

State Fair Transit Center

Project Overview

The State Fair Transit Center will provide Metro Detroit with access to transportation and restore a safe gathering space for the community

Structural Engineering
Geotechnical Engineering
Transportation Engineering
Water Resources Engineering
Environmental Engineering
Construction Engineering

Collaboration

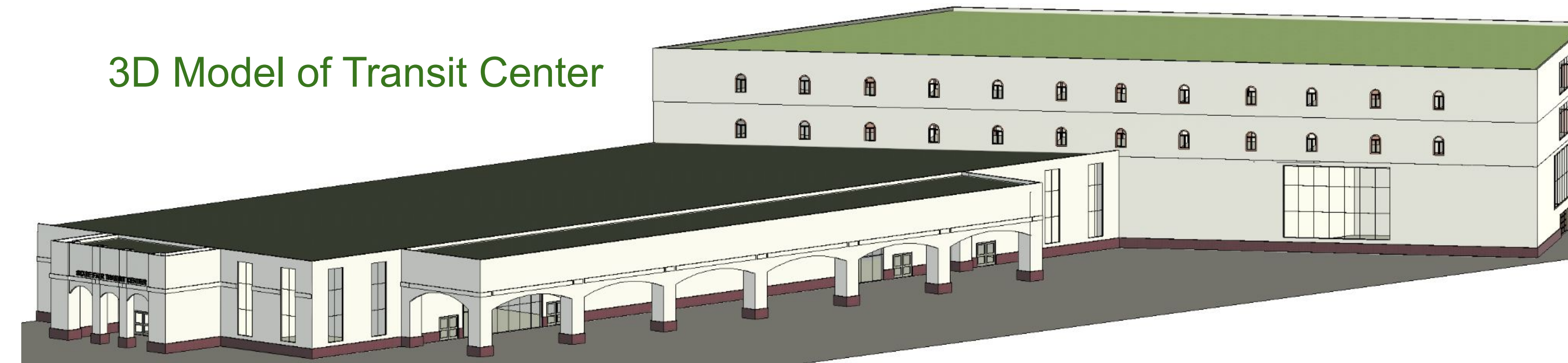
- This multi-discipline civil engineering project was completed with the guidance of professional engineers including faculty and industry mentors
- Project deliverables include four presentations to faculty, two technical breakouts with industry mentors, five technical reports, and two display board presentations with a civil engineering advisory board

Knowledge and Skills Gained

- Collaboration between students and faculty
- Critical thinking, professional communication, empathy
- Incorporation of multiple subdisciplines
- Software
 - Revit
 - AutoCAD
 - Mathcad
 - Primavera P6
 - RAM Structural System
 - MDOT TDMS
 - EPA SWMM
 - StormCAD
 - MS Office
 - Illustrator

Project Justification

- Metro Detroit has a lack of easily accessible public transportation
- No train station in this area currently
- Bus driver shortages due to poor working conditions result in unreliable bus routes
- There is a need for security for the bus stops in this area
- Current transportation options do not extend into all areas of the community, creating a cultural disconnect
- Demand for safe community gathering spaces
- A high unemployment rate will benefit from the creation of jobs
- Preservation of historical structures on the Historic State Fairgrounds



Public Health, Safety, and Welfare

- Focus on improving transportation accessibility of the public in a disadvantaged community
- Creating safe bus stops and amenities for bus drivers
- Preserving the history of the site and restoring the Historic State Fairgrounds to be used as a community space or gatherings such as weddings or concerts
- The center will create jobs and provide access to job opportunities in the community

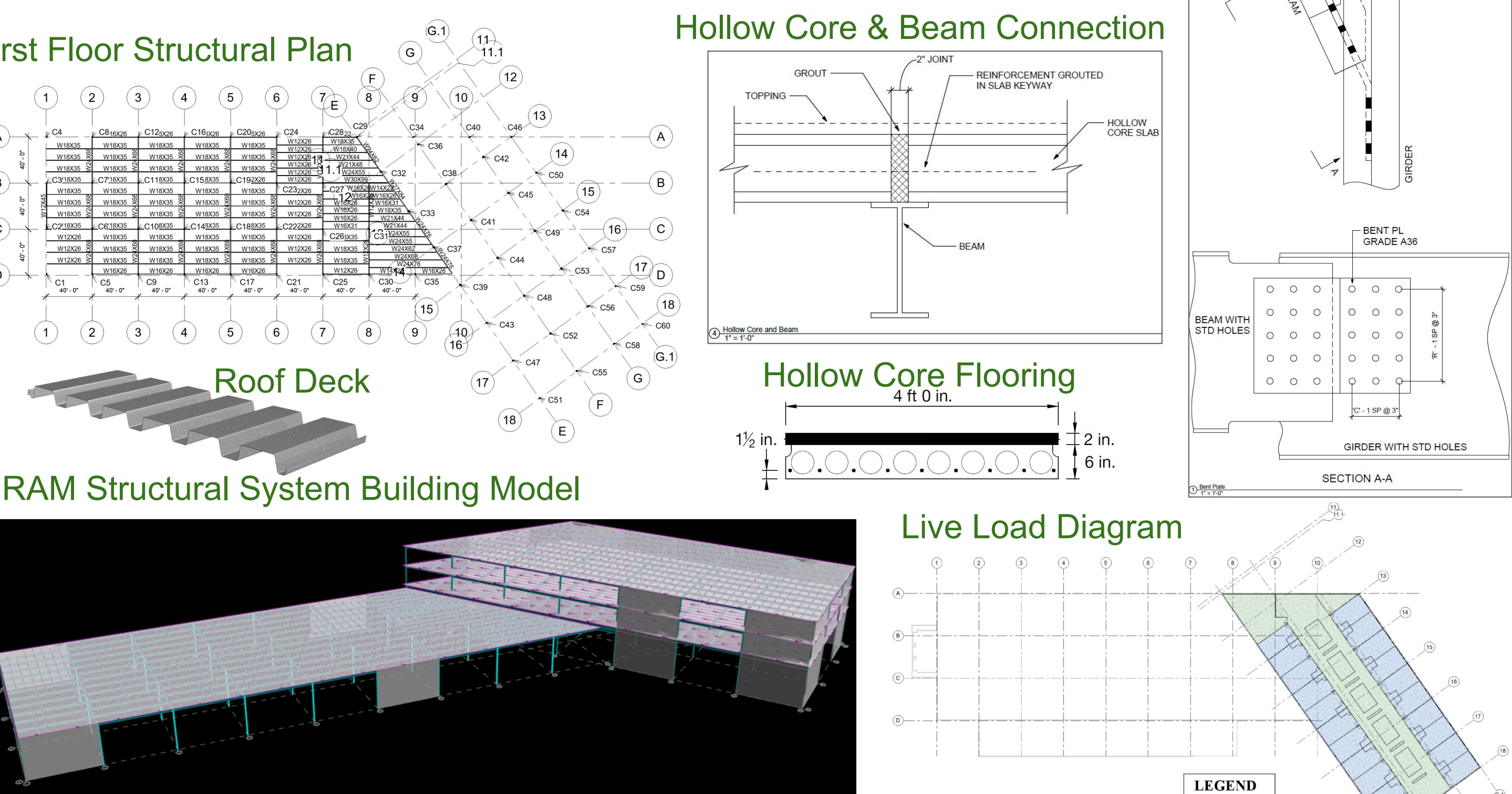
Sustainability

- First LEED Gold Building in Detroit under v4.1
- Local sourcing
- Low Impact Developments (LIDs)
- Material reuse
- Minimum construction waste

Category	Credit	Requirement	Score
Sustainable Sites	SS1	Conduct Predevelopment Assessment	1
	SS2	Protect or Restore Sensitive Areas	2
	SS3	Protect or Restore Quality Features	2
	SS4	Protect or Restore Wetlands	2
	SS5	Protect or Restore Stream Channels	2
	SS6	Protect or Restore Soils	2
	SS7	Protect or Restore Cultural Resources	2
	SS8	Protect or Restore Historic Resources	2
	SS9	Protect or Restore Visual Resources	2
	SS10	Protect or Restore Air Quality	2
Water Efficiency	WE1	Reduce Outdoor Water Use	1
	WE2	Reduce Indoor Water Use	2
	WE3	Reduce Water Metering	2
	WE4	Reduce Water Metering	2
	WE5	Reduce Water Metering	2
	WE6	Reduce Water Metering	2
	WE7	Reduce Water Metering	2
	WE8	Reduce Water Metering	2
	WE9	Reduce Water Metering	2
	WE10	Reduce Water Metering	2
Energy and Atmosphere	EA1	Reduce Building Energy Consumption	4
	EA2	Reduce Building Energy Consumption	4
	EA3	Reduce Building Energy Consumption	4
	EA4	Reduce Building Energy Consumption	4
	EA5	Reduce Building Energy Consumption	4
	EA6	Reduce Building Energy Consumption	4
	EA7	Reduce Building Energy Consumption	4
	EA8	Reduce Building Energy Consumption	4
	EA9	Reduce Building Energy Consumption	4
	EA10	Reduce Building Energy Consumption	4

Structural Engineering

- Create floor plan to lay out the building
- Determine the loads on the structure
- Design structural members to accommodate the load demand
- Design connections between structural members
- Create structural plans for construction



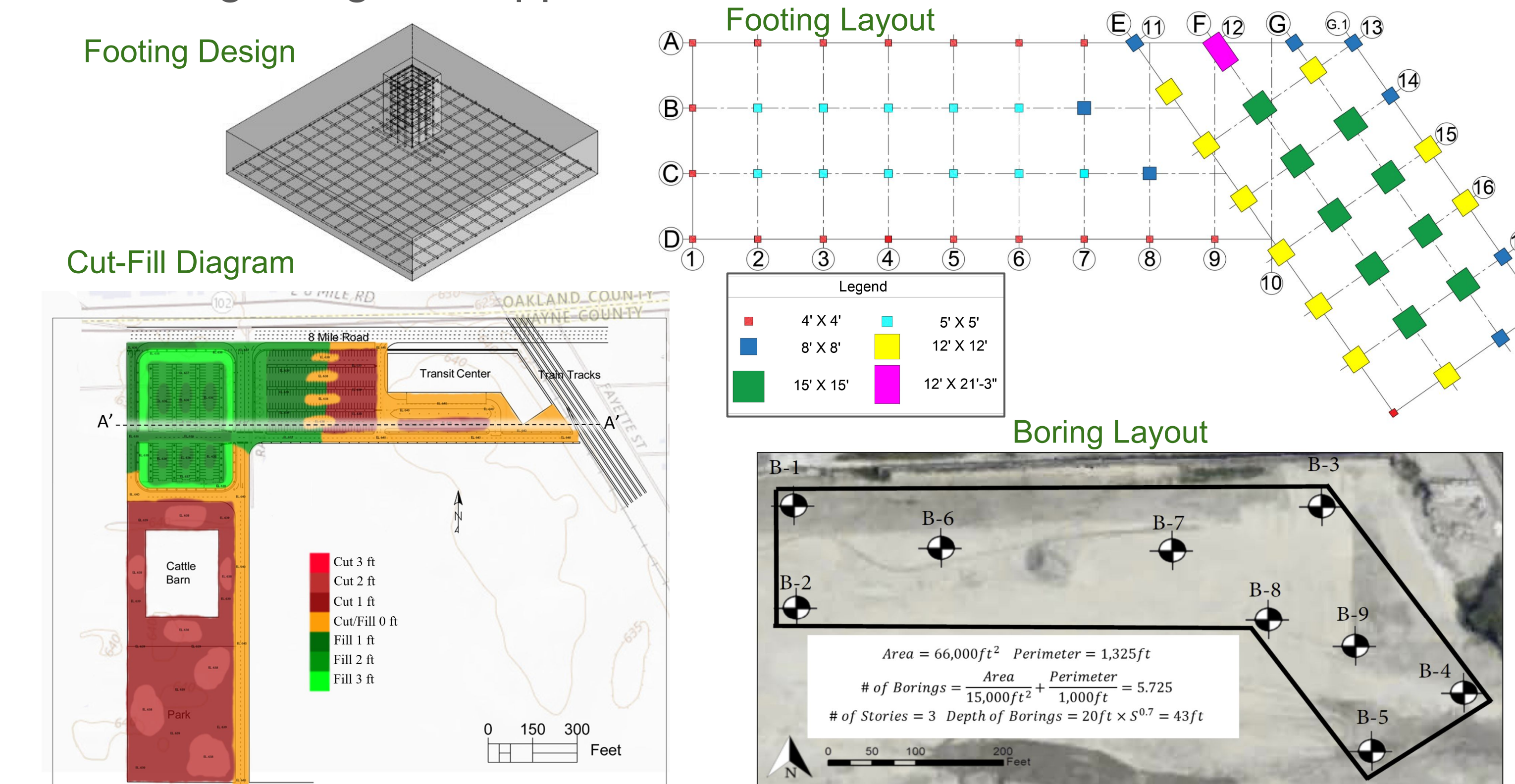
Project Description

- 113,000 square foot bus and train depot to provide transportation access for Metro Detroit
- Historical building restoration to recognize the history of the site
- 40 hotel rooms to accommodate those needing to stay overnight
- Visitors center and displays throughout the building to highlight local attractions and the history of Detroit
- Community park to provide a safe public gathering space



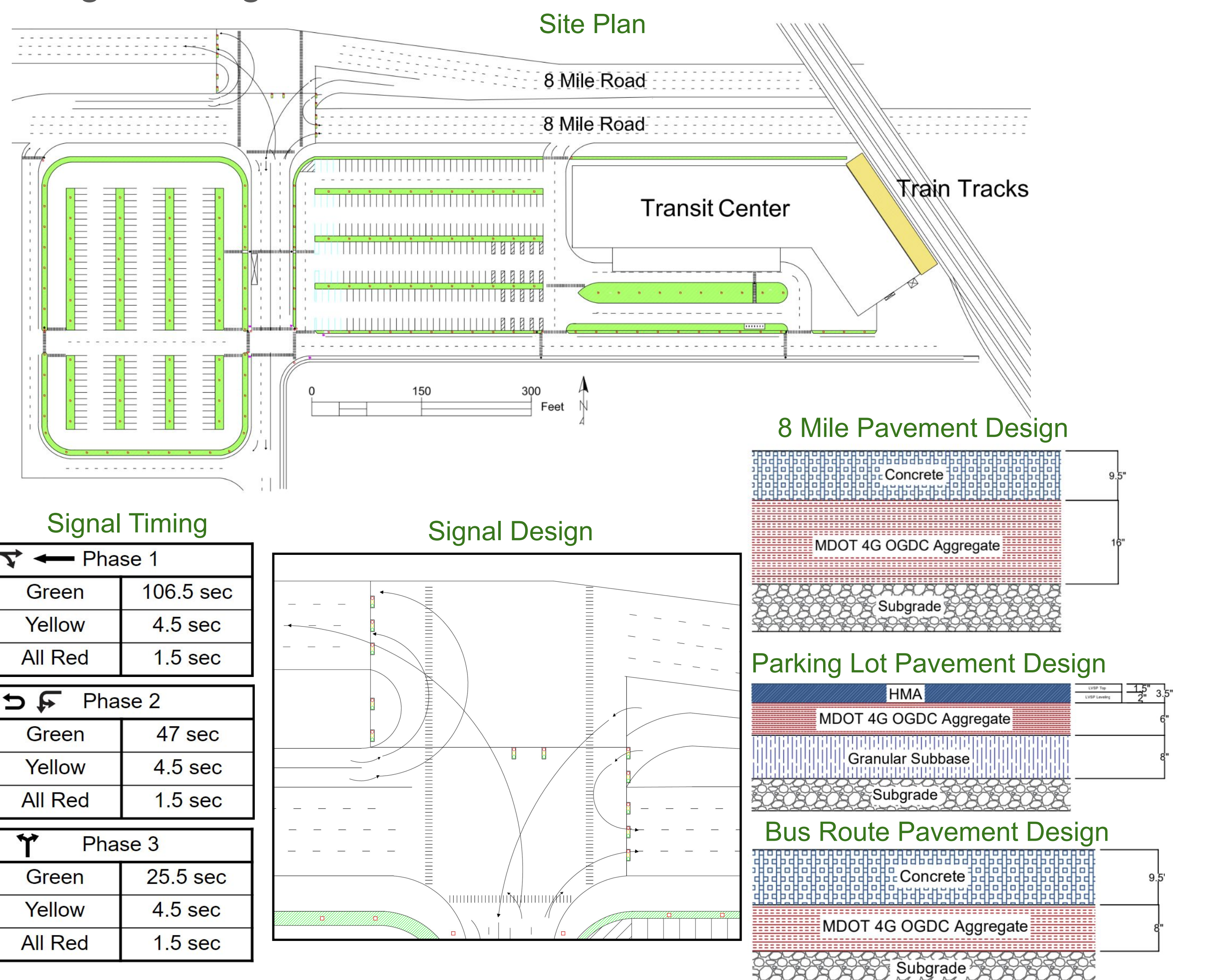
Geotechnical Engineering

- Analyze site history to understand soil properties
- Site contaminant investigation and erosion management
- Boring layout and analysis of borings to find soil parameters
- Cut-fill to achieve final elevation
- Footing design to support the transit center structure



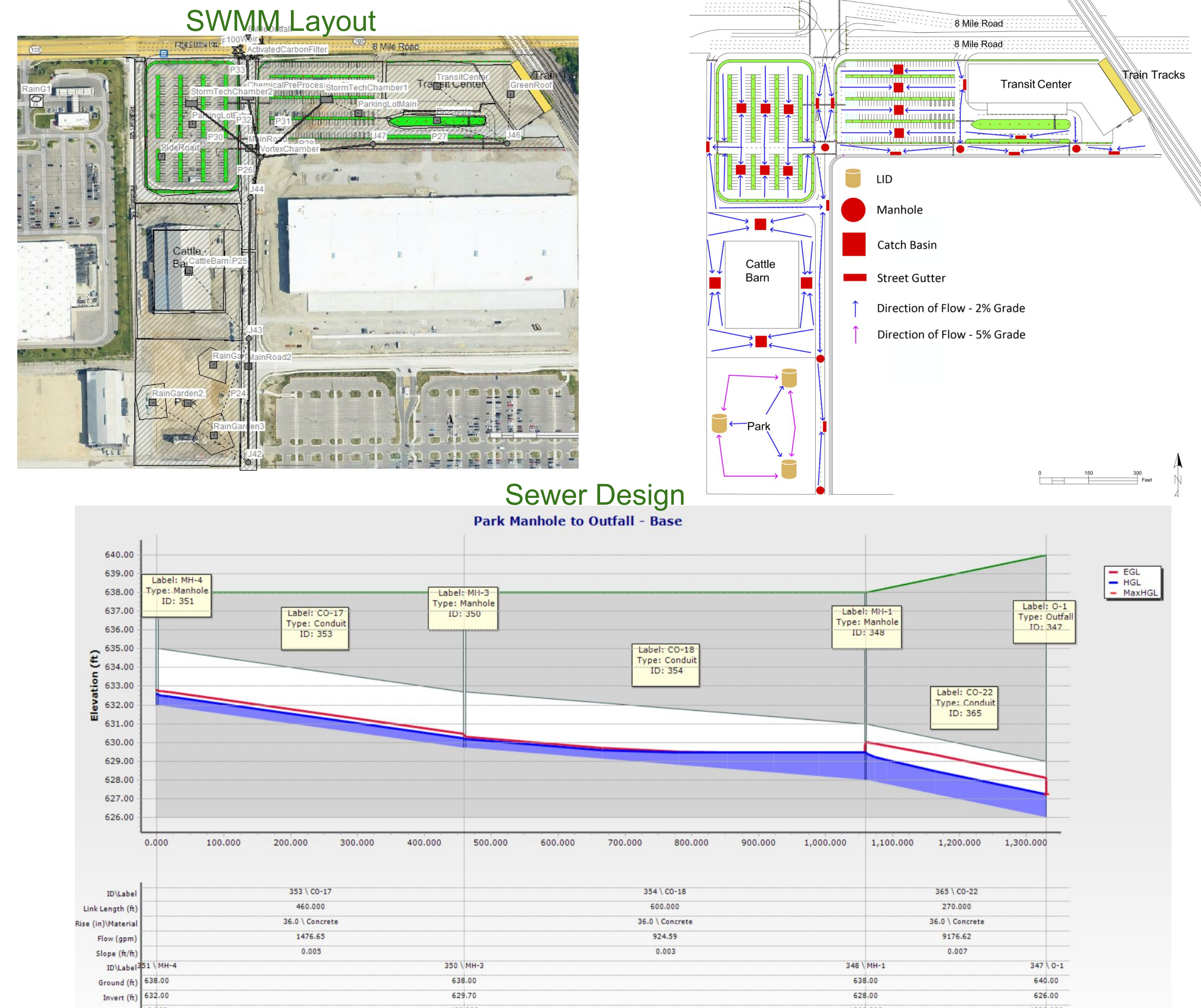
Transportation Engineering

- Traffic projection to determine future trips to the site
- Roadway and parking lot design to accommodate vehicles
- Pavement design to withstand vehicle traffic loads
- Signal design for efficient traffic flow



Water Resources/Environmental Engineering

- Analysis of site rainfall and drainage
- Stormwater management plan including Low Impact Developments, a green roof, and detention tanks
- Sewer pipe network for waste water management
- Water demand based on fixture method



Construction Engineering

- LEED to track sustainable practices
- Cost estimate to plan funding
- Schedule to track progress
- Safety plan to ensure safe practices
- Permitting plan to obtain permission for construction
- TTC plan to safely maintain traffic
- SUE analysis to locate utilities

