

Harrison, Ohio Dry Fork Road Sanitary Sewer and Pumping Station

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Presentation Outline

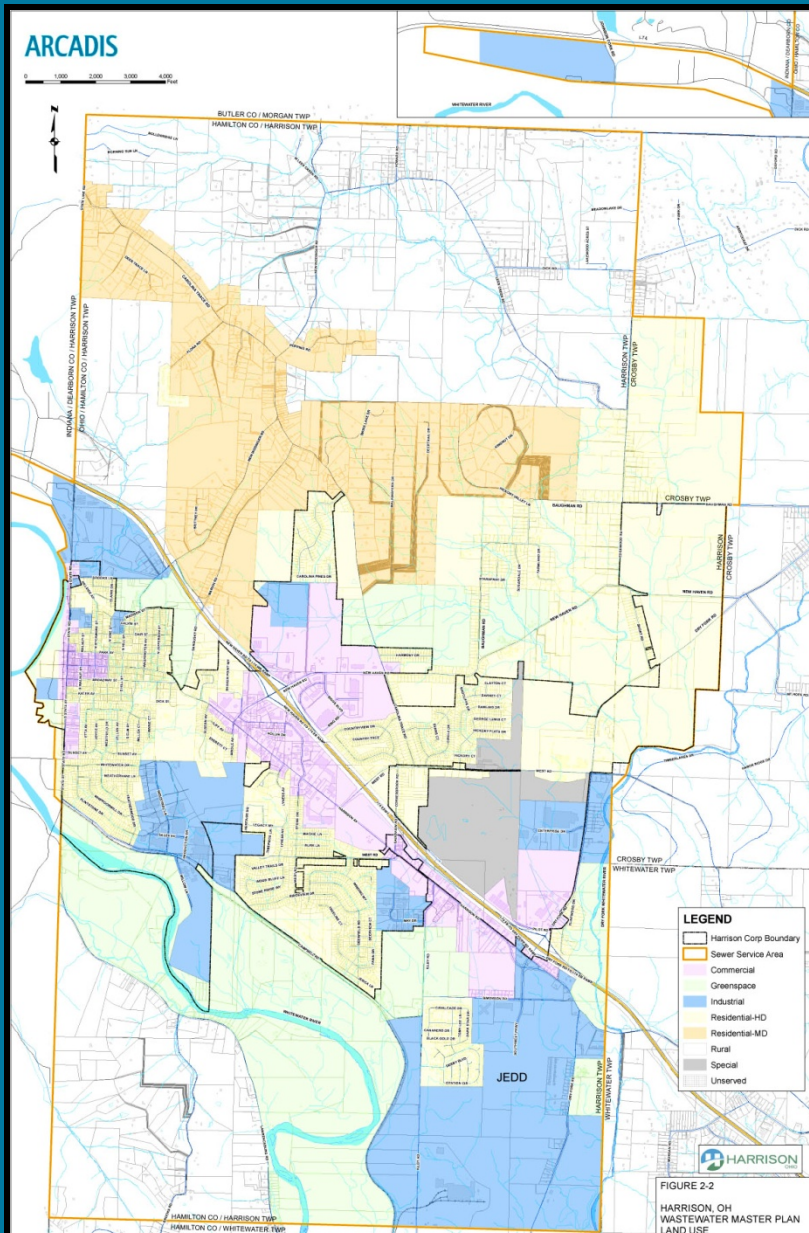
Master Planning

- Service Area or Study Area
- Land Use
- Existing Collection System Mapping
- Future Sewers

Dry Fork Trunk Sewer Design

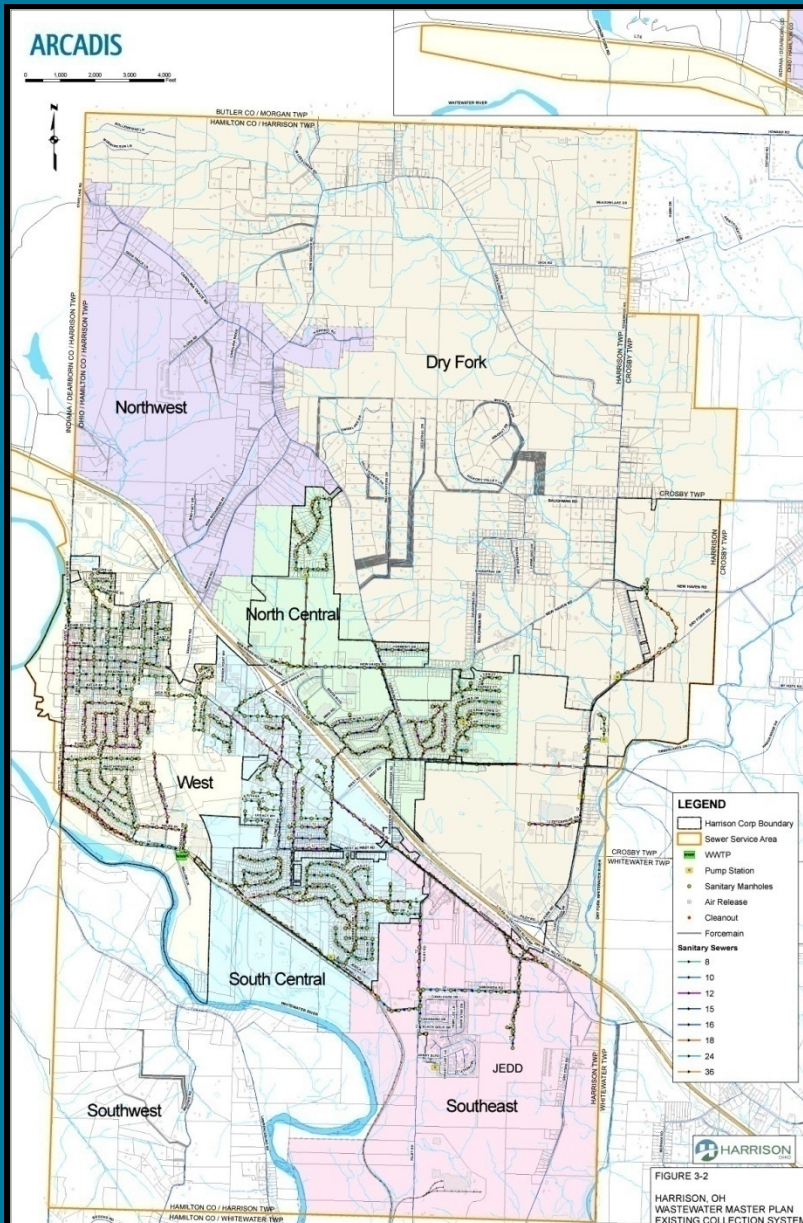
- Phase 1 – Gravity Sewer, Force Main and Pump Station
- Phase 2 – Gravity Sewer

Master Planning – Delineate Land Use



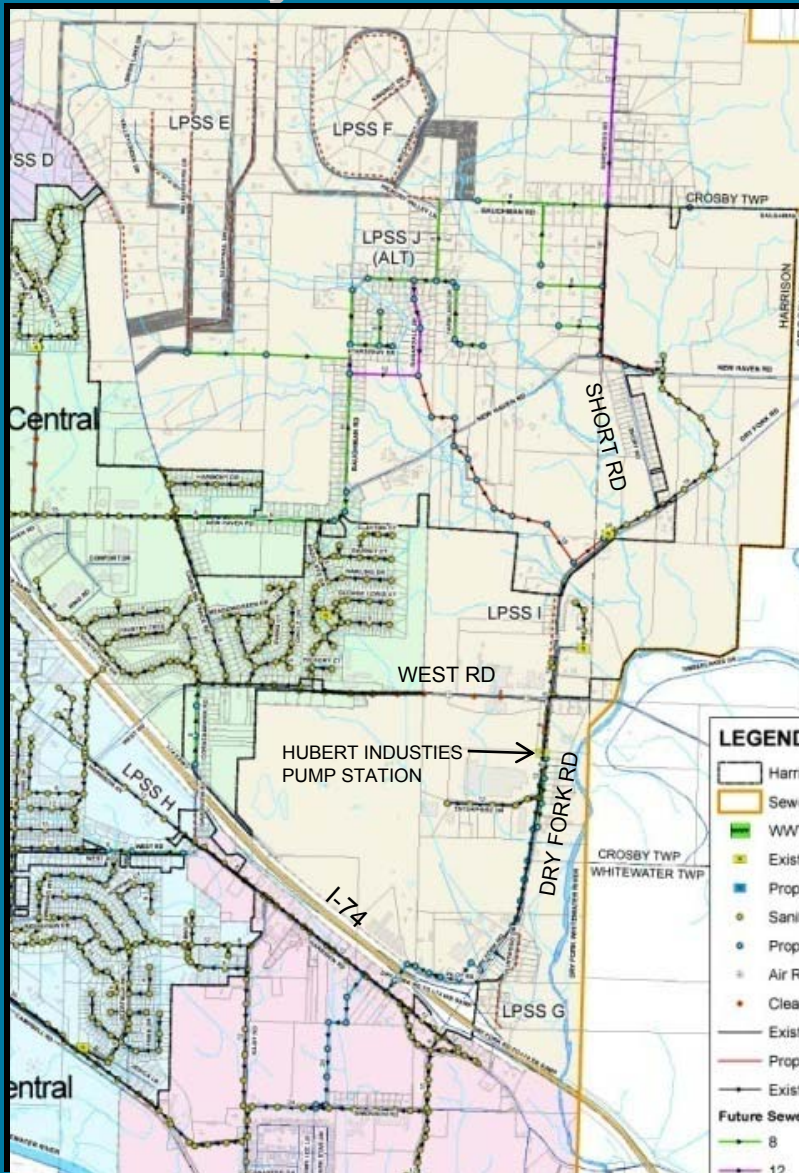
- Delineate Existing and Planned Land use:
 - Industrial
 - Commercial
 - Residential – High Density
 - Residential – Medium Density
 - Rural
 - Greenspace
 - Floodplain
 - Special (No flow)
- Determine areas deemed too remote or sparsely developed for centralized sewer collection
- Attribute flow generation by land use

Master Planning – Map Collection System



- Sewer Atlas
- GIS useful for database construction
 - Existing record drawings
 - Field survey
- Delineate Collection System into sewer drainage basins
- Dry Fork Basin has 5,100 acres with 2,400 acres generating wastewater

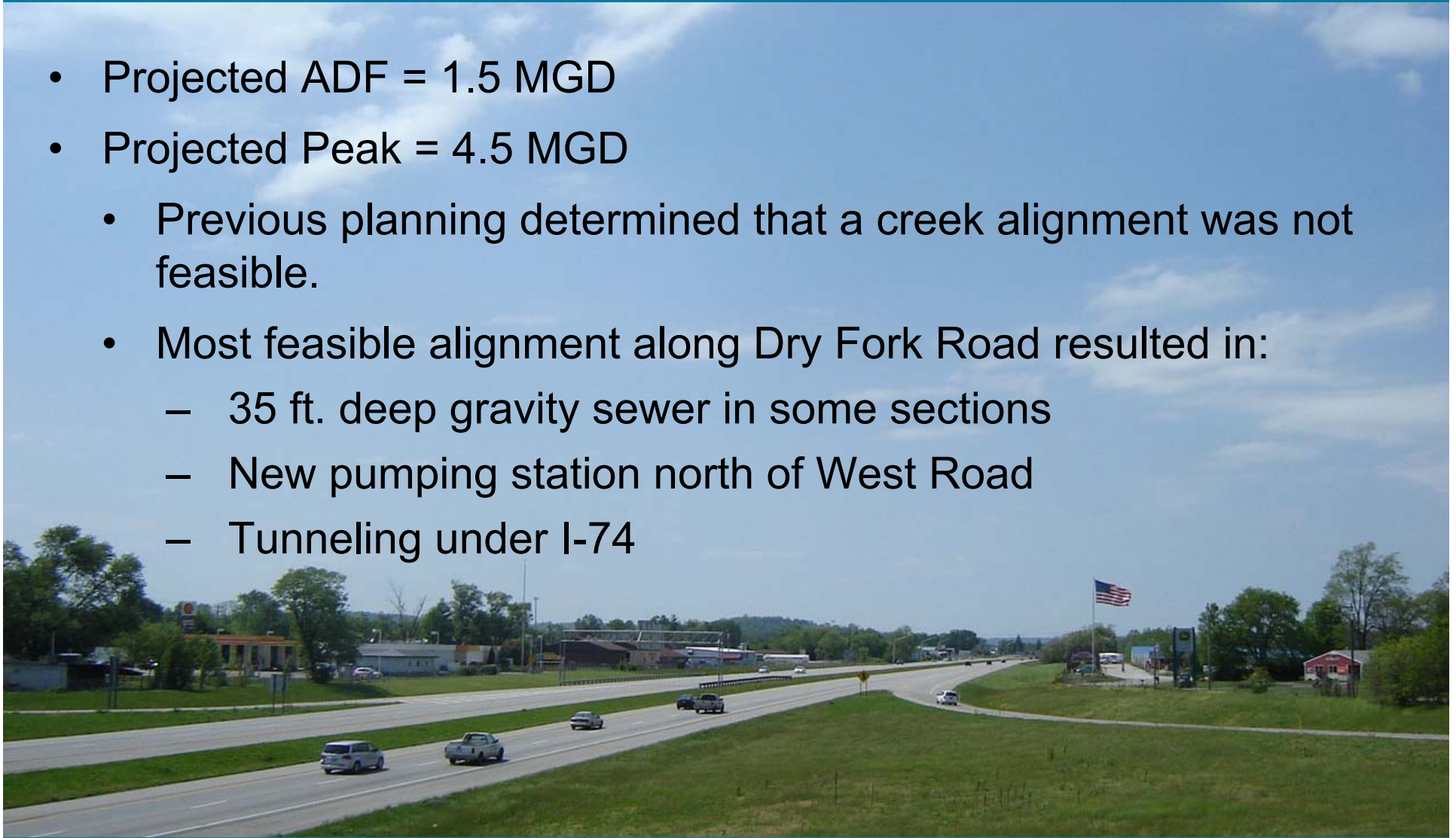
Master Planning – Identify Future Sewer Needs



- Extend sewer service into Dry Fork Basin with new trunk sewer
- Relieve West Road / I-74 Trunk Sewer
- Plan for gravity sewers in areas of high density
- Plan for alternative sewer systems where gravity sewers aren't feasible
- Collection system modeling useful for sewer sizing and recognizing capacity issues

Design Criteria – Dry Fork Trunk Sewer

- Projected ADF = 1.5 MGD
- Projected Peak = 4.5 MGD
 - Previous planning determined that a creek alignment was not feasible.
 - Most feasible alignment along Dry Fork Road resulted in:
 - 35 ft. deep gravity sewer in some sections
 - New pumping station north of West Road
 - Tunneling under I-74



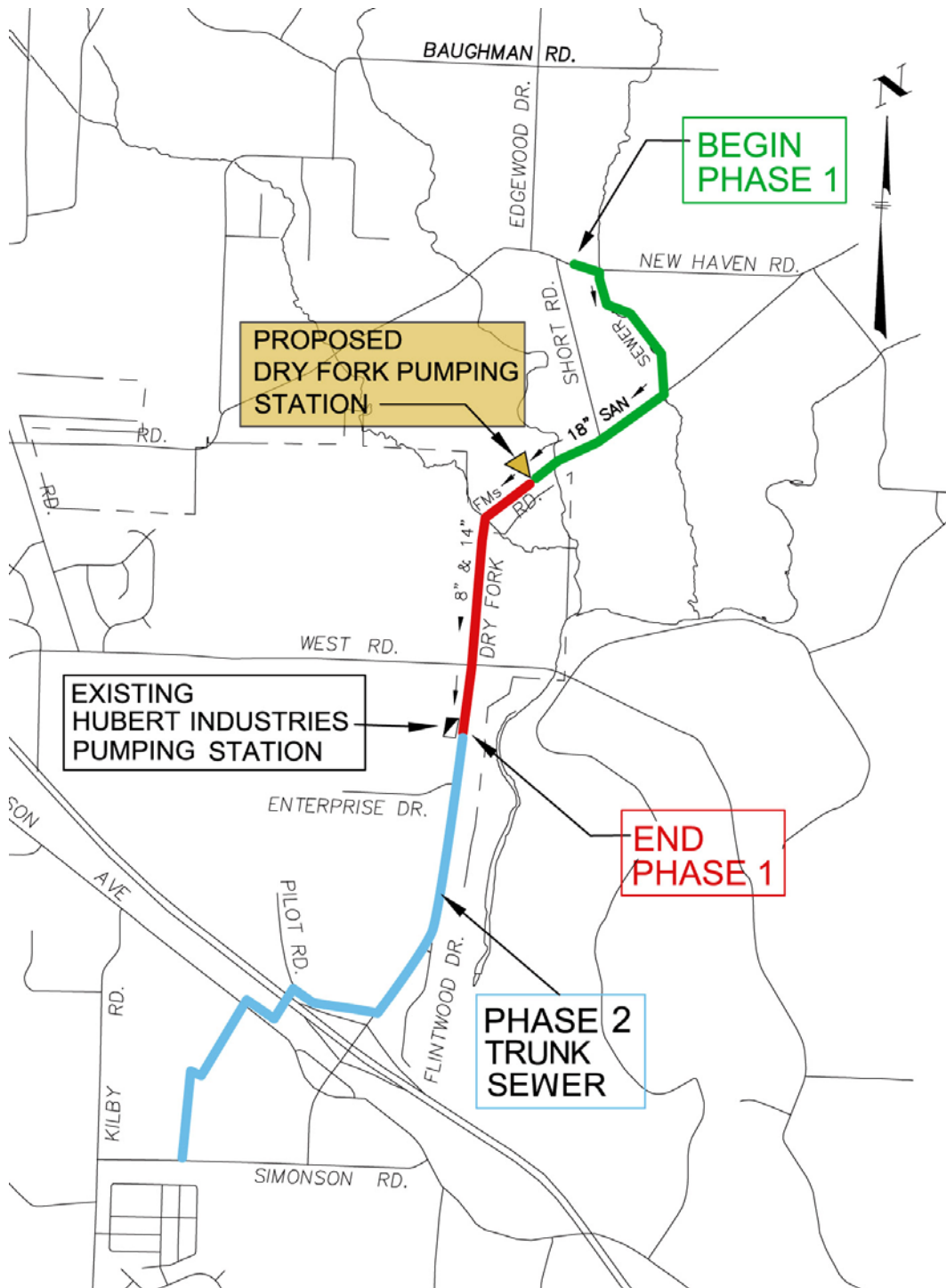
Dry Fork Phased Approach

Phase 1

- Construct upper end of trunk sewer to serve new residential developments
- Dry Fork Pump Station
- Force main to existing Hubert Industries Pump Station until Phase 2 trunk sewer can be installed

Phase 2

- Lower trunk sewer from Hubert Industries PS south to existing collection system
- Convert wet well of Hubert Industries PS to manhole
- Cross I-74 at Dry Fork Road
- Local collector sewers



Dry Fork Phase 1 Design

- 4,060 LF 18" Sanitary Sewer
- ▲ 4.5 MGD Pumping Station
- 3,837 LF of 8" and 14" parallel Force Mains
- Phase 2 Trunk Sewer

Phase 1 – Sanitary Sewer Design



- Determine most favorable alignment considering:
 - Depth of bury
 - Creek crossings
 - Easement acquisition
 - Soil conditions
- Average depth of bury: 25 ft.
- Maximum depth of bury: 35 ft.
- Adequate easement width obtained for excavation and future maintenance
 - Assume 1:1 side slopes

Phase 1 – Sanitary Sewer Design



- Tunneling (boring) selected at key locations
 - Reduce restoration costs
 - Save structures
 - Minimize easements
- Creek crossings minimized and made perpendicular to creek
- Keep alignment clear of creek riparian zone



Phase 1 – Pumping Station Design

Initial Conditions

- 0.2 MGD ADF following first residential development
- 0.6 MGD peak

Ultimate Conditions

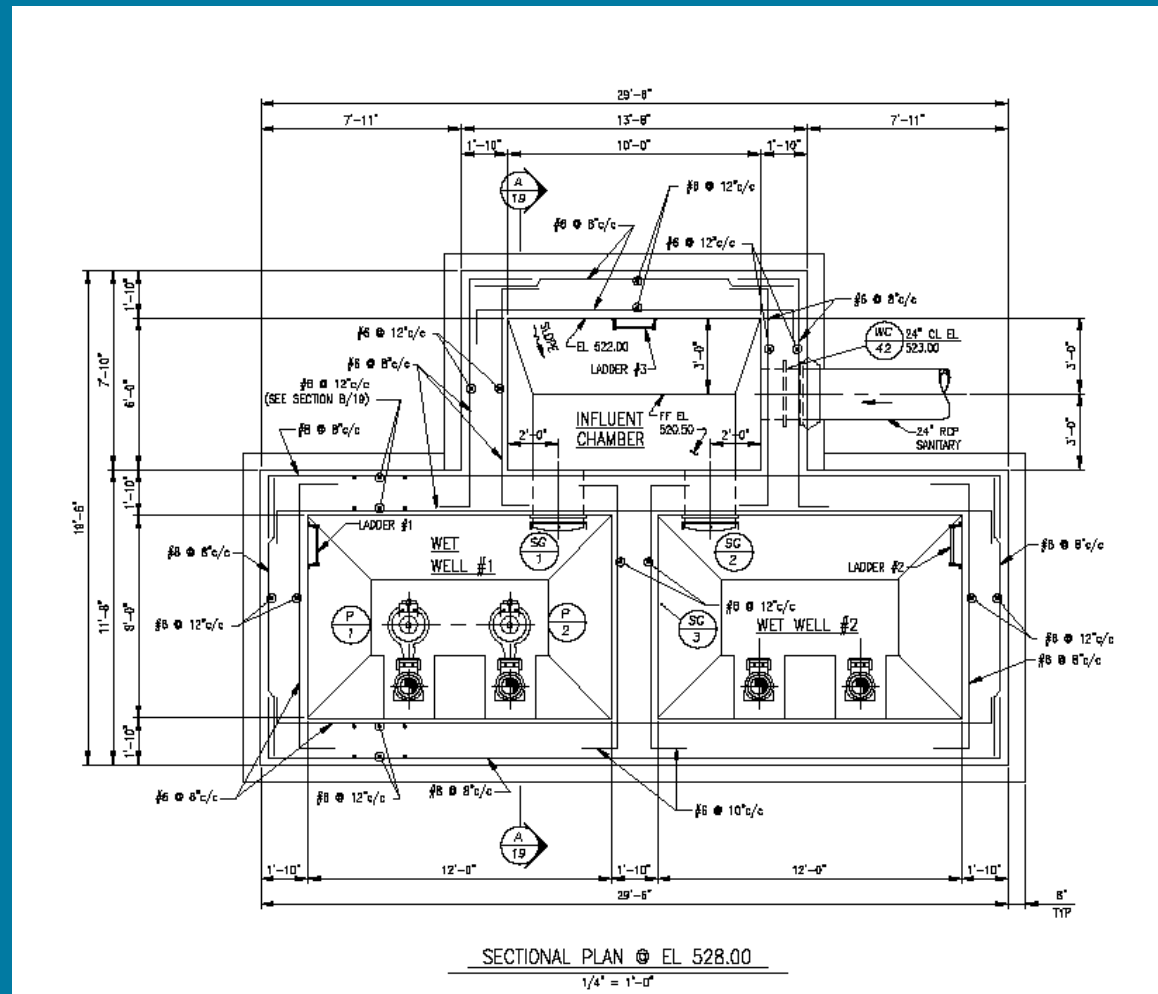
- 1.5 MGD ADF
- 4.5 MGD Peak



Phase 1 – Pumping Station Design

Wet Well

- Divided wet well design
 - Use one wetwell for initial low flows
 - Reduce wetwell volume and pump cycle time
 - Easier maintenance
- Minimize wet well detention times by adjusting pump control elevations
- Design total wet well volume for future 4.5 MGD peak



Phase 1 – Pumping Station Design

Pump Selection

- Select pumps with adequate turndown capability to meet initial low flows
- Install pumps needed for next 5 to 7 years. Pumps that sit unused for long periods will have balance problems when needed.
- Plan for pump additions and change-out as flows increase over time
- Use VFDs to reduce initial pump flows to match influent flows
- Size VFDs for future duty requirements

Phase 1 – Pumping Station Design

Pumping Strategy

<u>Avg / Peak (MGD)</u>	<u># Pumps / Cap*</u>	<u>Wet wells Req'd</u>
0.2 / 0.60	1 / 520 gpm**	1
0.4 / 1.2	2 / 520 gpm	2
0.7 / 2.1	3 / 520 gpm	2
1.0 / 3.0	2 / 1,040 gpm***	2
1.5 / 4.5	3 / 1,040 gpm	2

* Number of pumps for firm capacity, not including spare

** VFD operation for normal pumping at 250 gpm

*** Pump change-out required

Phase 1 – Pumping Station Design



Valve Vault Piping

- Install all piping in valve vault for future needs
- Installing future piping in other wet well is optional
- If pump discharge piping and pump bases are installed in future wet well, size for largest future pump

Phase 1 – Pumping Station Design



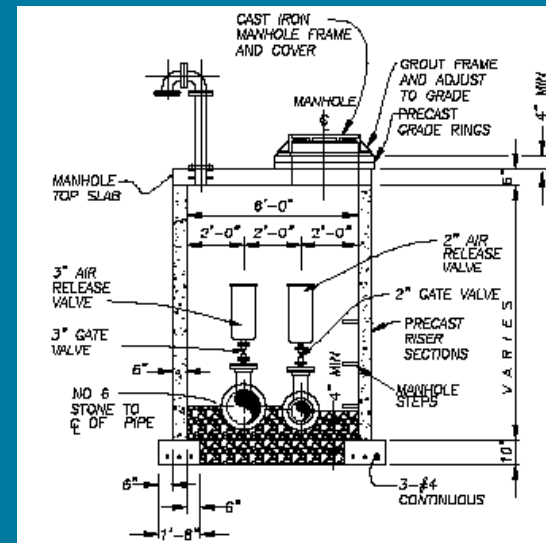
Misc. Design Elements

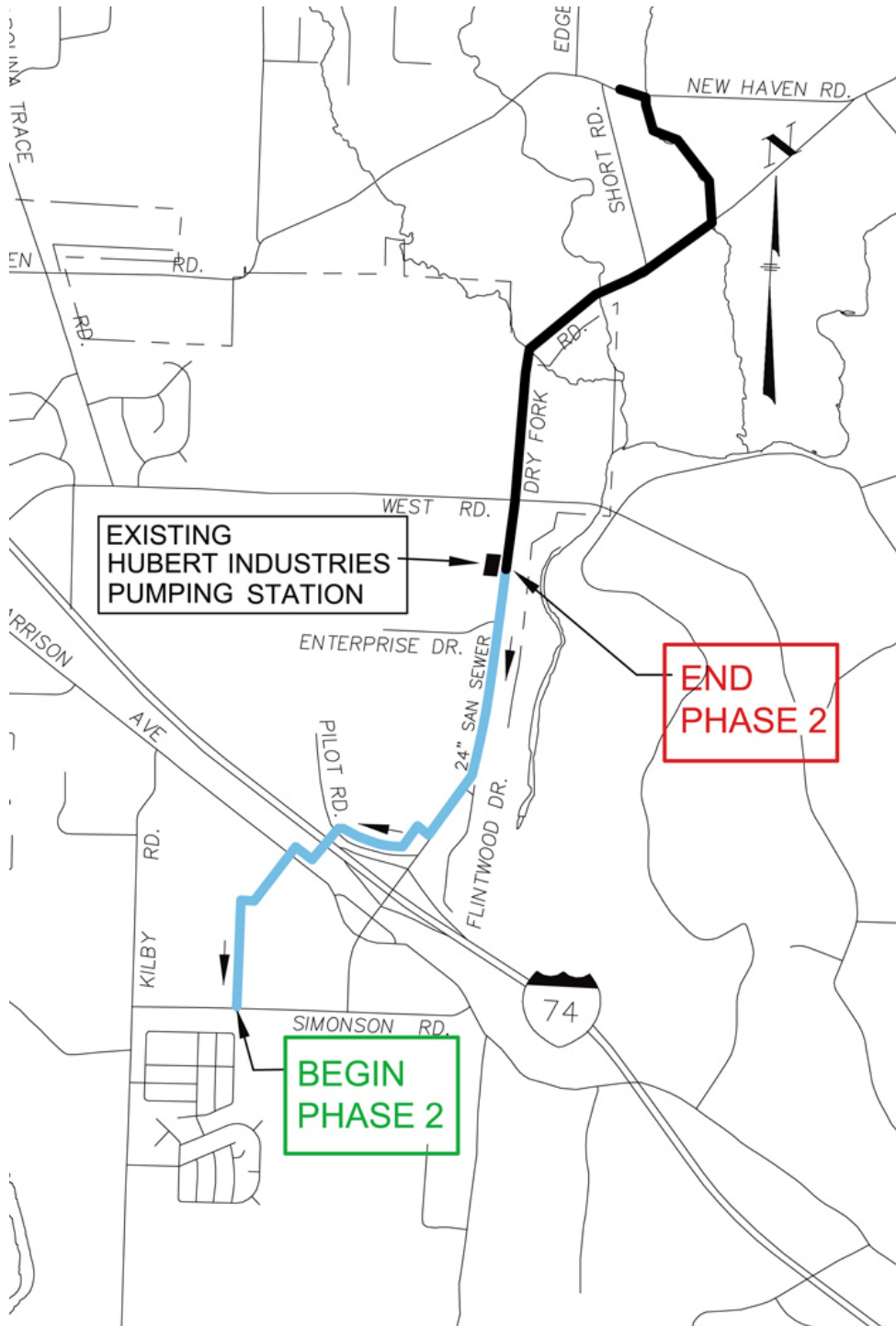
- Yard hydrant near wet well for washdown
- Non-potable water pumping skid (OEPA required)
- Floor space available for future chemical feed for odor control
- Emergency shower and eye wash
- Emergency power generator



Phase 1 – Force Main Design

- Dual force mains to accommodate wide flow range
- 8 inch force main: up to 1.5 MGD
- 14 inch force main: 1.5 to 4.5 MGD
- Install both force mains in common trench
- Air release valves for both FMs installed in common manhole





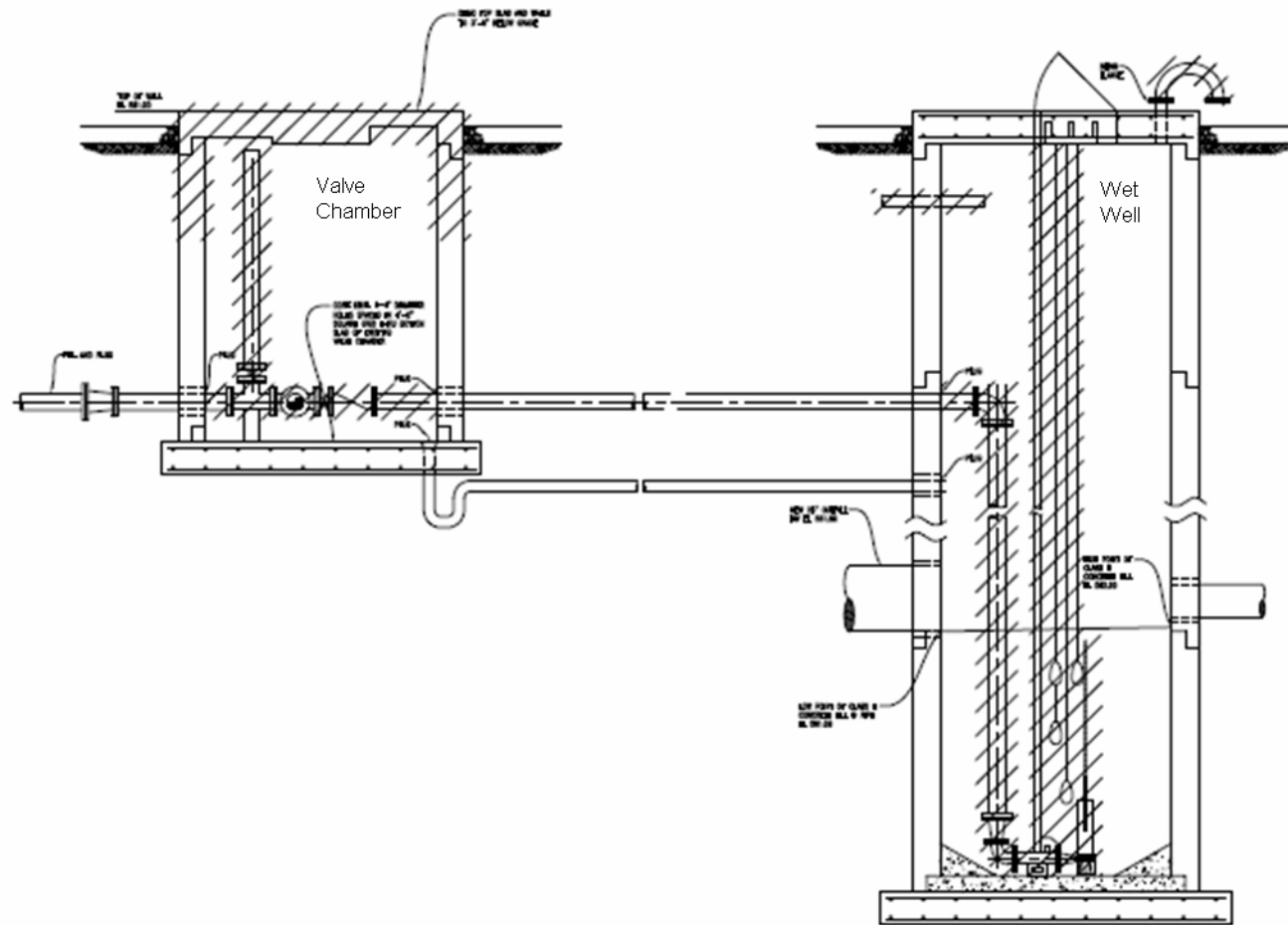
Dry Fork Phase 2

- 8,000 LF 24" Sanitary Sewer at 0.09% slope
- Convert Hubert Industries PS to manhole
- Local Collector Sewers
- Gas station at corner Dry Fork Road/Pilot Road
- Commercial properties along Pilot Road
- Cross I-74
- Connect to existing collection on Simonson Road

Aerial View



Phase 2 Design – Conversion of Hubert Industries Pumping Station



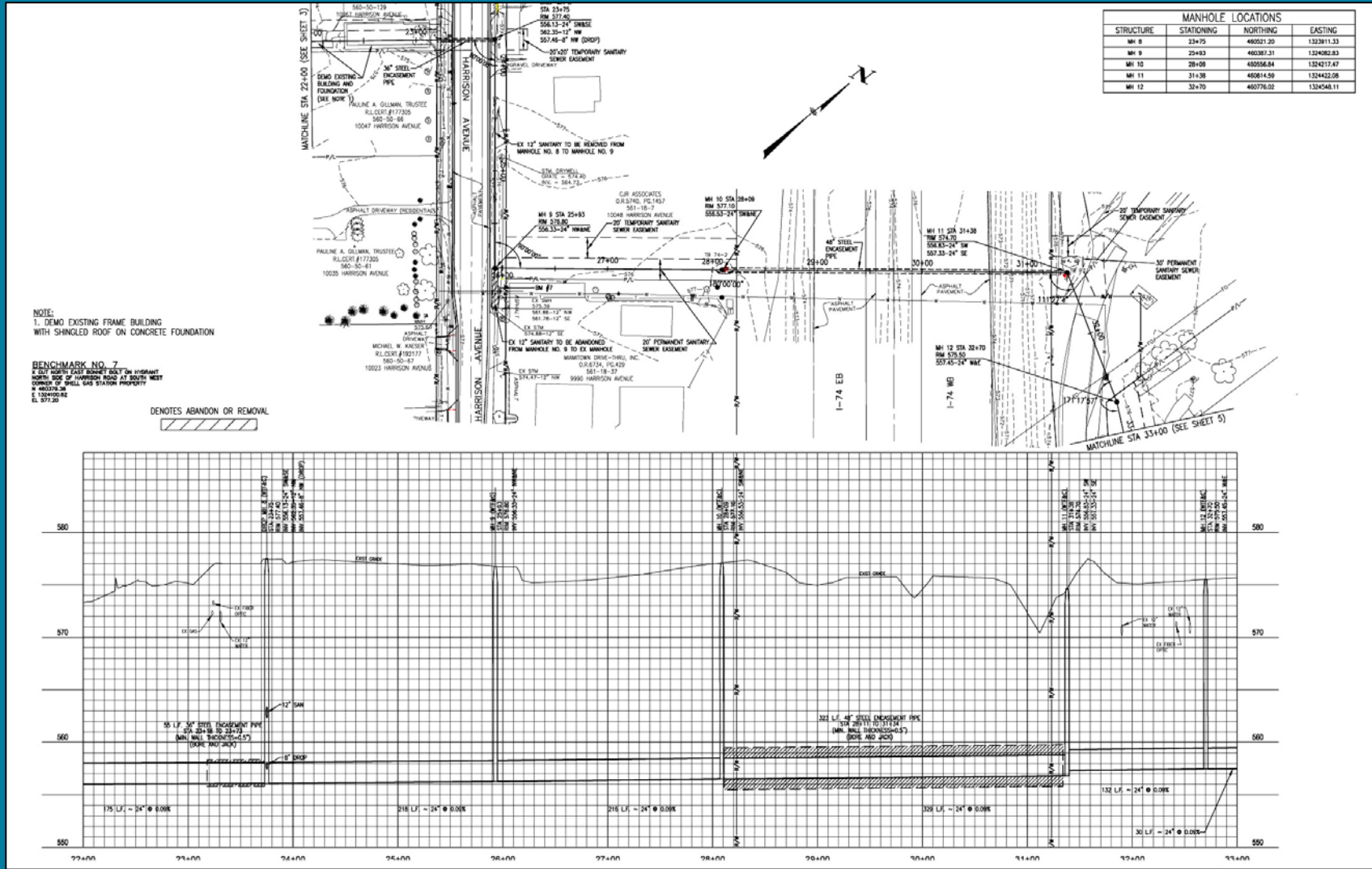
Phase 2 Design – I-74 Crossing Considerations

- Selection of location for crossing
- ODOT approval
- Encasement pipe
- Traffic maintenance in area of receiving pit on Pilot Road

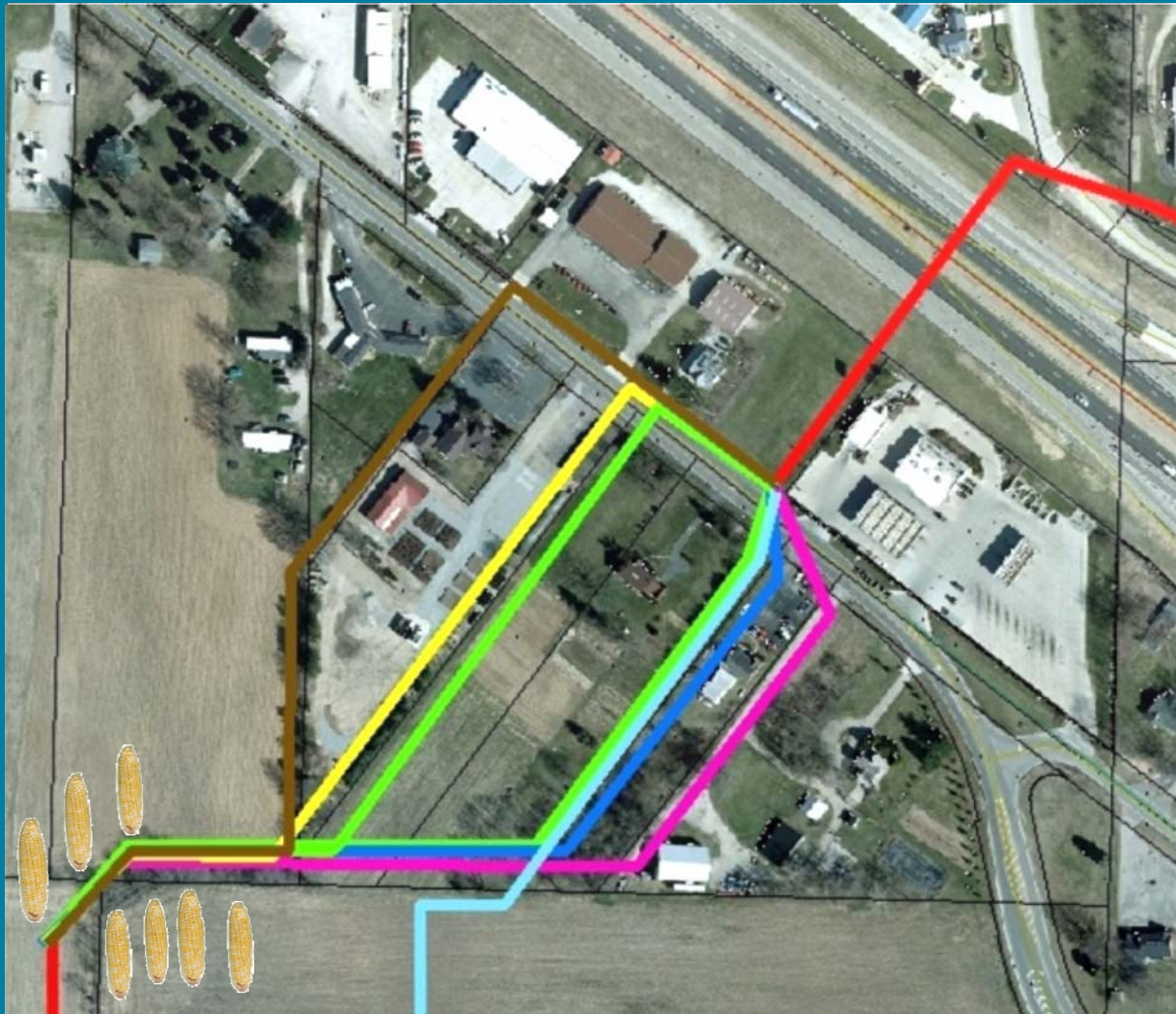
Phase 2 Design – Location of I-74 Crossing



Phase 2 Design – Plan of I-74 Crossing



Phase 2 Design – Alternative routes from Harrison Avenue to the corn field



Imagine the result

