Hyperloop-One’s Propulsion Open Air Test (POAT) Facility / Dev Loop Track are the first fully-realized manifestation of a “5th mode of transportation” in the form of a levitated pod that uses electricity to accelerate to 760 MPH through a low-pressure tube. The POAT facility was purpose-built for the first relatively large-scale testing required in Hyperloop-One’s “proof-of-concept” research and development effort. POAT is a 300 meter Electromagnetic Propulsion System test track on which a 1,500-pound metal sled is accelerated from stop by Hyperloop-One’s custom-designed electric motors to validate, test and improve upon the propulsion system that will ultimately drive the fully-functional transportation system. The Dev Loop facility is a 3 km full scale elevated test track with a 3.3 meter tube for conveyance of test pod vehicles. The Dev Loop track tube is elevated approximately 2.7 meters above existing grade supported by reinforced concrete piers spaced at 30 to 45 meters on center. The northerly terminus of the Dev Loop has a concrete pad staging area to provide access to the transport tube system.

Poggemeyer Design Group drew on our decades of experience in the Las Vegas Valley to assist Hyperloop-One in navigating the local regulatory environment throughout the design and

Hyperloop-One’s system is revolutionizing the future of transportation, a new energy-efficient and safe way to move people and cargo at airline speeds for minimal price.
construction phases. Additionally, our team of professionals provided civil engineering design of the earthen track bed, drainage mitigation, support facilities and enclosures as well as the detailed structural analysis and design of the track itself. Our design team is making their vision of transportation a reality. The Hyperloop is a new way to move people or things anywhere in the world quickly, safely, efficiently, on-demand and with minimal impact to the environment. The system accelerates a passenger or cargo vehicle through a steel tube in a near-vacuum using that linear electric motor. The autonomous vehicles glide comfortably at faster-than-airline speeds over long distances due to the extremely low aerodynamic drag and non-contact levitation. There are no direct emissions, noise, delay, weather concerns nor pilot error. Hyperloop-One’s Propulsion Open Air Test (POAT) Facility and DevLoop was constructed in the Apex Industrial Park in North Las Vegas. Hyperloop-One successfully propelled a metal sled down the POAT track opening the door for further testing and advancement of the system with a goal to be moving cargo inside of 5 years. Hyperloop-One’s system is revolutionizing the future of transportation, a new energy-efficient and safe way to move people and cargo at airline speeds for minimal price.
City of Lima

PDG was part of the design team hired by the City of Lima to prepare construction plans for the grade elimination of Vine Street and the Norfolk-Southern and CSX Railroads within the City. The project provided a means for emergency and local traffic to underpass these tracks during frequent periods of train stops. The design was completed within an aggressive four-month schedule.

PDG was responsible for all approach underpass pavement and all relocated public utilities, including drainage. PDG prepared detailed design plans for a 10,000 GPM storm water pump station and retention basin that outlets into the existing combined sewer system at limited flow rates. All civil, mechanical, electrical and architectural services were provided as required for the pump station and approach work. The project was funded by the American Recovery and Reinvestment Act (stimulus funding), with the ODOT, FHWA, and the City of Lima providing administration and traditional staged reviews.

Project Relevance

- Asphalt pavement removal/replacement
- Sidewalks
- Site drainage
- Construction document preparation, bidding & award support

Reference

Mr. Kirk Niemeyer, P.E.
City of Lima Engineer
419.228.5462 ext. 5508
Design of 5 Bridges, 24’X10’ Reinforced Concrete Box Culvert, Retaining Walls, and Utility Design

The I-11 Boulder City Bypass Design-Build Project (the Project) includes the design, construction and installation of a portion of I-11 for a distance of approximately 12.2 miles from north of US-95 to SR 172 at the Nevada Interchange in Boulder City, Clark County, Nevada. The project includes ten (10) overpass and underpass bridge structures for travel over existing roadways and wildlife migration corridors. Poggeneyer Design Group’s scope and responsibilities for the project include the structural engineering and design for the WAPA, Boy Scout Canyon, Intertie, and Big Horn Crossing bridges identified in the Project, in addition to the 24’x10’ reinforced concrete box culvert and other head and retaining wall design elements defined above. The structural bridge elements, retaining walls, drainage culverts, barriers, sign, signal and lighting are designed in accordance with the requirements of the Contract Documents and Performance Specification.

The WAPA and Boy Scout Canyon bridge structures occur travelling northeast bound on the new I-11 bypass at stations 410+00 and 560+75 respectively. Both the WAPA and Boy Scout bridge crossings have been reprofiled and reconfigured to provide a continuous single long...
Boulder City bypass (I-11)

The Intertie road access crossing Bridge (Bridge #4) structure occurs traveling further northeast on the bypass at station 672+32 and is located just before the scenic drive portion of the roadway. The bridge is to provide for a 16'-10" minimum clearance over the existing Intertie access road and includes one bridge only for both northbound and southbound roadway travel lanes. The Intertie Bridge will also use a conventional cast-in-place posttensioned box girder concrete construction with either an open seat or integral diaphragm abutment type.

The Intertie road access crossing Bridge (Bridge #4) structure occurs traveling further northeast on the bypass at station 672+32 and is located just before the scenic drive portion of the roadway. The bridge is to provide for a 16'-10" minimum clearance over the existing Intertie access road and includes one bridge only for both northbound and southbound roadway travel lanes. The Intertie Bridge will also use a conventional cast-in-place posttensioned box girder concrete construction with either an open seat or integral diaphragm abutment type.

The WAPA and Boy Scout Canyon bridge structures use a single 142'-0" long span bridge at both locations. The re-profiling adjustments and 142'-0" clear-span provide for a full 80'-0" wide road and trim width, plus a 1 to 2 slope finish. Both the WAPA and Boy Scout Canyon bridges will use conventional cast-in-place post-tensioned box girder concrete construction to span the 142'-0" distance, built integrally with the diaphragm abutments.

The Intertie road access crossing bridge also uses a conventional 6'-6" deep cast-in-place posttensioned box girder concrete construction with an open seat abutment type to span 139'-6" distance. Architectural aesthetic treatment of the bridges includes built out pilasters at the abutment approaches extending high above the roadway surfaces for dramatic effects, in addition to architectural sconces at the exterior of the bridge mid-spans. Pilasters, pilaster extensions, sconces and other architectural features and details are standardized between the bridges to provide for economies of construction and appearance consistency between the bridges.

Typical details, stressing access, bar coupling, deck overhang, barrier rails, conduit, and deck drainage provisions will also be used for the concrete post-tensioned box girder construction to provide for consistency in the concrete bridge construction and appearances.

The Big Horn Crossing (Bridge #5) bridge structure includes two (2) 75'-0" precast concrete arch spans over the new roadways with articulated aesthetic wall panels, parapet, fence, and earth fill for wildlife migration. The arched bridge spans are constructed using nine (9) 6'-0" wide precast concrete arch segments positioned adjacent to each other atop cast-in-place concrete piers with continuous concrete wall footings. The concrete arches support the structural mechanically stabilized earth (MSE), the MSE wall panels, selected surface material, along with the concrete edge moment slab and wildlife fencing requirement. Total width of the bridge section is 54'-0" with provisions for H-20 vehicle load design.

The utility design and relocation portion of PDG’s responsibilities are mainly comprised of the encasement of existing water lines and the relocation and encasement of an existing reclaimed water line. There will also be a new reclaimed water system that will replace the existing infiltration channels that run through the existing Bypass Right-of-Way. PDG will also have to locate and note on the plans that there are two existing Fiber Optic Lines and one existing infiltration channels that run through the existing Bypass Right-of-Way. PDG will also have to locate and note on the plans that there are two existing Fiber Optic Lines and one existing Southwest Gas main that must be labeled as protect-in-place. There are three potable water lines that have to be taken into account. The first line is the 14" PVC water main that is running parallel to the US-95 Right-of-Way. The portions of the water line that will cross under the new Bypass as well as the on/off ramps for the US-95 I-11 interchange will be encased with 30-inch steel encasement. This encasement will allow for any maintenance that may need to be done in the future to be done without having to excavate in the drive lanes of the new freeway and ramps. The encasement will also protect the roadways by helping to contain the water should the main burst. The other two lines are within the WAPA/Buchannan Right of Ways and are comprised of an 8-inch and 18-inch water mains. These water mains will be steel encased with 18-inch and 30-inch steel casings respectively the length of the Bypass Right-of-Way (750-LF). Poggemeyer also designed the electrical conduit runs for the three electrical connections needed for the major interchanges at US-95, WAPA, and US-93. The conduit runs ranged from 1903-LF to 3153 LF.

The City of Boulder City has contracted with Las Vegas Paving to add 5 additional conduits for future utility crossings ranging from 18-inches in diameter to 36-inches in diameter. The additional conduits will be spread form the I-11 / US-95 interchange to the WAPA Bridge.
PDG provided the Village of Oak Harbor with a unique solution to an on-going street problem. Park Street is located in a residential area with both a school and water facility. This is the only street in the Village with a railroad grade separation. A mill-and-fill technique for asphalt pavement restoration had been completed in 2005, however the constant bus and truck traffic from the water facility completely deteriorated the surface. Continual repairs were needed to rehabilitate the street, but could only be completed in the summer due to the school session. The Village considered another mill-and-fill technique, as well as complete reconstruction.

Due to time and budget constraints, PDG suggested a fiber-reinforced concrete overlay as a solution. The result was a rehabilitated street with the useful life of total reconstruction, but at

more...
only two-thirds the cost and one-third of the anticipated time. In addition to the overlay, underdrains and new integral curbs were installed. This project was awarded Ohio Concrete’s Northwest District’s Project of the Year.
Poggemeyer has played an integral role to-date in the conceptualization and development of the Marina District. As part of this extensive project, PDG completed a detailed design of the $5.8 million Marina and Site Improvements. PDG successfully met the accelerated schedule and the City’s very aggressive bid date. This project consists of a 96-slip marina with full utilities, sanitary pump-out facilities, marine fueling facilities, access roads, parking, all public utilities including: water, sanitary sewers, storm sewers, power, gas, telephone and cable.

Other major design components include; sheet pile wall and tie-back system in weak soils, a major 96” combined sewer junction chamber with primary screen, guide piles for floating docks, construction methods and sequencing to comply with brownfield clean-up requirements.

The electrical design for the floating docks, future development, street lighting and passenger terminal building included drawings and specifications for the utility service connection, power distribution, grounding, shore power connections, and area and parking lot lighting. This project was complicated by the constrained site, coordination with the Toledo Edison Company of relocation of their main 69KV
power feeding the entire downtown business district, connection to the existing 35ft deep sanitary sewer and aggressive design schedule.

**Electrical Elements**

- Underground Manholes
- Hand Holes and Duct Banks for Power Distribution
- Telephone and Cable Television System Cabling
- Calculations of Dock Electrical Loads According to National Electrical Code Requirements
- Calculations for Electrical Fault Analysis
- Photometric Analysis for Lighting Systems
- Construction Cost Estimating
This project involved the reconstruction of a one mile long segment of Maplewood Road in Liberty Township, Ohio. The project presented challenges due to the limited funds available to the Township, existing pavement conditions, heavily loaded transit from a dairy farm, and narrow width of the pavement prior to the reconstruction.

Due to the constraints and challenges, PDG and the Township were forced to consider a non-traditional pavement reconstruction method. The Cement Stabilization process proved to be the most viable option for this project due to the required pavement strength needed. Existing roadway materials remained on-site and were used in the reconstruction of the pavement, therefore reducing the amount of virgin material hauled to the site. In addition, lower costs permitted the pavement to be widened from ten to thirteen feet, enhancing the safety of the road.

In the end, the Township received a stronger, wider, and more environmentally sound product within the allocated budget.