Jensen Infrastructure® Guide Specification

StormVault® MBC
for
Buried Detention or Infiltration Systems

Revised 6/13/2025

This Product Guide Specification has been prepared in accordance with the Construction Specifications Institute (CSI) 3-Part Format, incorporating MasterFormat, SectionFormat, and PageFormat standards as outlined in the CSI Manual of Practice.

This Section must be thoroughly reviewed and customized by the Engineer to ensure compliance with the specific requirements of the Project and applicable local building codes. Coordination with related Specification Sections and the Project Plans is essential. All "Specifier Notes" should be removed during the editing process.

Section numbers are based on the MasterFormat 2018 Edition. Update to the latest edition as necessary to reflect current standards.

This Section pertains to Jensen Infrastructure® StormVault®—a precast concrete, modular, buried stormwater storage system. The StormVault® system is engineered to meet the unique demands of each Project.

For assistance in tailoring this Section to your specific application, please consult Jensen

SECTION 33 46 23 – MODULAR BURIED STORMWATER STORAGE UNITS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. StormVault® precast concrete, modular box culvert, buried stormwater storage units and accessories.

1.02 SUMMARY

A. This Section includes criteria for precast concrete, modular box culvert, buried, stormwater storage units utilized for detention or infiltration of stormwater runoff. This Section covers the materials and methods for the manufacture and installation of the precast concrete, modular, buried stormwater storage units.

1.03 RELATED SECTIONS

A. Section 01 33 00 – Submittal Procedures
B. Section 31 00 00 – Earthwork
C. Section 03 40 00 – Precast Concrete

1.04 REFERENCE STANDARDS

A. American Society of Civil Engineers (ASCE)

1. ASCE 7-16

B. American Association of State Highway Transportation Officials (AASHTO)

1. AASHTO – Standard Specifications for Highway Bridges, 17th Edition – 2002
2. AASHTO M198 – Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
3. AASHTO M288 – Standard Specification for Geosynthetic Specification for Highway Applications

C. American Concrete Institute (ACI)

1. ACI 318 – Building Code Requirements for Structural Concrete
2. ACI 350 – Code Requirements for Environmental Engineering Concrete Structures
3. ACI 350.3 – Seismic Design of Liquid-Containing Structures and Commentary

D. American Society for Testing and Materials (ASTM)

1. ASTM A1064 – Standard Specification for Steel Wire and Welded Wire Reinforcement for Concrete

2. ASTM A48 – Standard Specification for Gray Iron Castings
3. ASTM A615 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
   ASTM A706 – Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.
4. ASTM C32 – Standard Specification for Sewer and Manhole Brick (Made form Clay or Shale)
5. ASTM C139 – Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes
6. ASTM C478 – Standard Specification for Circular Precast Reinforced Concrete Manhole Sections
7. ASTM C595 – Standard Specification for Blended Hydraulic Cement
8. ASTM C877 – Standard Specification for External Sealing Bands for Concrete Pipe, Manholes, and Precast Box Sections
9. ASTM C890 – Standard Practice for Minimum Structural Design Loading for Monolithical or Sectional Precast Concrete Water and Wastewater Structures
10. ASTM C891 – Standard Practice for Installation of Underground Precast Concrete Utility Structures
11. ASTM C913 – Standard Specification for Precast Concrete Water and Wastewater Structures
12. ASTM C920 – Standard Specifications for Elastomeric Joint Sealants
13. ASTM C923 – Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals
14. ASTM C990 – Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
15. ASTM C1107 – Packaged Dry, Hydraulic Cement Grout (Non-Shrink)
16. ASTM C1478 – Standard Specification for Storm Drain Resilient Connectors Between reinforced Concrete Storm Sewer Structures, Pipes, and Laterals
17. ASTM D448 – Standard Classification for Sizes of Aggregate for Road and Bridge Construction
18. ASTM D698 – Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort
19. ASTM D2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
20. ASTM F2510 – Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures and Corrugated Dual- and Triple-Wall Polyethylene and Polypropylene Pipes

E. Local Stormwater Management Regulations and Codes

1. The detention system shall meet or exceed jurisdictional requirements for stormwater control, water quality, and environmental protection.

1.05 DESIGN REQUIREMENTS

A. Design Performance: Provide Modular Buried Stormwater Storage Units capable of withstanding design loads as indicated on the Plans and in accordance with the AASHTO LRFD Bridge Design Specifications to withstand site-specific conditions and the details listed herein.

1. Dead Loads shall be determined using the following:

i. **i.** Minimum combined load from overlying soil, pavement, and subbase shall be 120 pcf, based on wet sand and gravel conditions as defined in ASCE 7-16, and in accordance with the cover conditions specified in the project plans.
ii. Minimum concrete load of 150pcf.
iii. Static Lateral Earth Pressure to be based on a minimum (at-rest equivalent fluid pressure) of 80 pcf or a submerged (at-rest equivalent fluid pressure) of 113pcf.
iv. Other dead loads as indicated on the Plans.

2. Live Loads shall be determined using the following:

i. Horizontal soil pressure from surface loads shall be applied as a uniform surcharge pressure of 80 psf from surface to a depth of eight feet per ASTM C890.
ii. HL93 and Design Tandem Loading per AASHTO – Standard Specifications for Highway Bridges, 17th Edition – 2002 based on the minimum and maximum depth of burial as indicated on the Plans.
iii. Vehicle impact loads shall be increased 30% per ASTM C913.

3. Hydrostatic Load shall be determined using the following:

i. A minimum of 62.4 pcf water density at the maximum water storage depth as indicated on the Plans.

4. Maximum Soil Bearing Pressure shall be determined using the following:

i. The maximum allowable soil bearing pressure shall be 1,500 psf or;
ii. The soil bearing capacities shall be as determined by the Project Geotechnical Engineer or as listed in the Project Geotechnical Report.

B. The stormwater storage system shall provide detention or infiltration volume as specified in the Project Plans or as outlined in the Water Quality Management Plan (WQMP).

C. The footprint of the system shall conform to the dimensions shown on Plans. Any deviation from the specified footprint shall require a hydraulic analysis demonstrating that the change will not negatively impact the overall system performance.

1.06 QUALITY ASSURANCE

A. Precast concrete, modular, buried stormwater storage units shall be manufactured by a facility with at least 10 years of experience producing similar products. The Precaster shall comply with the NPCA Quality Control Manual and maintain a dedicated quality control department or retain an independent testing agency.

B. The Engineer may inspect all materials, methods, and completed subsurface stormwater storage systems. Acceptance shall be based on compliance with this Section's Specifications.

1.07 SUBMITTALS

A. Submittals shall conform to Section 01 33 00 - Submittal Procedures.

B. Action Submittals

1. Shop Drawings
    i. Submit manufacturer's shop drawings to include plans, elevations, sections, and details to include overall dimensions and individual precast component dimensions.
    ii. Submit reinforcement design to include all structural reinforcement, lifting and erection inserts, connections, and other cast-in hardware.
    iii. Submit details that indicate the size and location of all access openings and all inlet and outlet openings.
    iv. Indicate location and details of joint and sealant placement.

2. Concrete Design Mixtures
    i. Submit a concrete design mixture for all precast concrete elements and structures.

3. Water Storage Sizing
    i. Include design and/or calculations that confirm the stormwater storage system Design Storage Volume has been provided in accordance with the Plans and the Project Water Quality Management Plan (WQMP).

4. Structural Calculations
    i. Stamped and signed by a licensed professional engineer in the state of installation, including design considerations for soil loads, traffic loads (AASHTO HL-93), hydrostatic pressures, and other relevant factors
    ii. Manufacturer's certifications verifying compliance with ASTM and NPCA standards. Concrete batch reports and strength test results.

C. Informational Submittals (Upon Request)

1. Material Test Reports and Certifications

i. Concrete Compressive Strength
ii. Concrete Aggregates
iii. Reinforcement
iv. Cementitious materials
v. Admixtures

2. Operations and Maintenance Manual.

3. Installation Verification: The installation of the subsurface, stormwater storage system shall be verified by a Licensed Professional Engineer and a certification provided indicating that the system has been constructed and is in substantial conformance with the Approved Plans and WQMP.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver precast concrete components in quantities and at times that align with the Project schedule and installation sequence to ensure uninterrupted progress.
B. Transport and handle components to prevent excessive stress, cracking, or other damage.
C. Store components properly to prevent cracking, warping or distortion.
D. Accessories:
1. Accessory components shall be delivered in the manufacturer's original, unopened packaging, clearly labeled with make, model, and manufacturer.
2. Accessory components shall be stored in a clean, dry area out of direct sunlight.

1.09 WARRANTY

A. The Manufacturer shall provide a one (1) year limited warranty.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Jensen Infrastructure
9895 Double R Boulevard
Reno, Nevada 89521
Phone: 775.352.2700
Website: www.jensenprecast.com

2.02 MODULAR BURIED STORMWATER STORAGE UNITS

A. All material shall meet or exceed the applicable standards referenced in this Specification and shall conform to all federal, state, and local requirements.

B. Precast Concrete Members

1. *(Specifier Note: Select the appropriate configuration and delete all other configurations. Edit the font to standard font when completed.)*
   - *StormVault® 7.5'x13.25' Single Modules (type 1)*
   - *StormVault® 7.5'x13.25' Double Modules (type 2)*
2. Cement shall be Type II/V Portland cement conforming to ASTM C 150.
3. Aggregate shall conform to ASTM C33, except that the requirement for gradation shall not apply.
4. Reinforcement shall consist of steel bar conforming to ASTM A615, Grade 60, steel bar conforming to ASTM A706, Grade 60 (when welding is necessary), or mesh conforming to ASTM A1064, Grade 60.
5. All sections shall be cured by an approved method.
6. Pipe openings shall be sized to accept pipes of the specified size(s) and material(s) and shall be sealed by the Contractor with hydraulic cement grout conforming to ASTM C1107 or sealed by use of a Resilient Connector conforming to ASTM C923, C1478, or F2510.
7. Access risers and any necessary associated grade adjustments shall conform to ASTM A478 for round access risers and ASTM C857, C858, or C913 for square/rectangular access risers and shall provide for an access opening with a minimum dimension of 30-inches.
8. Castings for manhole frames and covers shall be in accordance with ASTM A48. The access cover/s shall be designed for HL93 traffic loading and shall provide a minimum of 30-inch clear opening.
9. Brick or masonry used to level the manhole frames and covers to finished grade shall conform to ASTM C32 or ASTM C139 and shall be installed in conformance with all local requirements.

C. Accessory Components

1. Joint sealer to span between concrete members shall be a polyolefin backed exterior joint wrap conforming to ASTM C877.

D. Bedding, Backfill and Final Fill

(Specifier Note: This Section includes material requirements for both detention and infiltration systems. Delete all content labeled "Infiltration" if specifying a detention system, and delete all content labeled "Detention" if specifying an infiltration system.)

1. Bedding and Backfill material for the precast concrete, modular, buried, stormwater infiltration systems shall conform to ASTM D2487 group GP or SP. Bedding shall be a minimum of 6-inches thick. Backfill width shall be sufficiently wide to ensure adequate working room to compact the materials but at no times shall the distance be less than 18-inches.
2. Final fill material for the precast concrete, modular, buried, stormwater infiltration systems shall conform to ASTM D2487 except group OL, CH, MH, OH, and PT.
3. Bedding, Backfill and Final fill material for the precast concrete, modular, buried, stormwater detention systems shall conform to ASTM D2487 except group OL,

CH, MH, OH, and PT. Bedding shall be a minimum of 6-inches thick. Backfill width shall be sufficiently wide to ensure adequate working room to compact the materials but at no times shall the distance be less than 12-inches.

4. Any open graded materials utilized for bedding, backfill, or final fill material shall be separated from the in-situ soil by a non-woven geotextile conforming to AASHTO M228, Class 2.

PART 3 – EXECUTION

3.01 Earthwork

A. Excavation, trenching, and backfilling shall be as specified in Division 31 00 00 "Earthwork."

3.02 Identification

A. All precast concrete, modular box culvert, buried stormwater storage systems shall be permanently marked at the surface with clearly visible identification indicating their function as stormwater storage.

3.03 Stormwater Storage System Installation

A. General

1. Installation shall conform to ASTM C891. Where specific installation procedures are not indicated in this Referenced Specification or the Plans, follow the product manufacturer's written instructions.

2. Inspect all precast components for cracks or defects before placement. Replace any damaged or misaligned units. Keep the system interior clean and free of debris throughout installation and upon completion.

3.04 Bedding

A. Bedding shall be stable and uniform. The bedding shall be compacted to a minimum of 90% of maximum density per AASHTO T99, or as shown on the Plans. Structure bedding shall be a minimum of 6" in thickness.

3.05 Placing Precast Concrete Members

A. Precast Modules shall be placed to within ± ¾" of the elevations as indicated on the Plans.

B. Precast Modules shall be placed horizontally to within ± ¾" of each neighboring module. The Engineer shall determine a course of action should the placement exceed this Specification.

3.06 Jointing/Sealing

A. Interior floor joints between concrete members (if any) shall be filled using a non-shrink hydraulic cement conforming to ASTM C595 or C1107.

B. Exterior joints on the top and side surface shall be sealed using a polyolefin backed exterior joint wrap conforming to ASTM C877. The joint wrap shall span the joint by a minimum of 6-inches on either side of the joint.

3.07 Backfilling

A. Backfilling Stormwater Storage System in Excavation

1. After proper bedding of the precast unit and drainage connections, place select backfill material—moist enough for compaction—uniformly around the structure in layers. Maintain no more than 12 inches difference in fill height between sides. Compact each layer using mechanical tampers or rammers to achieve the required density. Perform density tests as needed to verify compliance with the Geotechnical Report.

END OF SECTION 33 46 23