

CITY OF KANSAS CITY, MISSOURI  
SUPPLEMENT TO  
**APWA STANDARD SPECIFICATIONS AND DESIGN CRITERIA  
SECTION 2600**

This is the Kansas City, Missouri Supplement to Section 2600 of the American Public Works Association, Standard Specifications and Design Criteria. The following pages are approved and adopted as replacement pages to the sections and paragraphs of the Kansas City Metropolitan Chapter's APWA, Standard Specifications and Design Criteria (Metro Chapter Standards) that were adopted by the Chapter on April 17th, 1996. The deletions and additions in the following replacement pages that partially revise and supplement the April 1996 Metro Chapter Standards and the April 1999 KCMO Supplement become a part of Section 2600 for use within Kansas City, Missouri.

Text that supplements the Metro Chapter Standards text is identified by ***bold italic*** font. Text that is found in the Metro Chapter Standards text and that does not appear in the following replacement pages, is deleted and not adopted. The City of Kansas City, Missouri, Department of Public Works supplement replacement pages are identified in the bottom-left margin by “***KCMO (Adoption-Month Adoption-Year)***” and/or by light-blue stock. The supplement replacement pages are numbered and sectioned so as to follow in sequence with the Metro Chapter Standards.

### C. Backfill of Trenches:

**General:** All trenches and excavations shall be backfilled with suitable material placed and compacted in conformance with this Section and Section 2102.6 entitled "Embankment."

*The bedding material area identified as Zone "A" in Figures "1" through "3" in this Section shall consist of granular material of 3/8" clean rock for all storm sewer conduits. The bedding rock shall be consolidated by vibratory or manual "chinking" action to provide uniform support – beneath and up to the Springline of the conduit.*

*In the areas above Zone "A", the placement, consolidation, compaction, and moisture content of all backfill materials shall be done in accordance with the following specifications and cross-section details of Figures "1 thru 4." Controlled low strength material (CLSM), or flowable fill as it is commonly known, is the preferred backfill material for all trenches under street or alley pavements up to the level of the pavement subgrade. The pavement subgrade is a six to twelve-inch thick layer that consists of uniformly compacted material (as specified in Section 5200 and the Standard Drawings).*

*Figure 1: The cross-sectional details in Figure "1" describe the minimum requirements for trench backfilling in areas within street and alley pavements that are located in deep (greater than 30" of cover) areas where heavy construction compaction equipment (as required by the applicable specification, 203.3.5 or 203.4 of the "Missouri Standard Specifications for Highway Construction") is utilized to obtain proper compaction at optimum moisture levels.*

*Figure 2: The cross-sectional details in Figure "2" describe the minimum requirements for trench backfilling in areas within street and alley pavements that are (1) not widened to utilize heavy construction compaction equipment (as required by the applicable specification, 203.3.5 or 203.4 of the "Missouri Standard Specifications for Highway Construction") on the backfill material, or (2) located in shallow (30" to 18" from top of pipe to bottom of pavement) roadway trenches.*

*Figure 3: The cross-sectional detail of Figure "3" prescribes the minimum requirements for trench backfilling in areas that are outside of street and alley pavements. The requirements of Figure "3" may also be used in areas located within street or alley pavements – only when a developer surety in the form of a Maintenance Bond or irrevocable Letter of Credit (L.O.C.) agreement, in the name of the Developer and specific to a particular project, is in effect between the Developer (or current Landowner) and the Director of Public Works. The Maintenance Bond or L.O.C. agreement must reflect the requirements contained within this Section and in accordance with our standard*

*Maintenance Bond or L.O.C. agreement forms. The Maintenance Bond or L.O.C. Agreement shall be in the minimum amount of \$10,000, or \$200 per lot, whichever is greater. When allowed by separate ordinance or other provision to post a single Developer Bond or L.O.C. surety for multiple projects, said surety required shall not exceed a maximum of \$30,000. The term shall be a minimum of three years, and shall commence on the date of acceptance of the permit work, specified as the expiration date of the permit by the Director of Public Works. In the event the permit expires before the work is accepted, the Contractor shall apply for reissuance of the permit to establish a new permit expiration date. A Contractor is not authorized to continue work under an expired permit. Additionally, where L.O.C.'s are the form of surety under this provision, the Developer or Landowner shall amend said surety when applying for reissuance to reflect the revised permit expiration date and commencement date of the surety's 3-year maintenance period. In the event that street pavement repair work becomes necessary and monies are withdrawn from the Bond or Letter of Credit to effect the repair work, the Bond or L.O.C. shall be replenished by the Developer, and the term of the Bond or L.O.C. shall be reissued to commence upon completion and acceptance by the Director of Public Works of the repair work performed. The City reserves the right to withhold approvals under this provision from other Developer projects subject to a review of all outstanding claims under this provision. Acceptance of the street construction by the Director of Public Works shall not constitute conveyance of maintenance responsibility from the Developer Bond or L.O.C.*

*Developer Repair Bond or Letter of Credit: When the Developer or Landowner chooses not to use CLSM as the backfill material in Zone "B" for conditions set forth in Figures "1" and "2," the Developer must perform the work as set forth in Figure "3" and must post an irrevocable Letter of Credit or a Maintenance Bond. The Bond or L.O.C. shall be written to ensure the repair of any street pavement settlements that occur at the location of storm sewer, sanitary sewer, waterline mains, or dwelling service lines for same, as a result of construction, upon due notice (as outlined in the specifications stated herein) at all locations. The Letter of Credit or Maintenance Bond will be invoked by the Director of Public Works after a period of 120-days from the date of initial notification to the Contractor of a street settlement, and where there is inaction in effecting a street repair - as outlined in Standard Drawing SR-1, including minimum requirement modifications stated herein - (1) within thirty days of initial notification on the part of the Developer's Contractor to respond with a commitment and schedule of repair that complies with the 120-day grace period for affecting the repair, and (2) after there is non-response by the Contractor to produce a timely schedule, the Contractor's Bonding Company is formally notified, and the repairs are not completed within 120-days of the initial notification to the Contractor.*

*Minimum Repair Requirements: The repair of any street pavement settlements at the location(s) of storm, sanitary, waterline crossings, or service lines for same that were initially constructed under the specifications outlined in Figure "3" of this Section shall be done in accordance with Standard Drawing SR-1 under the field supervision of (1) an independent testing laboratory who provides certification that the repairs were done in accordance with Section 2600 and Standard Drawing SR-1, or (2) a representative of the Director of Public Works who shall have prescriptive authority over the intervals and amounts of nuclear density testing outlined herein.*

*Two nuclear density compaction and moisture content tests shall be done at the direction of the field supervisor upon excavation of the entire trench settlement area to a minimum depth of between four feet and one-half the depth of the conduit. The ultimate minimum depth shall be dependent on the soil conditions encountered during excavation. If testing of the underlying material at the required minimum depth reveals that the material is unsuitable, excavation shall continue until compaction and moisture testing confirms that suitable materials have been reached - or the top of pipe is encountered, whichever occurs first. A minimum of two nuclear density moisture and compaction confirmation tests shall be performed before backfilling.*

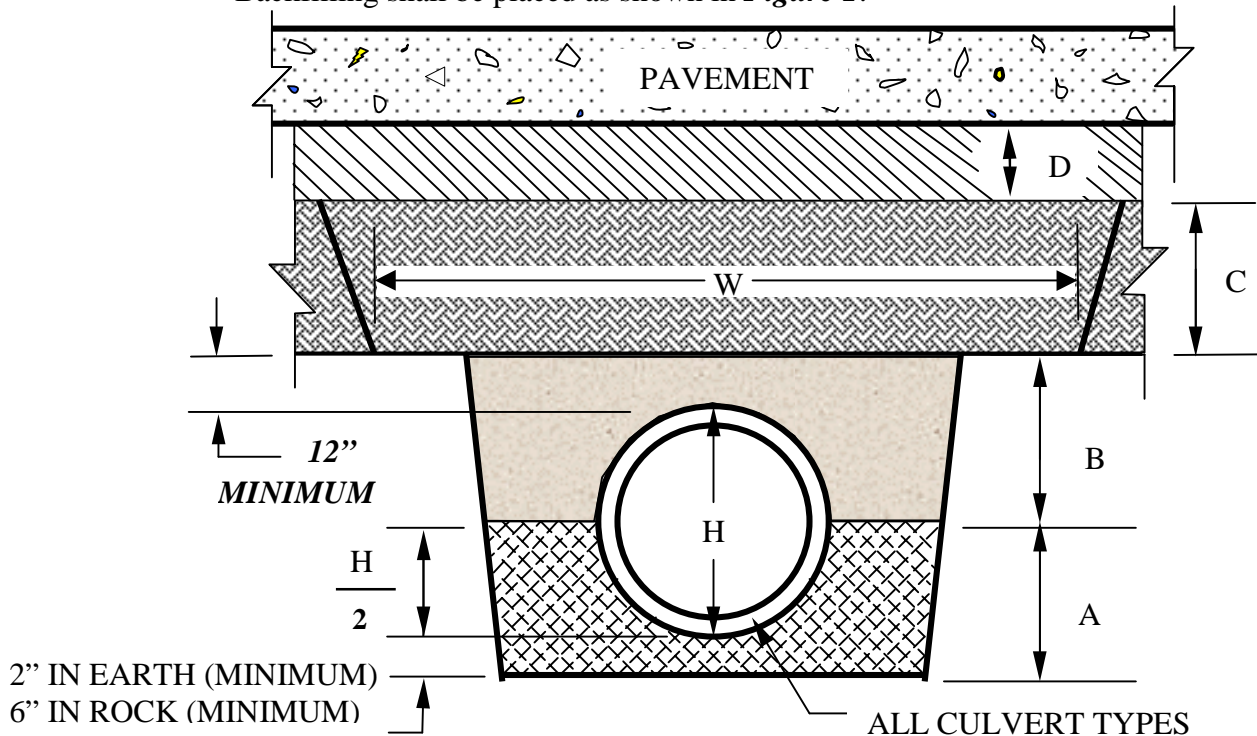
*In choosing the backfill materials, the Contractor may (1) treat the excavated (native) materials to attain optimum moisture content, (2) bring-in suitable materials from offsite that are of optimum moisture content, or (3) use CLSM. All non-CLSM backfill material shall be placed in compacted lifts not to exceed twelve inches for soil or six inches for soil and rock. Clean rock or a rock and dust mixture having a gradation similar or less than that described for untreated compacted aggregate in these specifications shall not be considered suitable material.*

*Two nuclear density compaction and moisture content tests shall be done at the direction of the field supervisor at a level that is half the distance up from the bottom of the newly excavated trench - whenever non-CLSM backfill material is used. A final set of tests shall be done at the top of subgrade. Any test that reveals that the materials do not comply with the requirements set forth in Figures "1" thru "3" shall be re-excavated to a level half the distance to the bottom of the trench, and another set of tests shall be done to confirm compliance.*

*All testing shall be arranged and paid for by one of the following firms and in the following precedence, as events progress and actions (or inaction) unfold: (1) the Contractor, (2) some other contractor as may be hired by the Contractor's Bonding company, (3) some other Contractor as may be hired by the Developer when there is a Bond or Letter of Credit Agreement/arrangement with the Director of Public Works, or (4) some other contractor as may be hired by the Developer's Bonding Company.*

1. *Backfilling under street and alley pavements in deep (30" minimum cover over pipe) areas where heavy compaction equipment (as required by the applicable specification, 203.3.5 or 203.4, of the "Missouri Standard Specifications for Highway Construction") is utilized.*

Backfilling shall be placed as shown in *Figure 1*.



A – *Consolidated* granular bedding material.

B – Flowable Fill (CLSM).

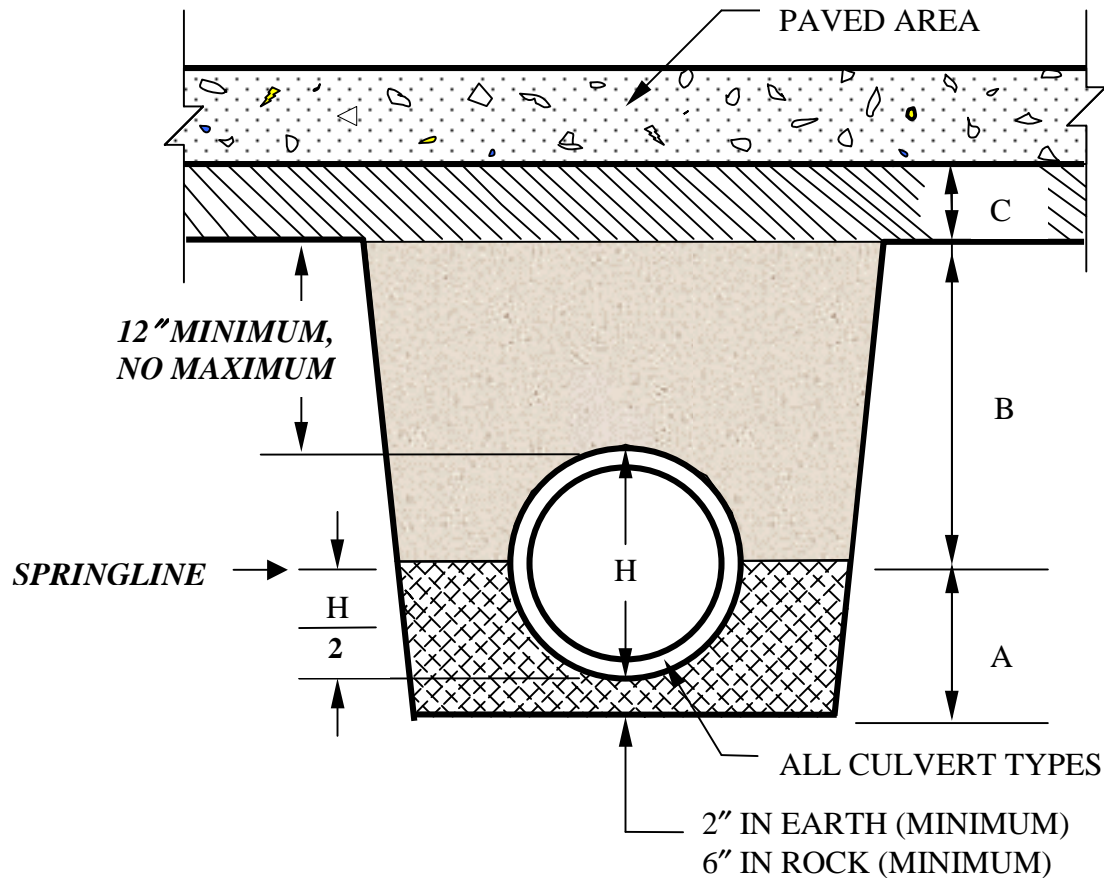
C – *Compacted Embankment* - Shall be constructed in accordance with Section 2102.6. Lift thickness shall not exceed the capability of the equipment being utilized to achieve the proper density and consolidation, and in no case shall a lift exceed twelve inches for soil. The minimum width, W, shall be two feet wider than the width of the required compaction device, or five feet, whichever is greater.

D – *Compacted Subgrade* - Subgrade thickness shall be as specified in Table 1 of Section 5206 and as directed by the engineer. Subgrade preparation shall be done in accordance with Section 2201 and shall consist of untreated compacted aggregate, stabilized aggregate base, or compacted soil – in accordance with the associated Sections 2201, 2202, and 2203.

**FIGURE 1**  
(Deep Sewer Lines Using Earth Compaction Equipment,  
or in Depths Exceeding 30" of Cover)

2. The following cross-sectional view of typical storm sewer trench construction under street and alley pavements, Figure 2, shall apply to all storm sewer backfill areas where deep trenches are not widened to allow heavy roadway compaction equipment. Figure 2 shall also apply to shallow (30" to 18" from top of pipe to bottom of pavement) roadway trenches:

Backfilling shall be placed as shown in *Figure 2*.



A – *Consolidated* granular bedding material.

B – Flowable Fill (CLSM).

C – *Compacted Subgrade* - Subgrade thickness shall be as specified in Table 1 of Section 5206 and as directed by the engineer. Subgrade preparation shall be done in accordance with Section 2201, and shall consist of untreated compacted aggregate, stabilized aggregate base, or compacted soil – in accordance with the associated Sections 2201, 2202, and 2203.

### FIGURE 2

(For Deep Trenches Without Roadway Compaction Equipment,  
or Shallow Trenches Having Less than 30" of Cover)

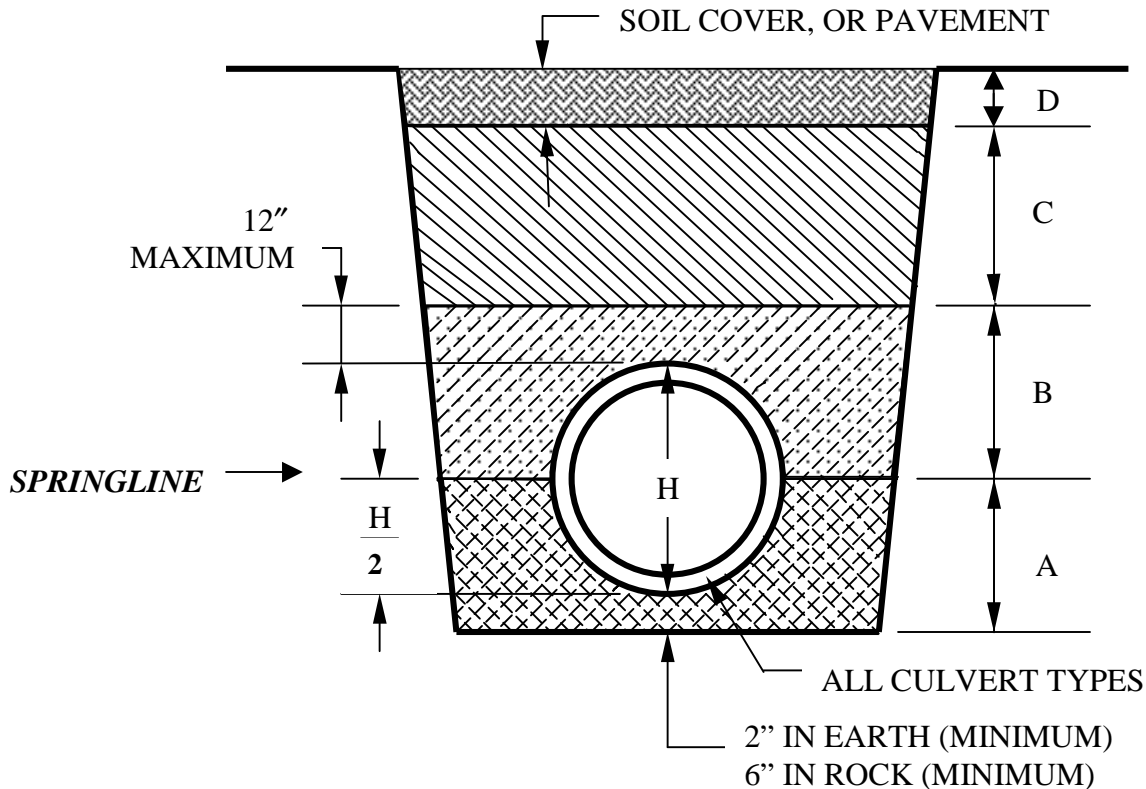
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3. **Trench backfilling in areas other than street and alley pavements where the near edge of trench is behind the back of curb:**

Backfilling shall be placed as shown in *Figure 3*.



A – **Consolidated** granular bedding material.

B – **Consolidated** granular bedding material, **flowable fill (CLSM)**, or compacted soil – **compacted to 90%** of maximum density using ASTM D 698. Maximum lift thickness **for the granular or soil materials shall be six inches**.

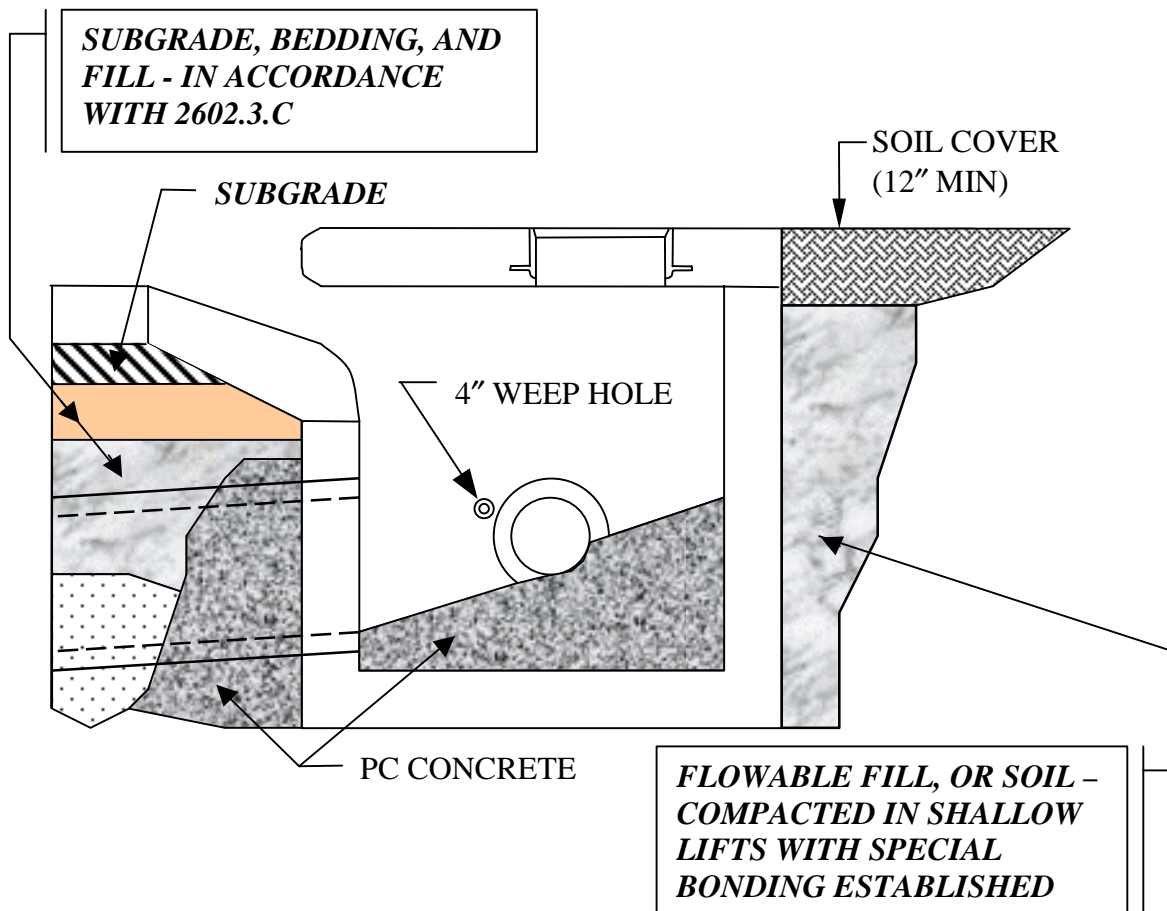
C – **Consolidated** granular bedding material, **flowable fill (CLSM)**, or compacted soil – compact to approximate density of adjacent soil but not less than 90% of maximum density using ASTM D 698. **Lift thickness shall not exceed the capability of the equipment being utilized to achieve the proper density and consolidation; however, in no case shall it exceed twenty-four inches for soil.**

D – **Soil Cover** – Soil cover shall be as specified in Section 2102.7. **The top twelve inches shall be consolidated soil; the top six inches shall be topsoil suitable for sustaining grass.**

**FIGURE 3**  
(Trenches Outside of Street Pavements, or  
Inside Street Pavements With Special Bonding Established)

Excavation for structures shall be carried a sufficient distance, but not less than 18 inches outside the limits of the structure, to permit efficient erection and removal of forms and laying of masonry units, and shall be sloped, stepped, or braced as required for stability. Unsuitable soils encountered at the bearing elevation of the structure shall be removed and replaced with either fill concrete or compacted granular material at the Contractor's option. Over excavation shall be corrected in like manner. The Contractor shall maintain the excavation free of standing water until backfilling is complete.

**D. Backfill of Structures:** All excavations of structures, such as cast-in-place and precast concrete structures for inlets, manholes, junction boxes, box culverts, and headwalls, shall be backfilled with suitable material placed and compacted in conformance with the specifications provided herein, and as otherwise provided in Section 2102 entitled "Grading."



*Note: Weep hole shall be backed by filter fabric or hardware cloth, and 3 cubic feet of granular material.*

**FIGURE 4**  
*(Structures Adjacent to Street Pavements)*

1. **Street Right-of-Way Areas:** *The trenched backfill areas around all storm sewer inlets, junction boxes, and manholes shall be backfilled with removable flowable-fill (CLSM) to a level flush with the bottom of pavement subgrade for paved areas or twelve-inches below finish grade for non-paved areas. When the Developer or Landowner chooses not to use CLSM as backfill material around structures adjacent to street pavement as shown in Figure 4 (above), the Developer must post an irrevocable Letter of Credit or a Maintenance Bond in accordance with Section 2602.3.C. Soil or untreated compacted aggregate backfill shall be compacted in four-inch lifts with hand-held mechanical (pneumatic or hydraulic) impact tampers. In non-paved areas, the top twelve inches shall be consolidated soil; the top six inches shall be topsoil.*

*The external opening surfaces of weep holes shall be covered with hardware cloth and surrounded with a minimum of three cubic feet of consolidated granular bedding material. The configuration of materials properly placed shall be as shown in Figure 4.*

2. **Areas other than Street Right-of-Way:** *The trenched backfill areas around all City-maintained storm sewer inlets, junction boxes, and manholes located within the pavements of private streets, driveways, and parking lots shall be backfilled as specified for the paved areas in Figure 4 and Section 2604.3.D.1 (above). City-maintained storm sewer structures that are located in non-paved areas shall be backfilled with removable CLSM, untreated compacted aggregate, consolidated granular bedding material, or compacted soil to a level twelve inches below finish grade. In non-paved areas, the top twelve inches shall be consolidated soil; the top six inches shall be topsoil.*
3. **Backfilling:** Backfilling shall conform to the requirements of Section 2602.3.C and as follows:
  - a. No backfill shall be placed over or around any structure until the concrete or mortar therein has attained a minimum strength of 2000 p.s.i. and can sufficiently support the loads imposed by the backfill without damage.
  - b. The Contractor shall use utmost care to avoid any wedging action between the side of the excavation and the structure that would cause any movement *or floating* of the structure. Any damage caused by premature backfill or by the use of equipment on or near a structure will be the responsibility of the Contractor.
  - c. Backfill shall be placed and compacted on all sides of the structure simultaneously, and operations shall be so conducted that the backfill is always at approximately the same elevation on all sides of the structure.
  - d. No excavated rock larger than 4 inches maximum dimension shall be placed within 1 foot of the exterior surface of any structure.