SECTION 02730
SANITARY SEWER SYSTEMS

PART 1 – GENERAL

1.1. Related Sections:
   Section 02730 Sanitary Sewer System
   Section 02513 Asphaltic Concrete Paving
   Section 02520 Portland Cement Concrete Paving
   Section 02221 Trenching, Backfilling and Compacting
   Section 02200 - Earthwork.
   Section 02722 - Drainage Structures and Piping.
   Section 02400 – General Utility Standards
   Sewer service connections to building: Division 15 sections.

1.2. Related Standard Details
   Refer to City of Boulder’s Technical Drawings for standard details.

1.3. Codes & Standards
   A. The most recent City of Boulder Design & Construction Standards are
      incorporated by reference into the University’s Standards. When there is a conflict
      between standards, the more stringent requirement shall apply. The University’s
      Civil Engineer must approve in writing any deviation from these standards prior to
      construction.
   
   B. 2006 International Plumbing Code
   
   C. 2006 International Building Code

1.4 SUMMARY:
   A. Intent:
      All improvements proposed to the University’s wastewater utility system shall
      conform with the goals, policies, and standards adopted in the UCB Civil Utility
      Master Plan.
   
   B. General:
      1. This section includes materials, installation, and testing of gravity sewer
         pipe and appurtenances conforming to ASTM D 3034 or ASTM F 789.
      2. Handle pipe and fittings to insure delivery in a sound, undamaged
         condition. Do not store materials on the ground. Use covers to protect
         materials from direct sunlight.
PART 2 – DESIGN

2.1 Design Considerations:

1. The University’s preference in design is to minimize the number of service connections and manholes for new buildings.

2. Wastewater collection mains shall be designed to convey the peak flow. Please consult University Engineer for peaking factors.

3. Wastewater collection mains shall be designed to ensure transport of suspended materials and preclude material deposits considering minimum-day flows.

4. The peak flow shall be determined using average-day forecasts adjusted by a peaking factor and including the allowed and any existing system infiltration or inflow.

5. The minimum-day flow shall be determined using average day-forecasts adjusted by a minimum flow factor and including the allowed and any existing infiltration or inflow.

6. Average-day flow forecasts shall include the ultimate area, population density, existing wastewater flow, anticipated industrial discharge, and any allowed infiltration/inflow, that produces the greatest wastewater flow rates.

7. Surface water, ground water, or cooling water shall not be discharged into the wastewater collection system. Prohibited connections include roof drains, storm inlets, foundation perimeter drains, area drains for open patios or driveway entrances to parking structures, and ground water sump systems.

8. Floor drains internal to covered parking structures, that collect drainage from rain and ice drippings from parked cars or water used to wash-down internal floors, shall be connected to the sanitary sewer using appropriate grease and sediment traps.

9. Final design flow determinations shall include any documentation and calculation of initial and ultimate areas, population densities, existing wastewater flow rates, existing or anticipated industrial discharges, and average-day, peak flow, minimum-day, and infiltration/inflow flow rates.

10. Pipe penetrations through foundation or tunnel walls shall use Link-Seal® or approved equivalent.

11. Manholes located within the 100-year floodplain, or in a location where runoff may accumulate and pond, shall be installed with a bolting-type cover, to prevent loss of the cover. The manhole ring shall be bolted to the manhole cone to prevent possible damage due to surcharge.
PART 3 - CONSTRUCTION

3.1 SEWER PIPE AND FITTINGS:
   A. Comply with the City of Boulder’s Design and Construction Standards, Chapter 9, Utilities Standards.

3.2 CONCRETE MANHOLES
   A. Comply with the City of Boulder’s Design and Construction Standards, Chapter 9, Utilities Standards.
   B. Manholes shall be required at all service connections for wastewater service lines six (6) inches in diameter and larger.
   C. All manholes shall be designed and constructed with a minimum drop through the manholes as follows:
      1. 0.1 foot for straight through sewer mains.
      2. 0.2 foot at a change in sewer main alignment or intersection of connecting sewer mains.

3.3 PIPE BEDDING:
   A. Comply with the City of Boulder’s Design and Construction Standards, Chapter 9, Utilities Standards.

3.4 IDENTIFICATION:
   A. Underground Type Plastic Line Marker:
      1. Manufacturer's standard permanent, continuous-printed plastic tape with metallic core, intended for direct-burial service; not less than 6" wide x 4 mils thick. Provide green tape with black printing reading "CAUTION SANITARY SEWAGE LINE BURIED BELOW".

PART 4 - EXECUTION

4.1 TESTING
   A. Comply with the City of Boulder’s Design and Construction Standards, Chapter 9, Utilities Standards.

4.2 TRENCHING, BEDDING, & BACKFILL:
   A. Comply with UCB Standards Section 02221.
4.3 INSTALLATION OF IDENTIFICATION:

A. During backfilling and top-soiling of underground sanitary sewer piping, install continuous underground line markers, located at two (2) depths, 1’ below grade and 2’ above pipe.

4.5 PIPE INSTALLATION:

A. Comply with the City of Boulder’s Design and Construction Standards, Chapter 9, Utilities Standards.

4.6 INSTALLING LATERALS: FOR SERVICE LINES LESS THAN 6-INCHES IN DIAMETER

A. Each wye branch fitting shall have its barrel diameter equal to the diameter of the sanitary sewer main and the spur (or branch) diameter as indicated on the plans. Do not place wye branches within 5 feet of any structure.

B. Install wye fittings so that the outlet branch is inclined upward at an angle of 45 degrees. Plug wye branch fittings that are to be left unconnected with a stopper or plug. Join laterals to the wye branch fittings at the sanitary sewer main by eighth bends. Eighth bends and quarter bends are a part of a lateral sewer line.

C. End of the lateral shall be at least 3 feet below the existing or proposed grade of the ground a existing structure to be served or as called for on the plans.

D. Where possible, laterals shall run perpendicular to the sewer main at a minimum of 2%. Bed laterals the same as the sewer main into which they connect.

E. Plug laterals with stopper in the socket of the last joint. Seal stopper in place so that it will withstand the internal pressure during the test for leakage and also that it may be removed without damage to the socket.

F. Cleanouts shall be provided and shown on the drawings.

4.7 CLOSING ABANDONED UTILITIES:

A. Close open ends of abandoned underground utilities which are indicated to remain in place. Provide sufficiently strong closures to withstand hydrostatic or earth pressure which may result after ends of abandoned utilities have been closed. Wood plugs are not acceptable.

4.8 TAP CONNECTIONS:

A. Make connections to existing conduits and underground structures, so that the finished work will conform as nearly as practicable to the requirements specified for new work.
4.9 FIELD QUALITY CONTROL:

A. Notify the Owner’s Representative and governing authorities (if any) at least 24 working hours in advance of pipe being laid in any trench and 16 working hours in advance of testing. Do not cover pipes until inspected by the Owner’s Representative and governing authorities (if any).

4.10 CLEANUP AND RESTORATION:

A. Comply with the City of Boulder’s Design and Construction Standards, Chapter 9, Utilities Standards.

END OF SECTION 02730