b>Item</b>	<b>Unit</b>	<b>Description</b>
207	Square Yard (Square Meter)	Construction Seeding and Mulching
207	Foot (Meter)	Slope Drains
207	Cubic Yard (Cubic Meter)	Sediment Basins and Dams
207	Foot (Meter)	Perimeter Filter Fabric Fence
207	Foot (Meter)	Bale Filter Dike
207	Foot (Meter)	Filter Fabric Ditch Check
207	Each	Inlet Protection
207	Cubic Yard (Cubic Meter)	Dikes
207	Square Yard (Square Meter)	Construction Ditch Protection
207	Square Yard (Square Meter)	Construction Slope Protection
207	Cubic Yard (Cubic Meter)	Rock Channel Protection Type C or D with Filter
207	Cubic Yard (Cubic Meter)	Rock Channel Protection Type C or D without Filter
207	Cubic Yard (Cubic Meter)	Sediment Removal
207	Foot (Meter)	Construction Fence
207	Square Yard (Square Meter)	Geo-textiles
<u>207</u>	<u>Cubic Yard (Cubic Meter)</u>	<u>Stabilized Construction Entrance</u>

**259.03 Classification**

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**259.03 Classification.** Based upon the Engineer's selection as described in 259.02, furnish one of the following pavement types:

**Permanent Pavement Replacement (Standard Drawing No. 1441-Dr.-A)**

Type I - Bituminous

Type III- Brick

Type V – Concrete

**Driveway Pavement Replacement (Standard Drawing No. 2160-Dr-A)**

Type IIIA - Asphalt Driveways

Type IIIB - Concrete Driveways

Type IIIC - Gravel Driveways

**306.01 Description**

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**306.01 Description.** This work consists of constructing a PCC base on a prepared subgrade or base course. This work shall conform to the requirements of Items 305 and 451 except that:

1. For concrete proportioning, meet the requirements of Item 499, Concrete, Class F.
2. Conform to the opening-to-traffic requirements as specified in 451.16 except that the split tensile strength shall be 250 pounds per square inch (1.7 MPa), as tested per ASTM C496.

3. Load transfer devices are not required.

**401.20 Asphalt Binder Price Adjustment**

Page 181

**401.20 Asphalt Binder Price Adjustment.** A Contract Item is eligible for a price adjustment when the Contract's Proposal specifically includes an Asphalt Binder Price Adjustment note ~~and the Contract Item meets the quantity limitations of the ODOT proposal note for Asphalt Binder Price Adjustments for Single Year or Multi Year, as applicable.~~

**451.061(2) Depositing and Curing Concrete During Cold Weather**

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2. Once placed, cover the entire surface of the top and the sides of the newly placed concrete and protect from freezing for seven days, unless split tensile-beam specimens have attained the required minimum strength specified. Accomplish protection as directed in Item 511.12 with insulated blankets or with a combination of loose straw 12 inches (0.3 m) thick covered with a securely fastened exterior cover of waterproof material.

**511.17 Curing and Loading**

Page 312

**511.17-1 (Table).**

TABLE 511.17-1			
	Span <sup>[1]</sup>	Age of Concrete in Days	
		No <del>Beam</del> Split Tensile Test	Beam Split Tensile Test <sup>[2]</sup>
Removing Falsework	Over 10 feet (3 m)	14	5
	10 feet (3 m) or less and all pier caps	7	3
Traffic <sup>[3]</sup>	Any	14	7

[1] Span is defined as the horizontal distance between faces of the supporting elements when measured parallel to the primary reinforcement.

[2] Applicable only when the average ~~Split Tensile psi modulus of rupture~~ for two tests is not less than ~~400 650~~ psi (~~2.76 4.5~~ MPa).

[3] When placing Class HP concrete for a superstructure between October 15 and March 15, open the deck to traffic no sooner than 30 days after placement.

**603.02 Materials**

Page 420

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

Soil and granular embankment ..... 203.02.R

Structural backfill, Types 1 and 2 ..... 703.11

~~The Engineer will allow Type 3 structural backfill, conforming to 703.11, to be used as bedding below the pipe only when pumping operations do not control severe ground water problems. Place at least 12 inches (300 mm) of Type 1 structural backfill on top of the Type 3 structural backfill to prevent piping.~~

Embankment ..... 203.02.R

**603.11 (D) Placement and Compaction Requirements.**

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~~(D) — Place Structural Backfill Type 3 in layers not to exceed 12 inches (300 mm) loose depth. Vibrate, tamp, or compact to approximately 85 percent of the original layer thickness.~~

**632.02 Contractor Personnel Requirements**

Page 530

~~603.02 Contractor Personnel Requirements. Conform to the requirements of City Supplement 1063 for the installation or testing of traffic signal equipment. Assign a full-time employee of the Contractor to act as the project supervisor. Do not change the project supervisor without giving the Engineer written notice. Provide International Municipal Signal Association (IMSA)-certified documentation for Contractor employees if requested by the City.~~

~~An IMSA level two-certified technician shall perform all of the following controller work:~~

- ~~1. Back panel wiring terminations~~
- ~~2. Programming~~

- ~~3. Testing or turn on~~
- ~~4. Troubleshooting~~

~~Assign a foreman to each crew performing work for the project. A foreman shall be present at all times when work is performed by the crew. Each foreman shall be an IMSA level one certified technician. Provide prior verbal notice to the Engineer in order to replace a crew foreman.~~

~~In addition, any trade person performing the following work shall be an IMSA level one certified technician:~~

- ~~1. Cable splices~~
- ~~2. Signal head installation~~
- ~~3. Cable and wire installation~~
- ~~4. Power service installation~~
- ~~5. Ground rod testing~~
- ~~6. Cable insulation testing~~
- ~~7. Field wiring terminations~~

## **632.14 Foundations**

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**603.14 Foundations.** Locate support foundations, and stake with the proper elevation. If underground or overhead obstacles are encountered during stakeout, or to correct slope and subsurface difficulties, change foundation location and orientation with the approval of the Engineer. Ensure that the approved location provides a safe clearance from overhead power lines for construction operations, in compliance with the National Electrical Safety Code. The Contractor is responsible for the correct location, elevation, and orientation for all poles and pedestals installed on the foundations.

Orient one side of the anchor base pole foundation cap parallel to the sidewalk, back of-curb or edge-of-pavement, edge of the curb ramp, as shown on the signal plans. Make the top of the foundation flush with any adjacent sidewalk or concrete area, except where the ground rises steeply behind the sidewalk or concrete area. In this case, match the back side of the foundation to the ground slope and set the street side of the foundation above the sidewalk or concrete area and completely out of the sidewalk or concrete area. Edge the pole foundation top using a 1/2-inch sidewalk edger and do not chamfer.

Install anchor bolts in the angular position shown in the plans. Install a minimum of two 2-inch conduit ells, used or unused, in each pole foundation.

Excavate for foundations using an earth auger to specified dimensions according to 503.04. Exercise caution when excavating in areas of underground installations to avoid their disturbance or damage. When a cave-in occurs or at the direction of the Engineer, excavate using casing, sleeving, or other methods, with the Engineer's approval according to 732.10. If subsurface obstructions are encountered, remove the obstructions, or replace the excavated material and relocate the foundation, with the

Engineer's approval. If bedrock is encountered, the Contractor may reduce that portion of the specified foundation depth within the bedrock up to 50 percent. Perform all necessary dewatering of the excavation.

Perform foundation concrete work according to Item 511, except that the loading restrictions in 511.17 are modified by this subsection. Place the concrete against undisturbed soil or compacted embankment. Form the top of the foundations to a nominal depth of 6 inches below the groundline. Place the concrete foundation, including formed top, in one continuous concrete pour.

For foundations for anchor base type supports, provide the required reinforcing rods, and have anchor bolts and conduit ells accurately held by a template.

Remove forms and templates once the concrete has hardened sufficiently so as not to be susceptible to damage. After 14 days, erect and load supports on anchor base foundations. The Contractor may erect and load supports after 7 days if the tests of two ~~split tensile beam~~ specimens of concrete yield an average ~~modulus of rupture~~ of not less than ~~400~~ 650 pounds per square inch.

### **632.23 Cable and Wire**

Page 540

**Replace unreadable table 632.23-1 with the following:**

**TABLE 632.23-1 FIELD WIRING HOOKUP**

PED UNIT FIELD WIRING HOOKUP

PED UNIT LOCATION	CROSSWALK DISPLAY	WIRE COLOR
SOUTH CROSSWALK	WALK	BLACK
	DONT WALK	ORANGE
WEST CROSSWALK	WALK	GREEN
	DONT WALK	RED
NORTH CROSSWALK	WALK	BLUE
	DONT WALK	WHITE W/BLACK TRACER
EAST CROSSWALK	WALK	GREEN W/BLACK TRACER
	DONT WALK	RED W/BLACK TRACER

SIGNAL HEAD & CABINET FIELD WIRING HOOKUP

SIGNAL DISPLAY	WIRE COLOR PER APPROACH
THRU R	RED
THRU Y	ORANGE
THRU G	GREEN
L/T R	BLACK (FUTURE USE ONLY)
L/T ↗	WHITE W/BLACK TRACER
L/T ↖	BLUE
R/T R	NOT USED BY CITY
R/T ↗	RED W/BLACK TRACER
R/T ↖	GREEN W/BLACK TRACER

WHITE SHALL BE USED FOR THE COMMON. SPLICE ALL WIRES IN THE SIGNAL HEAD OR PED UNIT. USE A #14 AWG 2 WIRE SPADE TERMINAL FOR EVERY 2 WIRES PER CONNECTION AND A #14 AWG 1 WIRE SPADE TERMINAL FOR EACH SINGLE WIRE CONNECTION TO CONNECT ALL WIRES TO ALL FIELD TERMINALS. USE BUTT SPLICES ON ALL THROUGH WIRES. ALL UNUSED WIRES SHALL BE SPLICED THROUGH AND SHALL HAVE A DEAD-END TERMINAL AT THE END OF THE WIRE.

**703.08 Aggregate for Pipe Bedding and Initial Backfill (New Section)**

Page 632

**703.08 Aggregate for Pipe Bedding and Initial Backfill.**

1. Provide No. 57 coarse aggregate, as specified in 701.01, consisting of washed gravel, or CCS.

Do not use RPCC for any bedding or initial backfill materials.

Do not use reclaimed asphalt concrete for any bedding or initial backfill materials.

**703.11 Structural Backfill for 603 Bedding and Backfill.**

Page 632 - 633

**703.11 Structural Backfill** ~~for 603 Bedding and Backfill~~. Furnish structural backfill ~~for 603 bedding and backfill~~ consisting of CCS, gravel, natural sand, sand manufactured from stone, ~~or~~ foundry sand, ~~or RPCC (Type I only)~~.

Do not use RPCC for any bedding or initial backfill materials.

Do not use RPCC as backfill material for any metallic pipe.

Do not use reclaimed asphalt concrete for any bedding or backfill materials.

Use foundry sand if the material meets these requirements and meets the requirements of the Ohio EPA, Division of Surface Water, Policy 400.007 “Beneficial use of Non-Toxic Bottom Ash, Fly Ash and Spent Foundry Sand and Other Exempt Waste,” and all other regulations. Ten days before using foundry sand on the project, from the Ohio EPA, the Contractor may elect to have an independent consultant pre-qualified by ODOT in remedial design environmental site assessment review the proposed usage. The consultant will provide all documentation utilized to usage according to all Ohio EPA regulations. Ensure that the consultant coordinates all EPA required meetings, documentation, and testing requirements. Ensure that the consultant certifies this to the City.

**A. Structural Backfill Type 1.**

1. Furnish Type 1 structural backfill that meets the gradations of Item 304, except 0 to 20 percent may pass the No. 200 sieve.

2. Physical properties.

Percent of wear, Los Angeles test, maximum (CCS or washed gravel)	50 %
Loss, sodium, sulfate soundness test, maximum	15 %
<del>Percent by weight of fractured pieces (one or more faces), minimum (Type 3 only)</del>	<del>90 %</del>

Do not exceed the following percentages of deleterious substances:

Material Type	Percent by weight
Shale and shaly material	5.0
Chert, that disintegrates in 5 cycles of the soundness test	5.0

Ensure that the portion of the material passing through the No. 40 (425 µm) sieve has a maximum liquid limit of 25 and a maximum plasticity index of 6.

When using RPCC, ensure that the maximum percentage passing the #200 sieve is 10%.

**B. Structural Backfill Type 2.**

1. Furnish Type 2 structural backfill that meets the gradation below:

Sieve Size	Total Percent Passing
2 1/2 inch (63 mm)	100
1 inch (25.0 mm)	70 to 100
3/4 inch (19.0 mm)	–
3/8 inch (9.5 mm)	–
No. 4 (4.75 mm)	25 to 100
No. 8 (2.36 mm)	–
No. 40 (425 μm)	10 to 50
No. 50 (300 μm)	–
No. 200 (75 μm)	5 to 15

2. Physical properties:

Percent of wear, Los Angeles test, maximum (CCS or gravel)	50 %
Loss, sodium sulfate soundness test, maximum	15 %

Ensure that the portion of the material passing through the No. 40 (425 mm) sieve has a maximum liquid limit of 25 and a maximum plastic index of 6.

**703.13 Coarse Aggregate for Items 305, 451 and 452.**

Page 633

**703.13 Coarse Aggregate for Items 305, 306, 451 and 452.**

**703.15 Suitable Materials for Embankment Construction.**

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**703.15 706.16 Suitable Materials for Embankment Construction.**

**703.16 Aggregate Materials for 304.**

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**~~703.16~~ 703.17 Aggregate Materials for 304.**

**703.17 Materials for Items 410, 411, and 617.**

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**~~703.17~~ 703.18 Materials for Items 410, 411, and 617**

**703.18 Rock and Aggregate Materials for Item 601.**

Page 640

**~~703.18~~ 703.19 Rock and Aggregate Materials for Item 601.**

**706.05 Precast Reinforced Concrete Box Sections.**

Page 661

**706.05 Precast Reinforced Concrete Box Sections.** Provide precast reinforced concrete box section conforming to ASTM C 1577, with the following modifications:

Use precast concrete member manufacturers certified by the Laboratory according to City Supplement 1073.

Submit shop drawings according to 501.04 (A).

6.2.1 Provide cement according to 701, except 701.07.

6.2.2 Provide fly ash according to 701.

6.3 Provide aggregates conforming to the quality requirements of 703.02.

6.5 Provide reinforcement according to 709.10 or 709.12. Provide longitudinal distribution reinforcement according to 709.01, 709.10 or 709.12.

7.1 Use only the following box sizes with a span by rise of 8 x 4, 5, 6, 7; 10 x 5, 6, 7, 8, 9; and 12 x 4, 6, 8, 10 feet.

9.1 Provide hardened concrete that contains a minimum of 4 percent entrained air for wet-cast sections with spans less than 14 feet and for all sections with spans 14 feet and greater.

9.4 Do not use lift holes. Use handling devices that do not require a hole through the box.

10.1 Verify concrete strength using cylinders. Do not ship items before the concrete reaches its design strength.

11.5 Ensure a minimum cover of 1/2 inch over both circumferential and longitudinal reinforcement at the mating surfaces of joints.

15 In addition, mark the identification of the plant on each box section. For box sections 14 feet or greater, mark the reinforcing steel areas for the section on each box section. Place the manufacturers' name and required product information on the inside of the box section within the top one-half of the culvert.

**706.051 Precast Reinforced Concrete Three-Sided Flat Topped Culverts**

**706.051 Precast Reinforced Concrete Three-Sided Flat Topped Culverts.** Provide precast concrete three-sided flat topped culverts according to ASTM C 1504, with the following modifications:

Provide flat deck culvert structures with a minimum clear span (measured normal to the structure at the bottom of the haunch) of 14 feet and a minimum opening rise (measured from bottom of leg to bottom of deck at the centerline of the structure) of 4 feet; and a maximum clear span of 34 feet and maximum opening rising of 10 feet. Ensure minimum wall and deck thicknesses of 10 inches and 12 inches respectively, measured under the haunch normal to the structure and at the centerline of the span measured perpendicular to the structure.

Use precast concrete member manufacturers certified according to City Supplement 1073.

Ensure that the manufacturer submits design calculations, a structural load rating and shop drawings ~~according to 501.04 (A) for review and approval by the City.~~ Do not produce any units until ~~approved drawings have been submitted to the City receiving approval. Submit a minimum of five copies of the drawings. Allow a minimum of four weeks for approval.~~ Ensure that the shop drawings include the following:

1. Load rate the structure according to the requirements of Section 900 of ODOT's Bridge Design Manual.
2. All material specifications.
3. All plan view.
4. All elevation view.
5. All headwall and wingwall attachment requirements.
6. All dimensions.
7. All maintenance of traffic phases.
8. All section sizes.
9. All design handling strength.

The manufacturer may modify an approved shop drawing and resubmit ~~according to 501.04 (A) for approval to the City.~~

### **706.052 Precast Reinforced Concrete Arch Sections**

**706.052 Precast Reinforced Concrete Arch Sections.** Provide precast reinforced concrete arch sections according to ASTM C 1504, with the following modifications:

This item shall consist of manufacturing precast reinforced concrete arch sections for culverts.

Use precast concrete member manufacturers certified according to City Supplement 1073.

~~5~~ Ensure the manufacturer submits design calculations, a structural load rating and shop drawings ~~according to 501.04 (A) for review and approval by the City.~~ Do not produce any units until ~~approved drawings have been submitted to the City receiving~~

~~approval. Submit a minimum of five copies of the drawings. Allow a minimum of 4 weeks for approval.~~ Ensure the shop drawings include the following:

1. Load rate the structure according to the requirements of Section 900 of ODOT's Bridge Design Manual.
2. All material specifications.
3. All plan view.
4. All elevation view.
5. All headwall and wingwall attachment requirements.
6. All dimensions.
7. All maintenance of traffic phases.
8. All section sizes.
9. All design handling strength.

The Contractor may modify an approved shop drawing and resubmit according to 501.04 (A) for approval to the City.

### **706.053 Precast Reinforced Concrete Round Sections**

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**706.053 Precast Reinforced Concrete Round Sections.** Provide precast reinforced concrete elliptical and circular arch sections according to ASTM C 1504, with the following modifications:

This item consists of manufacturing precast reinforced concrete elliptical and circular arch sections for culverts.

Use precast concrete member manufacturers ~~of~~ certified according to City Supplement 1073.

~~5.~~ Ensure the manufacturer submits design calculations, a structural load rating and shop drawings according to 501.04 (A) for review and approval by the City. Do not produce any units until approved drawings have been submitted to the City, receiving approval. ~~Submit a minimum of five copies of the drawings. Allow a minimum of 4 weeks for approval.~~ Ensure the shop drawings include the following:

1. Load rate the structure according to the requirements of section 900 of ODOT's Bridge Design Manual.
2. All material specifications.
3. Plan view.
4. Elevation views.
5. Headwall and wingwall attachment requirements.
6. Dimensions.
7. All maintenance of traffic phases.
8. Section sizes.
9. Design handling strength.

The City will allow the Contractor to modify an approved shop drawing and resubmit according to 501.04 (A) for approval to the City.

### 801.03 Ductile Iron Pipe

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#### 801.03 Ductile Iron Pipe.

Installation: Deliver film to the jobsite contained in a sound sacrificial sleeve of UV Protected Polyethylene to protect contents during storage prior to installation.

Install the polyethylene encasement per Method A of ANSI/AWWA C105/A21.5. Remove all lumps of clay, mud, cinders, etc. from the pipe surface before encasing the pipe. Keep soil, or bedding material, from becoming trapped between the pipe and the polyethylene sleeve. When lifting polyethylene-encased pipe use a fabric type sling or padded cable to protect the polyethylene. Overlap joints (double coverage) and tape. Fold excess slack over the top of the pipe and tape in place every three feet. Carefully backfill the pipe according to Item 801.11 and 801.12. To avoid damage during backfilling allow adequate slack in the film tube at joints. Use backfill material free of cinders, rocks, boulders, nails, sticks or other material that could damage the polyethylene sleeve.

### 801.10 Excavation and Pipe Laying

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**801.10 Excavation and Pipe Laying.** Pipe Haunching (for 20 inch ~~inch~~ diameter and greater): Provide Crushed Carbonate Stone (CCS) Size No. 57 as specified in 703 – Aggregate. Place backfill carefully and simultaneously on each side of pipe to avoid lateral displacement of pipe and damage to joints. Extend the depth of haunching ~~extend~~ from the trench bottom up to 1/2 times the pipe diameter. If the pipe requires adjustment after placement, remove and re-lay as new pipe. Prevent damage to coating when placing backfill. Place haunching material manually around pipe and spade full depth of lift to prevent bridging and provide uniform bearing and side support.

### 801.11 Backfill Within The Influence of Pavement

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**801.11 Backfill Within The Influence of Pavement.** This section discusses backfilling above the initial backfill up to ground surface or beneath pavement subgrade within the influence of pavement as defined by Standard Drawing L-6309E.

Unless otherwise shown, specified, or ordered, provide granular backfill material meeting the requirements of ~~Section 304.02 or Section~~ Item 703.11. The City will allow use of ~~f~~Flowable Control Density Fill, Type II complying with the requirements of Item 613 as an alternate to compacted granular material. Do not use RPCC for any bedding or backfill material.

Ensure that the moisture content does not exceed less than minus 4 percent of optimum moisture prior to spreading. Shovel in-place and compact material using pneumatic tampers in restricted areas, and vibratory-plate compactors or engine-powered jumping jacks in unrestricted areas. Do not exceed 8 inches for a single layer of compacted thickness. See ~~Section~~ Item 801.12 for compaction requirements. Extend

the compacted backfill to the top of the pavement subgrade for trenches within traveled areas, and to within 6 inches of the existing ground in all other areas.

**801.12 Backfill Outside The Influence of Pavement**

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**801.12 Backfill Outside The Influence of Pavement.** Backfill in conformance with the requirements of Section 801.11 above, outside the influence of pavement, as defined by Standard Detail L-6309E, except as herein modified..

Provide suitable backfill material native to the project, or granular backfill material conforming to the requirements of ~~Section 304.02 or Section Item~~ 703.11. Do not use RPCC for any bedding or backfill material. Dispose of excavated material unsuitable for backfill compacting at no additional cost to the City. Provide granular backfill material from somewhere else. Spread material in successive layers not exceeding a depth of 8 inches. Compact from above the initial backfill to within 6 inches of the existing ground. The following requirements apply to granular material conforming to Section 304.02, Section 703.11, and to native material:

<b>Max. Lab. Dry Wt. Lbs./cu. Ft.</b>	<b>Min. Compaction Requirements % Lab. Max.</b>
90-104.9	102%
105-119.9	100%
120 and more	98%

Backfill the remaining 6 inches of excavation with approved material without mounding of fill. Maintain trenches in good and safe condition up to the time of acceptance of the work.

Backfill traveled areas in accordance with Section 801.11.

**809.03 Installation**

Page 816

**809.03 Installation.** Furnish and install hydrants at the locations shown on the plans. Locate hydrants 2 feet behind the back of the curb line or 8 feet from the edge of paved area on non-curbed roadways unless otherwise shown on the plans or directed by the Engineer. Provide hydrants of the proper length to suit the depth of cover over the water lines at the locations shown on the plans and furnish the necessary extensions to obtain the proper length. Locate fire hydrants a minimum of 6 feet clear of all driveway openings and curb returns. Install and restrain a second watch valve within 2 feet of the hydrant if the hydrant lead exceeds 15 feet in length.

Excavate the pit or trench for the fire hydrant so when t installed, the hydrant base rests on a concrete slab on undisturbed soil. Set the hydrant plumb with nozzle outlet approximately 18 inches from ground line. Set hydrants set in accordance with grade line or approximately 2 inches below bottom of break connection on the hydrant standpipe.

Install fire hydrants with hardwood backing against Class "C" concrete backing poured against undisturbed earth, as approved by the Engineer.

### 901.11 Bedding and Embedment

Page 826 - 827

**901.11 Bedding and Embedment.** Place cutoff trench dams of native clay or impervious soil across and along the trench at 150 foot (45.7 m) intervals. Place at least 1 trench dam between adjacent manholes regardless of spacing. Compact the trench dams 6 feet (1.8 m) in length, as measured along the sewer centerline and bench into the undisturbed trench sides from the subgrade or top of cradle, to within 5 feet (1.5 m) of the existing surface. If constructing trench dams in rock or hardpan, extend to the top thereof whichever is greater. Where pipe cover is less than 5 feet (1.5 m) ~~the~~ extend the dam to within 1 foot (0.3 m) of the existing surface. Provide the trench dam installation with a minimum of 3 feet (0.9 m) of compacted material above the crown of the pipe.

#### Type I.

1. For flexible sanitary and storm sewers 6 inches (152 mm) in diameter up to and including 60 inches (1524 mm) in diameter, provide a bedding of No. 57 stone, conforming to Item 703.08, or compacted granular material in accordance with Section 912.02 extending from a point 4 inches (101 mm) below the bottom of the pipe to a point ~~12-6~~ inches (~~305-152~~ mm) above the outside top of pipe as shown on the standard drawings.
2. For rigid sanitary and storm sewers 6 inches (152 mm) in diameter up to and including 27 inches (685 mm) in diameter, provide a bedding of No. 57 stone, conforming to Item 703.08, or compacted granular material in accordance with Section 912.02 extending from a point 4 inches (102 mm) below the bottom of the pipe to spring line of the pipe as shown on the standard drawings.
3. For rigid sanitary and storm sewers 30 inches (762 mm) in diameter up to and including 108 inches (2743 mm) in diameter, provide a bedding of No. 57 stone, conforming to Item 703.08, or compacted granular material in accordance with 912.02 extending from a point 6 inches (152 mm) below the bottom of the pipe to the spring line of the pipe as shown on the standard drawings.

If using Type I bedding, include the cost of all bedding as described above in the price bid for the various pipe items. ~~If compacted granular material fails to meet the compaction required under Section 912.03, under pipe haunches and around the pipe, the Engineer will direct the use of stone bedding, No. 57, in lieu of compacted granular material at no additional cost to the City.~~

Provide embedment for thermoplastic pipe used in areas where lateral soil support is negligible or questionable in accordance with the recommendations of ASTM D2321 Appendix XI Commentary.

### 901.12 Laying Pipe

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**901.12 Laying Pipe.** Examine each pipe for defects and damage. Do not use defective or damaged pipe. Lay pipelines to the grades and alignment indicated. Provide proper facilities for lowering sections of pipe into trenches. Do not, under any circumstances lay pipe in water or when trench conditions or weather prove unsuitable for such work. Provide for the diversion of drainage or dewatering of trenches during construction as necessary. Inspect all pipe in place before backfilling, and remove and replace those pipes damaged during placement.

Lay pipes in finished trenches starting at the lowest point so that the spigot ends point in the direction of flow. Lay all pipes with ends abutting and true to line and grade.

Where necessary with bell end pipe, excavate suitable bell-holes in the bedding material for the bell of each pipe so that the bells will not support the weight of the pipe. Fit and match the pipes so that when placed, they will form a conduit with a smooth and uniform invert. Use all possible care when shoving the pipes together to minimize the joints and carefully clean the pipe ends before placing the pipes. Install gaskets in accordance with the manufacturer's recommendations.

Use Class A concrete encasement, in accordance with ~~to~~ the applicable dimensional standard drawing, within the limits of existing or proposed paved areas inside right-of-way, where minimum cover during construction or proposed cover over the outside top of the pipe to top of finished grade is 48 36 inches (~~762 914~~ mm) or less.

Make all connections with existing structures after cleaning the structures in a thorough, first class, neat and workmanlike manner acceptable to the Engineer. Include the cost of this work in the price bid for the various pipe items.

## **901.20 Leakage Tests**

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**901.20 Leakage Tests.** Acceptance testing of all sanitary sewers shall require a 30 day waiting period from the date of final backfilling. This shall include all laterals installed as part of mainline construction. Do not exceed the allowable limits of leakage for all completed and installed sanitary and storm sewer pipe as follows:

## **912.02 Materials**

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**912.02 Materials.** Use the following materials:

Unless otherwise shown, specified, or ordered, provide granular material meeting the requirements of Section 703.11, incorporated in an 8 inch (203 mm) layer. ~~Granular material consisting of natural or synthetic mineral aggregate such as broken or crushed rock, gravel, slag, sand or cinders incorporated in an 8 inch (203 mm) layer, and conforming to the gradation specified in Section 703.11, Type 1.~~

The Contractor may use controlled density fill mixes as an alternate to compacted granular material, conforming to the requirements of Item 613.

Do not use RPCC as bedding, initial backfill, or final backfill material for any metal sewer pipe installation.

**912.03 Compaction Requirements**

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**912.03 Compaction Requirements.** Apply the following compaction requirements to granular materials and to native backfill materials if such materials require compaction in accordance with Item 911.

<b>Max. Lab. Dry Wt. Lbs./cu. Ft. (kg/m<sup>3</sup>)</b>	<b>Min. Comp. Requirements % Lab. Max.</b>
90-104.9 (1442-1680)	102%
105-119.9 (1682-1920)	100%
120 and more (1922)	98%

Consider materials having a maximum laboratory dry weight of less than 90 lbs./cu. ft. (1442 kg/m<sup>3</sup>) unsuitable for backfill compaction. Spread soil, granular material, or other approved material in successive level layers of a depth to allow compaction to the specified density and of not more than 8 inches (203 mm) in thickness (loose measurement), unless otherwise specified and/or authorized in writing by the Engineer.

Cooperate to the fullest extent to accommodate compaction tests. The City will not pay for delay or time lost due to verification of compaction required.

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**REVISED ON A QUARTERLY BASIS, OR AS NEEDED.**