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Interstate 295/Route 38
Interchange 40 Improvement Project

DRAFT - Feasibility Assessment Report

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I. EXECUTIVE SUMMARY

Project Background:

The New Jersey Department of Transportation (NJDOT) is proposing improvements to the I-295/Route 38 Interchange (Interchange 40) and the surrounding local roadway system in Mount Laurel and Moorestown Townships, Burlington County. This project originated from a request by Honorable Francis Bodine and Burlington County Officials to investigate providing the missing movements at Interchange 40.

Interchange 40 is a partial interchange with three missing direct connections. The missing moves are as follows: I-295 southbound to Route 38 eastbound, Route 38 eastbound to I-295 southbound and Route 38 westbound to I-295 northbound. Motorists must navigate the adjacent local roadway network to compensate for these missing movements. The additional volume caused by the lack of direct movements at Interchange 40 directly affects traffic operations and circulation within the local roadway system. The Route 38/Marter Avenue intersection currently operates at LOS F during the PM Peak Hour. Future operational problems are anticipated at the Route 38/Marter Avenue and Route 38/Briggs Road intersections in Design Year 2026 due to background traffic growth, the completion of three commercial developments and the possibility of future development. Without completion of the Interchange 40 Improvement Project, these issues are anticipated to negatively impact Interchange 40, the Route 38/Marter Avenue and Route 38/Briggs Road intersections and the surrounding local roadway network.

Coordination with key stakeholders was maintained throughout Feasibility Assessment. NJDOT conducted coordination meetings with other agencies, local officials, and property owners. NJDOT provided the latest project information at these meetings and also responded to individual requests for project information. Feedback from key stakeholders was instrumental in developing a solution that addresses the operational issues identified during Feasibility Assessment. NJDOT will continue to coordinate with key stakeholders during preliminary design, final design and construction.

Initially Preferred Alternative:

Improvements proposed under the IPA assimilate Interchange 40, the Route 38/Marter Avenue intersection and the Route 38/Briggs Road intersection into a comprehensive solution that addresses the existing operational problems in the area of Interchange 40.

The IPA addresses the need to provide the missing movements at Interchange 40 and also provides relief to the local roadway system. Improvements proposed under the IPA include the following: a Semi-Direct Connection Ramp (SDCR) over I-295 and the NJ Turnpike from I-295 southbound to Route 38 eastbound, a ramp over the NJ Turnpike from Route 38 westbound to I-295 northbound, a grade separated interchange at the Route 38/Briggs Road intersection, improvements to the Route 38/Marter Avenue intersection and improvements to several I-295 ramps. Due to the FHWA’s approval of a Partial Build Alternative, the slip ramp at the southern end of Marter Avenue remains to
accommodate the movement from Route 38 eastbound to I-295 southbound. Refer to Appendix A for the IPA Plan and the SDCR profile.

Right of way and environmental impacts were balanced with the need to provide all the missing movements at Interchange 40 through the selection of a Partial Build Alternative as the IPA. Due to the minimal environmental impacts anticipated under the IPA, the project has been recommended by the NJDOT E-Team to qualify as a Categorical Exclusion (CE).

**Project Obstacles/Areas of Concern:**

The following obstacles and/or areas of concern are anticipated under the IPA:

- Construction Staging of the SDCR over I-295 and the NJ Turnpike
- Access and ROW impacts to adjacent businesses/commercial developments
- Coordination of concurrent commercial developments within the project area
- Widening of Route 38 structures
- Vertical underclearance under Route 38 structures
- Construction staging of a grade separated interchange at the intersection of Route 38 and Briggs Road
- Utility coordination during design of the SDCR
- Pedestrian and Bicycle Compatibility within the Project Limits
- Smart Growth Plan coordination with Burlington County for Interchange 40

**Project Cost:**

The approximate project costs for the IPA are:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
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<tr>
<td>Construction</td>
<td>$58,600,000</td>
</tr>
<tr>
<td>Utility Relocations</td>
<td>$5,400,000</td>
</tr>
<tr>
<td>ROW Property Acquisitions/Easements</td>
<td>$12,000,000</td>
</tr>
<tr>
<td>Construction Engineering, Design/Support, Contingencies</td>
<td>$17,000,000</td>
</tr>
<tr>
<td>Total Project Cost</td>
<td>$93,000,000</td>
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Preliminary Design Action Items:
A Scope Summary Meeting was held on Month Day, 2003 as part of the transfer process from Feasibility Assessment to Preliminary Design. Items discussed during the meeting to be addressed during Preliminary Design are listed below:

- Discussion items

II. INTRODUCTION

A. General Information

The I-295/Route 38 Interchange Improvement Project is located in Mount Laurel and Moorestown Townships, Burlington County, New Jersey. Project limits on I-295 are from M.P. 39.80 to M.P. 41.08 and from M.P. 9.00 to M.P. 10.36 on Route 38. The project area is depicted in Figure 1 – General Location Map on Page 5 and in Figure 2 – Project Area Map located on Page 6.

The I-295/Route 38 Interchange, also known as Interchange 40, is a partial interchange with three missing direct connections. Motorists must navigate the local roadway network to compensate for these missing movements. The Route 38 eastbound to I-295 southbound movement is performed utilizing the forward jughandle from Route 38 eastbound to Marter Avenue, then proceed south on Marter Avenue. A slip ramp to I-295 southbound is provided at the southern end of Marter Avenue. The missing movement from I-295 southbound to Route 38 eastbound is indirectly made by exiting I-295 via the slip ramp to Route 38 westbound. Motorists use the forward jughandle from Route 38 westbound to Marter Avenue to make a U-turn and access Route 38 eastbound. The missing movement from Route 38 westbound to I-295 northbound can be made indirectly by traveling along Route 38 westbound to the forward jughandle at Marter Avenue. Motorists can make a U-turn onto Route 38 eastbound at Marter Avenue and use the loop ramp from Route 38 eastbound to I-295 northbound.

The lack of direct movements at Interchange 40 directly affects traffic operations and circulation within the local roadway system. The Route 38/Marter Avenue intersection currently operates under failing conditions during the PM Peak Hour. Future operational problems are anticipated at the Route 38/Marter Avenue and Route 38/Briggs Road intersections in Design Year 2026 due to background traffic growth and completion of three commercial developments. These commercial developments, which total 4 million square feet, are proposed in close proximity to the interchange. These developments are scheduled to be completed by year 2008, at which time traffic volumes are expected to increase sharply at Interchange 40 and along the surrounding roadway network. Without completion of the I-295/Route 38 Interchange Improvement Project, this traffic volume increase will negatively impact the Route 38/Marter Avenue and Route 38/Briggs Road intersections and the surrounding local roadway network.
The I-295/Route 38 Interchange Project originated from a request by Honorable Francis Bodine and Burlington County Officials to investigate providing the missing direct movements at Interchange 40. This request was aimed at reducing congestion at the adjacent Route 38/Marter Avenue and Route 38/Briggs Road intersections and along the local roadways between Interchange 40 and Interchange 43 (I-295/Creek Road) to the north. This report addresses the Feasibility Assessment of improving Interchange 40 and the adjacent Route 38 intersections at Marter Avenue and Briggs Road.

A Scope Transfer Package was prepared and submitted under separate cover with this report to NJDOT-DPPD. The package contains backup data/information used to prepare the Feasibility Assessment Report. This backup data consists of the following:

- Initially Preferred Alternative (IPA) Plan.
- IPA Construction Cost Estimate.
- Scope of Work Form.
- NJDOT Review Comments.
- Photographs of the Project Area.
- Project Correspondence.

The project is categorized as Classification #1 – Construction.

Project Manager for the Division of Project Planning and Development is Amy Kennard (609-530-2709), Amy.Kennard@dot.state.nj.us.

Project Manager for the Bureau of Project Management is Frank Inverso (609-530-5638), Frank.Inverso@dot.state.nj.us.
Figure 1 – General Location Map
Figure 2 – Project Area Map
B. Concept Development Report

The Concept Development Report, titled *Final Concept Development Report for Interstate 295 and Route 38 Interchange*, was submitted in July 2000. This report can be found on file at the NJDOT.

Results of the Concept Development investigation verified that the existing I-295/Route 38 Interchange does not provide all of the necessary direct traffic movements. Direct movements from I-295 southbound to Route 38 eastbound, from Route 38 eastbound to I-295 southbound, and from Route 38 westbound to I-295 northbound are not currently provided within the study area. Existing high traffic volumes currently result in poor operations at the Route 38 intersections with Marter Avenue and Briggs Road. Significant commercial, industrial and residential development is ongoing and planned within the project area.

Preliminary traffic generation modeling performed in Concept Development determined that future development resulted in significant traffic increases over the next 20 to 25 years. These preliminary demand volumes demonstrated the need to provide the missing direct movements at the I-295/Route 38 Interchange. Analysis of model results also demonstrated a strong need to improve the Route 38/Marter Avenue and Route 38/Briggs Road signalized intersections.

Substandard roadway design elements were identified during Concept Development and will be addressed as part of the I-295/Route 38 Interchange Improvement Project.

The I-295 and Route 38 Interchange Improvement Project was recommended for Feasibility Assessment to advance schemes developed in Concept Development and to identify the most feasible alternative.

C. Project Description

The I-295/Route 38 Interchange Improvement Project is located in Mount Laurel and Moorestown Townships, Burlington County. The project limits are from I-295 M.P. 39.80 to M.P. 41.08 and from Route 38 M.P. 9.00 to M.P. 10.36. I-295, a six-lane divided urban interstate, is a major north-south corridor between the Delaware Memorial Bridge and I-95 in Lawrence Township, Mercer County. Route 38 is an urban principal arterial and a primary route for access from I-295 to the Camden/Philadelphia area. The Route 38/Briggs Road Intersection is located just east of Interchange 40. West of Interchange 40 is the Route 38/Marter Avenue (CR 615) Intersection. Running parallel to I-295 in the project area is the New Jersey Turnpike (NJ Turnpike). Figure 2 – Project Area Map on Page 6 depicts the project area for Feasibility Assessment. A photograph log of the project is included in Appendix B. The Straight Line Diagrams for I-295, Route 38, and Marter Avenue (CR 615) are located in Appendix C.
1. **Project Fact Sheet**

   A Project Fact Sheet was prepared for the initial Scope Team Meeting held on August 21, 2000. A copy of the Project Fact Sheet is located in Appendix D.

2. **Restatement of Project Need**

   Project Need originated from a request made to the NJDOT from the Honorable Francis Bodine and Burlington County Officials to investigate the addition of missing movements to Interchange 40 to relieve congestion at and around the interchange area. Concept Development verified this need.

   Preliminary construction cost estimates to add the missing ramps (which included a traditional full cloverleaf design, major improvements to Route 38/Marter Avenue and Route 38/Briggs Road, collector-distributor roads along I-295 and replacement of the existing Route 38 bridge over I-295) exceeded $50 million, not including right-of-way acquisition costs. Additionally, the alternatives had substantial right-of-way/access impacts and a failing weaving section along I-295. Given the magnitude of the cost estimate and the anticipated access and traffic impacts, NJDOT further evaluated the need to complete Interchange 40 by assessing the impacts of the missing direct connection ramps. A formal statement of Project Need was prepared during Feasibility Assessment and is included as Appendix E.

   The **Project Need Technical Memorandum for the I-295/Route 38 Interchange Project**, dated June 29, 2001, along with results of the traffic modeling effort, indicated that the majority of growth over the next 25 years will occur north of the Interchange 40 project area. The existing interchange does not directly provide for all movements to and from areas north of Interchange 40. Additionally, significant commercial development is planned in close proximity to Interchange 40. This development would adversely impact traffic operations along the local roadway network (e.g., Route 38 intersections at Marter Avenue and Briggs Road) due to high traffic volumes and missing ramps at the interchange. Local roadways and intersections are anticipated to operate at or over capacity. Providing the missing ramp movements would attract regional traffic to Interchange 40 and minimize regional trips that may divert to the local roadway network to access Interchange 43. The local roadway network would not be able to accommodate the anticipated traffic volumes if Interchange 40 is not completed.
3. **Project Methodology**

Several concepts were developed during Concept Development. These concepts were utilized to develop the alternatives studied in Feasibility Assessment. Development of these concepts into alternatives focused on the following major goals:

- Provide the missing movements at Interchange 40 while meeting *NJDOT Design Manual – Roadway* (NJDOT-RDM) guidelines
- Provide the missing movements at Interchange 40 to accommodate Design Year 2026 traffic at an acceptable Level of Service
- Minimize substandard/undesirable geometric elements
- Minimize ROW impacts
- Prepare Revised Interstate Access Request Report

Several alternatives were presented to NJDOT, FHWA, New Jersey Turnpike Authority (NJTA), and local officials to solicit comments and concerns. Design of the alternatives incorporated these comments and concerns. The IPA was selected with approval from the NJDOT, FHWA, NJTA and local officials and was prepared for transfer to Preliminary Design.

4. **Project Design Standards**

Alternatives developed for the I-295/Route 38 Interchange Improvement Project applied design standards in accordance with NJDOT-RDM guidelines. *A Policy on Geometric Design of Highways and Streets, 2001* (*2001 Green Book*), published by AASHTO was also utilized in certain instances where the vertical stopping sight distance (SSD) was a critical design parameter. The object height used for determination of vertical SSD was increased from six inches to a foot and a half in the *2001 Green Book*. NJDOT approved the use of the *2001 Green Book* design criteria due to its pending integration into the NJDOT-RDM (NJDOT has recently integrated the *2001 Green Book* into the NJDOT-RDM). Traffic analysis follows methodology outlined in the 2000 Edition of the *Highway Capacity Manual*, published by the Transportation Research Board.

D. **Existing Roadway Characteristics**

I-295 is an urban interstate that is part of the National Highway System (NHS). Six lanes (3 northbound and 3 southbound) convey traffic along this high volume corridor within the project area. Lane and shoulder widths were updated as part of the I-295 Rigid Pavement Improvement Project, which will be completed in 2003. Outside shoulder and lane widths are twelve feet. Inside shoulder widths along I-295 under the Route 38 overpass structure are nine feet due to the proximity of the overpass piers to...
the travelway. I-295 has a posted speed of 65 mph and a design speed of 70 mph. Along the travel lane and outside shoulder the pavement type, as per the I-295 Rigid Pavement Improvement Project, is generally 2" of Super Pave surface course with a 3" and variable intermediate course over the existing portland concrete cement rigid pavement section. The newly constructed inside shoulder consists of a 25" Super Pave Section (2" Super Pave Surface Course, 3" Minimum and Variable Super Pave Intermediate Course, 8" Super Pave Base Course, 4" Open Graded Drainage Layer and 8" Dense Graded Aggregate).

Route 38 is a four lane Urban Principal Arterial included in the NHS and State Transportation Program (STP). This roadway serves as a travel corridor from I-295 to Philadelphia and Camden. Lane widths along Route 38 are twelve feet, while shoulders are variable along the inside and outside shoulders. Curb exists along most of Route 38 as does a curbed median. The posted speed on Route 38 is 50 mph and the design speed is 55 mph.

Marter Avenue, also known as CR 615, intersects Route 38 to the west of Interchange 40. The southern portion of Marter Avenue serves as an entrance ramp for I-295 southbound. This county route will carry traffic from the Centerton Square Development to Route 38 and Interchange 40. Lanes along Marter Avenue are typically twelve feet except for the center turn lane, which is 11 feet. Improvements are proposed at the Marter Avenue intersection as part of the Centerton Square Development.

Briggs Road intersects Route 38 just east of Interchange 40. Briggs Road is the location of two upcoming roadway improvement projects. The first project extends Briggs Road to the north to connect to Marne Highway. The second project involves widening Briggs Road south of the Briggs Road/Route 38 Intersection.

See Appendix C for Straight Line Diagrams of I-295, Route 38 and Marter Avenue.

E. Existing Bridge Characteristics

Three structures along Route 38 span either I-295 or the NJ Turnpike. Structure No. 0327160, which spans I-295, was built in 1966 with a concrete/steel superstructure and a concrete substructure. The minimum underclearance under this 271-foot long structure is 14 feet 2 inches (the minimum required underclearance is 16 feet 6 inches). 106 feet of width accommodates six – 12-foot lanes, a 16-foot median, two 6-foot sidewalks, 1 foot outside shoulders and 2-foot inside shoulders. Repairs recommended on the Structural Inventory and Analysis Sheet (SI&A) include reset/repair bearings, repair substructure spalls and raise the substructure.

Structure No.’s TPKM03797 and 0805154 span the NJ Turnpike. Structure No. TPKM03797, as denoted by its nomenclature, is under the jurisdiction of the NJTA and carries Route 38 westbound. This 300-foot long structure is 44 feet wide and has a 6-foot sidewalk, a 10-foot outside shoulder, 2 – 12-foot travel lanes, a one-foot inside shoulder and shares a 16-foot median with the adjacent Route 38 eastbound structure.
Structure No. 0805154, the eastbound Route 38 structure, is also 300 feet long. A width of 44 feet supports two – 12-foot travel lanes, a 6-foot sidewalk, and 1-foot shoulders. Recommended repairs identified on the SI&A sheet are deck repairs for both Structure No. TPKM03797 and Structure No. 0805154.

See Appendix F for SI&A sheets for the Route 38 structures.

F. Project Area Characteristics

Land use along the Route 38 Corridor within the project area is primarily commercial, corporate or industrial. Large retail centers either currently exist or will be constructed within the project limits, which will impact Interchange 40 and the surrounding roadway system. Taylor Rental, Martin’s Liquors and the Texaco Service Station are located in the western portion of the project at the Marter Avenue/Route 38 intersection. Additionally a large shopping center known as Centerton Square began construction in 2003. Located in the area bounded by I-295, Route 38 and Marter Avenue, Centerton Square will contain several restaurants, several midsize retail stores and a few larger, anchor stores. Completion of this 1.2 million square foot development will have a sizable impact on Interchange 40 and the surrounding roadway system.

Zagara’s is a large retail shopping center (80,000 square feet) adjacent to Route 38 at the Briggs Road/Route 38 intersection. Several corporate developments exist along Route 38 within the project limits and several more will be constructed in the future. Bishop’s Gate, the largest of the existing corporate centers, contains Cendant, Okidata and NFL Films. Bishop’s Gate, which collectively contains over one million square feet of office space, is located just east of the NJ Turnpike along Route 38 eastbound. Bishop’s Gate II, a proposed 800,000 square foot corporate center, will be located adjacent to the NJ Turnpike and west of Bishop’s Gate. Refer to Appendix G for a land use plan and a comprehensive list of existing and future development within the project limits.
III. ALTERNATIVES ANALYSIS

Each alternative was designed applying standards and guidelines set forth in the NJDOT-RDM and NJDOT - Bridge Design Manual (unless otherwise noted). Alternatives were evaluated on the following criteria:

- Provides missing movements at Interchange 40
- Improves traffic operations at Route 38/Marter Avenue and Route 38/Briggs Road intersections
- Minimizes right of way/access impacts

The progression of the Alternatives Analysis is most easily described by organizing the effort into the following phases:

A. Analysis of Concept Development Schemes

B. Analysis of Full Improvement Alternatives

C. Presentation of the Full Improvement Alternatives to the Core Group

D. Formal Statement of Project Need

E. Analysis of Four Alternatives proposed in Formal Statement of Project Need

F. Selection of Partial Build Alternative

G. Development of Partial Build IPA

A. Analysis of Concept Development Schemes

Initially, the Alternatives Analysis focused on further developing schemes from Concept Development. These schemes did not provide every missing movement within Interchange 40 proper. NJDOT determined that only Full Improvement Alternatives within the Interchange 40 proper should be included in the Alternatives Analysis. Seven Full Improvement Alternatives were developed for Interchange 40 and the intersections of Marter Avenue/Route 38 and Briggs Road/Route 38. See Appendix H for plans of the Full Improvement Alternatives.

B. Analysis of Full Improvement Alternatives

Descriptions for the seven full improvement alternatives are as follows:
Full Improvement Alternatives #1, #1.1 and #1.2

These three alternatives proposed a traditional full cloverleaf design that provided all eight movements at the immediate interchange area. The ramp from Marter Avenue southbound to I-295 southbound would be removed. C-D roads were proposed on I-295 northbound and southbound at the interchange. Closure of the existing Marter Avenue ramp to I-295 southbound required a grade separated partial cloverleaf interchange at Route 38 and Marter Avenue. A traffic signal was proposed at the Marter Avenue/Midlantic Drive intersection. Route 38/Briggs Road was a grade separated partial diamond interchange. A new traffic signal was proposed along Route 38, east of the Briggs Road interchange, and two new signals were proposed on Briggs Road at the ramp junctions. The differences in the three alternatives were slight modifications to access in the southwest quadrant of the Route 38/Marter Avenue intersection.

The disadvantages to these alternatives included failing weaving sections along the I-295 northbound and southbound C-D roads due to high traffic volumes and short weaving distances between the existing and proposed loop ramps. Significant right-of-way impacts would be incurred by the commercial properties adjacent to the Route 38/Marter Avenue intersection. Construction of the C-D roads would require the replacement of the Route 38 structure over I-295.

These alternatives each had a construction cost of approximately $55 million, not including right-of-way acquisition costs.

Full Improvement Alternatives #2 and #2.1

These alternatives provided the missing movements from Route 38 westbound to I-295 northbound (slip ramp) and from I-295 southbound to Route 38 eastbound (loop ramp) at the immediate interchange area. The existing ramp from Marter Avenue southbound to I-295 southbound remained in place. Route 38/Marter Avenue was a grade separated partial cloverleaf interchange. A traffic signal was proposed at the Marter Avenue/Midlantic Drive intersection. Route 38/Briggs Road was a grade separated partial diamond interchange. A new traffic signal was proposed along Route 38 just east of the Briggs Road interchange, and two new signals were proposed on Briggs Road at the ramp junctions. The difference between the two alternatives was slight modifications to access in the southwest quadrant of the Route 38/Marter Avenue intersection.

This configuration was considered undesirable by FHWA standards. The non-typical Marter Avenue southbound ramp to I-295 southbound was classified as its own interchange, separate from Interchange 40. This condition would violate standard policy regarding closely spaced interchanges. Also, since Marter Avenue acted as a ramp south of Route 38, access along this roadway should be fully controlled. This condition would preclude access to Marter Avenue from Midlantic Drive. Other disadvantages included failing weaving sections along the I-295 northbound and southbound C-D roads due to high traffic volumes and the short weaving distances between the existing and proposed loop ramps. Significant right-of-way impacts would be incurred by the commercial properties adjacent to the Route 38/Marter Avenue intersection. Construction of the C-D roads would require the replacement of the Route 38 structure over I-295.
These alternatives each had a construction cost of approximately $54 million, not including right-of-way acquisition costs.

**Full Improvement Alternative #3**

This alternative provided the missing movements from Route 38 westbound to I-295 northbound (slip ramp) and from I-295 southbound to Route 38 eastbound (loop ramp) at the immediate interchange area. The existing ramp from Marter Avenue southbound to I-295 southbound remained in place. Route 38/Marter Avenue and Route 38/Briggs Road were at-grade signalized intersections and a new signalized intersection was provided at the Route 38/Bishops Gate Boulevard intersection. Forward and reverse jughandles provided the turning movements from Route 38 at these intersections. An additional traffic signal was proposed at the Route 38/Bishops Gate Boulevard intersection.

Maintaining the ramp from Marter Avenue southbound to I-295 southbound was undesirable by FHWA standards. Other disadvantages to this alternative included failing weaving sections along the I-295 northbound and southbound C-D roads due to high traffic volumes and the short weaving distances between the existing and proposed loop ramps. Sight distance on Route 38 eastbound approaching the new signal at Bishops Gate Boulevard would also be a safety issue. Additionally, the new traffic signal would adversely impact traffic operations along Route 38 and would create significant queuing on Bishops Gate Boulevard and Briggs Road approaching the signals. Significant right-of-way and parking impacts would be incurred by Laurel Corporate Center and the proposed pad sites along Route 38 westbound. Construction of the C-D roads would require the replacement of the Route 38 structure over I-295.

This alternative had a construction cost of approximately $38 million, not including right-of-way acquisition costs.

**Full Improvement Alternative #4**

This alternative was very similar to #3 except that all eight movements are provided at the interchange via a full cloverleaf design. The ramp from Marter Avenue southbound to I-295 southbound was removed.

Disadvantages to this alternative were the same as those described for Full Improvement Alternative #3. Right-of-way impacts for this alternative would be more significant. The Route 38/Marter Avenue intersection would operate at LOS F due to the closure of the Marter Avenue ramp to I-295 southbound. The Route 38/Briggs Road intersection would also operate at LOS F due to high traffic volumes.

This alternative had a construction cost of approximately $38 million, not including right-of-way acquisition costs.
C. Presentation of the Full Improvement Alternatives to the Core Group

On December 15, 2000, the seven Full Improvement Alternatives were presented at a Core Group Meeting between NJDOT and FHWA (Refer to Appendix I for Meeting Minutes documenting this meeting). Representatives of the FHWA indicated that the failing weaving sections on the C-D roads (present in each of the seven alternatives) were undesirable. Attendees noted that the associated construction costs of the full improvement alternatives were high and would be substantially higher when right of way costs were included. NJDOT Value Engineering (NJDOT-VE) suggested that a Single Point Urban Interchange (SPUI) be developed as a possible alternative. After further analysis NJDOT-VE concluded that the SPUI was not a feasible alternative because it could not accommodate the resulting left-turn volumes at the interchange.

D. Formal Statement of Project Need

NJDOT held internal meetings to discuss the direction of the project due to the associated costs, right-of-way/access impacts and failing weaving sections along I-295. A formal statement of project need, titled Final Technical Memorandum for I-295/Route 38 Interchange – Project Need (Project Need), was prepared to further evaluate the need to complete Interchange 40. Four Alternatives, described below in Section E, were proposed in the Project Need Statement and studied during Feasibility Assessment. The Project Need document is provided in its entirety in Appendix E.

E. Analysis of Four Alternatives proposed in Formal Statement of Project Need

Alternative 1 – No Build

No improvements were made to Interchange 40 under this Alternative. The missing movements would cause a high volume of regional traffic to be diverted to the local roadway system around Interchange 40. Extra volume added to the already overburdened local roadway system around Interchange 40 would cause further deterioration of traffic operations.

Alternative 2 – Intersection Improvement Only

Improvements were made to the Marter Avenue/Route 38 and Briggs Road/Route 38 intersections in this alternative. Alternative 2, in contrast to Alternative 1, results in an improvement to traffic operation on the local roadway system. Refer to the Project Need document in Appendix E for an in-depth discussion regarding improvements and their associated advantages/disadvantages. While this alternative does offer an improvement to the operation of the intersections adjacent to Interchange 40, it does not alleviate the traffic congestion at Interchange 40. The approximate cost of constructing these Intersection Improvements is $42 million.
Alternative 3 – Partial Build

This Alternative furthers Alternative 2 with the addition of a direct connection ramp from Route 38 westbound to I-295 northbound. This ramp attracts traffic destined for I-295 northbound that would otherwise utilize the local roadway system to complete the movement. Traffic operations improve at the Route 38/Marter Avenue intersection as a result of the removal of regional traffic from the local roadway system. Advantages and disadvantages are discussed in the Project Need document included in Appendix E. Alternative 3 costs an estimated $46 million to construct.

Alternative 4 – Full Build

Under Alternative 4 a full cloverleaf interchange is implemented at Interchange 40. All movements are provided within the immediate interchange area. Marter Avenue and Briggs Road Intersections experience improved traffic operation as a result of regional traffic being directed away from the local roadway system. Intersection Improvements are similar to those initially proposed as part of Alternative 2. Access to I-295 southbound via the Marter Avenue ramp is discontinued. The C-D Roads along I-295 fail under Design Year Traffic. Impacts to access and right-of-way are substantial. Alternative was estimated to have a construction cost of $90 million.

Refer to Appendix E for a more detailed analysis of Alternative 4.

F. Selection of Partial Build Alternative

The four alternatives outlined in the Project Need Report were presented to the FHWA on September 27, 2001, at a project status meeting (See Appendix I for the minutes of this meeting). The FHWA suggested that Alternative 3 – Partial Build be further developed and the use of a Semi-Direct Connection Ramp (SDCR) be investigated, as proposed by NJDOT-VE, to provide the movement from I-295 southbound to Route 38 eastbound. The FHWA supported the retention of access to I-295 southbound from the Marter Avenue ramp.

G. Development of the IPA

The direction provided by the FHWA at the project status meeting (September 27, 2001) helped determine the types of improvements that would be incorporated into the IPA. Their support of the SDCR and their concurrence on maintaining the existing I-295 southbound entrance ramp at the southern end of Marter Avenue allowed the IPA to be developed with less impact than would have occurred under any Full Build Alternative.

Though Interchange 40, the Route 38/Marter Avenue intersection and the Route 38/Briggs Road intersection function as a single traffic solution under the IPA, it is helpful to look at each area individually when discussing the associated alternatives analysis. Each of these areas was shaped by the operational requirements of Interchange 40 and the surrounding local roadway system and by interactions with key stakeholders.
Interchange 40

The most significant issues regarding the alternatives analysis for Interchange 40 were the retention of the existing I-295 southbound entrance ramp at the southern end of Marter Avenue, the design of the SDCR and the widening of the Route 38 structures over the NJ Turnpike and I-295.

I-295 Southbound Access

FHWA approval of the Partial Build Alternative allowed the existing I-295 southbound entrance ramp to remain at the southern end of Marter Avenue. Previous to this decision (in Full Build Alternatives), the movement from Route 38 eastbound to I-295 southbound was provided via a slip ramp in the southwest quadrant of Interchange 40. This slip ramp impacted the corporate campus in the southwest quadrant, which added $50 million to the right of way cost. Approval of the Partial Build Alternative is detailed in a report titled Final Revised Interstate Access Request Report, which is on file at NJDOT and the FHWA.

SDCR

Need for the SDCR arose from FHWA comments requiring that the Partial Build Alternative provide all missing moves. A traditional loop ramp was initially analyzed to provide the movement from I-295 southbound to Route 38 eastbound. Commercial property present in the southwest quadrant of Interchange 40, poor traffic operations and high construction costs made this solution infeasible.

NJDOT Value Engineering initially proposed the idea of the SDCR. Additional effort and input by NJDOT, FHWA, and Baker helped to develop the SDCR design presented in the IPA plan. Meetings attended by NJDOT, FHWA and Baker determined that 45 mph would be utilized as the design speed for the SDCR. Traffic analyses and geometric parameters, presented to NJDOT-Geometric Design, helped determine that the SDCR traffic operational characteristics were adequate at a 45 mph design speed. The issue of substandard horizontal SSD associated with the selected radius of 540 feet (chosen to minimize impacts to Centerton Square and NJ Turnpike right-of-way) requires a Design Exception. Verbal assurance for the approval of the Design Exception was granted from NJDOT-Geometric Design. Inside shoulders for the SDCR were increased to twelve feet to achieve 280 feet of horizontal SSD (the required horizontal SSD is 360 feet for a 45 mph design speed). The SDCR footprint was submitted to the NJTA for comment due to its location within NJ Turnpike Right-of-Way. NJTA stated that the encroachment was unacceptable because it would not allow for future widening of the facility. The SDCR footprint was shifted to the west to remove the encroachment, which resulted in additional impact to the Centerton Square Development. Developer’s Diversified Realty (DDR), developers of Centerton Square, objected to the additional impact due to their stated inability to modify the site plan. DDR’s traffic consultant proposed the use of a 40 mph design speed for the SDCR in an effort to reduce the impact to Centerton Square. Baker investigated this suggestion. A subsequent meeting with the FHWA concluded that the SDCR with a 45 mph design speed and the footprint shown in the IPA has their support and that they would not approve an SDCR with a 40 mph design speed.
The SDCR footprint proceeds to the left from its diverge point with the realigned I-295 southbound ramp to Route 38 westbound. The SDCR was not located on the right of the I-295 southbound ramp to Route 38 westbound because it would conflict with driver expectancy. A driver wishing to travel to the right (Route 38 westbound) would have to bear left at the diverge point which is counterintuitive. The SDCR is on a fill section with retaining walls until it reaches the embankment wall for the structure that carries it over Route 38. The SDCR continues on structure over I-295, over two I-295 northbound ramps, over a gas pipeline (which is owned by Williams and may need to be relocated) and over a six-lane section of the NJ Turnpike. NJTA has requested that this structure accommodate future widening of the facility. After crossing the NJ Turnpike the SDCR is constructed on fill and connects with Route 38 approximately 200 feet west of the existing Bishop’s Gate access drive. Under the IPA, the Bishop’s Gate access drive is relocated to a location along Briggs Road, south of Route 38. See Appendix A for the SDCR profile.

Widening of Route 38 Structures

Widening of Route 38 structures is necessary to accommodate the addition of 10-foot shoulders and new ramp tie-ins. There are three Route 38 structures that require widening. One structure (Structure No. 0327160) spans I-295. Two adjacent structures (No. 08050154 and TPKM03797) span the NJ Turnpike. One of the structures is under the jurisdiction of NJDOT and the other is under the jurisdiction of the NJTA. SI&A sheets for the Route 38 structures indicate that deck repairs and bearing replacement are needed. NJTA has also suggested that TPKM03797 be redecked.

Other Improvements

Other improvements at Interchange 40 include adding the missing movement from Route 38 westbound to I-295 northbound, relocation of two I-295 northbound ramps and several ramp modifications to accommodate the SDCR and the widening of the Route 38 structures. The missing movement from Route 38 westbound to I-295 northbound is provided via a new structure over the NJ Turnpike. NJTA has asked that all new structures accommodate future widening of the turnpike. The I-295 northbound terminals of the I-295 northbound ramp to Route 38 eastbound and the Route 38 eastbound ramp to I-295 northbound were moved south along I-295 northbound approximately 750-feet to eliminate the existing weaving section that operates at LOS F under Design Year 2026 Traffic Volumes. The termini of these two ramps were also modified to accommodate the widened Route 38 typical section. The I-295 northbound ramp to Route 38 westbound was modified near its terminus to accommodate the widened Route 38 typical section. The Route 38 westbound ramp to I-295 southbound was realigned to accommodate the SDCR footprint and the Route 38 widening. The existing I-295 southbound ramp to Route 38 westbound was shifted to the west to accommodate the SDCR footprint.

Refer to Appendix I for correspondence related to the alternatives analysis of the proposed improvements at Interchange 40. Correspondence with the following dates is related to Interchange 40: August 27, 2001, September 27, 2001, February 15, 2002.

Route 38/Marter Avenue Intersection

Grade separated and at-grade solutions were analyzed for the Route 38/Marter Avenue intersection. Initially, grade separated solutions were studied because they would provide better operational benefits than at-grade solutions in the absence of direct connection movements at the interchange. Impacts to the properties surrounding the Route 38/Marter Avenue intersection were substantial, which resulted in a significant right-of-way cost. The grade separated solution was dismissed upon the introduction of the SDCR. Volume that currently used the at-grade Marter Avenue intersection to access Route 38 eastbound from I-295 southbound was removed with implementation of the SDCR. Removal of this movement which eventually turned left from Marter Avenue southbound, allowed an improved at-grade intersection to perform at an acceptable LOS.

Improvements to the Route 38/Marter Avenue intersection included the modification of two forward jughandles, construction of two proposed reverse jughandles and the modification of the typical roadway sections of Route 38 and Marter Avenue. The forward jughandle from Route 38 westbound to Marter Avenue currently lies adjacent to the Taylor Rental property (Refer to the IPA plan in Appendix A for existing Route 38/Marter Avenue configuration). This configuration is atypical because access is not typically granted to properties inside of jughandles. Initially, the jughandle was relocated to the west to provide a typical jughandle configuration. This footprint impacted the Taylor Rental property and would have required a total right-of-way acquisition. Meetings between the owners of Taylor Rental and NJDOT concluded that the jughandle would be revised to allow the Taylor Rental property to remain in the interior of the jughandle with access revisions.

Introduction of a reverse jughandle from Route 38 westbound to Marter Avenue southbound impacted the Martin’s Liquors property. Further alternatives analysis concluded that the impact to the Martin’s Liquors property could be reduced and the LOS of the Route 38/Marter Avenue signal could be improved by developing a local roadway around the perimeter of the property. The local roadway would be limited access, divided by median barrier and would be right-in/right-out on Marter Avenue and Route 38. This roadway allows right turns from Marter Avenue southbound to be removed from the signal at the Route 38/Marter Avenue intersection, which improves the operation of the signal. This revised footprint also reduces the impact to the Martin’s Liquors property and prevents the necessity of a right-of-way acquisition.

The existing forward jughandle from Route 38 eastbound to Marter Avenue is modified from two lanes to one lane. The second lane is currently utilized to travel from Route 38 eastbound to Marter Avenue northbound. This lane is no longer needed because this movement is more safely negotiated by utilizing the proposed reverse jughandle from
Route 38 eastbound to Marter Avenue northbound. This reverse jughandle requires the acquisition of the Texaco Service Station in the southeast quadrant of the intersection.

The proposed typical section of Marter Avenue varies. At the northern approach to the intersection the typical section is six lanes (southbound: two left-turn lanes and two through lanes, northbound: two receiving lanes). At the southern approach to the intersection the typical section is five lanes (northbound: one left-turn lane, one through lane and a shared through/right-turn lane, southbound: two receiving lanes).

Refer to Appendix I for correspondence related to the alternatives analysis of the proposed improvements at the Route 38/Marter Avenue intersection. Correspondence with the following dates is related to the Route 38/Marter Avenue intersection: September 27, 2002, October 11, 2002, October 31, 2002 and February 07, 2003.

Route 38/Briggs Road

The existing Route 38/Briggs Road intersection is an at-grade signalized intersection. A grade separated intersection was proposed to accommodate both future traffic growth and the additional traffic that must use Briggs Road to access Bishop’s Gate (Construction of the SDCR necessitated the removal of the existing Bishop’s Gate access drive on Route 38 eastbound). Alternatives studied included Route 38 over Briggs Road and Briggs Road over Route 38. Briggs Road over Route 38 was selected because it had less right-of-way impact and cost less to construct. Two Briggs Road vertical profiles were developed for comparison. The first profile utilized NJDOT-RDM Vertical SSD Criteria and the second utilized 2001 AASHTO Green Book Vertical SSD criteria. The difference between the two criteria is the height of the object used to calculate the vertical SSD. Prior to the 2001 AASHTO Green Book the object height was six inches. The use of the latest AASHTO criteria greatly reduced the impact to the following properties adjacent to the intersection: Burlington County Engineering Building, Zagara’s Shopping Center, Johnson & Towers and others. It is important to note that NJDOT has since revised their vertical SSD criteria to match that of the 2001 AASHTO revision. See Appendix I correspondence dated March 15, 2002 and March 21, 2002 for an in-depth discussion regarding this analysis.

The configuration of Briggs Road under the IPA is a grade separated interchange over Route 38. Signalized intersections and proposed to the north and south of the Briggs Road overpass at its touchdown points. At the northern intersection movements to and from Route 38 westbound to Briggs Road are provided by a modified finger ramp (from Route 38 westbound to the signalized intersection) and a loop ramp (from the intersection and Briggs Road northbound to Route 38 westbound). These ramps connect to Briggs Road at a proposed signalized intersection located at the existing Zagara’s Shopping Center drive. The existing finger ramp from Route 38 westbound to Briggs Road is modified to create space for the new loop ramp that provides movements from Briggs Road to Route 38 westbound. Relocation of this finger ramp impacts the parking lot of the Burlington County Engineering Building. Retaining walls are proposed to reduce the impact to the parking lots at the Burlington County Engineering Building and Zagara’s Shopping Center. Provision of a direct connection from Briggs Road
southbound to Route 38 westbound was precluded in the southwest quadrant due to the presence of a detention basin with standing water.

Another signalized intersection is proposed at the intersection of several ramps, the revised Bishop’s Gate access drive and Briggs Road approximately 100 feet north of the existing Johnson & Towers northern access drive. A finger ramp is proposed from Route 38 eastbound to Briggs Road southbound. This ramp diverges approximately 450 feet past the ramp terminal. The left split provides access to southbound Briggs Road and the right split is a free flow movement into Bishop’s Gate. Median barrier is proposed along the left split to address the safety of the bifurcated section that exists up to the intersection (the section is bifurcated because the Briggs Road profile does not touch down until the intersection due to the vertical SSD requirements associated with the profile). The Bishop’s Gate revised access drive can only be accessed from the proposed finger ramp from Route 38 eastbound. Access is not permitted from Briggs Road due to the bifurcated section along Briggs Road southbound and the associated left-turn delay from northbound Briggs Road. Access from Briggs Road is provided at the southern Bishop’s Gate access drive located south of the proposed traffic signal.

The existing loop ramp from Route 38 eastbound to Briggs Road northbound is revised to provide an appropriate horizontal curve radius (the existing radius at the ramp terminal was substandard). A finger ramp is proposed to Route 38 eastbound to accommodate movements from southbound Briggs Road (via left turns), northbound Briggs Road (via right turns) and from the revised Bishop’s Gate access drive. The ramp begins as two lanes and tapers to one lane to accommodate the high volume through movement from the revised Bishop’s Gate access drive. Properties that are adjacent to this proposed intersection are impacted. There are several partial takes and a total take in the northeast quadrant of this intersection. Retaining walls are proposed along the Johnson & Towers facility. Johnson & Tower’s northern access drive is moved south approximately 50 feet under the IPA.

Recently, a Burlington County roadway project improved the typical section of Briggs Road north and south of Route 38. The improvements included varying width shoulders in select locations. The typical section of Briggs Road under the IPA is widened from its existing two-lane section (as improved by the Burlington County roadway project) to a four-lane section. On the overpass the typical section is five lanes to provide for an auxiliary lane. The typical section is also five lanes at the northern approach of the Briggs Road/Bishop’s Gate intersection due to the ramp from Route 38 eastbound.

Please refer to Appendix I for additional correspondence related to the alternatives analysis of the proposed improvements at the Route 38/Briggs Road intersection. Correspondence with the following dates is related to Route 38/Briggs Road intersection: August 12, 2002 and September 18, 2002.
IV. INITIALLY PREFERRED ALTERNATIVE

A. Description of IPA

Improvements proposed under the IPA assimilate Interchange 40, the Route 38/Marter Avenue intersection and the Route 38 Briggs Road intersection into a comprehensive solution that addresses the existing operational problems in the area of Interchange 40.

The IPA was selected because it provides the missing moves at Interchange 40 while resulting in the least ROW and environmental impacts. The IPA also provides acceptable traffic operations and improves safety at the interchange. Feedback and coordination from NJDOT, FHWA, NJTA and Burlington County helped to finalize the development of the IPA. A copy of the IPA plan and the SDCR profile can be found in Appendix A.

This project is categorized as Classification #1 – Construction. Preliminary construction costs for the IPA were calculated using the NJDOT Initial Engineers Cost Estimate, dated September 3, 2002. Preliminary project costs are summarized below in Table 1. Refer to Appendix J for a copy of the Preliminary Construction Cost Estimate.

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
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<tbody>
<tr>
<td>Construction</td>
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<td>Utility Relocations</td>
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</tr>
<tr>
<td>ROW Property Acquisitions/Easements</td>
<td>$12,000,000</td>
</tr>
<tr>
<td>Engineering</td>
<td>$17,000,000</td>
</tr>
<tr>
<td>Total Project Cost</td>
<td>$93,000,000</td>
</tr>
</tbody>
</table>

Notes:
1. Preliminary Project Costs were based on conceptual design performed during Feasibility Assessment and will be refined accordingly during Final Scope Development.

B. Geometrics (Proposed Roadway)

The proposed roadway, unless otherwise noted, follows guidelines set forth in the NJDOT Roadway Design Manual – English. The following sections describe the characteristics of the proposed roadway.
1. Posted and Design Speed

The posted and design speeds are presented in Table 2 below.

*Table 2 – Posted and Design Speeds*

<table>
<thead>
<tr>
<th>ROAD, RAMP or JUGHANDLE</th>
<th>POSTED SPEED or TYPE OF RAMP</th>
<th>DESIGN SPEED* (MPH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-295</td>
<td>65 mph</td>
<td>70</td>
</tr>
<tr>
<td>Route 38</td>
<td>50 mph</td>
<td>55</td>
</tr>
<tr>
<td>Route 38 WB to I-295 SB</td>
<td>Semi-Direct</td>
<td>30</td>
</tr>
<tr>
<td>I-295 NB to Route 38 EB</td>
<td>Semi-Direct</td>
<td>30</td>
</tr>
<tr>
<td>Route 38 EB to I-295 NB</td>
<td>Loop</td>
<td>25</td>
</tr>
<tr>
<td>I-295 NB to Route 38 WB</td>
<td>Loop</td>
<td>25</td>
</tr>
<tr>
<td>Route 38 WB to I-295 SB</td>
<td>Loop</td>
<td>25</td>
</tr>
<tr>
<td>I-295 SB to Route 38 WB (SDCR)</td>
<td>Semi-Direct</td>
<td>45</td>
</tr>
<tr>
<td>Marter Avenue</td>
<td>40 mph</td>
<td>45</td>
</tr>
<tr>
<td>Marter Avenue Route 38 WB Jughandle</td>
<td>Type A</td>
<td>25</td>
</tr>
<tr>
<td>Marter Avenue Route 38 EB Jughandle</td>
<td>Type A</td>
<td>25</td>
</tr>
<tr>
<td>Briggs Road</td>
<td>35 mph</td>
<td>40</td>
</tr>
</tbody>
</table>

2. Horizontal Alignment

The IPA maintains the existing horizontal alignments of I-295, Route 38, Marter Avenue and Briggs Road.

3. Ramp Alignment

A new direct connection slip ramp is proposed to provide the missing movement from Route 38 westbound to I-295 northbound. A semi-direct connection ramp (SDCR) is
proposed to provide the missing movement from I-295 southbound to Route 38 eastbound. The SDCR and the slip ramp from I-295 southbound to Route 38 westbound will have a combined two-lane takeoff section from I-295 southbound. The right outside exit lane will be utilized by motorists on the slip ramp to Route 38 westbound, and the left exit lane will be utilized by motorists on the SDCR to Route 38 eastbound.

The existing loop ramp and slip ramp in the southeast quadrant of the interchange will be reconfigured. The loop ramp from Route 38 eastbound to I-295 northbound will be modified to lengthen the weaving section on I-295 northbound and improve traffic operations. The slip ramp from I-295 northbound to Route 38 eastbound will be modified to accommodate the geometry of the SDCR and the loop ramp. The locations of the entrance and exit terminals of the loop ramps in the northwest and northeast quadrants of the interchange are slightly shifted to the north due to the proposed widening of Route 38.

The slip ramp from Marter Avenue southbound to I-295 southbound will remain in place. The length of the acceleration lane onto I-295 southbound is increased.

4. Vertical Alignment

Existing vertical geometry on I-295 is not anticipated to be raised as part of the Interchange 40 Improvement Project. Existing vertical geometry on Route 38 will not be altered unless the substandard vertical underclearance of the Route 38 overpass at I-295 must be corrected. A design exception was granted for this substandard underclearance on the I-295 Rigid Pavement Improvement Project to avoid the cost of raising the Route 38 structure and associated roadway approaches. If a design exception is not granted the structure will have to be raised or replaced.

Vertical geometry on Marter Avenue is not anticipated to change as part of the Interchange 40 Improvement Project. A grade separated interchange at the intersection of Route 38 and Briggs Road will alter the vertical geometry of Briggs Road. Design of the Briggs Road profile will follow the vertical SSD design criteria as presented in the 2001 AASHTO Green Book (the NJDOT-RDM has recently been updated to reflect the revision of the object height utilized in calculating vertical SSD) as documented in correspondence dated March 21, 2002 in Appendix I. The proposed vertical profile of Briggs Road is also included in this correspondence.

Implementation of existing NJDOT-RDM standards for stopping sight distance (SSD) resulted in significant ROW impacts to the Burlington County Engineering Building, Zagara’s Shopping Center, Johnson & Towers and other properties. Adoption of the new SSD design parameters set forth in the 2001 AASHTO Green Book (the increased object height of 1.5 feet) minimized ROW impacts to these properties.
5. Typical Roadway Section

**I-295**

The existing cross section is three 12-foot lanes, 12-foot outside shoulders and 3-foot inside shoulders in each direction. The I-295, Section 2E, 2F & 2J (Rigid Pavement Improvements) Project that is currently being constructed widens the inside shoulder width to 10 feet. Under the IPA, no changes are proposed to the revised cross section of I-295 in the project area. Proposed modifications to the ramps at Interchange 40 require minor changes to acceleration/deceleration lane lengths along I-295. The new ramp from Route 38 westbound to I-295 northbound requires the addition of an acceleration lane on I-295. The new SDCR requires a two-lane takeoff from I-295 southbound approaching the interchange. The auxiliary lane along I-295 northbound between the two loop ramps is lengthened to improve weaving operations.

**Route 38**

The cross section of Route 38 will be expanded to three lanes with inside and outside shoulders in each direction throughout the project area. Median barrier will separate the eastbound and westbound lanes east of Marter Avenue. Existing acceleration/deceleration lanes will be modified to accommodate the new ramps and improvements to the existing ramps at Interchange 40. The Route 38 bridge over I-295 will be widened to provide for the proposed cross section. The substandard vertical clearance for the bridge will not be improved.

Improvements to Route 38 will require widening of the Route 38 bridge over the NJ Turnpike. Additional repairs to the bridge deck are also proposed.

The existing Route 38 eastbound/Midlantic Drive intersection will remain in place. The Route 38 eastbound/Bishops Gate Boulevard intersection will be closed due to weaving section created by the proposed SDCR. Motorists will utilize a slip ramp to Briggs Road southbound to access a new entrance into the Bishops Gate development. The existing access driveway to the Zagara’s shopping center along Route 38 westbound will remain.

**Route 38/Marter Avenue Intersection**

Major improvements are proposed at the Route 38/Marter Avenue intersection. These improvements are necessary to accommodate the traffic volume increase at Interchange 40 due to background growth, Centerton Square, and Laurel Creek Commercial developments. Route 38/Marter Avenue will remain an at-grade signalized intersection.

The existing forward jughandle from Route 38 westbound to Marter Avenue will be modified to only provide the movement to Marter Avenue northbound. A proposed local roadway in the northwest quadrant of the intersection will accommodate the
movement to Marter Avenue southbound. That local roadway will also provide the movement from Marter Avenue southbound to Route 38 westbound. A reverse jughandle in the southeast quadrant is proposed to provide the movement from Route 38 eastbound to Marter Avenue northbound. The existing forward jughandle from Route 38 eastbound to Marter Avenue will be modified to only provide access to Marter Avenue southbound. Additional through lanes and turn lanes will be added to the four approaches of the Route 38/Marter Avenue intersection to accommodate anticipated Design Year 2026 peak hour traffic volumes.

Marter Avenue will be a four-lane roadway north of the Route 38 intersection. South of the intersection, Marter Avenue will be widened to accommodate intersection turning movements and then be transitioned to a two-lane roadway.

**Route 38/Briggs Road Intersection**

Major improvements are proposed at the Route 38/Briggs Road intersection due to the projected traffic volume increase at Interchange 40. Under the IPA, Route 38/Briggs Road will be a grade separated interchange with traffic signals on Briggs Road to the north and south of Route 38. A new structure is proposed to carry Briggs Road over Route 38.

The movement from Route 38 eastbound to Briggs Road southbound will be provided by slip ramp. Loop ramps are proposed to provide the movements from Route 38 eastbound to Briggs Road northbound and from Briggs Road northbound to Route 38 westbound. Access to Briggs Road northbound and southbound will be provided by a slip ramp from Route 38 westbound. A traffic signal is proposed at the intersection of this slip ramp, Briggs Road and the Zagara’s shopping center access road. Movements from Briggs Road northbound and southbound to Route 38 eastbound will also be provided by a slip ramp. A traffic signal is proposed at the intersection of this slip ramp, Briggs Road and the new access road to Bishop’s Gate.

Briggs Road will be five lanes south of its intersection with Route 38 until it transitions to a two-lane roadway approximately 1000 feet south of the Briggs Road/Bishop’s Gate Driveway Intersection. Briggs Road will have a 4-lane typical section that will extend northward from Briggs Road/Bishops Gate Driveway intersection to approximately 700 feet north of the Briggs Road/Zagara’s Driveway intersection, where it tapers to two lanes.

6. **Pavement Type**

Pavement types utilized for the I-295 and Route 38 will be the current NJDOT recommended pavement mix at the time of construction. (Super-pave mixes were utilized on the I-295 Rigid Pavement Improvement Project.) Pavement mixes on Marter Avenue and Briggs Road will comply with requirements set forth by the Burlington County Engineering Department.
7. Traffic Operations

During Concept Development, the Delaware Valley Regional Planning Commission (DVRPC) Regional Transportation Model was utilized to develop Design Year 2026 AM and PM Peak Hour traffic volumes for the study area. The DVRPC model was executed under No Build and Build Conditions to determine the magnitude of traffic that would be using the new ramps at Interchange 40. Build Conditions assumed that both missing ramps would be added to the I-295/Route 38 interchange and that Briggs Road would be extended north to Marne Highway. Design Year 2026 AM and PM Peak Hour volumes also indicate the effects of adding ramp movements at Interchange 40 on the Route 38/Marter Avenue and Route 38/Briggs Road intersections. Design Year 2026 AM and PM Peak Hour traffic volumes under No Build and Build Conditions are included in Appendix K.

Traffic capacity analyses for weaving sections, freeway segments and ramp junctions were performed using HCS2000 software. Signalized intersections were analyzed using TEAPAC SIGNAL2000 and Synchro/SimTraffic software. Analyses were conducted for the Design Year 2026 AM and PM Peak Hours under No Build and Build Conditions. Results of the traffic operations analysis are summarized in Table 3 below and are also included in Appendix K.

Table 3 – Interchange 40 LOS Results for No Build and Build Conditions

<table>
<thead>
<tr>
<th>Location</th>
<th>Analysis Type</th>
<th>2026 AM Peak Hour LOS No Build</th>
<th>2026 PM Peak Hour LOS No Build</th>
<th>2026 AM Peak Hour LOS Build</th>
<th>2026 PM Peak Hour LOS Build</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-295 northbound</td>
<td>Weaving Section</td>
<td>E</td>
<td>D</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Route 38 westbound</td>
<td>Weaving Section</td>
<td>F</td>
<td>C</td>
<td>C</td>
<td>B</td>
</tr>
<tr>
<td>I-295 northbound, north of Interchange 40</td>
<td>Freeway Segment</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>I-295 southbound, north of Interchange 40</td>
<td>Freeway Segment</td>
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<td>D</td>
<td>D</td>
<td>E</td>
</tr>
<tr>
<td>I-295 northbound, south of Interchange 40</td>
<td>Freeway Segment</td>
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</tr>
<tr>
<td>I-295 southbound, south of Interchange 40</td>
<td>Freeway Segment</td>
<td>D</td>
<td>D</td>
<td>D</td>
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The Route 38 westbound weave, Route 38/Marter Avenue signalized intersection, Route 38 westbound weave at Marter Avenue and the Route 38/Briggs Road signalized intersection are anticipated to operate at LOS F during Design Year 2026 under No Build Conditions. Under Design Year 2026 Build Conditions, traffic operations at these locations will improve to LOS D+ or better during the AM and PM Peak Hours.

Traffic operations at the majority of the analysis locations will remain the same or be improved under Build Conditions as compared to No Build Conditions. The I-295 southbound freeway section (north of Interchange 40) is the only location where LOS are expected to worsen during the Design Year 2026 AM and PM Peak Hours. This is due to new trips being attracted to I-295 with the addition of the two new ramps at Interchange 40.

Completion of Interchange 40 and proposed improvements at the Route 38/Marter Avenue and Route 38/Briggs Road intersections will also improve safety at the interchange area. The proposed SDCR and proposed slip ramp will provide direct access between I-295 and Route 38 and eliminate the need for motorists to use the Marter Avenue jughandle for U-turn movements. Intersection improvements at Route 38/Marter Avenue eliminate unsignalized left turns from the existing forward jughandles, which should help improve safety at the intersection. The proposed SDCR
will operate at LOS A during the peak hours and should reduce queuing on the ramp from I-295 southbound to Route 38 westbound.

C. Right of Way Impacts

Improvement alternatives were designed with the intent of minimizing Right of Way (ROW) impacts to the extent possible. The IPA results in the least ROW impact of all feasible alternatives. ROW impacts are presented below, grouped by area. Refer to the Land Use Map presented in Appendix F for the location of these properties.

Marter Avenue/Route 38 intersection

The Texaco Station in the southeast quadrant of the Marter Avenue/Briggs Road intersection will be acquired to accommodate a reverse jughandle along Route 38 eastbound. The footprint of this reverse jughandle will also impact the two corporate properties adjacent to the Texaco Station. Each property will lose several parking spaces.

Martin’s Liquors, originally the site of a reverse jughandle along Route 38 westbound, will have a two-way local road (with limited access) that will allow the liquor store to remain in the northwest quadrant of this intersection. Modification of the Martin’s Liquors site was required to accommodate the improvements to the local roadway system requested by the developers of Centerton Square.

The Taylor Rental property, currently located within a forward jughandle along Route 38 westbound, will remain in the jughandle with revisions to their existing access and circulation.

Interchange 40

The majority of the improvements at Interchange 40 are proposed within the NJDOT ROW boundaries. A private residence, adjacent to Route 38 eastbound, will be acquired in the southwest quadrant of the interchange to accommodate the SDCR footprint. The SDCR footprint also impacts a corporate property in the southwest quadrant. NJDOT ROW indicated that this property would incur a major loss of parking and two dumpster sites. The Williams Gas Co. operates a major gas pipeline in the area between I-295 and the NJ Turnpike. Impacts to the William’s Gas pipeline will be further discussed in the Utilities section of the report. Impacts to the Centerton Square Development in the northwest quadrant of Interchange 40 were closely coordinated with Developer’s Diversified Realty (DDR) during Feasibility Assessment. Several meetings were held with the developers of Centerton Square in an effort to mitigate the impacts to both the development and the ramp geometry at the interchange. The footprint of the SDCR was minimized to the extent possible to reduce impact to the development.
Briggs Road/Route 38 intersection

A private residence will be acquired in the southeast quadrant of the Briggs Road/Route 38 intersection. The Bishop’s Gate, Samost and Mainstay Suite properties are impacted by the removal of the existing Bishop’s Gate access drive and the addition of another driveway that provides access to the Route 38/Briggs Road intersection. Construction of the proposed Briggs Road overpass and the widening of Briggs Road will impact the Johnson & Towers property, located in the southwest quadrant of this intersection. Construction of retaining walls along the front of the Johnson & Towers facility has been suggested to minimize these impacts. Retaining walls are also proposed adjacent to Zagara’s Shopping Center and the Burlington County Engineering Building to minimize impacts associated with construction of the Briggs Road overpass. A property owned by Paparone Housing Co. will be acquired in order to construct the reverse jughandle and Route 38 entrance ramp in the southeast quadrant of this intersection.

Property owners were well informed of potential property impacts throughout Feasibility Assessment. Although the most accurate available information was used to determine these impacts, the level of accuracy inherent with mapping used during Feasibility Assessment does not allow more accurate ROW impacts to be determined until Preliminary Design.

NJDOT-ROW requested that an Alignment Preservation Map be filed to ensure that these improvements can be built without conflicting with future land development projects in the project area. The filing of an Alignment Preservation Map would provide NJDOT-ROW a 30-day window to acquire vacant land (within the footprint indicated in the Alignment Preservation Map) should someone seek to develop the land. The Alignment Preservation Map will be submitted to NJDOT in October 2003 and subsequently filed.

D. Structural Design

1. Existing Structures

Three structures along Route 38 span either I-295 or the NJ Turnpike. Structure No.’s TPKM03797, 0805154 and 0327160 will be widened to accommodate ten foot outside shoulders. A design exception may be required to widen Structure No. 0327160 that currently has substandard vertical underclearance of 14 feet 6 inches (the required vertical underclearance is 16 feet 6 inches). A design exception was granted for this structure during the I-295 Pavement Rehabilitation Project. Approval for the design exception was granted based on maintaining the minimum vertical underclearance of 14 feet 6 inches. This condition could also be satisfied for this project by using shallow depth beams to achieve the widening.
2. Proposed Structures

New structures are proposed at three locations: the SDCR from I-295 southbound to Route 38 eastbound, the direct connection ramp from Route 38 westbound to I-295 northbound and the Briggs Road overpass at Route 38.

Connecting I-295 southbound to Route 38 eastbound via the SDCR will require a new structure. Elevated for much of its length, the SDCR will require approximately 23 spans. Much of the SDCR can be constructed offline because motorists currently make this movement using the forward jughandle to make a U-turn at the Route 38/Marter Avenue intersection. The typical section of the SDCR structure will be a 12-foot inside shoulder, 12-foot travelway and an 8-foot outside shoulder.

The second structure will connect Route 38 westbound to I-295 northbound. This structure will pass over the NJ Turnpike and require three (3) spans. This structure can also be constructed offline because this movement is currently made using the Route 38/Marter Avenue intersection.

The third new structure will be located at the intersection of Briggs Road and Route 38. This intersection will become a grade separated interchange, with Briggs Road spanning over Route 38. The bridge will be a simple structure with 2 spans.

E. Access

The NJDOT State Highway Access Management Code, dated April 6, 1998 provides the following data for I-295 and Route 38 within the project limits:

**I-295**

1. Access Level = 1, fully controlled access.

2. Desired Typical Section (DTS) = 6A. A 6A value describes the DTS as having 6 lanes, divided with shoulders or parking.

3. Cell = 0, fully controlled access.

**Route 38**

1. Access Level = 3, allowing for right-turn access to and from an access point with left-turn access via a jughandle where signalized spacing standards are met.

2. Desired Typical Section (DTS) = 6A. A 6A value describes the DTS as having 6 lanes, divided with shoulders or parking.

3. Cell = 1, Access to and from an Access Point, Limited by Edge Clearance and Safety Considerations.
Specific changes to business access are discussed below.

**Bishops Gate Area**

The existing driveway to Bishop’s Gate along Route 38 eastbound will be removed due to the weaving section between the proposed SDCR and the right turn ramp onto Briggs Road. Access to Bishop’s Gate will instead be provided via a new access road that intersects Briggs Road just north of the Johnson & Towers property. A traffic signal is proposed at the new Briggs Road/Bishop’s Gate access road/Route 38 eastbound on-ramp intersection.

High traffic volumes and the introduction of a weaving section require the construction of a median barrier along Briggs Road to separate the Route 38 eastbound right turn ramp from the Briggs Road southbound lanes. Motorists on Briggs Road southbound traveling to Bishop’s Gate will be required to utilize the existing access driveway on Briggs Road located south of the project limits.

**Zagara’s Shopping Center**

The existing Route 38 westbound access driveway to Zagara’s will remain in place. A traffic signal is proposed at the Briggs Road/Zagara’s/Route 38 westbound off-ramp intersection.

**Marter Avenue Businesses**

Martin’s Liquors will have revised access to/from Route 38 westbound and to/from Marter Avenue southbound. Left turns will not be permitted into or from the access driveways. Martin’s Liquors will not have access to the proposed local roadway due to safety operational issues regarding driver expectancy.

Taylor Rental will have revised access to/from Route 38 westbound and to/from Marter Avenue northbound. Left turns will not be permitted into or from the access driveways.

**F. Traffic Engineering, Electrical and Highway Lighting**

1. **Traffic Signals**

The existing traffic signal at the Route 38/Marter Avenue intersection will be replaced to accommodate the proposed intersection improvements. A traffic signal is proposed at the new Briggs Road/Route 38 westbound off-ramp/Zagara’s intersection. A second traffic signal on Briggs Road is proposed at the new Briggs Road/Bishop’s Gate/Route 38 eastbound on-ramp intersection. Existing traffic signal equipment at the Route 38/Briggs Road intersection will be removed.
2. ITS Facilities

ITS Facilities are located in the median of I-295 within the project limits and are also being constructed along Route 38 west of Interchange 40. NJDOT Traffic Operations South has requested that a VMS sign and monitoring camera be provided east of Briggs Road. The addition of this equipment requires that new fiber-optic be placed and connected to the facilities currently under construction.

3. Roadway Lighting

Roadway lighting was recently replaced adjacent to I-295 as part of the I-295 Rigid Pavement Improvement Project. Additional lighting and/or relocation of existing lighting will be required along newly constructed or modified ramps. Lighting along Route 38 will need to be relocated and may need to be updated. Lighting modifications may also be required at the Route 38/Marter Avenue and Route 38/Briggs Road intersections.

G. Constructibility

A constructibility review was performed in January 2003 for the I-295/Route 38 Interchange Improvement Project. Baker senior staff, representing structures, traffic and highways, met to discuss constructibility issues and to devise a staging scheme. The purpose of this review was to present the sequence of the proposed construction staging activities and to detail constructibility issues. Refer to Appendix L for Preliminary Construction Staging Plans that were developed as part of this effort.

Construction Staging

In the Baker plan, construction was broken into five stages. The staging scheme was developed with the intent of performing as much work as possible offline, which would limit the impact to the already congested I-295/Route 38 Interchange. Much of the work can be performed offline due to the existing traffic patterns, which already compensate for three missing direct movements (I-295 southbound to Route 38 eastbound, Route 38 westbound to I-295 northbound and Route 38 eastbound to I-295 southbound). The staging is as follows:

Construction Stage 1

Complete all structural tasks associated with activities over the NJ Turnpike. Tasks to be completed include the following:

- Construction of the semi-direct connection ramp from I-295 southbound to Route 38 eastbound
- Construction of retaining wall as necessary to provide uninterrupted traffic flow on the finger ramp from I-295 southbound to Route 38 westbound
- Construction of the direct connection ramp from Route 38 westbound to I-295 northbound
• Widening of eastbound and westbound portions of the Route 38 structure over the NJ Turnpike
• Relocation of 36" gas line (Williams will perform this work)

Construction Stage 2

Tasks to be completed include the following:
• Construction of improvements associated with the Marter Avenue/Route 38 intersection
• Construction of the ramp from I-295 northbound to Route 38 eastbound and associated deceleration lane along I-295 northbound
• Construction of ramp from Route 38 eastbound to I-295 northbound and associated acceleration lane along I-295
• Completion of ramp from Route 38 westbound to I-295 northbound
• Construction of ramp from Route 38 westbound to I-295 southbound

Construction Stage 3

Tasks to be completed include the following:
• Construction of semi-direct connection ramp from I-295 southbound to Route 38 eastbound

Construction Stage 4

Tasks to be completed include the following:
• Closure of Route 38 westbound structures over I-295 and the NJ Turnpike
• Placement of four lanes of traffic on Route 38 eastbound structure (2 eastbound & 2 westbound)
• Removal and reconstruction of medians on structures over I-295 and NJ Turnpike
• Provision of traffic detour from Route 38 westbound to I-295 southbound via the Marter Avenue/Route 38 intersection
• Provision of traffic detour from I-295 northbound to Route 38 westbound via ramp from I-295 northbound to Route 38 eastbound and then u-turn at Briggs Road/Route 38 intersection
• Shift four lanes of traffic from Route 38 eastbound structure to Route 38 westbound structure
• Provision of traffic detour from Route 38 eastbound to I-295 northbound via u-turn at Briggs Road/Route 38 intersection

Construction Stage 5

Tasks to be completed include the following:
• Provision of traffic detour from Briggs Road/Route 38 intersection east to Route 686 (Hartford Road)
• Construction of grade separated interchange at Briggs Road/Route 38 intersection

Constructibility Issues

The constructibility issues that were identified during the constructibility review are presented below. They are grouped with their associated construction task.

Roadwork Affecting I-295/Route 38

Traffic Operations South submitted a request in Feasibility Assessment regarding the maintenance and protection of traffic during construction. They require that three lanes of traffic be maintained on I-295, in both directions, during peak commuting periods (6 AM to 9 PM). Traffic Operations South also asked that two lanes of traffic be maintained on Route 38, in both directions, during peak commuting periods (6 AM to 9 PM).

Semi-Direct Connection Ramp

The semi-direct connection ramp extends from I-295 southbound to Route 38 eastbound and spans Route 38, I-295, a 36” gas-line and the NJ Turnpike. Building this structure over Route 38, I-295 and the NJ Turnpike will require short roadway closings lasting 15 to 30 minutes at night. Center piers will likely be required in the medians of roadways that are spanned by the semi-direct connection ramp. The 36” gas line adjacent to the turnpike is owned by Williams Gas Pipeline, who will perform any necessary relocation. A modified pier shape that could straddle the gas line may be used in lieu of a physical relocation.

Route 38 Westbound Ramp Bridge to I-295 Northbound

This bridge, which spans the NJ Turnpike, provides the movement from Route 38 westbound to I-295 northbound. This structure will likely require a center pier in the turnpike median. Short nighttime roadway closures lasting 15 to 30 minutes will be required to construct this bridge over the NJ Turnpike.

Widening the Route 38 Structure over I-295

Widening of the existing structures over I-295 is necessary to accommodate the typical section of the Initially Preferred Alternative (IPA). The existing piers and abutments of the two structures need to be widened. Shallow beams should be used to widen the decks so that the already substandard underclearance of 14’-2” on I-295 is not reduced. Lowering the profile of I-295 to correct the substandard underclearance was analyzed and determined to be not feasible. The I-295 profile was already lowered as part of the I-295 Rigid Pavement Rehabilitation Project and the new I-295 pavement box nearly rests on the top of the abutment footings. A potential solution would involve jacking the structure 2.5 feet or replacing the entire superstructure. Either of these solutions will require that all four lanes of traffic be moved onto one structure. The
westbound widening could be completed while traffic is on the eastbound structure and the eastbound widening could be completed while traffic is on the westbound structure. Short nighttime roadway closures lasting 15 to 30 minutes will be required to construct this bridge over I-295.

**Widening the Route 38 Structure over the NJ Turnpike**

Widening of the existing structures over the NJ Turnpike is necessary to accommodate the typical section of the IPA. The eastbound structure is owned by NJDOT, and the NJTA owns the westbound structure. The existing piers and abutments of the two structures need to be widened. Shallow beams should be used to widen the decks so the substandard vertical underclearance of 14’-11” is not impacted. The NJ Turnpike roadway could be milled and resurfaced to meet the NJTA’s minimum vertical underclearance of 15’-0”. Short nighttime roadway closures lasting 15 to 30 minutes will be required to construct this bridge over the NJ Turnpike.

**Briggs Road over Route 38**

The Briggs Road/Route 38 intersection is currently an at-grade intersection. Under the IPA this intersection will become a grade separated interchange. In order to allow the Briggs Road profile to touch down at the signalized intersections north and south of Route 38 the minimum allowable vertical curve should be utilized over Route 38. Retaining walls are proposed near Zagara’s Shopping Center, the Burlington County Engineering Building and possibly in front of of the Johnson and Towers property. Traffic using Briggs Road will have to be temporarily shifted or detoured to allow construction of the interchange. Short nighttime roadway closures lasting 15 to 30 minutes will be required to construct this bridge over Route 38.

**Conclusion**

The IPA for the I-295/Route 38 Interchange Improvement is a complex but constructible project.

**H. Utilities**

Several utility relocations are required to construct the IPA. Proposed pier locations for the SDCR may necessitate the relocation of a Williams 36” gas pipeline located between the NJ Turnpike and I-295. A representative of Williams said that they perform all relocations to their pipeline. Relocations are typically performed in spring or fall. Williams requires six months notice and the typical duration of a relocation of this magnitude is typically two months.

Overhead utilities along Route 38 will have to be relocated to accommodate improvements to Route 38. Additionally, there is a large fiber-optic bank under construction adjacent to Route 38. Plans were not yet available at the time of this submission. As-built should be obtained during Preliminary Design to determine their exact locations. Ramp lighting in the area of Interchange 40 may need to be relocated.
as per proposed ramp modifications. Drainage facilities along I-295, Route 38, Marter Avenue and Briggs Road will need to be adjusted or relocated. A One-Call should occur during Preliminary Design and again before any construction activities take place. Test pits may be required to locate certain utilities.

I. Drainage

Drainage facilities associated with I-295 were updated as part of the I-295 Rigid Pavement Improvement Project. As-built plans depicting the updated systems should be obtained during Preliminary Design to determine what modifications may be required to implement proposed Interchange 40 improvements. Drainage facilities along Route 38 should be inventoried during Preliminary Design to determine which portions of the system should be replaced or modified. NJDOT Traffic Operations South has stated that the storm sewer system that currently services the Route 38/Marter Avenue intersection should be relocated to the Route 38 westbound shoulder. In addition, the drainage ditch bordering the Martin’s Liquors property should be cleaned to prevent recurring maintenance issues.

A detention basin is proposed adjacent to the forward jughandle near Taylor Rental. This basin is part of the Centerton Square development and impacts the current ramp footprint. If the basin is constructed as depicted on the mapping the ramp footprint may need to be revised (more accurate mapping is required to determine the true extent of the impact).

There is also a detention basin present in the southwest quadrant of the Briggs Road/Zagara’s Drive intersection, adjacent to Route 38 westbound. Another detention basin is adjacent to Route 38 near Zagara’s western access drive. Erosion control measures should be addressed in the Soil Erosion and Sediment Control Plans to protect these basins during construction activities.

J. Geotechnical Engineering

1. Skid Numbers

Skid resistance information and the Present Serviceability Index (PSI) for the portion of Route 38 and I-295 within the investigation limits (based on 1994 – 1995 testing) were obtained from the NJDOT – Bureau of Project Support and Engineering, Pavement Management Section. The skid numbers (SN) were compared to the minimum SN (33) at 40 mph by the NJDOT based on *Tentative Skid Resistance Requirements for Main Rural Highways, Report No. 37*, prepared by the National Cooperative Highway Research Board. An average skid number of 45.10 was recorded for Route 38 and 46.75 for I-295 indicating an adequate skid resistance for both roadways. The PSI within the investigation limits (based on 1996 – 1997 testing) was 3.60 for I-295 correlating to a description of good. The section of Route 38 within the project limits was not listed in the 1996 - 1997 Pavement Management Priority List.
2. **Pavement Analysis**

The wearing surface along Route 38 is a bituminous concrete overlay of Portland Cement Concrete (PCC). Pavement on I-295, as per the I-295 Rigid Pavement Improvement Project in 2003, is new and generally 2 inches of Super Pave surface course, with a 3-inch and variable intermediate course over the existing portland concrete cement rigid pavement section. The newly constructed inside shoulder consists of a 25-inch Super Pave Section (2-inch Super Pave Surface Course, 3-inch Minimum and Variable Super Pave Intermediate Course, 8-inch Super Pave Intermediate Course, 4-inch Open Graded Drainage Layer and 8-inch Dense Graded Aggregate). A visual survey was performed to determine a general overall pavement condition for Route 38. The observed pavement condition of Route 38 and the bituminous concrete jughandles was good with no high severity distresses present.

3. **Soil Borings**

A soil-boring program should be developed during PD to collect the soil types and bearing capacities to aid in the construction of the structures proposed under the IPA. Tests for the presence of acid-producing soil should also be conducted in PD and FD.

**K. Survey/Base Plans**

Mapping utilized for feasibility assessment consisted of digitized aerial mosaics with a scale of 1”=100’. Supplemental field survey was collected to analyze the feasibility of providing a flyover semi-direct connection ramp. In addition, mapping was supplemented with aerial mapping as well as available site improvement plans. NJDOT Survey recommends that primary control for this project be re-established instead of attempting to reuse the primary control established for I-295 Rigid Pavement Improvement Project.

Available as-built plans for this area are: Route 295 Section 2J, Route 38 Section 2D & 3A (1964); Route 295 Section 2L & 3A (1970); Route 38 Section 2 (1932); Route 38 Section 3B (1987); Route 295 Section 3E, 2F & 2J (Current construction).

**L. Pedestrian and Bicycle Compatibility**

Route 38, Briggs Road, and Marter Avenue are currently incompatible with pedestrian/bicycle guidelines within the project area, due to the absence of shoulders and bicycle safe inlet grates. Four-foot minimum shoulders are required for pedestrian/bicycle compatibility. Bicycles and pedestrians are not permitted along I-295.

Under the IPA, Route 38 will have 10-foot shoulders throughout the project area. Substandard inlet grates will be replaced with bicycle safe inlet grates throughout the project area. Route 38 is pedestrian and bicycle compatible throughout the project.
area. Route 38 is not compatible east and west of the project area due to substandard inlet grates and the lack of shoulders.

Marter Avenue has ten-foot shoulders within the project limits, but lacks shoulders elsewhere. Substandard inlet grates will be replaced within the project limits. Marter Avenue is bicycle and pedestrian compatible within the project limits.

Briggs Road is bicycle/pedestrian compatible because it provides 4-foot shoulders on the overpass structure over Route 38. Numerous jughandles along Briggs Road within the project area create an environment of merging/diverging that may not be conducive to pedestrian/bicycle traffic even with the presence of 4-foot shoulders.

M. Context Sensitive Design/Aesthetic Involvement

The IPA incorporates feedback from the community which was obtained throughout Feasibility Assessment. Feedback was used to develop feasible solutions that improve roadway operational characteristics in the project area and address concerns raised by the public. This collaborative process led to the reduction of ROW impacts to the Martin’s Liquor property caused by a standard reverse loop ramp. A local road type-design was used to provide the equivalent operational characteristics of the loop ramp while reducing the ROW impact. Collaboration also resulted in the IPA providing revised access to the Taylor Rental property while meeting the operational demands of design year traffic.

The design of the SDCR should take into consideration the role that different structural designs play in the overall aesthetic appearance. In general, structural materials should seek to blend the SDCR into its surroundings and not create a massive presence that overpowers the area around the interchange.

Extensive coordination occurred between NJDOT and the community regarding the development of the Briggs Road/Route 38 intersection. Feedback and site plans from business owners allowed the development of traffic solutions that minimized ROW impacts to businesses adjacent to the Route 38/Briggs Road intersection while distributing a high volume of commuter traffic to their destinations.

N. Environmental

1. Environmental Screening

An Environmental Screening Report was prepared and submitted by Baker in May 2000. A copy of this report has been included in Appendix M. Key findings of the report are:

- Wetlands were identified in the NW quadrant of the Route 38/Marter Avenue intersection. Additionally, there are drainage swales and detention basins
present within the project limits. Impacts to these areas, while not known for certain, are anticipated to be minimal.

- Four sites within the project area were identified as being on the Known Contaminant Sites list. These sites include Taylor Rental, Texaco, U-Haul and Johnson & Towers.

- There doesn’t appear to be any areas within the project limits with cultural or 4f significance.

2. Federal Permits

No federal permits are anticipated for this project.

3. State Permits/Coordination

Environmental permits that are anticipated for this project include:

- NJDEP - Freshwater Wetlands Permit.
- NJDEP - Stream Encroachment Permit.
- NJDEP - Water Quality Certificate.
- NJDEP - Soil Erosion and Sedimentation Control Plan.

NJDOT Bureau of Environmental Services has recommended that this project qualify as a Categorical Exclusion (CE). This recommendation is based upon the project meeting the definition of CE as presented in the NJDOT Procedures Manual and that the project is expected to have minimal environmental impacts. Please refer to Appendix I for correspondence documenting this recommendation.

O. Coordination

Coordination with key stakeholders was maintained throughout Feasibility Assessment. NJDOT conducted coordination meetings with other agencies, local officials and property owners. NJDOT provided the latest project information at these meetings and also responded to individual requests for project information. A list of key stakeholders and a summary of the associated coordination follows:

FHWA

The FHWA attended several project status meetings at NJDOT and provided direction regarding project alternatives, particularly on the issues of Full Build Alternatives versus Partial Build Alternatives and design of the SDCR. The FHWA granted preliminary approval of the Final Revised Interstate Access Request Report on January 7, 2003. This document requested the FHWA's approval of the improvements to Interchange 40 as proposed under the IPA. The final version of this document was
submitted to the FHWA on March 21, 2003. Final approval will not be granted until the NEPA process has been completed.

NJTA

NJDOT submitted the IPA plan to the NJTA to receive their feedback regarding the footprint of the SDCR and the widening of the Route 38 structures over the NJ Turnpike. NJTA requested that footprint of the SDCR be revised because it impinged on their ability to widen the NJ Turnpike in the future. They also stated that widening the Route 38 Structures over the NJ Turnpike would require the use of NJTA personnel and equipment for the maintenance and protection of NJ Turnpike traffic. The NJTA requested that NJDOT review the jurisdiction agreement regarding the NJTA's structure (TPKM03797) over the NJ Turnpike. NJDOT addressed the concerns raised by NJTA and will coordinate with NJTA in subsequent design and construction phases of this project.

DVRPC

The DVRPC Regional Traffic Model was utilized to complete the traffic analysis and modeling of the Interchange 40 Improvement Project. The DVRPC model was used to help develop the future traffic demands that will be placed on Interchange 40 and the adjacent local roadway system.

NJDEP

NJDOT contacted NJDEP during the Concept Development phase of this project to inquire about potential impacts to cultural/environmental resources within the project area. NJDEP – HPO responded that there were some potential cultural resource impacts in the project area. Coordination with NJDEP will continue in Preliminary and Final Design to secure the permits listed under the Environmental heading of this section of the Feasibility Assessment Report.

Burlington County/Moorestown Township/Mount Laurel Township

The local municipalities and the county engineering office were instrumental in helping NJDOT coordinate with local business and property owners. The county engineering office provided their facilities numerous times for meetings and helped contact/identify key stakeholders.

Property Owners

Property owners were invited to see the proposed alternatives for the Interchange 40 Improvement Project and to offer their suggestions. Feedback from property owners was utilized to develop the IPA.

Developers

NJDOT's coordination with developers in the project area included meetings and fulfilling project information requests. Baker updated project mapping upon receiving approved land development plans from developers. Extensive coordination occurred
with DDR, the Centerton Square Developer, regarding the placement of the SDCR. Impacts to the Centerton Square site plan were reduced to the extent possible.

**Internal NJDOT**

NJDOT assembled a Core Group comprised of the following NJDOT departments:

- Project Planning and Development
- Project Management
- E-Team
- Access Design
- Major Access
- Value Engineering
- Structural Design
- Right of Way
- Traffic Signal & Safety Engineering
- Traffic Engineering & Safety Programs
- Community Relations
- Mobility Strategies
- Geometric Design

These NJDOT departments met regularly with NJDOT-DPPD at Core Group Meetings to provide feedback and direction regarding proposed alternatives and project issues.

Coordination with key stakeholders during the upcoming design phases, and later during construction, will be integral to the success of this project. NJDOT plans on staging additional Public Information Centers and will also seek to coordinate design/construction with ongoing development.
V. SUMMARY OF KEY ISSUES

Key issues of the Interchange 40 Improvement Project are:

- The IPA provides a feasible solution to the existing and future congestion problems at Interchange 40 and the local roadway system.
- Staging of construction and traffic impacts
- Relocation of an existing 36” gas pipeline
- Utility contact early in PD for test pits and subsurface exploration
- Coordination with NJTA, FHWA, local officials and property owners
- Coordination with the Centerton Square Development
- Coordination with the Burlington County’s Smart Growth Plan
- Conformity with Smart Growth Initiatives
- Design exception for substandard vertical underclearance under the widened Route 38 structure over I-295
- Design exception for substandard horizontal SSD on the SDCR
- Maintaining access to businesses during construction
- Continued Public Involvement
- Bicycle/Pedestrian Compatibility (Baker recommends that a Bicycle/Pedestrian Compatibility Study be performed during PD)

VI. SCOPE OF WORK FORMS

A completed copy of the NJDOT Office of Budget Development & Analysis Project Scope of Work Form is provided in Appendix N.