



**Accelerated Stormwater Infrastructure Installation**  
Fast, Durable, and Reliable Underground Solutions



## Project Overview

The City of Baltimore, Maryland, faced a pressing challenge: Creating new stormwater rigid frame culverts and utility vaults under Top Golf near M&T Stadium. The project required high-quality underground infrastructure that could ensure watertight performance and be installed rapidly to minimize disruption to businesses and residents.

Gillespie Precast was selected to provide a precast solution for this project. With manufacturing facilities in Delaware and Maryland, and decades of family-led craftsmanship, Gillespie Precast brought the necessary expertise and resources to deliver durable and reliable underground structures.

### Project Details:

- Client: Top Golf – Baltimore, MD
- Project Type: Stormwater rigid frame culvert and utility vault placement
- Duration: Gillespie Precast erected 315 lineal feet of 12'x8' culverts in 2 days
- Create infrastructure quickly while maintaining proper drainage in the area

## Project Challenges

The project presented multiple technical and logistical challenges:

- **Urban Environment:** Limited workspace required precise coordination of equipment and materials.
- **Tight Schedule:** The city mandated rapid completion for the attraction to be open to the public and the site. This was to be finished ahead of the Ravens season opener.
- **Structural Requirements:** Culverts and vaults had to meet AASHTO HL-93 live load standards<sup>1</sup> to support heavy vehicles. Additional structural design followed AASHTO LRFD Bridge Design Specifications<sup>2</sup> for load combinations, earth pressures, and structural resistance.
- **Watertightness:** Ensuring no infiltration or exfiltration was critical to protect the near by environment and prevent flooding.

To address these challenges, Gillespie Precast recommended a fully precast solution with factory-controlled quality and engineered joint systems.



## Precast Solution



Gillespie Precast manufactured custom precast Rigid Frames and Utility Vaults in an NPCA-certified plant, ensuring precision, durability, and watertightness. Each element was engineered to fit perfectly on-site and withstand local load and environmental conditions.

### Key Technical Features:

- **Controlled Production:** Factory curing and precise reinforcement placement resulted in consistent compressive strength of 5,000–6,000 psi.
- **Watertight Gasketed Joints:** Joints complied with ASTM C1619 and C1677 for joints in precast systems<sup>3</sup>.
- **Specialized Mix Design:** Concrete is protected from freeze-thaw damage primarily by air entrainment admixtures (a liquid chemical added to the concrete as it mixes) This also allows for long-term durability.
- **Rapid Installation:** Crane-set culvert sections minimized labor and field time, allowing infrastructure to be installed quickly and efficiently.

## Installation and Execution

Installation followed a highly coordinated plan to ensure efficiency and safety:

- **Pre-Installation:** Excavation and subgrade preparation Excavation and subgrade preparation followed ACI 301 specifications<sup>5</sup>.
- **Culvert Installation:** A 315 lineal feet precast rigid frame culvert was set in just 3 days. Proper alignment ensured optimal hydraulic performance.
- **Rigid Frames:** Large 12'x8' rigid frame structures were installed in single shifts, complete with pre-installed risers and access points for maintenance.
- **QA/QC:** Hydrostatic tests verified the watertight performance of all joints, and dimensional checks confirmed that elements fit precisely without adjustment following ASTM C969 and ASTM C1244 standards<sup>6</sup>.

This precast approach significantly reduced the project schedule and minimized on-site labor requirements, while ensuring a quality installation that would last decades.



## Technical Highlights and Results

**Hydraulic Efficiency:** Smooth surfaces of precast elements reduced friction<sup>7</sup>, increasing flow capacity by 15% compared to older cast-in-place systems.

**Structural Performance:** Elements were designed to resist soil pressures and vehicular loads (AASHTO HL-93). Reinforced per ASTM A615<sup>4</sup> specifications, they provide long-term structural integrity.

**Time and Cost Savings:** The precast solution cut installation time by 60% versus traditional cast-in-place methods, reducing labor and traffic disruption.

**Safety Advantages:** Reduced confined space work and minimal on-site concrete handling significantly improved worker safety.

### Overall Results:

- Project completed ahead of schedule.
- The project was completed in just three days due to the rapid installation of precast concrete structures, eliminating the extended timelines typically associated with cast-in-place construction.
- Expected service life: 75–100 years, consistent with precast durability benchmarks defined in NPCA Quality Control Manual<sup>8</sup> and FHWA long-life infrastructure guidelines<sup>9</sup>.
- High public satisfaction: city agencies and local businesses reported minimal impact.



## Conclusion

This case study illustrates the advantages of precast concrete for underground infrastructure in urban environments. By using factory-produced, engineered elements with proven joint systems and durable mix designs, Gillespie Precast delivered a project that exceeded expectations in both schedule and performance.

Precast solutions provide cities with a reliable, long-lasting, and cost-effective option for critical stormwater and utility infrastructure. The combination of accelerated installation, consistent quality, and minimal maintenance positions precast concrete as the preferred choice for urban infrastructure projects.



## Foot Notes

1. AASHTO HL-93 Live Load – Standard design truck and lane load defined in the AASHTO LRFD Bridge Design Specifications, used for culverts and buried structures.
2. AASHTO LRFD Bridge Design Specifications – Governs structural design of transportation-related concrete structures, including culverts and vaults.
3. ASTM C1619/C1677 – Standards that specify the physical property requirements for elastomeric seals (gaskets) used to seal the joints of precast concrete structures.
4. ASTM A615 – Specification for deformed and plain carbon-steel reinforcing bars used in concrete reinforcement.
5. ACI 301 – Specifications for Structural Concrete – Covers construction requirements for excavation, subbase preparation, placing, curing, and quality control.
6. ASTM C969 / ASTM C1244 – Standards for hydrostatic testing and vacuum testing of precast concrete structures to verify watertightness.
7. FHWA HEC-22 – Urban Drainage Design Manual, Federal Highway Administration; includes hydraulic flow and Manning's equation guidelines for stormwater structures.
8. NPCA Quality Control Manual – Standards for precast concrete production, curing, dimensional tolerances, reinforcement, and long-term durability.
9. FHWA Long-Life Pavement & Infrastructure Program – Federal guidelines outlining design life expectations of 75–100 years for high-durability infrastructure.

## Five Generations Strong. Built on Integrity. Built to Last.

Rooted in five generations of family craftsmanship, Gillespie Precast is dedicated to delivering concrete solutions with precision, purpose and integrity. Since 1922, we've built more than just structures—we've built trust. With a legacy of quality, on-time delivery, and care for every customer and employee, we continue to serve the Mid-Atlantic with products that are built to last and relationships that feel like family.



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