

MEMORANDUM

DATE: July 15, 2011
TO: B/CS Development Community
FROM: Cities of Bryan & College Station
SUBJECT: B/CS Unified Standards – 2011 Update

Thank you for your review and comments regarding the proposed changes to B/CS Unified Standards that were recently released for review and comment to the local engineers and the development community. This memo serves to give history on these standards, updates efforts, and highlights some of the current proposed significant changes with explanation for those changes when needed.

Background:

Efforts to develop the subject standards date back 15+ years and have critical contributions from both cities, local engineers, developers, and TEEX. The standards include design guidelines, technical specifications, and standard details – primarily for public infrastructure. These standards are utilized on both permitting of private development projects as well as public capital projects.

Prior to 2000, each city maintained separate standards which were recognized as an inconvenience for the development community. Local design engineers and local contractors now largely support the joint purpose to standardize these regulations. Joint water, sanitary, and roadway standards were first released in 2000. Joint drainage sections were developed from 2004 to 2007. Sanitary Liftstation sections were developed in 2009 and 2010.

In addition to new sections, there have been continued efforts to update the standards approximately every year or two. These updates are generally to implement changes in construction materials, improved methodology, house-keeping correction of errors or internal conflicts, etc. Many of the changes do not have a significant impact on design or construction costs, though some clearly have more significant impacts.

Input from local engineers and the development community have varied over the years with different efforts. More hours and attendance occurred with the earlier efforts with these standards. Due to less attendance and general efficiency, more recent updates have been primarily drafted first by engineering and maintenance staff from the two cities. The proposed changes have been forwarded to the development community for comment and meetings if requested.

In addition to input from a recent HBA meeting, we have received approximately a half dozen comments via our website. By request, we are extending the review period through August 10, 2011. We ask that all comments be emailed to agibbs@cstx.gov and pkaspar@bryantx.gov prior to the August 10, 2011 deadline. This will allow both cities time to review any additional comments and discuss potential associated changes. On Wednesday August 17, 2011 at 3:00pm we will host a meeting at the City of Bryan Municipal Building Basement Training Room to discuss, review, and provide feedback on all comments that have been received. Please have your comments submitted by the August 10th deadline to ensure the meeting time is productive. Below is a summation of the proposed changes to the joint standards to date.

General Specs

- Spec 33 05 01 - PVC Pipe and Fittings Technical Specification
 - *Waterline Material, Part 2.1*
 - *A.1.a – Changed 4 inch back to 6 inch so there really isn't a change here. Change will be going to specify DR 14 only and not get into Pressure Class designations to simplify specification. Originally removed 4 inch pipe due to stocking and limited supply issues.*
 - *A.1.b – Change to DR 14 C905. Clarified specification to match design manual to reference standard for pipe size greater than 12 inches. Remove 4 inch designation for standardization of pipe sizes from maintenance operations.*
 - *A.1.d – Removed next to last sentence regarding 4 inch pipe size.*

- Spec 03 30 00 - Concrete
 - *General Section and Submittals – Added the requirement that all concrete shall be provided from a NRMCA certified plant. This requirement was added after reviewing requirements to maintain a NRMCA certification and realizing those requirements aid in ensuring that consistent high quality products are delivered from the plants. Most local providers of concrete already maintain such certification or can achieve the certification readily. Actual plant certification shall be provided as a submittal.*
 - *2.1B – Fly Ash – clarification of fly ash maximum percentage at 25% and change measurement from volume to by weight for consistency.*
 - *2.1D – Water – clarification to ensure good clean water is utilized in batching of concrete, added 50,000 ppm total suspended solids limit in accordance with AASHTO T26 and compliance with ASTM 1602 for water obtained from a non-municipal water supply.*
 - *2.2A – Do not modify table – leave as current standard. Remove the sentence about fly ash approval under the first table.*

- Spec 09 03 13 – Conductive Trace Wire
 - *Title, Measurement and Execution – added requirement of trace wire to sanitary sewer force mains to assist in locating the pipelines at a later date after construction as there are not many surface features to locate from.*
 - *Part 2.1A – Added the requirement for traffic rated tracer box (they make different types). Also approved equal designation must be received from City ahead of construction.*
 - *Part 3 Execution – remaining items that are removed were taken out to help clarify the specification and make it easier to read leaving only the critical important items.*

- Spec 32 92 13 – Hydro Mulch Seeding
 - *Part 2 Products – No significant change – just converted to tabular format for clarity.*
- Spec 31 23 33 – Excavating, Trenching, and Backfilling
 - *Materials 2.1A – Clarified that embedment details were not just Bryan’s but joint B/CS detail.*
 - *D.2.b – Specified a minimum distance of 100 feet apart for placing offset stakes. These are essential in making sure alignment and grade are maintained on the pipelines. There have been recent projects where pipeline was removed and relayed because poor control was maintained, this requirement is to avoid that in the future.*
- Spec 03 34 00 – Flowable Fill Existing Line
 - *Housekeeping item of changing the name from “grout” to “flowable” to comply with the industry standard language.*
 - *NOTE – we need to change rest of the Spec – Part 3 – it still has “grout fill”.*
- Spec 01 30 00 – Digital Construction Pictures
 - *1.3.A – Submittals – The requirement to add a small sign (paper or dry erase boards typically used) that gives location designation of what is contained in the picture. This is important to the City as this information will be cataloged in our GIS system and linked to the valves, manholes and other infrastructure information to maintain valuable records of how the construction took place and in many cases will be invaluable to maintenance personnel having to dig up that line at a future date.*

Water Design Guidelines

- Erosion Control Plans submitted in accordance with TCEQ water quality requirements.
 - *This was added for projects that are only composed of water infrastructure.*
- PVC pipe designation change
 - *In 2007, the American Water Works Association(AWWA) revised the AWWA C900 standard (3- through -12 inch PVC) to decrease safety factors and eliminate surge allowances. This AWWA revision essentially changed pressure classification definitions from 200 to 305 for the equivalent pipe. Both cities have had problems with thinner wall pipe because of deformations during mega lug installations and tapping operations. C909 pipe will be removed as allowable due to limited production. We will change to require only DR 14 in specs and eliminate specifying the pressure class in the specification to simplify specification.*
- Standard Pipe Sizes
 - *Removed 4 inch pipe due to stocking and limited supply issues.*
 - *Commercial and Industrial areas have minimum pipe size of 8 inch because these areas have the potential for high rise development and gives greater flexibility as the communities grow and redevelop to a denser development requiring additional water needs. The 8 inch Commercial/Industrial minimum pipe size change was initiated by the fire departments.*
- Looping Requirements
 - *Replaced 4 inch pipe with 6 inch pipe due to stocking and limited supply issues.*

- Max length of water mains
 - This change eliminated the 4 inch pipe size for permanent dead end mains. This change is for standardization of materials stocked by both Cities for maintenance.
- Vertical Layout
 - Changes made were to cleanup/clarify the intent of bury depth of lines.
- Flushing Design
 - Removed 4 inch pipe size from Main Size-Blow Off table. This change is for standardization of materials stocked by both Cities for maintenance.
- Valves
 - Changes made involve the elimination of butterfly valves. Butterfly valves have been an operational issue with both cities including installation, leaking, increased repair frequency, and increased maintenance costs compared to gate valves. This affects 18 inch diameter and larger which are typically capital projects or development projects where the city would oversize participate.
- Tapping Sleeves
 - MJ (mechanical joint) designation is clarification – not a change. Two separate tapping sleeve and valves are specified, one for each city, based on water services operational preferences.
- Fire Hydrant
 - Changes made involve moving the location of hydrant from building from 15 ft to 50 ft to give more separation for fire personnel to operate safely from the building when it is on fire.
- Fire Dept Connection
 - Clarified to be in accordance with adopted fire code .
- Water lines crossing creeks
 - Changes made involved the removal of air relief valves required at all creek crossings. Air relief valves are still required at system high-points and covered under flushing section of the guidelines.
- Easements
 - This was added to clarify that in unique and limited cases where the waterline might be extremely deep additional easement width may be needed.

Water Specifications

- Water Main Construction- Section 33 11 13.1
 - 3.1 – General: Vertical Layout – changes made were to cleanup/clarify the intent of allowable buried line depths.
- Fire Hydrants- Section 33 12 19
 - Part 2.2A: Acceptable fire hydrants – changes made only allow ‘American Flow Control 5-1/4” B-84-B’ and Clow Medallion fire hydrants. This change is for standardization of materials stocked by both Cities for maintenance. The Cities perform maintenance on the hydrants in the

field (replacing components within the hydrant) which would require stocking too many different parts and certifications of personnel making those repairs.

- *Part 3.1A: Potential assembly valve omission – changes made allow the assembly valve to be omitted if the respective main-line valve is within 50' of a fire hydrant. This was added to eliminate unnecessary/redundant valves.*
- *Part 3.1E: Fire hydrant installations- changes were made to increase the distance of the steamer nozzle over the nearest grade. This was changed to allow for easier operation, accessibility, and maintenance of fire hydrants.*
- *Part 3.1F: Steamer nozzle chains- changes were made to have the contractor remove the chains from the steamer nozzles prior to final project inspection. This was changed due to maintenance issues/concerns of chains binding to cap causing difficulty during removal.*
- *Water Main Line Valves- Section 33 12 16*
 - *Part 2.1B: Changes were made to NOT allow brass operating nuts. This was changed due to maintenance issues/concerns.*
 - *Part 2.1B-1a: Acceptable gate valves – Will leave specification as it was previously. Pre-approved equal statement has been removed.*
 - *Part 2.1C: Deleted butterfly section per removal of butterfly valve requirement in the Water Design manual.*
- *Water Services-Section 33 12 13*
 - *Part 2.1: Changes were made to revise allowable angle ball curb stops for both Cities. This change is for standardization of materials stocked by both Cities for maintenance.*
- *Tapping Sleeve and Valve*
 - *New spec has been created.*

Water Details

- *Detail W1-00:*
 - *This detail was revised to only allow traffic rated tracer wire test station and to remove a depicted splice connection. This was changed due to reliability issues as well as maintenance issues/concerns.*
- *Detail W1-02:*
 - *Potential assembly valve omission – changes made allow the assembly valve to be omitted if the respective main-line valve is within 50' of a fire hydrant. This was added to eliminate unnecessary/redundant valves.*
 - *Fire hydrant installations- changes were made to increase the distance of the steamer nozzle over the nearest grade. This was changed to allow for easier operation, accessibility, and maintenance of fire hydrants.*
 - *Steamer nozzle chains- changes were made to have the contractor remove the chains from the steamer nozzles prior to final project inspection. This was changed due to maintenance issues/concerns.*
- *Detail W1-03:*
 - *This detail was revised to only allow traffic rated trace wire test stations and to remove a depicted splice connection. This was changed due to reliability issues as well as maintenance issues/concerns.*
 - *This detail also now depicts a tracer wire test station to be installed at the dead end of a line.*
- *Detail W2-01:*
 - *Note added to require water service stub-out to be 8"-12" from finished grade with an angle ball valve for commercial developments. This was changed to allow both Cities to more easily excavate at commercial sites that may have extensive paving/landscaping/sidewalks installed nearby.*
 - *Note added to clarify when to use a 1-1/2" ball valve.*

- Detail W3-00:
 - *Section A-A was revised to depict minimum allowable end of line blocking dimensions. This was added for clarification*
- Detail W3-02:
 - *Note added to require a sleeve be installed for copper tubing that is penetrated through the depicted concrete slab. This was changed to allow both Cities to more easily maintain air release valves and to increase the service life of the new copper.*
 - *This detail now includes the depiction of a bronze insect screen that was previously called out. This was added for clarification.*
- Detail W4-02:
 - *This detail was revised to attempt to make the overall detail easier to understand/interpret. For example, the previous detail depicted bedding 'options' while the revisions simply state in 'non-structural' of 'areas to be paved'. This note was revised for clarification.*

Sanitary Sewer Guidelines

- Minimum Pipe sizes:
 - *Commercial service leads will allow 4 inch pipe for service lead. (Current minimum allows 6 inch service)*
- Pipe slope table:
 - *This suggestion was from private sector engineer. The intent was to match preferred minimum velocity in the pipe and be consistent with other pipe sizes. The velocity for the pipes 18 inch thru 36 inch would be 2.5 fps and changing this minimum would match. These are preferred minimum slopes – TCEQ minimums are still the absolute and many times allowed if needed for difficult conditions.*
- Drops inside manholes:
 - *It was decided to remove this statement from the design guidelines in favor of referring to the standard detail for drop manholes.*
- Crossings of creeks:
 - *Proposed to remove the concrete cap over shallow pipeline crossings to remove additional weight / load over the pipeline crossing.*

Sanitary Sewer Specifications

- Spec 33 39 13
 - *Cement sand material was removed as a backfill material for manhole drops since drops are to be built inside of the manhole.*
 - *Clarification was made on the thickness of the base depending on the depth of the manhole.*
 - *The City of College Station drafted language for how to construct a manhole around an existing pipe.*
 - *Cleanout cap clarification type was made for both Cities.*
 - *Clarification was added on how to construct a drop inside the manhole and how far the pipe should be extended toward the flow line of the manhole.*

- Spec 33 39 14
 - *Cleanout cap clarification type was made for both Cities.*
- Spec 33 01 30.13
 - *Clarification was added on the type of closed circuit television equipment that should be used to post inspect the construction.*

Sanitary Sewer Details (Unified)

- Structural Backfill Area(S2-03)
 - *Slight modifications were made for the bedding and backfill detail for non-structural and areas to be paved or streets to be reconstructed. The previous detail that allowed the sand bedding did not set a maximum of the bedding depth above the pipe.*
- Notation added to manhole lid detail (S4-02 and S4-03)
 - *A note was added to clarify that the City logo lids are to be used on public mains only. Private mains inside of a development should not use the City logo lids.*

Additional detail sheets have been created to show city specific details. These details are in response to the differences in maintenance preferences between the City of Bryan and the City of College Station.

Sanitary Sewer Details (BRYAN ONLY)

- Detail B1-00 & B1-01
 - *Depiction added to show updated inside drop manhole*
 - *This detail was added to show the configuration of the pipe for the drop inside of the manhole. This drop structure should be easier for the contractor to construct and for the City to maintain the piping. It also eliminates the additional cleanouts that are required with outside drops.*
 - *Inside drops are required unless outside drops are specifically approved by the City Engineer.*
- Detail B2-01 & B2-02
 - *Note/depiction added to state that all service connections & extensions are to be installed with the main line construction. This was revised for clarification purposes.*
 - *Note/depiction added to state that the sewer service connections are to be installed at depths within 3-1/2 feet below natural/proposed ground. This note was added for clarification and to decrease deeper service connection that cause maintenance/installation issues.*
 - *Detail was added for the contractor to stub out the sewer service connection 4-feet above the ground at the time of construction. The private plumber will then make the connection to this pipe at the height needed for the structure. In exchange for this configuration the City of Bryan is looking to charge a different fee from the standard tap fee. The addition of a brass cap is the type of cap used by the City of Bryan when it makes the service connection when a standard tap fee is paid. Most likely the new fee will be a \$100 inspection fee paid in lieu of the \$350 tap fee. The brass cap is approximately a \$5-\$6 component.*
- Depiction added to show allowable tapping areas.
 - *This detail was added for clarification purposes and allows for more laminar sanitary sewer flow.*

Sanitary Sewer Details (COLLEGE STATION ONLY)

- Detail CS1-01 & CS1-02
 - Note/depiction added to state that all service connections & extensions are to be installed with the main line construction. This was revised for clarification purposes.
 - Note/depiction added to state that the sewer service connections are to be installed at depths within 3-1/2 feet below natural/proposed ground. This note was added for clarification and to decrease deeper service connection that cause maintenance/installation issues.
- Detail CS2-00
 - Detail shows the type of drop manhole that the City of College Station prefers to use. Drop manhole configuration uses a nye configuration which replaces the tee configuration shown on the 2009 details.
 - Note added to outside drop manholes stating they shall only be used on main line connections (sizes 6" and larger). This was added due to City of College Station maintenance/inspection concerns of manhole access involving TVI camera and cleaning equipment.
 - Inside drop manhole added for use only on service line connections (4" and smaller) unless specifically approved by the City Engineer.
- Depiction added to show allowable tapping areas.
 - This detail was added for clarification purposes and allows for more laminar sanitary sewer flow.

Lift Station Details

- Detail LS1:
 - Note added to 'call-out' a bypass manhole that is to be located no farther than 80' from the lift station site. This requirement was previously in the Lift Station guidelines and was added to the detail for clarification.
 - Note added to 'call-out' a hose bib vacuum breaker (self-draining and non-freezing). This requirement was previously in the Lift Station guidelines and was added to the detail for clarification.
 - Note added to 'call-out' a required backflow assembly. This requirement was previously in the Lift Station guidelines and was added to the detail for clarification.
- Detail LS2:
 - Note added to 'call-out' a bypass pumping assembly appurtenances. This requirement was previously in the Lift Station guidelines and was added to the detail for clarification.
 - Note added to 'call-out' a 6" bypass suction line into the proposed wet well. This requirement was previously in the Lift Station guidelines and was added to the detail for clarification.
 - Note/depiction added to identify intermediate guide bar brackets. This requirement was previously in the Lift Station guidelines and was added to the detail for clarification.
 - Note/depiction added to identify the structural design requirements of all proposed lift stations. This requirement was previously in the Lift Station guidelines and was added to the detail for clarification.
 - Note/depiction added to identify the 'as-required' dimension for the bottom of a proposed wet well. This requirement was previously in the Lift Station guidelines and was added to the detail for clarification.

Street Design Guidelines

- Submittal Requirements
 - *Pavement Marking and Sign information revised to clarify that this information is needed for all roads and facilities.*
 - *Erosion Control Plan added to list to spell out that one needed for standalone street projects.*
- Pavement Lane and Width
 - *Bike lane delineation changed to bike lane symbol to align with TMUTCD.*
- Intersection Design
 - *Table 1 – Minimum Centerline Distance Between Intersections has been eliminated. These standards were already more sufficiently addressed in each city’s development ordinances. It was recognized there was a discrepancy between the guidelines and each City’s development ordinances; therefore we enlisted a local traffic engineering expert to provide advice in the matter. The recommendations provided were substantially more conservative than the current standards reflected in either Cities ordinance; therefore we decided to not go with those recommendations. The proposal is to simply reference the existing standards and delete the conflicting table in this guideline.*
- Signage
 - *Regulatory Signage – Clarified requirements for End of Road signage to minimize accident frequency and damage.*
 - *Street Name Signs – College Station has clarified sign standards to include block numbers.*
 - *Foundations – Clarified that different anchor systems are required between Bryan and College Station.*
- Pavement Markings and Signage
 - *Table III revised as follows –*
 - *Pavement Marking and Sign information revised to clarify that this information is needed in the plans for all roads and facilities to TMUTCD standards.*
 - *Spells out that the Developer is required to install pavement markings and markers.*
 - *Bryan still installing street name signage after collection of sign fee. In College Station, clarified that sign installation required before Letter of Completion (fixed wording)*
 - *In College Station, put in writing that street name signs and End of Road markers shall be installed by developer which is already the current practice. All other regulatory signs shall be installed by the City.*
- Pavement Markings
 - *Crosswalk pavement marking section added to specify and indicate preference between the two Cities.*
 - *Stop and Yield Lines section added to clarify the addition of retroreflective thermoplastic transverse striping on either side of crosswalks designed with brick pavers, stamped concrete, etc. to aid in visibility at night.*
- Streetlights
 - *Revised to reflect current practice and to provide flexibility in more rural areas.*
- Pavement Thickness Criteria
 - *Table IX modified to require Private Streets to be built of 8” concrete pavement which gives HOA less maintenance burden and could aid in City accepting future dedication, as is typically requested when maintenance issues develop.*

Street Specifications

- Section 32 12 16 Hot Mix Asphalt Concrete Paving
 - *In order to be consistent with 2004 TxDOT spec. adjustments were made to Gradation and Asphalt Content Table, laboratory density tolerance, roadway surface temperature, tack coat application rate, and HMAC temperature. This was recommended by geotechnical consultant to allow for consistency at plant and lab.*
- Section 34 41 13 Signage
 - *This spec was added to provide specifications for the signage provision already required in Design Guidelines.*

Street Details

- Unless otherwise noted below, the changes made to the Street and Sidewalk Details were an effort to reflect the requirements in the Design Guidelines that the Contractor may not be seeing in the construction plans.
- ST3-00 Expansion and Construction Joint Details
 - *Detail modified to coordinate joint spacings that were previously inconsistent between details and specification documents and to provide spacings that were not previously divisible.*
- SW2, SW3-00 and SW3-01 (regarding Pavement Markings)
 - *SW2 - Crosswalks notes provided to define the crosswalk standards as part of the pavement markings provision already required in the Design Guidelines.*
 - *Details SW3-00 and SW3-01 crosswalk markings removed from details. Note has been inserted stating crosswalk markings, dimensions, etc. shall be shown elsewhere in the plans.*

Drainage Design Guidelines

- Detention Facility Exemption
 - *Clarify “single family” is detached and not town homes or duplexes. This has been the existing interpretation.*
 - *Clarify “existing lot” is legal lot prior to January 2007 which was the original adoption and effective date of the Drainage Guidelines. This date applies to detention facility exemption only.*
- Submittal Requirements
 - *Erosion Control Plan added to list to spell out that one is needed for standalone drainage project.*
 - *Project limits added requirement to clarify limit of disturbed ground, for erosion control, construction methodology, floodplain or other grading and vegetation disturbance to define for contractor and general design.*
- Low-flow Multi-barrel Culverts
 - *Typical maintenance and performance problem with outer culverts silting-in. General idea is to lower middle (or actually raise the outer) culvert(s) to attempt to mimic trapezoidal channel shape and minimize maintenance to remove the silt and keep the culverts more open. Recent project development has shown that a 2yr storm sizing can engage more than just 1 box culvert. A better guideline is to design the lowest box to match or exceed the existing velocity of the channel during a 2 year storm event. The guideline has been modified accordingly.*

- Water Quality Permitting (See Revised Draft Guideline)
 - *The State's TPDES permit has been in place for several years. Both cities currently require compliance to the TCEQ storm water permit.*
 - *Best Management Practices are provided to assist and standard methods and preferences to storm water pollution prevention plans.*
 - *Sequencing is established so that the extent of flooding or erosion that may occur during the construction phase is minimized or eliminated, i.e. installation of detention ponds prior to construction of the impervious, etc that would increase the drainage runoff.*

Drainage Specifications

- Section 33 40 01 – Storm Drain System – TV Testing
 - *Clarify specific requirements of the TV test. These specifications mirror the existing TV testing specification for sanitary sewer.*
- Section 33 40 02 – Reinforced Concrete Pipe
 - *Clarify that Class III pipe is the current minimum required. (Class IV pipe is the required minimum per ASTM C76 if cover is less than 1 ft with traffic loadings.)*
 - *Clarify that joint gaskets should be equalized so that the gasket is not stretched on one side where the joint may not seat fully or properly, or even cause a gasket to fail.*
- Section 33 42 16.13 Pre-cast Reinforced Concrete Box Culverts
 - *ASTM updated standards from C789 and C850 in recent years to just C1577. New ASTM standards provide labeling on pipe for minimum required cover for ease of confirmation in field.*
 - *Proposal to increase RCBC joints from tongue and groove to gasket. This gasket joint would be similar to the existing joint required for RCP. The proposed spec would require the gasket to be fabricated with gasket so that if is not installed at the site – this allowed significant deletions to the spec and removed construction steps for contractor while increasing material/ construction conformity. Existing tongue and groove requires multiple strips of Ramneke to be placed when pushing the joints together. There is an inherent difficulty to ensure the Ramneke strips do not have voids. In short, the gasket is a superior joint and watertight where the tongue and groove is only soil tight at best if properly installed.*

Drainage Details

- Inlet and Junction Boxes
 - *Proposed to increase minimum base thickness from 6 inches to 8 inches; and that depths (final grade to flow line) greater than 12 feet require 12 inch thick bases and 2 mats of reinforcement steel. This is to mirror the requirement for sanitary sewer manhole bases. In the future we will discuss the need to increase the wall thickness as depth varies.*
 - *Revised inlet extension. A private engineer raised this issue that inlet extensions are being required to be constructed with full dimensions of the inlet which is an unnecessary cost. This proposed revision is to allow the extensions with minimal dimensions and would remain hydraulically and structurally adequate while enabling initial cost savings and providing additional clearance for adjacent utilities, etc.*
- Concrete Strength (See Revised Details)
 - *Several details and specs initially proposed inlets, channels, pavement, etc to require 4000 psi. These updates are no longer proposed and will return to existing requirement of 3000 psi.*

- Grate Inlets
 - *Grates shall be bicycle or pedestrian friendly, respectfully, so that the grate does not become a hazard.*
- Headwalls
 - *Headwall adjustments to specify minor design preferences.*
- Structural Backfill Area
 - *Further illustrate existing definition of “structural” areas requiring structural compaction effort. This detail currently exists for water and sanitary sewer, and now the same is proposed for public storm.*
 - *Clarify that “structural” effort applies to new streets and reconstructed streets.*
- Trench
 - *Increase the cement stabilized sand bedding from 4 to 6 inches minimum. This was proposed to increase to ensure sufficient support under the pipe bells.*
- Manhole Cover
 - *Added 32” manhole cover and conformed detail to match the Sanitary Sewer Manhole layout.*
- General Notes
 - *Added general notes to include requirements that are the same and apply to more than one detail on this sheet. Also added erosion control notes that are similar to notes on the water and sewer detail sheets.*