ACTT WORKSHOP

New Jersey

November 16 - 18, 2004 | Cherry Hill, New Jersey

DEPARTMENT OF TRANSPORTATION
THE STATE OF NEW JERSEY

U.S. Department of Transportation
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Executive Summary

Accelerated Construction Technology Transfer (ACTT) is a strategic process that uses innovative techniques and technologies to reduce construction time on major highway projects while enhancing safety and improving quality. The process is implemented by conducting 2-day workshops for State Departments of Transportation (DOT). The American Association of State Highway and Transportation Officials (AASHTO) and the Federal Highway Administration (FHWA) jointly fund ACTT workshops.

In November 2004, the New Jersey Department of Transportation (NJDOT) hosted its second ACTT workshop, bringing together transportation professionals from around the Nation. The 82 attendees at the workshop included 29 national experts and 53 local subject matter experts, including the design consultant and representatives from NJDOT, the FHWA divisional office, and other public agencies.

The primary objective of the workshop was to draw on the expertise of participants to help NJDOT achieve its primary goal of minimizing construction time for its I-295/I-76/SR-42 interchange project while minimizing use of secondary roads during construction and maintaining the existing number of lanes from 5:00 a.m. to 11:00 p.m. The purpose of the $300 million project is to totally reconstruct the severely substandard interchange located southeast of Philadelphia. With over 250,000 vehicles going through this interchange daily, capacity is a principal reason for this undertaking. The absence of a direct connection forces through-traffic from I-295 onto a series of ramps, where it mixes with traffic from other highway systems. As a result, the interchange ramp system experiences operational failures in many locations and has accident rates significantly in excess of the statewide average. The project is arguably among the Nation's most challenging, ranks among the most congested, and according to former Commissioner Jack Letteire, it is the most important for the region. The project is currently undergoing the NEPA process, which is to be completed in 2006. Construction is to begin in 2009.

At the opening session on November 16, Mr. Letteire kicked off the workshop by welcoming the participants and challenging them to get creative and identify methods and measures that could help achieve project goals as he posed the question, "Do we have to take 3 to 5 years to complete the project or can we do it in 2 years?" Neil Hawks, Director of the Transportation Research Board's (TRB's) Special Programs, delivered the "Why ACTT? Why Now?" session very effectively as he conveyed the importance of accelerating the transfer of technology as well as accelerating construction. The opening day concluded with a project overview by the project management team and a bus tour of the project site.

The skill sets selected by NJDOT prior to the start of the workshop were: Structures, Geotechnical, Innovative Contracting/Financing, Traffic/ITS/Safety, Public Relations, Environmental, Construction, and Roadway/ Geometric Design. Workshop participants took the Commissioner's challenge to heart and produced a highly successful workshop. Each skill set team focused on how the ACTT process applied to the specific concerns of their area of expertise, while collectively, the teams searched for methods/measures to help NJDOT achieve its project goals. The skill set teams presented numerous recommendations, many of which were deemed viable solutions and will be pursued, according to NJDOT. Among the many recommendations presented were:

- Advance purchase/fabrication of the structural components including sub/super structures and railroad structures.
- Consider the use of high-performance materials like HPC/HPS and technologies like self-propelled modular transporters (SPMT), girder launching/skidding, roll-in, and vertical lifting.
- Keep the embankment height low and use lightweight fill material like geofoam, foamed concrete, wood fiber, shredded tires, etc.
- Use high-capacity piles to reduce the number and cap size. Use augered piles where vibration is a major issue. Test piles during the design phase.
- Consider a right-of-way (ROW) lease-purchase (annuity) option for long-term financing.
- Meet with Bellmawr Park Community residents to discuss impact mitigation options like the use of undeveloped land adjacent to the park for relocation, use of open space within the park, and/or the construction of higher density units along the alignment within the park.
- Deploy a communication plan that includes:
  - Establishing a visible friendly presence in the community via a mobile information center.
  - Developing a newsletter for community residents, elected officials, and community leaders with projected details and milestones.
  - Employing a full-time communication professional.
  - Establishing a mobility strategy group to provide and promote alternate transportation choices.
  - Providing frequent updates to elected officials to include project tours.
- Modify the design by raising Browning Road to:
  - Reduce height of I-295 mainline structures.
  - Enhance mainline geometrics.
  - Reduce noise and visual impacts.
  - Reduce cost by $50-$100 million.

With the workshop now completed, it remains for NJDOT to sift through the various workshop ideas/recommendations and decide which ideas should be implemented in future planning, design, and construction phases of the interchange.

CHAPTER 1

Accelerated Construction Technology Transfer

Highway construction continues to produce significant disruptions in communities across the Nation as departments of transportation work to update an aging infrastructure system. While highway construction is unavoidable, excessive construction time is unnecessary and should be avoided because it is costly and exposes workers and the traveling public to substandard conditions. The ACTT initiative aims to minimize travel delays and community disruptions by reducing cost and construction time and improving quality, traffic control, and safety.

1.1 Background

ACTT is a process that uses innovative technologies and methods to accelerate the construction of major highway projects to reduce user delay and community disruption. A complete accelerated construction approach involves evaluating the planning, design, and construction activities within a highway corridor using multiple strategies and technologies. Successful ACTT deployment requires a thorough examination of all facets of a highway corridor with the objective of improving safety and optimizing cost effectiveness while minimizing adverse impacts for the benefit of the traveling public.

Recommendations in Transportation Research Board (TRB) Special Report 249, "Building Momentum for Change: Creating a Strategic Forum for Innovation in Highway Infrastructure," called for creating a strategic forum to promote accelerated construction in the highway infrastructure. As a result, TRB Task Force AFH35T (formerly A5T60) was formed with the following objectives:

- Facilitating the removal of barriers to innovation.
- Advocating continuous quality improvement and positive change.
- Enhancing safety and mobility.
- Encouraging the development of strategies that generate beneficial change.
- Creating a framework for informed consideration of innovation.

Fully supporting the task force's mission and objectives, the FHWA and the Technology Implementation Group (TIG) of AASHTO joined the task force in an outreach effort. The result was the formation of a national resource pool known as the "National Skill Sets Council" and completion of two ACTT pilot workshops (one in Indiana and one in Pennsylvania). Following the pilot workshops, TRB Task Force AFH35T transferred the concept to FHWA and AASHTO to continue the effort by conducting future workshops.

CHAPTER 2

Project Overview

The purpose of this project is to improve safety and reduce traffic congestion at the intersection of I-295, I-76, and SR-42. The project will address quality-of-life issues as they relate to the motorist, residents, and the environment.

Presently the I-295, I-76, and SR-42 interchange does not provide a direct connection for I-295 through traffic. The existing interchange requires motorists to reduce speed in both directions of I-295 so that they can safely negotiate ramps with 35 mi/h (56 km/h) speed limits.

Exacerbating the problem is the fact that drivers traveling through the interchange on I-295 must also contend with vehicles entering from SR-42 and I-76, necessitating dangerous weaving movements. As a major carrier of Philadelphia commuter traffic via the Walt Whitman Bridge and a connection to the southern New Jersey shore via SR-42 and the Atlantic City Expressway, this interchange is the busiest in the region.

High volumes of traffic, low mainline design speed, the complex configuration of the interchange, and the weaving movements combine to cause a high incidence of motor vehicle accidents.

2.1 Schedule

The following is a preliminary schedule for the development of the required improvements.

Develop Alternatives	2001-2003
Technical Studies/Alternatives Analysis	2004
Draft Environmental Impact Statement	2005
Final Environmental Impact Statement	2006
Design	2007-2009
Construction	2009-2012

2.2 The Study Area

The I-295, I-76, and SR-42 interchange is located within areas of the Borough of Bellmawr, Borough of Mount Ephraim, and Gloucester City. While the proposed project is primarily focused upon the interchange of the three highways, the project study area encompasses a larger area than the interchange itself. This is necessary to ensure that all prudent and feasible alternatives and potential impacts are examined in the project vicinity. The study area includes I-295, beginning in the north at the Pennsylvania-Reading Railroad tracks (just south of Collett Street, James Avenue, and Route 168) to the south ending at Creek Road (County Route 753). On I-76, the western limit of the study area is the Market Street (County Route 634) bridge over I-76. On SR-42, the project's eastern limit is the extension of Heller Road and Leaf Street, east of Windsor Creek Road.

While the proposed project is primarily focused upon the interchange of the three highways, the project study area encompasses a larger area than the interchange itself.

2.3 Background Studies

Between 1985 and 1987, an investigation into the possibility of creating a direct connection with a design speed of 70 mi/h (112 kn/h) was performed. Because it accommodates an optimal design speed, this straightened alignment is preferred from a traffic standpoint, but it would require the taking of a substantial amount of residential properties in the community of Bellmawr. Because of this, NJDOT decided to forego

any further detailed data collection and/or analysis of this concept, which has come to be known as the "Unrestricted Alternative."

NJDOT's Bureau of Project Scope Development was then given the assignment to evaluate and develop new conceptual solutions for improving the interchange. Thus far, twelve individual concepts have emerged that seem to be workable from strictly a constructibility standpoint. These concepts depict how design speed, while not attaining the desired 70 mi/h (112 kn/h), can be increased up to 60 mi/h (96 mi/h). Even without the benefit of detailed environmental studies and public or outside agency input, it can be observed that each concept would have some impact to at least one known environmentally sensitive resource.

A key objective of the current phase of NJDOT's effort to improve the I-295/I-76/SR-42 interchange is to evaluate all of the potential impacts of these concepts. Coordination and open lines of communication with the surrounding communities and regulatory agencies will be paramount in the consensus building required to make the necessary decisions on this regionally significant project.

Subsequent to the development of the current alternative concepts for the I-295/I-76/SR-42 interchange, the SR-42 widening project provided an additional fourth lane of travel for vehicles on SR-42 into and out of the interchange to the south. The new lane also eliminates the southbound weaving between I-76 to I-295 and the I-295 to SR-42 movements.

To meet Federal transportation regulations, NJDOT, in conjunction with the Delaware Valley Regional Planning Commission (DVRPC), undertook a transportation investment study (TIS). This study is to provide decisionmakers with comprehensive multimodal alternatives to address identified transportation deficiencies within this area. Included in the TIS is a congestion management study (CMS) that identifies travel demand reduction strategies and operational improvements that complement a potential investment. The initial results of this study confirm a continued need for the direct connection of I-295 movements through the interchange.

Efforts associated with the development of an environmental impact statement (EIS) include:

- Project partnering.
- Screening.
- Topographic survey.
- Community involvement.
- Traffic count program.
- Development of alternatives.
- Environmental baseline evaluations and analysis.
- Technical environmental studies.
- Preparation of an EIS and a selection of an initally preferred alternative.

2.4 Public Participation

Public participation is an important component of all NJDOT projects. NJDOT has created a comprehensive public involvement action plan and an outreach program to include the public in the decisionmaking process and include their comments and concerns throughout the project. These include:

- Web site.
- Newsletter.
- Newspaper announcements and mailings.
- Audio simulations of before and after noise impacts.
- Graphic lighting simulations for the alternatives.
- Traffic simulation and animations.
- Meetings with community advisory committees and local public officials.
- Public outreach meetings.

2.5 Project Objectives

The project objectives are:

- Provide direct connectivity for I-295.
- Reduce crash rates (currently exceeding 4x the statewide average).
- Reduce congestion (identified as one of the 10 most congested locations in New Jersey).
- Improve traffic operations for:
  - The through-traffic on I-295, I-76, and SR-42.
  - The weaves on I-295 between SR-42 and SR-168.
  - The weaves on I-76 between Market Street and I-295.
  - The weaves on SR-42 between I-295 and Creek Road.
- Reduce geometric deficiencies.
- Improve emergency response operations.
- Accommodate environmental concerns.
- Improve quality of life.

The estimated cost ranges from greater than $150 million for the least costly alternative to more than $500 million for some of the more costly alternatives.

2.6 Skill Set Description and Goals

The following is a brief description of each skill set and its project-specific goals for the workshop.

2.6.1 Environmental Skill Set

Scope-of-work and construction activities need to reflect environmental concerns to ensure the most accommodating and cost effective product while minimizing natural and socioeconomic impacts.

Environmental Goals:

- Minimize impacts to Little Timber Creek and associated wetlands.
- Conform to New Jersey Department of Environmental Protection (NJDEP) stormwater regulations.
- Mitigate noise and air issues associated with the "tunnel."

Figure 1. Map of project area.

- Minimize impacts to Section 4(f) properties.
- Minimize impact to Bellmawr Park Mutual Housing.

2.6.2 Roadway/Geometric Design Skill Set

Highway geometrics can have a great impact on project funds and integrity. Although designers may have several options meeting design standard requirements, identifying the most accommodating product while minimizing impacts should be the objective.

Roadway/Geometric Design Goals:

- Maintain 60 mph (97 kph) and 45 mph (72 kph) design speeds for mainline and ramps, respectively.
- Provide a typical section that minimizes design exceptions (i.e., full shoulders).
- Maximize weaving lengths with adjacent interchanges.
- Provide two-lane ramps where volumes justify it.

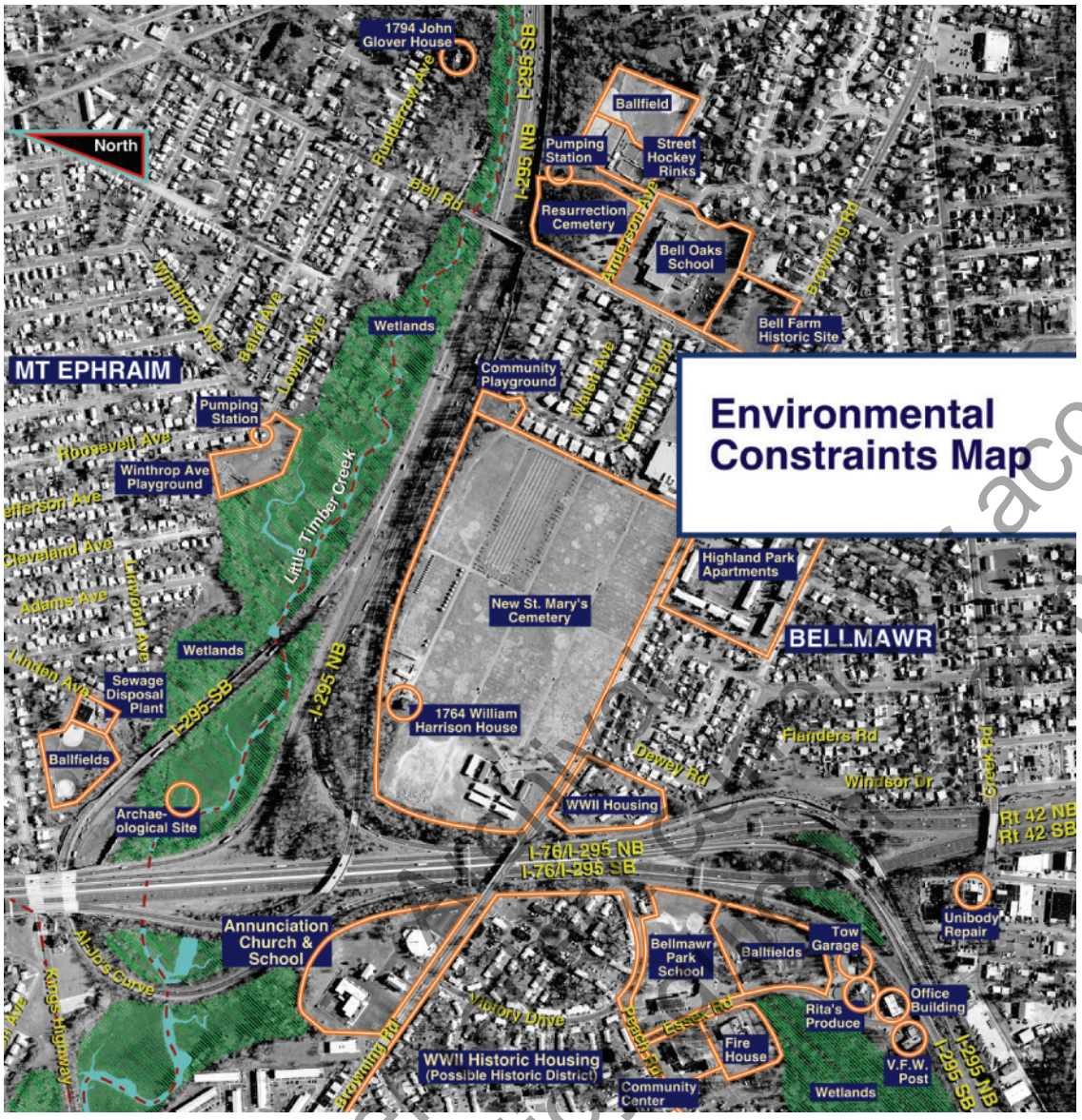

Figure 2. Map of project area.

2.6.3 Geotechnical Skill Set

Geotechnical subsurface conditions and issues should be explored to assess their impacts on the project. Based on the geography of the project, subsurface investigations may be complicated by traffic volume, wetlands, utilities, railroad property, and right-of-way (ROW). The use of innovative materials should be explored and encouraged on projects to maximize the creative characteristics of the designer and contractor. By identifying project performance goals and objectives, the designer and contractor have the maximum freedom to determine the appropriate methodology for constructing the project.

The length of the underpass in Alternative K is also of concern, due to motorist safety and hazardous cargo issues.

Geotechnical Goals:

- Construction of underpass structures to minimize construction duration and impact to the traveling public.
- Mainline underpass that is not classified as a "tunnel."
- Retaining wall systems that satisfy roadway geometric, construction staging, and ROW constraints.
- Means of addressing existing pile foundations at locations where geometrics require the construction of new substructure units.

2.6.4 Structures Skill Set

The existing I-76/SR-42 corridor through the Browning Road area is striped to provide minimal shoulders and has private property improvements immediately adjacent to the existing ROW. The proposed Direct Connection alignment will require the construction of new roadways (elevated and/or depressed) crossing the corridor at flat angles and retaining walls adjacent to the existing ROW. Several local roadways and a railway cross the I-76/SR-42 and I-295 corridors, which will require replacement to accommodate the improvements. The existing structures are generally supported on timber pile foundations. The corridors also have existing noise barriers that will need to be maintained and potentially supplemented.

It is desirable to provide low-maintenance, economical, and aesthetically pleasing structures that minimize adverse project impacts (ROW, maintenance and protection of traffic (MPT), construction duration, and environmental).

Structure Goals:

- Low-maintenance, economical, and aesthetically pleasing bridge types that satisfy roadway geometric, construction staging, and MPT constraints.
- Retaining wall systems that satisfy roadway geometric, construction staging, and ROW constraints.
- Bridge types and means of construction to minimize construction and duration for replacement of existing bridges.
- Means of addressing existing pile foundations at locations where geometrics require the construction of new substructure units.
- Construction of underpass structures to minimize construction duration and impact to the traveling public.
- Use of prefabricated components where practical.
- Use of high-performance materials where practical.

2.6.5 Traffic/ITS/Safety Skill Set

Enhanced safety and improved traffic management by corridor contracting should be considered. Developing and evaluating contract models may illustrate the best use of incentives to enhance safety and improve traffic flow during and after construction. Evaluating both the construction and maintenance work may help assess traffic and safety issues more fully than the conventional project-by-project approach. Another goal is to provide better information to the traveling public and politicians on the relationships among crashes, delays, mobility, total traffic volume, truck traffic volumes, and the need for lane closures during construction. Implementing integrated ITS systems to communicate construction information to motorists via radio,

Internet, and wireless alerts, along with incident management systems/services will be considered.

Traffic/ITS/Safety Goals:

- Maintain existing number of lanes on I-295/I-76/SR-42 from 5 a.m. to 11 p.m.
- Maintain one lane of travel in each direction and a sidewalk at each local road crossing.
- Minimize impact to traffic.
- Clear and well-signed traffic patterns.
- Ensure contractor and motorist safety.
- Incident management systems.
- Media relations.

2.6.6 Construction (Techniques, Automation, and Constructability) Skill Set

Accelerated construction may increase the challenge for the contractor to deliver a quality product in confined time frames and areas, while maintaining traffic. Completion milestones and MPT are key elements visible to the traveling public. Allowing contractors to have input during the design process on design elements that would have an impact on time or quality during construction can improve the effectiveness and efficiency of the overall project completion. The use of the latest technology to enhance construction equipment performance, construction engineering and surveying, data collection and documentation, and contract administration should be explored and implemented.

Construction Goals:

- Staging.
- Contractor staging area.
- Minimize impact to traffic.
- Multiple contracts versus large contract.
- Minimize cost and duration.

2.6.7 Innovative Contracting/Financing Skill Set

It is important to align the financing options with the goals of the project by matching anticipated cash flow with project management, while recognizing competing priorities for existing resources. Financing tools could include cost sharing strategies, tolling mechanisms, contractor financing, leveraging techniques, credit assistance, and cost management and containment concepts.

State of the art in contracting practices should be explored to obtain a better knowledge of how these techniques could be selected, organized, and assembled to match the specific situations needed on this project. Techniques to be considered include performance-related specifications, warranties, design/build, maintain, operate, cost + time, partnering escalation agreements, lane rental, incentive/disincentives, value engineering, and any other innovative contracting techniques that would apply to the project.

Innovative Contracting/Financing Goals:

- A+B bidding.
- New construction methods to encourage contractors to speed up construction.
- Partnering to speed up the decisionmaking process.
- Advanced construction contracts.

2.6.8 Public Relations Skill Set

Partnering with the local community, including elected officials, community groups, and emergency management personnel should be considered. Proactively engage the traffic reporting agencies and media to gain support for the project. Explore the development of a local/State team for emergency response and incident management. Identify and deploy best practices for information deployment to local business, organizations, and community members.

Public Relations Goals:

- Gain acceptance of the community for accelerated construction.
- Develop a plan for engagement of the community to communicate how acceleration would work and the benefits to the community.
- Minimize community impacts.
- Minimize use of secondary roads during construction.
- Collaborate on emergency response and incident management with the community.
- Publicize the project well in advance to allow the public to change/adapt to patterns.
- Collaborate with the media on traffic mitigation.
- Develop a strategic marketing plan to ease congestion during construction using traffic mitigation tools.

CHAPTER 3

Workshop Recommendations

3.1 Environmental Skill Set

Constraints and Opportunities

1. Natural Resources:
- Stormwater–must consider stormwater options early:
  - Affects ROW needs.
  - Affects project cost (design, construction, ROW, and mitigation).
  - Affects constructibility.
  - Affects geometry (need greater design detail).
  - Avoid violations during construction.
  - Little Timber Creek ecosystem.
  - Pursue diverging Ramp B and C alternative proposed by geometric skill set to provide significant wetland credit and stormwater opportunities:
    - Remove two stream crossings on Al-Jo's curve.
    - Maximize floodplain and wetland creation and restoration.
    - Add bioretention in reclaimed areas.

2. Bellmawr Park Community:
- Avoid/minimize impacts by redesigning Ramp F.
  - Meet with Bellmawr Park residents and association to identify preferred solution(s) to potential impacts. Some mitigation options identified are:
    - Utilize undeveloped land adjacent to Bellmawr Park for relocation.
    - Utilize open space within the Bellmawr Park community.
    - Construct higher-density units along alignment within Bellmawr Park to replace affected units.
    - Relocate community facilities to area adjacent to highway and construct new housing in their place.
    - Offer buy-out option to residents (not just affected residents) in order to acquire units for relocation for affected residents who wish to remain in Bellmawr Park.
    - Address Section 106 considerations.

3. Baseball Fields:
- Reconstruct an urban deck in the depressed section alternative.

4. Noise Impacts:
- Limited mitigation options are available on stacked alternative.
- Address increased noise impacts at tunnel portals.
- Utilize quiet paving throughout project.
- Utilize noise absorbing materials on structures.

5. Visual Impacts:
- Develop appropriate modeling to assess and communicate visual impact of alternatives.
- Consider context when designing structures.
- Height.
- Aesthetic treatments.

6. Tunnel/Underpass:

- Select location of tunnel/underpass portals to avoid impacts to sensitive receptors.
- Consider multiple depressed sections to:
  - Minimize visual, noise, and traffic impacts.
  - Optimize constructibility and use of space.
  - Avoid need for detour routes for hazardous cargo.

3.2 Roadway/Geometric Design Skill Set

1. Evaluate alternate Ramp A connection with Missing Moves I-295 SB Ramp (SR-42 NB to I-295 NB).

Pros:

- One primary decision point for SR-42 NB traffic heading towards I-295.
- Eliminates separate Ramp A exit and one decision point along SR-42 NB.
- Moving ramp entrance reduces number of weaving sections along SR-42.
- Continued benefit of longer distance to execute weave between this interchange and SR-168 Interchange.
- Majority could be built off line. One less movement that has to be maintained within interchange during construction.
- Improved likelihood of providing a two-lane entrance with I-295—2400 ft (720 m). Current design has two-lane SR-42 takeoff that necks down to one lane prior to merge with I-295.
- Simplified bridge. Eliminates challenging elevated connection to I-295 mainline.
- Simplified signing.

Cons:

- Potentially worsens weaves between SR-55 and Missing Moves ramp.
- Missing Moves ramp may not be able to handle increased volume even if increased to two lanes. Missing Moves ramp already services both Leaf Ave and I-295 SB.
- Additional ROW impacts and/or takings including new impacts to commercial properties along Creek Road.
- Portion of alignment on inactive landfill requiring likely use of same geofoam roadway section being used in Missing Moves project—increased cost.
- Original concept does not accommodate local traffic, industrial park traffic, and state trooper access to I-295 NB (see below).
- Major impacts to Missing Moves project schedule and environmental documents if incorporated into that project.

2. Evaluate Ramp A connection through variation of original Alternative D concept.

Pros:

- Avoids Ramp A on structure over I-76.
- Continued benefit of longer distance to execute weave between this interchange and SR-168 interchange, however less than current scheme.
- Elevated section would still lessen potential impacts to properties to remain along Fir Place.

Cons:

- Still requires complex structural connection to I-295 mainline bridge.

- Constructibility–footprint over existing ramp network.
- Affects mausoleum. Would require additional shifting of mainline north into floodway/floodplain.

3. Evaluate single two-lane takeoff for Ramp F and Ramp D (I-76 SB to I-295 NB and SB, respectively).

Pros:
- One primary decision point for I-76 SB traffic heading to I-295.
- Eliminate Ramp F exit and one decision point along I-76 SB.
- Could move Ramp C bullnose north to improve weave to Leaf Ave.
- Eliminating Ramp F through Bellmawr Park reduces property impacts and roadway footprint.
- Eliminate need for large retaining walls between Ramp C and Ramp F.
- Eliminate bridge for Ramp F and Ramp C crossing if reuse of Al-Jo's curve is pursued.
- Simplified signing.

Cons:
- Combined ramp volumes of 2,300 a.m. peak and 3,200 p.m. peak may be too high to be supported on two-lane ramp.
- Requires complex structural connection to I-295 mainline bridge.
- Could worsen weave for traffic from Market Street.
- Reversing curves will be difficult to properly superelevate.
- Not compatible with Ramp C over I-76.

4. Evaluate single takeoff for Ramp B and Ramp C (I-295 to I-76 NB and SB, respectively).

Pros:
- One primary decision point for I-295 SB traffic heading toward I-76.
- Eliminate Ramp B exit and one decision point along I-295 SB.
- Increased weave distance for SR-168 on ramp.
- Improved driver expectancy if Ramp C under I-76 pursued.
- Alignment shift could potentially minimize creek impacts.
- Simplified signing.

Cons:
- Combined ramp volumes of 4,200 a.m. peak and 4,000 p.m. peak would likely require three-lane exit.
- May not have sufficient length to develop profile for Ramp C under I-76.
- Reversing curves will be difficult to properly superelevate, leading to high crown line break between lanes.
- Gore grading/drainage could be undesirable–drain across mainline.
- Could worsen weave from SR-168.

5. Evaluate improvements to the Leaf Avenue Interchange along SR-42 NB.

Pros:
- Maintains connectivity to I-295 and SR-42 NB for locals and commercial properties along Benigno Boulevard.
- Potentially improves exit to Benigno Boulevard–longer queue.

- Potentially eliminates need for traffic signal at Benigno Boulevard–less conflict.
- Leaf Avenue local on ramp would only need to be one lane connection to I-295.
- Opportunity to cul-de-sac Wellwood Avenue and/or vacate in conjunction with adding left turn lane on Creek Road.
- Eliminates single exit for I-295 SB and Benigno Boulevard in Missing Moves project.
- Improves driver expectancy for Benigno Boulevard movement.
- Most "pros" from first item still applicable.

Cons:

- Requirement improvements cited in first item–connection to Missing Moves ramps.
- Missing Moves flyover ramp could require widening to two lanes.
- Most "cons" from first item still applicable.
- Revisions to Missing Moves project would likely delay that project.
- One lane Ramp A would still require complex midspan connection.

6. Evaluate realignment of Essex Avenue with Harding Avenue.

Pros:

- Could be integrated with modifications to alternatives that shift alignment into ball fields.
- Provides improved connectivity to SR-42 SB. Eliminates need for left turn from Essex and left turn from Creek Road.
- Eliminates T-intersection configuration of Essex Ave and Creek Road.
- Reduces structure length if variation for Ramp A from Missing Moves is pursued.

Cons:

- Could potentially worsen Creek Road level of service (LOS).
- Could require a traffic signal at Creek Road.
- Limited, if any, specific benefit to the project purpose and need–scope creep.

7. Investigate benefits of maintaining existing alignment along Al-Jo's Curve for Ramp C movement (I-295 to I-76 SB).

Pros:

- Already being investigated as part of the technical environmental study (TES) effort for Alternates D1 and H2.
- Possibly avoid new structure crossing of I-76. Currently requires widening along I-76 SB and possible deck replacement for NB due to elimination of express/local configuration.
- Avoid long span curved Ramp C bridge over I-76.
- Improved elevation differentials along Bellmawr Park versus Ramp C over or under schemes.
- Potential staging benefits. Limit I-76 maintenance and protection of traffic (MPT) if existing underpass maintained.

Cons:

- Public perception that major roadway deficiency is not being eliminated.
- Existing substandard underclearance.
- Existing substandard radius and stopping sight distance for 45 mi/h (72 km/h) design speed.

- Providing required radius could affect additional environmental resource and church property.
- Reduction in wetlands available to be restored. Existing creek crossing not eliminated.

8. Investigate required number of lanes along I-295 through interchange and/or reduced roadway section with 12-ft (3.6-m) outer shoulders.

Pros:
- Reduced structure width and cost. Even larger benefit realized with underpass/tunnel and stacked alternatives.
- Reduced footprint through Bellmawr Park.
- Improved ability to develop multilane ramps–2,400 ft (720 m).

Cons:
- Deviates from established project goal of maintaining three-lane I-295 roadway in each direction.
- Preliminary traffic analysis indicates nominal improvement.
- Proposed 16- and 17-ft (4.8- and 5.1-m) shoulders meet posted 55 mi/h (88 km/h) speed–more approvable design exception. The 12-ft (3.6-m) shoulders meet less than 45 mi/h (72 km/h) design speed.
- Perception of being short sighted with respect to traffic increases.

9. Investigate improvements to the Market Street/Rte 130 I-76 SB on-ramp.

Pros:
- Could improve Market Street/Rte 130 to Ramp D weave by reducing on-ramp turbulence.

Cons:
- Higher Market Street on ramp volumes could be function of non-existent Missing Move ramps–U-turns.

3.3 Geotechnical Skill Set

Focus:
- Accelerate Construction.
- Minimize impact on:
  - Community.
  - Existing traffic.
  - Existing structures.
- Improve safety.

1. Depressed Roadway/Urban Decks

Pros:
- Minimal impact to existing traffic.
- Improved work zone safety (versus bridge construction).
- Reduced noise.
- Context sensitive solution (open space).

- Work underground 24/7.

Cons:
- Cost.
- Spoils.

2. Jacked Boxes:
- Jacked sections (under live traffic).
- Under 800 ft (240 m), not classified a tunnel.
- Use in conjunction with cut and cover.
- Minimal impact to traffic.
- Locations:
- I-295.
- Ramp C (under Browning, Ramps B, D, and I-76).
- Under all existing roadways.

3. Cut and Cover:
- Slurry wall construction.
- Top down.
- Precast decking.
- Work below covered area.
- Minimal impact to traffic.

4. Embankments:
- Keep heights as low as possible.
- Use lightweight fills liberally.
- Advanced construction contract.

5. Lightweight fill materials:
- EPS geofoam embankments.
- Lightweight foamed concrete.
- Shredded tires.
- Numerous facing/aesthetic treatments.

Fill Type	Range of Density (kg/m3) [lb/ft3]
Geofoam	14 to 30 [1-2]
Foamed Concrete	335 to 770 [20-50]
Wood Fiber	550 to 960 [35-60]
Shredded Tires	600 to 900 [35-55]
Expanded Shale or Clay	600 to 1040 [35-65]
Flyash	1120 to 1440 [70-90]
Boiler Slag	1000 to 1750 [65-110]
Air Cooled Slag	1100 to 1500 [70-95]

6. Shredded tires:
- Use of waste material.
- FHWA guidelines.

7. Earth retaining structures:
- MSE walls.
- Soil nailing.
- Secant walls.
- Anchored walls.
- Gravity walls.

8. Secant pile wall system

9. Deep foundations:
- High-capacity piles.
- >200 tons.
- Fewer piles.
- Smaller cap.
- Less noise.
- No spoils.
- Simplify quality control (QC), dynamic testing, inspection.
- Augered (drilled shafts, micropiles).
- Where vibrations are a major issue (<100 ft [30 m]).
- Advanced construction contract.
- Design phase load test program.

10. Cross-discipline:
- Safety.
- MOT.
- Access/laydown.
- Material availability.
- Contracting mechanism.
- Contaminated soil.
- Utilities.

3.4 Structures Skill Set

Get In, Get out

1. Bridges:
- Prefabrication of any bridge, bridge elements, and structural systems.
- Advance purchase/fabrication of structural components.
- Superstructures.
- Deck systems.
- Substructures.

- Roll-in railroad structure.

2. Walls–select based on construction speed and design needs:
- MSE walls.
- Sheeting with or without facade.
- Post and panels.
- Modular walls.

3. Technology:
- High-performance concrete (HPC) and high-performance steel (HPS).
- Lighter loads.
- Shallower system.
- Bridge movement system.
- Self-propelled modular transport.
- Girder launching/skidding.
- Roll in.
- Vertical lifting.

4. Stay Out:
- HPC and HPS.
- Low-maintenance structures (no tunnel).
- Quality and durability–integral abutment bridges.
- Inspectibility without affecting traffic.
- Future redecking.
- Automated deicing on deck of big bridge and flyovers.

5. Miscellaneous:
- Design with these items–lock in transportability.
- Set construction duration.
- Project-wide Web-based electronic communication plan.
- Electronic shop drawings.
- Electronic design submittals.

6. Suggestions to Alternative D:
- Investigate depressed Ramp C and make Ramp D flyover.
- Investigate eliminating Ramp F by combining with Ramp D and bring it to the big bridge.
- Investigate taking all I-295 traffic off SR-42 NB at Missing Move ramp.

3.5 Traffic/ITS/Safety Skill Set

1. Identify closure hours/options:
- Monday through Thursday (11 p.m.–5 a.m.), except weekends/holidays; summer period–May 15 to September 1.
- Tailor hours to actual volumes and capacities on mainline and ramps.
- Evaluate noise ordinance restrictions; seek waivers.
- Consider special/sports event impact.

- Shoulder/median can be used as through lane.
- Multiple shifts and night work should be considered.
- Ensure current and reliable counts.
- Moveable barrier (reversible lane).

2. Identify alternate routes:
- Identify routes such as NJTPK, SR-130, SR-41, SR-47, SR-168, and local roads.
- Identify and involve stakeholders, including Pennsylvania DOT and Delaware DOT.
- Identify opportunities for improved efficiencies on alternate routes (variable-use lanes; restrict movements on SR-168 and SR-130, signal timing, signing and striping modifications, and intersection improvements).

3. Staging components:
- Consider staging sequence to minimize road user impact.
- Sequencing key phases.

4. Public transportation alternatives and incentives:
- Port Authority Transit Company (PATCO).
- New Jersey Transit.
- Free/discounted passes, HOV discounts.
- Park 'n Ride (temporary leases or permanent) discounts.
- Cross County Connection, TMA.
- Include in budget to accommodate additional alternatives.

5. Smart Work Zone Concept:
- Provide travel times for existing and alternate routes.
- Provide detector and camera information.
- Evaluate possible lane closure options.
- Use permanent or temporary locations.

6. Construction coordination:
- Establish coordination committee.
- Ensure coordination with other agencies/contractors active in area.
- Traffic Interference Report (TIR).
- Maintain active construction worksite.

7. Emergency response team:
- Partnering:
  - Communication with police, fire, and other agencies.
- Include traffic operations and contractor representative.
- Include incident management task force (Routes 295/42/76).

8. Advanced notice to public/politicians:
- Ensure accurate/complete information.
- Feed info to news media.
- Variable message signs (new message alert–highway advisory radio).
- Reliable delay reporting.
- "511" phone information source.
- Prepare marketing.

9. Integrated ITS implementation:
- Traffic video will be available via TS #16 (real-time and Internet recorded images in use).
- Permanent VMS are present adjacent to project area.
- ITS capabilities will be available during construction.

10. Safety:
- Work zone construction details including ramp merge.

3.6 Construction Skill Set

1. Design-Build:
- Saves time, reduces claims.
- Requires critical path method (CPM).
- Allows more innovation.
- Under contractor control.
- Single contract.
- Public relations.
- Permits innovative funding.
- Limits bidder pool.

2. Construction Management:
- Use of CPM activities:
  - Regardless of contracting method implemented, use cost loaded CPM.
  - Escrow of bid documents.
  - Hire contractor and/or designer to review construction schedule prior to contract award.
  - Incentives and disincentives used at critical stages and milestones.
- SUE:
  - Prior to design phase.
    - Allows for advanced utility work.
  - Influences design-build options.
  - Benefits funding issues.
  - Utility corridor.
- A+B bidding and lane rental:
  - NJDOT has experience with A + B bidding.
  - Lane rental is a proven technology that should be pursued in New Jersey.
  - Nationwide experience.

3. Staging:

- Construct a temporary ramp for SR-42 SB to the Missing Moves project to I-295 SB:
  - Allows construction of Ramp F, part of Ramp C, and false work on I-295 bridge (mainline) without traffic.
  - Capacity of Missing Moves project must be evaluated.
- Construct a temporary ramp from I-295 NB to the Missing Moves project to SR-42 NB:
  - Improves construction staging and operations for new I-295 mainline.
  - Additional initial costs will be offset by a much shorter construction duration and lower overall contract costs.
- Detour traffic using the NJTPK:
  - Segregates I-295 through-traffic.
  - Allows for accelerated construction.
  - Should eliminate NJTPK tolls during construction.
  - Traveler mitigation.
- Modify Browning Road grade-raise:
  - Reduces heights of I-295 mainline and ramp structures.
  - Reduces cost of mainline work ($50 to $100 million).
  - Reduces impacts to Victory Drive (homes).
  - Enhances mainline and ramp geometrics.
  - Reduces noise and visual impacts.
  - Reduces construction duration by approximately 1 year.
  - 30 percent reduction.
  - Requires reassessment of Bellmawr homes.
- Build prefabricated structures and other elements:
  - Minimizes disruption to traffic.
  - Provides cost savings.
- Allow closure of I-295 for short durations:
  - Need advanced public relations (PR).
  - PR needs to be continuous.
- Consider use of reversible barrier:
  - Easy and quick to implement.
  - Increases traffic capacity.
- Contractor staging area and casting yard:
  - Eases construction and speeds delivery.
  - Saves contractor money–owner.

4. Materials:

- Pavement-type HMA versus PCC:
  - Recommend HMA to facilitate construction stages
- Use innovative materials/technology as needed to facilitate construction:
  - Numerous materials are available that could be used on this type of project.
  - Cost effective.
  - High quality and durable.

3.7 Innovative Contracting/Financing Skill Set

1. Delivery Methods:
- Phased construction.
- Advance construction (DBB):
  - Utility relocations.
  - Prepurchase material.
  - ITS for alternate routes.
- Primary contract method (modified DB):
  - Special prequalifications (short list).
  - Risk allocation.
  - Clearly define roles/responsibilities.
    - Prescriptive performance requirements.
- Program management oversight.

2. Cost plus time bidding:
- Commonly referred to as A+B bidding.
- Award to the lowest A+Bx, where:
  - A = traditional bid component.
  - B = contractors bid for the number of days to complete critical work.
  - x = an amount based on road user cost per day.
- Include I/D provisions in the contract.

3. Multiparameter bidding:
- A+B-C:
  - A+B = cost plus time.
  - C = maintenance or warranty parameter.

4. Special prequalification:
- Pass/fail criteria.
- Specialized expertise.

5. Contract management:
- Incentives:
  - Time I/D.
  - Quality I/D.
  - Traffic management I/D.
- Lane rental:
  - A contracting technique that assesses a rental fee for each lane taken out of service during construction.
  - The use of this technique minimizes the time that roadway restrictions affect traffic flow.
- Partnering:
  - Elevate issues in a timely fashion.
  - Eliminate litigation and claims.
  - Complete projects on schedule.
  - Complete projects within budget.

- Maintain high quality.
- Maintain safety.
- Find better ways to get the job done.

6. Quality-based methods:
- VE/constructibility.
- Warranty/maintenance provisions.

7. ADR:
- Mediation/DRB.
- Mandatory prebid.
- Preconstruction workshops:
  - Utility coordination and process review.
  - Scheduling.
  - QA adjustments.

8. Financing considerations:
- Revenue sources.
- Financing mechanisms.
- Project finance plan and cost estimates.

9. Revenue sources:
- Federal Aid Highway Program.
- New Jersey Transportation Trust Fund Authority.
- User charges: direct or shadow tolling, HOT lanes.
- Local involvement: developer assessments, sales taxes, and property taxes.
- Private sources: construction companies, other contractors.
- State general funds (GO bond proceeds).

10. Financing mechanisms:
- Long-term:
  - GARVEE bonds.
  - Trust fund tax-free debt.
  - 63/20 corporation.
  - DBOM/DBM contracting (prepaid maintenance/warranty).
  - ROW lease-purchase (annuity).
- Short-term:
  - Construction cashflow financing.
  - Commercial paper issued by State or trust fund.

11. Financing plan:
- Basic financing plan and time schedule for each alternative as decision criteria:
  - Consistent with project schedule.
  - Cost estimate:
    - Common cost categories including environmental, traffic management, and utilities.
    - Inclusive of project scope, financing costs.

- Expressed in year of construction dollars.
- Includes contingencies.
- Incorporates certainty/probability (Washington State DOT cost estimation model).

3.8 Public Relations Skill Set

Communication Goals:

- Inform communities of construction plans, potential impacts, and address their concerns during construction phase.
- Advise commuters of short- and long-term traffic impacts, i.e., lane closures, traffic pattern changes.
- Divert 10-20 percent of traffic from the interchange during construction.

Approach:

1. Conduct research to:

- Determine best method of reaching key audiences–find out what they want to know, methods of getting it to them, and how it will change their commutes.
- Determine motivations that will divert motorists, i.e., time savings or costs.
- Use and expand community advisory committee.
- Identify stakeholder groups and communications needs.

Outcome–communications plan:

2. Communications plan strategy #1:

- Conduct an aggressive community outreach program:
  - Establish visible, friendly presence in the community via a mobile information center.
- Communications professional serves as community liaison to address concerns, i.e., noise, traffic.
- Develop newsletter for community residents, elected officials, and community leaders with project details and milestones.
- Frequent updates to elected officials to include project tours.

3. Communications plan strategy #2:

- Advise commuters of short- and long-term traffic impacts.
- Partnership with local traffic reporters.
- Work with tourism industry.
- Commercial media advertising, radio, and print.
- Project website; link to live traffic cameras.
- HAR radio.
- VMS.
- Project brochures (distribute at toll booths, EZ pass mailings).
- E-mail subscriptions for project updates, lane closures, etc.
- Shopping mall kiosk.

4. Communications plan strategy #3:

- Divert 10-20 percent of automobiles from interchange during construction.
- Establish a mobility strategy group to provide and promote alternative transportation choices:

    - Transportation Management Association (TMA).
    - Delaware River Port Authority (DRPA).
    - New Jersey Transit.
    - NJTPK.
    - Atlantic City Expressway Authority.
    - Delaware Valley Regional Planning Commission (DVRPC).
    - Limousine/tour bus industry.
- Divert 10-20 percent of automobiles from interchange during construction.

5. Aggressive media relations program:
- Broadcast and newspaper.
- Traffic reporters.
- Special interest publications, i.e., AAA.

6. Communications needs:
- Budget 4-6 percent of project cost.
- Add to the project team a full-time communications professional.
- Procure marketing firm to assist with research and advertising activities.

7. Potential funding mechanisms to supplement project funding:
- Congestion mitigation air quality (CMAQ) promotion of ride sharing.
- Highway safety 402 funds–promotion of workzone safety, aggressive driving, etc.

CHAPTER 4

Next Steps

Approximately one month after the ACTT workshop, the project manager held a meeting with the designer and some of the NJDOT subject matter experts to review the workshop findings and determine how to best address them as the project progresses.

It was decided that each of the final recommendations fall into the following four categories:

- Current–can be investigated/implemented now.
- Future–can be investigated/implemented during design and construction.
- Tabled–not a viable option.
- Implemented–will be included in the alternative development.

The table below shows the current status of each recommendation

Environmental		Structures		Construction	
1	Current	1	Future	1	Future
2	Current	2	Future	2a	Future
3	Current (Alternate K only)	3	Future	2b	Future
4	Future	4	Future	2c	Future
5	Current	5	Future	3a	Current–Tabled
6	Current (Alternate K only)	6a	Current	3b	Current–Tabled
		6b	Current	3c	Future
Geometrics		6c	Current–Tabled	3d	Current
1	Current–Tabled			3e	Future
2	Current–Implemented	Traffic ITS Safety		3f	Future
3	Current–Tabled	1	Future	3g	Future
4	Current (Except Alternate D1)	2	Current	3h	Future
5	Current–Tabled	3	Future	4	Future
6	Current	4	Future		
7	Current	5	Future	Innovative Contracting	
8	Current	6	Future	1	Future
9	Current–Tabled	7	Future	2	Future
		8	Future	3	Future
Geotechnical		9	Future	4	Future
1	Future	10	Future	5	Future
2	Future			6	Future
3	Future	Public Relations		7	Future
4	Future	1	Future	8	Future
5	Future	2	Future	9	Future
6	Future	3	Future	10	Current (ROW lease purchase)
7	Future	4	Future	11	Future
8	Future	5	Future		
9	Future	6	Future		
		7	Future		

In the upcoming months, the designer will continue to evaluate each of the recommendations in the "current" category for potential implementation in the alternative analysis process. The target date for the completed technical environmental study is July 2005 with the DEIS following in September 2006 and the final EIS in July 2007.

APPENDIX A

Workshop Attendees

NJDOT's ACTT Workshop Attendee Roster

Key Speakers:

- Neil Hawks, Director of Special Programs, Transportation Research Board, (202) 334-1430, nhawks@nas.edu
- Jack Letteire, Commissioner, New Jersey Department of Transportation, Jack.Letteire@dot.state.nj.us
- Dennis Merida, Division Administrator, FHWA, Dennis.Merida@fhwa.dot.gov

Moderators:

- Anthony J. McCloskey, Bureau of Design, PennDOT (717) 705-1495, amccloskey@state.pa.us
- Dan Sanayi, Construction and System Preservation Engineer, FHWA, (202) 493-0551, dan.sanayi@fhwa.dot.gov

Observers:

- Brent DeYoung, Senior Project Manager, UTDOT, (801) 620-1680, brentdeyoung@utah.gov
- Chris Costello, North II Group Engineer, Construction, DelDOT, (302) 326-4401, ccostello@mail.dot.state.de.us
- Javier Torrijos, North I Area Engineer, Construction, DelDOT, (302) 368-6629, jtorrijos@mail.dot.state.de.us
- Dave Geiszler, South II Area Engineer, Construction, (302) 853-1350, dgeiszler@mail.dot.state.de.us

Structures Skill Set

National Experts:

- Art Linfante, HNTB, (973) 237-1650, alinfante@hntb.com
- Bill F. McEleney, Regional Director, National Steel Bridge Alliance, (401) 943-5660, mceleney@nsbaweb.org
- Vasant Mistry, FHWA, (202) 366-4599, vasant.mistry@fhwa.dot.gov

Local Experts:

- Helene Bowman, FHWA, Helene.Bowman@fhwa.dot.gov
- Harry Capers, NJDOT, Facilitator, Harry.Capers@dot.state.nj.us
- Dick Dunne, NJDOT, Richard.Dunne@dot.state.nj.us
- David Hicks, Dewberry, Dhicks@Dewberry.com
- Rod Lewis, NJDOT, Roderick.Lewis@dot.state.nj.us
- Jose Lopez, NJDOT, Jose.Lopez@dot.state.nj.us
- Bruce Riegel, NJDOT, Bruce.Riegel@dot.state.nj.us
- Binh Vo, NJDOT, Notetaker, Binh.Vo@dot.state.nj.us

Innovative Contracting/Financing Skill Set

National Experts:

- Jim Hatter, Innovative Finance Specialist, (404) 562-3929, jim.hatter@fhwa.dot.gov
- Jannet Friedl Kavinoky, Project Director for Transportation Finance, (202) 624-5818, jkavinoky@aashto.org
- Sidney Scott, Vice President, Trauner Consulting Services, Inc., Facilitator, (215) 814-6400, sid.scott@traunerconsulting.com,
- Jerry Yakowenko, Contract Administration Engineer, (202) 366-1562, jerry.yakowenko@fhwa.dot.gov

Local Experts:

- Ron Bersch, FHWA, Ron.Bersch@fhwa.dot.gov
- Charles Dougherty, DVRPC (Delaware Valley Regional Planning Commission), cdougherty@dvrpc.org
- David Hawk, FHWA, David.Hawk@fhwa.dot.gov
- Mark Hauske, NJDOT, Mark.Hauske@dot.state.nj.us
- Bucky Misner, NJDOT, Emerson.Misner@dot.state.nj.us
- Kanti Patel, NJDOT, Notetaker, Kantilal.Patel@dot.state.nj.us

Geotechnical Skill Set

National Experts:

- Chris Dumas, FHWA, NRC, (410) 962-2009, chris.dumas@fhwa.dot.gov
- Peter Osborn, Geotechnical Team Leader, NRC, FHWA, (410) 962-0702, peter.osborn@fhwa.dot.gov
- John Volk, Principal Engineer, URS Corporation, (215) 619-4108, John_Volk@URSCORP.com

Local Experts:

- Angelo Mendola, NJDOT, Notetaker, Angelo.Mendola@dot.state.nj.us
- Kuangyu Yang, NJDOT, Kuangyu.Yang@dot.state.nj.us

Traffic/ITS/Safety Skill Set

National Experts:

- Greg Jones, FHWA, NRC, (404) 562-3906, greg.jones@fhwa.dot.gov
- Tim Simmons, ASCG Inc. of NM, (505) 247-0294, Cell: (505) 306-1945, Fax: (505) 242-4845, tsimmons@ascg.com

Local Experts:

- Vince Baglivo, NJDOT, Vince.Baglivo@dot.state.nj.us
- Sowatta Seng Eap, NJDOT, Sowatta.Eap@dot.state.nj.us
- Rick Jaffe, NJDOT, Facilitator, Richard.Jaffe@dot.state.nj.us
- Craig Johnson, Dewberry, Cjohnson@dewberry.com
- Dave Martin, NJDOT, David.Martin@dot.state.nj.us

- John Miller, NJDOT (ITS), John.Miller@dot.state.nj.us
- Charlie Phy, NJDOT, Charlie.Phy@dot.state.nj.us
- Rob Raachini, NJDOT, Robert.Raachini@dot.state.nj.us
- Michael Roberson, FHWA, Michael.Roberson@fhwa.dot.gov
- Stan Worosz, NJDOT, Stan.Worosz@dot.state.nj.us
- Carey Younger, NJDOT, Notetaker, Carey.Younger@dot.state.nj.us
- Karen Yunk, FHWA, Karen.Yunk@fhwa.dot.gov

Environment Skill Set

National Experts:

- Brian Smith, FHWA, NRC, (708) 283-3553, brian.smith@fhwa.dot.gov
- Harold Peaks, Team Leader, FHWA, (202) 366-1598, Harold.peaks@fhwa.dot.gov

Local Experts:

- Nick Caiazza, NJDOT, Nicholas.Caiazza@dot.state.nj.us
- Sue Gresavage, NJDOT, Notetaker, Susan.Gresavage@dot.state.nj.us
- Steve Hardegen, NJDEP (SHPO), Steven.Hardegen@dot.state.nj.us
- Ileana Ivanciu, Dewberry, IIvanciu@Dewberry.com
- Bub Kovacs, Dewberry, Facilitator, drbubk@aol.com
- Jeanette Mar, FHWA, Jeanette.Mar@fhwa.dot.gov

Construction/Materials Skill Set

National Experts:

- Bob Ferguson, (760) 360-4945, erfpaf@aol.com
- Joe Huertta, FHWA, NRC, Baltimore, Facilitator, (410) 962-2298, joseph.huertta@fhwa.dot.gov
- Michael M. Sprinkel, Associate Director, Virginia Transportation Research Council, (434) 293-1941, Michael.Sprinkel@VirginiaDOT.org
- Terry Zoller, MNDOT, (763) 205-4400, terry.zoller@dot.state.mn.us

Local Experts:

- Lourdes Castaneda, FHWA, Lourdes.Castaneda@fhwa.dot.gov
- Doug Fadool, NJDOT, Notetaker, Doug.Fadool@dot.state.nj.us
- Paul Hofmann, NJDOT, Paul.Hofmann@dot.state.nj.us
- Kim Sharp, NJDOT, Kimberly.Sharp@dot.state.nj.us
- Girish Thakkar, NJDOT, Girish.Thakkar@dot.state.nj.us
- Anker Winther, NJDOT, Anker.Winther@dot.state.nj.us

Roadway Design/Geometrics Skill Set

National Experts:

- Wayne Kinder, Chief Road Design Engineer, NVDOT, Facilitator
  (775) 888-7490, wkinder@dot.state.nv.us
- William Prosser, FHWA, (202) 366-1332, william.prosser@fhwa.dot.gov

Local Experts:

- Robert Abitz, NJDOT, Notetaker, Robert.Abitz@dot.state.nj.us
- Peter Agnello, Dewberry, Pagnello@Dewberry.com
- Dave Barbalace, NJDOT, Dave Barbalace@dot.state.nj.us
- George Hoops, FHWA, George.Hoops@fhwa.dot.gov
- Tom Kondash, NJDOT, Thomas.Kondash@dot.state.nj.us
- Tom Saylor, NJDOT, Thomas.Saylor@dot.state.nj.us
- Amutha Vijayakumar, NJDOT, Amutha.Vijayakumar@dot.state.nj.us

Public Relations Skill Set

National Experts:

- Lynda South, Communications Director, VDOT, (804) 786-2715, Lynda.South@virginiadot.org
- Bridget Spedalieri, PIO, NMSHTD, (505) 544-6613, Bridget.Spedalieri@nmshtd.state.nm.us

Local Experts:

- Jody Barankin, NJDOT, Notetaker, Jody.Barankin@dot.state.nj.us
- Patricia Feliciano, NJDOT, Patricia.Feliciano@dot.state.nj.us
- Veronica Murphy, NJDOT, Veronica.Murphy@dot.state.nj.us
- Mike Russo, NJDOT, Facilitator, Mike.Russo@dot.state.nj.us

APPENDIX B

Glossary of Acronyms

AASHTO–American Association of State Highway and Transportation Officials
ACTT–Accelerated Construction Technology Transfer
ADR–Alternative Dispute Resolution
CMAQ–Congestion Mitigation Air Quality (Fund)
CPM–Critical Path Method
DB–Design-Build
DBB–Design-Bid-Build
DBOM/DBM–Design-Build-Operate-Maintain/Design-Build-Maintain
DEIS–Draft Environmental Impact Statement
DEP–Department of Environmental Protection
DRB–Dispute Resolution Board
DRPA–Delaware River Port Authority
DVRPC–Delaware Valley Regional Planning Commission
EIS–Environmental Impact Statement
EPS–Expanded Polystyrene
ESP–Emergency Service Patrol
FA–Feasibility Assessment
FHWA–Federal Highway Administration
GARVEE–Grant Anticipation Revenue Vehicle (debt financing)
GEC–Geotechnical Engineering Circular (publication)
GO–General Obligation (bonds)
HAR–Highway Advisory Radio
HMA–Hot Mix Asphalt
HOT–High Occupancy Toll (lane)
HOV–High Occupancy Vehicle (lane)
HPC–High-Performance Concrete
HPS–High-Performance Steel
I/D–Incentive/Disincentive
ITS–Intelligent Traffic Systems
MOT–Maintenance of Traffic
MPT–Maintenance and Protection of Traffic
MSE–Mechanically Stabilized Earth
NJDEP–New Jersey Department of Environmental Protection
New Jersey Department of Transportation (NJDOT)
NJTPK–New Jersey Turnpike
NJTTA–New Jersey Transportation Trust Fund Authority
PATCO–Port Authority Transit Company
PCC–Portland Concrete Cement
QC–Quality Control
ROW–Right-of-Way
RUC–Road User Cost
SJTA–South Jersey Transportation Authority
SPMT–Self-Propelled Modular Transporters
TEA–Transportation Equity Act
TES–Technical Environmental Study
TIG–Technology Implementation Group

TIR–Traffic Impact Report
TMA–Traffic Management Association
TRB–Transportation Research Board
TS–Traffic Signal (contract)
VE–Value Engineering
VECP–Value Engineering Construction Proposal
VMS–Variable Message Sign

Appendix C

Skill Set Reporting Forms

ENVIRONMENTAL SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"
Must consider stormwater options early.	1. Increased right of way. 2. Increased cost. 3. Affect constructibility. 4. Will increase cost of construction. 5. Need greater design detail. 6. Budget for mitigation.	
Wetland mitigation.	Utilize area between Little Timber Creek floodplain/wetland and geometric skill set's newly proposed ramp B and C for mitigation.	
Bellmawr Park—what can we do to assist the association in an equitable relocation of impacted residents?	Relocate within community. "Adjacent land to relocate units—tight squeeze due to other constraints—Little Timber Creek wetlands, tidal creek off of big timber, may be endangered species in wooded and field area." Open space inside the community is very limited and building there may affect the historic integrity of the community and jeopardize eligibility for historic register. Construct second story or attached units to replace impacted units. Relocate community center and open space adjacent to highway and construct new housing in its place. Offer buy-out to all residents to come up with units for relocation for residents who want to remain.	Initiate work session with Bellmawr Park community—identify impacts and constraints and let the association and the community recommend solutions. What is fair market value for these properties? How do people on the waiting list get into the association now?

ENVIRONMENTAL SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"
Bellmawr Park.	"Acquire adjacent residences to add to Belmar Park Corp., then do a less restrictive relocation for the other residents." "May impact historic register eligibility, very close knit community and would impact community cohesion, general Belmar population is not amenable to relocating Belmar Park residents in their community."	Understand that historic district does not preclude any impacts to that community. Through 106 process acknowledge historic significance of community and try to minimize impacts.
Eliminate ramp C.	Provides environmental benefit with regard to wetlands. May also be used for Belmar Park relocation—affect community cohesion and the ramp C area is in a different municipality.	Pursue diverging ramp B and C alternative proposed by geometric skill set to provide significant wetland credit and stormwater opportunities.
Free space usage—existing or created.	Bellmawr Park Housing. Recreation—open space. Stormwater. Wetland mitigation. Ramp C as credit. Flood plain preservation.	
Tunnel.	Utilize area over tunnel for housing or cemetery—problem with hazmat detour. FHWA—has input on land usage over tunnel.	
Underpass (depressed section).	Lack of modeling information for air and noise portals for tunnel/ underpass scenario. Especially important in area adjacent to baseball fields. Will be very difficult to mitigate also with stacked road alternative.	
Quiet paving.	Noise reducing pavement.	Should be used in noise sensitive areas.
Relocate Little Timber Creek and possibly associated floodplain and or elevate I-295 over floodplain.	DEP will not allow us to relocate the stream or span the floodplain (shading issue).	Open dialog with DEP again.

ENVIRONMENTAL SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"
Re-evaluate Browning Road over I-295.		

ROADWAY/GEOMETRICS SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"
Realign ramp A to exit off of Missing Moves (I-295 SB ramp).	This will extend weave from SR-42 and SR-168.	Combining ramp volumes may hurt SR-42/I-295 SB ramp and SR-55 weave.
Utilize aljo's curve for wetland mitigation.	Shift mainline over a little more into wetlands to help.	
Tie ramp A into I-295 NB prior to mausoleum.	(This is without a new ramp A built over SR-42.) This will help the SR-168 weave. Possibly build a new cantilever ramp structure over I-295 to stay away from mausoleum. Or shift mainline alignment over a little more—impacts Belmawr Park and ball fields a little more—Mitigate.	
One-lane entrance ramp A into I-295 NB—problem.	This ramp starts at two-lanes and necks down to one prior to the entrance to I-295 NB—problematic.	
Maintain left exit from I-76 SB to I-295 NB.	This may help with constructability and traffic operations but could create problems with driver expectancy down stream. FHWA is against left entrances will consider left exit.	
Provide only two through lanes for I-295.		

ROADWAY/GEOMETRICS SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"
Browning Road over I-295.	This may help with ramp grades and relocated ramp C.	
Take Browning Road under SR-42.		
Take ramp C under Browning Road.		
Do we need shoulders through tunnel?		
Should we pursue 12-ft shoulders max?	"Current designs provide 17-ft shoulders for sight distance, which meets the posted speed. Consider design exceptions where constraints may warrant."	
Investigate C-D roads.		
"Eliminate Alternates G2, H, and K."		
Realign Essex Road to tie into Harding Avenue.	If main line gets realigned through ball fields, then the Essex Road bridge can be eliminated and constructability can be improved.	

GEOTECHNICAL SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"
	Clearly the best way to significantly reduce the impact to existing traffic.	Reduce the impact to existing traffic.
1. Depressed roadway and urban decks.	Urban decks will allow roadway to be used for public purposes safely (near ball fields and cemetery).	Reduce noise (improve existing conditions).
Locations:	Safety.	Greater cost.

GEOTECHNICAL SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"
I-295 Ramp C.	• Girders/construction over/near travel lanes. • Construction workers and equipment in and near travel lanes. Reduce noise (improve existing conditions).	Environmental potential if contaminated soils encountered —cost increase. Length limitations. Hazmat issues. Security issues. Maintenance issues. Groundwater/drainage issues.
2. Embankments.	"For underlying weak and compressible clay deposits, embankment fills may require staged construction." "To avoid this, single stage fills might incorporate lightweight fills or column supported embankments." Embankment heights should be kept to a minimum. Some embankments may be converted to structures.	Tradeoff for use of lightweight fills of structure to buy time. Use of slightly contaminated soils as embankment fill—DEP approval.
3. Advanced Contracts.	Initiate advanced contracts for critical path items to facilitate construction schedule. These might include: Utilities Ground improvement Foundations Structures to facilitate MOT.	ROW Permits Coordination
4. Deep foundation.	• High-capacity driven pipe piles—200 ton. Driving fewer piles. • Smaller cap. • Less noise/vibration. • No spoils (speed issue). • Testing is simple and fast.	Where vibration is an issue: • Use bored piles. • Micropiles. • Drilled shaft (caisson). • Methods that require excavation—contaminated soil issues.
5. Existing foundation conflicts.	Primarily existing timber piles of short length can be removed easily.	

GEOTECHNICAL SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"
6. Cross discipline.		MOT. Access/laydown areas!! Materials—steel/cement. Utilities. Safety. "Contracting mechanism—design-build or break into contracts, incentives/ disincentives can be helpful." Contaminated soils.
7. Impact of construction on existing structures.	"Installation of foundations, embankments, tunnel, and retaining walls can affect the performance of existing structures due to vertical and lateral movements and vibrations."	• Real-time instrumentation can assist in identifying and evaluating situations before significant damage occurs.
8. Design phase full scale tests.	Reduce contractor's risk—lower prices. "Ensure constructability of method, means, and technology. Reduce claims and delays." Reduce costs through lower factors of safety. Test embankment. Test piles. Pilot tunnel.	Need to do early enough in project.
9. Earth retention systems.	Wherever possible use: MSE. Soil nailing. Tie backs. FHWA GEC #2—Earth retaining structures. "Limited ROW locations, such as Fir Place." Secant pile system.	"Fir Place: Evaluated and determined to consist of only approximately 150 ft of limited ROW and wall height max of 15 ft. If tie backs are not acceptable to homeowner, secant pile system will provide robust wall with reduced lateral movements—used for railroads and subways for minimum lateral movements."

STRUCTURES SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"
1. Prefabricate structures.	• Advance purchase of standard sections. • Box type structures (concrete and steel). • Offsite staging (portion of the cemetery). • Bridge movement systems technology.	
2. Technologies.	• Use of high-performance materials. • Use of integral pier caps. • Use of lucite barriers. • Use of proper wall types.	
3. Willingness to mix and match to minimize impacts.	• Environment. • ROW. • "Motoring public, etc."	
I. "Get In and Get Out"		
1. Bridges.	• "Prefabrication of any bridge, bridge elements, and structural systems." • Advance purchase and fabrication of structural components.	Advance purchase/fabrication of structural components includes: •Superstructures. •Deck systems (i.e. Inverset). •Substructures. •Roll in railroad structure.
2. Walls.	Retaining walls are selected based on construction speed and design needs.	Types of retaining walls considered: •MSE walls. •Sheeting with or without façade. •Post and panels. •Modular walls.
3. Technology.	• High performance concrete and high performance steel (HPC and HPS). • Bridge movement system to expedite construction.	• The use of HPC and HPS will result in lighter loads and shallower system. • Types of bridge movement system: •Self-propelled modular transport. •Girder launching/skidding. •Roll in. •Vertical lifting.

STRUCTURES SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"
II. "Stay Out"		
4. Stay out.	• Use of HPC and HPS. • Inspectibility without impacting traffic. • Future redecking. • Automated deicing on deck of big bridge and flyovers.	Use of HPC and HPS will result in low maintenance of structures and offer quality and durability to finished product.
III. Miscellaneous Project Issues		
5. Miscellaneous project issues	• Design with these items—lock in transportability. • Set construction duration. • Project wide Web-based electronic communication plan.	• Use of electronic shop drawings and electronic design submittals will expedite design process. • Web-based electronic communication plan will keep the motoring public informed.
IV. Suggestions to Alternatives		
6. Suggestions to alternative D.	• Investigate depressed ramp "C" and make ramp "D" flyover. • Investigate eliminating ramp "F" by combining with ramp "D" and bring it to the big bridge. • Investigate taking all I-295 traffic off SR-42 NB at missing move ramp.	
7. Suggestions to alternative K.	Tunnel carry I-295 traffic under I-76.	This alternative is not preferred due to: • High initial and maintenance costs. • "Ventilation, lighting, and fire code requirements." • Security issue (target for terrorist attack). • Trucks carrying flammable/ contaminated materials cannot use the tunnel.

STRUCTURES SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"
8. Suggestions to alternatives G2 and H1.	Double stacking I-295 structures.	This alternative is not preferred because it is extremely unpleasing visually. Looking at a 70-75-ft bridge and retaining wall will not be well received by the local community.

TRAFFIC/ITS/SAFETY SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"
1. Identify closure hours/options.	"Monday thru Thursday (11 p.m.—5 a.m.), except weekends/holidays; summer period May 15—Sept 15. " Tailor hours to actual volumes and capacities on mainline and ramps. Evaluate noise ordinance restrictions; seek waivers. Consider special/sports event impacts. Shoulder/median can be used as through lane. Multiple shifts and night work should be considered. Ensure current and reliable counts. Moveable barrier (reversible lane).	

TRAFFIC/ITS/SAFETY SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"
2. Identify alternate routes.	"Identify routes such as NJTPK, Routes 130, 41, 47, 168, and local roads." Identify and involve stakeholders including PennDOT and DelDOT. "Identify opportunities for improved efficiencies on alternate routes (variable-use lanes; restrict movements on Routes 168 and 130, signal timing, signing and striping modifications, and intersection improvements)."	
3. Staging components.	Consider staging sequence to minimize road user impact. PATCO.	Sequencing key phases.
4. Public transportation alternatives and incentives.	NJ Transit. "Free/discounted passes, HOV." Park 'n Ride (temporary leases or permanent) discounts. "Cross county connection, TMA."	Include in budget to accommodate additional alternatives.
5. Smart work zone concept.	Provide travel times for existing and alternate routes.	Use permanent or temporary locations.
	Provide detector and camera information.	
	Evaluate possible lane closure options.	
6. Construction coordination.	Ensure coordination with other agencies/contractors active in area. Traffic interference report (TIR). Maintain active construction worksite.	Establish coordination committee.
7. Emergency response team.	Partnering. "Communication with police, fire, and other agencies."	Include traffic operations and contractor representative. Include incident management task force (Routes 295/42/76). Consider expanded ESP hours.

TRAFFIC/ITS/SAFETY SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"
8. Advanced notice to public/ politicians.	Ensure accurate/complete information. Feed info to news media. Variable message signs (new message alert—highway advisory radio). Reliable delay reporting. "511" phone information source.	Prepare marketing materials for alternative routes.
9. Integrated ITS implementation.	Traffic video will be available via TS #16 (real-time and Internet recorded images in use). Permanent VMS are present adjacent to project area. ITS capabilities will be available during construction.	
10. Safety.	Work zone construction details including ramp merge.	

CONSTRUCTION SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"
Construct a temporary ramp for SR-42 SB to the Missing Moves project to I-295 SB.		"Allows construction of ramp F, part of ramp C and falsework on I-295 bridge without traffic. " Capacity of Missing Moves project must be able to handle added traffic volumes.
Construct a temporary ramp from I-295 NB to the Missing Moves project to SR-42 NB.		Allows for improved construction staging at newly constructed I-295. Additional costs will be offset by a shorter construction duration and lower contract bids.

CONSTRUCTION SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"
Detour traffic using the NJTPK.		Segregates I-295 through traffic. Allows for accelerated construction. Eliminate tolls during this stage of construction.
Construct interchange at SR-42 and the NJTPK.		Segregates I-295 through traffic.
Allow for closure of I-295 for short durations.		Will need advanced public relations.
Build prefabricated structures and other elements offsite.		Minimizes disruption to traffic and provides cost savings.
Consider use of reversible barrier.		Increases traffic capacity during construction.
Contractors staging area and casting yard.		Eases construction. Saves money.
Modify Browning Road grade.		Reduces heights of I-295 structures. Reduces cost of mainline work ($50 to $100 million). Reduces impacts to Victory Drive. Reduces impacts geometrically. Reduces noise and visual impacts. Reduces construction duration by approximately one year. Requires reassessment of Bellmar homes.

INNOVATIVE CONTRACTING AND FINANCING SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"
Financing: revenue sources.	• Federal Aid Highway Program. • New Jersey Transportation Trust Fund Authority. • "User charges: direct or shadow tolling, HOT lanes." • "Local involvement: developer assessments, sales taxes, property taxes." • "Private sources: construction companies, other contractors." • State general funds (GO bond proceeds).	• "FAHP: uncertainty of reauthorization; multiple major projects competing for funds; stretch funds using financing mechanisms (GARVEEs) (may limit future flexibility); consider different programs, e.g. ITS, safety, for funding various components of project." • NJTTFA: needs renewal after 2006; gas tax lags behind peer states and needs; capacity to issue debt. • User charges: • Shadow tolling may include payments from Delaware River Port Authority (DRPA) and South Jersey Transportation Authority (SJTA) as proxies for direct tolling (authorities could increase tolls and pass on revenues to NJDOT). Move toll collection sites closer to project to capture traffic—extend DRPA and expressway collection authority to cover project segments. • Create HOT lanes in segment for through traffic with value pricing to manage congestion. • Payments from NJTP. • "Local involvement: region benefits from increased mobility, improved safety. Capture benefits through developer assessments (unlikely due to mature development), sales taxes, tax increment financing, property taxes and dedicate to project." • Companies provide construction financing. • Capture receipts from State general obligation debt as "equity" contribution or as debt repayment.

INNOVATIVE CONTRACTING AND FINANCING SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"

Financing: financing mechanisms.	• Long-term:
	  • GARVEE bonds.
	  • Trust fund tax-free debt.
	  • 63/20 non-profit corporation.
	  • DBOM/DBM contracting (prepaid maintenance/ warranty).
	  • ROW lease-purchase (annuity).
	• Short-term:
	  • Construction cash-flow financing.
	  • Commercial paper issued by State or trust fund.
		GARVEE bonds: pledge of Federal revenues to repay long-term debt; term typically 12-15 years.
		Trust Fund tax-free debt: New Jersey Transportation Trust Fund Authority structured to issue debt backed by dedicated revenues.
		63/20: non-profit corporation structured to issue debt to provide tax exempt financing off State balance sheet (Virginia Pocahontas Parkway).
		"Design-build-operate-maintain or design-build-maintain contracts incorporate prepayment of maintenance costs up front. Contractor warrants performance, performs maintenance (New Mexico 44)."
		"Acquire ROW by creating annuity for ROW owner—small up front payment, stream of cash flows to owner, possibly based on traffic counts in new project (spreads out ROW acquisition costs, unique long-term, transferable benefit for property owner) (Texas DOT)."
		Construction cash-flow financing: construction companies provide up-front financing later replaced by long-term debt or directly repaid.
		"Commercial paper (short-term debt) would allow low interest construction financing before locking in long-term interest rates. Could use variable rate debt, depending on cost."

INNOVATIVE CONTRACTING AND FINANCING SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"
Financing: financial plans.	• Basic financing plan and time schedule for each alternative as decision criteria: • Consistent with project schedule. • Cost estimate. •Common cost categories including environmental, traffic management, and utilities." •Inclusive of project scope, financing costs. •Expressed in year of construction dollars. •Includes contingencies. •Incorporates certainty/ probability (Washington State DOT cost estimation model).	• Finance plan should be standard component of the alternative selection process, incorporated as early as possible into the planning process. • Costs can be expressed in ranges and/or using probabilities to manage expectations. (See: Washington State DOT cost estimating). • Upon passage of TEA-21 reauthorization, it is expected that FHWA will be required to publish cost estimating guidelines. In addition, it is likely that major projects ($100 million+) will require project finance plans. Projects $1 billion+ require project management plans integrated with project finance plans. Considered "prudent management" by Congress." • Essential to express costs in year of construction dollars—choose inflation rates to apply to estimates. • Project finance plans should include contingencies (larger earlier in development cycle, smaller with greater certainty) and financing costs (cost of debt service). • See "Checklist for Project Financial Plan" from AASHTO Project Finance Institute.
Delivery methods.	Phased construction. Advance construction (DBB). Primary contract (method DB). Program management oversight.	Utility relocations. Pre-purchase material. ITS for alternate routes. Special prequalifications (short list). Risk allocation. Clearly define roles/responsibilities. Prescriptive performance requirements.

INNOVATIVE CONTRACTING AND FINANCING SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"
Procurement.	Cost plus time bidding. Commonly referred to as A+B bidding. Award to the lowest A+Bx where: Inclusive incentive/disincentive (I/D) provisions in the contract. Multiple-parameter bidding. A+B-C. Special prequalifications. Pass/fail criteria. Specialized expertise.	User cost is very high for this project. Limit money value on RUC. NY FL use a lot. Utility out of way and similar items. Contractor risk to estimate time and do faster. "Design built with A+B, some states have done it." Critical piece of contract. A = traditional bid component B = contractors bid for the number of days to complete critical work. X = An amount based on road user cost/day. A+B = Cost plus time. C = Maintenance or warranty parameter. Design build or design competition. Pennsylvania—Competition among 5-10 design consultants; owner pay and choose idea or design. Stipend funding for this DB competition.

INNOVATIVE CONTRACTING AND FINANCING SKILL SET		
Idea (Short Name)	Idea (Detailed Description)	"Implementation Details (Barriers, Skill Set Coordination, etc.)"
Contract management.	Incentives. Lane rental. Partnering. Quality-based methods. ADR-alternative dispute resolution.	Time I/D. Quality I/D. Traffic management I/D. Lane rental: Lane closure for part of time. NJDOT choose lane closing and time hours weekends and night. Contractor bid lane closing hours and cost of it. NJ Turnpike alternate route. Elevate issues in a timely fashion. Eliminate litigation and claims. Complete projects on schedule. Complete projects within budget. Maintain high quality. Maintain safety. Find better ways to get job done. VE/constructibility. Warranty/maintenance provisions. Mediation/DRB. Mandatory prebid. Preconstruction workshops. Utility coordination and process review. Scheduling.
8. Bid alternate.	Alternate technical concepts. VECP program.	"Restrictive specs, NJDOT is conservative." Fed has to say in approval. "Alternate bridge design, structures."

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