March 19, 2007

ADDENDUM

TO

Promoting Safety and Access
Cleveland Innerbelt Freeway
Publication Number FHWA-IF-06-038-OHIO

The following is part of the Structures I (Major Bridges) skill set's final recommendations and should be included in Section 3.4 at the bottom of page 12. Please add to your copy of the report accordingly.

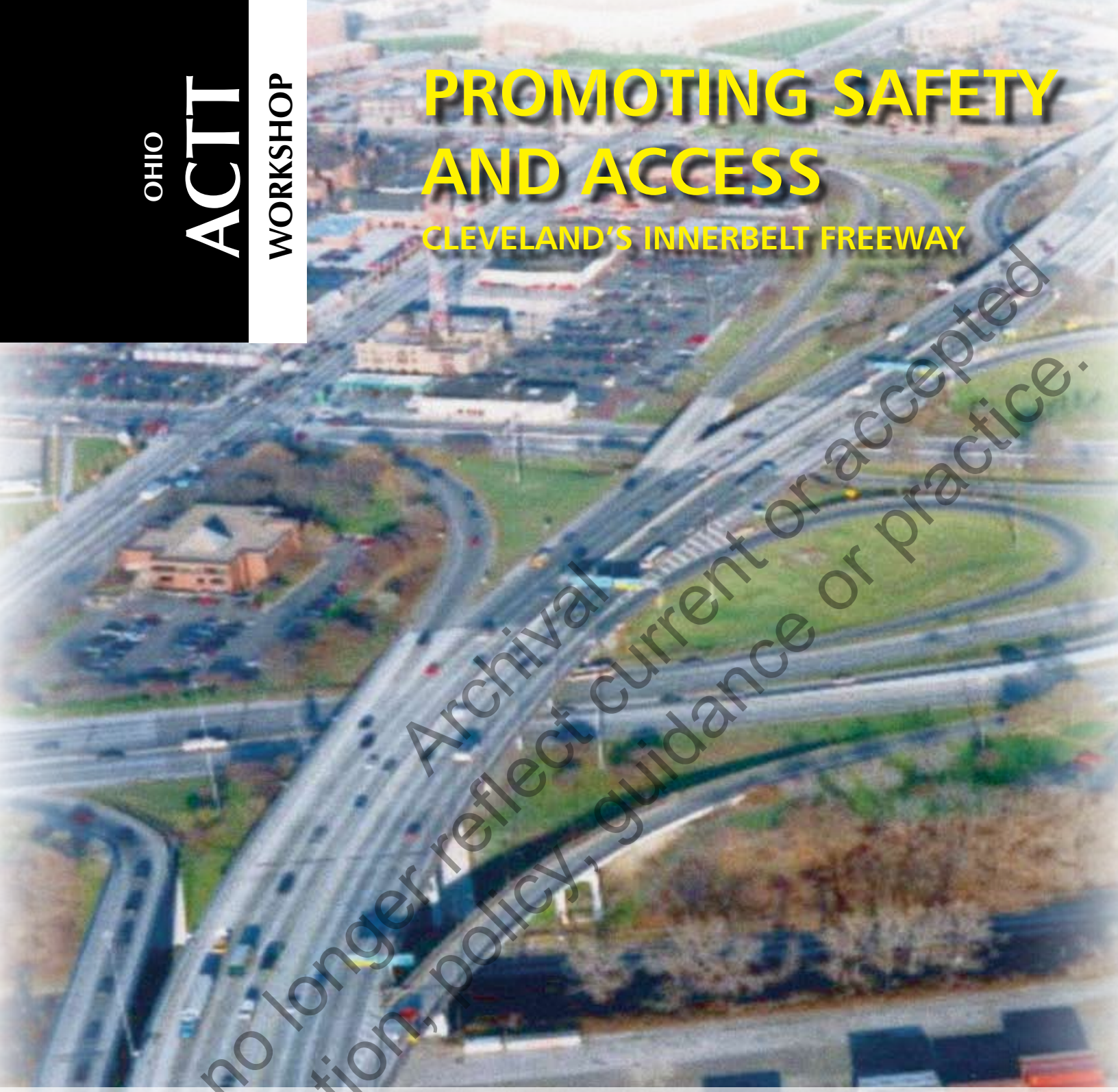
Demolition of Existing Bridge

- Demolish the existing single-span bridge, and construct two new shorter-span structures. This will eliminate a significant maintenance liability for ODOT.
  - Utilize the pier in the west embankment of the river (as noted above) to construct a less costly, shorter-span structure.
  - Decrease deck width; two-way traffic may not need to be maintained on the southbound bridge.
  - Utilize savings from the repetition of two similar structures to balance the cost of building two shorter versus one long bridge.

OHIO ACTT WORKSHOP

PROMOTING SAFETY AND ACCESS

CLEVELAND'S INNERBELT FREEWAY



U.S. Department of Transportation
Federal Highway Administration

CLEVELAND INNERBELT STUDY

ACTT
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- ACTT provides a fresh outlook by bringing national experts to your planning table.
- ACTT introduces innovations that have been tested elsewhere.
- ACTT saves time: according to FHWA's *ACTT II* report, published in March 2005, "most agencies have found ways to slice construction time by 30 percent or more."
- ACTT saves money: ACTT suggestions enabled New Jersey to reduce its budget for the Route 46 bridge project from $10 million to $7.2 million.
- ACTT works for you and your customer!

How do I ACTT?

- Select a corridor: ACTT is most helpful when applied during the project development phase.
- Make a workshop proposal to ACTT team members, and submit a copy of your proposal to the FHWA Division Office. Include details on the project corridor, timeline and goals.
- Hold a pre-workshop meeting with the ACTT management team.
- Select a meeting site, and coordinate workshop details with the FHWA Division Office.
- Host the workshop.
- Draft a report for submittal to FHWA.
- Incorporate ACTT into project operations.

WHY ACTT?

OHIO ACTT WORKSHOP

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EXECUTIVE SUMMARY

The cover story of the June 2006 edition of FOCUS: Accelerating Infrastructure Innovations ("Accelerating Urban Highway Rehabilitation with Construction Analysis Software") sums up a major challenge facing State departments of transportation (DOTs) today:

> As transportation departments increasingly turn their focus from new construction to rehabilitating and reconstructing existing highways, accelerating construction is key to reducing problems with congestion, safety, and user delays, particularly in heavily traveled urban areas.

This is the situation the Ohio Department of Transportation (ODOT) is facing on one of its major endeavors, the Innerbelt Freeway Reconstruction project.

Constructed in the late 1950s and early 1960s, Cleveland's Innerbelt Freeway (I-90) is host to a number of operational and safety concerns. As a result, ODOT has embarked on an ambitious plan to completely reconstruct the Cleveland Innerbelt.

The project, estimated to cost over $850 million, will upgrade the existing facility to current design standards while balancing safety, operation and access. The undertaking poses significant construction challenges; the origin and destination points of approximately 85 percent of the a.m. and p.m. peak traffic in this region fall within the project study area.

Knowing this, ODOT approached the Federal Highway Administration (FHWA) about hosting an Accelerated Construction Technology Transfer (ACTT) workshop for the Innerbelt Freeway Reconstruction project. Together, the project management and ACTT teams established the following skill sets for the Cleveland workshop:

- Innovative Contracting/Innovative Financing.
- Right-of-Way (ROW) – Including Building Removals.
- Construction/Maintenance of Traffic (MOT).
- Structures I (Major Bridges).
- Structures II (Other Bridges and Retaining Walls).
- Environmental.
- Public Relations.
- Utilities/Railroad Coordination.
- Roadway/Geometric Design.
- Materials/Accelerated Testing/Pavement Design.
- Traffic Engineering/Work Zone Safety/Intelligent Transportation Systems (ITS).

Each skill set team focused on how the ACTT process applied to their area of expertise, while the group as a whole searched for methods and measures to help ODOT achieve its goals of accelerating construction and minimizing inconvenience to the traveling public.

As the workshop progressed, each team summarized their thoughts and narrowed them down to a list of priority recommendations, which they presented to conference attendees on the final day. Now that the workshop is complete, ODOT will sift through the various recommendations and decide which ideas should be implemented as part of the Innerbelt Freeway Reconstruction project.

1.1. Opening Session

ODOT hosted the Cleveland Innerbelt ACTT workshop February 20-22, 2006, at the Crown Plaza Hotel in Cleveland, Ohio.

ODOT Director Gordon Proctor and Ohio FHWA Division Administrator Dennis Decker provided opening remarks, after which the participants introduced themselves. ODOT District 12 Innerbelt Project Manager Craig Hebebrand and Burgess and Niple Project Manager Paul Dorothy followed with a project overview. FHWA National Resource Center Innovative Contracting Contract Engineer and Work Session Moderator Jerry Blanding concluded the day with a presentation on "Why ACTT, Why Now."

1.2. Workshop Process

The ODOT workshop followed the traditional ACTT process. On Wednesday morning, the ACTT management team discussed the brainstorming process with workshop attendees. The skill sets then broke apart to discuss the project and brainstorm preliminary ideas, reconvening before lunch to share initial thoughts. After lunch, the skill sets continued their work, intermingling with other teams to ask questions and share ideas. (The synergy created during these discussions is the heart of the process.) The teams spent the remainder of the afternoon preparing final recommendations for presentation to the group on Thursday morning.

1.3. Skill Set Goals

Participants in each skill set had an established group of goals that was unique to their subject area:

Innovative Contracting/Innovative Financing

- Determine the cash flow necessary to accelerate construction schedule.
- Identify inflation factors, potential funding sources and budget risks.
- Review recommendations for innovative contracting methods.
- Discuss contract incentives to promote safety.

ROW

- Discuss ROW acquisition in terms of priorities, schedule and budget.
- Make recommendations for demolition of large buildings on small sites. (*Note*: This was the first ACTT workshop to include the use of an expert in vertical structure demolition, Mr. Mark Dowiak from URS, to advise on methods for safely clearing major structures within the project ROW.)

- Avoid/minimize ROW needs.
- Discuss ways to coordinate between design and ROW.

Construction/MOT

- Minimize ramp closures.
- Minimize local street closures.
- Plan for future replacement of the existing Central Viaduct.
- Make recommendations for construction of the Trench, the Innerbelt Curve and the Central Interchange.
- Review options for replacement of the Easterly Interceptor.
- Identify techniques to avoid building takes.
- Evaluate MOT options for downtown events.

Structures I

- Identify options and issues for constructing the new I-90 bridge over the Cuyahoga River and for rehabilitating the existing I-90 bridge over the Cuyahoga River.
- Review the current geotechnical site issues.
- Identify issues with working over navigable waters, active railroads, local streets and operating businesses.

Structures II

- Investigate rehabilitation and reconstruction options for bridges over the Interstate, for Interstate bridges over other roads and for curved structures (ramp bridges).
- Make recommendations for retaining walls (tall walls on small sites).
- Evaluate the proximity of foundations to major utilities, buildings to remain, etc.

Environmental

- Identify and preserve cultural resources.
- Minimize noise and vibration.
- Ensure compliance with the National Environmental Policy Act (NEPA) process.
- Incorporate context sensitive solutions (CSS).
- Address secondary impacts and mitigate appropriately.
- Discuss storm water best management practices (BMPs).

Public Relations

- Engage key communities prior to/throughout construction, i.e., downtown employers, community development centers (CDCs), media, etc.
- Develop appropriate communications strategies for the construction phase.

- Maintain public trust.
- Manage the changing political environment; there are new administrations at all levels of government.

Utilities/Railroad Coordination

- Coordinate utility relocations (public/private).
- Coordinate railroad relocations.
- Coordinate placement of fiber optic utilities with the railroad ROW.
- Identify issues with "exotic" utilities.
- Make recommendations for replacement of the Easterly Interceptor.
- Identify permissible closures.

Roadway/Geometric Design

- Discuss the key elements of the complex access modification study.
- Review the recommendation for the removal of system interchange ramps.
- Discuss the balance of access versus operation, especially in the Midtown area.
- Address the I-77/Kingsbury Run sight distance issue.
- Discuss the balance needed between geometrics, safety and access.

Materials/Accelerated Testing/Pavement Design

- Select optimal pavement materials.
- Investigate options for accelerating pavement construction (when, where and how).
- Evaluate the need for special materials testing and approval procedures, i.e., performance-based specifications, warranties, quality assurance/quality control (QA/QC) provisions, etc.
- Evaluate potential applications of innovative materials such as geotextiles and geofoams.
- Investigate noise-/vibration-sensitive designs and materials.

Traffic Engineering/Work Zone Safety/ITS

- Investigate options for integrating ramp signals into the City of Cleveland's signal system(s).
- Utilize ITS applications during construction.
- Ensure contractor access.
- Ensure work zone safety.
- Promote safety by design.
- Address pedestrian movements throughout the corridor.

2.1. Project Overview

For the past several years, ODOT has been working with the community to develop a comprehensive strategy to rebuild the Cleveland Innerbelt. This effort, which in 2004 evolved into the Cleveland Innerbelt Plan, includes rebuilding portions of Interstates 71, 77 and 90 through downtown Cleveland.

The Innerbelt Plan is divided into several projects, which include:

- East 55th Street Bridge.
- Innerbelt Curve.
- Innerbelt Trench.
- Central Interchange.
- I-77 Access.
- Central Viaduct.
- Southern Innerbelt.
- Quigley Road Extension.
- West 7th Street/I-490 Interchange.

Since 2004, ODOT and its consultant team have been working on preliminary engineering and environmental studies for various segments of the project.

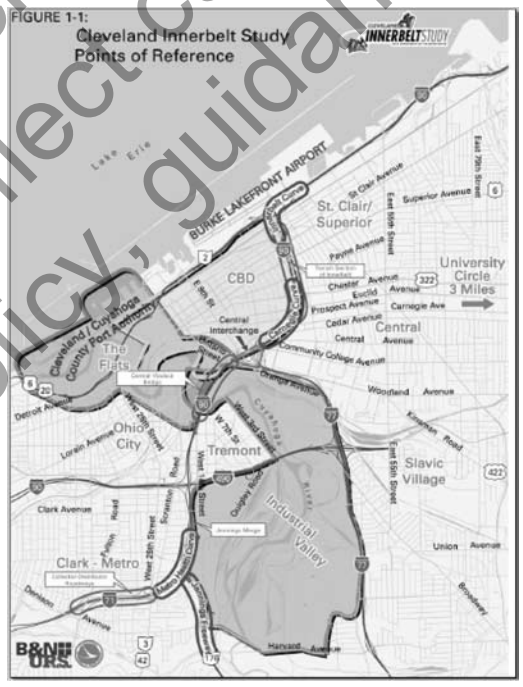

Figure 1. Cleveland Innerbelt Study Points of Reference

2.2. Project History and Development

The concept of the Innerbelt Freeway was first discussed in a series of reports published by two entities, the Regional Association of Cleveland and Cuyahoga County, between 1944 and 1957.

These publications detailed a transportation system for downtown Cleveland that resembles half a wheel, with radial freeways extending from the downtown "hub" like spokes and the Innerbelt Freeway serving as the encircling rim that ties the system together via the Central Interchange. (See Section 2.1 of the *Cleveland Innerbelt Study Purpose and Need*, available online at http://www.innerbelt.org/Innerbelt/Documents/Purpose%20and%20Need.pdf.)

Because some portions of the proposed system were never constructed, the arterial streets and parallel freeways carry more regional travelers than originally projected. This, in turn, impacts the number of lanes needed for lane balance on the Innerbelt Freeway.

2.3. Project Purpose

The purpose of the Innerbelt Plan, as defined in the Purpose and Need Statement, is as follows:

- Improve the physical condition of the existing Innerbelt Freeway bridge decks and roadway pavements.
- Improve the operational performance of the Innerbelt Freeway.
- Improve the safety of the Innerbelt Freeway.
- Improve the access provided by the Innerbelt Freeway.
- Support community goals, enhance the aesthetics of the built environment and reflect high standards of environmental responsibility.

2.4. Project Challenges

Concentration of Bridges

There are 25 bridges on the Innerbelt, including the 5,079-foot-long Central Viaduct. Twenty-four of the bridges fall within a three-mile corridor between the Jennings Interchange and the Central Interchange, with over half of the freeway in this area located on structure.

All 25 of the bridges on the Innerbelt were constructed between 1959 and 1969. ODOT estimates that the bridge decks will need to be replaced between 2008 and 2017.

Design Deficiencies

The *Cleveland Innerbelt Study Purpose and Need* states that there are "numerous areas" along the Innerbelt that do not meet current freeway design standards. The report notes several issues that must be addressed as part of the Innerbelt Freeway Reconstruction project:

- Improper reductions in the number of basic lanes on the freeway.
- Inadequate acceleration, deceleration, wave or terminal spacing lengths on the freeway ramps.
- Inadequate curve radius on the freeway mainline.

MOT

The average daily traffic (ADT) for the project study area is 130,000, with large portions of the Innerbelt Freeway operating at a level of service (LOS) of D or below during the morning and afternoon peak travel periods. [A LOS of C or higher is the desired standard.] This, combined with a lack of shoulders and an inability to dissipate even the most minor of disruptions to traffic flow, makes MOT a major concern, especially during construction.

2.5. Project Status

In 2004, the Innerbelt Scoping Committee reached agreement on both the scope and the design concept for the Innerbelt project, and the Ohio Transportation Review Advisory Committee (TRAC) committed funds to several Innerbelt projects for state fiscal years 2007-2010, namely the reconstruction of the Innerbelt Curve, the East 55th Street railroad bridge, and a reconstructed West 14th Street interchange from I-71 and SR 176 that includes a connector road to Quigley Road in the Cuyahoga River Valley.

Also in 2004, the Northeast Ohio Area Coordinating Agency (NOACA) amended its Transportation Plan and Transportation Improvement Plan to include the reconstruction of the Innerbelt, and the City of Cleveland and ODOT signed a Memorandum of Understanding (MOU) regarding reconstruction of the Innerbelt.

ODOT and its consultant team have been working on preliminary engineering and environmental studies for various segments of the project for the past two years. ODOT expects to complete the final environmental document, featuring selection of the preferred alternative, in late 2006/early 2007.

3.1. Innovative Contracting/Innovative Financing

The innovative contracting/innovative financing team discussed several risk factors and then proceeded with their recommendations:

Risk Factors/Unknowns

- Federal revenue projections.
- State revenue estimates.
- Construction inflation.
- Industry capacity limits.
- Potential material shortages.
- The accuracy of the preliminary estimate.
- Project development timeframe.
- ROW cost/clearance.
- The timing of the NEPA document.

Strategies/Recommendations

- Determine if the project timeline is reasonable. Focus on ROW and the relocation of utilities with available cash on hand (including earmarks), especially for the Central Viaduct.
- When ready, bond and accelerate to finish in a reasonable timeframe. National experts say Ohio's indebtedness is conservative. Consider additional bonds, i.e., Grant Anticipation Revenue Vehicle (GARVEE), regular, etc.
- Consider design-build (D-B) and other strategies for the bridge. Give the community a range of choices, including signature and non-signature options.
- Be up-front with elected leaders: ODOT needs earmarks to continue with this signature corridor (not the bridge). This requires strong local and regional support.
- Reconsider priorities within the corridor and within the State. Does ODOT need to completely rehabilitate the existing Central Viaduct? Could the DOT perform a minor rehabilitation and move on to other priorities such as the Curve? What do safety and congestion priorities dictate?
- Evaluate when and where contractors are involved, especially when discussing phasing, idle equipment costs, ingress/egress issues, staging areas, hauling, local access, etc. Now is the time to solicit contractor input.
- Consider accelerating projects/sub-projects within the corridor, i.e., East 9th, Ontario, the I-77 connection, etc.
- Utilize innovative techniques such as A-plus-B-plus-C contracting, incentives and disincentives, lane rentals, etc.
- Incorporate strategies to control material price spikes, i.e., pre-bidding of materials, shorter contract timeframes, etc.
- Establish a permanent, corridor-based project management team (PMT). Include a dispute review board (DRB) to be forward-looking and to control claims costs.

- Utilize 24/7 corridor-based responses and solutions, corrective actions, a decision process that includes full decision-making authority, and post-award cost controls.
- Assign cost risks per contract group, utilizing a range of probable costs.
- Understand the inflation and risk impacts per contract group/ material; continually adjust estimates based on key items for the region.
- Understand workforce availability and its impact on the overall project cost.
- Consider corridor-based contractor insurance.
- Create a “shopping list” of add-ons to the new bridge contract if the base bid is good, i.e., prioritizing the Trench or Central Interchange bridges or deleting alternatives if necessary.

3.2. ROW

The ROW skill set made their recommendations according to key areas such as ROW acquisition and utility coordination:

- Develop plans along the corridor in enough detail that ROW acquisition can begin sooner rather than later. Property owners need enough time to understand the project impacts and the acquisition process.
- Make advance ROW acquisition a priority so that ROW acquisition stays on schedule.
- Utilize total take residue properties for staging areas. Need input from area contractors.
- Determine if the project needs to charge an underlying fee in areas of existing highway easement/ROW takes.
- Discuss ROW take options for the new Innerbelt Bridge, i.e., fee ownership, aerial easements, etc.
- Do ROW takes necessary for storm water BMPs, mainly for the Innerbelt Bridge section.
- Make utility coordination a priority so that utility relocation activities take place ahead of project activities.
- Consider revising partial takes to total takes to accommodate MOT and staging areas. Need constant communication with the design team on this.
- Identify critical demolition structures for integration of the highway foundation design.
- Understand and control vibrations when demolishing buildings in sensitive areas.
- Identify materials that can be recycled or salvaged from demolished structures.
- Investigate the condition of the foundations in buildings that will be removed.

- Identify potential environmental hazards within the structures being removed.
- Consider finding sites within the project area for building demolition materials.
- Develop ongoing communication with affected railroads to identify potential ROW needs along their corridors, especially for utilities and temporary tracks.
- Require delivery of all ROW plans immediately after approval of the environmental document so that acquisitions stay on schedule. This also allows for approval of the appropriation process.
- Work with FHWA on allowing ODOT to let the highway contract prior to clearing ROW. This will help the project schedule tremendously.
- Have a ROW expert available during decision-making sessions; he or she can provide input on potential ROW impacts.

3.3. Construction/MOT

The construction/MOT crew made recommendations in the areas of scheduling and phasing, constructability, packaging and utilities/ROW:

Scheduling and Phasing

- Divorce critical path method (CPM) from the financing package.
- Minimize impacts on traffic.
- Let as stand-alone projects.
- Maintain local service for trucks.
- Consider the trench option: it is most critical for MOT purposes.
- Use cut-off/retaining walls for staging and access.
- Allow for contractor innovation in MOT.
- Maintain overhead traffic in the Trench.
- Utilize a limited number of short-term full closures.

Constructability

- Build offline.
- Conduct ROW acquisitions early.
- Construct overhead structures with an eastbound trench.
- Emphasize utility coordination.

Packaging

- Limit the number of contracts.
- Provide adequate staging areas.
- Transfer responsibility for MOT to the contractor.
- Divert traffic to alternate routes.

- Construct a new westbound I-90 Central Viaduct between 2009 and 2012. Utilize the far north alignment.
- Reconstruct the I-77 Central Interchange between 2010 and 2012.
- Construct a trench and overhead bridges on the Innerbelt Curve between 2012 and 2014.
- Construct the I-90 eastbound Central Viaduct between 2012 and 2014. This will follow construction of the new westbound viaduct and the Central Interchange.
- Consider a five-year program instead of an eight-year schedule.

Utilities/ROW

- Consider separate utility bridges.
- Consolidate utilities.
- Prepare a pre-approved list of relocation contractors for a utilities subcontract.
- Investigate the legalities of payment for non-compensable relocations.
- Acquire all ROW early.

3.4. Structures I (Major Bridges)

The Structures I (Major Bridges) team made the following recommendations:

Mitigation of Slope Instability

- Accommodate the pier in the west embankment of the Cuyahoga River, utilizing techniques such as:
  - Rock-socketed shafts with isolation casings.
  - A footing isolation wall.
  - Soil nailing, chemical grouting and drainage.
  - Slurry cut-off walls.
  - Excavation and the use of lightweight embankment materials to unload the slope.
- Provide an early, separate contract for slope mitigation and foundation construction.

Signature Bridge Perception

- Note that the term “signature bridge” implies a bridge significant to Cleveland, not a particular bridge type.
- Develop a public process to define the signature qualities of the bridge.
- Strike a balance between visual quality, appropriate engineering, cost and constructability.

Viaduct: Transition to a New Structure

- Use the "fill approach":
  - Consider lightweight fill.
  - Improve MOT transitions.
  - Provide a separate structure at the Regional Transit Authority (RTA).

Cost Control

- Address potential cost escalation; it is a critical issue.
- Provide for alternate designs – depending on material availability.
- Focus on proven technology.
- Encourage bidders through pre-bid meetings, advance plans, adequate time to bid and bidder prequalification.

3.5. Structures II (Other Bridges and Retaining Walls)

The Structures II (Other Bridges and Retaining Walls) group focused on bridges over the Interstate, curved structures, retaining walls and the proximity of foundations to major utilities and buildings.

Bridges over the Interstate

- Consider dedicated utility corridors.
- Encourage advance utility relocations.
- Maintain pedestrian traffic.
- Build structures wider than normal. This will enhance MOT, utilities and final-use options in terms of greenspace, wider sidewalks and commercial development.
- Consider modular demolition/construction.
- Construct roll-in bridges.
- Prefabricate or pre-cast elements, as was done with East 22nd over I-90.
  - Provide a temporary pedestrian bridge to permit total closure.
- Consider raising the profile/grade of cross streets in the Trench.
- Consider pushing the ramps and service roads farther away from the mainline to avoid conflicts with the bridge abutments.
- Consider excavation and retaining walls for the eastbound mainline with overhead structures.
  - Provides staging areas.
  - Can group "like items" of work together for efficient contracting.

Curved Structures

- Consider revising the geometry to build SR 2 eastbound to I-90 westbound offline.

Retaining Walls

- Consider conventional walls or mechanically stabilized earth (MSE) walls.
- Consider the following options for full-height walls:
  - Top-down construction.
  - Drilled shafts.
  - Soil nailing.
  - Tiebacks.
  - Pressed piling.
  - Pre-augered holes for piles (to reduce vibrations).
  - Slurry walls.

Proximity of Foundations to Major Utilities/Buildings

- Utilize press piles, auger-cast or pre-bored holes instead of driven piles.
- Consider top-down abutment construction.

Additional Thoughts

- Remediate the removal of green slopes by trying to re-seed as much as possible.
- Consider possible uses for the additional bridge opening width.
- Consider aesthetic opportunities for asymmetrical spans.

3.6. Environmental

The environmental skill set discussed the NEPA document, other relevant environmental issues and interaction with other disciplines:

NEPA Document

- Determine the critical path areas/issues that need to be resolved in order to complete the Environmental Assessment (EA)/ Finding of No Significant Impacts (FONSI).
  - Remove as many issues from the table as possible, and concentrate on those that remain.
- Conduct Phase I and II cultural resource surveys.
- Complete an access modification survey, and have FHWA review it.
- Do a preliminary noise study now with available traffic data.
- Utilize visualization techniques to show the project's alternatives and the magnitude of impacts to 4f/106 resources.

- Consider preparing the EA with design options rather than waiting for all the necessary pieces to develop the preferred alternative.
- Address secondary impacts, i.e., disposal areas.
- Address environmental justice (EJ) issues, i.e., the ability to walk along Cedar Avenue to transit service after the cul-de-sac.
- Prepare a memorandum of agreement (MOA) after the EA is complete.
- Request a land transfer from the airport and/or the required coordination and approvals from the Federal Aviation Administration (FAA).
- Require coordination with, and approval from, the U.S. Coast Guard.
- Require coordination with, and approval from, the Ohio Department of Natural Resources for Coastal Zone consistency finding.

Other Relevant Environmental Issues

- Determine if Section 4f criteria are applicable.
- Evaluate what mitigation of impacts (and/or the degree of enhancements or aesthetics to these structures) to historic resources, residences, churches, etc., can be considered. Will ODOT consider converting staging or disposal areas to future greenspace or park use?
- Start Endangered Species Act (ESA) Phase II testing.
- Bring the City on as a partner/supporter.
- Show the economic development positives in addition to Midtown.

Interaction with Other Disciplines

Construction Methods

- Explore strategies to minimize noise and vibration impacts and the concerns of the local community.
- Consider piles, drilled shafts or other techniques.
- Look at the whole picture, i.e., the cost savings of construction techniques versus the possible additional cost associated with mitigating impacts to historic resources/residences; the cost and extent of a monitoring plan; and so forth. Prepare the monitoring plan on a site-specific basis, and make it results-oriented.
- Look at the timing of construction activities, i.e., night-time and weekend work.
- If warranted**,** consider building noise barriers during the early stages of the project.

Southern Alignment

- Develop and quantify the pros and cons of the southern alignment. Need to bring closure to the analysis of alternatives and prepare the administrative record.
  - Identify all the problems associated with this alternative.
  - Determine what benefits will be realized if this alignment is chosen.
  - Remember that the acquisition cost for the Juvenile Justice Center is estimated to be $35 million.

Storm Water Management/ROW

- Look at combined sewer overflow (CSO).
- Consider separate systems.
- Evaluate in-line treatment in light of the additional ROW needs. Determine if additional permits will be needed.
- Assume the worst-case scenario.

Staging Area Needs, Temporary Takes

- Determine where construction staging areas are needed and what is on those parcels.
- Find out if the acquisition of additional areas will make the project easier and/or less costly to build. Determine if there are any with minimal environmental issues that can be acquired.
- Evaluate whether there are areas that can be acquired and converted to some beneficial use for the community as mitigation.

Rephasing

- Determine if the bridge should be delayed to shorten the overall project time.

Modeling

- Demonstrate the modeling of City street network results to the City and others in the Midtown district.
- Utilize modeling to discuss future operations such as construction, access, detour routes, etc.
- Coordinate with the single point of contact for traffic management, if one is established.

Surface Type

- Determine if surface will be asphalt or concrete, as that will affect noise.

3.7. Public Relations

The public relations team outlined their goals for the Innerbelt project and made recommendations in several areas:

Goals

- Increase public awareness and education to:
  - Alleviate anxiety/negative outlook.
  - Manage congestion/downtown access.
  - Increase work zone safety.
- Develop a positive long-term message.
- Establish and maintain public trust.

Demographic Analysis

- Conduct a scientific survey to determine the demographics of roadway users. Use this information to tailor the outreach program and make targeted investments.
  - Will require outside expertise.

Road Spotters

- Use road spotters to gather immediate feedback on construction activities and to make adjustments in the field.
  - Identify reliable sources. Involve the business community, trucking companies, neighborhoods, delivery services, etc.

Customer Satisfaction Surveys

- Conduct quarterly surveys of businesses, commuters, etc.
  - Determine satisfaction with the overall project.
  - Query as to the best mechanism for disseminating traffic information.
  - Measure the public's knowledge level.
  - Use the information gathered to adjust ODOT's outreach program and project. Need to establish how ODOT defines success.
  - Utilize outside expertise.

Dedicated Outreach Team

- Develop advance outreach efforts and establish the "face of the project."
- Work to identify and market travel demand management (TDM) programs.
  - Need expertise to develop TDM strategies.
- Build a strong relationship with the district construction/ contractor project team.
  - Use the relationship to get accurate, advanced information and cooperation to make field adjustments.

Traffic Advisories

- Provide daily traffic alerts, as needed, to the public and the media via e-mail.
- Use personal outreach, lunch room briefings, posters, table tents and so forth to reach those without web/e-mail access.

Non-Traditional Stakeholders

- Market informational materials to targeted stakeholders, such as:
  - Season ticket holders.
  - Downtown leasing agents.
  - Blue collar workers.
  - Major traffic generators.
- Create a database, and develop marketing materials to fit the needs of each audience.

Relationship Building

- Cultivate/maintain the face of the project throughout construction.
- Have a go-to person for inquiries.
- Develop and maintain the "right" message, tailoring it, as needed, to fit the audience and backing it up with key facts. Possible messages include:
  - Safety.
  - Economic development.
  - Quality of life.
- Use community development organizations and other people or groups to help deliver ODOT's message.

3.8. Utilities/Railroad Coordination

The group made numerous recommendations in the areas of railroad and utilities coordination:

Railroads

Communication and Coordination

- Build relationships and maintain ongoing communication with local and national Norfolk Southern (NS) and CSX Transportation officials.
- Use a communications matrix to track outstanding issues.
- Establish single points of contact with the railroads and the Innerbelt coordinator.
- Use proactive rather than reactive project management.
- Address potential barriers, such as time constraints for railroad personnel and follow-through by all parties.

Early Commitments

- Solicit input early from railroad personnel.
- Seek acceptance of the conceptual plan in writing.
- Address potential barriers, such as time constraints for railroad personnel and the reality of determining who's in charge.

Plan Review Durations

- Convey that complete, quality plans are critical.
- Allow a maximum of 180 working days for approval (Stage 3 to authorization) through temporary agreements.
- Address potential barriers, such as last-minute plan revisions and legal issues.

ROW and Construction Access

- Identify ROW needs early.
- Seek advance acquisitions.
- Include temporary at-grade crossings in the engineering plans, rather than relying on the contractor.
- Identify construction access routes and staging areas early in the design process.
- Address potential barriers, such as reconciliation with the railroads over ROW needs and undefined construction limits.

Project-Specific Issues

- Discuss the proximity of NS Railroad's lift bridge to the proposed westbound Central Viaduct bridge.
  - Identify true maintenance clearance requirements now.
  - Schedule a face-to-face meeting with NS officials.
  - Determine Central Viaduct foundation construction methods early, and communicate them to NS Railroad.
- Look at the need to construct a temporary railroad bridge for CSX Transportation over the existing I-90 (at the Curve).
  - Instead of demolishing the existing overhead railroad bridge, fill and bury it using low-strength mortar. This would eliminate the need to construct a temporary bridge to maintain rail traffic.
- Study the existing at-grade crossing and interconnected signals between the Curve and East 55th.
  - If replacement is warranted, pursue Ohio Rail Development Commission (ORDC) safety funding.
  - Negotiate sharing the costs with CSX Transportation.

Utilities

Project Issues

- Need to relocate an enormous number of utilities, which could have a significant impact on the project schedule.
- Need to evaluate possible inaccurate subsurface utility survey information.
- Face potentially unresponsive utility companies.
- Face potential vibration damage to underground utilities during construction.

General Ideas

- Design to avoid major impacts.
- Begin coordination efforts early.
- Utilize subsurface utility engineering (SUE) data early in the design process.
- Follow up with utility companies to ensure railroad access permits are secured early.
- Create financial incentives for meeting completion dates.
- Identify vibration-sensitive underground utilities early.
- Hold regular update meetings with the utility companies.
- Establish a dedicated, full-time utility coordination officer beginning now and ending at the completion of construction. The officer could be employed directly by ODOT or hired as a consultant. Need to explore potential funding mechanisms, i.e., line items in contract bids, etc.
- Consider consolidating utilities in the Trench on temporary or permanent separate structures.
- Consider construction of "wide" bridges in the Trench, and consolidate utilities in off-line bays.
- Identify possible corridors for utility consolidation.
- Install protective concrete caps where cover is compromised.
- Encourage joint trenching.
- Generate a "relocation blackout" matrix where specific utilities cannot be moved due to high demand.

Potential Issues/Barriers

- Face significant ROW/easement issues and design changes.
- Need to address traffic control issues.
- Need to investigate possible legal restrictions on utility incentive payments and penalty clauses.

3.9. Roadway/Geometric Design

The roadway/geometric design skill set delineated their recommendations by structure:

Kingsbury Run Bridge

- Re-stripe the existing bridge to accommodate needed capacity.
- Maintain a balance between travel lane width, shoulder width and sight distance.
- Address concerns with drainage.
- Investigate concerns over crown location.
- Study alternatives for the southbound direction further; the northbound can be accomplished.
  - Consider a 45 mile-per-hour design speed for the auxiliary lane.
  - Consider narrowing the median shoulder.
  - Investigate different barrier options.

Broadway Avenue Ramp

- Take into consideration the community's interest in re-establishing this ramp.
- Discuss all design possibilities.
- Consider a proposal to reallocate access to East 22nd Street via I-90, East 22nd Street via I-77 and East 30th Street via I-77.
- Look at keeping the Broadway ramp by having it share the proposed Ontario ramp.
  - Need to address concerns regarding the mainline weave operation.
  - Need to address concerns regarding adequate signage.

Carnegie Avenue Ramp

- Take into consideration the community's interest in re-establishing this ramp.
- Discuss all design possibilities.
- Redirect access via I-90 or I-77 to East 22nd Street. This will remove the weave with the northbound I-77 on-ramp.
- Note that there is not a "feasible and prudent" alternative to avoid impacts to Historic Register-eligible property.

Prospect Avenue Ramp

- Take into consideration the community's interest in re-establishing this ramp.
- Discuss all design possibilities.
- Redirect access to East 18th Street or Chester Avenue via the Midtown Connector. This will remove the weave between the Chester Avenue on-ramp and the Prospect Avenue off-ramp, the weave between the Prospect Avenue on-ramp and the Chester Avenue off-ramp, and the weave between the Prospect Avenue on-ramp and the I-77 off-ramp.
- Note that there is not a "feasible and prudent" alternative to avoid impacts to Historic Register-eligible property.

Removal of System Ramps in Central Interchange

- Remove the northbound I-77 to westbound I-90 ramp.
- Remove the eastbound I-90 to southbound I-77 ramp.
- Provide indirect access via I-490, and provide additional signage.

3.10. Materials/Accelerated Testing/Pavement Design

The materials/accelerated testing/pavement design team identified several key issues that played a factor in their recommendations:

Key Issues

- Pavement type selection.
- Accelerated pavement construction.
- Need for special materials testing.
- Innovative materials.
- Noise-/vibration-sensitive designs.

Recommendations

- Consider full-depth asphalt on the mainline lanes to reduce the noise generated by traffic.
  - Reduces construction time.
  - Aids in MOT because of the tie-ins for bridges and ramps.
  - Allows for rehabilitation using mill and fill.
- Consider using stone matrix asphalt (SMA) for the surface: it has a longer life and a higher resistance to permanent deformation.
- Evaluate the benefits of using Portland Cement Concrete (PCC) pavement on the mainline lanes because it:
  - Provides rutting resistance and skid resistance.
  - Has higher smoothness specifications.
  - Reduces noise.

- Recycle old asphalt pavement into new hot mix asphalt (HMA) utilizing ODOT's existing specification.
- Recycle the old concrete into new concrete or asphalt pavement. ODOT does not yet have a specification for this.
- Use a high-friction aggregate such as slag or trap rock.
- Use innovative contracting methods to construct ramps using PCC. This will minimize rutting issues.
- Use post-tensioned, pre-cast panels for the tie-in sections.
- Set up a separate test lab at the project site.
- Use a maturity meter to evaluate concrete strength.
  - Have the FHWA mobile concrete lab visit District 12.
- Utilize pavement warranties for either HMA or PCC pavement.
- Go for longer-term warranties of at least seven years.
- Designate surface friction as a warranty item.
- Determine where the water table is in the Trench: district staff has reported that the water table is near the bottom of the existing pavement.
  - Ascertain whether this is from failed under drains (the local water table) or the general water table (from the lake level).
- Fill the subcut in the Trench section with open stone (half- or three-quarter-inch rock).
  - Ensure that in-fill is insensitive to moisture content.
  - Separate the rock from the soil with geotextile.
- Consider using high-strength, low-elongation geotextile in the aggregate fill for strength in the Trench section.
- Address soil conditions by:
  - Removing variable soil.
  - Replacing with competent material.
  - Utilizing lightweight materials.
  - Stabilizing the subgrade.

3.11. Traffic Engineering/Safety/ITS

The traffic engineering/safety/ITS group developed a mission statement and centered their recommendations around that:

Mission Statement

During construction we will strive to minimize delays and accidents and inform the community of incidents, lane closures and the construction schedule.

Incident Management

- Establish an incident management (IM) team with broad representation.
- Require IM team members to take a National Highway Institute (NHI) IM course.

- Conduct incident reviews and tabletop exercises.
- Develop incident procedures.
- Designate an IM coordinator/work zone traffic manager, preferably a full-time ODOT engineer.
  - Has final approval of lane closures; coordinates project MOT.
  - Runs incident management team.
- Provide motorist assistance through “Road Crewzers.”
  - Equip the Road Crewzer as a tow truck.
  - Dedicate one Crewzer to the project.
  - Work with Cleveland police officers during rush hour.
- Provide a common means of communication for police, fire, emergency services, Road Crewzer, the ODOT TMC and contractor staff, i.e., Nextel radios.
- Update the IM playbook for incidents and ramp closures.
- Plan for special events.
  - Coordinate with the venues.
  - Coordinate with the IM team.
  - Provide traffic information on the scoreboards at sporting events.
  - Provide shuttle buses to and from events.

Work Zone Safety

- Provide pull-off zones for breakdowns.
- Designate a work zone traffic supervisor to inspect the work zones daily, including nights and weekends.
- Utilize a speed information system to reduce rear-end accidents.
- Utilize stationary cameras and van cameras for photo speed enforcement.
- Conduct a work zone accident analysis.
  - Do an immediate analysis and fixes.
  - Provide a bid item for fixes.
  - Involve Cleveland State University (CSU).
- Do a software analysis for the queues.
- Consider variable speed limits.
- Establish traffic count stations, both temporary and permanent.
  - Re-evaluate lane closure times.

Arterial Management

- Identify all arterials that will be impacted by MOT.
  - Upgrade pavement markings.
  - Remove unwarranted signals.
  - Enforce parking restrictions.
- Designate a traffic engineer to coordinate and fine-tune arterial management during construction.
- Provide for pedestrian movement:
  - Maintain at least one sidewalk on all bridges that are built using phased construction.

- ❖ Install pedestrian signal heads.
- ❖ Improve crosswalks along all detours.

- ♦ Examine possible Congestion Mitigation and Air Quality (CMAQ)/FHWA funding options for the designated traffic engineer, for signal system upgrades and for arterial improvements such as geometric changes, repaving, etc.

ITS

- ♦ Install temporary/permanent cameras during construction along the bridge and Trench.
- ♦ Tie portable changeable message signs (PCMS) to the traffic operations center.
- ♦ Utilize ITS to route traffic around the city and allow either partial or complete closures (short-term and on weekends).
- ♦ Provide District 12 backup at the project office in order to:
  - ❖ Coordinate work zone operations with ITS.
  - ❖ Share camera images.
  - ❖ Control message boards and PCMS.
  - ❖ Manage the detours.

Safety Design Improvements

- ♦ Utilize the following to improve signage and markings:
  - ❖ Clear-view font.
  - ❖ Prismatic sheeting.
  - ❖ Larger text.
  - ❖ Six-inch pavement markings.
  - ❖ Larger glass beads.
  - ❖ Raised pavement markers.

4.1. Next Steps

Now that the workshop is complete, ODOT, FHWA and the design team will evaluate the skill set recommendations for possible incorporation into the Cleveland Innerbelt Reconstruction project.

As this report demonstrates, the input of national experts and local representatives has once again proven to be a valuable tool in project innovation, acceleration and success.

GLOSSARY OF FREQUENTLY USED TRANSPORTATION ACRONYMS

ACRONYM	FULL NAME
AASHTO	American Association of State Highway and Transportation Officials
ACC	Acid Copper Chromate
ACTT	Accelerated Construction Technology Transfer
ADT	Average Daily Traffic
AGC	Associated General Contractors of America
ASCE	American Society of Civil Engineers
ASR	Alkali-Silica Reaction
ATCs	Alternative Technical Concepts
BIMRS	Bridge Incident Management and Response System
BMPs	Best Management Practices
CAD	Computer-Aided Design
CCTV	Closed Circuit Television
CDC	Community Development Center
CE	Categorical Exclusion
CM at Risk	Construction Manager at Risk
CMAQ	Congestion Mitigation and Air Quality
CMP	Congestion Mitigation Plan
CPM	Critical Path Method
CRCP	Continuously Reinforced Concrete Pavement
CSO	Combined Sewer Overflow
CSS	Context Sensitive Solutions
CSU	Cleveland State University
D-B	Design-Build
D-B-B	Design-Bid-Build
DEIS	Draft Environmental Impact Statement
DMS	Dynamic Message Sign
DOT	Department of Transportation
DRB	Dispute Review Board
EA	Environmental Assessment
EJ	Environmental Justice
EMS	Emergency Management System
EPS	Expanded Polystyrene
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEIS	Final Environmental Impact Statement
FONSI	Finding of No Significant Impacts
FFY	Federal Fiscal Year
FHWA	Federal Highway Administration

ACRONYM	FULL NAME
GARVEE	Grant Anticipation Revenue Vehicle
GPS	Global Positioning System
GRS	Geosynthetic Reinforced Soil
HAR	Highway Advisory Radio
HfL	Highways for LIFE
HMA	Hot Mix Asphalt
HOT	High Occupancy Toll
HOV	High Occupancy Vehicle
HPC	High-Performance Concrete
HPS	High-Performance Steel
IM	Incident Management
IT/ITS	Intelligent Transportation/ Intelligent Transportation Systems
LOS	Level of Service
MIS	Major Investment Study
MOA	Memorandum of Agreement
MOT	Maintenance of Traffic
MOU	Memorandum of Understanding
MPH	Miles per Hour
MPO	Metropolitan Planning Organization
MSE	Mechanically Stabilized Earth
NCHRP	National Cooperative Highway Research Program
NEPA	National Environmental Policy Act
NHI	National Highway Institute
NPDES	National Pollutant Discharge Elimination System
NOACA	Northeast Ohio Area Coordinating Agency
NS	Norfolk Southern
ODOT	Ohio Department of Transportation
PAB	Private Activity Bond
ORDC	Ohio Rail Development Commission
PCC	Portland Cement Concrete
PCMS	Portable Changeable Message Signs
PIO	Public Information Officer
PMT	Project Management Team
PR	Public Relations
PSI	Pounds per Square Inch
QA/QC	Quality Assurance/Quality Control
RAP	Reclaimed Asphalt Pavements
RFP	Request for Proposal
RFQ	Request for Qualifications

ACRONYM	FULL NAME
ROD	Record of Decision
ROW	Right-of-Way
RPMs	Raised Pavement Markers/Markings
RSCH	Repeated Shear at Constant Height
RTA	Regional Transit Authority
RWIS	Roadway Weather Information System
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SCC	Self-Consolidated Concrete
SEP	Special Experimental Project
SIP	State Implementation Plan
SIP Forms	Stay-in-place Forms
SMA	Stone Matrix Asphalt
SPMTs	Self-Propelled Modular Transporters
SUE	Subsurface Utility Engineering
TDM	Traffic Demand Management
TIF	Tax Incremental Financing
TIFIA	Transportation Infrastructure Finance and Innovation Act
TIG	Technology Implementation Group
TMC	Traffic Management Center
TMP	Traffic Management Plan
TRAC	Transportation Review Advisory Committee
TRB	Transportation Research Board
TSA	Transportation Security Administration
TSP	Thrift Savings Plan
VE	Value Engineering
VMS	Variable Message Sign
VPPP	Value Pricing Pilot Program
WiFi	Wireless Fidelity

WORKSHOP ATTENDEES

Key ODOT Staff:
Craig Hebebrand, District 12 Innerbelt Project Manager
Dave Lastovka, Co Project Manager
Jeanne Braxton, ACTT Coordinator

Key FHWA Staff:
Jerry Blanding, RC Innovative Contracting Engineer, Moderator, ACTT Coordinator
Roger Ryder, Division Urban Program Engineer, Division ACTT Coordinator
Mike Armstrong, Division Field Operations Engineer, District 12 Area Eng.

Innovative Contracting/Innovative Financing

National invitees:	*FHWA experts:*
Jennifer Townley	Jerry Yakowenko
Dale Schiavoni	Prabhat Diksit
Randy Over	Roger Rochelle

ROW – Including Building Removals

National invitees:		*FHWA experts:*
Dick Henry	Frank Belanger	Glenn Bridger
Joan Short	Mark Dowiak	
Dan Dougherty	Greg Kronstain	
Kevin Schlereth		

Construction/MOT

National invitees:		*FHWA experts:*
Dave Holstein	Joe Glinski	Gene Hoelker
Jennifer Gallagher	Tom Hyland	Bruce Hammers
Paul Silvestri	Scott Slack	Mark Robinson
Brian Toombs	Matt Schulz	Pete Garcia
Vince Amato		

Structures I (Major Bridges)

National invitees:		*FHWA experts:*
Nick Corda	Kirk Gegick	Vijay Chandra
Tim Keller	Matt Shamis	Steve Stroh
Mike Malloy	John Diedrick	Steve Saye
Joseph Seif	Dean Palmer	
Pat McCafferty		

Structures II (Other Bridges and Retaining Walls)

National invitees:		*FHWA experts:*
Travis Butz	Mark Sakian	Raymond McCabe
Dave Leake	Tom Lefchik	
Jim Calanni	Jeff Broadwater	
Craig Hebebrand	Tom Boyer	

Environmental

National invitees:		*FHWA experts:*
Larry Hoffman	Mark Carpenter	Scott Duncanson
Tim Hill	John Motl	Judith Lindsey
Neil Chase	Debbie Berry	David Grachen
Cory Grayburn	Bob Brown	
Sara Greemore		

Public Relations

National invitees:		*FHWA experts:*
Michelle May	Fred Carabello	Judith Johnson
Lora Hummer	Tom Cerny	Amanda Perry

Utilities/Railroad Coordination

National invitees:		*FHWA experts:*
Ray Lorello	Dave Lastovka	Robert Memory
Richard Behrendt	Mike Harrington	
Curt Malone	Ray Bencivengo	
John Threat		

Roadway/Geometric Design

National invitees:	
Dirk Gross	Paul Dorothy
Dave Riley	Jason Panard
George Soos	Kirsten Bowen
Adam Johnson	Ricky Colombo

Materials/Accelerated Testing/Pavement Design

National invitees:		*FHWA experts:*
Steve Taliaferro	Nadar Armand	Gerry Huber
Faour Alfaour	Jim Marszal	Dennis Devorak
Bob Mcquiston		

Traffic Engineering/Work Zone Safety/ITS

National invitees:		*FHWA experts:*
Rick Pesta	Jamal Husani	John Tolle
Dennis O'Neil	Paul Ciupa	Jeff Arch
Rob Mavec	Randy Kill	
Andy Cross		

Additional invitees:

Bob Klaiber	Victoria Peters
Mike Armstrong	Gene Geiger

Innovative Financing. The team's primary goals are to align potential financing options with project goals; match anticipated cash flow with project management; and provide options for managing competing priorities for existing resources.

ROW/Utilities/Railroad Coordination. The ROW group's primary role is to ensure that ROW, utilities and railroad work comply with state laws and procedures. They must also consider the numbers and types of businesses and residences impacted by a project and evaluate the ready availability of additional right-of-way.

Geotechnical/Materials/Accelerated Testing. The geotechnical team explores subsurface conditions to determine their impact on the project; pursues options for expediting materials acceptance and contractor payment; and evaluates the use of innovative materials in accordance with project performance goals and objectives.

Traffic Engineering/Safety/ITS. The traffic engineering team strives to enhance safety; improve traffic management; and explore technologies, including ITS systems, that will communicate real-time construction information to the public.

Structures (Bridges, Retaining Walls, Culverts, Miscellaneous). The structures skill set focuses on accelerating the construction of structures. Their task is to identify the most accommodating types of structures and materials that will meet design requirements and minimize adverse project impacts.

Innovative Contracting. The innovative contracting group explores state-of-the art contracting practices and strives to match them with the specific needs of the project.

Roadway/Geometric Design. The roadway team evaluates proposed geometrics and identifies the most accommodating product with the minimum number of adverse impacts.

Long Life Pavements/Maintenance. The maintenance skill set identifies pavement performance goals and objectives and explores future maintenance issues for the project corridor, including winter service, traffic operations and preventative maintenance.

Construction (Techniques, Automation and Constructability). The construction crew explores techniques that will encourage the contractor to deliver a quality product within a specific timeframe while maintaining traffic.

Environment. The environment team ensures that the scope of work and construction activities reflect local environmental concerns. Their goal is to provide the most accommodating and cost effective product while minimizing natural and socio-economic impacts.

Public Relations. The public relations skill set discusses ways to partner with local entities and effectively inform both local communities and the traveling public about the project before, during and after construction. Their role is to put a positive spin on the project.

Background of ACTT

ACTT is a process that brings together public- and private-sector experts from across the country in a setting that encourages flexibility and innovation. The goal is to recommend technologies that will accelerate construction time while reducing user delay and community disruption. This necessitates a thorough examination of all facets of a highway corridor with the objective of improving safety and cost effectiveness while minimizing adverse impacts to the traveling public.

The ACTT concept was originated by the Transportation Research Board (TRB) in conjunction with FHWA and the Technology Implementation Group (TIG) of the American Association of State Highway and Transportation Officials (AASHTO). Following the completion of two pilot workshops, one in Indiana and one in Pennsylvania, the originating task force, A5T60, passed the concept off to FHWA and TIG to continue the effort. They have done so by coordinating a series of ACTT workshops around the country, with several more pending in 2006.

More information on the ACTT program is available online at http://www.fhwa.dot.gov/construction/accelerated/index.cfm.

FHWA-IF-06-038 OHIO