
Conceptual Alternatives Study

GRE-35-4.26
PID 80468

Prepared for
Ohio Department of Transportation

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1. Introduction

1.1. History of the Project

In 2004, the Miami Valley Regional Planning Commission (MVRPC) in cooperation with the Ohio Department of Transportation (ODOT) completed the *Greene 35 Corridor Study*, to recommend a strategy to convert the section of US 35 between the North Fairfield Interchange and the Xenia Bypass to a limited-access facility. This section of US 35 carries 39,000 vehicles per day, has five at-grade intersections, including three that are signalized, and is the only segment of US 35 between I-75 and West Virginia that is not a limited-access freeway. Designated a “macro” corridor by the Ohio Department of Transportation, US 35 is primarily intended to carry long distance trips and facilitate the movement of people and goods on a regional and statewide level. Two previous studies (ODOT, 1982 and MVRPC, 1998) also recommended conversion of US 35 to a limited-access facility.

The *Greene 35 Corridor Study* is the planning level study envisioned by Steps 1-4 of the ODOT Project Development Process (PDP) for a Major Project. In the PDP, the current study is Step 5 – Conceptual Alternatives.

1.2. Purpose and Need

The purpose of the GRE-35-4.26 project is to improve safety and travel efficiency within the study area on a freeway level highway that considers impacts on local businesses to the degree consistent with the safety, travel efficiency, and system linkage goals and fiscal responsibility.

The main transportation needs for the area were identified in the *Greene 35 Corridor Study*:

- Travel efficiency
- Traffic safety
- System linkage

Travel efficiency is the predominant transportation issue in the project area. US 35, with five at-grade intersections in the study area, does not have enough capacity to serve existing transportation demands. The 2003 levels of service are at or close to failing at the US 35/ Factory Road intersection. By 2030, US 35 approaches to the signals at Factory, Orchard Lane, and Valley-Trebein are forecast to be Level of Service (LOS) F.

Safety is one of the primary problems noted in this section of US 35. The area is identified locally and statewide as a high crash area, and ODOT has identified it as a Non-Freeway “Hot Spot” based on crash frequency. Five locations within the project area are on the current Highway Safety Program list.

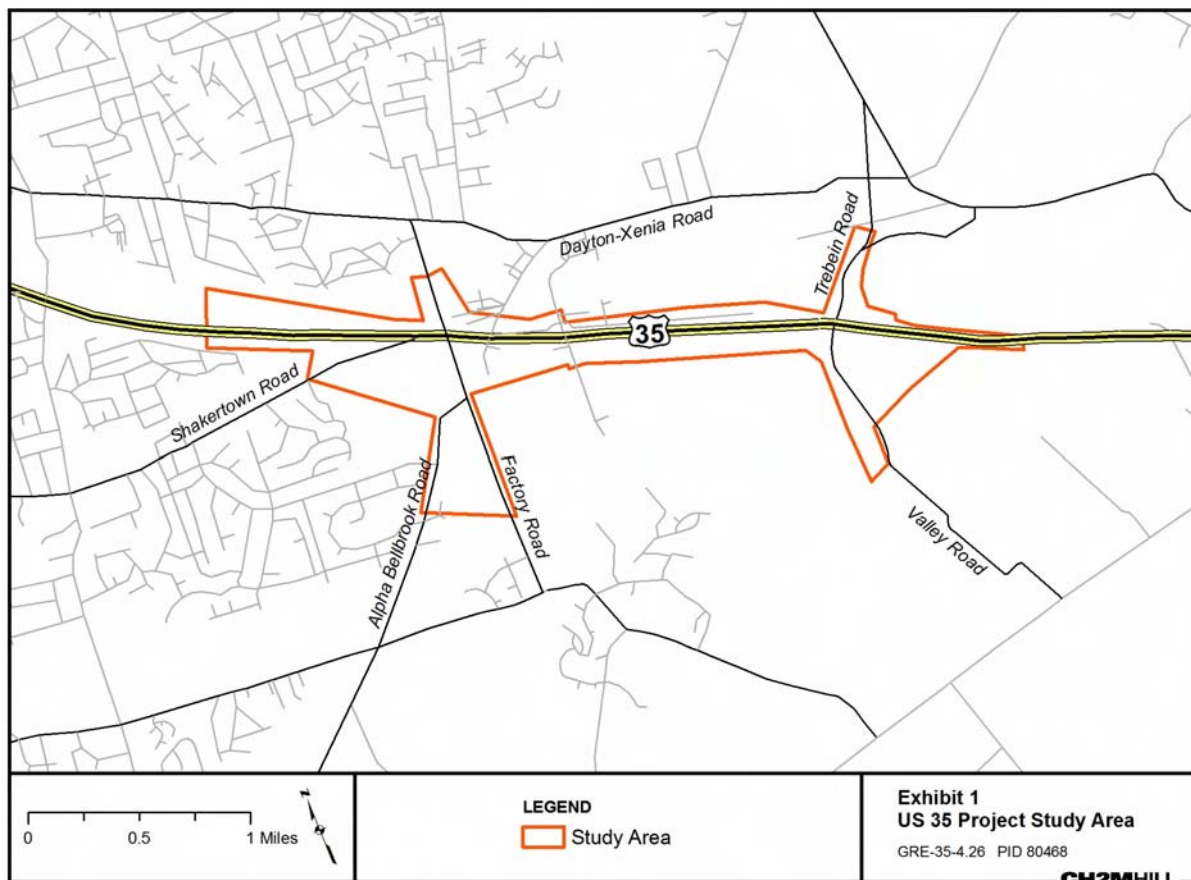
Access Ohio – Macro Phase is Ohio’s long-range transportation plan. In that study, US 35 is designated as a macro corridor, a corridor with statewide significance for Ohio’s economic vitality. A macro corridor is intended primarily to carry longer distance trips and not to provide closely spaced access points to service adjacent land. The section of US 35 between North Fairfield Road and the Xenia Bypass currently has five at-grade intersections that are inconsistent with the macro-corridor designation.

1.3. Study Area Limits

The study area is centered on the section of US 35 between North Fairfield Road and the Xenia Bypass (Exhibit 1). This is the one remaining segment of US 35 between I-75 and West Virginia that is not a limited-access freeway.

EXHIBIT 1

The US 35 Project Study Area is Focused on US 35



The study area extends along Shakertown Road, Alpha-Bellbrook Road, Factory Road, Valley Road, and Trebein Road a distance sufficient to accommodate improvements to those roads that might also be required by the conversion of the segment of US 35 to a freeway.

2. Traffic Engineering Baseline

2.1. Design and Legal Speeds

Design and legal speeds in the study area will be unchanged by the implementation of the project. Design and posted (legal) speeds are shown in Exhibit 2.

EXHIBIT 2
 Design Speed and Posted Speed on Select Roadway Segments

Roadway	Design Speed	Posted (Legal) Speed
US 35 (current)	65 mph	55 mph
US 35 (proposed)	65 mph	55 mph
Trebein Road	55 mph	55 mph
Shakertown Road	45 mph	40 mph
Factory Road	45 mph	40 mph
Alpha-Bellbrook Road	45 mph	40 mph
Valley Road	60 mph	55 mph
Frontage roads (proposed with split diamond)	35 mph	30 mph
Orchard Lane	25 mph	25 mph
Heller Drive	25 mph	25 mph

2.2. Functional Classification

US 35 between North Fairfield Road and the Xenia Bypass is currently classified as a Principal Arterial. The portion of US 35 at either end of this segment is classified as Freeway. The proposed project will result in the reclassification of the principal arterial segment of US 35 to a freeway consistent with the classification at either terminus.

Also in the study area, Fairfield Road, Dayton-Xenia Road, Indian-Ripple Road, and Upper Bellbrook Road are all classified as Minor Arterials. Shakertown Road, Alpha-Bellbrook Road, Factory Road, and Valley Road are classified as Collectors. All other roads in the study area are classified Local Roads.

2.3 Projected Traffic Volumes

Exhibit 3 shows existing and projected traffic along US 35 and within the study area. The existing safety and operational problems identified within the study area are not expected to improve with traffic volumes projected to steadily increase under the existing conditions. On both the east and west limits of the study area, the average daily traffic (ADT) is projected to grow on average by approximately 0.5 percent annually between 2003 and 2030.

Between Factory Road and Valley-Trebein the average annual growth for that same period varies between 0.5 percent and 1.5 percent. Similarly, as shown by the representative traffic for Factory and Valley-Trebein, at locations immediately north and south of US 35, the local roadway system growth parallels the US 35 traffic growth. Comprehensive traffic data is included in Appendix A.

EXHIBIT 3
 Existing and Projected Traffic Along US 35

Roadway/Segment Year	ADT		AM Peak		PM Peak	
	2003	2030	2003	2030	2003	2030
US 35 Westbound						
West of Factory	16,533	18,232	1,510	1,980	1,110	1,450
Factory to Alpha	19,600	22,408	1,395	1,830	1,205	1,580
Alpha to Orchard	19,593	22,408	1,525	2,000	1,290	1,690
Orchard to Valley-Trebein	17,373	22,547	1,415	1,850	1,185	1,550
East of Valley-Trebein	17,000	18,231	1,460	1,910	1,240	1,620
US 35 Eastbound						
West of Factory	16,550	18,090	1,080	1,410	1,445	1,890
Factory to Alpha	19,500	23,970	1,100	1,440	1,410	1,850
Alpha to Orchard	18,324	23,970	1,145	1,500	1,570	2,060
Orchard to Valley-Trebein	16,628	24,392	970	1,270	1,360	1,780
East of Valley-Trebein	17,500	20,332	1,015	1,330	1,370	1,790
Factory Road						
North of US 35	10,730	11,568	800	1,130	970	1,380
South of US 35	2,452	6,122	620	890	800	1,140
Valley-Trebein						
North of US 35	7,957	9,610	435	610	655	910
South of US 35	1,593	3,809	95	150	150	220

2.4 Existing and Future Level of Service- Existing Conditions

Exhibit 4 shows LOS for the intersections along US 35 if the proposed improvements are not implemented. The intersection of US 35 and Factory Road currently experiences, and will continue to experience, lengthy delays during both AM and PM traffic peaks. While the intersections of Alpha, Orchard, and Valley-Trebein operate within acceptable levels of service based on analysis of 2003 traffic volumes, by 2030 the operation of these intersections during both the AM and PM peak periods will degrade to unacceptable levels at or near failure. Under these conditions, all approaches will experience lengthy delays and affect the operation of the adjacent roadway network.

EXHIBIT 4

Existing and Forecast LOS on US 35 with the No Build Alternative

Roadway/Segment	AM Peak		PM Peak	
	2003	2030	2003	2030
US 35 Study Area Intersections*				
Factory	F	F	F	F
Alpha	C/C	D/F	C/F	C/F
Orchard	C	E	C	E
Valley-Trebein	C	E	C	F

Alpha Road is two-way stop controlled with EB and WB through movements free flowing and with NB and SB approaches stop controlled. These results reflect the critical (worst) movement LOS for EB or WB left-turns and critical approach LOS for NB or SB.

Factory, Orchard, and Valley-Trebein are signal controlled and these results reflect the overall intersection LOS.

3. Introduction to the Conceptual Alternatives

3.1. No-Build Alternative

The no-build alternative would retain the current configuration of the stretch of US 35 between North Fairfield Road and the Xenia Bypass. This would include 2 lanes of traffic in each direction and signalized intersections at Factory, Orchard, and Valley-Trebein.

3.2. Build Alternatives

Two build alternatives have been developed.

- Alternative 1 is a refinement of the Recommended Alternative from the *Greene 35 Corridor Study* and includes a tight diamond interchange at Factory Road and a tight diamond with a loop ramp in the southwest quadrant at Valley-Trebein Road.
- Alternative 2 addresses traffic circulation, local access, and business access concerns at Orchard Lane and a reduced project footprint at Valley-Trebein Road. It includes a split tight diamond interchange at Factory Road-Orchard Lane and a tight diamond interchange at Valley-Trebein Road.

The alternatives could be configured differently. The tight diamond interchange at Factory Road (Alternative 1) could be paired with the tight diamond interchange at Valley-Trebein (Alternative 2) instead of with the tight diamond with loop ramp configuration currently shown. Likewise, the split-diamond interchange presented for Factory Road and Orchard Lane (Alternative 2) could be paired with the tight diamond with loop ramp configuration (Alternative 1) at Valley-Trebein. When appropriate, this study looks at effects at each interchange rather than for the full alternatives.

Typical cross sections of the roadway segments are included in Appendix B. Two typical sections have been included for US 35 depicting both the more characteristic at-grade section and the elevated section where US 35 would bridge Factory Road and Orchard Lane.

The existing roadway has a 30-foot median that does not meet a 65 mph design speed. The proposed US 35 will maintain two lanes in each direction but will be converted to an urban-like roadway section with a median concrete barrier to address the substandard median width. Retaining the 30-foot median with the median barrier eliminates the need to shift lanes at the project limits to match existing conditions.

Within the elevated section, retaining walls would be needed to minimize the project footprint and limit impacts on local businesses adjacent to US 35. The impact of these walls is discussed in Section 4.3.4. Appropriate retaining wall justification studies will be required in subsequent steps of the PDP.

In the typical sections, the grading shown is for clear zone grading. One illustrative typical section was developed for US 35 in a normal section and elevated section. The roadside grading will be a combination of safety, clear zone, common and barrier grading used. The limits and types of grading will be developed in PDP Step 6 with the cross sections.

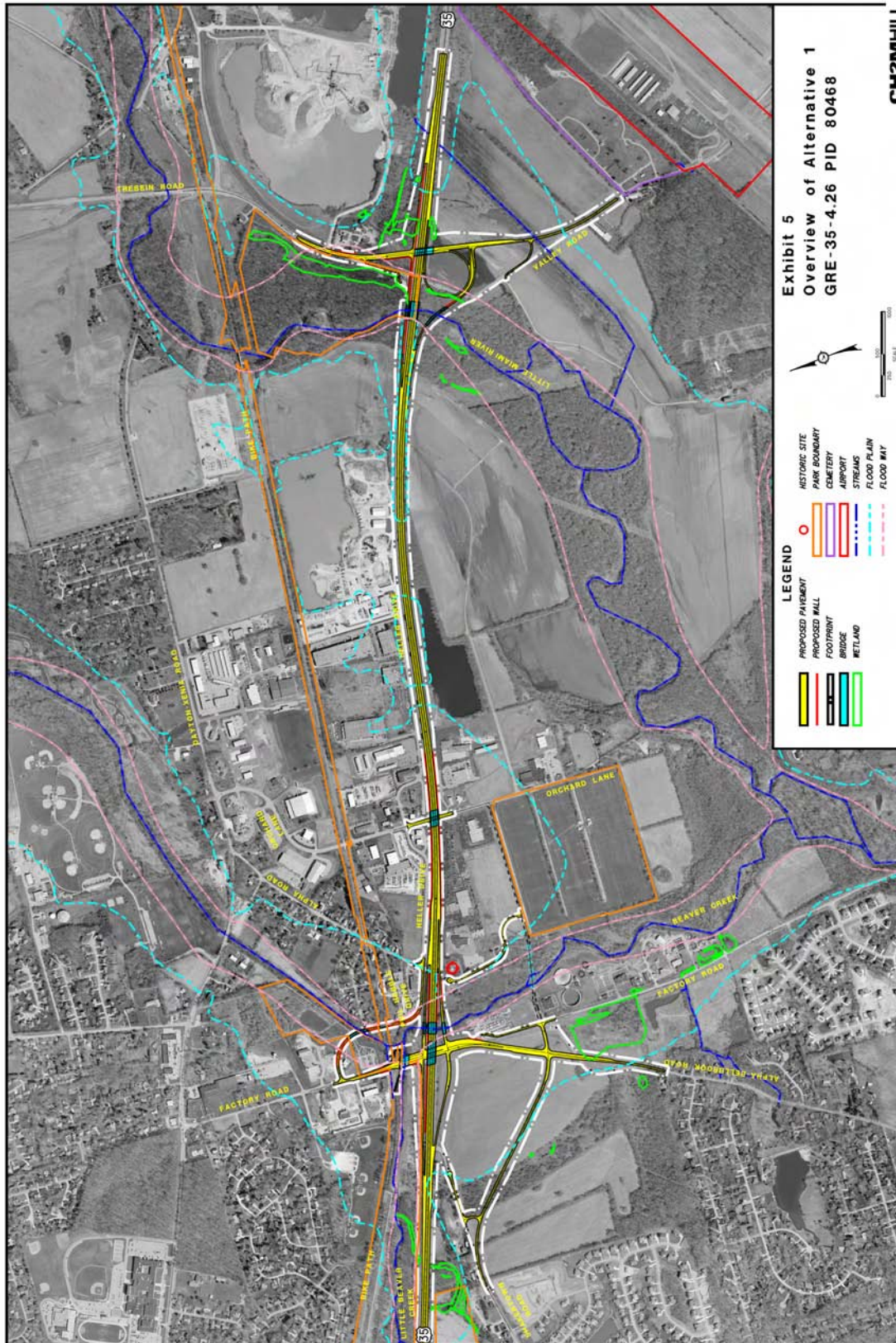
The alternatives have several comparabilities including the following:

- Converting the stretch of US 35 between North Fairfield Road and the Xenia Bypass into a limited-access highway with two lanes of traffic in each direction.
- Providing an interchange at Valley-Trebein Road and either a full or split-diamond interchange to access Factory Road.
- Near Factory Road extending Heller Drive to Factory Road, although along different alignments.
- Placing a cul-de-sac at Alpha Road south of US 35 and improving the intersection of Alpha Road with Heller Drive north of US 35.
- Bridging US 35 over Orchard Lane although Alternative 2 would also incorporate Orchard Lane as part of a split diamond interchange with Factory Road.
- Providing a tight diamond configuration along the north half of the interchange at US 35 and Valley-Trebein.

An overview of Alternative 1, including environmental concerns, is shown in Exhibit 5. US 35 would have two through lanes in each direction with an interchange at Factory Road and an interchange at Valley-Trebein Road. A new extension of Shakertown Road would connect to Alpha Bellbrook Road and Factory Road. An independently sponsored Greene County project would align with the eastern terminus of Shakertown Road, parallel the northern boundary of the John Ankeney Soccer Complex and connect to Orchard Lane. Alpha Lane, which will be closed south of US 35, will be extended to connect to this county road. North of US 35, Heller Road will be extended to the west, then north, and then connect with Factory Road north of the Banjara Banquet Center. The intersection of Alpha Road and Heller Road will be improved to allow traffic to move north, east, or west. The redeveloped US 35 will bridge over Orchard Lane with no direct access to Orchard Lane.

EXHIBIT 5

Overview of Alternative 1 including Environmental Features



Valley Road would be realigned to the east with a loop ramp in the southwest quadrant serving eastbound on-traffic. Detail on the Factory Road/Orchard Lane Interchange is discussed in Section 3.2.1. Detail on the Valley-Trebein Road Interchange is discussed in Section 3.2.2.

An overview of Alternate 2, including environmental concerns, is shown in Exhibit 6. As with Alternative 1, US 35 would have two through lanes in either direction with an interchange at Factory Road and an interchange at Valley-Trebein Road. A new extension of Shakertown Road would connect to Alpha-Bellbrook Road and Factory Road. Traffic on Alpha-Bellbrook and Factory would merge and lead to the interchange at Factory Road. Unique to Alternative 2, Alpha Road south of US 35 would connect to a two-lane, one way road that will link Factory Road and Orchard Lane. Across Orchard Lane this frontage road will align with the eastbound on-ramp to US 35. Valley-Trebein would be realigned to a different alignment than Alternative 1. A tight diamond interchange would connect to US 35. Factory Road/Orchard Lane would be paired in a split diamond interchange. Detail on the Factory Road/Orchard Lane Interchange is discussed in Section 3.2.2. Detail on the Valley-Trebein Road Interchange is discussed in Section 3.2.4.

3.2.1 Factory Road Interchange – Alternative 1

A detailed view of the Factory Road Interchange for Alternative 1 is in Appendix C. The interchange would be a tight diamond configuration with US 35 bridging over Factory Road and Orchard Lane.

The eastbound entrance ramp (Ramp A) and exit ramp (Ramp B) at Factory Road are identical for Alternative 1 and Alternative 2. For Alternative 1, the entrance ramp for eastbound traffic at Factory Road (Ramp C) would align with the exit ramp and would extend to a merge gore in front of Lang's Chevrolet. Both the eastbound and westbound ramp intersections would warrant a traffic signal.

The existing intersection of Shakertown Road with US 35 would be closed. Traffic from Shakertown Road would use a new extension of Shakertown Road that would connect to Alpha-Bellbrook Road and to Factory Road. Traffic headed to US 35 would go north on Alpha-Bellbrook to merge onto Factory Road and access US 35.

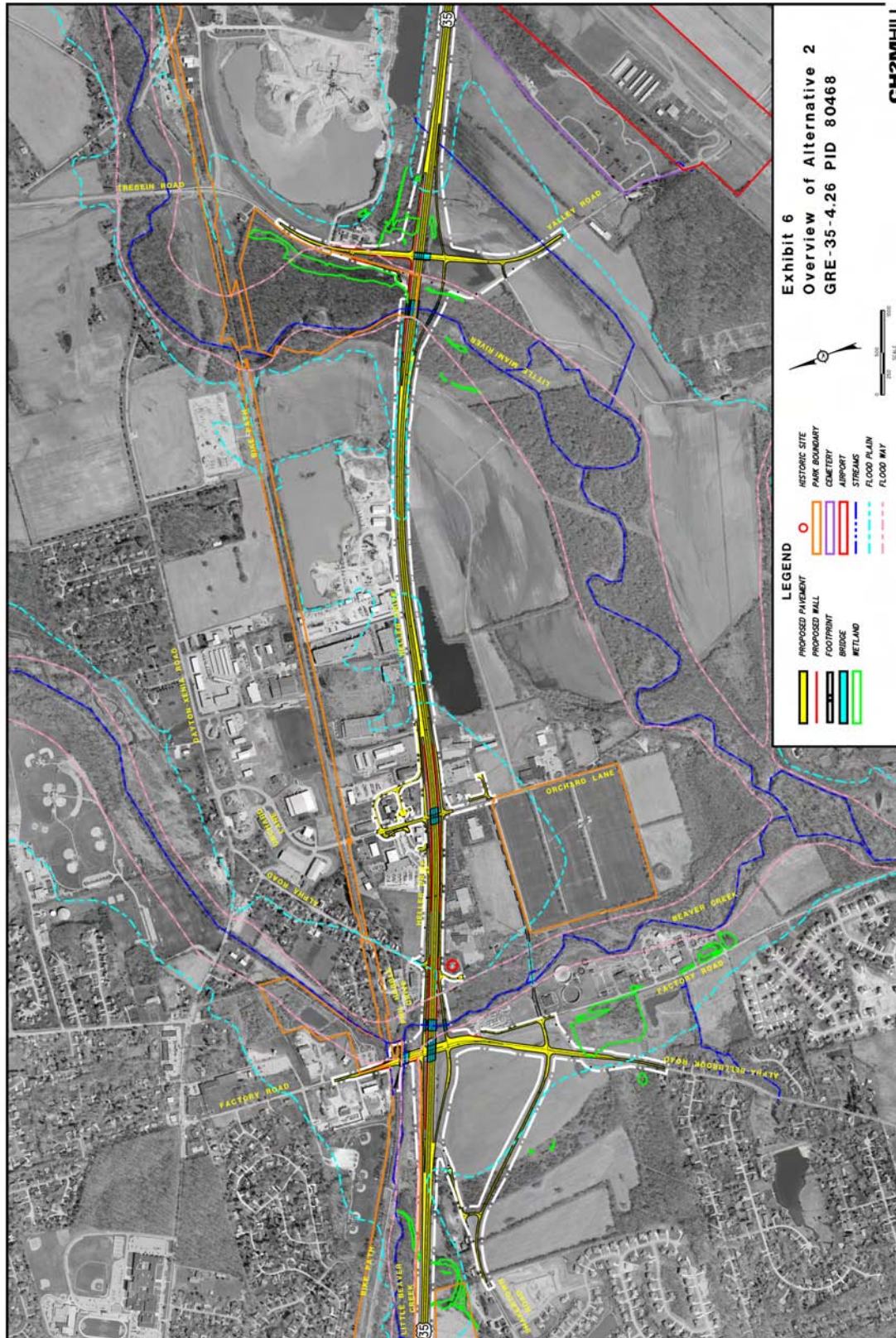
The intersection of Factory Road and Alpha-Bellbrook will be modified so Factory aligns with the Shakertown Road extension. Through traffic will use Alpha-Bellbrook Road. Local traffic will reach roadside businesses along the remaining segment of Factory Road.

A separate Greene County project will build a new road from the extension of the Shakertown Road/Factory Road intersection to Orchard Lane. The new county road would skirt the northern boundary of the John Ankeney Soccer Complex.

Alpha Road will be terminated in a cul-de-sac south of US 35. A new extension, part of the US 35 reconstruction project, would extend Alpha Road to the south where it would connect to the new Greene County Road.

EXHIBIT 6

Overview of Alternative 2 including Environmental Features



Heller Drive north of US 35 would be extended to Factory Road. The intersection of Alpha Road and Heller Drive would be improved and Heller Drive would continue to the west.

Short of Beaver Creek, Heller Road would turn northward to cross over the bikepath, then bridge over Beaver Creek before trending westward again to link with Factory Road. Heller Drive would have one travel lane in either direction.

A segment of the existing bike path will be realigned to cross under the bridge on Factory Road that goes over Little Beaver Creek. Factory would need to be raised approximately seven feet to provide a total clearance of approximately 14 feet for bicyclists. Extensions of this crossing will reconnect to the existing bike path on either side of Factory Road. The at-grade intersection of the bike path and Factory Road will be replaced by this underpass. The raised section of Factory Road will require a retaining wall that will impact access to approximately three high mast utility towers and seven utility poles. Access issues need to be resolved with utility owners. The bike path is the same in both alternatives.

3.2.2 Factory Road Interchange – Alternative 2

A detailed view of the Factory Road/Orchard Lane Interchange for Alternative 2 is shown in Appendix D. The interchange would be a split diamond configuration with US 35 bridging over Factory Road and Orchard Lane. Traffic would exit westbound US 35 before Orchard Lane. East of Orchard Lane, Heller Drive would be realigned to the north to provide separation from the Ramp D exit. A signal would be warranted on Orchard at the end of Ramp D. West of Orchard Lane, Heller Drive would be extended and converted to a one way frontage road with two lanes for westbound traffic only. Entrance Ramp A would align with the Heller Road extension for westbound traffic. A traffic signal would be warranted at the intersection with Factory Road.

The eastbound exit ramp at Factory Road is identical for Alternatives 1 and Alternative 2. A traffic signal would be warranted at the intersection with Factory Road. For Alternative 2, a two-lane one-way eastbound frontage will align with Ramp B at Factory Road and connect to Orchard Lane. The frontage road will connect to the segment of Alpha Road south of US 35 and provide access to properties along the southern side of US 35.

Unique to Alternative 2, the eastbound on-ramp (Ramp C) will originate at Orchard Lane. This ramp will align with the frontage road noted above.

Access drives along Orchard Lane will be closed where appropriate for limited-access facilities control. Access to the Food Mart would be provided at the south side of the property along Heller Drive. Access to the Aamco would be located on the north side of the property.

A separate Greene County project will provide a new road from the extension of the Shakertown Road/Factory Road intersection to Orchard Lane. The new county road would skirt the northern boundary of the John Ankeney Soccer Complex. Access to properties in the southeast quadrant of US 35 and Orchard Lane will be provided by a new spur that will align with the new county road

On the north side of US 35, Heller Drive will continue to loop behind businesses near Orchard Lane and US 35 although some curves and intersections will be updated to improve safety.

The westbound exit ramp from US 35 (Ramp D) will intersect with Orchard Lane rather than Factory Road as with Alternative 1. Heller Drive will become a one-way two-lane frontage road extending to Factory Road where it aligns with Ramp A. A portion of Heller Drive will be relocated closer to US 35 and the intersection with Alpha Road will be improved.

A segment of the existing bike path will be realigned to cross under the bridge on Factory Road that goes over Little Beaver Creek. Extensions of this crossing will reconnect to the existing bike path on either side of Factory Road. The at-grade intersection of the bike path and Factory Road will be replaced by this underpass. The bike path is the same in Alternative 1 and Alternative 2.

3.2.3 Valley-Trebein Interchange – Alternative 1

A detailed view of the Valley-Trebein Road Interchange for Alternative 1 is shown in Appendix E. The interchange would be a loop interchange in the southwest quadrant and a tight diamond on the north side of US 35. US 35 will clearspan the Little Miami River on the same alignment as the existing bridge. Valley-Trebein will bridge over US 35.

Exit Ramp F would diverge from US 35, curve around the loop of Entrance Ramp G, and terminate at the realigned Valley Road. Because the eastbound on-ramp (Ramp G) is a loop in the southwest quadrant, there is no ramp in the southeast quadrant. Ramp G is a 260-foot radius loop with a design speed of 30 mph.

Trebein Road and Valley Road would be realigned to the east, eliminating the sharp curve in Valley Road just south of US 35. The new alignment will be pushed to the east to provide room for the loop ramp, balancing the impacts on the two businesses in the northeast quadrant. The drive to the south and the access to the park will be more than 600 feet from the ramps as required for limited-access facilities.

To avoid impacts to Glenn Thompson Reserve, and to align with one another, Ramps E and H, serving westbound on and off traffic respectively, will be located close to with US 35. Retaining walls along Ramp E will minimize the potential impact on Glenn Thompson Reserve. Ramp E will clearspan the Little Miami River before merging with US 35.

A short access road will be retained along the existing alignment of Trebein Road to maintain access to the Glen Thompson parking lot.

3.2.4 Valley-Trebein Interchange – Alternative 2

A detailed view of the Valley-Trebein Road Interchange for Alternative 2 is shown in Appendix F. The interchange would be a tight diamond configuration with a ramp in all four quadrants. US 35 will clearspan the Little Miami River on the same alignment as the existing bridge. Valley-Trebein will bridge over US 35.

Ramp F would divert from US 35 eastbound, clearspan the Little Miami River, and terminate at relocated Valley Road. It will align with Ramp G that will serve traffic onto US 35 eastbound.

Trebein Road will be relocated to the east to align with the relocated Valley Road. This will eliminate the sharp curve in Valley Road just south of US 35.

To avoid impacts to Glenn Thompson Reserve, and to align with one another, Ramps E and H, serving westbound on and off traffic respectively, will be located close to with US 35. Retaining walls along Ramp E will minimize the potential impact on Glenn Thompson Reserve. Ramp E will clearspan the Little Miami River before merging with US 35.

A short access road will be retained along the existing alignment of Trebein Road to maintain access to the Glenn Thompson parking lot that serves a trail system and canoe launch area.

3.3 Future Level of Service - Build Conditions

Preliminary traffic analyses were performed with the aid of the Highway Capacity Software (HCS) to evaluate and update the conceptual build alternatives. The 2030 design year traffic model as reported in the *GRE-35 Corridor Study* was used in the analyses. That report shows existing and projected traffic along US 35 and within in the study area and summarizes the results of the traffic analysis (Appendix A). Exhibit 7 shows the intersection, freeway segment, and ramp merge/diverge capacity analyses for Factory, Trebein, and US 35 for Alternative 1.

EXHIBIT 7

HCS Analysis of the 2030 Volumes on Alternate 1

Location	Type of Analysis	AM		PM	
		LOS	Delay	LOS	Delay
EB Factory	Signalized Intersection	C	21.5	C	21.9
WB Factory	Signalized Intersection	C	21.9	C	23.0
EB Trebein	Two-Way Stop Controlled Intersection	A	9.3	B	11.6
WB Trebein	Two-Way Stop Controlled Intersection	B	10.4	B	12.9
EB West	Freeway	B	--	B	--
EB Factory	Freeway	A	--	A	--
EB Mid	Freeway	B	--	B	--
EB Trebein	Freeway	B	--	B	--
EB East	Freeway	B	--	B	--
WB East	Freeway	B	--	B	--
WB Trebein	Freeway	B	--	B	--
WB Mid	Freeway	B	--	B	--
WB Factory	Freeway	A	--	A	--
WB West	Freeway	A	--	A	--
EB Factory Off	Ramp Diverge	A	--	B	--
EB Factory On	Ramp Merge	B	--	B	--

EXHIBIT 7

HCS Analysis of the 2030 Volumes on Alternate 1

Location	Type of Analysis	AM		PM	
		LOS	Delay	LOS	Delay
EB Trebein Off	Ramp Diverge	A	--	B	--
EB Trebein On	Ramp Merge	B	--	B	--
WB Trebein Off	Ramp Diverge	B	--	B	--
WB Trebein On	Ramp Merge	B	--	B	--
WB Factory Off	Ramp Diverge	B	--	B	--
WB Factory On	Ramp Merge	B	--	B	--

Exhibit 8 reflects the analysis at the same locations as Exhibit 7. In addition, Exhibit 8 includes intersection analysis for Orchard, as required for the configuration of Alternative 2.

EXHIBIT 8

HCS Analysis of the 2030 Volumes on Alternate 2

Location	Type of Analysis	AM		PM	
		LOS	Delay	LOS	Delay
EB Factory	Signalized Intersection	C	22.4	C	22.6
WB Factory	Signalized Intersection	C	20.7	C	23.2
EB Orchard	Two-Way Stop Controlled Intersection	D	31.7	C	23.9
EB Orchard	Signalized Intersection	B	14.8	B	14.8
WB Orchard	Two-Way Stop Controlled Intersection	F	495.6	F	806.7
WB Orchard	Signalized Intersection	C	23.3	C	31.4
EB Trebein	Two-Way Stop Controlled Intersection	C	17.3	F	185.3
WB Trebein	Two-Way Stop Controlled Intersection	B	10.7	B	13.3
EB West	Freeway	B	--	B	--
EB Factory	Freeway	A	--	A	--
EB Mid	Freeway	B	--	B	--
EB Trebein	Freeway	B	--	B	--
EB East	Freeway	B	--	B	--
WB East	Freeway	B	--	B	--
WB Trebein	Freeway	B	--	B	--
WB Mid	Freeway	B	--	B	--
WB Factory	Freeway	A	--	A	--
WB West	Freeway	A	--	A	--
EB Factory Off	Ramp Diverge	A	--	B	--
EB Orchard On	Ramp Merge	B	--	B	--
EB Trebein Off	Ramp Diverge	A	--	B	--
EB Trebein On	Ramp Merge	B	--	B	--
WB Trebein Off	Ramp Diverge	B	--	B	--
WB Trebein On	Ramp Merge	B	--	B	--
WB Orchard Off	Ramp Diverge	B	--	B	--
WB Factory On	Ramp Merge	B	--	B	--

These summary results show acceptable ranges of level of service for nearly all components of the roadway system regardless of alternative. While signals were not likely to be warranted upon Opening Day at the Alternative 2 Orchard Lane intersections with the frontage roads, based on a preliminary review of Design Year volumes, it is likely they will be warranted by Design year. Therefore, where initially evaluated as stop controlled, supplement analysis was performed to evaluate these intersections under signal control. The results of both signal controlled analysis are shown in Exhibit 8.

4. Summary of Environmental Investigations

4.1. Preliminary Geotechnical Analysis

Based on geotechnical studies from the original construction of US-35 and other published information, there are no major geotechnical issues present within the proposed corridor which would influence alignment selection. However, the geotechnical issues listed below could affect the design, construction, and cost of the project.

- Soil drainage problems in several locations throughout the project area;
- Unsuitable materials in the vicinity of Orchard Lane South;
- Active, reclaimed, or abandoned surface mines such as gravel pits and ponds in the study area.

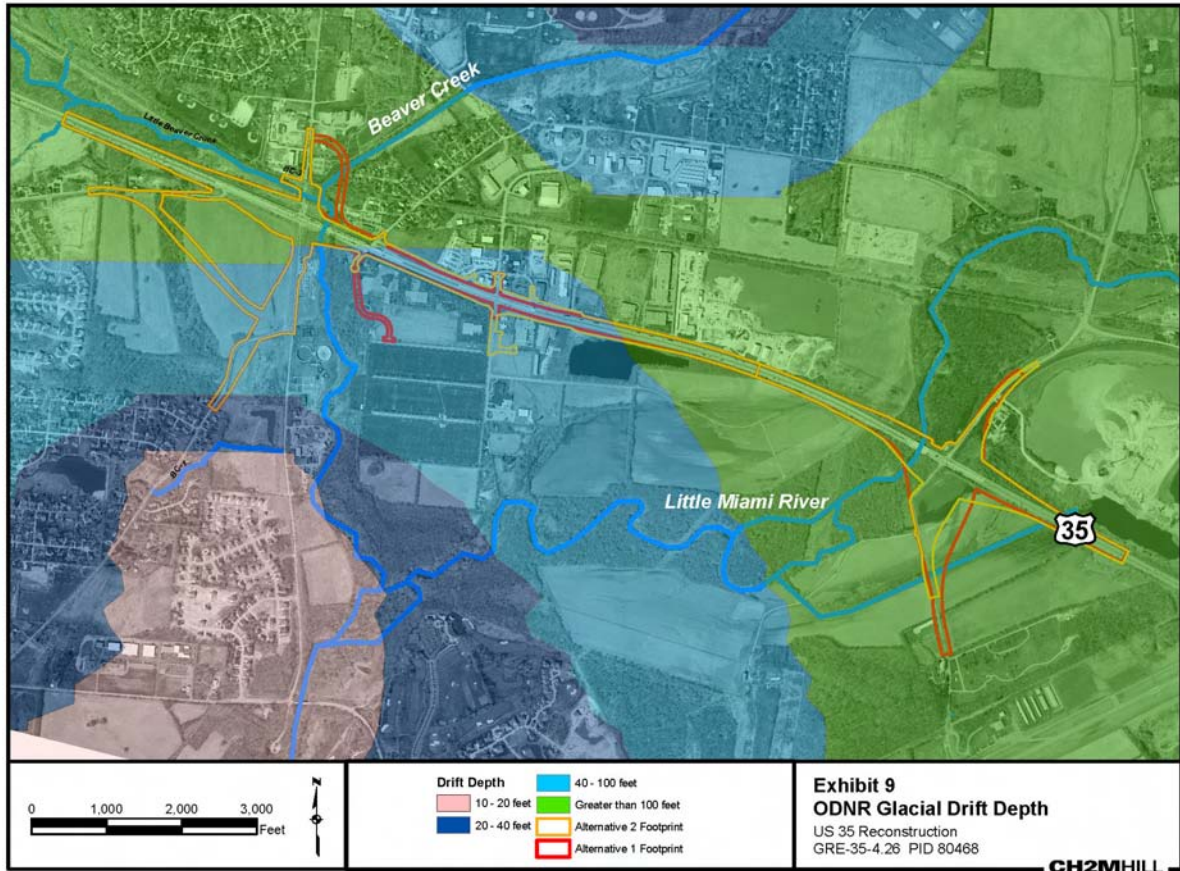
The underlying bedrock of Greene County is composed of interbedded limestone and shale layers of Ordovician age and limestone and dolomite of Silurian age. Above the bedrock is a thick mantle of glacial till, outwash material, loess, and silty and clayey lacustrine material. Glacial drift depth (unconsolidated materials over bedrock) mapping of Greene County shows most of the project area is located in an area where bedrock is 40 to more than 100 feet below the surface (Exhibit 9).

The ecological survey conducted in the project area identified more than 10 water crossings and wetlands in the corridor (Exhibits 5 and 6). There is potential for the presence of unsuitable soft soils within these areas. The presence of soft soils is of particular concern for the proposed elevated section over Orchard Road and the two grade separation interchanges that will require approach and ramp embankments of up to 25 feet or more.

No karst areas are known in the project area nor are there any indicators of karst, such as natural sinkholes, shown on USGS mapping. A field inspection of the project area also found no natural karst features. The nearest known Karst areas are more than 5 miles northwest of the project area.

The soil profiles prepared in the early 1950's provided only a limited description of the corridor soils; 10 to 20 feet below the original ground surface. In addition, the profiles did not include any geotechnical design information (i.e. SPT blow counts, index laboratory data, strength data, etc.)

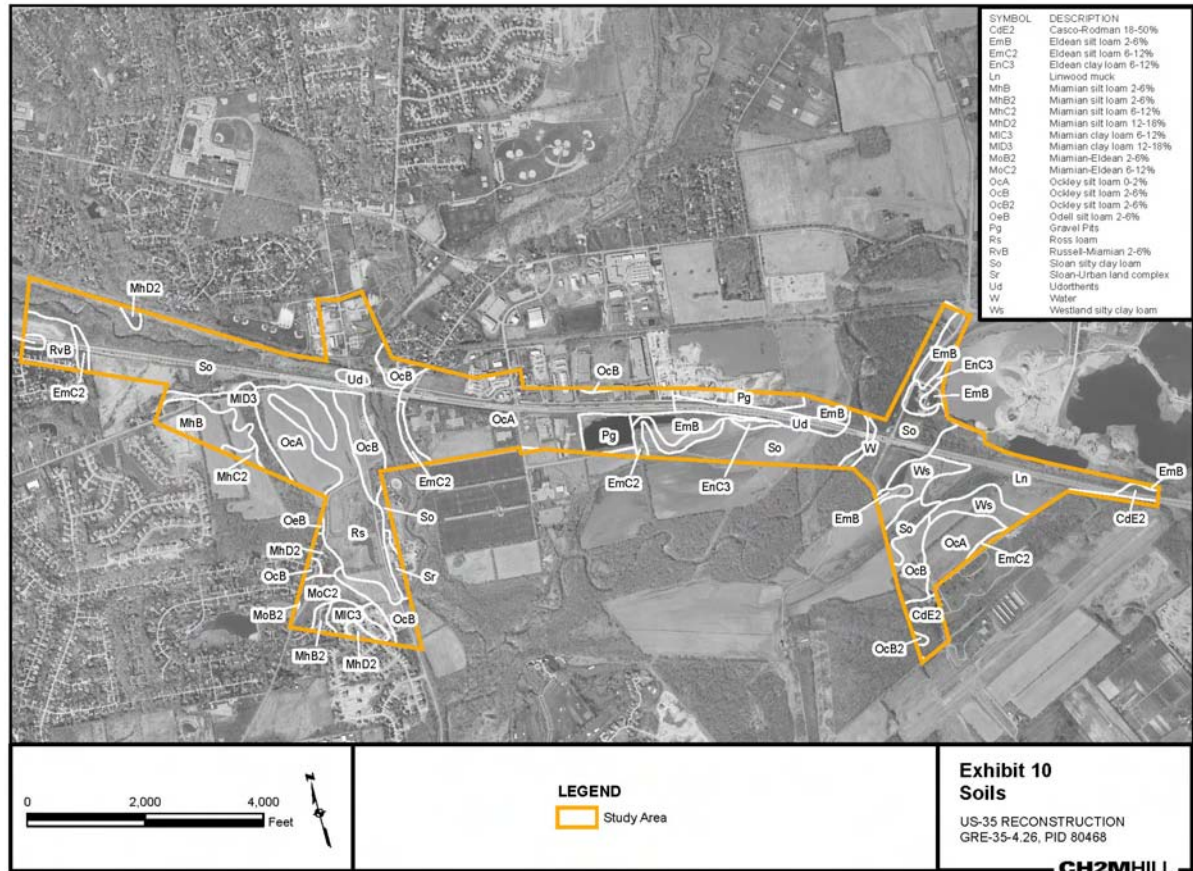
EXHIBIT 9
Depth of Glacial Drifts in the Study Area



The Greene County Soil Survey and ODNR geology information indicate that within the large portion of study area that falls in the 100-year flood plain along the Little Miami River and Beaver Creek, near surface natural soils generally consist of alluvial deposits comprised of silt, clay, and fine sand containing varying amounts of organics. Soils that are typically poorly drained (Sloan, Westland, and Linwood) are widespread around the proposed interchange areas (Exhibit 10).

“Eathquakes in Ohio,” Education Leaflet No 9 from the Ohio Division of Geological Survey (2005), shows no known faults in the project area or in Greene County. The leaflet explains that most faults in Ohio are in Precambrian rock, overlaid by later layers, do not reach the surface and have not been active in recent times. The identified geotechnical issues could significantly influence the design, construction, and cost of the project. The existing soils data from the 1950’s provides only a shallow depth survey (ten to twenty feet) and no geotechnical design parameters. With the available data, the suitability of the soils within the corridor study for the proposed bridges, culverts, embankments, and profile grade increases cannot be determined, evaluated, nor cost estimates developed.

EXHIBIT 10
Soils in the Study Area



4.2. Utility Coordination

Contact with the organizations listed below has resulted in the identification of utilities lines of potential concern. Copies of the cover letter correspondence are included in Appendix G.

- AT&T Ohio
- Beavercreek Township
- Cinergy
- Dayton Power & Light
- Greene County Department of Public Works
- HLG Engineering
- KDL Fiber
- Ohio Department of Transportation
- Qwest
- Time-Warner Cable
- Time-Warner Telecon
- Vectren

Within the Factory Road and Orchard Lane vicinity, there are a few major utilities of particular concern. There is a fiber optic line that runs parallel to Orchard Lane on the east side. The line should be unaffected by construction. There is also a fiber optic line that runs parallel to the north side of US 35. In Alternative 1, the existing location would run under Orchard Lane and under Ramp D to Factory Road. In Alternative 2, the fiber option line would be under Heller Drive, Ramp D, and under the north frontage road to Factory Road. This line potentially would be relocated outside the limits of the pavement. A third fiber optic line runs under the Heller Drive extension in Alternate 1, and under Factory Road. This utility might need to be moved outside of the limits of pavement.

At the northwest corner of Factory Road and US 35, there is a high mast tower. A retaining wall potentially would be needed along the west side of Factory Road as the profile for Factory Road is raised. If a retaining wall is not justified, the tower would need to be relocated.

Located between Orchard Lane and Valley/Trebein, just east of Phillips Gravel, are two series of overhead utility lines. The first series is two lines and the second series is five lines. All these utility lines should be unaffected by the project.

4.3. Results of Environmental Studies

4.3.1 Ecological Survey

Level 1 Ecological Survey field investigations were performed on July 5 through August 17, 2007.

The major aquatic habitats in the study area are the Little Miami River, Beaver Creek, and Little Beaver Creek. The eastern end of the study area crosses the Little Miami River and associated floodplain. The reach of the Little Miami River through the study area is assigned a use designation as an Exceptional Warm Water Habitat (EWH), and is designated a State Resource Water, a State Scenic River and a National Wild and Scenic River. The habitat of the river upstream of US 35 is good, but lacks the characteristics and diversity that are typically associated with a EWH. The primary substrates are cobble and gravel, with sandbars along the banks in shallow areas. The river is partially shaded by riparian vegetation, although it is relatively straight (little to no sinuosity) with mostly glide/pool habitats. Some riffle habitat is present near the southern boundary of the study area. Visual inspection of the banks of the river for native mussels found only a moderate number of the invasive Asian clam. Water quality (as indicated by field measurements of pH, dissolved oxygen, temperature, and conductivity) is generally good in the river.

Beaver Creek and Little Beaver Creek are located near the US 35 and Factory Road intersection. US 35 bridges Beaver Creek just east of Factory Road; Factory Road bridges Little Beaver Creek just north of US 35. Both of these streams are designated Warmwater Habitats (WWH). Most streams in Ohio that are in natural or close to natural condition are considered WWH. The habitat conditions found in these streams within the study area were consistent with that designation. Like the Little Miami River, both streams have little

sinuosity, and largely comprise moderately stable riffle/run/pool habitats. Water quality is generally good in both streams. The bridges across both of these streams would be widened for either alternative. Alternative 1 would have an additional bridge crossing of Beaver Creek north of US 35 and east of Factory Road to accommodate the extension of a service road.

There are seven other small stream systems in the study area that are tributary to the Little Miami River, Beaver Creek, or Little Beaver Creek. Whichever alternative is selected, the same two of these streams would be affected. One is a tributary to the Little Miami River east of the Valley/US 35 intersection. This is a channelized stream through a gravel pit and agricultural area; its habitat conditions are indicative of a Modified Warmwater Habitat. This stream is currently flows in a culvert under US 35 and Valley Road. Both alternatives would require widening or relocating these existing culverts. The other stream is a small, intermittent Class II headwater that is tributary to Beaver Creek. This stream is in a culvert beneath Factory Road. This crossing would also be widened by either alternative.

Five ponds, either borrow pits, farm ponds, or stormwater ponds, are present within the study area. None of the ponds would be affected by either of the alternatives.

The field investigation identified 22 wetlands in the study area. Two appear to meet the criteria of Category 3 wetlands, the highest ranking, according the Ohio EPA's Rapid Assessment Method (ORAM): one located in the riparian woodlands of the Little Miami River in the ODNR's Glen Thompson Reserve, and the other is a former channel/oxbow of the Little Beaver Creek. Twelve wetlands are Category 2 (the "average" ranking), and ten are Category 1 (the lowest ranking). The build alternatives would have similar impacts to the same ten wetlands; the total impact would be about one acre. Either alternative would have minor, peripheral impacts on the two Category 3 wetlands adjacent to existing US 35. Either alternative would affect four Category 2 wetlands and four Category 1 wetlands.

Approximately 61 percent of the study area is composed of managed lands, namely: existing right-of-way, developed lands (including gravel pits) and adjacent mowed open fields, and active agriculture. Standing forest (successional/riparian) comprises approximately 20 percent of the study area. Woodlands occur adjacent to the Little Miami River, Beaver Creek, and Little Beaver Creek, and as several scattered woodlots in the study area. Approximately 7 percent of the study area is scrub-shrub vegetation.

Either alternative would have similar impacts to terrestrial habitats. More than half of each alternative would occur in the existing right-of-way. Another 20 to 25 percent would be in active row cropland, and about 5 percent would be developed lands. Total impact to natural communities (woods, scrub and open fields) would be between 28 to 31 acres (depending on the combination of alternatives selected), or around 20 percent of the total footprint areas of the alternatives. Alternative 1 at Factory Road would affect slightly more woodland because of the Heller Drive extension north of US 35. Given their vegetative composition and historical disturbance, none of these habitats are considered to be regionally significant.

There are no records of federally listed species within a one mile radius of the study area. Several federally listed species have been recorded in Greene County, based on records from the U.S. Fish and Wildlife Service and the Ohio Natural Heritage Database: the Indiana bat (*Myotis sodalist*, federal endangered), the eastern massasauga rattlesnake (*Sistrurus catenatus*, federal candidate, state endangered), the clubshell mussel (*Pleurobema clava*, federal endangered). The nearest record of the Indiana bat and the eastern massasauga rattlesnake are from Wright-Patterson Air Force Base, approximately 6 miles north of the study area. The nearest recorded downstream location of the clubshell mussel is in northern Warren County, some 14 river miles downstream of the study area.

Woodlands are categorically considered to be potentially suitable summer habitats for the Indiana bat throughout Ohio. In particular, living or standing dead trees with peeling or loose bark, split trunks and/or branches, or cavities are considered to be preferred summer roosting and brood-rearing habitats. While a number of these trees were identified in field studies, only one site (two trees) would be affected by either of the Valley-Trebein interchange alternatives. Neither of the Factory Road interchange alternatives would affect any bat trees. Impacts to woodlands would largely be adjacent to existing US 35, and would be comparable for each alternative.

The eastern massasauga is a docile rattlesnake that is often found in or near wet areas including wetlands, wet prairies, nearby woodlands, or shrub edge habitat. Dry upland areas up to 1.5 miles away are used during the summer, if available. Some of the wetlands and adjacent habitats in the study area may be suitable for the eastern massasauga. Each alternative would have comparable impacts on these habitats. Capture studies were not performed for this project.

The habitat of the clubshell mussel is not well described, but the species occurs in small rivers and streams in clean sweep sand and gravel. Some portions of the Little Miami River, Beaver Creek, and Little Beaver Creek in the study area may provide suitable habitat, although no mussels were found during field studies in any of these streams. All of these streams would be bridged by either alternative.

The ODNR has record of two state species within a 2 mile radius of the study area: the snuff box mussel (*Epioblasma triquetra*, state endangered) in the Little Miami River about 2 miles downstream of US 35, and the plant species "fen Indian-plantain" (*Cacalia plantaginea*, state potentially threatened) southeast of the study area. Neither of these species are recorded, or were found in field studies, in the study area.

4.3.2 Environmental Site Assessment Screenings

An Environmental Site Assessment Screening was completed to determine the likelihood of hazardous substances within the study area. Historic and current land use information and regulatory databases were reviewed to identify parcels that may require additional environmental assessment. The 13 parcels where additional environmental assessment is warranted are listed in Exhibit 11 and mapped on Exhibit 12.

EXHIBIT 11
Parcels Recommended for Environmental Site Assessment

ESA Checklist Number	Description	Address
4	Homecroft Building	245 North Valley
12	Jeff Schmitt Cadillac	631 Orchard Lane
13	Lang's Chevrolet	635 Orchard Lane
20	Greene County Regional Laboratory	422 Factory Road
29	Unknown parcel ownership	West of US 35 and Shakertown Road
32	Valley Asphalt Corp.	790 North Valley Road
34	Benedict Slurry Seal, Inc.	556 North Valley Road
38	Elano Division of Unison Industries	2060/2070 Heller Drive
50	Site Food Mart	2260 Heller Drive
53	Delaney Oil Company	2396 Phil Hubble Drive
58	Elano Plant 1	1010 Factory Road or 2455 Dayton-Xenia Road
60	Duncan Oil Company	849 Factory Road
65	Unknown parcel ownership with monitoring well, GM-BS	Adjacent to 785 Factory Road

4.3.3 Section 4(f) Resource Identification

49 USC 303 (generally known as Section 4(f) of the Department of Transportation Act) provides protection from conversion to a transportation use for publicly owned parks and recreation areas; historic sites (regardless of ownership) of national, State, or local significance; and wildlife or waterfowl refuges. The properties may be converted, but additional analyses and approvals are typically required.

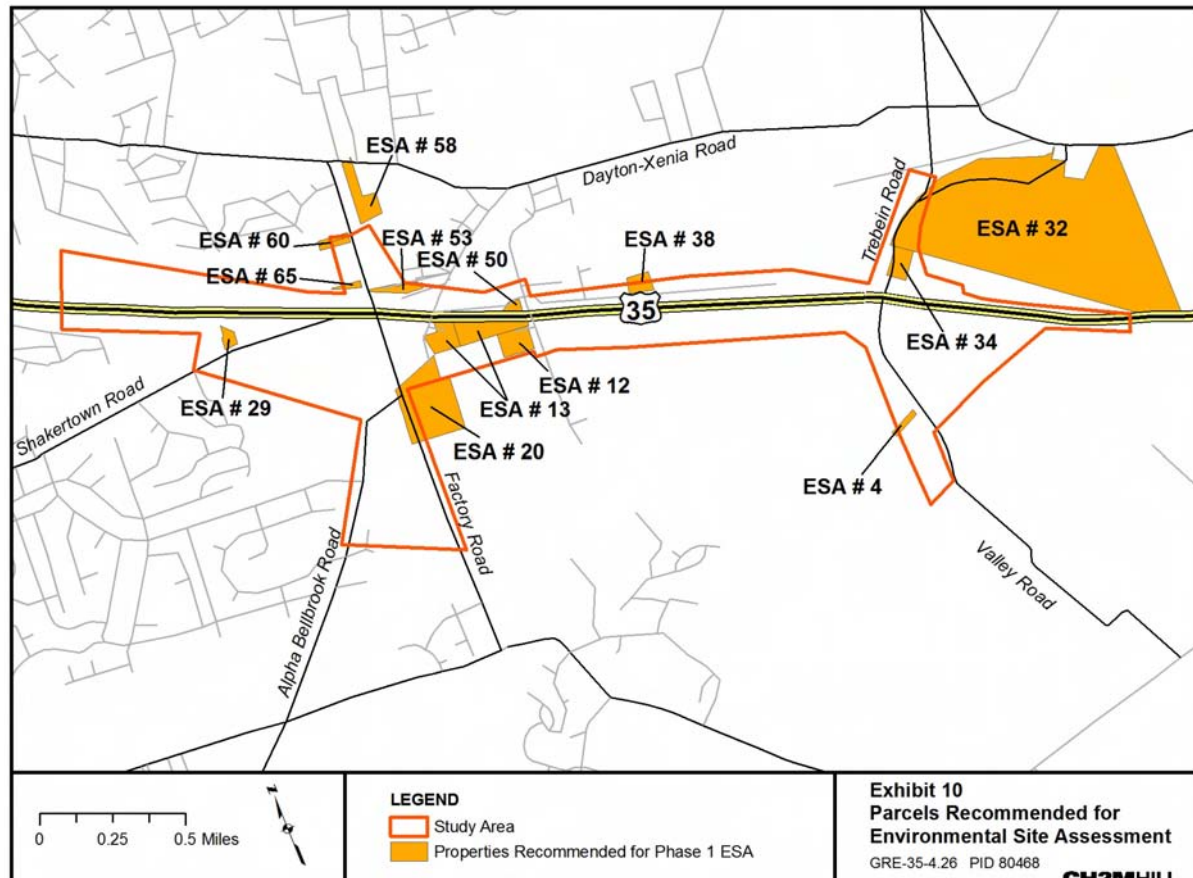
A property ownership search, initial cultural resources investigations, and field visits identified a number of recreational properties that are potentially subject to Section 4(f). These are listed in Exhibit 13.

One historical building, eligible for listing on the National Register of Historic Places (NRHP), is located in the study area, just south of US 35 at Alpha Road (section 4.3.5). This historical building would be protected under Section 4(f). The current plans show encroachment of about one third acre into the parcel where the historic house is located for either alternative, including modifications to the existing drive. This property will be more fully evaluated in the Phase II architecture report (Step 6) as to its eligibility for the National Register of Historic Places, and the limits of the eligible property would be defined. The potential impact to the property from the alternatives will also be evaluated in the Phase II report.

A number of archaeological sites in the study area require additional study to determine if they are eligible for listing on the NRHP. Even if eligible, these sites are not necessarily Section 4(f) sites. Section 4(f) does not apply to archeological sites where the FHWA, after consultation with the Ohio Historic Preservation Office (OHPO) and the Advisory Council

on Historic Places (AHP), determines that the archeological resource is important chiefly because of what can be learned by data recovery and has minimal value for preservation in place.

EXHIBIT 12
 Parcels Recommended for Phase 1 Environmental Site Assessment



The Little Miami River is a National and State Wild and Scenic River that is protected by Section 4(f). The area of the river north of US 35 is state-owned and a Section 4(f) resource. Private property borders the river to the northwest, and all of the land adjacent to and including the river south of the US 35 crossing is private land.

Projects crossing a National Wild and Scenic River that require a federal permit or license require a review of potential impacts under Section 7 of the National Wild and Scenic River. A similar stipulation is codified for state projects. ODNR is the regulatory agency that administers the State Scenic River program, and the National Park Service administers the National program. Typically, these agencies review impacts of projects within a 1000-foot buffer surrounding scenic rivers.

There are no properties in or adjacent to the study area that were purchased or improved with funds provided under Section 6(f) of the Land and Water Conservation Act according

to information obtained from the National Park Service, the ODNR, and Greene County Park District.

EXHIBIT 13
 Section 4(f) Properties in the Study area

Name	Owner	Location
Recreational Properties		
Beavercreek Community Park	Beavercreek Township	Factory Road (north of US 35 and east of Factory Road, adjacent to Creekside Trail)
Creekside Reserve	Greene County Park District	North of US 35, West of Factory Road
Creekside Trail	City of Beavercreek	Parallel and North of US 35; Section at Alpha Road
Creekside Trail	Beavercreek Township	Parallel and North of US 35; Sections at Factory Road and Trebein Road
EJ Nutter Park	City of Beavercreek	Factory Road (north of US 35 and west of Factory Road, and Creekside Trail)
Glenn Thompson Reserve	Ohio DNR (leased by Greene County Park District)	Trebein Road, Northwest of US 35
Hershner Property	Greene County Park District	Between Shakertown Road and US 35
John Ankeney Soccer Complex	City of Beavercreek, and Beavercreek Soccer Association	Orchard Lane
Historical Properties¹		
GRE-431-1/AL016, Greek/Federal Revival residence	Greene County Board of Commissioners	South of US 35 at Alpha Road intersection

¹ Includes historical structures on or eligible for listing on the National Register of Historic Places

4.3.4 Socioeconomic Research

There are no homes or other dwelling units that would be directly affected by GRE-35-4.26. No resident or business will be relocated and no RAP study is necessary.

A review of Census 2000 was performed to identify environmental justice populations (low income level or racial minority) and persons who may be at a disadvantage because of language, lack of personal transportation, disability, or age, pursuant to Title VI of the Civil Rights Act. The Census reports data only at levels of aggregation needed to protect individual privacy. For the study area this is the Census Block level for racial and age characteristics and the Census Block Group level for other characteristics of interest.

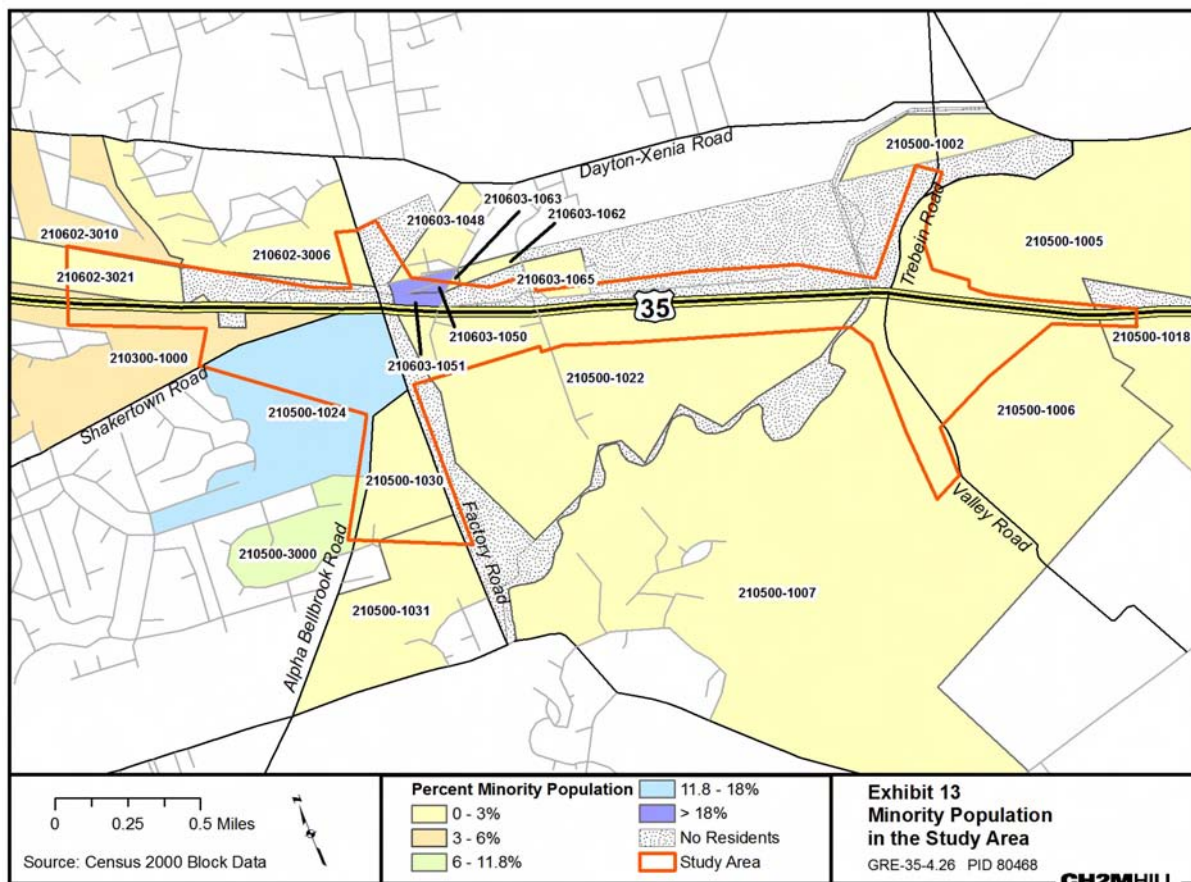
Exhibit 14 shows the racial and age distribution for Census Blocks in the study area. The minority population data are mapped in Exhibit 15. Three Census Blocks have a higher proportion minority than the county as a whole, 210500-1024, 210603-1050, and 210603-1051. Of these three Census Blocks, only 210500-1024 has a population of more than 10 people. On the whole, the study area has a much smaller proportion of minority population than Greene County.

EXHIBIT 14
Racial and Age Characteristics in Study Area

Tract-Block	Total Population	Minority Population	Percent Minority	Population Age 65+	Percent Age 65+
210300-1000	466	26	5.6%	39	8.4%
210500-1002	10	0	0.0%	0	0.0%
210500-1005	3	0	0.0%	0	0.0%
210500-1006	3	0	0.0%	0	0.0%
210500-1007	91	2	2.2%	17	18.7%
210500-1018	7	0	0.0%	0	0.0%
210500-1022	12	0	0.0%	2	16.7%
210500-1024	120	21	17.5%	15	12.5%
210500-1030	41	0	0.0%	2	4.9%
210500-1031	16	0	0.0%	2	12.5%
210500-3000	153	12	7.8%	12	7.8%
210602-3006	215	5	2.3%	47	21.9%
210602-3010	131	6	4.6%	24	18.3%
210602-3021	2	0	0.0%	0	0.0%
210603-1048	81	1	1.2%	16	19.8%
210603-1050	4	3	75.0%	0	0.0%
210603-1051	9	2	22.2%	3	33.3%
210603-1062	3	0	0.0%	3	100.0%
210603-1063	11	0	0.0%	1	9.1%
210603-1065	2	0	0.0%	1	50.0%
Study Area	1380	78	5.7%	184	13.3%
Greene County	147,886	15,911	10.8%	17,492	11.8%

The Census Blocks are mapped in Exhibit 15. The data show that the limited minority population in the study area is concentrated near the intersection of Factory Road and US 35. Data for the two blocks northeast of the intersection have a population of only 13 individuals, of whom 5 or 38 percent are classified minority. Census Block 210500-1024 to the southwest of the intersection has a high number and proportion of minorities. Development patterns suggest that they are more likely to live in the south west portion of the block.

EXHIBIT 15
Distribution of Minority Population in the Study Area

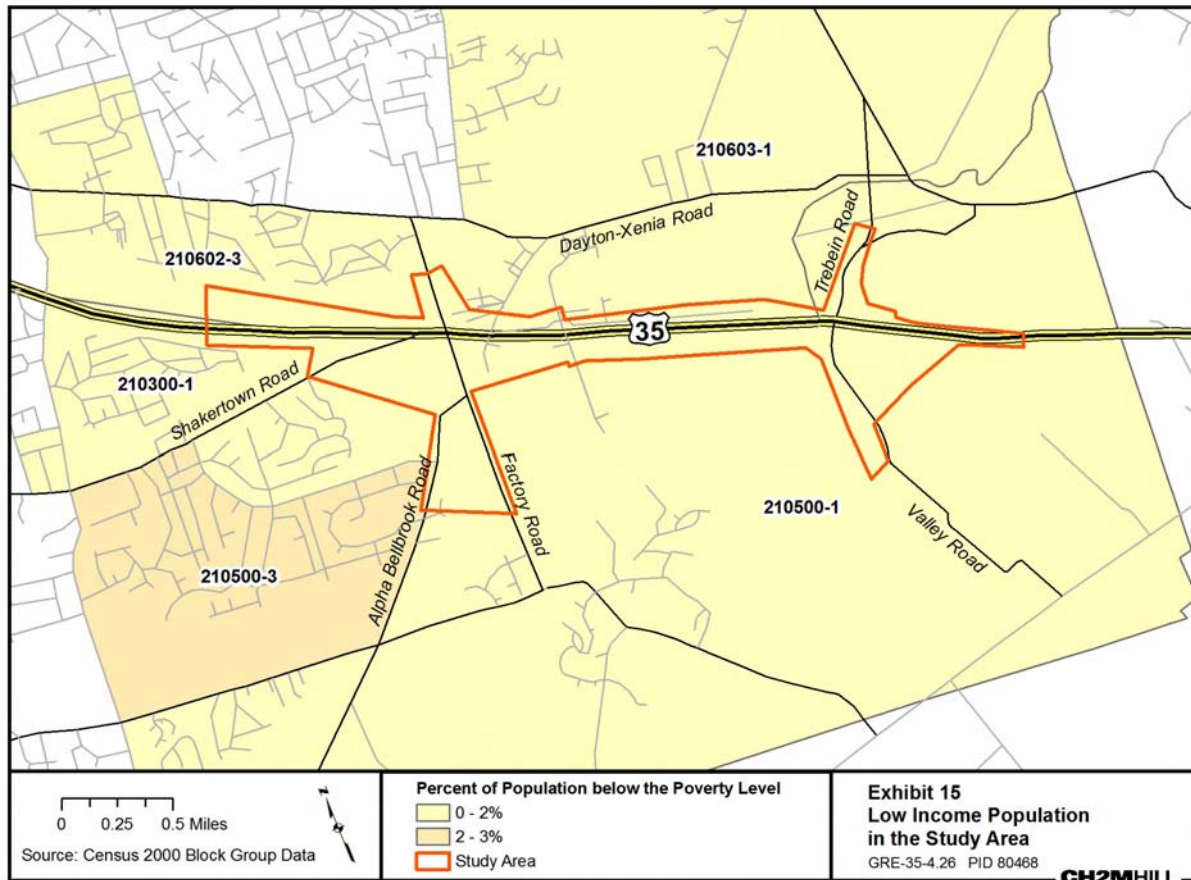


Income, and other indicators of potentially disadvantaged populations, is available for the Census Block Group level of aggregation. The data are reported in Exhibit 16 and mapped in Exhibit 17. There are no Census Block Groups with concentrations of low income populations in the study area. The residential areas of the Census Block Groups that have higher proportions than countywide data of those who speak English less than well, who are in no vehicle households, or who are disabled are not adjacent to the study area.

EXHIBIT 16
Low Income and Other Indicators of Potentially Disadvantaged Populations

Tract-Group	Below Poverty Level		Speak English Less than Well		No Vehicle Households		Disabled	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
210300-1	9	0.8%	17	1.5%	0	0.0%	160	14.0%
210500-1	0	0.0%	12	0.6%	19	2.4%	416	19.6%
210500-3	49	2.3%	0	0.0%	6	0.8%	264	11.7%
210602-3	8	0.5%	0	0.0%	8	1.2%	480	32.9%
210603-1	53	1.7%	52	1.8%	5	0.5%	390	13.8%
Greene County	11,847	8.5%	1,089	0.8%	2,897	5.2%	36,395	26.1%

EXHIBIT 17
Distribution of Low Income Population in the Study Area



For either alternative if retaining walls are not used, more property would be required from parks, historic sites, businesses, and residential property. At Factory Road, in the northwest quadrant, more property would be needed from a park and a business. In the northeast quadrant more property would be needed from three businesses, a vacant parcel, and a residence on Maple. In the southeast quadrant one business would be a total take, land would be required from a property that is eligible for the National Register (see Section 4.3.5), and property would be needed from a second business. The southwest quadrant would be unaffected as retaining walls are not currently proposed.

If retaining walls are not used at Orchard, there would be additional takes of three businesses in the northwest quadrant, four in the northeast quadrant, one in the southwest quadrant, and four in the southeast quadrant. These takes could affect the continued viability of the businesses.

The primary difference between the alternatives at Factory is that Alternative 2 would not affect as much park land or the residential property. There are no real differences at Orchard Lane.

For both alternatives at Valley-Trebein Road, retaining walls along the north side of US 35 protect portions of Glenn Thompson Reserve. In the northwest quadrant, elimination of the walls would result in greater impacts to two businesses.

4.3.5 Cultural Resources

Preliminary studies were performed to identify cultural resources in the study area that may be protected under Section 106 of the National Historic Preservation Act.

The Phase 1 Historic Architecture Survey (ASC Group, 2007) of buildings and structures in the study area found only one historical structure that is considered eligible for the National Register of Historic Places. This Greek/ Federal Revival house is located about 150 feet south of US 35 at the Alpha Road intersection and is owned by Greene County. This site would be protected under Section 4(f) as well as Section 106.

A Literature Review and Historic Context Report (ASC Group, 2007) was prepared to identify potential archaeological sites. There are a number of archaeological sites in the study area that require additional study to determine if they are eligible for listing on the NRHP.

Even if eligible, Section 4(f) does not apply to archeological sites where the FHWA, after consultation with the OHPO and the ACHP, determines that the archeological resource is important chiefly because of what can be learned by data recovery and has minimal value for preservation in place. In that case, eligible sites affected by the selected alternative would need to be mapped and excavated to recover and curate any artifacts before construction.

4.3.6 Noise Analysis

A noise analysis has been prepared for Alternative 1 and Alternative 2. Exhibit 18 shows the alternatives with a 600 foot buffer area. Sensitive receptors (homes and parks) are highlighted. Within each cluster of sensitive receptors a representative receptor was identified. In accordance with Step 5 of the PDP, the noise analysis was performed using the FHWA's Traffic Noise Model Lookup Tables. The TNM model will be used to fully evaluate the impacts of the Preferred Alternative in Step 7.

The traffic volumes for the No-Build and Alternative 1 were based on those generated for the MVRPC Planning Study. Traffic for Alternative 2 is also based on the MVRPC study, but with modifications to account for different movements at the Factory Road split-diamond interchange.

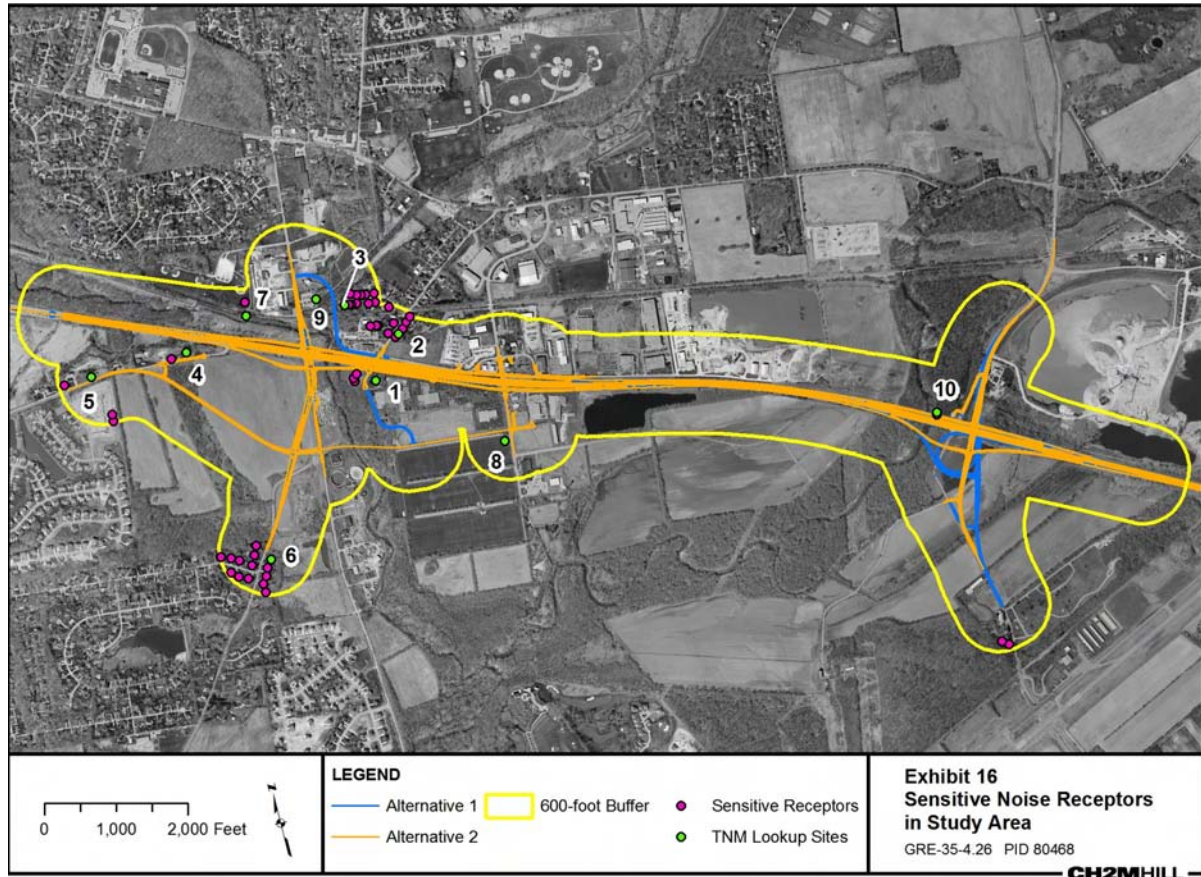
Impacts are based on the ODOT Noise Standard Procedure (Standard Procedure No.417-001(SP), effective July 1, 2005). A project-related noise impact is considered to occur when either of the following conditions exists:

1. Predicted (design year) noise levels approach (within one dBA) or exceed the FHWA Noise Abatement Criteria levels given in Exhibit 19.

2. Predicted (design year) noise levels substantially exceed (by 10dBA) the existing noise levels.

EXHIBIT 18

Sensitive Noise Receptors in the Study Area



All of the sensitive receptors identified in the study area are within Category B Land Use Activities in Exhibit 19. Serenity (Activity Category A) is not crucial to the enjoyment of the parks in the study area as evidenced by their location adjacent to US 35.

Exhibit 20 shows that most sensitive receptors would be equally affected by the No Build and either of the build alternatives. Differences of less than 2 dB are not within the limits of accuracy of the model. Only the two locations within about 200 feet of the highway (Sites 1 and 10) show forecast noise levels approaching or exceeding the NAC (i.e., equaling or exceeding 66.0 dBA).

EXHIBIT 19
FHWA Noise Abatement Criteria

Activity Category	Design Noise Levels Hourly L_{eq} (dBA)	Description of Land Use Activity Category
A	57 (Exterior)	Tracts of land for which serenity and quiet are of extraordinary significance and which serve an important public need. The preservation of serenity and quiet is essential if this land is to continue to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, open spaces, or historic districts that are dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, and parks, which are not included in Category A; and residences, motels, hotels, public meeting rooms, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A and B above.
D	--	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: Code of Federal Regulations. Title 23 CFR Part 772 – Procedures for Abatement of Highway Traffic Noise and Construction Noise. Federal Highway Administration, April 1992.

A preliminary analysis of the feasibility of noise barriers was made for these two locations. At Site 1, there is one existing residence, and 3 model homes (which could one day be residences). To benefit these receptors, a continuous barrier along US 35 would need to extend several hundred feet to the east and west of the residences, for a total of about 825 feet. Such a barrier is not feasible under Alternative 2, because maintaining access to these sites along Alpha Road would break the barrier, making it ineffective.

EXHIBIT 20
Estimated Noise Levels for the Design Year (2030)

Site	Description	No Build Alternative (dBA)	Alternative 1 (dBA)	Alternative 2 (dBA)
1	Residence 1	67.2	67.2	67.8
2	Residence 2	63.5	59.1	59.4
3	Residence 3	55.5	58.8	55.4
4	Residence 4	66.8	64.7	64.7
5	Residence 5	64.9	64.9	64.9
6	Residence 6	62.6	63.6	63.6
7	Creekside Trail, 700-feet west of Factory Road	60.4	60.3	60.3
8	Ankeney Soccer Complex	61.2	61.2	61.2
9	Beaver Creek Community Park	62.9	64.8	62.8
10A	Glenn Thompson, 100-feet from existing US 35	69.6	73.7	73.7

Under Alternative 1, the barrier would not be broken by Alpha Road, but would need to extend in front of the Lang Chevrolet property to be effective, which may be counter to the interests of this business. Preliminary analysis indicates the barrier would need to be around 10 feet high to benefit the receptors by more than 3 dBA. The approximate total cost of the barrier (at \$17.50 per square foot, as assumed by ODOT) would be \$144,375, or about \$36,100 per receptor. This total cost exceeds the ODOT reasonableness criterion of \$25,000 per receptor. A noise barrier would not likely be justified at this location.

A noise barrier might be justified and feasible in the area of the Glenn Thompson Reserve. Parks generally qualify as Special Land Uses and can be potentially eligible for noise barriers when areas of frequent human use (such as walking trails) are within 150 feet of the right-of-way line. A feasible barrier provides a minimum 5 dBA reduction at locations within 100 feet of the project's edge of pavement. At Glenn Thompson, a trail, canoe launch, and popular fishing site are located within 100 feet of US 35. Preliminary analysis indicates that a noise barrier with a minimum average height of 2 meters (about 6.6 feet) would achieve the necessary 5 dBA reduction at this site. The barrier would likely need to extend from the Trebein Road intersection to 400 feet or more west of the Little Miami River to benefit these areas of the park.

4.3.7 Prime Farmlands

Prime farmlands were determined based on GIS mapping of soil types from the Natural Resources Conservation Service (NRCS) and the list of Prime Farmland soils, also from NRCS. The analysis tabulated the areas of each Prime Farmland soil type within the footprint of each alternative, excluding the area of existing right-of-way and developed areas. Some soil types are considered Prime Farmland only if they are effectively drained and protected from flooding. Much of the area around the Little Miami River is mapped as poorly drained and/or is subject to periodic flooding. For this analysis, these soils were included as Prime Farmlands because they are actively farmed; no assessment was made of their drainage or protection from flooding. A detailed assessment will be part of Step 6.

Alternative 1 at Factory Road would have a slightly greater impact because of the service road extension north of US 35. At Valley-Trebein Road, the loop ramps of Alternative 1 have a larger footprint and therefore a larger impact on Prime Farmland soils.

4.3.8 Floodway and Floodplains

The extent of Federal Emergency Management Agency (FEMA) mapped floodways and floodplains in the study area were determined based on GIS transcription of FEMA mapping, as provided by the Ohio Geographic Information Management System. These areas were checked against the FEMA Floodway and Floodplain maps (Community Panel 390193 0050 and 390193 0055, effective 4/1/1981). The floodway and floodplains are shown on Exhibits 5 and 6 and in Appendices C through F. The analysis tabulated the areas of floodplain and floodway within the footprint of each alternative, regardless of land use or whether the crossing would be by bridge or embankment.

The impacts of the alternatives are similar, although Alternative 1 has a slightly greater impact area at both interchanges. Alternative 1 at Factory Road would have a slightly larger impact because of the service road extension. Alternative 1 at Valley-Trebein Road would have a slightly greater impact because of a larger footprint.

4.3.9 Sole Source Aquifer

The groundwater protection areas mapping available from the ODNR Geographic Information Management System and maps of the Miami Buried Valley Aquifer from Ohio EPA show essentially the entire study area to be within the Class 1 sole source aquifer area. The Class 1 area is the central part of the aquifer, and generally has high potential groundwater productivity based on the aquifer characteristics and the proximity to recharge. The Greene County Northwest Regional Water Treatment plant draws its water from the Buried Valley Aquifer via well fields along Valley Road, Shakertown Road, and Beaver Valley Road. These well fields are considered to be moderately susceptible to contamination.

The analysis tabulated the areas of the footprint of each alternative, regardless of land use, that is beyond the existing right-of-way.

Based on the Ohio EPA listing of drinking water sources, there are two, non-community public water systems in the study area: the former Econo Lodge at Orchard Lane and US 35, and the Homecroft Building on Valley Road. Both Factory Road alternatives would include improvements of US 35, Orchard Lane and/or Heller Drive within the Econo Lodge protection zone. At Valley-Trebein, Alternative 1 will improve Valley Road near or within the Homecroft Building protection zone, while Alternative 2 would not.

4.4. Public Involvement

4.4.1 Previous Public Involvement

Four public meetings and several meetings with local business were held during preparation to the *Greene 35 Corridor Study*. The public meetings were held December 9, 2003, March 18, 2004, June 17, 2004, and August 18, 2004.

Local business owners expressed concern about how their access to US 35 would change based on closing the at-grade intersections. Because many of the businesses are located on Orchard Lane or Heller Drive, north of US 35, they were particularly concerned with the loss of access at this intersection.

Other stakeholders expressed a concern that the alternatives will negatively impact traffic to and from the soccer fields.

Still other stakeholders were concerned that the heavy truck traffic from Phillips Sand and Gravel would use the proposed Factory-Orchard Connector or Dayton -Xenia Road, both of which were viewed as unsafe.

4.4.2 Stakeholder Goals and Measures of Effectiveness

Project stakeholders met on May 16, 2007 to identify goals and success factors. Stakeholders were first asked to identify and agree on goals (Performance Criteria) for the project. These goals are listed in the first column of Exhibit 21. They were then asked to weigh the criteria by placing one or more of five dots on the Performance Criteria they felt were most important. This weighting is shown parenthetically in the first column of Exhibit 21. Finally, the stakeholders were asked to develop Performance Measures for each Performance Criteria. Following the meeting, the measures were developed more fully than was possible in the meeting format. Stakeholder concurrence was subsequently sought for the results shown in Exhibit 21.

Performance on most of the measures cannot be evaluated until later in the in the project schedule, although meeting the objectives is an ongoing consideration.

EXHIBIT 21

Performance Criteria and Measures Identified by Stakeholders

Performance Criteria (Participant Selections)	Performance Measure
Reduction of accidents (16)	Forecast lower future vehicle accident rates versus current accident rates along US 35, Dayton Xenia Road and intersections. Design facility with lowered probability of accidents involving bicycles or pedestrians.
Reduction of travel time (13)	Identify five typical trips in the project vicinity (include on US 35, to/from US 35, and on local streets but not on US 35). Compare current and future travel time on five selected routes Compare current and future LOS on selected routes including roadway segments and intersections. Compare current and future delay times at intersections on selected routes
Local traffic patterns/ Disruption to travel (8)	Link five origin/destinations and compare the travel time and distance Access from US 35 to businesses fronting US 35 will increase 5 minutes or less. Comparisons will be at peak and typical traffic conditions. Access from local roads to businesses fronting US 35 will not increase. MOT plan to keep at least two lanes of traffic open in each direction at all times on GRE-35.
Public Satisfaction (8)	Receive negative comments from fewer than 25 people at public meeting Receive at least 5 positive comments at public meetings and in newspapers Reduce number of negative comments to city, county, and state officials about delays, accidents, and congestion in year following construction compared to year before start of construction.
Aesthetically appealing, but responsible fiscally (6)	Meets ODOT aesthetic guidelines Cost to ODOT of aesthetic enhancements below 1 percent of construction cost. Local contributions may increase total. ¹
Fiscal responsibility (6)	Project whose costs is comparable with similar projects in the area Design a project that can be constructed for the \$66.5 million (adjusted for inflation) currently shown in Ellis.
Quality work, do it right the first time (5)	Meet all ODOT and FHWA guidelines for design and environmental work.

EXHIBIT 21

Performance Criteria and Measures Identified by Stakeholders

Performance Criteria (Participant Selections)	Performance Measure
Economic vitality (3)	At least three new businesses or business expansions near the project within five years of completion of construction Within five years of completion, no business closures primarily attributed to revised access
Manage risks both technical and financial (3)	Prepare a Risk Assessment to identify project concerns.
Minimize environmental impacts (3)	Successfully complete the NEPA process
No law suits (3)	No law suits challenging NEPA document No law suits within one year of completion of construction
No surprises/ Effective communication (3)	Establish and follow a communication plan Produce and transmit all documents in Microsoft standard software or Adobe Acrobat. Distribute minutes of meetings within one week of the meeting Advise recipient(s) by e-mail and voice mail of all submissions Distribute monthly memo of status including percent complete, actions accomplished in previous month, actions planned in upcoming month, current issues/concerns. Keith Smith and Daniel Baah make priority notification to other of any scope or budget issues, key personnel changes, or schedule issues.
Project completed on schedule (3)	CH2M HILL to meet completion of project schedule through Step 5 CH2M HILL to meet completion of project schedule for Steps 6 through 8 once determined ODOT to meet construction award date of 1/1/2012 shown in Ellis Contractor to meet completion of construction schedule once determined

¹ There is no ODOT policy that establishes one percent of construction costs, or any other amount, as the amount for aesthetic enhancements although one percent is often used. Aesthetic treatments provided by ODOT consist of minimal costs to the project, and do not just add extraneous items.

4.4.3 Public Involvement Meetings

ODOT sponsored two public meetings to present updated project plans and collect public comment. The first meeting was held November 20, 2008 and the second meeting was held December 11, 2008. Both meetings were held in the Maintenance Facility, 789 Orchard Lane, Beavercreek, Ohio which is in the project area. The sign-in sheets included in Appendix I show that 63 people attended the first meeting and 72 attended the second.

Large displays of the alternatives at Factory/Orchard and at Valley/Trebein and a display that summarized the key features of each alternative were available for review at both meetings. The same content is available in Section 5 and Appendices B, C, D, E, and F of this report. These displays were successful in stimulating comment and discussions among participants and between project staff and participants.

While project staff answered comments they encouraged participants wishing to comment on the record to provide written comments through any of several mechanisms. A total of 54 written comments were provided. These have been summarized in Exhibit 22 along with responses.

EXHIBIT 22

Public Comments and Responses for GRE-35-4.26

Category	Comment	Response
General	Instead of the project, consider adjusting the timing to the stop lights and providing "Prepare to Stop" flashing lights to alert traffic of an upcoming traffic light.	Changing signal timing would not meet the purpose and need of the project which includes the elimination of the signalized intersections along US 35.
General	Consider revisiting the long range plan of replacing at-grade intersections with interchanges.	While transportation plans are reviewed frequently, it is unlikely that local officials or MVRPC would reverse their decision on the need to eliminate the congested and dangerous signalized intersections along US 35.
Alpha Road	Put a cul-de-sac at Alpha Road on the north side of US 35.	This will be evaluated during Step 6, the next step in the Project Development Process.
Alpha-Bellbrook Rd	Close off Alpha-Bellbrook Road.	Eliminating access from Alpha-Bellbrook to Factory Road and therefore US 35 would adversely affect a large number of residents and is not an alternative for this project.
Beaver Valley Rd.	Extend Beaver Valley Road south of Dayton-Xenia to intersect Factory Road.	This is outside the scope of the GRE-35-4.26 project and, if implemented, it would be a local project, not an ODOT project.
Bicycles	Add a prefabricated tunnel under Factory Road instead of adding a sharp turn currently proposed.	The proposed alignment removes the at-grade intersection of the bike trail with Factory Road by providing a path under Factory Road where it bridges over Little Beaver Creek. West of Factory this includes a minor realignment of the bike path. East of Factory an "S" curve will provide appropriate geometrics for a bike path. An additional underpass less than 50 feet north of this location is unnecessary.
Bicycles	Add bicycle facilities along Factory Road connecting the subdivisions south of US 35 along with Shakertown Road to Creekside Trail located north of US 35.	The addition of bicycle facilities will be considered during Step 6, the next step in the Project Development Process. The facilities mentioned are not part of the MVRPC long-range plan.
Bicycles	Provide bicycle access along Orchard Lane connecting the soccer field to Creekside Trail.	The addition of bicycle facilities will be considered during Step 6, the next step in the Project Development Process. The facilities mentioned are not part of the MVRPC long-range plan.
Business Impacts	Move the new Alpha Bellbrook Road to the west so that the impacts to the Coyote Canyon Drive Thru and Storage Units are limited.	The alignments have been developed to minimize the impacts to businesses and utilities while meeting traffic operations and design criteria.

EXHIBIT 22

Public Comments and Responses for GRE-35-4.26

Category	Comment	Response
Business Impacts	Other possible solutions should be given due consideration that would limit the affects to local businesses.	Considerable effort has gone into minimizing impacts on local businesses consistent with meeting the overall purpose and need for the project. While additional specific proposals are welcome and would be given due consideration, the project already incorporates such measures identified.
Business Impacts	Consider the impacts to the local businesses.	Minimizing impacts to local businesses, to the degree that is consistent with the purpose and need for the project, has been a consideration throughout the project.
Construction cost	Break the project into buildable units due to the cost.	ODOT will review the most cost effective way to construct the project during Step 8 of the Project Development Process.
Design	Keep US 35 at-grade and have Factory Road and Orchard Lane be elevated.	US 35 will be elevated to minimize impacts to local businesses. For example, if Orchard was elevated access to several businesses along Orchard would be eliminated before Orchard returned to the existing elevation. Having US 35 elevated and keeping the local roads at their current grade minimizes access impacts to these businesses.
Design	Design the Valley/Trebein Intersection with the US 35 EB Exit and Entrance ramps located in the southeast quadrant to allow for an extension of Yellow Brick Road in coordination with anticipated developments of the Valley Springs Farm Corporation.	The two types of intersections have been determined based on cost, right-of-way needed and functionality with traffic demands.
Design	Consider one interchange located between Trebein Road and Orchard Lane instead of two interchanges provided at both Orchard Lane and Trebein Road. This would eliminate the interchange at Orchard, minimize impacts to businesses and Right-of-Way, and provide lower construction costs.	The interchange locations at Factory Road / Orchard Lane and Trebein Road were selected taking into account interchange spacing requirements, environmental constraints and impacts, and cost factors. ODOT will evaluate the need for a new interchange location in Step 6.
Frontage Roads	Design the frontage roads for two-way traffic.	This will be evaluated during Step 6, the next step in the Project Development Process.
Hydrology	Consider drainage and detention due to the flood plain areas. Construction could greatly affect the hydrology at both Factory and Trebein.	Drainage, detention, and hydrology have been considered throughout the project to date. More detailed evaluations will focus on these issues in future steps.
Reflective paint	Add reflective paint on median at Trebein and US 35. It is difficult to see to make a left turn at night.	This suggestion is outside the scope of the current project.
Right turn lanes	Add right turn lanes on Factory at US 35 and on Trebein at US 35 prior to the GRE-35-4.26 project as a short-term solution.	ODOT will evaluate the need for any short-term improvements prior to construction of the GRE-35-4.26 project.

EXHIBIT 22

Public Comments and Responses for GRE-35-4.26

Category	Comment	Response
Roundabouts	Use roundabouts at intersections, particularly the Factory Road/Yellow Brick Road and Shakertown Road/Factory Road.	As part of the design process, the ODOT will evaluate different configurations including stop, controlled signalized, and a roundabout intersection.
Sidewalks	Add sidewalks to local roads.	The addition of pedestrian facilities will be considered during Step 6, the next step in the Project Development Process.
Soccer complex access	Add a rear entrance from the soccer complex to Yellow Brick Road.	This is outside the scope of the GRE-35-4.26 project and, if implemented, it would be a local project, not an ODOT project.
Speed Limit	Reduce the speed limit on US 35 as a first measure before proceeding with the project.	Changing the speed limit would not meet the purpose and need of the project which includes the elimination of the signalized intersections along US 35.

5. Comparative Evaluation of Alternatives

Exhibit 23 highlights the criteria that have been used to evaluate the alternatives. Where practical at this stage of the analysis, quantitative variables have been used in the evaluation. Where necessary or appropriate, qualitative variable have been used. Most of the criteria are discussed earlier in this report although a few (e.g., cost) are so common that they are provided without elaboration.

EXHIBIT 23

Comparative Evaluation of Alternatives

Evaluation Factors	Alternatives			
	Factory-Orchard		Valley-Trebein	
	Alternative 1	Alternative 2	Alternative 1	Alternative 2
Engineering				
Convert US35 to a limited access facility	Yes	Yes	Yes	Yes
Interchange Configuration – south side	Tight diamond	Split diamond	Diamond w/loop	Diamond
Interchange Configuration – north side	Tight diamond	Split diamond	Tight diamond	Tight diamond
US 35 LOS for Year 2030	B	B	B	B
Direct access to Orchard Road from US35	No	Yes	N/A	N/A
Frontage road from Factory to Orchard	No	Yes	N/A	N/A
Total Area of New Structures (sq ft)	98,810	86,095	57,589	54,039
Total Retaining Wall Construction (sq ft)	128,7000	104,010	56,770	53,560
Total Right-of-Way Acres	35.7	38.2	29.9	24.4
Total Right-of-Way Cost	\$3358,300	\$5,135,000	\$306,200	\$112,800
Total Construction Cost	\$59,446,000	\$58,465,000	\$32,972,000	\$31,455,000
Total Project Cost	\$66,400,000	\$67,100,000	\$35,300,000	\$33,500,000

EXHIBIT 23
Comparative Evaluation of Alternatives

Evaluation Factors	Alternatives			
	Factory-Orchard		Valley-Trebein	
	Alternative 1	Alternative 2	Alternative 1	Alternative 2
Business Displacements (#)	0	0	0	0
Residential Displacements (#)	0	0	0	0
Environmental				
Major geotechnical issues	None	None	None	None
Unsuitable soft soils potential	Yes	Yes	Yes	Yes
Floodway Acres	9.0	6.9	11.2	10.1
Floodplain Acres	51.6	48.1	59.7	55.8
Wetlands (#/acres)	3/0.34	3/0.34	7/1.09	7/1.04
Streams (crossings/linear feet)	4/1,180	3/890	3/840	3/700
Prime Farmland (acres)	35.5	34.8	28.5	22.4
Phase 1 ESA Properties (#)	8	8	3	2
Section 4(f) properties (#/acres)	4/4.6	5/4.1	1/3.6	1/3.1
Section 106 properties (#)	5	4	5	4
Sole Source Aquifer Area (acres)	37.2	36.8	30.9	25.6
Socioeconomic				
Business Accessibility at Orchard	Reduced	Preferred	No Issue	No Issue
Environmental Justice	No issue	No issue	No issue	No issue
Potential Noise Impacts (locations)	1	1	1	1

6. Recommendations

Either Alternative 1 or Alternative 2 would meet the project purpose and need.

The differences in the alternatives are very small. Displaying them next to one another, as in Exhibit 23, emphasizes the differences and places more emphasis on the minor differences than is warranted. The approximately one percent cost difference between the two alternatives at Factory-Orchard is well within the error factor of estimates at this level of detail. Business accessibility does produce a modest preference for Alternative 2 at Factory-Orchard, but not so substantial as to drive a choice of alternative. Due to the modest differences between the alternatives, the recommendation is to retain both alternatives at Factory-Orchard and defer the decision until more comprehensive data are available in a subsequent step.

Comparison of alternatives at Valley-Trebein shows no meaningful differences. Cost differences are somewhat larger than at Factory-Orchard, but still well within the estimating error. However, the traffic analysis indicates an unacceptable LOS for exiting eastbound PM peak hour traffic. This could be corrected by installing a traffic signal, but the available traffic forecasts do not warrant a signal. Due to this uncertainty and the fact that the traffic is not typically certified until Step 6, the recommendation is to retain both alternatives at Valley-Trebein and defer the decision until certified traffic is available in Step 6.

Appendices

Appendix A Traffic Data

- A.1 2003 Average Daily Traffic
- A.2 2030 Average Daily Traffic (No Build)
- A.3 2003 AM Peak Hour Traffic
- A.4 2030 AM Peak Hour Traffic (Alternative 1)
- A.5 2030 AM Peak Hour Traffic (Alternative 2)
- A.6 2003 PM Peak Hour Traffic
- A.7 2030 PM Peak Hour Traffic (Alternative 1)
- A.8 2030 PM Peak Hour Traffic (Alternative 2)
- A.9 Summary Tables HCS Analysis (Alternatives 1 & 2)
- A.10 Signalized HCS Analysis Factory Road (Alternative 1)
- A.11 Two-Way Stop Controlled HCS Analysis Valley/Trebein (Alternative 1)
- A.12 Signalized HCS Analysis Factory Road (Alternative 2)
- A.13 Two-Way Stop Controlled HCS Analysis Orchard Lane (Alternative 2)
- A.14 Supplemental Signalized HCS Analysis Orchard Lane (Alternative 2)
- A.15 Two-Way Stop Controlled HCS Analysis Valley/Trebein (Alternative 2)
- A.16 Freeway HCS Analysis (Alternatives 1 & 2)
- A.17 Ramp Merge/Diverge HCS Analysis (Alternatives 1 & 2)

Appendix B Typical Sections (3 sheets)

Appendix C Alternative 1 at Factory (4 sheets)

Appendix D Alternative 2 at Factory (4 sheets)

Appendix E Alternative 1 at Valley/Trebein (5 sheets)

Appendix F Alternative 2 at Valley/Trebein (5 sheets)

Appendix G Utility Coordination Letters

Appendix H Cost Detail

Appendix I Sign-In Sheets

Appendix H
Cost Detail

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Summary Preliminary Cost Opinion August 2008 (2008 dollars)

Location	Configuration	Construction Cost	Right-of-Way Cost	Engineering Cost	Contingency Cost	Total Project Cost
Factory Road/ Orchard	Tight Diamond	\$44,941,000	\$3,358,300	\$3,595,000	\$14,489,790	\$66,400,000
Factory Road/ Orchard	Tight Split Diamond	\$43,756,000	\$5,135,000	\$3,500,000	\$14,667,300	\$67,100,000
Valley- Trebein	Tight Diamond with loop	\$25,273,000	\$306,200	\$2,022,000	\$7,673,760	\$35,300,000
Valley- Trebein	Tight Diamond	\$24,151,000	\$112,800	\$1,932,000	\$7,279,140	\$33,500,000
Alternative	Configuration	Construction Cost	Right-of-Way Cost	Engineering Cost	Contingency Cost	Total Project Cost
Alternative 1	Tight Diamond/ Tight Diamond w/loop	\$70,214,000	\$3,664,500	\$5,617,000	\$22,163,550	\$101,700,000
Alternative 2	Tight Split Diamond/Tight Diamond	\$67,907,000	\$5,247,800	\$5,432,000	\$21,946,440	\$100,600,000

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Alternate 1 Factory Road / Orchard Lane Conceptual Cost Opinion Summary August 2008 (2008 dollars)

ITEM	Item Description	UNIT	QUANTITY	UNIT PRICE	TOTAL
1	Pavement Removal	yd ²	74,640	\$8	\$597,120
2	New Pavement	yd ²			
	Mainline (Us35 Sta. 202+50 To Sta. 285+00)	yd ²	97,004	\$48	\$4,656,192
	Ramps	yd ²	17,265	\$48	\$828,720
	Frontage Road (North - Heller Dr Extension)	yd ²	6,481	\$40	\$259,240
	Frontage Road (South)	yd ²	0	\$40	\$0
	Other Roadway	yd ²	59,529	\$40	\$2,381,160
3	Concrete Barrier	ft	8,250	\$70	\$577,500
Subtotal Roadway Cost					\$9,299,932
4	Earthwork	L.S.	15% of 1-3	N/A	\$1,394,990
5	Drainage	L.S.	12% of 1-4	N/A	\$1,283,391
6	Erosion Control	L.S.	5% of 1-4	N/A	\$534,746
7	Maintenance Of Traffic	L.S.	12% of 1-4	N/A	\$1,283,391
8	Lighting	L.S.	4% of 1-4	N/A	\$427,797
9	Traffic Signals	each	3	\$150,000	\$450,000
10	Signing/Markings	L.S.	3% of 1-4	N/A	\$320,848
11	Utilities	L.S.	5% of 1-4	N/A	\$534,746
12	Incidental	L.S.	20% of 1-4	N/A	\$2,138,984
Total Roadway Costs (Items 1-12)					\$17,669,000
13	Bridge Removal	ft ²	14,950	\$15	\$224,250
14	New Bridge	ft ²	98,810	\$150	\$14,821,500
15	Retaining Wall	ft ²	128,700	\$95	\$12,226,500
Total Structure Costs (Items 13-15)					\$27,272,000
Total Construction Costs (Items 1-15)					\$44,941,000
16	Row Acquisition & Relocation				
	Park Land	Acre	4.23	varies	\$0
	Other Areas	Acre	31.44	varies	\$3,358,300
	Relocation & Compensation -- Commercial	L.S.	0		\$0
	Relocation & Compensation -- Residential	each	0		\$0
Total Row Costs (Item 16)					\$3,358,300
17	Engineering				
	Preliminary And Final Design	L.S.	8% of 1-15	\$3,595,000	\$3,595,000
Total Engineering					\$3,595,000
18	Contingency	L.S.	30% of 1-16	N/A	\$14,489,790
Total Project Cost - 2008 Dollars					\$66,400,000

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Alternate 2 Factory Road/Orchard Lane Conceptual Cost Opinion Summary April 2008 (2008 dollars)

ITEM	Item Description	UNIT	QUANTITY	UNIT PRICE	TOTAL
1	Pavement Removal	yd ²	76,970	\$8	\$615,760
2	New Pavement	yd ²			
	Mainline (Us35 Sta. 202+50 To Sta. 285+00)	yd ²	98,685	\$48	\$4,736,896
	Ramps	yd ²	30,106	\$48	\$1,445,109
	Frontage Road (North - Heller Dr Extension)	yd ²	11,068	\$40	\$442,720
	Frontage Road (South)	yd ²	14,510	\$40	\$580,413
	Other Roadway	yd ²	60,477	\$40	\$2,419,076
3	Concrete Barrier	ft	8,250	\$70	\$577,500
Subtotal Roadway Cost					\$10,817,474
4	Earthwork	L.S.	15% of 1-3	N/A	\$1,622,621
5	Drainage	L.S.	12% of 1-4	N/A	\$1,492,811
6	Erosion Control	L.S.	5% of 1-4	N/A	\$622,005
7	Maintenance Of Traffic	L.S.	12% of 1-4	N/A	\$1,492,811
8	Lighting	L.S.	4% of 1-4	N/A	\$497,604
9	Traffic Signals	each	3	\$150,000	\$450,000
10	Signing/Markings	L.S.	3% of 1-4	N/A	\$373,203
11	Utilities	L.S.	5% of 1-4	N/A	\$622,005
12	Incidental	L.S.	20% of 1-4	N/A	\$2,488,019
Total Roadway Costs (Items 1-12)					\$20,478,553
13	Bridge Removal	ft ²	14,950	\$15	\$224,250
14	New Bridge	ft ²	86,095	\$150	\$12,914,250
15	Retaining Wall	ft ²	106,730	\$95	\$10,139,350
Total Structure Costs (Items 13-15)					\$23,277,850
Total Construction Costs (Items 1-15)					\$43,756,000
16	Row Acquisition & Relocation				
	Park Land	Acre	2.74	varies	\$
	Other Areas	Acre	35.46	varies	\$5,135,000
	Relocation & Compensation -- Commercial	L.S.	0		\$0
	Relocation & Compensation -- Residential	each	0		\$0
Total Row Costs (Item 16)					\$5,135,000
17	Engineering				
	Preliminary And Final Design	L.S.	8% of 1-15	\$3,456,000	\$3,500,000
Total Engineering					\$3,500,000
18	Contingency	L.S.	30% of 1-16	N/A	\$14,667,300
Total Project Cost - 2008 Dollars					\$67,100,000

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Alternate 1 Valley-Trebein Road Conceptual Cost Opinion Summary August 2008 (2008 dollars)

ITEM	Item Description	UNIT	QUANTITY	UNIT PRICE	TOTAL
1	Pavement Removal	yd ²	49,000	\$8	\$392,000
2	New Pavement	yd ²			
	Mainline (Us35 Sta. 202+50 To Sta. 285+00)	yd ²	69,217	\$48	\$3,322,427
	Ramps	yd ²	27,057	\$48	\$1,298,731
	Frontage Road (North - Heller Dr Extension)	yd ²	--	\$40	\$0
	Frontage Road (South)	yd ²	--	\$40	\$0
	Other Roadway	yd ²	28,583	\$40	\$1,143,338
3	Concrete Barrier	ft	7,000	\$70	\$490,000
Subtotal Roadway Cost					\$6,646,495
4	Earthwork	L.S.	12% of 1-3	N/A	\$797,579
5	Drainage	L.S.	8% of 1-4	N/A	\$595,526
6	Erosion Control	L.S.	3% of 1-4	N/A	\$223,322
7	Maintenance Of Traffic	L.S.	10% of 1-4	N/A	\$744,407
8	Lighting	L.S.	4% of 1-4	N/A	\$297,763
9	Traffic Signals	each	0	\$150,000	\$0
10	Signing/Markings	L.S.	2% of 1-4	N/A	\$148,881
11	Utilities	L.S.	4% of 1-4	N/A	\$297,763
12	Incidental	L.S.	20% of 1-4	N/A	\$1,488,815
Total Roadway Costs (Items 1-12)					\$11,241,000
13	Bridge Removal	ft ²	0	\$15	\$0
14	New Bridge	ft ²	57,589	\$150	\$8,638,350
15	Retaining Wall	ft ²	56,770	\$95	\$5,393,150
Total Structure Costs (Items 13-15)					\$14,401,250
Total Construction Costs (Items 1-15)					\$25,273,000
16	Row Acquisition & Relocation				
	Park Land	Acre	1.24	varies	\$0
	Other Areas	Acre	28.70	varies	\$306,200
	Relocation & Compensation -- Commercial	L.S.	0		\$0
	Relocation & Compensation -- Residential	each	0		\$0
Total Row Costs (Item 16)					\$306,200
17	Engineering				
	Preliminary And Final Design	L.S.	8% of 1-15	N/A	\$2,022,000
Total Engineering					\$2,022,000
18	Contingency	L.S.	30% of 1-16	N/A	\$7,673,760
Total Project Cost - 2008 Dollars					\$35,300,000

GRE-35-4.26 PID 80468

Alternate 2 Valley-Trebein Road Conceptual Cost Opinion Summary August 2008 (2008 dollars)

ITEM	Item Description	UNIT	QUANTITY	UNIT PRICE	TOTAL
1	Pavement Removal	yd ²	53,290	\$8	\$426,320
2	New Pavement	yd ²			
	Mainline (Us35 Sta. 202+50 To Sta. 285+00)	yd ²	70,603	\$48	\$3,388,965
	Ramps	yd ²	22,079	\$48	\$1,059,781
	Frontage Road (North - Heller Dr Extension)	yd ²	--	\$40	\$0
	Frontage Road (South)	yd ²	--	\$40	\$0
	Other Roadway	yd ²	26,095	\$40	\$1,043,813
3	Concrete Barrier	ft	8,000	\$70	\$560,000
Subtotal Roadway Cost					\$6,478,880
4	Earthwork	L.S.	12% of 1-3	N/A	\$777,466
5	Drainage	L.S.	8% of 1-4	N/A	\$580,508
6	Erosion Control	L.S.	3% of 1-4	N/A	\$217,690
7	Maintenance Of Traffic	L.S.	10% of 1-4	N/A	\$725,635
8	Lighting	L.S.	4% of 1-4	N/A	\$290,254
9	Traffic Signals	each	0	\$150,000	\$0
10	Signing/Markings	L.S.	2% of 1-4	N/A	\$145,127
11	Utilities	L.S.	4% of 1-4	N/A	\$290,254
12	Incidental	L.S.	20% of 1-4	N/A	\$1,451,269
Total Roadway Costs (Items 1-12)					\$10,957,082
13	Bridge Removal	ft ²	0	\$15	0
14	New Bridge	ft ²	54,039	\$150	\$8,105,850
15	Retaining Wall	ft ²	53,560	\$95	\$5,088,200
Total Structure Costs (Items 13-15)					\$13,194,000
Total Construction Costs (Items 1-15)					\$24,151,000
16	Row Acquisition & Relocation				
	Park Land	Acre	0.73	varies	\$1,500
	Other Areas	Acre	23.69	varies	\$111,300
	Relocation & Compensation -- Commercial	L.S.	0		\$0
	Relocation & Compensation -- Residential	each	0		\$0
Total Row Costs (Item 16)					\$112,800
17	Engineering				
	Preliminary And Final Design	L.S.	8% of 1-15	\$1,932,000	\$1,932,000
Total Engineering					\$1,932,000
18	Contingency	L.S.	30% of 1-16	N/A	\$7,279,140
Total Project Cost - 2008 Dollars					\$33,500,000