



# CUY-90-14.90

PID 77332/85531

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## PROJECT SCOPE

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State of Ohio  
Department of Transportation  
Jolene M. Molitoris, Director

### Innerbelt Bridge Construction Contract Group 1 (CCG1)

Approved \_\_\_\_\_

Date \_\_\_\_\_ District Deputy Director

Approved \_\_\_\_\_

Date \_\_\_\_\_ Director, Department of

Transportation

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APPENDICES:

Appendix DI-01 – Document Inventory lists all appendices to the Project Scope.

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## **PROJECT EXPECTATIONS**

This document describes the requirements for Construction Contract Group 1 (CCG1) of the Cleveland Innerbelt, a critical component of the City of Cleveland's infrastructure and one of Ohio's most essential transportation corridors. In accordance with the Project's importance, the Ohio Department of Transportation (ODOT) has undertaken significant efforts to define project expectations such that this Project can serve as a model for future project delivery statewide.

In partnership with the City of Cleveland, the Federal Highway Administration (FHWA) and many local agencies, neighborhood groups and private entities, ODOT has introduced numerous initiatives into this Project with the goal of maximizing opportunities for positive impact. ODOT, the City, and Cleveland residents expect prospective design build teams (DBTs) to bring superior design and construction expertise while at the same time focusing on achieving outstanding aesthetics, introducing creative ideas for sustainability, and striving for excellent community relations.

The importance of Project aesthetics has led ODOT to define global architectural and landscaping enhancements, which have resulted from a series of meetings and hands-on collaboration with key stakeholders. DBTs are expected to deliver these enhancements and to propose outstanding detailed aesthetic treatments to further elevate Project quality. The Project's Design Principles, developed by the Innerbelt Aesthetic Subcommittee, will serve as a guide to DBTs for implementation of aesthetics.

ODOT and the City likewise anticipate that this Project will set a standard of excellence for the implementation of sustainable design principles. Among the required sustainability initiatives are:

- Enhanced structural durability for longer service life
- A progressive approach to storm water management and best management practices (BMPs)
- Requirements for salvage and re-use of materials
- Focus on energy efficiency including LED architectural lighting for the Main Viaduct
- Cuyahoga River improvements
- Multi-modal enhancements including accommodations for the Towpath Trail
- Extensive introduction of vegetation into the urban environment

It is the expectation of ODOT and the City that DBTs will embrace these initiatives and demonstrate a commitment to further introducing additional sustainable practices in all aspects of the Project.

The proposed CCG1 construction will impact mobility near Cleveland's central business district and neighborhoods for several years. Accordingly, ODOT expects the DBTs to place emphasis on providing excellent community relations for the entire Project duration. The DBTs will be expected to work in

partnership with ODOT to disseminate information to the public in a timely fashion, facilitate frequent dialogue with key stakeholders, and enhance the public's ability to stay informed and provide input.

In addition to the requirements outlined in this document, DBTs are encouraged to become closely familiar with all previous project development. The project website ([www.innerbelt.org](http://www.innerbelt.org)) contains a significant amount of information relevant to previous project efforts, including all public outreach and partnering by ODOT with the City of Cleveland and local organizations and agencies.



# **1 GENERAL**

## **1.1 PROJECT CONTEXT and INTRODUCTION**

This Project is a result of the completed Innerbelt Planning Study, Environmental Impact Statement and Record of Decision, which describe a program of projects for the reconstruction of the existing interstate highways in and around the Central Business District of Cleveland, Ohio. The CUY-90-14.90 Project, referred to as Construction Contract Group 1 (CCG1), is the first major project to be constructed from these planning efforts. CCG1 primarily involves the construction of a new westbound I-90 Bridge over the Cuyahoga River Valley. Implicit in the goals of CCG1 is to enable the construction of Construction Contract Group 2 (CCG2), which primarily involves the replacement of the existing I-90 Central Viaduct. The new structure built in CCG2 will carry I-90 eastbound traffic and will allow for five (5) lanes of westbound traffic on the bridge constructed under CCG1. The Bi-Directional Condition, described in detail in the CCG1 Project Scope and Conceptual Plans, is the implementation of the key component of the CCG2 maintenance of traffic scheme. Bridge decks are included for replacement as part of CCG1. These bridge deck replacements will enable the construction of future construction contract groups and will accommodate the alternate I-90 route, which is to be implemented during and at the completion of the construction of CCG1.

In general, the Project is as follows: The Design Build Team (DBT) will design and construct a new bridge over the Cuyahoga River Valley on I-90 that will accommodate six (6) lanes of bi-directional traffic on opening day and five (5) lanes of traffic westbound through traffic following future Innerbelt Construction Contracts. This will include approach pavement and structures. The Project also includes: bridge deck replacement and bridge rehabilitations for I-90 eastbound and westbound mainline and ramp bridges over E.14<sup>th</sup> Street, and I-90 eastbound and westbound mainline over I-77 ramps to/from I-90 (E-8 and E-10); reconstruction of westbound I-90 entrance ramps and associated structures from E.14<sup>th</sup> Street, E.9<sup>th</sup> Street and Ontario Avenue in the Central Business District; Reconstruction of Ontario Avenue, Carnegie Avenue and ramp intersection and associated structures; construction of new sections of E.9<sup>th</sup> Street, Broadway Avenue and E.14<sup>th</sup> Street and associated structures; replacing the deck of the existing I-71 southbound bridge over Starkweather Avenue; replacing the deck of the existing I-90 westbound bridge over Starkweather Avenue; modifying and replacing the deck of the existing I-90 westbound bridge over Kenilworth Avenue; reconstruction of Commercial Road and Central Viaduct Way and the Fire Station and Museum Area; construction of a new E. 9<sup>th</sup> Street Alignment; major earthwork grading of the West Slope region between Abbey Avenue and the Cuyahoga River; reconstruction of the I-90 exit to Abbey Avenue and Fairfield Avenue, including construction of W.14<sup>th</sup> Street extension; reconstruction of bulkheads along the Cuyahoga River; removal of sections of University Avenue; closure and removal of the I-77 northbound to the I-90 westbound ramp, and I-90 eastbound to the I-77 southbound ramp; and all associated items, including but not limited to, demolitions, removals, earthwork, pavements, landscaping, sidewalks, drainage facilities, utilities, waterlines, walls, traffic control, lighting and aesthetic enhancements for the completion of a facility that can be opened to traffic.

## **1.2 PROJECT GOALS**

The Department's goals for the Project are:

- A. Deliver Project within budget. (The State Transportation Improvement Program budget summary for the Project is included in Appendix GN-01 for reference.)
- B. Achieve high quality in design and construction.
- C. Minimize negative impacts on public.
- D. Open new structure to six (6) lanes of bidirectional traffic on I-90 (four [4] lanes westbound and two [2] lanes eastbound), all structures, ramps and local streets on or before 6/30/14. Complete all construction on or before 9/30/2014.
- E. Meet or exceed Project aesthetic, land-use and sustainability guidelines.

## **1.3 COMPLETION DATE**

The overall project completion date shall be set three (3) months after the DBT substantial completion date listed in the DBT's technical proposal.

## **1.4 PROJECT SCOPE DOCUMENTS**

The DBT shall be solely responsible for design and construction for this contract in accordance with the Contract Documents and Basic Configuration Documents.

Contract Documents consist of contractual requirements.

Basic Configuration Documents are Contract Documents that contain elements of the Basic Configuration. These Basic Configuration elements are considered to be contract requirements.

Reference Documents contained in the RFP (including those portions of the Conceptual Plans that do not establish the Basic Configuration elements) are provided for informational purposes to assist DBTs in preparing their Proposals. The Department makes no representation or warranty as to the accuracy, adequacy, applicability or completeness of the Reference Documents. Reliance upon the Reference Documents shall be at the DBT's risk, and the Department shall have no liability or obligation as a result of the inaccuracy, inadequacy, inapplicability or incompleteness of the Reference Documents, regardless of the contents thereof. Each DBT is responsible for reviewing the Conceptual Plans in advance of submitting its Proposal, for purposes of assessing their adequacy for meeting the Contract requirements, and determining whether any changes are necessary or advisable.

The Project Scope is a Basic Configuration Document and Contract Document. Appendices to the Project Scope are Contract Documents, Basic Configuration Documents or Reference Documents as designated in Appendix DI-01 - Document Inventory. Project Scope Appendix DI-01 - Document Inventory lists all the Project Scope Appendices and stipulates the document type.

## 1.5 BI-DIRECTIONAL, INTERIM and FUTURE CONDITIONS

### 1.5.1 Compatibility Requirement

This contract will be first of multiple contracts to reconstruct the Cleveland Innerbelt. It is anticipated that other Innerbelt Construction Contract Groups will follow this contract and will not commence until CCG1 is complete. Contracts to follow CCG1 include:

- A. **CCG2.** Construction of a new eastbound Central Viaduct to completely replace the existing Central Viaduct.
- B. **CCG3.** Reconstruction of the Central Interchange (I-90/I-77 interchange) and associated approach and ramp reconstruction.

The DBT shall design and construct CCG1 such that the construction of CCG2 and CCG3 will require no reconstruction of facilities built in CCG1, except as indicated in 1.5.2(B.). The CCG2 and CCG3 Roadway Engineering Conceptual Plans are made available to the DBT in Appendix LD to ensure that the DBT's design meets this requirement.

### 1.5.2 Design Conditions

The DBT shall consider three conditions to account for future contracts in the DBT's design. These are defined as:

- A. **Bi-Directional Condition.** This will be the condition at completion of CCG1. This is also referred to as opening day. This condition will serve as the key component of the Maintenance of Traffic scheme for the construction of CCG2. This condition will accommodate six (6) lanes of bi-directional traffic on the new I-90 Central Viaduct. Bi-directional traffic will consist of four (4) westbound lanes and two (2) eastbound lanes.
- B. **Interim Condition.** This will be the condition at conclusion of CCG2 through construction of CCG3. This condition will accommodate five (5) lanes of westbound traffic on the Central Viaduct constructed in CCG1 and five (5) lanes of eastbound traffic on the Central Viaduct constructed in CCG2. In order to implement the Interim Condition, it is required that the only rework of items constructed under CCG1 shall be: removal of pavement markings and placement of new pavement markings; removal of eastbound bi-directional signage; removal of cover plates on westbound signage; removal of portable concrete barrier and repair of bridge deck; and removal and reconstruction of guardrail and barriers at tie-ins. This rework shall provide a facility designed for 60 mph for westbound traffic.
- C. **Future Condition.** This will be the condition at the conclusion of CCG3 and will be the ultimate condition. This condition will shift the I-90 westbound traffic in the Central Interchange area onto new roadway constructed in CCG3 and onto bridges over E.9th Street and Ontario Avenue constructed in CCG1.

## **1.6 COMPATIBILITY WITH ENVIRONMENTAL DOCUMENTS**

The Project shall be in compliance with the following Cleveland Innerbelt Documents:

- A. Conceptual Alternatives Study
- B. Draft Environmental Impact Study/Draft Section 4(f) Evaluation
- C. Final Environmental Impact Study/Section 4(f) Evaluation
- D. Record of Decision
- E. Documentation for Environmental Consultation
- F. Interchange Justification Study

The Design-Build Designer is expected to be knowledgeable of the Project's environmental record and the basis for the Project Decision. The DBT shall design and construct the Project in a manner that does not increase Project documented environmental impacts and does not increase the severity of each impact based on context and intensity individually or in accumulation with other Project impacts.

## **1.7 BASIC CONFIGURATION**

The Project Scope in its entirety and elements of the Conceptual Plans, as indicated in this section, constitute the basic configuration. The design-build proposal must be consistent with the basic configuration subject only to such changes approved by the Department in accordance with Section 6.0 Alternative Technical Concepts of the Selection Criteria.

The following elements shall be considered as part of the basic configuration:

- A. Number/Type/Location of Ramps/Overpasses/Underpasses/Interchanges as indicated in the CCG1 Roadway Engineering Conceptual Plans in Appendix LD-01.
- B. Number of Interstate, Ramp and Local Road lanes as indicated in the CCG1 Roadway Engineering Conceptual Plans in Appendix LD-01 and the Functional Plan for Bi-Directional Condition in Appendix LD-06.
- C. Typical section minimum dimensions as indicated in the CCG1 Roadway Engineering Conceptual Plans in Appendix LD-01.
- D. Locations and widths of shared-use, pedestrian and bicycle facilities as indicated in the CCG1 Roadway Engineering Conceptual Plans.
- E. Environmental Commitments of the Record of Decision (ROD), Final Environmental Impact Statement (FEIS), and Draft Environmental Impact Statement (DEIS) in Appendix ED.
- F. Substructure No-Build Zones as indicated in the Substructure No-Build Zones Plans in Appendix LD-04.
- G. Right-of-way limits as indicated in the Final Right-of-Way Plans in Appendix RW-03.
- H. Number, type and general location of overhead signs as indicated in the Bi-Directional Signing Conceptual Plans in Appendix TC-01.
- I. Bulkhead Reconstruction Limits as shown in the Bulkhead Conceptual Plans in Appendix ST-03.

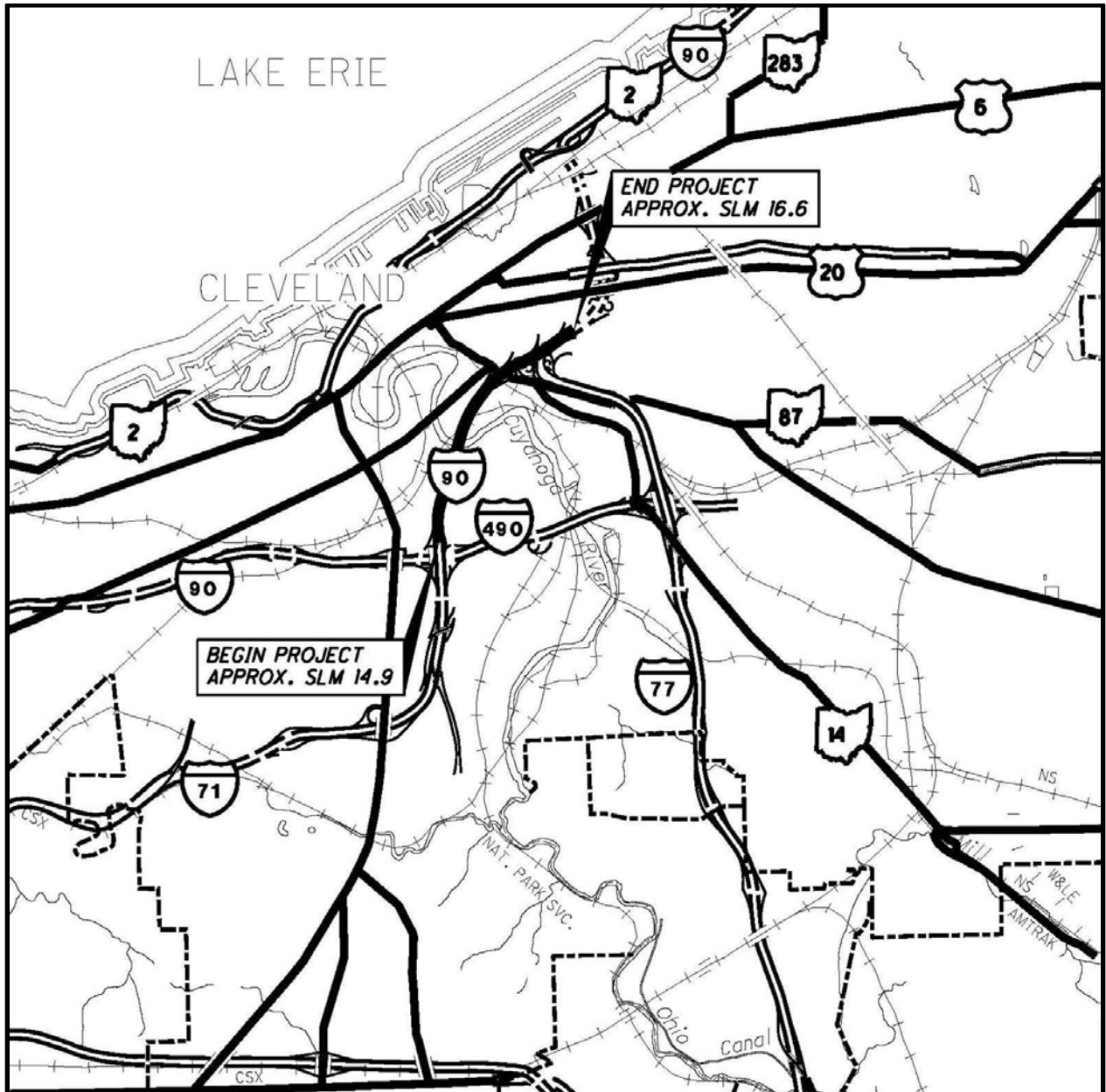
- J. West Slope Grading between Abbey Avenue and the Cuyahoga River as indicated in the West Bank Grading Plans in Appendix GE-01.
- K. Requirements of the permits obtained for this Project in Appendix EC.
- L. Horizontal and Vertical Alignments as indicated in the CCG1 Roadway Engineering Conceptual Plans with the following allowable adjustments: Horizontal Alignments may be adjusted by up to 10 feet, and Vertical Alignments may be adjusted at the discretion of the DBT in any direction, providing that all of the following conditions are met:
  - a. The adjustments do not result in the need to acquire additional right-of-way.
  - b. The adjustments are compatible with design condition requirements of Section 1.5.
  - c. The adjustments meet the approved permitting requirements.
  - d. The adjustments meet the environmental commitments.
  - e. The adjustments do not impact future West Slope grading scheme for the replacement of the existing I-90 Central Viaduct. Adjustments reducing the proposed distance of 175 feet between the existing centerline of the Central Viaduct and the outside parapet face of the new Central Viaduct will not be allowed within the limits between Abbey Avenue and University Road crossing.
  - f. The adjustments do not impact access of emergency vehicles to the Fire Station at Carnegie Avenue and Central Viaduct Way.
  - g. All other design standards and criteria are met, or exceeded as described in the Contract Documents.
  - h. The adjustments do not require a new design exception or revision to the approved design exceptions.
  - i. The adjustments are compatible with the environmental documents as required by Section 1.6.

## 1.8 PROJECT LOCATION and PROJECT LIMITS

The Project is located in the City of Cleveland, Cuyahoga County, Ohio at approximately 41° 29' 12" Latitude and 81° 41' 28" Longitude.

The minimum Project limit stationing is described in Section 12.2.1 and shown in Appendix PA-02.

Figure 1-1: Project Location Map



## 1.9 DESIGN DESIGNATIONS and MAINTAINING AGENCIES

Table 1-1 below indicates the functional classification, design speeds, legal speeds and maintaining agencies of roadways and trails that are designed and constructed as part of this contract or will be crossed by a new bridge or other structure as part of this contract. Available traffic information is depicted in the Innerbelt Interchange Justification Study in Appendix TC-03. Additional traffic information required will be obtained by the DBT and certified as necessary.

The design speed for the Future Condition and Interim Condition of I-90 shall be as listed in Table 1-1. The design speed for the Bi-Directional Condition of I-90 will vary from the value listed in the table for the tie-ins as indicated in Section 12.3.

The existing legal speed for I-90 in the Project limits is 50 mph. The Bi-Directional Condition and Interim Condition will be posted for 50 mph. The Future Condition will be posted for 55 mph at the completion of all Innerbelt Construction Contract Groups.

The streets along the Ontario-Broadway-Orange corridor will be renamed as part of the Project. Currently Ontario terminates at Carnegie and becomes Broadway. Upon the realignment of Broadway, Ontario will extend south to a new E.9<sup>th</sup> Street intersection and Orange will extend north to the same new E.9<sup>th</sup> Street intersection. As such, the following intersections will be renamed: Carnegie/Ontario-Broadway will become Carnegie/Ontario, and E.9<sup>th</sup> Street/Broadway-Orange will become E.9<sup>th</sup> Street/Ontario-Orange.

**Table 1-1: Design Designations and Maintaining Agencies**

Roadway	Functional Classification	Other Designation	Design Speed (MPH)	Legal Speed (MPH)	Maintaining Agency
I-90	Urban Interstate	STRAHNET, NHS High Priority	60	50 <sup>1</sup>	Ohio Department of Transportation (ODOT)
I-71	Urban Interstate	STRAHNET, NHS High Priority	60	50 <sup>1</sup>	ODOT
E.14th Street Ramp to I-90 westbound (A3)	Diamond Ramp		30 (Minimum)	-	ODOT

<sup>1</sup> The existing speed zone will remain in place until the completion of all of the Innerbelt construction contract groups. Upon completion of final build out the existing speed zone will be revised and I-90 posted for 55 MPH. The speed zone revision is not part of this contract.

<b>Roadway</b>	<b>Functional Classification</b>	<b>Other Designation</b>	<b>Design Speed (MPH)</b>	<b>Legal Speed (MPH)</b>	<b>Maintaining Agency</b>
<b>E.9th Street Ramp to I-90 westbound (A4)</b>	Diamond Ramp		30 (Minimum)	-	ODOT
<b>Ontario Avenue Ramp to I-90 westbound (A5)</b>	Diamond Ramp		30 (Minimum)	-	ODOT
<b>I-90 westbound Ramp to W. 14<sup>th</sup> Street Extension (A6)</b>	Loop Ramp		25 (Minimum)	-	ODOT
<b>W.14th Street Extension</b>	Future Urban Collector	City Street	25	25	City of Cleveland
<b>University Road</b>	Urban Local	City Street	30	25	City of Cleveland
<b>E.9th Street (Between Canal and Broadway)</b>	Future Urban Collector	City Street, Future NHS Intermodal Connector	30	25	City of Cleveland
<b>E.14th Street</b>	Urban Arterial	Future SR 14 and Future SR 43 between Orange and Broadway	30	25	City of Cleveland
<b>Broadway</b>	Urban Arterial	SR 14 and SR 43	30	30	City of Cleveland
<b>Commercial Road</b>	Urban Collector, Future Urban Local	City Street, Existing NHS Intermodal Connector Pending E.9 <sup>th</sup> Street	25	25	City of Cleveland
<b>Central Viaduct Way</b>	Urban Local	City Street	25	25	City of Cleveland



Roadway	Functional Classification	Other Designation	Design Speed (MPH)	Legal Speed (MPH)	Maintaining Agency
<b>E.9th Street (under I-90)</b>	Urban Arterial	City Street, Other NHS and NHS Intermodal Connector	30	30	City of Cleveland
<b>Carnegie Avenue</b>	Urban Arterial	SR 10 and NHS Intermodal Connector	30	30	City of Cleveland
<b>Orange Avenue</b>	Urban Arterial	SR 87, US 422, SR 8, NHS Intermodal Connector, Future SR 14,	30	30	City of Cleveland
<b>Ontario Street</b>	Urban Arterial	SR 87, US 422, SR 8, SR 14, SR43 and NHS Intermodal Connector	30	30	City of Cleveland
<b>Canal Road</b>	Urban Collector	NHS Intermodal Connector	30	25	City of Cleveland
<b>West 3rd Street</b>	Urban Collector	NHS Intermodal Connector	30	25	City of Cleveland
<b>W.14th Street</b>	Urban Collector	City Street	30	25	City of Cleveland
<b>Abbey Avenue</b>	Urban Collector	City Street	30	25	City of Cleveland
<b>Fairfield Avenue</b>	Urban Collector	City Street	30	25	City of Cleveland
<b>Kenilworth Avenue</b>	Urban Local	City Street	30	25	City of Cleveland
<b>Starkweather Avenue</b>	Urban Local	City Street	30	25	City of Cleveland
<b>Towpath Trail</b>	Shared Use Path	Independent Facility	20	-	Multi-Party Agreement <sup>2</sup>

<sup>2</sup> City of Cleveland, Cleveland Metroparks, ODOT and Cuyahoga County

## 1.10 SUSTAINABILITY GUIDELINES

The Project scope defined in this document includes a number of requirements related to the implementation of sustainable practices throughout the design and construction of the Project. In addition, the DBT shall demonstrate a commitment to sustainability and shall propose additional efforts to maximize the implementation of sustainable practices in all aspects of the Project.

As part of the Technical Proposal, the DBT shall submit a Sustainability Plan to ODOT that will describe the DBT's approach and commitment to sustainable design and construction practices. The plan shall, at a minimum, describe the DBT's approach to the following:

- A. **Energy and Energy Efficiency.** The Sustainability Plan shall describe the DBT's plans for maximizing energy efficiency throughout the Project, including:
  - a. Incorporation of low-energy lighting into the architectural lighting scheme for the main viaduct and all other project lighting.
  - b. Minimizing energy and fuel usage during construction.
  - c. Innovative ideas for incorporation of energy generation and use of renewable energy sources.
- B. **Community Environment.** The Sustainability Plan shall describe the DBT's commitment to environmental quality and enhancement above and beyond the requirements of the EIS, including:
  - a. Minimizing air quality degradation during construction.
  - b. Commitment to sustainable storm water management, specifically the incorporation of permanent Best Management Practices for storm water management.
  - c. Proposals for quantifying and minimizing the project's carbon footprint.
- C. **Green Building.** The DBT shall locate the Project Management Office in existing, currently unused office space. The DBT may propose the use of a LEED (Leadership in Energy and Environmental Design) certified Green Building for the Project Management Office. If the DBT makes this commitment, certification will be required per the third party independent certification procedures defined by the U.S. Green Building Council (refer to [www.usgbc.org](http://www.usgbc.org)).
- D. **Waste Reduction and Recycling.** The Sustainability Plan shall describe the DBT's approach to minimizing the amount of waste generated by the project. The plan shall also describe the DBT's plans for maximizing the re-use of materials, including construction material from structures and facilities demolished as part of this project. The DBT may also include plans to incorporate into the project recycled materials generated off site. Any such plan must be in conformance with Contract Documents and the Basic Configuration Documents or an approved Alternative Technical Concept.

The Sustainability Plan shall also define the roles and responsibilities of the IQF in ensuring that the proposals outlined in the Sustainability Plan are carried out during construction, including identification of key personnel and their responsibilities. At the conclusion of the Project, the DBT shall submit a Final

Project Sustainability Report which will document all sustainable practices successfully implemented into the Project.

### **1.11 MAJOR PLAN SUBMISSIONS TO THE DEPARTMENT**

In addition to the meeting the requirements of Section 2, The DBT shall submit the plans listed below in draft and final format to the Department for review and comment:

- A. Quality Management Plan
- B. Public Information Plan
- C. Aesthetics and Enhancement Implementation Plan
- D. Traffic Management Plan

Review and comment by the Department does not constitute approval of these plans. These plan submissions shall meet the requirements of Section 2 for Independent Quality Firm (IQF) review and approval procedures (unless noted otherwise in the Project Scope).

Additional submittals directly to the Department are required in accordance with the contract and shall be identified in the Quality Management Plan (QMP).

### **1.12 EXISTING CENTRAL VIADUCT BRIDGE RESTRICTIONS**

The Existing Central Viaduct Bridge shall not be used to store equipment or materials, or be used as a work platform for any purpose.

### **1.13 PROJECT DATUM, SURVEY CONTROL and MAPPING**

The Project datum and horizontal survey control are indicated in the right-of-way plans. Survey control information including elevations used in the development of the planning level aerial mapping used in the development of the Roadway Engineering Conceptual Plans is available in Appendix SU-01. An analysis of this control was conducted by the ODOT Office of Aerial Engineering and is included in Appendix SU-03.

Planning level aerial mapping information:

- A. The Project was flown at a 250-foot photo scale.
- B. The mapping was to be compiled at a 1 inch = 50 feet mapping scale with a horizontal accuracy of 90% of well defined features being within 6 inches, and the remaining 10% of well defined features within 1 foot. The vertical accuracy would have 90% of the contours or spot elevations shown within 4 inches, and the remaining 10% within 8 inches in areas that are not obscured.
- C. The photography used a 500-foot negative scale for the orthophoto.

ODOT Office of Aerial Engineering conducted an evaluation of the CCG1 aerial mapping. The results of this evaluation are included in Appendix SU-02 - Aerial Mapping Accuracy Evaluation.

The DBT may elect to obtain additional survey and/or mapping as appropriate for design and construction.

The DBT is responsible for verification of provided survey control and establishing the Project survey control.

DBT shall determine location and construct centerline and/or reference monuments. See Section 8 - Right-of-Way for additional requirements for right-of-way monument construction.

### **1.14 CONSTRUCTION NOISE**

The City of Cleveland has a noise ordinance. The Department has obtained a variance with the City's noise ordinance. The variance documentation is in Appendix EC-05. The DBT shall comply with the noise ordinance and variance requirements.

### **1.15 AIRWAY/HIGHWAY CLEARANCE FOR AIRPORTS and HELIPORTS**

An airway/highway clearance study was performed and is included in Appendix EC-02. The Project is exempt from FAA notification requirements based on the assumptions in the clearance study. Additional FAA coordination and permitting may be required depending on DBT design and construction. The DBT is responsible for this coordination and permitting.

### **1.16 LIMITED ACCESS**

This improvement is to be especially designed for through traffic and has been declared a limited access highway or freeway by action of the Director in accordance with the provisions of Section 5511.02 of the Ohio Revised Code. See Right-of-way plans in Appendix RW-01 for Limited Access Right-of-way locations.

### **1.17 GOVERNING REGULATIONS**

It is the responsibility of the DBT to acquire and utilize the necessary manuals that apply to the design and construction work required to complete this Project.

The Standard Specifications of the State of Ohio, Department of Transportation (Construction and Materials Specifications [C&MS]), and Supplemental Specifications shall govern this Project.

(See Section 2.6.8 for modifications of the approval requirements of the governing regulations listed in this section.)

The DBT shall design and construct Interstate and NHS elements of the construction Project in conformance with the standards, policies, and standard specification cited in 23 CFR 625.4, and use the latest edition of each enumerated provision.

The following listing of governing regulations is alphabetical. Utility and railroad work shall comply with appropriate governing regulation. ODOT Standards and Manuals take precedence over others listed

unless noted otherwise in the Project scope. The current edition, including updates released on or before May 15, 2010, of the following shall be met or exceeded in the performance of the design and construction work required to complete this Project:

- A. American Association of State Highway and Transportation Officials (AASHTO) Publications:
  - a. A Policy on Design Standards - Interstate System
  - b. A Policy on Geometric Design of Highways and Streets
  - c. Bridge Welding Code
  - d. Guide Design Specifications for Bridge Temporary Works
  - e. Guide for the Development of Bicycle Facilities
  - f. Guide Specifications for Design and Construction of Segmental Concrete Bridges
  - g. Guide Specifications for Thermal Effects in Concrete Bridge Superstructures
  - h. Laboratory Specifications
  - i. LRFD Bridge Construction Specifications
  - j. LRFD Bridge Design Specifications
  - k. Manual for Bridge Evaluation
  - l. Manual on Subsurface Investigations
  - m. Roadside Design Guide
  - n. Roadway Lighting Design Guide
  - o. Standard Specifications, 17<sup>th</sup> Edition (for existing structures only)
- B. ADA Accessibility Guideline US Access Board
- C. American Traffic Safety Services Association (ATSSA) Portable Changeable Message Sign (PCMS) Handbook
- D. American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering
- E. CEB/fip Model Code for Concrete Structures, Appendix E, Time Dependent Behavior of Concrete, Creep and Shrinkage
- F. City of Cleveland Publications:
  - a. Cleveland Water Standards at:  
([http://www.clevelandwater.com/system\\_overview/standard\\_details06.aspx](http://www.clevelandwater.com/system_overview/standard_details06.aspx))
  - b. Standard Construction Drawings (including Drainage Design Standards) at:  
(<http://www.city.cleveland.oh.us/CityofCleveland/Home/Government/CityAgencies/PublicService/Public%20Service%20Publications>)
- G. Cleveland Public Power (CPP) Street Light Standards and General Construction Notes
- H. CSX Publications:
  - a. Criteria for Overhead Bridges
  - b. Design & Construction Standard Specifications
- I. Federal Highway Administration (FHWA) Publications:
  - a. HEC-21 Design of Bridge Deck Drainage
  - b. HEC-22 Urban Drainage Design Manual

- c. Manual of Uniform Traffic Control Devices (MUTCD)
- J. Illuminating Engineering Society of North America (IESNA)
  - a. Roadway Lighting RP-8-00 (Reaffirmed 2005)
  - b. Lighting for Parking Facilities (Parking Lots)
  - c. Recommended Practice for Tunnel Lighting (Underpass Lighting)
- K. National Cooperative Highway Research Program (NCHRP) 350 Hardware Report
- L. National Electric Code (NEC)
- M. National Electric Safety Code (NESC)
- N. Norfolk Southern's (NS) Guidelines for Design of Highway Separation Structures over Railroad (Overhead Grade Separation)
- O. Ohio Department of Transportation (ODOT) Publications:
  - a. Aesthetic Design Guidelines
  - b. Bridge Design Manual (2007 edition for new structures and 2004 edition for existing structures) (BDM)
  - c. CADD Engineering Standards Manual
  - d. Construction Inspection Manual of Procedures
  - e. Construction and Material Specifications
  - f. Design Guidance for Independent Bicycle Facilities
  - g. Design Guidance for Roadway-Based Bicycle Facilities
  - h. Ecological Manual
  - i. Ecological Resources and Permits - Technical Guidance Documents
  - j. Environmental Services Handbooks and Guidelines
  - k. Geotechnical Bulletins
    - i. GB1-Plan Subgrades
    - ii. GB2-Special Benching and Sidehill Embankment Fills
    - iii. GB4-Guidelines for the use of Geotechnical Instrumentation
    - iv. GB9-Geotechnical Software
  - l. Geotechnical Engineering Checklists
  - m. Guidelines for Identifying Acceptable Locations for the Disposal of Waste Material and Construction Debris or the Excavation of Borrow Material within ODOT Right-of-Way
  - n. Location and Design Manuals
    - i. Volume One - Roadway Design
    - ii. Volume Two - Drainage Design
    - iii. Volume Three - Plan Preparation
  - o. Manual for Abandoned Underground Mines - Inventory and Risk Assessment
  - p. Mapping Specifications – Office of Aerial Engineering
  - q. Ohio Manual of Uniform Traffic Control Devices (OMUTCD)
  - r. Pavement Design & Rehabilitation Manual
  - s. Plan Insert Sheets
  - t. Quality Standard for Temporary Traffic Control Devices

- u. Qualified Products List (QPL)  
(<http://www.dot.state.oh.us/divisions/constructionmgt/materials/pages/qpl.aspx>)
- v. Railroad Coordination Policy and Procedures Manual
- w. Real Estate Policies and Procedures Manuals
- x. Roadway Safety Landscaping Guidelines
- y. Sign Design Manual (SDM)
- z. Specifications for Geotechnical Explorations (SGE)
- aa. Standard Construction Drawings – All Series (SCD)
- bb. State Highway Access Management Manual
- cc. Survey Manual
- dd. Traffic Engineering Manual (TEM)
- ee. Quality Standards for Temporary Traffic Control Devices
- ff. Utility Manual “Procedure for Utility Relocations, Adjustments and Reimbursement”
- gg. Wireless Communication Tower Manual
- hh. Waterway Permit Manual
- P. Transportation Research Board (TRB)
  - a. Highway Capacity Manual
- Q. United States Coast Guard (USCG)
  - a. Bridge Permit Application Guide
  - b. Bridge Lighting and Other Signals

## **1.18 SUPPLEMENTAL SPECIFICATIONS**

The DBT is directed to perform work as applicable in accordance with the supplemental specifications listed below. Supplemental Specifications modified specifically for this contract have been included in Appendices. Other supplemental specifications govern depending on DBT design and construction. (See Section 2.6.8 for modifications of the approval requirements.)

- A. SS800 – Revisions to the C&MS
- B. Modified SS832 Temporary Sediment And Erosion Control
- C. SS835 - Exfiltration Trench
- D. SS836 - Seeding and Erosion Control with Turf Reinforcing Mat
- E. SS837 - Liner Pipe
- F. SS839 - Trench Drain System
- G. SS840 - Mechanically Stabilized Earth Wall
- H. SS850 - Cement Treated Free Draining Base (for exfiltration trench applications only)
- I. SS879 – QC/QA Embankment
- J. SS895 - Manufactured Water Quality Structure
- K. Modified SS898 - QC/QA Concrete for Structures
- L. SS902 - Conduit Inspection Equipment
- M. SS937 - Polyethylene Liner Pipe

- N. SS939 - Precast Trench Drain
- O. SS995 - Precast Water Quality Structure

## **1.19 CO-LOCATION FACILITIES FOR DBT and DEPARTMENT FORCES**

### **1.19.1 Project Management Office**

The DBT shall co-locate with Department personnel for the duration of the Project. It is the Department's intent to co-locate with the DBT in order to facilitate active participation between Department and the DBT during the Project. The DBT shall provide Class B office space for this co-location requirement within one (1) mile of the Project Location. The following requirements are for Department forces only. DBT is responsible for determining additional project management office requirements to accommodate the DBT's forces.

In addition to the requirements of C&MS 619, provide the following items and features for the required office space and facilities within 45 days after Notice to Proceed:

- A. Office furniture for the entire office space
- B. A copier, printer, fax and scanner system per the specifications listed below
- C. The Department will provide IP Phones via the Department's network. The Department will provide two (2) dedicated phone lines, one for facsimile and one for a land line back-up in case of network disruption.
- D. All rooms, cubicles, conference rooms shall be capable of having network jacks installed for use by the Department's staff.
- E. ODOT will obtain and pay for an internet connection. ODOT will provide the necessary network equipment and communication circuits to connect the field office to the ODOT network. District 12 IT personnel will install the following equipment in the field office:
  - a. Locked Cabinet w/UPS
  - b. Network Switch
  - c. Network drops in the office
- F. Office space for the Department's staff that has, at a minimum, the following:
  - a. Twelve (12) offices (150 square feet, each enclosed office space with individual locking door)
  - b. Twenty (20) cubicles (150 square feet each)
  - c. Two (2) enclosed conference rooms (600 square feet each) with doors, each provided with a computer projector and minimum 7' wide screen
  - d. Break room with sink (150 square feet, with 12 square feet of counter space, microwave oven and a 20-cubic-foot refrigerator)
  - e. Lockable filing space (400 square feet)
  - f. Two lockable closets (25 square feet each)
  - g. An appropriate number of desks, chairs and filing cabinets



- h. Two (2) licensed copies of Primavera (P3) and the appropriate contract management software compatible with the Department's project document management system
  - i. Hard-surfaced (paved) parking, with one space per office and one space per cubicle plus 10 visitor spaces. The cost of providing these parking spaces shall be included in the cost of the Project Management Office.
  - j. Include potable hot and cold water. Toilet/washroom facilities must be appropriately sized for this size office space. Furnish all lavatory and sanitary supplies.
- G. Public meeting space for meetings with public officials, key stakeholders, media and others that has at a minimum:
- a. Separate entrance from main hallway or foyer so that Project staff is not disrupted by the meetings.
  - b. 800 square feet of space
  - c. Tables and chairs
  - d. Six (6) floor standing easels for Project boards
  - e. Computer projector and minimum 7' wide screen

### **1.19.2 Field Office**

The DBT shall provide for separate field offices for DBT and Department forces. The DBT is responsible for determining additional field office requirements to accommodate the DBT's forces. The DBT shall provide a field office for use by Department forces in accordance with C&MS 619 except as modified by the following:

- A. A Conference Room shall be supplied with a minimum of 600 square feet of floor space. The room shall be supplied with tables and chairs capable of seating a minimum of 20 attendees. The room shall include a separate phone line with speaker phone capabilities.
- B. Floor space to be provided shall be increased to a minimum of 3000 square feet including the conference room.
- C. The requirement of one (1) separate room shall be increased to four (4) separate enclosed rooms of 150 square feet per room.
- D. The requirement of two (2) separate telephone service and telephones shall be increased to four (4) separate telephone service and telephones.
- E. The contractor shall provide a copier, printer, fax, and scanner system per the specifications listed below.
- F. The all-weather parking spaces provided shall be increased to 25 and include snow removal. The cost of providing these parking spaces shall be included in the cost of the Field Office.
- G. All rooms, cubicles, conference rooms shall be capable of having network jacks installed for use by the Department's staff.
- H. DBT shall obtain and pay for a broadband internet connection capable of download speeds greater than 10 Mbps and upload speeds greater than 786 Kbps. If these speeds are not available, provide the highest speeds available in the area. ODOT will provide the necessary

network equipment and communication circuits to connect the field office to the ODOT network. District 12 IT personnel will install the following equipment in the field office:

- a. Locked Cabinet w/UPS
  - b. Network Switch
  - c. Network drops in the office
- I. Security shall be provided for the field office and surrounding parking facilities by illuminating all sides of the field office.
  - J. Provide a separate storage facility for nuclear density gauges to be used on the Project. This facility must be a minimum of 15 feet away from any storage or work areas, large enough to hold two nuclear gauge storage boxes (approximately 4 feet by 3 feet by 3 feet) that can be secured to the walls or floor, and be lockable. The area provided for the storage facility shall be in addition to the square foot requirements shown above and in 619.02 of the ODOT C&MS. ODOT employees will be the only personnel permitted in the facility. This facility must have adequate electrical outlets for charging density gauges and be able to maintain temperatures between 50 degrees Fahrenheit and 90 degrees Fahrenheit. The Department's Radiation Safety Officer will have final approval of the gauge storage facility.
  - K. The base radio with four (4) hand held units will not be required.

### **1.19.3 Copier, Printer, Fax, and Scanning System Specifications**

- A. Automatic document feeder with 80-sheet ARDF
- B. Equipped to handle paper up to and including 11-inch x 17-inch (originals and copies) including mixed originals
- C. Reduction and enlargement features
- D. Unlimited duplexing for all size originals 8.5-inch x 11-inch through 11-inch x 17-inch
- E. Manual and selectable automatic exposure settings
- F. Operate on standard voltage with no special or dedicated lines
- G. Stapler/finisher support with the following features:
  - a. Paper size support for 5.5-inch x 8.5-inch to 11-inch x 17-inch/A6 to A3
  - b. Paper Weight support from 16 to 42 lb. Bond/ 60 to 157g/m<sup>2</sup>
  - c. Staple Position three (3) positions (1 staple/2 positions; 2 staples/1 position)
  - d. Staple Capacity – 50 sheets (8.5-inch x 11-inch) 30 sheets (8.5-inch x 14-inch or larger)
- H. 1 to 999 sort capacity
- I. Paper Capacity – 500 sheets x four (4) trays, 50-sheet Bypass tray
- J. Paper Weight Support – 20 to 28 lb. Bond/64 to 105g/m<sup>2</sup> (Trays 1,2,3 & 4) 16 to 44 lb. Bond/52 to 163g/m<sup>2</sup> (Bypass) 20 to 28 lb. Bond/64 to 105g/m<sup>2</sup> (Duplex)
- K. Energy Star compliant
- L. Network printer capability with 10BASET/100BASETx network card
- M. Printer speed 35 ppm
- N. Network protocol support for TCP/IP
- O. Network operating system for Windows 7 Professional

- P. Client Print driver support for Windows 7 (Both PCL/PS drivers)
- Q. Minimum print resolution of 600 x 600 dpi
- R. Secure printing with password or pin
- S. Network scanning that supports the following:
  - a. Scan Speed 52 ipm (@200 dpi)
  - b. Scan Area up to 11-inch x 17-inch
  - c. Grayscale – 256 levels (Color Required)
  - d. Scanning Resolution – 600 dpi
  - e. Scanning Protocol Support – TCP/IP, SMTP, SMB, FTP, POP3, NCP
  - f. Scanning support for Scan-to-Email, HDD, Folder, URL, and TWAIN
  - g. File Formats – Single Page TIFF, JPEG, PDF, Multi-Page TIFF, PDF
  - h. Address book support for multiple items
  - i. OCR software that supports TIFF, PDF, Multi-Page TIFF, and Multi-Page PDF
  - j. OCR software must support batch workflow processing of documents
- T. Minimum shared memory capacity for all options – 384 MB
- U. Hard Disk Drive – 40 GB drive for internal storage and network scanning
- V. Analog Fax Support for PSTN, PBX that supports the following:
  - a. Resolution – 200 x 200/100 dpi 400 x 400 dpi (optional)
  - b. 33.6 Kbps with Auto Fallback
  - c. Address Book and Auto-Dial Number Storage
- W. Black & White and color capable

## 1.20 PRECONSTRUCTION AUDIO – VIDEO COLOR RECORDING

The DBT shall provide the Department with preconstruction audio-video color recording as follows:

### 1.20.1 General

- A. **Recording.** Construction in any area shall not start until the area has been recorded and the tapes and DVDs submitted.
- B. **Visual Inspection.** Prior to recording, all areas to be recorded shall be investigated visually with notation made of features not readily visible by taping methods. This would include, but not be limited to, culverts (size, type and condition) and manholes that may be partially buried. Record all measurements made during the inspection.
- C. **Approvals.** All taping shall be conducted in the presence of the Department unless waived by the Department. At the start of taping, the DBT shall submit a sample recording of a portion of this Project for the Department to review. The sample recording shall be approved before any other recording is allowed.
- D. **Certification.** Upon completion of the work, the DBT shall provide Certification in writing to the Department that all the requirements of the audio-video color taping for this Project were accomplished in accordance with these specifications.

- a. **Identification.** All recordings (DVDs and cases) shall be properly identified by recording number, location, and project name in a manner acceptable to the Department.
- b. **Record.** A record of the contents of each recording shall be supplied on a run sheet identifying each segment in the recording number, location, and project name in a manner acceptable to the Department.
- c. **Inventory.** A brief report and inventory of all recordings completed, referenced by location and recording number, shall be furnished to the Department upon completion of the work and delivery of the recordings. All recordings and written records shall become the property of the Department.

### 1.20.2 Video Information

- A. **Audio Preamble.** Each recording shall begin with the current date, project name, and municipality and be followed by the general location (e.g., name of the street or property owner, location of cross country line, viewing side, and direction of progress).
- B. **Date and Time.** To preclude the responsibility of tampering or editing in any manner, all video recordings shall, by electronic means, display continuously and simultaneously generated transparent digital information to include the date and time of recording. The date information will contain the month, day and year; for example, 10/5/83. The time information shall consist of hours, minutes, and seconds separated by colons; for example, 10:35:18.
- C. **Stationing.** The Engineering stationing shall correspond to the project stationing and include the standard Engineering symbols (e.g., 14+84). The Engineering stationing shall represent the location of the camera. If the Engineering stationing is not recorded simultaneously with taping, the stationing shall be noted on Audio Track 1. This transparent information shall appear in the lower half of the viewing screen. Houses and buildings shall be identified by an address when visible.
- D. **Information.** Below the Engineering stationing, periodic transparent alpha numeric information consisting of the names of the project, name of the area covered, direction of travel, viewing side, etc., shall appear.

### 1.20.3 Coverage

- A. **General.** Recorded coverage shall include, but not be limited to, all existing driveways, sidewalks, curbs, ditches (drainage patterns are of particular concern), streets (including condition of paving for full width), landscaping, trees, culverts, catch basins, headwalls, fences, visible utilities and all buildings (interior and exterior) located within the zone of influence of construction. Of particular concern are existing faults, fractures, defects or other imperfections.
- B. **Streets.** Unless otherwise noted, streets and street areas shall be recorded by audio-video for full width of the zone of influence of construction, including both sides of the street. The term "street" shall be understood to mean street, highway, avenue, boulevard road, alley, lane, driveway, parking lot, etc., and all adjacent areas within the possible zone of the influence of construction.

## **2 QUALITY MANAGEMENT**

### **2.1 GENERAL**

The DBT has the responsibility for the quality of the Work, including, but not limited to, products of subcontractors, subconsultants, fabricators, suppliers and vendors.

The DBT must employ an Independent Quality Firm (IQF) who will be responsible for verifying and documenting all quality related data for the Department including:

- A. Design
- B. Testing
- C. Inspection
- D. Geotechnical investigations
- E. Environmental activities
- F. Maintenance of Traffic plans
- G. Survey Verification
- H. Computer database of materials testing results

### **2.2 INDEPENDENT QUALITY FIRM**

In order to maintain complete and strict independence of the IQF from the DBT's day-to-day organization, the IQF will report to both the Department and the DBT. The IQF will be responsible for providing qualified personnel and verifying that the Project quality requirements are met. Although the IQF is employed by the DBT, the DBT is not permitted to terminate or seek the termination or removal of any IQF personnel without the expressed written permission from the Department.

The IQF will:

- A. Be an independent contractor and must not be owned by the DBT or any of its joint venture members, partners, or affiliated entities;
- B. Be considered as a Major Participant in the organization of the DBT. The IQF position in the DBT's table of organization should be a direct report to the DBT Project Manager. The IQF will have the authority required to stop all design work and construction work if all quality requirements are not being met, exclusive of schedule or cost; and
- C. Have the ability to provide either a permanent or temporary testing laboratory meeting all contract and QMP requirements within 20 miles of the Project Site. If major components of the project are constructed off the project site other testing laboratory facilities may be utilized that meet all contract and QMP requirements.

The IQF will include the following three (3) lead members to manage and implement the Quality Program:

- A. Independent Quality Manager (IQM)

- B. Independent Construction Quality Manager
- C. Independent Design Quality Manager

The duties of the three lead members are defined in Sections 2.6.1.1, 2.6.1.2 and 2.6.1.3, respectively. All three lead members of the IQF will be named in the Technical Proposal.

## **2.3 QUALITY MANAGEMENT PLAN**

The DBT with the Department's participation will develop and implement a written Quality Management Plan (QMP) for all elements of the Project, including, but not limited to, management, administration, design, geotechnical investigations, construction, testing, and environmental monitoring and compliance. Figure 2-1 presents a general overview of the quality management process. Additional details are provided throughout Section 2.

The DBT will engage the Department in the QMP development process to facilitate the process and ensure understanding. The Department's participation in the development of the QMP does not waive the DBT's responsibility for the quality of the Work, nor does it ascribe any responsibility to the Department for the Work. Further, this involvement does not preclude subsequent rejection of the QMP by the Department.

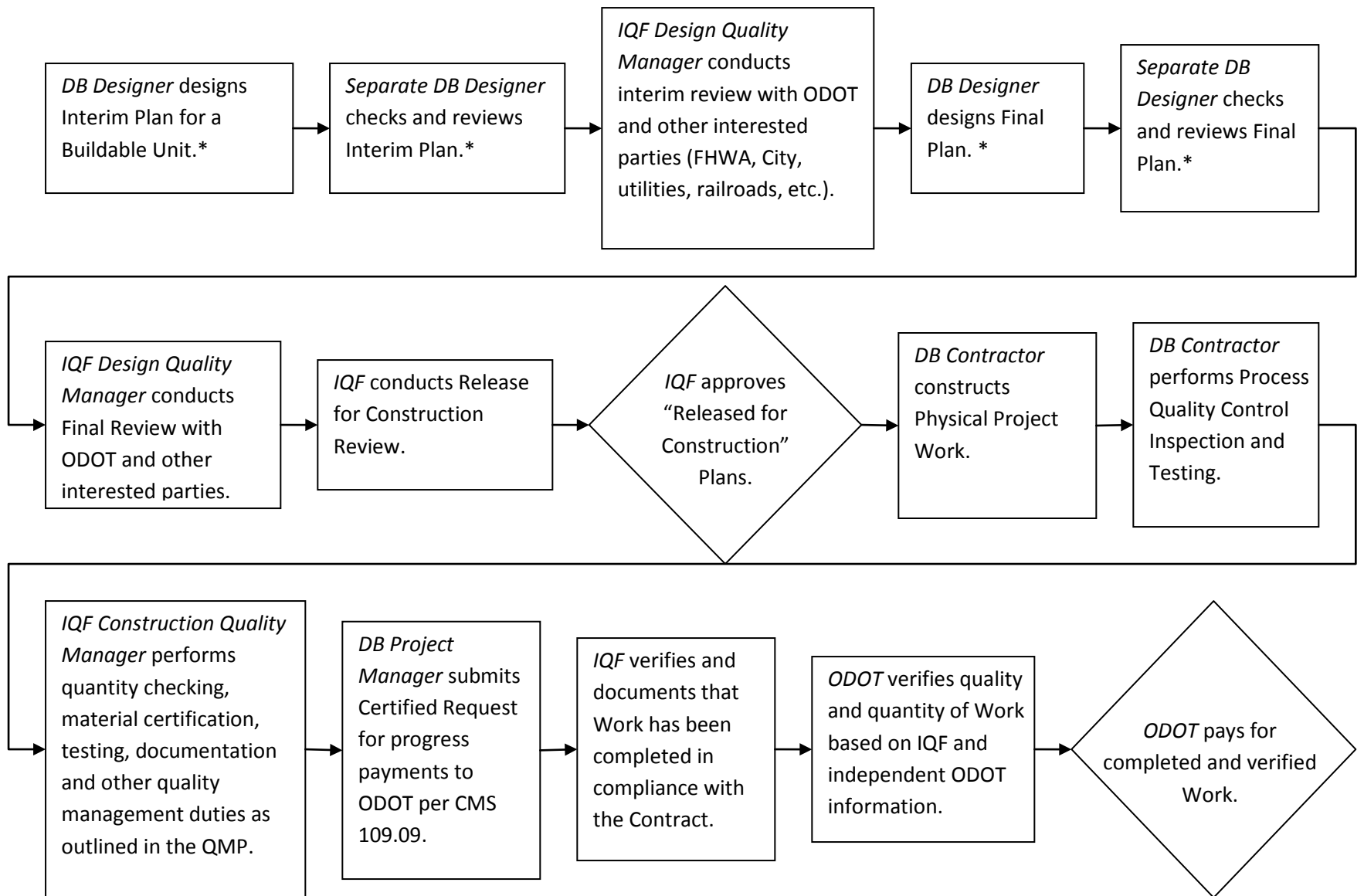
The implemented QMP shall accomplish the following quality functions and objectives:

- A. Successfully achieve the goals of the Project listed in Section 1 of the Project Scope
- B. Successfully deliver the Project within the accepted Critical Path Method (CPM) schedule for the Project
- C. Construct a high quality Project as described in the contract documents
- D. Provide a complete quality program that uses quality control, verification and quality assurance principals to eliminate non conforming items and ensure that any non conforming items are detected and corrected.

The QMP will address the responsibilities for each of the following quality components:

- A. Procedures for Design Quality Control performed by the DB Designer
- B. On-site Process Quality Control Inspection and Process Quality Control Testing performed by the DB Contractor
- C. Verification procedures (i.e. the IQF Inspection and IQF Testing), performed by the IQF

The QMP will delineate how the DBT will ensure that all disciplines, aspects and elements of the Work will comply with the requirements of the Contract Documents and that all materials incorporated into the Work will perform satisfactorily for the purpose intended and conform to the contract requirements. The DBT may use any nationally accepted format for the QMP.



**Figure 2-1:**  
**QMP OVERVIEW**  
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\*IQF performs ongoing Over-the-Shoulder Reviews with involvement of ODOT, City, utilities, railroads, etc.

## **2.4 RELATIONSHIP OF DBT WITH THE IQF and THE DEPARTMENT**

### **2.4.1 DBT Responsibilities**

The DBT is responsible for compliance with all contract requirements. The DBT is responsible for performing all quality control required to assure contract compliance and making required adjustments to achieve this compliance.

The DBT, not including the IQF, is responsible for Process Quality Control as defined in Section 2.6.1.9.

The DBT is responsible for immediately identifying and resolving any non conforming items found by its quality control processes, the IQF's verification processes, or the Department's Quality Assurance processes.

### **2.4.2 IQF Responsibilities**

The IQF is required to verify and document whether or not the DBT has completed the Project and/or portions of the Project in compliance with the contract's requirements for both design and construction.

The IQF will have the authority from the DBT to reject design work, "stop construction work," and "reject material" if quality requirements are not being met, exclusive of schedule or cost. The only authority able to overrule the IQF is the Department.

### **2.4.3 Department Responsibilities**

The Department will perform Quality Assurance to validate and document the DBT's quality control and the IQF's quality verification processes. Quality Assurance reviews that are performed by the Department only represent a sampling of the Work and do not relieve the DBT of the contract compliance requirements.

The Department's role in the Quality Program is to:

- A. Actively participate in quality checkpoints (QCP) (Section 2.6.5.25), over-the-shoulder reviews (Section 2.6.4.8), and interim/final design reviews (Section 2.6.4.9).
- B. Review the IQF's material sampling and testing results.
- C. Perform the Department's Quality Assurance functions required to provide the Department a final assurance that contract provisions have been met and to fulfill the Department's responsibilities to FHWA as required in 23 CFR 637.
- D. Conduct Department quality assurance testing at the frequency determined in paragraph C; or if no frequency is specified, at approximately 10% of the IQF Testing.
- E. Monitor/audit the DBT's Quality Program activities, including IQF activities, to confirm adherence to the QMP.
- F. Audit the IQF's records.



- G. Conduct Department Independent Quality Assurance Reviews of inspection and testing personnel and of inspection and testing equipment.
- H. Perform the off-site Quality Assurance inspection and testing for the fabrication of precast and pre-stressed concrete elements and of structural steel.
- I. Perform the final inspection and validation conforming to C&MS 109.11 and 109.12 and to include a final audit of IQF records for a final conformity evaluation of the work to the requirements of the contract.
- J. Maintain all authority under C&MS to accept and reject non-conforming design, construction and materials.
- K. Maintain its responsibility for utility and railroad coordination as per Section 6, but will use the IQF to support its control of design submittals, scheduling, notification and documentation requirements. The DBT must obtain Department approval for any proposed changes to the utility and railroad agreements. Any approved changes to the terms of the agreement between the Department and the utility or railroad owners that result in adverse impacts to the Project in terms of cost, time or other liabilities will be sole responsibility of the DBT.

#### **2.4.4 Department Access to Testing Facilities**

The Department reserves the right to:

- A. Check DBT's, including the IQF's, testing equipment for compliance with specified standards.
- B. Check DBT's, including the IQF's, testing procedures and techniques.
- C. Access the testing facilities of independent testing agencies in order to witness testing, verify testing procedures and techniques, and review lab personnel certifications and test results at no additional cost to the Department.

#### **2.4.5 Stop Work**

If there is evidence that the QMP procedures are not being followed, or if the materials or workmanship are not meeting the contract requirements, the Department may, at its sole discretion, stop Work until appropriate quality procedures have been established and the QMP has been revised and approved. In addition, the Department retains authority to stop Work without liability wholly or in part if the DBT fails to do either:

- A. Correct conditions that are unsafe for Project personnel or the general public; OR
- B. Correct unacceptable design or construction practices.

#### **2.4.6 Definitions of Department Activities**

The Department will coordinate its quality activities via the following components.

**Department Independent Assurance:** Department Independent Assurance comprises split sampling and testing performed by the Department. These tests and observations of both the IQF Testing and the Design Build Team's Quality Control sampling and testing procedures are performed to:

- A. Confirm that all testers are qualified and certified.
- B. Confirm that test methods and procedures are performed accurately.

This function may also be performed by the Department's Project personnel any time there is a question about IQF Inspection or IQF Testing procedures or personnel.

**Department Quality Assurance Inspection:** Department Quality Assurance Inspection is the oversight inspection of the DBT's Work by the Department, including:

- A. The Department's participation in the quality control checkpoint meetings.
- B. Audits of all documentation to confirm that the DBT and the IQF are achieving the Contract obligations and commitments.
- C. The Department's inspection of off-site fabrication of structural steel and of precast and prestressed concrete structures. This inspection does not remove the DBT's responsibility for conformance to contract requirements for these items.

**Department Quality Assurance Testing:** Department Quality Assurance Testing encompasses material sampling and testing performed by Department personnel that are used to statistically compare and validate the results of the IQF's tests, in accordance with individual specifications of the Construction and Materials Specifications, Supplemental Specifications, and the contract documents. The Department Quality Assurance Testing tests will be conducted at the frequency required, or if no frequency is specified at approximately 10% of the IQF Testing. The IQF Testing test results will be used for acceptance, if the Department Quality Assurance Testing tests are validated with the IQF Testing tests.

## **2.5 TIMING OF QMP ACTIVITIES**

### **2.5.1 Initial Project Activities**

Except for preliminary meetings, development of the Critical Path Method schedule, limited preliminary design work and the development of the QMP, no Work will begin on the Project before the Department has approved the QMP or Interim QMP.

### **2.5.2 QMP Approval**

The Department will approve or reject each QMP submission within 15 Business Days following Department's receipt of the QMP. After the QMP has been approved, any revisions to the Plan, staffing levels, or key quality personnel, as defined in Section 2.6.1, will require prior written Department approval. If the DBT chooses to submit an interim CPM schedule, the Department will allow the submittal of an interim QMP for the same period as the approved interim CPM. The associated interim QMP must be approved by the Department before work under the interim CPM schedule can progress. The interim QMP must cover quality functions for the work to be performed in the interim CPM.

As part of the QMP acceptance process, the Department will evaluate Quality Assurance (QA) alternatives and determine the level of QA to be performed for both design and construction. Alternative QA options, if any, will be evaluated by the Department as part of this process.

### **2.5.3 Construction Activities**

Construction of any Work will not begin until the design for that portion of the Work is complete; has been accepted through the approved QMP process; has been “released for construction” in accordance with Section 2.6.4.11; and has been signed and sealed by a Registered Professional Engineer in conformance with the Ohio Revised Code.

### **2.5.4 Quality Checkpoint (QCP)**

A QCP is a point in time when construction has proceeded to a stage as defined in Section 2.6.5.25 at which representatives of the DBT and the IQF, including the Independent Construction Quality Manager and the Department’s Engineer, determine the progress to date by reviewing any or all of the following:

- A. Daily inspection reports
- B. IQF Testing and Department Quality Assurance Testing reports
- C. Foundation records
- D. Survey records
- E. QMP records
- F. Department Quality Assurance Results
- G. Any other pertinent data to determine acceptable work

The parties then judge whether to accept or reject the completed Work. No additional Work will take place past the QCP until all parties agree that the Work up to that point is acceptable. When the parties cannot agree the Department will not allow Work to proceed beyond the QCP.

## **2.6 QUALITY MANAGEMENT PLAN CONTENTS**

At a minimum the QMP shall include: procedures for Design Quality Control and checking performed by the DB Designer, on-site Process Quality Control Inspection and Process Quality Control Testing performed by the DB Contractor, and the verification responsibilities (i.e. the IQF Inspection and IQF Testing), which are performed by the IQF. The plan includes the methods, procedures and organization that will ensure the quality of all components of the Project.

The QMP submitted by the DBT will be organized into the following sections and address requirements as outlined in Section 2:

**Table 2-1: QMP Section References**

<b>QMP SECTION NUMBER</b>	<b>QMP SECTION TITLE</b>	<b>PROJECT SCOPE SECTION REFERENCE</b>
<b>1</b>	Management	2.6.1
<b>2</b>	Administration	2.6.2
<b>3</b>	Design related Investigations and Testing	2.6.3
<b>4</b>	Design	2.6.4
<b>5</b>	Construction	2.6.5
<b>6</b>	Environmental Compliance and Monitoring	2.6.6
<b>7</b>	Maintenance of Public Facilities	2.6.7
<b>8</b>	Approvals	2.6.8

**2.6.1 QMP Section 1 - Management Requirements**

QMP Section 1 (Management) will describe the quality management organization of the DBT, including the IQF. The QMP will include the following:

- A. An organizational chart showing lines of authority and reporting responsibilities for all Project Work
- B. The name, position, qualifications, duties, responsibilities and authorities of each person proposed for a quality management function, including the following key quality staffing positions:
  - a. Independent Quality Manager (IQM)
  - b. Independent Construction Quality Manager
  - c. Independent Design Quality Manager
  - d. Independent Lead Highway Inspector
  - e. Independent Lead Structural Inspector

Each key staffing position must be filled by a person who does not have any other responsibilities on the Project. Personnel identified in the Technical Proposal will not be allowed to be changed in the final QMP

Key quality staff must:

- A. Be located at the Project offices.
- B. Be an employee of the IQF (or an employee of a consultant to the IQF).
- C. Have sufficient authority and organizational freedom to identify quality problems, and to recommend, provide and verify implementation of solutions.
- D. Be at an organizational level high enough to ensure that Project schedule, performance or cost will not influence implementation of quality management measures.

### ***2.6.1.1 Independent Quality Manager***

The QMP will name the IQM, who will be responsible for the overall management and implementation of all elements of the QMP. The IQM will report both to the DBT and to the Department's Engineer. This position is required for the entire duration of the Project. The IQM must have no less than 10 years of experience in quality management after becoming a licensed Professional Engineer. The IQM must be a licensed Professional Engineer in Ohio by the time of the Technical Proposal submittal or demonstrate the ability to become licensed by the time of award of the contract. The IQF will not replace the IQM without prior written approval from the Department. A request to replace the IQM will include a name of a proposed replacement manager and complete details of the replacement's qualifications. If approved, the replacement will be on site within five (5) Business Days of Department approval of the change.

### ***2.6.1.2 Independent Construction Quality Manager***

The QMP will name the Independent Construction Quality Manager, who will be responsible for the verification of the quality of the construction elements of the Project. The Independent Construction Quality Manager must have no less than eight (8) years of experience in construction quality management and inspection and testing after becoming a licensed Professional Engineer. The Independent Construction Quality Manager must be a licensed Professional Engineer in Ohio by the time of the Technical Proposal submittal or demonstrate the ability to become licensed by the time of award of the contract. This position is required for the duration of all construction related activities on the Project. The IQF will not replace the Independent Construction Quality Manager without prior written approval from the Department. A request to replace the Independent Construction Quality Manager will include a name of a proposed replacement manager and complete details of the replacement's qualifications. If approved, the replacement will be on site within five (5) Business Days of Department approval of the change.

### ***2.6.1.3 Independent Design Quality Manager***

The QMP will name the Independent Design Quality Manager, who will be responsible for the verification of the quality of the design elements of the Project. The Independent Design Quality Manager cannot be part of any of the design firms for the Project or share similar ownership. The Independent Design Quality Manager must have no less than eight (8) years of total design engineering experience on projects with similar scope and complexity after becoming a licensed Professional Engineer. The Independent Design Quality Manager must be a licensed Professional Engineer in the State of Ohio by the time of the Technical Proposal submittal or demonstrate the ability to become licensed by the time of award of the contract. This position is required for the entire duration of all design activities on the Project. The IQF will not replace the Independent Design Quality Manager without prior written approval from the Department. A request to replace the Independent Design Quality Manager will include a name of a proposed replacement manager and complete details of the replacement's qualifications. If approved, the replacement will be on site within five (5) Business Days of Department approval of the change.

#### ***2.6.1.4 Independent Lead Highway Inspector***

The Independent Lead Highway Inspector is responsible for the inspection and field documentation of all highway elements on the Project including but not limited to embankments, drainage, pavements, signage, striping, ITS, lighting, Maintenance of Traffic, etc. The Independent Lead Highway Inspector must have a minimum of seven (7) years experience in performing testing and inspection on highway projects. The Independent Lead Highway Inspector must be a licensed Professional Engineer in Ohio by the time of Technical proposal submittal or demonstrate the ability to become licensed by the time of award of the contract. The Independent Lead Highway Inspector must have worked at least two (2) years in a similar capacity on highway projects with applicable scope and complexity. This position is required for the duration of all construction activities on the Project. The IQF will not replace the Independent Lead Highway Inspector without prior written approval from the Department. A request to replace the Independent Lead Highway Inspector will include a name of a proposed replacement inspector and complete details of the replacement's qualifications. If approved, the replacement will be on site within five (5) Business Days of Department approval of the change.

#### ***2.6.1.5 Independent Lead Structural Inspector***

The Independent Lead Structural Inspector is responsible for the inspection and field documentation of all structural elements on the Project including but not limited to bridges, box culverts, walls, foundations, etc. The Independent Lead Structural Inspector must have a minimum of seven (7) years experience working in performing testing and inspection on structures for highway projects. The Independent Lead Highway Inspector must be a licensed Professional Engineer in Ohio by the time of Technical proposal submittal or demonstrate the ability to become licensed by the time of award of the contract. The Independent Lead Structural Inspector must have worked at least two (2) years in a similar capacity on highway projects with applicable scope and complexity. This position is required for the duration of all construction activities on the Project. The IQF will not replace the Independent Lead Structural Inspector without prior written approval from the Department. A request to replace the Independent Lead Structural Inspector will include a name of a proposed replacement inspector and complete details of the replacement's qualifications. If approved, the replacement will be on site within five (5) Business Days of Department approval of the change.

#### ***2.6.1.6 Pile Driving Dynamic Measurements***

The firm performing the pile driving dynamic measurements will be employed by and/or report directly to the IQF. The firm and on-site employee will have a minimum of five (5) years experience in monitoring the driving of steel pipe piles with dynamic measurements and in performing signal matching analyses. If other foundation capacity validation methods are used or required, such as Osterberg load cell, the firm and on-site employee must have a minimum of five (5) years experience in the method and report directly to the IQF.

#### **2.6.1.7 Other IQF Staff Responsibilities**

The IQF inspection staff and geotechnical and environmental monitors will check for compliance with all permits, environmental monitoring and construction operations. Staff will be on site to monitor all field operations for their disciplines. Construction operations requiring continuous field sampling and testing will proceed only in the presence of the assigned IQF staff personnel.

The IQF staff will monitor the DBT's coordination effort with the Utility and Railroad Owners to verify that adequate notification is provided to the Utility and Railroad Owners for them to inspect construction activities performed on or around their facilities. They will also verify that the Utility and Railroad Owners have the opportunity to conduct design reviews of Project activities near their facilities.

All on-site Work will be inspected by the IQF's staff, except that certain portions of Work may be inspected by qualified individuals who are employees of or retained by manufacturers, vendors or Suppliers, if approved in writing by the Department.

#### **2.6.1.8 IQF Staff Qualifications**

IQF staff will be employees of the IQF or its accepted sub-consultant and will have been trained in the applicable procedures for inspection of Work, geotechnical and environmental monitoring, and material sampling and testing. The professional training and experience of the IQF staff (including hydrologists, and geotechnical engineers, etc.) will be commensurate with the scope, complexity, and nature of the activity to be inspected, monitored, or tested and verified.

#### **2.6.1.9 DBT Process Quality Control Staff Qualifications**

Process Quality Control Inspection and Process Quality Control Testing are the inspection and material sampling and testing performed by the DBT's certified personnel as products are being manufactured and processed on site. The purpose of process control sampling and testing is to modify the processes so that the products will meet the Contract requirements when checked and tested at the point of acceptance by the IQF and can be incorporated into the Project.

The DBT will maintain a qualified and experienced Process Quality Control inspection and material sampling and testing staff. The IQF cannot provide the Process Quality Control Staff. The Process Quality Control staff will be certified as per Table 2-2 and 2-3. Process Quality Control staff will be qualified by formal education or training and experienced in construction or craft supervision at the journeyman level.

#### **2.6.1.10 Certifications and Accreditations**

IQF personnel performing on-site inspection and material sampling and testing will have applicable certifications as listed in Table 2-2 and 2-3.

Portable or satellite field laboratories will be AASHTO Materials Reference Laboratory accredited for the testing they perform.

The Department will perform quality assurance reviews on the IQF staff’s field performance and test results as part of the Department’s Quality Assurance responsibilities. The IQF will perform reviews of the inspection and test results and submit weekly summaries to the Department.

The QMP will specify procedures that:

- A. Familiarize all personnel with all requirements of the Contract Documents pertaining to their responsibilities.
- B. Educate, train, and certify (as appropriate) personnel performing activities affecting or measuring the quality of the Work, and ensure that they achieve and maintain reasonable proficiency.
- C. Ensure that personnel performing the Work do so according to the QMP.

**Table 2-2: Material Testing Personnel Certification Requirements**

<b>Certifications Required For On-Site Material Sampling and Testing for:</b>	
<b>Fresh Concrete Sampling and Testing</b>	<b>Concrete Field Testing Technician – grade 1</b>
<b>Concrete Cylinder and Core Testing</b>	<b>Concrete Strength Testing Technician</b>
<b>Concrete Mix Design Testing</b>	<b>AASHTO AMRL Testing Laboratory</b>
<b>Aggregate Sampling</b>	<b>Ohio Level 1 Aggregate Technician</b>
<b>Basic Aggregate Testing</b>	<b>Ohio Level 2 Aggregate Technician</b>
<b>Aggregate Durability Testing</b>	<b>Ohio Level 3 Aggregate Technician</b>
<b>In Place Density Testing</b>	<b>NICET Level II, Construction Materials Testing – subfield Soils certification, and 2 years relevant experience</b>
<b>Asphalt plant sampling and testing</b>	<b>Ohio Asphalt level II</b>
<b>Asphalt mix design</b>	<b>Ohio Asphalt level III</b>

**Table 2-3: Inspection Personnel Certification Requirements**

<b>Certifications Required for Field Inspector for:</b>	
<b>PCC Paving and PCC Batch Plant</b>	<b>NICET Level III, Highway Construction</b>
<b>Embankment</b>	<b>NICET Level II, Construction Materials Testing – subfield Soils certification, and 5 years relevant experience</b>
<b>Structural Concrete</b>	<b>NICET Level III, Highway Construction</b>
<b>Structural Steel Welding</b>	<b>AWS Certified Field Welding Inspector</b>
<b>Asphalt Paving</b>	<b>Ohio Field Quality Control Supervisor</b>
<b>Prestressed Concrete</b>	<b>PCI level II and III</b>
<b>Post Tensioning construction</b>	<b>PTI Bonded Post Tensioning Level II Certified</b>
<b>Post Tensioning Grouting</b>	<b>ASBI certified Grouting Technician</b>



<b>Certifications Required for Field Inspector for:</b>	
Bridge, Tower and Lighting Coating Application	ODOT bridge paint quality control specialist 514.04.A
Maintenance of Traffic	Worksite Traffic Control Supervisor (conforming to ODOT requirements)
Temporary Sediment and Erosion Control	CESSWI - Certified Erosion, Sediment, and Storm Water Inspector
	CPESC - Certified Professional in Erosion and Sediment Control

### **2.6.1.11 Removals**

The Department will have the authority within their Department Independent Assurance and QA functions, to permanently remove from the Project any of the following:

- A. A tester who does not perform the IQF. or Process Quality Control tests in accordance with the test methods
- B. A tester who does not report test results accurately
- C. An inspector or geotechnical or environmental monitor who does not exercise good judgment in the performance of duty
- D. A tester who does not have the appropriate certifications, as per Table 2-2 and 2-3
- E. A designer who has their professional license suspended or revoked or loses their qualifications with the Department for the required design work
- F. Any IQF position that is not performing their functions in accordance with the QMP and the Contract requirements

### **2.6.1.12 Staffing Levels**

The staffing levels proposed in the Technical Proposal will be updated in the QMP and then updated, as necessary, during the course of the Project to reflect the actual construction schedule. With the exception of the key members, the size of the IQF staff will reflect the complexity, needs, shifts and composition of the construction activities consistent with the construction schedule, the relative locations of the Work to be covered, geotechnical considerations, environmentally sensitive areas, and the specific nature of the Work. The Department will review and approve staffing levels presented within the QMP for adequacy in meeting Project needs.

## **2.6.2 QMP Section 2 - Administration Requirements**

In general, QMP Section 2 (Administration) will describe the procedures for coordinating and ensuring the consistency and quality of all Work performed or provided for the Project by all participants.

### **2.6.2.1 Document Control**

The QMP will specify procedures for meeting documentation requirements and document control for the filing of design criteria, reports and notes, calculations, plans, specifications, schematics, supporting materials, inspection, testing, construction material, etc., and for the specific responsibilities of personnel to satisfy these requirements.

All documents will be maintained by the DBT for the required duration, according to ODOT's Record Retention Policy. Documents will be organized, indexed and delivered to the Department for Final Acceptance, as well as within five (5) Business Days of receipt of request from the Department. Any and all documentation will be available for review at any time by the Department and will conform to Section 902 of ARRA.

Documentation will be provided in formats acceptable to the Department. The Electronic documentation processes will conform to the Department's requirements or will be of an acceptable and compatible system with the Department's IT processes.

A computer database of all soil, asphalt, aggregate, concrete and other materials testing from all groups (IQF Testing, Department Quality Assurance Testing, and Process Quality Control Testing) will be provided, maintained, and updated on a daily basis. The electronic database must have the following capabilities:

- A. Perform comprehensive statistical data analysis when statistical acceptance or comparison of materials is required by specifications (F & t tests, paired t, PWL, range, etc)
- B. Allow multiple users input from multiple test groups (IQF, Department Quality Assurance Testing, Process Quality Control) and any other DBT or Department affiliated members
- C. Track any changes made to the test data by some acceptable security and ownership system
- D. Sort by multiple fields such as technician, station, etc.
- E. Be capable of performing and evaluating statistical analysis on test data when statistical acceptance or comparison of materials is required by specifications
- F. Be compatible with ODOT software and useable to ODOT after Project completion
- G. Report to both the DBT and the Department

The QMP will identify (by name) document control supervisory personnel for the maintenance and management of records and documents pertinent to IQF activities. The Department will require electronic documentation for the Project.

### **2.6.2.2 Change Documentation**

The QMP will specify measures to control the receipt and issuance of documents (such as instructions, procedures, drawings, and any changes thereto) that prescribe activities affecting quality. These measures will ensure that approved documents, including all authorized changes thereto, are reviewed for adequacy, approved for release by authorized personnel, and distributed to and used at the locations

where the prescribed activity is performed. Changes to documents will be reviewed and approved by the same organizations that performed the original review and approval, unless the Department allows, in writing, another responsible organization to perform such reviews and approvals.

### ***2.6.2.3 Process Quality Control Audits***

The QMP will specify a comprehensive series of planned periodic audits of the DBT's Process Quality Control to determine the effectiveness of the Quality Program. A minimum of two audits per year will be conducted. Audits will be performed in accordance with the written procedures or checklists by appropriate trained personnel of the IQF. Audit results will be documented, reviewed and acted upon by DBT management having responsibility in the areas audited. Follow-up action, including re-audit of deficient areas, will be taken where indicated. Audits will be performed on the periodic schedule or when the Department determines the QMP is not effective. The Department will be notified and participate in the audits.

### ***2.6.2.4 Design Changes***

The QMP will specify procedures for tracking and distributing and obtaining approval of design changes made after the release-for-construction design drawings.

### ***2.6.2.5 As-Constructed Drawings***

The QMP will specify procedures to be used in preparation of the final as-constructed drawings to ensure accurate and timely documentation of the constructed Project. As-constructed drawings will be done as the Project progresses and each work element (buildable unit) is completed to ensure all parties are aware of any issues. Final submittal of complete as-constructed Drawings will conform to Section 2.6.4.12 and 2.6.4.13.

### ***2.6.2.6 Scheduling***

For each design item from the CPM schedule, or buildable unit segment, or construction phasing review, The DBT shall provide the Department the opportunity to be included in all design reviews. Through day-to-day communications, the DBT shall keep the Department up to date on the exact timing of all reviews and review processes. The DBT shall coordinate interim and final reviews in accordance with the agencies and review times listed in Section 2.6.4.9.

The schedule impacts of revisions required as a result of Contract non-compliance, including the Department's time for reviewing revisions, will be borne by the DBT. Frequent and early coordination regarding resolution of previously identified issues is encouraged. Early agreement on issue resolution will eliminate or reduce significant design and construction impacts.

### ***2.6.2.7 Minimum Documentation Requirements for Progress Payments***

Progress payments will conform to the requirements of C&MS 109.09, as modified by the Proposal.

The QMP will specifically define how the IQF will both verify and document to the Department that the work shown on the cost-loaded CPM schedule has been completed or partially completed. At a

minimum, the QMP will include progress payment verification and documentation procedures as indicated in the following paragraphs.

For design Work, the QMP will establish verification procedures and documentation requirements that will show the Engineer the percentage of design work completed as compared to the CPM schedule. The IQF will certify that any design Work listed as 100% complete has been reviewed and approved by the IQF. The IQF will document any outstanding issues that would require rework and identify a revised percentage of completion based on these issues. The IQF will provide documentation to the Department supporting the percent complete of all design work.

For construction Work, the quantity breakdowns provided by the DBT in their cost-loaded CPM schedule and verified by the IQF will be used to verify Work completed for a progress payment. The IQF verification will be based on their inspections, DBT quality control testing, IQF verification testing, and all Project records associated with the quantity of Work submitted for a progress payment to the Engineer.

The Engineer will validate the DBT's certification for progress payment by using IQF submittals and the Department's independent QA information. The Engineer will make the final determination regarding progress payments in accordance with C&MS 109.09.

#### ***2.6.2.8 Project Progress Documentation***

Section 2 of the QMP will indicate how the IQF will collect and retain each of the following types of data in written form during the performance of the Work, all of which will be in a form acceptable to the Department. At a minimum all documentation will conform to the Department's Construction Inspection Manual of Procedures, Construction Inspection Forms, and applicable standard procedures and provided in a format compatible with the Construction Management System employed for use with this Project. This documentation will be made available to the Department daily throughout the Project.

##### ***2.6.2.8.1 Material Sampling Tracking***

The IQF will obtain and track manufacturer's certificates and/or Department certification documents for all materials accepted by certifications or the Department's TE-24 and QPL processes. The IQF will track, document the receipt of, and provide the Engineer, when required, with the copies of these documents and a breakdown of quantity of material, use of material, and location of materials. Manufacturer's certifications will conform to the C&MS 700 Material Details and other contract documents.

##### ***2.6.2.8.2 Quality Documentation***

The IQF will review proposed progress payments to verify that acceptable quality documentation is on file for all payment items and to certify the required quality documentation is complete and/or document any issues to the Engineer in conformance with Section 2.6.2.7 and C&MS 109.09.

##### ***2.6.2.8.3 Daily Manpower and Equipment Reports***

The IQF will maintain daily manpower and equipment reports for construction-related activities as well as each subcontractor.

#### 2.6.2.8.4 Daily Occurrence Log

The IQF will prepare a Daily Occurrence Log of construction activities that will be maintained in narrative form and will document all significant occurrences on the Project, including:

- A. Weather conditions
- B. Asserted Force Majeure events
- C. Events and conditions causing or threatening to cause any significant delay, disruption, or interference with progress of Work
- D. A general overview of the current Project activities including Maintenance of Traffic
- E. Significant injuries to a person or property
- F. A listing of all activities on the current Monthly Plan Update that are being actively prosecuted
- G. A daily record (in a standard format) of all labor, materials, equipment and/or expenses incurred for each item of work and all IQF activities

#### 2.6.2.8.5 Regulated Materials

For regulated material work, the IQF will maintain the data required by contract requirements and all laws and regulations. Records will be maintained separately for each site.

#### 2.6.2.8.6 Utilities and Railroads

The IQF will be responsible for oversight of coordination with utilities and railroads. Design, construction, rework, progress and protection during construction of utilities and railroads will be documented for use by the DBT and the Department. The data will be maintained separately for each individual utility and railroad facility.

#### 2.6.2.8.7 Other Work

The IQF will maintain a separate Daily Occurrence Log for any Project Work not addressed in other sections of this document.

#### 2.6.2.8.8 Specific Buildable Unit segments of Work

The IQF will document all Buildable Units of Work as defined in the contract documents or in the accepted CPM schedule.

The minimum documentation requirements for actual construction will conform to the Department's Construction Management System and the Construction Inspection Manual.

#### 2.6.2.8.9 Quality Records

The IQF will document all quality, inspection and testing activities, including any delays encountered, Work that does not conform to the requirements of the Contract and is released for construction design, and the corrective actions taken regarding such nonconforming Work.

The minimum documentation requirements will conform to the Department's Construction Management System and the Construction Inspection Manual.

#### 2.6.2.8.10 IQF Monthly Certification

As part of the monthly progress report, the IQF will provide a written certification signed by the Independent Design Quality Manager and the Independent Construction Quality Manager, indicating that the QMP and all of the measures and procedures provided therein are functioning properly and are being fully complied with. This certification will be in addition to the requirements of C&MS 109.09.

The IQF will also maintain and submit records weekly with evidence that all required activities and/or tests have been performed, including the following:

- A. Type, number, and results of all current quality management activities, including reviews, inspections, material statistical analysis, tests, audits and monitoring of Work performance
- B. Closely related data, such as the qualifications of personnel and the procedures and equipment used
- C. Identity of the inspector or data recorder, the type of test or observation employed, the results and acceptability of the Work
- D. Minutes of all QC and IQF meetings (distribute draft minutes within 48 hours)
- E. The nature of any nonconforming Work, causes for rejection, etc.
- F. Proposed corrective action(s) for any nonconforming Work, corrective action(s) taken and results of corrective action(s)

#### 2.6.2.8.11 Materials and Equipment Conformance Record

The IQF will maintain documentary evidence that materials and equipment conform to the procurement requirements, and have it available at the jobsite at least 24 hours before installation or use of such material and equipment. When, due to the nature of the material (e.g., concrete), the 24 hour notification is impractical, a mutually agreeable timeframe will be determined. This agreement must be adopted 24 hours prior to the use of the material or equipment.

This documentary evidence will be retained at the jobsite and will be sufficient to identify specific requirements, such as all Contract Documents, codes, standards and specifications met by the purchased material and equipment. The effectiveness of the control of quality by the DBT's own forces and subcontractors will be assessed by the DBT at intervals consistent with the importance, complexity and quantity of the product or services, and will be verified by the IQF.

The Department reserves the right to inspect and review these documents at any time and requires submittals of all materials records, if not already provided, with any progress payment as evidence of all materials being approved.

#### 2.6.2.8.12 Weekly Scheduling Notice to Department

The DBT shall notify the Department in writing by Thursday noon of each week of planned design and construction activities, including fabrication, for each Work Activity segment for the following Monday through Sunday to allow the Department to schedule its resources. For activities (fabrication, etc.)

occurring out of immediate Project area (beyond 60 miles of the Project), the notification will be given at least 10 Business Days before the planned Work.

#### 2.6.2.8.13 Acceptance

At the completion of the Work, or if the Department grants a partial acceptance conforming to C&MS 109.11, the IQM will jointly conduct a Final Inspection with the Department and FHWA. Final Acceptance will conform to C&MS 109.12 and will include, but not be limited to, associated as-built documents, certifications, other Project documentation and DBT clean-up requirements. Inspection will be accomplished within five (5) Business Days of notification that the Project, or portion thereof, is ready for final or partial inspection as determined by the Engineer.

As part of a partial or final inspection, the Work will be examined and DBT quality control, IQF verification, and quality assurance documentation will be reviewed. The Department and the IQM will determine a punch list of nonconforming Work. This punch list will be included in quality documentation with an agreed date of correction for each deficiency. The IQF Manager will verify that each deficiency has been corrected before the agreed completion date, provide all final documentation, and perform a final inspection with Department representatives to verify that the punch list deficiencies have been satisfactorily corrected.

#### 2.6.2.8.14 Final Certification

At completion of the Project, a Certification signed by the DBT and IQM will be submitted with the final invoice stipulating that all design, construction and materials incorporated in the Project conform to the Contract requirements.

#### 2.6.2.8.15 Final Owner Acceptance

The Department has sole responsibility and authority for the Final Owner Acceptance of all Work.

### **2.6.3 QMP Section 3 – Design Related Investigations and Testing Requirements**

QMP Section 3 (Design related investigations and Testing) will:

- A. Describe procedures for ensuring the quality and documentation of Project geotechnical investigations and testing.
- B. Define the procedures for ensuring the quality and documentation of field surveying Project mapping coordinate system.
- C. Provide assurance of qualifications of all laboratories performing any testing as part of the Design process.

### **2.6.4 QMP Section 4 - Design Requirements**

In general, QMP Section 4 (Design) will describe design quality management practices and processes that are intended to:

- A. Place responsibility for design quality on the DBT.

- B. Ensure that Work is designed and built in accordance with the Contract.
- C. Ensure that all design documents are prepared in accordance with Department practices and meet all the requirements of the Contract.
- D. Ensure reviews are in compliance with the contract requirements and the accepted QMP.
- E. Ensure that reviews of all design elements are completed and include all involved agencies (e.g., Department [District and Central office], FHWA, City of Cleveland, utilities, railroads, etc.).
- F. Allow the Department to fulfill its responsibility of exercising due diligence in overseeing the overall design process and individual buildable unit segments as defined by the cost loaded CPM schedule.

General submittal rules include:

- A. Any partial design review submittal to the IQF and the Department, whether it aligns to the CPM's cost loaded activity or buildable unit segment or not, will be a submittal that can be reviewed without having to make assumptions regarding how other portions of the Project might be designed. Any limited assumptions will be completely documented by the DB Designer and provided to the IQF and the Department.
- B. If the IQF or the Department determines the submitted items are incomplete or assumptions are not sufficiently defined, the review will be cancelled and the costs and delays will be the responsibility of the DBT.
- C. The IQF's Design Oversight is responsible for the verification of the quality of the design elements of the Project. The IQF's Design Oversight will oversee the verification of the design of the Project by conducting design reviews, providing documentation and coordinating with the DBT and the Department to confirm and document that the design meets all requirements of the Contract. The IQF staff performing design oversight must be employees of the IQF or the IQF's design review consultant(s).

#### **2.6.4.1 Quality Requirements**

The QMP shall specify procedures for ensuring the quality of all design plans, specifications, reports, calculations, and other design and construction documents. These procedures will be formulated to ensure that appropriate quality requirements are specified and included in all design and construction documents, and that deviation from such requirements are controlled. For any deviations from these procedures, advance written approval will be obtained from the Department.

#### **2.6.4.2 Design Checks by the DB Designer**

The QMP shall specify quality procedures used by the DB Designer for preparing and checking all plans, specifications, calculations, reports and other documentation. The DBT shall ensure that these documents are independently checked and back-checked in accordance with generally accepted engineering practices, Departmental policies and procedures, and Ohio and Federal Law. The DBT shall submit as part of the QMP, a listing of the DBT's designers and checkers for each design portion of the



Project. The DBT shall assure that those personnel are qualified in accordance with Departmental policies and procedures and Ohio and Federal Law.

Specific procedures will be included demonstrating that any computer programs to be used, and the resultant output, are acceptable from an engineering perspective and conform to the contract's design requirements.

The DBT shall define the process(es) and procedures that the Design Process Quality Control managers will employ to demonstrate that the QMP is understood and followed by the design personnel and the verification processes to assure the process(es) and procedures are followed. The design engineer and checker on all final Design Documents will be clearly identified.

The checking of structures and structural design will include independent calculations for all structural elements. The IQF cannot fill the checking engineer role.

#### ***2.6.4.3 Verification of Design Adequacy by the DB Designer***

The QMP shall specify the level, frequency, and methods of checking the design adequacy of the Project, including the methods by which all Design Documents, calculations, and reports shall be independently checked, verified for adequacy of design, and back-checked in accordance with generally accepted design and engineering practices by senior experienced engineers from the DBT's staff. This checking cannot be performed by the IQF.

#### ***2.6.4.4 Design Coordination by the DB Designer***

The QMP shall specify detailed procedures for coordinating Work performed by different persons, firms, or disciplines on related tasks, in the same geographic area, or in adjacent geographic areas. These procedures will be formulated to ensure that, under such circumstances, no conflicts, omissions or misalignments occur between drawings or between the drawings and the specifications, and that the DBT coordinates the review, approval, release, distribution, and revision of documents. Such procedures could be an interdisciplinary review process, conflict identification process, omission identification process, etc.

#### ***2.6.4.5 Unique Design Features***

The QMP shall specify those elements of the Contract Documents, Design Documents and Construction Documents that require special attention to or emphasis on quality, including applicable standards of quality or practice to be met, level of completeness, and/or level of detail required.

#### ***2.6.4.6 DBT's IQF review***

The Independent Design Quality Manager will review all designs to verify that development of the Plans and Specifications are in accordance with the requirements of the Contract.

The IQF will have a documented, operative and effective Quality Program consistent with the approved QMP. At a minimum, all designs will be checked by a Senior Experienced Engineer licensed in the State of Ohio.

#### **2.6.4.7 Participation**

The Designer of Record and the appropriate design manager(s) for the discipline(s) involved in the design (e.g., structures design manager, highway design manager, etc.) must be present for and participate in all reviews.

#### **2.6.4.8 Over-the-Shoulder Design Reviews**

The Independent Design Quality Manager will conduct over-the-shoulder design reviews. The Department will participate in these reviews. Involved utilities, railroads, and City Departments may participate in these reviews and comment as requested or as otherwise deemed necessary by the Department. These over-the-shoulder reviews will be conducted in the Project office of the Department, the DBT or its design engineer and in the presence of the design personnel, with the intent of minimizing disruption of ongoing design Work. The Independent Design Quality Manager, design staff, and the Department will jointly determine the materials to be compiled for each review. Formal assembly and submittal of drawings or other documents will not be required, but the DBT is encouraged to provide informal submittals to facilitate reviews. The over-the-shoulder review may be of progress prints, computer images, draft documents, working calculations, draft specifications or reports, or other design documents. If mutually agreed upon for specific review items, the over-the-shoulder review may be facilitated by the transfer of electronic files. The IQF will document the conclusions of each over-the-shoulder review.

#### **2.6.4.9 Interim and Final Reviews**

The Independent Design Quality Manager will conduct formal interim (40-60% complete) and final (100% complete) reviews. These two (2) formal reviews will be required for each CPM defined buildable unit segment or DBT defined buildable unit segments.

The IQF will conduct interim and final reviews in accordance with the approved QMP. Each review will determine whether the Contract requirements and design criteria are being followed. In addition, the Independent Design Quality Manager will verify that there are no conflicts between the buildable unit being reviewed and any previously approved designs. All deviations from these requirements will be noted and corrected. Time frame for these reviews may be defined in other sections of the project scope.

For each review, the DBT shall prepare a formal design submittal to all parties (e.g. the Department, FHWA, all involved railroads, utilities and City Departments) to include, at a minimum, design drawings, calculations (if required by scope), reports, specifications, geotechnical data, environmental requirements and any other relevant design information. Provide two (2) hard copies and one (1)

electronic file (PDF format for reports and TIF format conforming to Department standards for the plans).

All parties will be invited to attend these reviews. Schedule these review meetings at least five (5) Business Days (not including weekends or state holidays) after all parties have received the submittals.

If utility, railroad or City of Cleveland approvals are required per this scope or by permit, allow the following additional time in the schedule for review and comments/approvals:

**Table 2-4: Agency Review Time Allowances**

<b>AGENCY</b>	<b>REVIEW TIME</b>
<b>Utility company (including City of Cleveland owned utilities)</b>	Four (4) Weeks
<b>Railroads</b>	Six (6) Weeks
<b>City of Cleveland</b>	Five (5) Days

When reviews by multiple agencies (e.g., Department, Railroads, utilities, etc.) are involved, the longest review time will control.

The Department reserves the right to waive interim reviews based on the complexity of submission.

The Independent Design Quality Manager will prepare and distribute minutes of each review and will document that all review comments have been reviewed and addressed by the DB Designer, and that the IQF has verified all required revisions.

The IQF and/or DB Designer will seek concurrence from the Department prior to incorporating external agency (e.g., utilities, railroads, City of Cleveland) review comments.

#### **2.6.4.10 Interim and Final Review Content**

ODOT and the City of Cleveland’s manuals contain requirements for multiple design review submissions required as part of their Design Bid Build processes. All design information normally submitted as part of these design reviews must be submitted as part of an interim and/or final review for this Project.

However, the timing, packaging and grouping of this review information will be as indicated in the DBT-developed, ODOT-approved, and CPM schedule. At the request of the DBT, the Department may waive reviews that are not applicable in a DB environment.

In addition to the above requirements, the Project Scope may call for reviews of specific aspects of the Project (e.g., Public Information Plan, Traffic Management Plan, Aesthetic and Enhancement

Implementation Plan, etc.). Unless determined otherwise by the Department, these reviews are in addition to the Interim and Final reviews.

#### ***2.6.4.11 Release-For-Construction Reviews and Quantities***

Following the Final Review, the Independent Design Quality Manager will conduct and take minutes of all formal release-for-construction reviews. The DB Designer will prepare a full set of drawings and accompanying documents stamped "Checked and Ready for Review." This information shall be submitted to all parties from which a review is required five (5) Business Days prior to the scheduled review meeting date. Additional time for delays associated with the failure of the DBT to identify the proper review parties will not be recognized by the Department.

The Independent Design Quality Manager will sign and stamp on the plans "Released for Construction" after the following requirements have been met:

- A. All review comments, including IQF and all agency comments, have been resolved.
- B. Plans have been designed in accordance with the Contract requirements and correlate with the overall design.
- C. Plans have been checked in accordance with the approved QMP.
- D. No design exceptions exist that have not been approved by the Department.
- E. Plans have been signed and sealed by the Designer of Record.

The DBT shall provide detailed quantity estimates for all Work covered by plans. The quantity estimates will be provided for the Department's use and to facilitate quality sampling and testing (i.e., the units will be consistent with the units used to determine frequency of sampling and testing). For example, if the number of compaction tests to be taken is based on a specific number of cubic yards of embankment, then the quantity estimate will also be in cubic yards.

#### ***2.6.4.12 Bridge As-Constructed Submittal***

Before the Viaduct Bridge, or any portion of the bridge, is opened to traffic, the DBT shall provide the Department with a set of record "as-built" design plans. In addition, the DBT shall submit a complete set of marked up plans showing any field modifications varying from the final stamped design plans. The field modification set will be signed and stamped by the Designer of Record.

#### ***2.6.4.13 Project As-Constructed Submittal***

Before Final Project Acceptance and after construction of the entire Project is completed, the DBT shall prepare a formal design submittal for the entire Project that includes all the updates to the final design such as any design changes, actual field as-built changes, actual survey info, etc. in both hard copy and electronic CADD format (conforming to Department CADD standards). The DBT shall identify all changes made to the final design. This work shall include as-constructed information on all utilities relocated (public or private) as part of this project. The as-constructed plans shall be prepared in conformance with the Location and Design Manual, Volume 3, Section 1200 - Plan Preparation.

#### **2.6.4.14 Schedule Requirements**

The DBT shall submit the proposed design and oversight review schedule and update monthly. The schedules will indicate the date and location of each review. The number of reviews in a given time period, especially if concurrent reviews are scheduled, will be coordinated with the IQF and the Department.

The following is the schedule order for design reviews:

- A. Over the Shoulder Reviews
- B. Interim review
- C. Over the shoulder design reviews
- D. Final Review
- E. Release-for-Construction Reviews

#### **2.6.4.15 Design Review Documentation**

The IQF will maintain a written record of all design reviews and oversight visits. The written record will:

- A. List the participants in each review or visit.
- B. Report all items discussed.
- C. Identify discrepancies noted and report on corrective action(s) taken or planned.
- D. Identify follow-up action items, due dates, and the responsible party.
- E. Identify items needing resolution and time constraints for resolution.
- F. Include the final results of all reviews.
- G. Include all correspondence and review comments between the IQF and the DBT.
- H. Include Daily Manpower and Equipment Reports.

The IQF shall maintain daily manpower reports for design-related activities. The IQF shall provide reports at a frequency required by the Department's Engineer.

The IQF shall maintain a record of internal quality activities. Internal quality activities will be summarized in monthly progress reports.

Reports of design reviews, over the shoulder design reviews and oversight visits will be submitted to the Department within three (3) Business Days of the completion of the review or visit and include plans reviewed, calculations, correspondence and review comments.

#### **2.6.4.16 Acceptance of Design**

Department acceptance of the design will occur at the time of acceptance of construction. The DBT will submit all documents required for final design approval, with a certification from the DBT and the IQF that the constructed Work has been built in conformance with the Contract documents, design documents and the construction documents, and has been reviewed and approved by the Independent Design Quality Manager.

### **2.6.4.17 Design Changes**

#### **2.6.4.17.1 Initiation**

Both the DBT and the Department may initiate design changes. Design changes may be made on items during or after design.

#### **2.6.4.17.2 Reasons for Changes**

Design changes can occur for several reasons, including, but not limited to, errors in the final design plans or specifications, unexpected or changed conditions in the field, scope changes, or design alternatives proposed by field or other personnel.

#### **2.6.4.17.3 Validity**

Requests for information (e.g., earthwork settlement releases, additional geotechnical information, additional alignment information, and dimensions) or design engineer evaluation of nonconforming constructed Work does not constitute a valid design changes. (See Section 2.6.5.19 for the resolution process of non-conforming constructed work.)

#### **2.6.4.17.4 Procedures**

The QMP shall include a process to propose, receive, track, respond to and distribute design changes. In addition, the QMP shall identify the general goal, the participants, the participants' responsibilities and a Work process for each change. The DBT shall request review by the IQF and the Department of all design changes. The IQF, the Department, and the DBT will jointly determine the procedures for reviews, with the mutual understanding that a timely and expeditious design change process benefits all parties.

For review of design changes, the DBT shall allow at least 20 Business Days (based on a five day workweek) after the plans or documents are received by the Department. Changes needing City of Cleveland review will be completed within the 20 working day timeframe. Additional time will be allowed as listed in Section 2.6.4.9 when railroad and/or utility reviews are necessary.

#### **2.6.4.17.5 Quality Checks**

For all design changes, the DBT shall perform the same quality checks as were performed on the original design, and conform to all provisions of the Contract. No design change shall be made without first obtaining the written approval of the Department. All design changes, including but not limited to plans, sketches, memoranda, specifications, calculations, and reports shall be signed, sealed, and dated by a Professional Engineer licensed in Ohio.

In all cases, the Independent Design Quality Manager will certify in writing that the design change:

- A. Has been designed in accordance with Contract requirements.
- B. Has been checked in accordance with the approved QMP.
- C. Is consistent with other elements of the original design.

- D. Has been reviewed by the IQF and the Department and the Department has accepted the design change.
- E. Is fully compatible with the design conditions as defined in Section 1.4.

#### 2.6.4.17.6 Costs

The DBT shall bear all costs associated with making any change (initiated by either the DBT or the Department), unless a change to the Contract and the associated costs are approved by the Department.

#### **2.6.4.18 Department Audits of Design Quality**

The Department will audit, as needed, the Independent Design Quality Manager Processes and Design Documents to verify compliance with the Contract Documents.

For any type of review, the Department reserves the right to continue its review of the design documents after the interim and/or final review meeting and to perform audits to verify compliance with contract requirements.

#### **2.6.5 QMP Section 5 - Construction Requirements**

In general, QMP Section 5 (Construction) will describe construction quality management requirements that are intended to:

- A. Place responsibility for construction quality on the DBT.
- B. Ensure that Work is constructed in accordance with the Contract, plans, and specifications.
- C. Allow the Department to fulfill its responsibilities of exercising due diligence in overseeing the construction.

##### **2.6.5.1 Work Conditions**

The QMP will specify procedures to ensure that all activities affecting the quality of the Work will be accomplished under suitably controlled conditions, using appropriate equipment, and with assurance that all prerequisites to the proper accomplishment of a given task by a worker have been satisfied. These activities will be coordinated with the Safety program specified in the Design Build Team's technical proposal.

##### **2.6.5.2 Quality Procedures**

The QMP will describe specific procedures to be followed to ensure that all the Work conforms to all the requirements of the Contract Documents and the design documents being used as the basis for construction, and that all materials, equipment and elements of the Work which will be incorporated in the Project will perform satisfactorily for the purpose intended. The QMP will specifically include the procedures for inspecting, sampling, testing, checking, documenting the Work (including all Work performed by Subcontractors and utilities), and distribution of information (Release for Construction Plans, Design changes, Nonconformance Report remediation, etc) to all necessary parties.

### ***2.6.5.3 Supplemental Information***

The QMP shall specify that all activities undertaken that affect the quality of the Work will be prescribed by and performed in compliance with documented instructions, procedures, and/or drawings of a type appropriate to the circumstances. This supplemental information will include quantitative and/or qualitative criteria to determine whether all activities have been satisfactorily accomplished.

### ***2.6.5.4 Purchased Materials***

The QMP shall specify measures to ensure that purchased materials, equipment and services conform to the Contract Documents and the design documents. Measures will include provisions and the documentation procedures, as appropriate, for source evaluation and selection, objective evidence of quality furnished by Subcontractors, inspection at the manufacture or vendor source, and examination of products upon delivery.

### ***2.6.5.5 Material Identification***

The QMP shall specify procedures that identify and control materials, equipment and elements of the Work to prevent the use of incorrect or defective materials and equipment. These procedures will ensure that identification of the item is maintained by appropriate means, on records traceable to the item, as necessary, throughout fabrication, erection, installation and use of the item. Material identification will include a direct relationship to the Department's construction management system's materials identification and tracking processes.

### ***2.6.5.6 Inspection***

The QMP shall include a program for inspection of all Work, including examinations, measurement, and tests of materials or elements for each Work operation where appropriate to verify quality. Such inspections will not be limited to that required for quality testing purposes. If the design documents specify mandatory inspection points that require witnessing or inspecting by the IQF, and beyond which work will not proceed without the approval of the Department's Engineer, then the specific inspection points will be indicated in all appropriate documents. Mandatory inspection points will also be included to conform to the Department's Construction Inspection manual, including forms and documentation.

### ***2.6.5.7 Field Procedures***

The QMP will specify procedures to address all elements that affect the quality in the production, placement and finishing of all construction items, including but not limited to roadway surfacing, paving, structural concrete, lighting, pavement markings, etc. These elements include, but are not limited to, the DBT management and process control personnel, testing equipment and laboratory facilities, testing frequencies, aggregate production, stockpile management, proportioning, mixing and processing, transporting, placing, spreading, depth or thickness, finishing, compaction, joints and mix designs.

### ***2.6.5.8 Dispute Resolution Laboratory***

The QMP shall recommend a system to resolve disputes that may arise between IQF sampling and testing process for the IQF verification quality testing and the DBT's quality control testing. If the



recommended dispute resolution system involves a "dispute resolution laboratory," the name of a recommended laboratory must be included. The dispute resolution laboratory will not be a participant in the quality process of either the DBT or the Department and must be an accredited AASHTO Materials Reference Laboratory. The DBT is responsible for maintaining all materials for the dispute resolution laboratory. Dispute resolution processes will only evaluate if a result is or is not accurate. Dispute resolution processes that initiate additional testing without showing initial testing incorrect will not be acceptable.

When there is a dispute between either a Quality Control test result or IQF verification test result and the Department's QA test result, the Department's dispute resolution processes and non-specification materials policies will apply.

#### ***2.6.5.9 Shop Drawings***

The QMP shall specify personnel assigned to shop drawing review and approval (including falsework drawings and other critical structure shop drawing); procedures for documenting reviews and approvals and for obtaining corrective action, when necessary; and procedures for checking compliance with shop drawing and falsework drawing requirements.

#### ***2.6.5.10 Plant Inspection***

The QMP shall specify procedures for plant inspection for production of hot-mix asphalt, Portland cement concrete pavement, and structural concrete in addition to any Department requirements specified in the contract or construction and material specifications.

#### ***2.6.5.11 Test Procedures***

The QMP shall include a program to ensure performance of all testing required to demonstrate that all materials, equipment and elements of the Work will perform satisfactorily for the purpose intended and meet the standards specified in the Contract documents and design documents. The QMP will specify written test procedures for all tests that incorporate the requirements and acceptance limits contained in applicable design documents and which include provisions for verifying that all prerequisites for the given test have been met and that adequate test instrumentation is available and used. Where proposed test procedures differ from Department Standards, the Department standards will be followed. The QMP will require test results to be documented and evaluated to verify that test requirements have been satisfied.

#### ***2.6.5.12 Equipment Certifications***

The QMP shall specify measures to ensure that tools, gages, instruments and other measuring and testing devices used in activities affecting quality are properly maintained, controlled, calibrated, certified and adjusted at specified periods to maintain accuracy within necessary limits.

#### ***2.6.5.13 Material Handling***

The QMP shall specify procedures to control the handling, storage, shipping, cleaning and preservation of materials and equipment to prevent damage or deterioration.

#### **2.6.5.14 Material Identification**

The QMP shall specify procedures to indicate (by the use of markings such as stamps, tags, labels, routing cards or other suitable means) the status of inspections and tests performed upon individual items of the Work. To preclude inadvertent bypassing or duplication of such inspections and tests, these procedures will provide for the identification of items that have satisfactorily passed required inspections and tests.

#### **2.6.5.15 Instrumentation**

The QMP shall specify procedures and personnel to be used to ensure that specified instrumentation is installed, maintained and monitored in accordance with applicable specifications.

#### **2.6.5.16 Coordination**

The QMP shall set forth a program to coordinate inspections and testing by local agencies, railroads and Utilities. The Department will be notified of all inspections and their results.

#### **2.6.5.17 Laboratories**

Laboratory Independent Quality Material Testing will be conducted by independent testing laboratories (not owned by or directly affiliated with the DBT) that comply with the requirements of the AASHTO Materials Reference Laboratory (AMRL) for applicable tests. Laboratories may be owned by or under contract to the IQF. AMRL accreditation will be obtained for all AASHTO and American Society for Testing and Materials (ASTM) test methods to be performed by the testing laboratory. Accreditation will also be obtained for AASHTO and ASTM test methods that are modified or referenced by Ohio test methods. A copy of AMRL accreditation certificate(s) will be submitted to the Department upon receipt by the testing laboratory.

Satellite (field) laboratories may be used where appropriate for the tests being conducted. Satellite laboratories will be AMRL accredited before starting Work. The laboratory will have written policies and procedures to ensure that the satellite laboratories performing testing activities on the Project are capable of providing testing services in compliance with applicable test methods. The policies and procedures will address inspection and calibration of testing equipment as well as a correlation testing program between the accredited laboratory and portable or satellite facilities. Depending on the scope of the testing the satellite laboratory will be performing, the DBT may request the Department to waive the AMRL certification in lieu of some other equal certification.

#### **2.6.5.18 Nonconforming Work**

The IQF will identify, document and report all elements of the Work that have not, or are believed to have not, been constructed in accordance with the contract requirements. This reporting will be in the form of a Nonconformance Report and will be submitted to the IQM in writing within 24 hours of identification, with a copy sent to the DB Designer , DB Contractor and the Department

#### **2.6.5.19 Nonconformance Report Remediation**

A Nonconformance Report will clearly describe the element of Work that is nonconforming and the reason for nonconformance. The Design Engineer who signed and sealed the drawings for the Work will evaluate and determine if a nonconformance exists, the effect of the nonconformance on performance, safety, durability, long-term maintenance and the life of the item. Remedial actions will be documented and bear the Ohio Professional Engineer's stamp of the Designer of Record. The IQF must also sign the Nonconformance Report, stating that remedial actions to be employed have undergone the same level of inspection and testing as required for the original design.

The Engineer will be provided the Nonconformance Report Remediation for review and acceptance by the Department. If the Department does not agree with the remedial actions set forth in a Nonconformance Report, it will have the authority to call for removal of the nonconforming Work at no cost to the Department.

#### **2.6.5.20 Weekly Nonconformance Report Reports**

The IQF will maintain a log of all Nonconformance Reports and submit it weekly to the Department. Each Nonconformance Report will be numbered sequentially, given a brief description and a status, and, if it is not closed, an expected date for closure. The Department will not grant Final Acceptance for any portion of Work that has an outstanding Nonconformance Report.

#### **2.6.5.21 Department Nonconformance Report**

The Department will retain the right to write its own Nonconformance Reports based on its observance of Work, its quality assurance testing and its quality assurance verification of the QMP and quality control. Department-generated Nonconformance Reports require the same review and ultimate closure as Nonconformance Reports generated by the IQF.

#### **2.6.5.22 Supplemental Drawing Procedures**

##### **2.6.5.22.1 Shop and Working Drawings**

The DB Designer will submit signed and sealed design drawings from which the DBT will then generate shop and working drawings as necessary to clearly define, control, construct and inspect the Work. The shop and working drawings will be sent back to the DB Designer for review and internal approval.

##### **2.6.5.22.2 Reviews by Local Agencies, Railroad, and Utilities**

The Department and all other applicable local agencies that may require review of shop and working drawings will be consulted and assured that the DBT coordinates the preparation, submittal, and review of all such shop and working drawings. Where permits are required from railroads, utilities, or local agencies, shop and working drawings will be submitted to them for review and approval in accordance with their specific requirements.

#### 2.6.5.22.3 Public Safety

Shop and working drawings of Work elements that could adversely affect public health, welfare, or safety will be submitted to the Department and the local agency with jurisdiction for review and approval at the same time as they are submitted to the original design engineer for review and approval. Shop drawings, working drawings, and calculations for excavation shoring, cribs, cofferdams, falsework, overhead signs, temporary support systems, formwork and other temporary work that describe the methods of construction proposed to be used for the Work will be prepared and reviewed by the Design Engineer. The Department will not review or regularly receive copies of these submittals unless it specifically requests so. However, the Department reserves the right to request copies of these submittals for audit purposes. All liability for temporary items used in the Work will lie with the DBT. The receipt of submittals for temporary work will in no way constitute approval of the planned work or acceptance of any liability by the Department.

#### 2.6.5.22.4 Bridge Superstructure or Substructure Shop Drawings

The fabrication of any bridge superstructure or substructure elements will not commence without approved shop drawings or notification to the Department's quality assurance inspection forces. Any procurement or fabrication of materials without approved shop drawings will be solely at the DBT's own risk.

#### 2.6.5.22.5 Shop Drawings

Shop drawings for permanent Work will include structural steel fabrication plans, prestressed concrete or precast concrete members, anchor bolt layouts, shop details, erection plans, equipment lists and any other information specifically required by the ODOT Standard Specifications or local agencies requirements when required in the contract documents. All shop drawings will be signed and sealed by a Professional Engineer licensed in the State of Ohio, stamped "Approved for Construction," signed by the reviewer, and reviewed by the Independent Design Quality Manager prior to being considered "Released for Construction".

All necessary approvals of shop and working drawings and copies of all approved drawings will be provided to the Department's Engineer three (3) Business Days prior to the start of any on-site Work detailed by those drawings. For off-site fabrication, the approvals and drawings will be provided 14 Business Days in advance. No changes will be made to any approved shop or working drawing after they have been approved.

#### ***2.6.5.23 Survey Verification and Staking***

The QMP will specify procedures for the IQF to follow in verifying the construction surveying. This will include field verification of critical elements of the DBT-provided construction surveying.

#### ***2.6.5.24 Acceptance of IQF verification Testing***

Testing of embankment and structural backfill compaction, gradations, and compaction of surfacing, pavement, structural, concrete and other items requiring on-site acceptance tests will be performed by

the IQF. Tests will be conducted in accordance with the requirements (location, frequency, lot sizes, test methods, etc.) of the C&MS, supplemental specifications and contract, and the results will be input into an electronic database. The IQF will also input the results of the Department Quality Assurance Testing and Process Quality Control Testing into the electronic database. Results of the IQF's testing will be compared with the Department QA Testing. If the results of the Department's QA sampling and testing validate the results and quality of the material, the material will be accepted. Initial IQF tests and Department QA Testing will be performed side-by-side to establish a confidence level between the results of IQF tests and Department QA Testing. The IQF firm will exercise sound judgment in its testing approach and will increase the frequency of testing in situations in which quantities may be small but location is critical, such as sliver fills.

#### 2.6.5.24.1 Report Forms

All report form submissions shall use either a Department-approved standardized form for reporting test results or a form acceptable to the Department. Samples of the Department forms are on the Department's Construction Management website.

#### **2.6.5.25 Quality Checkpoints (QCPs)**

QCPs will be established at certain stages of the construction process to ensure that only acceptable work is incorporated into the Project. As Work is accomplished, representatives of the DBT and the IQF, the Independent Construction Quality Manager, and the Department's Engineer will review the progress to date, including inspection reports, process and acceptance test reports, settlement data, pile driving records, string-line measurements, audits, survey verification and other pertinent data. The IQF will coordinate the group members to ensure that the QCPs are accomplished timely. When a QCP is reached, the Department's Engineer will respond within one working day of notification that all work has been completed for the checkpoint. Adequate time will be allowed to complete the QCP review before planning on proceeding with work past the QCP. Notifying the Department that the QCP has been reached when work is still ongoing or not allowing adequate time to complete the QCP review and make adjustments (i.e. the concrete truck waiting while still placing rebar while trying to conduct a QCP review), will result in a Stop Work directive until the QCP is met. The IQF may provide a courtesy notification of possible QCPs within the next 24 working hours to help facilitate the gathering of the necessary documents. The necessary documents to determine the acceptability of work (e.g., inspection reports, test reports, settlement data, Nonconformance Report remediation, etc.) will be provided to all parties at the time of QCP notification. This group will come to a mutual agreement that the Work completed to date is acceptable and documented. The specified work item shall not proceed until this agreement is met.

QCPs will be established at the stages of construction listed below:

- A. Environmental Controls:
  - a. At the completion of each property's hazardous material or regulated waste mitigation work, prior to general demolition work.

- B. Earthwork:
  - a. After all clearing, grubbing, and excavation to check subgrade or embankment foundations.
  - b. Per C&MS for lift requirements and at intervals of embankment construction of 20,000 cubic yards or 10 vertical feet, whichever occurs first (applicable to all embankments, including walls).
  - c. After completion of MSE Wall panel placement every ten (10) vertical feet.
- C. Structures:
  - a. Before placement of the leveling pad of a mechanically stabilized earth (MSE) wall or other type of retaining wall (to confirm subgrade materials).
  - b. At completion of bridge embankment settlement and before start of bridge foundation pile driving.
  - c. At approval of pile driving submittals (including design calculations, wave analysis, hammer and dynamic load testing).
  - d. After completion of pile driving at each structure support (pile group) (including pile-driving results and records).
  - e. Before concrete placement of any substructure element, including piling and drilled shaft in-filling.
  - f. After girder and diaphragm placement.
  - g. Before concrete placement of deck, approach slabs, diaphragms and parapets.
  - h. Before installation of post-tensioning cables into structural segments.
  - i. At the completion of the first mass concrete pour.
- D. Surfacing, Paving, and Concrete:
  - a. Before placement of each course above subgrade on any permanent roadway components (Granular Borrow, UTBC, lean base, LSE, CSE, etc).
  - b. Before placement of each lift of asphalt concrete or Portland cement concrete paving on any permanent roadway components.
- E. Field Painting of Structural Steel:
  - a. Follow QCP requirements as set forth under C&MS 514.
- F. Maintenance of Traffic:
  - a. At the end of each month, review Work Zone Traffic Control documentation for compliance and action.

### **2.6.6 QMP Section 6 - Environmental Monitoring and Compliance Requirements**

QMP Section 6 (Environmental Compliance and Monitoring) shall describe the methods, processes and procedures to provide for the effective implementation and documentation of the environmental protection, training, compliance and monitoring program.

### **2.6.7 QMP Section 7 - Maintenance of Public Facilities Requirements**

QMP Section 7 (Maintenance of Public Facilities) shall specify procedures to be followed in the maintenance of detours constructed on the Project and off-site haul roads for controlling noise, dust and debris associated with the hauling operations. Such procedures will provide the public with safe and effective alternative routes, as well as safe and convenient access to residences and businesses affected by construction activities.

### **2.6.8 QMP Section 8 - Approvals**

The Construction and Materials Specifications (C&MS), Supplemental Specifications, Construction Inspection Manual of Procedures, and City of Cleveland Specifications contain multiple references to “approvals by the Engineer ” or similar language. The Department waives submittal requirements of the stated specifications that are addressed by the IQF in accordance with the approved QMP. The Department reserves the right to obtain and review these submissions in accordance with the Project Scope.

The QMP shall include a list of all “approved by” or similar language contained in the C&MS, Supplemental Specifications, Construction Inspection Manual of Procedures and City of Cleveland Specifications along with the proposed responsibility (IQF or Department) for approval of each of the items. Waivers of approvals related to payments to the DBT will not be granted. The Department retains the authority to audit any IQF approvals.

### **2.6.9 QMP Reimbursement**

All costs associated with this QMP shall be incidental to the appropriate item of work. These items of work will be identified in the DBT's Cost Loaded Project Schedule and, upon receipt of all required documentation, reimbursed accordingly.

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### **3 DOCUMENT MANAGEMENT**

The DBT shall be required to coordinate the various reporting and submission activities related to the requirements of the Project and Work within the framework established by the Department for document management.

Microsoft - SharePoint will support the electronic submission of all project related documentation. It will serve as a single point of reference all documentation related to this project.

Oracle Primavera - Contract Manager V13 will support the contract management process workflows for on-going project management.

ODOT's Construction Management System (CMS) is being replaced with Site-Manager for Daily construction activities that will be recorded on-line remotely from construction field offices and from district and central offices.

The awarded DBT shall be expected to conform to these software systems, incorporating project tasks in their planned processes to ensure all required project documentation and submissions to ODOT are compatible. District 12 shall require the inclusion of customized data fields, according to the District's file naming structure, using various templates for all electronic submissions to the Department. These electronic submissions will be uploaded into the proper file folders on the ODOT's Sharepoint site by DBT personnel. The awarded DBT's proposed fields, templates and electronic formats shall be forwarded for approval by the ODOT Project Manager, prior to the submittal of any documentation to the Department.

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## **4 PUBLIC INFORMATION and COMMUNICATION**

### **4.1 GENERAL**

ODOT and the DBT shall develop and maintain a consistent level of public communication, while encouraging broad public awareness and understanding of the Project. Public information and communication efforts will meet or exceed the requirements of the ROD, FEIS and DEIS.

Providing clear, consistent, and timely messaging is an essential element to successful Project delivery. The public information role consists of many tasks including responding to public inquiries and complaints; coordination with the media; preparing regular traffic updates, press releases, web updates and photo and video documentation; and coordinating with local jurisdictions, transit providers, emergency service providers, and local neighborhood, community, and business groups. To support this effort, ODOT will share clear, concise and timely information with the public, elected officials, community leaders, businesses and the news media.

The DBT shall work with ODOT to achieve the following public information and community relations goals:

- A. Support the successful delivery of the Project.
- B. Provide information to individuals and entities directly affected by construction in as proactive, responsive, and complete manner as possible.
- C. Reinforce positive ODOT relationships with associated agencies, individuals, and community groups.
- D. Increase understanding of the importance of the Project and the overall Innerbelt Reconstruction Program to the mobility and economic vitality of the region and the State.

General requirements of the Public Involvement and Communication for the Project have been incorporated from the DEIS (page 4-44) and are included herein, along with a definition of the respective responsibilities of the DBT and ODOT. The Public Involvement and Communications requirements described in this section are the minimum requirements of the contract. The DBT shall work with ODOT to ensure that all Public Involvement and Communications requirements of the DEIS are addressed by all parties to this contract.

### **4.2 PERFORMANCE REQUIREMENTS**

#### **4.2.1 Joint Communications Effort**

Development and dissemination of public information for the Project requires the integration of resources and labor between ODOT and the DBT. Joint communications will educate and inform the public, establish expectations, and play a significant role in delivering a successful Project.

#### **4.2.2 Communications Planning Workshop and Construction Communications Public Information Plan (PIP)**

The DBT shall submit a Draft Construction Communications Public Information Plan (PIP) in accordance with this section, within 30 Calendar Days after Notice to Proceed. The content of the Final PIP will be agreed to during a communications planning workshop held within 30 Calendar Days of submittal of the Draft PIP. The DBT shall organize and implement the workshop to include participation of the DBT's Project Manager and communications staff, and ODOT's Project personnel and communications staff. The DBT shall invite staff from the City of Cleveland to attend this workshop, using a contact list developed and maintained by ODOT and provided to the DBT. The DBT shall develop a draft format and agenda for the workshop, and submit it to ODOT for review at least seven (7) Calendar Days before the workshop. The location of the workshop shall be determined jointly by ODOT and the DBT.

The Draft PIP shall serve as the basis for discussion at the workshop. The Draft PIP shall describe the Project's Communications Plan, and the critical role of the Communications Plan to the overall success of the Project. The Draft PIP shall also describe the DBT's approach to public involvement, public outreach, communications goals and significant public relations risks and benefits. The Final PIP shall be the framework for communicating and disseminating information, and for responding to public inquiries, comments, and requests. The Final PIP shall also include performance-monitoring processes and tools to be used by ODOT to assess the progress and measure the success of the DBT's overall communications efforts.

#### **4.3 ODOT'S COMMUNICATIONS RESPONSIBILITIES**

ODOT's Public Information Office will retain primary responsibility for the following communications tasks:

- A. Publishing of Annual Construction Guide
- B. Organization of Construction Season Kick-off Media Event
- C. Responses to public comments regarding the Innerbelt Bridge Construction Contract Group 1
- D. Communications involving previous work associated with the Cleveland Innerbelt Final Environmental Impact Statement and Record of Decision, including issues such as noise analysis and mitigation
- E. Managing a Project public contact database, including citizen requests for information. (The DBT shall update this database with Project-specific information, requests, and responses)
- F. Coordination with ODOT executive and steering committees
- G. Media relations activities
- H. Public Service Announcements
- I. Maintaining E-mail List Serve via the ODOT and Project Web sites to receive Project updates: [www.dot.state.oh.us/districts/D12/HighwayManagement/Pages/EmailNotificationsonProjectUpdates.aspx](http://www.dot.state.oh.us/districts/D12/HighwayManagement/Pages/EmailNotificationsonProjectUpdates.aspx) or [www.Innerbelt.org](http://www.Innerbelt.org)
- J. Managing the Project Web site

- K. Updating BuckeyeTraffic.org
- L. Communications with local, regional and state-wide elected officials
- M. Coordination with the DBT's public information staff and monitoring Project communications to meet ODOT standards for form, graphic design, content, and messaging

#### **4.4 DBT'S ROLE IN PUBLIC INFORMATION EFFORTS**

The DBT shall assist ODOT in identifying and implementing ways of informing the public, individual property owners and broader communities about design and construction activities that directly affect them. ODOT will be responsible for responding to all public information requests, with support from the DBT.

The DBT shall participate in Project communications meetings between ODOT and the DBT as determined necessary by ODOT to maintain regular coordination on all public information goals and activities. In addition, the DBT shall participate in one or two region-wide ODOT communications meetings per year, as determined by ODOT.

The DBT shall assist ODOT with updates to the Project public contact database with Project-specific information requests. ODOT will manage the database and will be responsible for providing responses to these information requests.

##### **4.4.1 Public Information Staff**

The DBT shall provide a full-time Public Information Specialist and additional staff as needed to support the Project. This staff is responsible for identifying public information issues related to the DBT's Work, and for formulating and implementing strategies to address those issues. Prior to implementing these strategies, the Public Information Specialist shall consult with ODOT. The Public Information Specialist shall work with ODOT to maintain public satisfaction with the Project.

The Public Information Specialist shall be available at the Project construction office as necessary to respond to the communications needs of the Project. The Public Information Specialist shall be readily available by telephone during all business hours with immediate computer and email access. During critical construction activities and emergencies, the Public Information Specialist shall be available as necessary.

The Public Information Specialist shall have at least three (3) years of recent experience coordinating information on public projects, preferably on large highway improvement projects. The Public Information Specialist's professional experience shall include the following:

- A. Writing for the public, news media and internet. (Knowledge of and experience with ODOT's media relations protocols is preferred.)
- B. Providing and presenting information to the public, news reporters, community groups and others

- C. Developing, implementing, and measuring the results of strategic communication plans and strategic messaging
- D. Developing and producing maps, charts, graphs, diagrams and other visual images. (Experience with ODOT graphics standards is preferred.)
- E. Developing and implementing public involvement and community relations programs

The Public Information Specialist shall have full access to all of the DBT's Project details that may be relevant to the public, public agencies, emergency service providers, businesses, media and other interested parties. The Public Information Specialist shall share information with ODOT continually throughout the Project.

The DBT shall provide ODOT with a prioritized after-hours call list within 30 calendar days after Notice to Proceed. The call list shall include the contact information for the DBT's public information staff, including home and mobile phone numbers and e-mail addresses.

## **4.5 DBT PUBLIC INFORMATION SPECIFICATIONS**

### **4.5.1 Meetings**

The Public Information Specialist shall meet with ODOT regularly to maintain coordination and communication with ODOT on all public information goals and activities. Meetings may include staff from the City of Cleveland, as well as representatives from other key constituencies and other key stakeholders.

The Public Information Specialist shall meet with the ODOT staff more frequently, as directed by ODOT, in the initial months of the Project to learn about Project specifics and expectations.

When requested by ODOT, the Public Information Specialist shall also participate in conference call meetings to assist in the development and implementation of communications plans related to critical construction activities.

The DBT shall be available to participate in community meetings and shall organize annual Public Meetings/Open Houses on Innerbelt Progress.

### **4.5.2 Traffic Congestion Mitigation Support**

The DBT shall assist ODOT in coordinating with local stakeholders, including but not limited to the Greater Cleveland Partnership, the Downtown Cleveland Alliance, and the City of Cleveland, in an effort to develop a program for creative solutions for traffic congestion mitigation and associated publicity. The goal of this traffic congestion mitigation shall be to maximize the potential for transition of downtown Cleveland commuting and traffic from peak hours to off-peak hours. Examples of ideas for such a program could include publicizing restaurants or other entertainment venues willing to offer discounts specifically aimed at retaining commuters past the PM traffic peak, free or discounted entertainment events, and publicity aimed at encouraging expanded use of public transportation.

Local stakeholders to be included in this effort shall be identified by ODOT and communicated to the DBT. The DBT shall convene a minimum of one meeting with these stakeholders and, within 30 days of the meeting, shall submit to ODOT a 'Traffic Congestion Mitigation Report' containing recommendations focused on minimizing traffic into and out of downtown Cleveland during peak traffic hours. The Traffic Congestion Mitigation Report shall address congestion mitigation specific to construction activities during construction of Contract Group 1, and shall recommend congestion mitigation solutions during full closures of ramps and during the implementation of the Alternate Route Plans. Implementation of the recommendations of this report will be as directed by ODOT.

#### **4.5.3 Weekly Progress Reports**

The DBT shall provide a brief Weekly Progress Report to ODOT. The Report shall summarize progress made the previous week and include photos of the previous week's construction activities. The DBT shall submit the Report by email every Monday to the designated ODOT Public Information Lead for the Project.

#### **4.5.4 Construction Information Dissemination**

The DBT shall coordinate with ODOT to collect, write, edit, and disseminate design and construction information to the Project Web site and other outlets. The DBT shall provide ODOT with reader-friendly, clear and concise information. The DBT shall communicate with the designated ODOT Public Information Team weekly, and more frequently when requested by ODOT, regarding planned and current construction activities such as location, estimated duration of activity, type of Work being performed, physical impacts (e.g., lane closures, narrowed lanes, commercial vehicle restrictions) and planned construction detours.

The DBT shall also facilitate direct mailings to established mailing list which can include special mailings and/or quarterly newsletters. Content shall be approved by ODOT.

#### **4.5.5 Construction Schedule**

One month prior to commencement of construction in any area of the Project, the DBT shall notify ODOT and the public of construction schedules. The DBT shall provide construction updates to ODOT on a weekly basis. The DBT shall deliver additional updates if construction and traffic impacts change, or if ODOT requests additional updates. These updates shall include the upcoming week's planned closures, detours, Project status and other information relevant to the public.

#### **4.5.6 Crisis Communications Plan**

The DBT shall include a Crisis Communications Plan (emergency response protocol) for responding to emergencies and incidents during the Project in its Draft PIP. The DBT shall coordinate this approach with the DBT's overall Traffic Management Plan and Traffic Incident Management Plan. The DBT's Crisis Communications Plan shall address the following:

- A. Communications approaches to emergencies such as fire, gas line strikes, injured employees, auto accidents in a Work zone, and environmental spills

- B. Staff designated to respond to the emergency
- C. The cause of specific disruptions such as construction-related disruptions and weather
- D. Actions that could be taken to mitigate the crisis
- E. Procedures for notifying ODOT, the public, and the DBT
- F. Any corrective procedures that will be put in place as a result of the crisis
- G. Procedures for referring victims of auto damage due to construction to appropriate staff

In the event of a crisis, the DBT shall summarize the emergency protocol used in an Emergency Incident Report and submit that Report to ODOT within three (3) calendar days of the crisis.

Within 30 calendar days of Contract execution, the DBT shall schedule a crisis communications workshop with ODOT to discuss protocols and potential emergency situations. The DBT shall be responsible for inviting the necessary staff from the City of Cleveland and ODOT to the workshop. Follow-up workshops will be held annually, and following any crisis situations, at ODOT's discretion.

#### ***4.5.6.1 Dissemination of Emergency Information***

As part of the Crisis Communications Plan, the DBT shall establish and manage an emergency response call list. All appropriate personnel shall be included on the call list for immediate response in the event of an emergency. The call list shall be divided into areas of expertise, so the proper people are contacted for specific emergency situations.

The following ODOT personnel shall be included on the call list for notification of all emergencies:

- A. The Engineer
- B. Public information staff
- C. Traffic Safety Management Center

The following DBT personnel shall be included on the call list for notification of all emergencies:

- A. DB Contractor Project Manager/Engineer
- B. DB Project Manager
- C. Work Zone Traffic Engineering Manager
- D. Public information Specialist

The personnel on the call list shall be agreed upon at the communications planning workshop between ODOT and the DBT. At the communications planning workshop, ODOT and the DBT shall also agree upon appropriate staff from the City of Cleveland to be included on the call list for notification of all emergencies. In addition, the DBT shall provide a trained spokesperson as needed during emergencies, and shall provide prompt information and assistance as requested by ODOT during an emergency.

#### **4.5.7 Coordination with Traffic Management Plan**

The DBT's Public Information Specialist shall coordinate with Project staff to communicate construction traffic information to the public and other affected parties. In addition, the DBT shall be responsible for



coordinating traffic communications with neighboring construction projects, as part of an established coordinated communications plan. (Refer to Section 18 - Maintenance of Traffic for additional traffic coordination requirements.)

#### **4.5.7.1 Maintenance of Traffic and Access**

The DBT shall assist ODOT in providing maintenance of traffic and access information for the entire Project to affected commuters, residents and businesses at least two weeks prior to any revision to access in the area affected. Notifications shall include the following:

- A. Purpose of the change
- B. Area affected and dates of impact
- C. Alternate routes and detours
- D. A contact person for further information (the contact person shall be coordinated in advance with ODOT.)

#### **4.5.7.2 Traffic Conditions**

The DBT shall inform ODOT Project personnel of any unusual traffic conditions, such as road obstructions, within 15 minutes of detection.

#### **4.5.7.3 Commercial Vehicle Access and Restriction Information**

Fourteen calendar days prior to any activity taking place that may restrict or impede the movement of commercial vehicles due to reduced lane widths, reduced height clearances or lower weight limits, the DBT shall coordinate with ODOT and shall assist ODOT in providing the following agencies with a description, start date and end date of the event:

- A. City of Cleveland Police Department
- B. ODOT District 12 – Permits
- C. Other – City of Cleveland Fire Department, City school transportation, Greater Cleveland Regional Transit Authority (GCRTA) etc., as deemed by ODOT to be appropriate

#### **4.5.7.4 Emergency Vehicle Access**

The DBT shall assist ODOT in developing a protocol for communicating information to the emergency service providers regarding access to the Project area for emergency vehicles. This protocol shall be included in the PIP.

#### **4.5.8 Local Public Stakeholders Outreach Assistance**

The DBT shall assist ODOT in maintaining a partnering relationship with the community at large and include appropriate outreach efforts. The DBT is encouraged to implement, in the Public Information Plan (PIP), creative means of keeping local affected stakeholders informed on a regular basis. For example, the DBT may suggest weekly ‘coffee shop’ meetings in the Tremont and Gateway neighborhoods, at which local residents and business owners can informally obtain updated Project information.

The DBT shall also assist ODOT with ongoing coordination with the Aesthetics and Enhancements Advisory Team, as outlined in Section 16.3.2 of this document. The DBT shall be responsible for working with ODOT to coordinate and convene meetings with the Aesthetics and Enhancements Advisory Team and with the public, as defined in Section 16.3.2.

## **4.6 METHODS and TOOLS FOR DISSEMINATION OF INFORMATION**

The methods and tools listed in this section shall be employed by the DBT to disseminate information to the public in a timely fashion. In addition, the DBT is encouraged to incorporate further use of social media (for example, Facebook and Twitter) to enhance the ability to quickly notify the public of incident alerts or other construction change alerts.

### **4.6.1 Highway Advisory Radio (HAR)**

The DBT shall provide timely and accurate information daily or as requested by ODOT for HAR messages. The DBT shall prepare draft messages for advance notice of traffic restrictions due to planned construction activities, for ODOT to record.

### **4.6.2 Variable Message Signs (VMS)**

The DBT shall prepare draft messages for advance notice of traffic restrictions due to planned construction activities.

### **4.6.3 Telephone Hotline**

The DBT shall establish and manage a telephone hotline for the Project. The DBT shall respond to any inquiries from the hotline within 24 hours. The DBT shall answer and respond to after-hours calls forwarded from the hotline. The DBT shall ensure that all staff responding to inquiries is trained, friendly, responsive and informed about construction and traffic impacts. The DBT shall be responsible for compiling and summarizing questions and comments from the general public. This includes tracking responses to callers, analyzing and reporting trends, and providing a weekly status report.

### **4.6.4 Collateral Materials**

In addition to the dissemination of construction information discussed in this section, the DBT shall, upon request from ODOT, assist ODOT with producing written materials regarding construction issues specific to the Project, which may include, but are not limited to, schedule, noise, lights and fugitive dust. ODOT shall be responsible for making these materials available to the public as requested through U.S. mail, e-mail, ODOT's Web site and at individual and group meetings. Printing of materials shall be the responsibility of the DBT.

ODOT shall determine when materials shall be distributed to businesses and neighborhoods, the size of the distribution area, and the content of the materials.

The DBT shall also facilitate direct mailings (to the established mailing list) that can include special mailings and/or quarterly newsletters. Content shall be approved by ODOT.

#### **4.6.5 Correspondence and E-Mail**

ODOT will forward e-mail, letters and other forms of correspondence from the public regarding design and construction issues to the DBT for response. The DBT shall assist ODOT in providing responses to correspondence; however, ODOT shall be responsible for responding to all correspondence.

The DBT shall forward to ODOT all requests the DBT receives for Project related information via telephone, e-mail and letters to from the public within five (5) Business Days of the request. Project-related correspondence shall include communications from the public, businesses, community groups and government entities affected by the Project.

#### **4.6.6 Open Houses, Special Events, Public Meetings, and Speaking Engagements**

The DBT shall convene one public open house per year to inform the public of the Project's status, and to answer questions related to the Project. The DBT is encouraged to work with ODOT to develop alternate approaches to open houses that actively engage and inform as many people as possible.

The DBT shall assist with outreach to community groups, including but not limited to, local jurisdictions, neighborhoods, businesses, truckers, shippers, transit agencies, employee transportation coordinators and environmental groups. The DBT shall be available to attend public and community meetings or to make presentations at ODOT's request. The DBT shall attend at least 10 public or community meetings per year for the duration of the Contract, and shall assist ODOT in coordinating and presenting information at 10 additional community meetings per year.

#### **4.6.7 Photographs and Video**

The DBT shall assist ODOT in providing documentation of construction, public outreach and other Project-related events using photographs and video. The documentation shall be used for public communications, media relations and ODOT archival purposes. All photographs and video taken by the DBT in support of ODOT's documentation of the Project shall be provided to ODOT by the DBT.

DBT shall provide continuous webcam monitoring of the bridge construction. Detail requirements are included in Appendix GN-02.

#### **4.6.8 Events**

The DBT shall coordinate, communicate and provide a plan to minimize construction impacts for public events held by public and private entities. ODOT shall develop and maintain a list of public events, which will be updated weekly and communicated with the DBT. Examples of public events include, but are not limited to, Cleveland Indians, Cavaliers and Browns sporting events; Quicken Loans Arena Concerts; and CSU Wolstein Center events.

ODOT shall notify the DBT of planned events that may be affected by construction 14 calendar days before the event takes place.

#### **4.6.9 Media Relations**

Although media relations are the responsibility of ODOT, the DBT shall participate in media interviews or other media information support activities at ODOT's request. When participating in media inquiries and interviews, the DBT shall provide information that complies with ODOT messaging and other standards, including requirements for advance Project information, Project progress and accountability, and timely response to media inquiries.

The DBT shall coordinate all media requests with ODOT prior to interviews. ODOT will be the media spokesperson. The DBT shall provide ODOT with information and access to key Project staff for press interviews, as requested. At ODOT's request, the DBT shall conduct tours of the Project site for media, local or State government officials, or ODOT management. The DBT shall provide information and materials that meet local broadcast and print media requirements and deadlines. All information released to the news media must first be reviewed and approved by ODOT prior to release.

#### **4.6.10 Ground Breaking and Ribbon Cutting Events**

The DBT shall be responsible for conducting ground-breaking and ribbon cutting events. ODOT public relations staff shall assist the DBT with the planning of these events and will provide the DBT with a list of authorities to be invited to these events.

#### **4.6.11 Project Tours**

ODOT anticipates potential strong interest from public groups and individuals for tours of the Project site during construction. The DBT shall work with ODOT's Project staff to develop a plan, at the outset of the Project, to coordinate regular public tours of the Project site. To coordinate ODOT led project tours, the DBT shall provide and maintain required safety gear for up to 50 people. The plan shall include consideration for appropriate public safety and shall be designed to result in minimal impact to the contractor's field activities. The plan shall be revised if ODOT deems that demand during construction is substantially different from what was anticipated in the original plan.

#### **4.6.12 Pre-Construction Conference with Stakeholders**

Within 30 calendar days of Contract execution, the DBT will conduct a pre-construction conference to include City of Cleveland Staff, ODOT and key stakeholders to present major aspects of the Project such as scope, schedule, impacts, contacts, construction phasing, maintenance of traffic, public involvement and communications, aesthetics and enhancements, demolitions, bridge construction, etc. The list of attendees to be invited to this Pre-Construction Conference will be provided by ODOT to the DBT, and ODOT will be responsible for inviting all attendees.

### **4.7 UTILITY INTERRUPTIONS**

The DBT shall conduct regular communication with residents and businesses affected by utility interruptions. The DBT shall contact and provide written notification to all affected residents and businesses 48 hours in advance of a utility interruption, and shall maintain a record of each notification. Notices shall indicate the purpose and expected duration of the interruption, and provide information

indicating how those affected by the interruption can contact the DBT. Notices shall meet ODOT's communications style and be pre-approved by ODOT before dissemination. Such notices may also be provided by ODOT. This applies only to utility interruptions that are a result of DBT work activities. It does not apply to interruptions conducted by and coordinated by the utility owners.

In the event of an emergency involving a utility interruption, the DBT shall notify the utility owner in accordance with utility company standards and local emergency services.

#### **4.8 CONSTRUCTION TRAFFIC MITIGATION**

The DBT shall collaborate with ODOT's Public Involvement Team on opportunities to work with transportation coordinators, transit agencies, local chambers of commerce, sports teams, retail centers, businesses, communities and others to encourage more efficient use of highways and roadways. The DBT shall work with the Public Involvement Team on marketing plans to contact these entities, and to keep them informed of construction activities. The DBT shall participate in meetings with the Public Involvement Team and with ODOT construction mitigation staff, as required.

#### **4.9 QUALITY ASSURANCE and QUALITY CONTROL**

The DBT shall maintain a high level of quality control for all public information tools and materials. The PIP shall outline a process for managing review and resolution of comments for all communications materials, both within the DBT's team and with ODOT. ODOT will provide the DBT with periodic feedback and suggestions for improvement. The DBT shall be responsible for implementing any changes required by ODOT.

#### **4.10 SUBMITTALS**

Project submittals include, but are not limited to, the following:

- A. Project Contact Call List – submit within 30 Calendar Days of NTP
- B. Communications planning workshop date and draft agenda within 30 Calendar Days of NTP
- C. Weekly Progress Reports – establish format within 30 calendar days of NTP with reporting beginning immediately thereafter
- D. Draft and Final PIPs
- E. Construction Information
- F. Emergency Response Protocol
- G. Project Identification Signs
- H. Telephone Hotline Information
- I. Photos and videos

#### **4.11 OUTREACH TO THE DISADVANTAGED BUSINESS ENTERPRISE COMMUNITY**

The DBT shall employ a Diversity and Inclusion Consultant familiar with the Disadvantaged Business Enterprise (DBE) Community in the area to specifically communicate employment opportunities, consulting opportunities, and materials supply opportunities. This consultant should have experience with the DBE program and dealing with DBE eligibility and certification issues. The consultant should develop innovative and aggressive strategies to attract and retain a diverse pool of vendors, consultants and suppliers for the project's procurement opportunities, and to recruit potential DBEs eligible for certification. The DBT shall report outreach progress and results at least quarterly. The Diversity and Inclusion Consultant are to coordinate their outreach activities with ODOT's staff and/or consultants.

## **5 ENVIRONMENTAL COMMITMENTS**

### **5.1 PERMITTING PROJECT REQUIREMENTS**

The DBT must ensure that the Project is constructed and maintained in accordance with all conditions of the environmental commitments and each applicable permit required for the Project. This includes the permits described in the scope and any additional permits needed that are not specifically identified in the scope.

If not already obtained by the Department, the DBT shall obtain all necessary permits and pay all charges, fees and taxes associated with these permits. The DBT shall be responsible for any fines levied by environmental regulatory agencies as a result of their construction activities or non-compliance with any permit special or general conditions.

#### **5.1.1 Waterway Permits**

It is required that the DBT be aware of Section 404/401 Permits/Certifications and U.S. Coast Guard (USCG) Section 9 Permit requirements for the Project.

The Office of Environmental Services (OES) will obtain the required waterway permits from the U.S. Army Corps of Engineers (USACE) and the Ohio Environmental Protection Agency (OEPA) based on assumptions established by the Department or other agents for the Department regarding the amount and location of fills. The DBT shall comply with the requirements and conditions of the approved waterway permits.

The DBT shall be responsible for completing the draft and final USCG Section 9 Bridge Permit Application. The Section 9 Bridge Permit application shall be prepared according to the ODOT Waterway Permits Manual. The draft Section 9 application shall be submitted to OES for review and comment. The DBT shall address all the comments and submit the final Section 9 application with a list of the disposition of all comments to OES for coordination with the USCG. The DBT shall comply with the requirements and conditions of the approved permit. USCG Coordination information is provided in Appendix EC-08.

USCG Contact information:

Scot M. Striffler  
Bridge Program Manager, Ninth Coast Guard District Bridge Program  
U.S. Coast Guard  
1240 E.9th Street  
Cleveland, OH 44199  
(216) 902-6087  
Scot.M.Striffler@uscg.mil

OES coordinates any issues regarding USCG Section 9 Permits, USACE Section 404 Permits and OEPA 401 Water Quality Certification. At no time will the DBT coordinate waterway permit issues directly with the permitting agencies unless directed to do so by OES.

OES Permits Contact information:

William R. Cody  
Assistant Environmental Administrator  
Office of Environmental Services  
Ohio Department of Transportation  
1980 W. Broad Street  
Columbus, OH 43223  
(614) 466-5198  
bill.cody@dot.state.oh.us

The Corps of Engineers issued Nationwide Permits #3 & #7 for the project on April 14, 2010. All design and construction shall be in accordance with the Nationwide Permits and the Special Conditions of the permit. The Nationwide Permits are in Appendix EC-22. The permits are valid until March 18, 2012.

The DB Team shall prepare a re-evaluation application, in order to obtain a permit extension. The DB Team shall submit the re-evaluation application to ODOT by November 1, 2011.

If the DBT proposes any temporary and/or permanent fill(s) that have not been permitted through the 404/401 or Section 9 permit processes, permit modification(s) are required. The DBT shall coordinate the request for the permit(s) modification with the Project Engineer and OES. The Department makes no guarantee to granting the permit modification(s) request. The permit modification(s) shall be coordinated by OES with the USCG, USACE and OEPA where applicable. Supply the Project Engineer/OES with the following information:

- A. A plan and profile drawing showing the temporary and/or permanent fill(s) with the Ordinary High Water Mark (OHWM) elevation. The OHWM elevation of the main navigation channel of the Cuyahoga River is 575.00 feet within the project limits.
- B. Volume of temporary and/or permanent fill below the OHWM.
- C. The surface area of temporary and/or permanent fill below the OHWM.
- D. A restoration plan for the area affected by the causeway and access fill.
- E. Time frames for placement and removal of the temporary and/or permanent fill.
- F. A minimum of 60 days shall be allowed for OES to coordinate any proposed permit modification with the USCG, USACE and/or OEPA.



### **5.1.2 National Pollutant Discharge Elimination System (NPDES) Permit**

ODOT obtains the Notice of Intent (NOI) from OEPA for the Project. The DBT and the IQF shall be co-permittees.

All temporary sediment and erosion control is the responsibility of the DBT. Refer to Appendix EC-03: Modified SS832 for developing the Storm Water Pollution Prevention Plan (SWPPP) and locating, furnishing, installing, and maintaining temporary sediment and erosion control.

Earth disturbing activity is not permitted prior to the OEPA issuance of a Facility Permit Number and fully executed co-permittee Form. The SWPPP must be in place prior to the initiation of any earth disturbing activity. The DBT shall describe the effects of construction sequencing with respect to temporary sediment and erosion control in the SWPPP. In addition, the DBT shall describe the approach to temporary sediment and erosion control for the overall project and the implementation of temporary erosion and sediment practices or facilities to be employed during each operation of the construction sequence.

All temporary sediment and erosion control work and the SWPPP shall be according to Modified SS832. (For information about OEPA's NPDES permit requirements see <http://www.epa.state.oh.us/dsw/permits/permits.aspx>.)

### **5.1.3 Harbormaster Permit**

The DBT shall be responsible for obtaining permits and paying any fees related to the permit for the City Harbormaster in accordance with Section 573 of the City Ordinances for the City of Cleveland.

Harbormaster contact information is:

Sandra Ambris  
Harbor Master  
1501 N. Marginal Rd.  
Cleveland, Ohio 44114  
(216) 664-5020  
sambris@clevelandairport.com

The DBT shall forward a copy of any correspondence with the City Harbormaster to the OES Permits Contact.

### **5.1.4 Floodplain Impacts**

Prior to construction of any and all drainage structures in a floodplain, the DBT shall be responsible for submitting a letter identifying any temporary or permanent impacts to the floodplain to the ODOT District 12 Environmental Coordinator for review and comment. The District will coordinate with the local flood plain coordinator for agreement.

Any additional impacts identified subsequent to the agreement from the floodplain coordinator require coordination by ODOT District 12. Allow 15 days for this further coordination.

### **5.1.5 Removal of Temporary Erosion Control Items**

The DBT shall remove all temporary erosion control items before the Project is accepted. Removed temporary erosion control items become the property of the DBT. The DBT shall dispose of removed temporary erosion control items in accordance with the appropriate C&MS specifications.

### **5.1.6 Typical U.S. Coast Guard Conditions**

The following is a list of typical conditions placed in Section 9 Bridge Permits by the USCG for the DBT's consideration. The final Section 9 Permit will contain specific conditions for the Cleveland Viaduct Project. The DBT shall comply with the final requirements and conditions of the approved permit. OES coordinates any issues regarding USCG Section 9 Permits. At no time will the DBT coordinate waterway permit issues directly with the permitting agencies unless directed to do so by OES.

- A. Maintain free navigation of the waterway and navigable depths.
- B. Two weeks prior to the scheduled demolition work on the bulkhead, notify the USCG office of the demolition schedule. Complete the Project Information Record and return it to the USCG office.
- C. One week prior to demolition, schedule a pre-demolition meeting with the USCG and all involved parties to ensure that all equipment, manpower and materials are in place for the impending demolition.
- D. Prior to commencing operations, furnish the Commander, Ninth Coast Guard District, evidence of a good and sufficient bond to insure compliance with USCG requirements.
- E. Prevent the dropping of spark-producing, lighted and other objects on tows or vessels. Cease use of all flame-cutting, welding, and similar spark-producing operations over the channel when vessels are passing beneath the bridge.
- F. Promptly remove any object dropped into the river which may constitute a hazard to navigation.
- G. Where explosives or blasting is permitted and planned for use, immediately prior to the denotation of any underwater explosives, explode two or three blasting caps to frighten fish away from the demolition site.
- H. If any objects causing an obstruction to navigation are placed or accidentally dropped into the river, mark such objects with one or more lighted buoys. Use buoys that are horizontally striped orange and white with the top stripe orange; align the buoys cross-river at intervals of about 25 feet or as close as practicable to the obstruction in the river. Light each buoy at night with a quick flashing white light (60 flashes per minute). If steel is extending above water, orange flags by day and quick flashing white lights by night may be displayed on the steel in lieu of any buoy.
- I. Notify the Commander (dwb), Ninth Coast Guard District, at least 15 days in advance of any action that may impede navigation. Allow 15 days for issuance of revised notices caused by any revision of work schedule. Update notification by telephone if necessary to assure that

navigation interests are aware of impending events that may affect the movement of river traffic.

- J. The DBT agrees to be responsible for damages to persons or properties resulting from the work and save and hold harmless the United States from any claim for damages resulting from this operation.
- K. Maintain the present navigation lighting on the bridge until all work is completed, and the navigation lights to be prescribed at a future time are installed and placed into operation. If work activities obscure the existing lights on the bridge from the river, the DBT shall relocate the existing lighting or install temporary navigation lights that meet USCG approval.
- L. When using barges and other watercraft in demolition activities, use lights and signals for the barges and watercraft as required by the "Inland Navigational Rules of 1980."
- M. Where explosives or blasting is permitted and planned for use, use flagmen to warn river traffic before blasting. Station flagmen in a radio-equipped boat approximately one-half mile upstream and downstream of the bridge not less than one hour prior to and during the detonation of explosives to warn approaching river traffic of the impending action and obstructions in the river. Provide such warning devices as may be necessary to keep boats out of the immediate danger area.
- N. Any temporary fills, rubble, or similar material deposited in the river must be approved by the Commander, U.S. Army Engineer District 9, and Buffalo District pursuant to Section 404 of Public Law 95-217.
- O. Coordinate and submit plans for any temporary causeways, work bridges or other falsework to be placed in the river to the Commander (dwb), Ninth Coast Guard District for approval.
- P. Spoil all rubble in upland, non-wetland areas above ordinary high water. Obtain approval for disposal sites from the Commander, U.S. Army Engineer District, and Buffalo District.
- Q. Submit requests to temporarily block the river and stop river traffic, in writing, for approval to the Commander (dwb), Ninth Coast Guard District.
- R. Where explosives or blasting is permitted and planned for use, if, in the opinion of the person in charge of the explosive detonation, the use of radiotelephone or other electronic equipment in the area should be prohibited, at any time, advise the Coast Guard well in advance so that timely notices can be published.
- S. Where explosives or blasting is permitted and planned for use, if explosives are to be transported by water, obtain permits in accordance with Title 49, Code of Federal Regulations. Submit applications to the USCG Marine Safety Office, 9<sup>th</sup> District.
- T. When the Commander, Ninth Coast Guard District determines that hazardous conditions exist, provide a towboat (tug) to assist vessels through the bridge on demand. Provide a vessel of adequate capacity and design to assist tows through the work area. Make the towboat (tug) available 24 hours a day, seven days a week. The boat may also be used as the DBT's work tug, provided that the assistance of commercial tows through the area takes priority over the DBT's normal usage.

### 5.1.7 Typical Nationwide Permit Conditions

The following is a list of typical conditions placed on Nationwide Permits for the DBT's consideration. The final Nationwide Permit will contain specific conditions for the Cleveland Viaduct Project. The DBT shall comply with the final requirements and conditions of the approved permit. OES coordinates any issues regarding USACE Section 404 Permits and OEPA 401 Water Quality Certification. At no time will the DBT coordinate waterway permit issues directly with the permitting agencies unless directed to do so by OES.

- A. **Waterway Permit Time Restrictions:** Complete all work in streams and wetlands depicted in the final approved permit by the date provided in the Permit.  
For work on streams and wetlands, the Department will consider the Contractor's submission of an extension to the waterway permit end date based on project constraints. In order to be considered, the Contractor must submit a justification to the Engineer at least two months prior to the waterway permit end date.  
The Engineer will submit the request for a time extension to the ODOT OES Waterway Permits Unit (614-466-7100) for consideration and coordination with the USACE and/or Ohio EPA.
- B. **Deviations from Permitted Construction Activities:** Make no deviations from the requirements for work in streams and wetlands depicted in the plans and/or Final Permit unless a modification has been submitted to ODOT and approved by the appropriate agencies (i.e., USACE, OEPA, USCG, Ohio Department of Natural Resources [ODNR], U.S. Fish and Wildlife Service [USFWS]).  
For emergency situations resulting in unanticipated impacts to streams or wetlands, provide notification (verbal or written) to the Engineer as soon as possible following discovery of the situation. Written notification to the Engineer and notification to the ODOT OES Waterway Permits Unit must be made within 24 hours.  
For non-emergency situations, notify the Engineer in writing for submission to the ODOT OES Waterway Permits Unit (614-466-7100) for consideration and coordination with the appropriate agencies. Notification must be made at least two months prior to the planned non-permitted activities. Consideration of the requested deviation is at the discretion of the Director and must be coordinated with the appropriate regulatory agencies.
- C. **Bank Protection and Temporary/Permanent Fill Materials:** For bank protection and temporary and permanent fills in or adjacent to streams and wetlands on the Project, use materials free from toxic contaminants in other than trace quantities. Broken asphalt is specifically excluded. Do not use cadmium, chromium, arsenate (CCA), creosote, and other pressure treated lumber in structures that are placed in wetlands and streams.
- D. **Cultural Resources:** If archeological sites or human remains are discovered, cease all work in the immediate area and notify the Engineer who shall immediately contact OES. OES Cultural Resource Contact information:

Paul Graham

Assistant Environmental Administrator  
Office of Environmental Services  
Ohio Department of Transportation  
1980 W. Broad Street  
Columbus, OH 43223  
(614) 466-5099  
paul.graham@dot.state.oh.us

In the event of human remains are discovered, the Engineer shall also contact the Cuyahoga County Sherriff's Office.

- E. Water Resource Demarcation: Prior to site disturbance, demarcate all streams, wetlands, lakes, and ponds indicated on the plans in the field as per modified Supplemental Specification 832. Maintain demarcation fence throughout the construction process. Remove the demarcation fence and posts following the completion of the Project.
- F. Blasting: Notify the ODNR if blasting is required within or near stream channels according to ORC 1533.58 and ODOT C&MS 107.07. Notify the Engineer, in writing, for submission to the ODOT OES Waterway Permits Unit (614-466-7100) for coordination with the ODNR.
- G. Waterway Permits: Maintain a copy of the waterway permits (e.g., USACE 404, USCG Section 9 Bridge Permit and the OEPA WQC and/or Isolated Wetland Permit) at the work site at all times and make it available to all contractors and subcontractors.
- H. Birds and Bats: Prior to the removal of bridge structures, examine the underside of the bridge for the presence of birds and bats. Should any birds or bats be found roosting on the underside of the bridge, notify the Engineer for coordination with ODOT OES (614-466-7100).
- I. Construction Completion Certification: Upon Completion of the work, notify the Engineer. Complete the USACE Construction Completion Certification and obtain the signature of the Engineer. Forward this information to:
  - U.S. Corps of Engineers
  - DSCC
  - Building 10, Section 10
  - 3990 East Broad Street
  - Columbus, Ohio 43218

The DBT shall forward a copy of the certification to the ODOT OES Permits Contact.

## **5.2 OTHER ENVIRONMENTAL COMMITMENTS**

### **5.2.1 Noise Walls**

(See Section 15 - Noise Analysis and Noise Barriers.)

## **5.2.2 Vibration Analysis**

(See Section 9.3.4 - Vibration Monitoring and Control Requirements.)

## **5.2.3 Section 106/Historic Sites**

The DBT shall comply with all provisions of the Programmatic Agreement (PA) among the Federal Highway Administration (FHWA), The Ohio State Historic Preservation Office, and ODOT regarding the Federal-Aid Highway Improvement of Interstate Routes 71, 77, and 90 in The City of Cleveland, Cuyahoga County, Ohio CUY-90 Innerbelt: PID 77510, Agreement Number 15498.

In accordance with the PA, FHWA and ODOT propose the following treatment plans to resolve the adverse effect on the three impacted historic properties:

- A. Broadway Mills – Level II documentation as specified by the Historic American Building Survey (HABS) will be prepared. A commemorative display will be located at or near the existing mill site.
- B. Marathon Gas station – Level II documentation as specified by the Historic American Building Survey (HABS)
- C. Distribution Terminal Warehouse – a historic context will be prepared documenting the significance of the resource in relation to the City of Cleveland’s food distribution industrial history.

The Level II documentation and historic context will be prepared by the Department and will be included in Appendix EC-07. The DBT is not permitted to begin demolition activities until the Level II documentation has been completed. A schedule indicating when the property is released for demolition/construction is included in Appendix RW-01.

The DBT shall ensure that the above mitigation/enhancement activities are included in the design of the Project. The six 30-inch diameter (approximate) medallions on the north face of the Broadway Mills Building shall be salvaged prior to demolition. The 10 architectural sandstone center pieces above each half circle window on the top floor shall also be salvaged prior to demolition. These salvaged materials shall be incorporated into the design of a commemorative display to showcase the historic value of the Broadway Mills Building to this area of Cleveland. The commemorative display will be located on the existing Broadway Mills site within the new overlook area. Other pieces of the Broadway Mills Building, (e.g. sandstone window sills, exterior bricks, cornices, etc.) may also be salvaged for reuse in the commemorative display and in the overall design of the overlook areas under the new bridge.

The DBT shall design three commemorative displays of the Broadway Mills Building. The DBT designer shall have Historic/Architecture Investigations prequalification.

See Section 16 – Aesthetics and Enhancements for additional requirements.

### 5.2.4 Asbestos on Bridges

An asbestos survey conducted on the bridges within the project limits was completed in June 2009 by a certified asbestos hazard evaluation specialist from HzW Environmental Consultants, Inc. The survey identified the asbestos containing materials (ACM) on the bridges listed in the chart below. See Appendix EC-10 for the full inspection report.

Table 5-1: Asbestos on Bridges

County-Route-Section	Location	SFN	Identified Asbestos - Pipes (linear feet)	Identified Asbestos - Surface Area (sq. ft.)
CUY-90-1490L	Westbound I-90 over Starkweather Avenue	1809342	126 feet	97 square feet
CUY-90-1490R	Eastbound I-90 over Starkweather Avenue	1807625	504 feet	259 square feet
CUY-90-1506	I-90 over Kenilworth Avenue	1807684	150 feet	357 square feet
CUY-90-1628EW	Center bridge I-90 over E.9 <sup>th</sup> Street	1807552	575 feet	79 square feet
CUY-90-1628L	North bridge I-90 over E.9 <sup>th</sup> Street	1807498	575 feet	88 square feet
CUY-90-1628R	South bridge I-90 over E.9 <sup>th</sup> Street	1807714	575 feet	82 square feet
CUY-90-1640	I-90 over Ramps E-10 and E-8	1807773	1955 feet	127 square feet
CUY-90-1651L	Westbound I-90 over E.14 <sup>th</sup> Street	1807900	1735 feet	122 square feet
CUY-90-1651R	Eastbound I-90 over E.14 <sup>th</sup> Street	1807803	1735 feet	122 square feet
<b>Total</b>			8280 feet	1333 square feet

The removal and disposal of any ACM during the construction must comply with the Ohio Administrative Code, Occupational Safety and Health Administration (OSHA) regulations, and the National Emission Standard for Hazardous Air Pollutants (NESHAP) Standards for Asbestos.

A copy of the OEPA Notification of Demolition and Renovation form with Sections I-VII and XVI completed is included as Appendix EC-09. The DBT shall complete Sections VIII-XIII of the signed form and submit the completed form to the Local Air Authority at least ten (10) days prior to demolition of the bridges. The Contractor shall provide a copy of the completed form to the Department. The Local Air Authority is:

City of Cleveland  
Department of Health & Welfare  
Division of the Environment  
1925 St. Clair Avenue  
Cleveland, Ohio 44114

The DBT shall provide an individual trained in the provisions of NESHAP that will be on-site during removal of the ACM. In addition to the ACM identified in the Asbestos Survey Report, any additional non-visible asbestos encountered within the project work limits shall also be monitored by this individual.

If unknown contamination is discovered during construction, the DBT shall notify ODOT immediately and shall follow the Spill Prevention Control and Countermeasure (SPCC) Plan as well as all appropriate regulations.

The DBT shall furnish all labor, equipment, and materials necessary to complete, submit, and comply with the OEPA Notification form and to remove, transport, and dispose of the materials containing asbestos from within the project work limits. The cost for this work shall be included in the overall lump sum price and is not to be compensated through force account as described in Section 5.2.5.

### **5.2.5 Materials Management**

Before building demolition operations begin, the Department will conduct regulated materials inspections of all buildings subject to renovation or demolition. The findings of these inspections will be made available to the DBT. A list of property acquisitions is available in Appendix RW-01. The table in the appendix shows the status of individual parcels and buildings and the status of asbestos inspection.

Regulated materials can include but are not limited to: asbestos, mercury switches, fluorescent light bulbs, underground storage tanks (UST), and oil pits.

The DBT is responsible for abatement activities required for the buildings determined to contain regulated materials from the Department's inspections. All buildings, where the DBT is granted access to AND is in receipt the Department's regulated materials inspection findings prior to the bid submission are considered Known Abatements. The cost for these Known Abatements shall be included in the overall lump sum price and is not be compensated through force account.



It is expected that the Department will not have acquired or will not have provided an inspection report for some properties. The regulated material inspections on these properties will not be available to the DBT prior to bid. These are considered Unknown Abatements. Items used to implement the DBT's regulated material removal activities for Unknown Abatements shall be paid from the encumbered amount included in the proposal as Regulated Material Removal and Disposal. The fixed amount represents the Department's estimate of the total cost of the Unknown Abatement activities for these buildings. Payment for the removal and disposal of regulated materials for Unknown Abatements shall be based on C&MS 109.05 - Force Account and is considered an excusable, non-compensable delay as per Item 108.06.B.7.

At least 10 Business Days before operations begin, the DBT shall complete an OEPA 'Notification of Demolition and Renovation' form and submit this to the local air pollution control division, if delegated, or OEPA.

The DBT shall ensure that all suspect materials shall be removed and properly disposed of by a certified Asbestos Removal Professional in accordance with OAC 3745-20. An individual trained in the provisions of NESHAPS (40 CFR Part 61, subpart M) will be on site during the demolition or renovation of any structure with ACM and evidence that the required training has been accomplished by this person will be available during normal business hours.

If the DBT encounters an unknown or known UST within the right-of-way, the DBT shall decommission and remove the UST. This effort will be paid under C&MS 109.05 - Force Account and is considered an excusable, non-compensable delay as per Item 108.06.B.7. If a UST is encountered, ODOT and the DBT shall follow all applicable rules and regulations associated with UST removal activities.

The DBT shall meet all regulatory conditions imposed at properties with regulated materials associated with construction. These conditions could include ensuring that the surrounding properties and populations are not exposed to the regulated materials on the site. The DBT shall ensure that the site is properly contained during construction so that regulated materials do not migrate off site; and so that the health and safety of all on-site personnel are protected during work at the site, the DBT shall prepare an Spill Prevention Control and Countermeasures (SPCC) plan that provides specific guidance for managing regulated materials that may be encountered within the right-of-way.

If unknown regulated materials are discovered during construction, the DBT shall notify ODOT immediately and shall follow the SPCC Plan as well as all appropriate regulations.

The DBT shall dispose of construction waste material such as concrete or other harmful materials at approved sites in accordance with all appropriate regulations.

The DBTs shall review the environmental documentation for the project, including the Environmental Site Assessments completed by the Department. DBTs shall utilize this information to manage excavated materials on the project. DBTs shall use innovative and sustainable methods to reuse as

much of the excavated materials as allowed by applicable regulations. Excess excavated materials that are regulated shall be appropriately managed by the DBT. This management may include transporting and paying for disposal at appropriate disposal facilities.

During the geotechnical investigation for the East 9<sup>th</sup> Street/Commercial Road realignment, off-colored and odd smelling soils were encountered in field samples. Based on these indications, soils were sampled and tested. The Phase II ESA analytical test results did not show levels of compounds that would characterize excavated materials from this site as a hazardous waste. The test results along with the sample borings logs show that the soils contain weathered slag. The Phase II ESA Reports are available in Appendix EC-11.

Based on the Phase II ESA reports for the Norfolk Southern property (Parcel 632), the DBT can incorporate the excavated material into project. If the excavated material is not incorporated into the project, it shall be disposed of in a solid waste landfill.

## **6 UTILITIES**

### **6.1 GENERAL**

The DBT shall be responsible for coordination with the owners of all utility facilities affected by the project. The resolution of any conflicts between utility facilities and the construction of the project shall be the responsibility of the DBT. Utility facility relocations over, under or in railroad right-of-way will require coordination with the affected railroad in addition to coordination with the utility facility owner. The DBT is also responsible for the railroad coordination effort. (Refer to Section 7 - Railroads.)

- A. Any required relocation of public utility facilities shall be included in the DBT's bid (cost) and schedule. This work includes relocation of Cleveland Public Power (CPP), City of Cleveland Department of Water (CWD), City of Cleveland - Division of Water Pollution Control (CDWPC), and Northeast Ohio Regional Sewer District NEORSR facilities; with the exception of the NEORSR Walworth Run and Westerly Low Level Sewer.
- B. ODOT has initiated coordination efforts with specific private/investor owned utility companies having known conflicts with CCG1. The DBT shall be responsible for coordination with the private/investor owned utility facility owners as described in the scope.
- C. The DBT is responsible for all coordination and schedule risk for relocation of private/investor owned utility facilities, except as described in Section 6.4.2 - Deadlines and Delays.
- D. The DBT shall submit a listing of all utility facilities required to be relocated by the DBT's proposed work as part of the technical proposal. The Department will score proposals on the DBT's efforts to minimize schedule and cost risks associated with relocation of utility facilities.

The Department will make all determinations of compensable rights related to utility facility design, relocation, modification and construction. Except as specifically indicated in the contract documents, no additional compensation or time will be granted for any delays, inconveniences, or damages sustained by the DBT due to interference from utility facilities or utility facility relocations.

### **6.2 GOVERNING REGULATIONS FOR UTILITY DESIGN and CONSTRUCTION**

Any utility relocation work performed by the DBT shall be consistent with ODOT's utility relocation process. This work shall also be consistent with the utility owner's reasonable, written specifications, standards of practice and construction methods, as well as any applicable ODOT, City of Cleveland and/or railroad permit requirements.

The plans for the design of the utility work shall show at the minimum the following information: existing topography, right-of-way, lanes of travel and the location of the utilities. When the DBT develops utility relocation plans, these plans shall be subject to review by the Independent Quality Firm (IQF), ODOT, the City of Cleveland, the involved railroad and the involved utility, as applicable.

Section 1.17 identifies specifications related to the design and construction of underground water lines, storm and sanitary sewers. All utility design, relocation, modification and construction shall be

performed in accordance with these specifications or accepted industry standards as applicable. In the event of a conflict among the standards listed in Section 1.17 related to design, construction, modification or relocation of public utilities (Cleveland Water Department, Cleveland Division of Water Pollution Control, Northeast Ohio Regional Sewer District, Cleveland Public Power), the most restrictive standard shall take precedence. In the event of a conflict among the standards listed in Section 1.17 related to design, construction, modification or relocation of private/investor owned utilities and accepted industry standards, the most restrictive standard shall take precedence.

### **6.3 UTILITY CONTACTS**

The following named utility owners maintain and operate utility facilities within the project limits. Currently available contact information is provided for each.

Electric:

Cleveland Public Power (CPP)  
(Public Utility)  
Attn: Dale Turkovich  
1300 Lakeside Avenue  
Cleveland, Oh 44114  
216-664-3922 ext. 115

Cleveland Electric Illuminating Company (CEI)  
(Private/Investor Owned Utility)  
Attn: Mark Robinson  
6896 Miller Road  
Brecksville, Oh 44141  
440-717-6845

Natural Gas:

Dominion East Ohio Gas Company (DEOG)  
(Private/Investor Owned Utility)  
Attn: Mary Long  
320 Springside Drive, Suite 320  
Akron, Oh 44333  
330-664-2409

Water:

City of Cleveland, Division of Water (CWD)  
(Public Utility)  
Attn: Guy Singer  
1201 Lakeside Avenue  
Cleveland, Oh 44114  
216-664-2444 Ext 5555

Catv:

Time Warner Cable  
(Private/Investor Owned Utility)  
Attn: Larry Clark  
1100 E. 22<sup>nd</sup> St.  
Euclid, Oh 44117  
216-531-6188

Sewer:

Northeast Ohio Regional Sewer District (NEORSB)  
(Public Utility)  
Attn: Richard Switalski  
3900 Euclid Avenue  
Cleveland, Oh 44115  
216-881-6600

City of Cleveland, Division of Water Pollution Control (CDWPC)  
(Public Utility)  
Attn: Elie Ramy  
12302 Kirby Ave.  
Cleveland, Oh 44108  
216-644-3785

Signals:

City of Cleveland, Division of Traffic Engineering  
(Public Utility)  
Attn: Rob Mavec  
12302 Kirby Ave.  
Cleveland, Oh 44108  
216-644-3785

Lighting:

ODOT District-12  
(Public Utility)  
Attn: Travis Bonnett  
5500 Transportation Blvd.  
Garfield Heights, Oh 44125  
216-584-2221

Cleveland Public Power (CPP)  
(Public Utility)  
Attn: Dale Turkovich  
1300 Lakeside Avenue  
Cleveland, Oh 44114  
216-664-3922 ext. 115

Steam:

Cleveland Thermal, LLC  
(Private/Investor Owned Utility)  
Attn: Scott Templeton  
1921 Hamilton Avenue  
Cleveland, Oh 44114  
216-241-4192

Telephone:

XO  
(Private/Investor Owned Utility)  
Attn: Dale Ferguson  
815 Superior Ave, Suite 200  
Cleveland, Oh 44114  
216-619-3492

AT&T  
(Private/Investor Owned Utility)  
Attn: Eric Westerburg  
13630 Lorain Ave, 4<sup>th</sup> Floor  
Cleveland, Oh 44111  
216-476-6142

Broadwing  
(Private/Investor Owned Utility)  
Attn: Morlon Cockerell  
1122 South Capital of Texas Highway  
Austin, Tx 78746  
512-742-1439

American Fiber Systems  
(Private/Investor Owned Utility)  
Attn: Brice Basista  
16363 Pearl Road, Suite 100-C  
Strongsville, Oh 44136  
585-785-5861

Verizon  
(Private/Investor Owned Utility)  
Attn: Al Guest  
120 Ravine Street  
Akron, Oh 44303  
330-253-8267

Elantic Telecom  
(Private/Investor Owned Utility)  
Attn: Roger Maddern  
6777 Engle Road, Suite E  
Middleburg Heights, Oh 44130  
440-260-0102

Adesta, LLC  
(Private/Investor Owned Utility)  
Attn: Michael Crawford  
3352 Euclid Heights Blvd. Cleveland, Oh 44118  
814-440-9026

Paetec  
(Private/Investor Owned Utility)  
Attn: Kevin Martin  
1625 Rockwell Ave.  
Cleveland, Oh 44114  
216-325-5004

Qwest Communications  
(Private/Investor Owned Utility)  
Attn: Chris Strayer  
4650 Lakehurst Ct., 1<sup>st</sup> Floor  
Dublin, Oh 43016  
614-215-5606

Sprint Communications  
(Private/Investor Owned Utility)  
Attn: Joe Thomas  
11370 Enterprise Park Dr.  
Sharonville, Oh 45241  
513-612-4204

Cavalier  
(Private/Investor Owned Utility)  
Attn: Roger Maddern  
6777 Engle Road, Suite E  
Middleburg Heights, Oh 44130  
440-260-0102

#### **6.4 UTILITY COORDINATION**

Known relocations are identified in Section 6.8. Additional relocations shall be identified by the DBT. The DBT shall design the project to minimize the scope and extent of additional relocations, where possible. When relocations are necessary, coordination of these relocations with the involved utility shall be the responsibility of the DBT.



Only those utility facilities immediately affected by the proposed construction shall be relocated or adjusted. If the DBT desires the temporary or permanent adjustment of the utilities for their benefit, they shall conduct all negotiations with the utility owners and pay all costs associated with the adjustment. The DBT shall assume all schedule impacts from these relocations or adjustments.

The DBT shall:

- A. Identify and contact the owners of all utilities within the project area to verify the nature, extent and location of their existing facilities
- B. Identify all impacted utility facilities
- C. Provide all project construction plans, SUE and geotechnical information to these utilities
- D. Coordinate all work with the affected utility owners
- E. Schedule and conduct coordination meetings during design and construction
- F. Ensure all utility relocations are reasonably compatible with future Innerbelt contract groups; especially for compensable utility relocations

The DBT shall be responsible for maintaining and updating the Utility Conflict Matrices to reflect their design. The Utility Conflict Matrices shall be updated, at least monthly, by the DBT as necessary during the course of plan development. The DBT shall make their updated matrices available to affected utility owners, ODOT's District Utility Coordinator and Engineer.

The DBT is responsible for establishing a schedule of utility coordination meetings commensurate with the complexity of each utility's relocation issues. The DBT shall notify the ODOT District Utility Coordinator at least three (3) Business Days in advance of each of the meetings. The ODOT District Utility Coordinator will participate as necessary. The DBT is responsible for keeping meeting minutes and providing this documentation to ODOT within two (2) Business Days following each meeting.

The DBT shall copy the ODOT's District Utility Coordinator and Engineer on all correspondence related to utility facilities.

The following flowcharts provide guidance on utility facility relocations identified after contract award:

Figure 6-1: Utility Relocation Flowchart

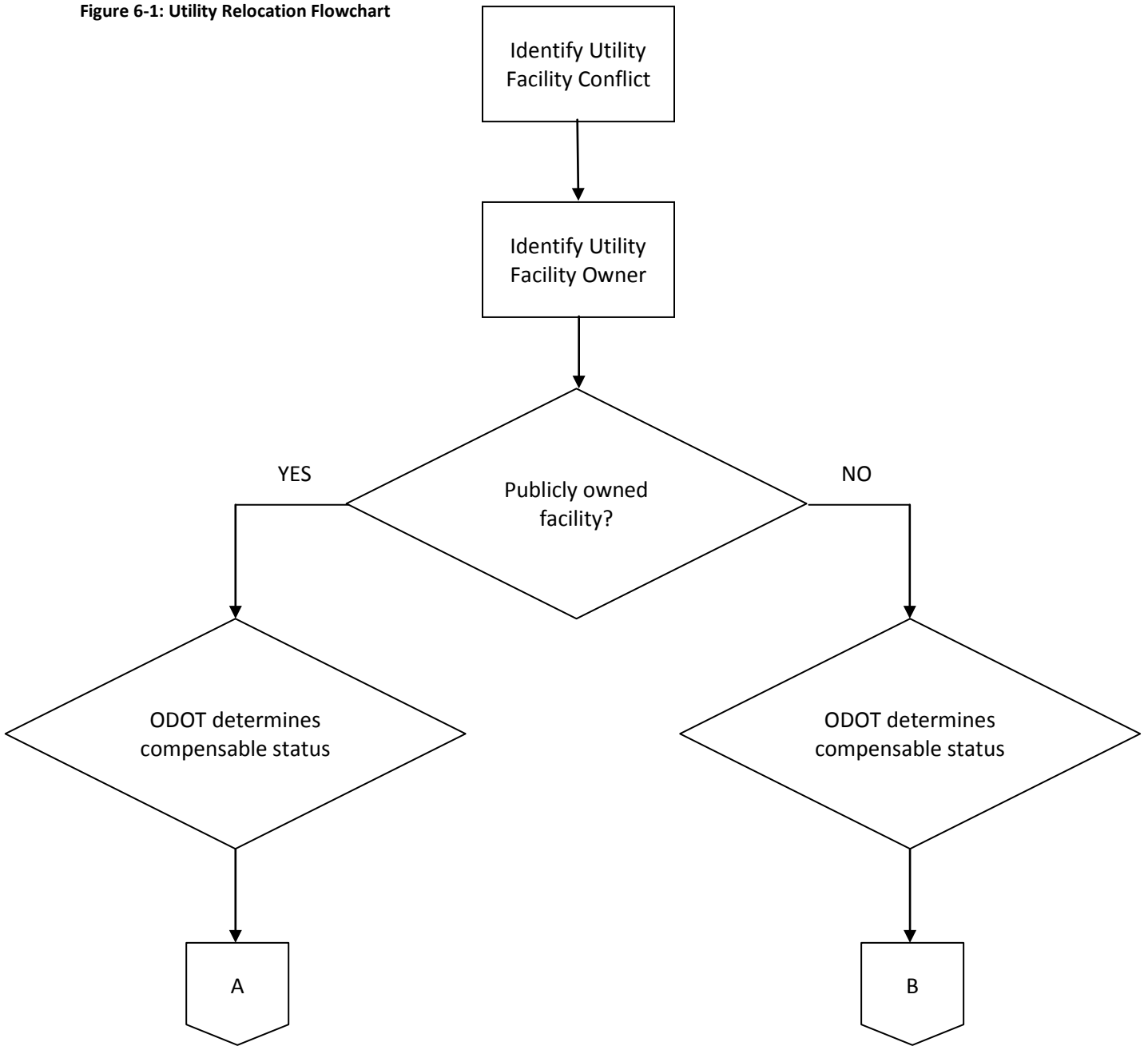


Figure 6-2: Utility Relocation Flowchart – Public

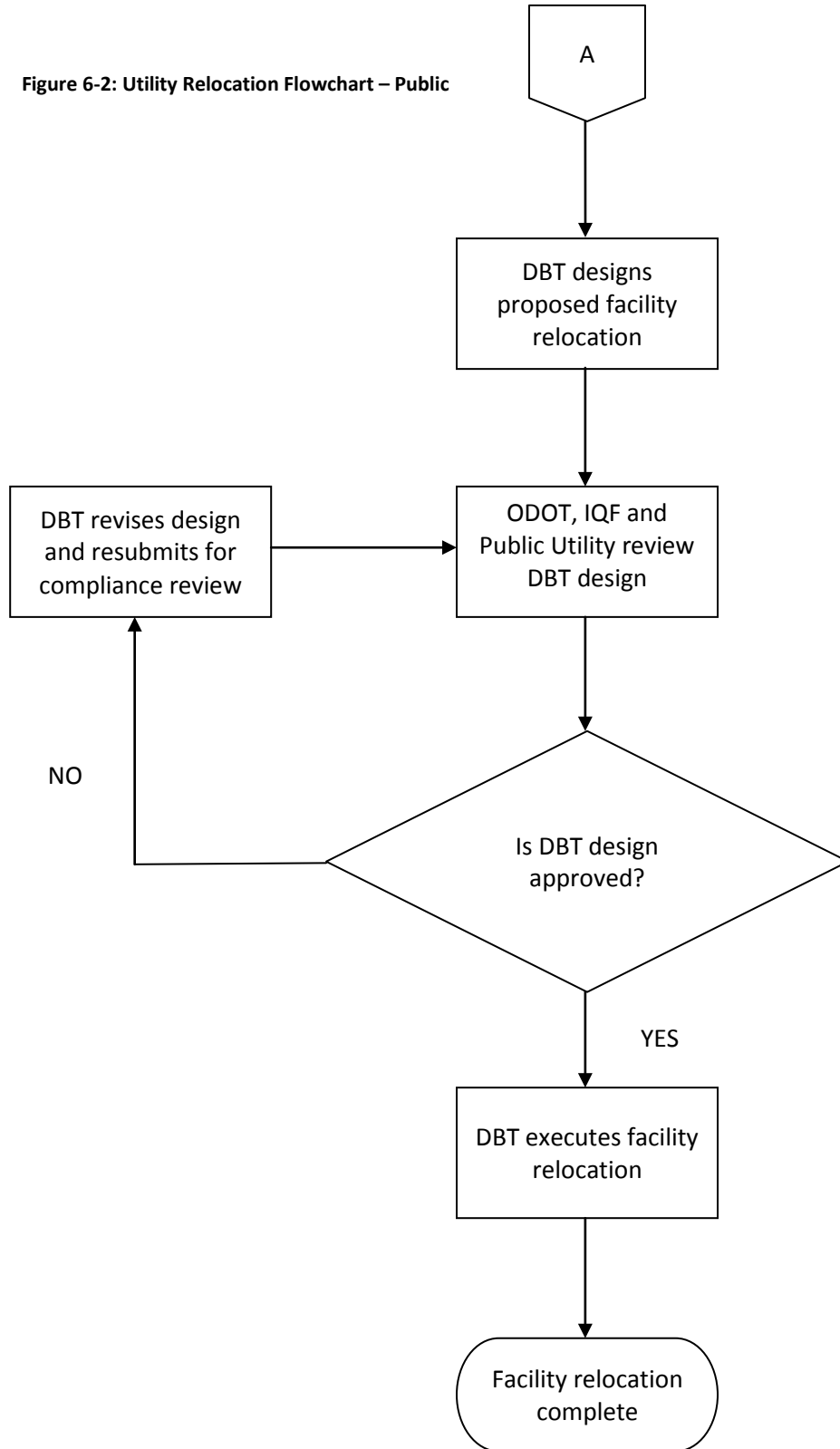
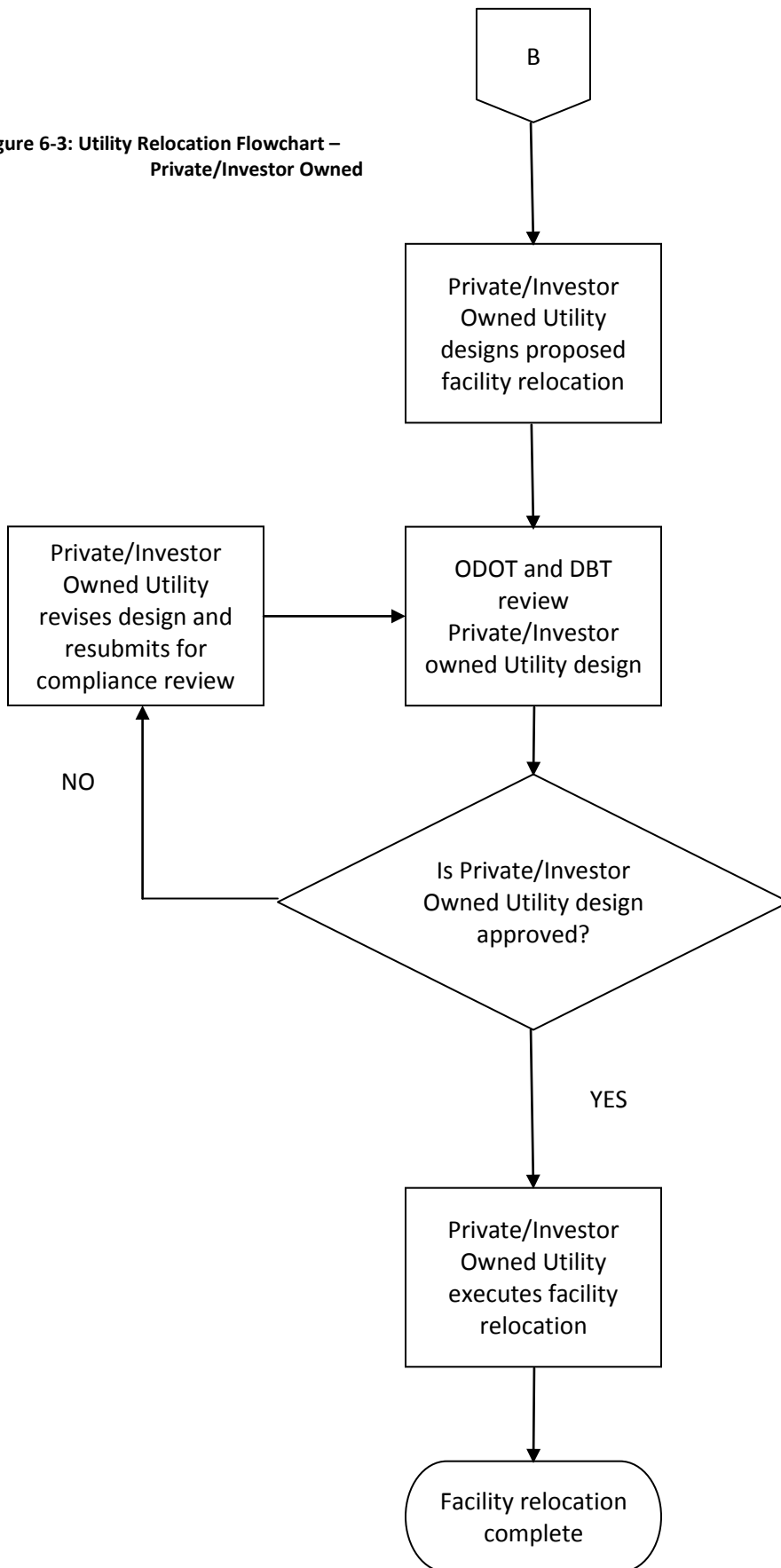


Figure 6-3: Utility Relocation Flowchart – Private/Investor Owned



#### **6.4.1 SCHEDULING OF UTILITY RELOCATION WORK**

The DBT shall confirm the relocation construction timeframes required by with utility owner and incorporate these timeframes into the project's CPM schedule.

The DBT shall consider special scheduling requirements of utilities, such as peak load periods (e.g., winter gas loads and summer electric loads) when developing their CPM schedule.

The DBT shall pay all costs incurred by the utility owner associated with the use of DBT proposed construction acceleration methods, (e.g., the use of overtime or subcontractors). These acceleration costs are NOT eligible for reimbursement by the Department.

When the DBT prepares a utility facility relocation plan, the utility owner will review and approve/reject the design prepared by the DBT no later than 28 calendar days after its submission to the utility owner, unless a different time period is agreed to by both parties. If a utility owner rejects any design work, the DBT shall immediately notify ODOT, in writing, of the grounds for rejection and suggestions for correcting the problem. The DBT shall correct the design and resubmit to the utility owner for review. This compliance review is anticipated to take 14 calendar days.

When the utility owner prepares a utility facility relocation plan, ODOT, the DBT, and IQF review the design and/or permit application to ensure that the relocation does not interfere with other proposed construction activities, including relocations of other utility facilities. This review shall be completed no later than 14 calendar days after its submission to the DBT, unless a different time period is expressly agreed to by both parties. The DBT shall compile and provide written review comments to ODOT and the utility owner.

The DBT shall be responsible for inspection of private/investor owned utility relocation to ensure that the relocation does not interfere with other proposed construction activities, including relocations of other utility facilities.

#### **6.4.2 DEADLINES and DELAYS**

The DBT shall be responsible for monitoring utility facility relocations including plan development, plan review, and construction. The DBT shall promptly notify ODOT if a utility facility owner is not complying with the agreed upon time frames indicated in Section 6.4.1. If the DBT provides documentation confirming that a utility has failed to relocate their facilities in a timely manner, an Obstruction Removal Notice will be issued by ODOT or the City of Cleveland, as appropriate. ODOT will not be responsible for payment of delay claims associated with utility coordination/relocation, unless the DBT is able to provide ODOT with sufficient documentation for an Obstruction Removal Notice.

#### **6.4.3 CHANGES TO THE UTILITY WORK**

Once a utility relocation has begun, the DBT shall not make any changes to the proposed project design which would necessitate a second relocation of the utility facility. However, the DBT may make changes if they agree to absorb the schedule impact and provide full compensation for 100 percent of all costs

(design and construction) associated with the second relocation to the utility company. If this is the case, the DBT shall provide ODOT with documentation of their agreement with the involved utility.

#### **6.4.4 UTILITY OWNER TO PERFORM INSPECTIONS**

The utility owner may perform inspections of construction of any utility work that is performed by the DBT on their facility. The DBT shall notify ODOT of any such inspections. The DBT shall provide ODOT with written documentation of all utility comments and their resolution. The DBT shall provide safe access and any necessary traffic control for any utility work inspections performed by the utility owner.

#### **6.4.5 REIMBURSEMENT PROCESS**

If a utility company notifies the DBT that they believe any utility relocation work is reimbursable (to the utility) or requires additional right of way acquisition by ODOT, the DBT shall immediately notify ODOT.

#### **6.4.6 CONTINUITY OF UTILITY SERVICE**

The DBT shall ensure that all utilities remain operational during all phases of project construction to the greatest extent practicable. Necessary interruptions of service, including proposals for shutdowns and temporary diversions of affected utilities, shall be approved by the involved utility. The DBT is directed to Section 4.7 for notification requirements of disruptions in service.

Where the DBT is responsible for the performance of utility relocation work, in order to maintain the service continuity of the utility owner's facilities to the extent practicable during that performance of work, the DBT, at its cost, shall:

- A. Keep the utility owner fully informed of schedules, including coordinating with the utility owner with regard to their design, construction and inspection of utility work performed by the DBT
- B. Keep the utility owner fully informed of changes that affect their facilities
- C. Keep the utility owner involved in making the decisions that affect their facilities so the utility owner is able to provide uninterrupted service to its customers, or be subject to the least interruption practicable

All the utility owner's facilities shall remain fully operational during all phases of project construction, except as specifically allowed and approved by the utility owner.

### **6.5 EXISTING UTILITY LOCATIONS**

#### **6.5.1 UNDERGROUND UTILITIES**

Existing public and private/investor owned underground utility facilities within the project area are tentatively located and identified in the appendices. Locations, sizes and depths (when indicated) have been compiled by a combination of efforts including reviewing existing facility plans, field survey and subsurface utility engineering (SUE) efforts. However, the DBT is advised that the locations, sizes and depths should be considered tentative. The DBT is responsible for final verification of all subsurface

utility facility locations, both public and private/investor owned, within the confines of their work. Record documents used in the SUE effort are included for reference in Appendix UT-02.

### **6.5.2 OVERHEAD UTILITIES**

Existing public and private/investor owned overhead utility poles and towers within the project area are tentatively located and identified in the appendices. Locations have been compiled by a combination of efforts including reviewing existing facility plans and field survey. However, the DBT is advised that the locations should be considered tentative. The DBT is responsible for final verification of all overhead utility facility locations including type, number and elevation of lines, and related above ground facilities, both public and private/investor owned, within the confines of their work. Record documents used in the SUE effort are included for reference in Appendix UT-02.

## **6.6 KNOWN UNDERGROUND UTILITY CONFLICTS**

Currently identified underground utility facility conflicts within the project limits are tabulated in the Identified Utility Impacts - Mainline; and Identified Utility Impacts - E.9th Street matrices contained in Appendix UT-07 and Appendix UT-08, respectively. The matrices will be maintained and updated by ODOT through the bidding process. The matrices as provided by ODOT at that time shall be considered tentative and subject to final verification by the DBT.

Additional conflicts shall be identified by the DBT as a result of chosen substructure unit locations; retaining wall construction; building demolition; roadway and pavement construction; excavation and embankment limits; DBT selected construction means and methods; and other construction. Existing utility facilities to be abandoned, including but not limited to, service connections for buildings to be razed as part of the project must be disconnected and removed or abandoned to ground.

## **6.7 PROTECTION OF UTILITY FACILITIES**

The DBT shall coordinate project construction with utility adjustments and take all necessary precautions to prevent disturbance to utility facilities.

The DBT shall perform work in a manner that will cause the least reasonable inconvenience to the utility owner and those being served by the utility owner. Existing, adjusted, or new utility facilities that are to remain within the right-of-way of the project shall be properly protected by the DBT to prevent disturbance or damage resulting from project construction operations. If the DBT encounters a previously unknown utility that requires adjustment, they shall not interfere with the utility but shall take the proper precautions to protect the facility or take appropriate actions, per the contract documents, to coordinate the adjustment of the facilities.

### **6.7.1 Existing Utility Facilities that Cannot be Impacted by the Proposed Work**

Several existing utility facilities have been identified by their respective owners as unable to be relocated or modified in any fashion as a result of the proposed construction. Currently known facilities

falling into this category are identified and described below. These facilities are also identified in the Identified Utility Conflict Matrices in Appendices UT- 07 through UT-10.

### **6.7.1.1 *Cleveland Electric Illuminating Company (CEI)***

#### **6.7.1.1.1 Horizon Tunnel**

CEI's "Horizon Tunnel" runs approximately north and south, and roughly parallel to existing Canal Road through the project limits. This facility crosses the proposed mainline at approximate Station 158 + 50. This facility also crosses existing Commercial Road. The DBT's proposed construction shall not impact this facility. Refer to Appendix UT-05 for existing plans, easements and restrictions.

#### **6.7.1.1.2 138 kV Oil-Cooled Transmission Lines**

CEI maintains two (2) 138 kV oil-cooled transmission lines under existing Commercial Road and continuing into the City of Cleveland Central Business District. These lines emanate from an existing sub – station on Commercial Road. The DBT's proposed construction shall not impact this facility. Refer to Appendix UT-06 for existing plans.

### **6.7.1.2 *AT&T Telecommunications Duct Banks***

AT&T maintains several concrete encased duct banks under existing Ontario/Broadway Avenue, Orange Avenue, E 9<sup>th</sup> Street and E 14<sup>th</sup> Street. The DBT's proposed construction shall not impact these facilities. Refer to Appendix UT-02 for existing plans.

## **6.8 KNOWN UTILITY FACILITY RELOCATIONS**

### **6.8.1 Northeast Ohio Regional Sewer District (NEORS) Facilities**

The existing Walworth Run Interceptor, and associated facilities and services owned by the NEORS in the vicinity of the proposed West Bank Unloading area, will be relocated by NEORS forces and/or agents. Plans of the proposed relocation are provided in Appendix UT-03. The DBT shall coordinate its activities with NEORS and their agent in accommodating the NEORS Walworth Run Interceptor relocation work.

### **6.8.2 City of Cleveland Division of Water (CWD) Facilities**

#### **6.8.2.1 *West Bank Slope Unloading Area***

The existing water lines and associated facilities and services owned by the CWD in the vicinity of the existing University Avenue area shall be relocated by the DBT in conjunction with the West Bank Slope Unloading and construction of the proposed Abbey North Parking retaining wall, including installation of the proposed West Bank slope drains. Conceptual Plans are provided in Appendix UT-04. The DBT is responsible for design and construction of this water line relocation. This work includes fire hydrants, service connections, and miscellaneous appurtenances. Work shall be in accordance with Cleveland Water Department standards.



Final plans for this work shall be developed to minimize impacts to the proposed slope drain network installed as part of the West Bank Slope Unloading effort. The proposed waterline shall not be constructed within the zone of influence of the proposed Abbey North Parking retaining wall, and in no case closer than 10 feet from the wall. The zone of influence shall be considered to emanate at a slope of one (1) Vertical to one (1) Horizontal from the intersection of the finished grade with the front face of the wall. The invert elevation of the proposed waterline shall be established above this line.

The DBT shall repair or restore the slope drain network in the West Bank Slope Unloading area as necessary following water line installation. The waterline shall be constructed in trench using a trench box to minimize impacts to the finished slope and the drain network. Trenches shall be cut, the waterline placed, and the trench backfilled on the same day as they are excavated. Details of the trench construction requirements are provided in Appendix UT-11.

#### **6.8.2.2 E. 9<sup>th</sup> Street Extension Area**

Existing water lines and associated facilities and services owned by the CWD in the vicinity of the proposed E.9th Street Extension area shall be relocated during this project by the DBT. Conceptual plans are included in Appendix UT-12. The DBT is responsible for design and construction of this water line relocation. This work includes fire hydrants, service connections, and miscellaneous appurtenances. Work shall be in accordance with Cleveland Water Department standards.

#### **6.8.3 Other Utility Facility Relocations**

Additional utility facility relocations, modifications and adjustments may be necessary as a result of the details of the DBT's final design. All such utility facility relocations, modifications and adjustments shall be coordinated by the DBT with the affected utility. All such utility facility relocations, modifications and adjustments shall be executed by the DBT or the affected utility owner as appropriate.

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## **7 RAILROADS**

The DBT is responsible for all coordination with affected railroads. The DBT is directed to the Railroad Agreements included in Appendix RR.

### **7.1 GENERAL**

The DBT may perform work in the immediate vicinity of, under or over several active rail lines during execution of the work included in CCG1. The affected railroads include the Norfolk Southern Corporation (NS), CSX Transportation (CSX), the Greater Cleveland Regional Transit Authority (GCRTA) and the Flats Industrial Railroad (FIR). The Department will enter into Standard Construction Agreements with each of these railroads. The DBT's operations shall be conducted in accordance with these agreements and any applicable Special Provisions, Special Clauses, or Construction Requirements. The DBT shall be responsible for coordination with each of these railroads. The DBT shall be responsible for making application for and acquiring all necessary pipeline crossing permits for the execution of CCG1 from the affected railroad.

#### **7.1.1 Norfolk Southern Corporation**

The Conceptual Plans have identified two (2) structures crossing Norfolk Southern Corporation (NS) facilities by the proposed highway improvements within the Project limits of CCG1. The proposed crossings occur at the existing Abbey Avenue Bridge over NS track; and at approximate Station 139+75 Centerline of Right-of-Way and Construction I-90 westbound (approximate, MP B-184.33 of the Lake Erie District / Dearborn Division NS tracks). The proposed I-90 westbound structure will pass through the existing NS aerial easement and above an existing NS elevated structure carrying two (2) tracks.

The Conceptual Plans have identified two (2) pipeline (storm drainage conduit) crossings of NS facilities by the proposed highway improvements within the Project limits of CCG1. The proposed crossings occur at approximate Station 141+00 Centerline of Right-of-Way and Construction I-90 westbound (approximate MP B-184.31 of the Lake Erie District / Dearborn Division NS tracks); and at approximate Station 126+30 Baseline of Conceptual E.9<sup>th</sup> Street Storm Sewer Outfall (approximate MP B-184.21 of the Lake Erie District / Dearborn Division of the NS tracks). In both cases, the proposed pipeline will pass through the ground under an existing NS elevated structure carrying two (2) tracks. In the case of the crossing at approximate MP B-184.31 one (1) manhole is proposed on the ground beneath the NS aerial easement; however, the DBT may propose other permanent or temporary works within this easement. In the case of the crossing at approximate MP B-184.21, no manholes are proposed on NS right-of-way.

The DBT may also conduct other construction operations above, under and around the existing NS elevated structure in the public right-of-way, within the Project limits. Additional aerial and underground utility crossings of NS property and/or facilities may also be required as part of this Project.

#### **7.1.2 CSX Transportation**

The Conceptual Plans have identified two (2) structure crossings of CSX Transportation, Inc. (CSX) facilities by the proposed highway improvements within the Project limits of CCG1. The proposed

crossings occur at approximate Station 155+75 Centerline of Right-of-Way and Construction I-90 westbound (approximate MP BJB – 74.07 of the CSX Willow Industrial Track, Cleveland Subdivision); and at approximate Station 709+75 Baseline of Ramp A5 (approximate MP BJB – 74.09 of the CSX Willow Industrial Track, Cleveland Subdivision). The proposed I-90 westbound and Ramp A5 structures will pass through the existing CSX right-of-way and over two (2) existing CSX tracks.

The Conceptual Plans have identified two (2) pipeline crossings (storm drainage conduit) of CSX Transportation, Inc. (CSX) facilities by the proposed highway improvements within the Project limits of CCG1. The proposed crossings occur at approximate Station 155+75 Centerline of Right-of-Way and Construction I-90 westbound (approximate MP BJB – 74.05 of the CSX Willow Industrial Track, Cleveland Subdivision); and at approximate Station 127+00 Baseline of Conceptual E.9<sup>th</sup> Street Storm Sewer Outfall (approximate MP BJB - 73.86 of the CSX Willow Industrial Track, Cleveland Subdivision). In the case of the crossing at approximate MP BJB – 74.05, the proposed pipeline will pass under two (2) existing CSX tracks. No manhole locations are currently proposed within the existing CSX right-of-way by the Conceptual Plans. In the case of the crossing at approximate MP BJB - 73.86, the proposed pipeline will pass under one (1) existing CSX track. One manhole location is currently proposed within the existing CSX right-of-way by the Conceptual Plans, and the continuation of the drainage conduit across CSX right-of-way to the Cuyahoga River is proposed. For the proposed East 9<sup>th</sup> Street extension outfall sewer (or any other locations), the DBT shall be responsible for obtaining from CSX a temporary at-grade crossing permit. The DBT shall be responsible for paying all fees and incorporating CSX processing time into their overall project schedule.

The DBT may also conduct other construction operations above, under and around the existing CSX tracks in the public right-of-way, within the Project limits. Additional aerial and underground utility crossings of CSX property and/or facilities may also be required as part of this Project.

### **7.1.3 Greater Cleveland Regional Transit Authority**

The Conceptual Plans have identified three (3) structure crossings of Greater Cleveland Regional Transit Authority (GCRTA) facilities by the proposed highway improvements within the Project limits of CCG1. The proposed crossings occur at approximate Station 165+50 Centerline of Right-of-Way and Construction I-90 westbound (approximate Station 28+25 of the GCRTA tracks); approximate Station 700+50 Baseline of Ramp A5 (approximate Station 27+25 of the GCRTA tracks); and at approximate Station 23+00 Centerline of Construction Proposed E.9<sup>th</sup> Street (approximate Station 41+00 of the GCRTA tracks). The proposed I-90 westbound, Ramp A5 and E.9<sup>th</sup> Street structures will pass through the existing GCRTA easement through NS property and over two (2) existing GCRTA tracks.

The Conceptual Plans have identified one (1) aerial pipeline (storm sewer conduit) crossing of Greater Cleveland Regional Transit Authority (GCRTA) facilities by the proposed highway improvements within the Project limits of CCG1. The proposed crossing occurs at approximate Station 109+50 Baseline of Conceptual E.9<sup>th</sup> Street Storm Sewer Outfall (approximate Station 42+00 of the GCRTA tracks). The

proposed pipeline will pass through the existing GCRTA easement through NS property and over two (2) existing GCRTA tracks.

The DBT may also conduct other construction operations above, under and around the existing GCRTA facilities in the public right-of-way, within the Project limits. Additional aerial and underground utility crossings of GCRTA property and/or facilities may also be required as part of this Project.

#### **7.1.4 Flats Industrial Railroad**

The Conceptual Plans have identified one (1) structure crossing of Flats Industrial Railroad (FIR) track by the proposed highway improvements within the Project limits of CCG1. The proposed crossing occurs at the existing Abbey Avenue Bridge over the FIR track. The existing Abbey Avenue Bridge will undergo minor structural modifications. The DBT may also conduct other construction operations above and around the existing FIR track in the public right-of-way, within the Project limits, upon adequate notification to the FIR.

### **7.2 RAILROAD AGREEMENTS**

The Department has entered into, or is in the process of entering into Standard Construction Agreements with each of the affected railroads. The DBT is directed to the draft Railroad Agreements included in Appendices RR-01, RR-02 and RR-03 for the CSX, NS and GCRTA, respectively. ODOT's State Rail Coordinator is responsible for development and execution of all Railroad Construction Agreements and will provide copies of executed Railroad Construction Agreements to the DBT upon execution by ODOT and the applicable railroad.

### **7.3 RAILROAD PROVISIONS**

#### **7.3.1 Norfolk Southern Corporation**

The DBT shall be responsible for all technical coordination and drawing reviews with NS, as well as construction and flagman scheduling during subsequent construction phases. (Refer to Appendix RR-05 for applicable special provisions to the NS Agreement.)

#### **7.3.2 CSX Transportation**

The DBT shall be responsible for all technical coordination and drawing reviews with CSX, as well as construction and flagman scheduling during subsequent construction phases. (Refer to Appendix RR-04 for applicable special clauses to the CSX Agreement.)

#### **7.3.3 Greater Cleveland Regional Transit Authority**

The DBT shall be responsible for all technical coordination and drawing reviews with GCRTA, as well as construction; and flagman payment and scheduling during subsequent construction phases. The costs for the flagman will not be compensated separately and shall be included in the lump sum price proposal. (Refer to Appendix RR-06 for applicable special clauses to the GCRTA Agreement.)

#### **7.3.4 Flats Industrial Railroad**

The DBT will be responsible for all technical coordination and drawing reviews with FIR, as well as construction and flagman scheduling during subsequent construction phases. (Refer to Appendix RR-09 for applicable special clauses to the FIR Agreement.)

#### **7.4 GCRTA SPECIFICATIONS**

The DBT shall comply with all GCRTA Specifications in the execution of CCG1. (Refer to Appendix RR-07 for the GCRTA Standards.)

#### **7.5 RAILROAD PIPELINE CROSSING PERMITS**

The DBT shall be responsible for acquiring all necessary pipeline crossing permits for the execution of CCG1 from the affected railroad, including paying all fees. Currently identified pipeline crossing locations are defined in Section 7.1.

All permits for the underground and aerial crossings associated with the E.9<sup>th</sup> Street Storm Sewer Outfall shall be acquired by the DBT and shall list the City of Cleveland Department of Water Pollution Control as the Owner. The DBT shall provide copies of the permit application form and all associated documents to the Engineer, the ODOT District 12 Utility Coordinator, the ODOT State Rail Coordinator and the City of Cleveland Department of Water Pollution Control.

All permits for the underground crossings associated with the East Bank Outfall Sewer shall be acquired by the DBT and shall identify ODOT as the Owner. The DBT shall provide copies of the permit application form and all associated documents to the Engineer, the ODOT District 12 Utility Coordinator and the ODOT State Rail Coordinator.

## **8 RIGHT-OF-WAY**

### **8.1 GENERAL**

ODOT will acquire all temporary and permanent right-of-way within the proposed construction limits necessary for the Project. The Right-of-Way Property Map included in the Final Right-of-Way Plans indicates the existing right-of-way lines and those parcels being acquired for the Project. The Right-of-Way Property Map also indicates any permanent and/or temporary easements being acquired by ODOT for the Project. The Design Build Team (DBT) shall not enter into negotiations for purchase of any property or property rights identified within the Right of Way Property Map. Right of possession of the Site and the improvements made thereon by the DBT shall remain at all times with ODOT. The DBT's right to entry and use of the Site arises solely from permission granted by ODOT under the Contract. Refer to Appendix RW-03 for Final Right of Way Plans.

The DBT will be provided access to each parcel identified in the right-of-way plans as the parcel is cleared. The status of each parcel is indicated in Appendix RW-01 - Right-of-Way Acquisition Schedule.

ODOT will provide an acquisition status report at the time the contract has been awarded. In addition, ODOT will provide the DBT with monthly reports regarding the status of the acquisition process for parcels for which access was not provided at the award of the contract. ODOT will provide written notification to the DBT of the availability of each required parcel and notify the DBT of any access restrictions that may be applicable. The DBT shall not be allowed access to any parcel until written notification is provided. Refer to Appendix RW-01 for the acquisition status.

### **8.2 OWNER REQUESTED ADDITIONAL RIGHT-OF-WAY**

If the Department determines that additional right-of-way is required the DBT, acting as an agent on behalf of ODOT, shall provide acquisition services for the additional right-of-way. Individuals engaged in right-of-way acquisition shall be selected from ODOT's preapproved list. Right-of-way acquisition services shall include project management, title research, appraisal, negotiation, closings, relocation assistance services and property management. The DBT shall provide right-of-way plans and legal descriptions as well as associated survey work, including staking of right-of-way. Appraisal review must be conducted by an independent third party. ODOT will be responsible for the appraisal review contract. The DBT must coordinate all appraisal assignments with ODOT before authorizing an appraiser to prepare an appraisal report. ODOT will file the appropriation for any parcel where a condemnation action is necessary. ODOT will retain authority for approving just compensation, relocation benefits and administrative/case settlements. ODOT must issue a "Notice to Commence" right-of-way acquisition to the DBT prior to any work beginning. ODOT must also issue a Notice to Commence Construction to the DBT once the property has been acquired prior to commencing construction on the property. The DBT will not be responsible for the actual cost of purchase of right-of-way, including utility easements, as part of the Project. The DBT shall carry out the responsibilities as outlined on the Office of Real Estate Scope Definitions for Right-of-Way Services. (Refer to Appendix RW-02.)

During the acquisition process, and for a period of five years after final payment is made to the DBT for any phase of the work, or until the State has indefeasible title to the property, all Project documents and records not previously delivered to ODOT, including but not limited to design and engineering costs, construction costs, costs of acquisition of rights-of-way, and all documents and records necessary to determine compliance with the laws relating to the acquisition of rights-of-way and the costs of relocation of utilities, shall be maintained and made available to ODOT for inspection or audit. Throughout the design, acquisition, and construction phases of the Project, copies of all documents/correspondence shall be submitted to ODOT.

### **8.3 MONUMENT CONSTRUCTION**

The DBT shall construct items associated with monument assemblies, reference monuments, right-of-way monuments, and any other items associated with monuments according to C&MS 604. Monuments on ODOT-maintained facilities shall be in accordance with ODOT standards. Monuments on City of Cleveland-maintained facilities shall be in accordance with City of Cleveland standards and procedures described in DR-10, Item 604.9 - Monument Assemblies.

### **8.4 PRIVATE PARKING LOT CONSTRUCTION**

The proposed right-of-way limits impact existing private parking on several parcels within the project. In order to mitigate the loss of parking on these parcels, the DBT shall be responsible for construction of replacement parking. The DBT shall ensure that temporary parking is made available to the affected owners at all times while existing parking is removed and replacement parking is being constructed. See Section 12.2.4 for additional Parking Lot requirements.



## **9 GEOTECHNICAL**

### **9.1 GOVERNING REGULATIONS**

The DBT shall conduct all Work necessary in accordance with current practices and with due diligence in all areas of engineering including but not limited to geotechnical exploration, analysis, design and construction.

Governing regulations are listed in Section 1.17, and supplemental specifications are listed in Section 1.18. Conceptual plans and additional reference documents are addressed in Section 1.4. In the event of a conflict among the standards listed in Section 1.17 related to geotechnical engineering, the Department's standards shall take precedence.

### **9.2 PROJECT SPECIFIC REQUIREMENTS**

#### **9.2.1 West Slope Excavation (Sta. 128+00 to 134+50)**

A pier stabilization project for the existing CUY-90-1524 bridge was constructed in 1999. The west end pier and pier 1 located in the west end slope above the Cuyahoga River were identified as having moved as much as nine (9) inches over the life of the structure. The slope was found to be unstable, moving the substructure and causing an expansion joint to close in the truss superstructure. The stabilization project constructed an underground tied-back drilled shaft structure to hold the slope. A 7,000-ton section of steel truss superstructure was relocated three (3) inches in 1999 to relieve built-up stress in the steelwork.

The section of the steel truss superstructure was relocated about 3 ½ inches in 2009 to open the expansion joint that had closed again.

Monitoring began in 1985 with field survey measurements. Inclometers and piezometers were first installed in 1994. During the course of the 1999 project, instrumentation and monitoring points were installed to gather information to evaluate changing conditions and document the performance of the constructed stabilization project. Monitoring of the existing bridge, stabilization structure, and slope has been performed regularly ever since.

ODOT is prescribing stabilization construction for the west slope prior to construction of the viaduct bridge. The Stabilization consists of removal of the cold storage building, soil excavation, and installation of vertical and horizontal drains. The DBT shall construct the prescribed stabilization in accordance with the West Bank Grading Plans presented in Appendix GE-01, and Horizontal and Vertical Drains presented in GE-11.

#### **9.2.2 Supplemental Subsurface Explorations**

ODOT has provided an extensive subsurface exploration for all foreseeable locations of roadway, embankments, excavations, retaining walls and bridge foundations. This exploration may not be thorough and complete. This exploration information, in the form of boring logs, soil profile plan sheets,

testing results and reports, along with historic explorations, are presented in the contract documents. Laboratory testing results, instrumentation data, and detailed reports regarding the instability of the west slope of the Cuyahoga River Valley, as it relates to the existing I-90 Viaduct Bridge and proposed viaduct bridge alignments, are also included in the contract documents. All exploration information is representative of site conditions at the time and location of the exploration.

Proposers are responsible for reviewing and analyzing the geotechnical information provided with the RFP. Soil samples and rock cores obtained to develop the Soil Profile that were not consumed by testing are available for viewing at the ODOT Office of Geotechnical Engineering, 1600 West Broad Street, Columbus, OH.

Soil and groundwater conditions are only known at the exploration locations at the time of the explorations. Bedrock data is only known at the locations of rock cores obtained at boring locations. Interpretation and interpolation between exploration locations shall be at the sole risk of the Proposer. It is the Proposer's responsibility to make interpretations and draw conclusions with respect to the character of the geotechnical materials encountered and their impact upon its work.

ODOT plans to provide an opportunity for each Proposer to obtain additional geotechnical information at ODOT's expense. Because the geotechnical information necessary for each Proposer varies with each Proposer's design, it is recognized that the subsurface information provided with the RFP may not provide all the geotechnical information that the Proposer determines is necessary. Therefore, ODOT will provide, at its own cost, additional geotechnical exploration as directed by the Proposers, subject to the limitations as provided herein, to be known as the "Supplemental Boring Program." Additional explorations will be provided at the Proposer/DBT's expense as described at the end of this section.

The Proposer may submit to Pre-bid, in writing, a Supplemental Boring Program detailing the locations (by station and offset) and bottom elevations of up to two (2) boring locations, no later than seven (7) days after the department announces the Short-Listed DBTs, which can be found in the selection process calendar in the proposal. Late submittals will not be accepted. Failure to submit such a Boring Program by said date will constitute a conclusive presumption that the Proposer has determined that it does not require any additional geotechnical data to properly design, construct and price the work, or that the Proposer intends to obtain such data at its expense. ODOT will make every effort to locate the borings where requested. The borings will be performed at the locations requested, except that proposed boring locations within 25 feet of another will be averaged to one proposed location. If a Proposer's boring is averaged with another Proposer's boring, neither Proposer will be allowed an additional boring. Seven (7) days after the proposed boring locations are submitted by the DBTs, the locations of all planned borings will be distributed to all Proposers in writing, keeping Proposers anonymous.

The Supplemental Boring Program will be performed by ODOT in-house staff or an independent, qualified, drilling contractor, utilizing rotary drilling techniques. The borings will be inspected by a qualified inspector working for ODOT, and boring locations and elevations will be established by survey

personnel provided by ODOT. At the option of the Proposer, the Proposer may have a maximum of one on-site person to witness the drilling, sampling, testing and coring. All such on-site persons shall not interfere with the operation of the drillers and inspector, and shall coordinate transportation to the drilling site with ODOT.

The Department's drill crew or drilling contractor will be prepared to conduct the following sampling and testing procedures in the Supplemental Boring Program: Standard Penetration Tests (SPT) and split-spoon samples at 5.0-foot intervals, ODOT laboratory classification testing on disturbed soil samples to the minimum requirements of the Specifications for Geotechnical Explorations, and NQ-size rock cores at 10-foot intervals with Rock Quality Designation and visual description. In the Supplemental Boring Program submittal, the Proposer is responsible for identifying SPT and split spoon samples at specific depths and elevations, and the total length and depth of rock coring. Furthermore, the Proposer may request up to three (3) thin-walled Shelby tube undisturbed samples per boring, identified by boring location and elevation interval. The Proposer shall identify any additional rock and soil testing to be conducted.

The state will perform the borings in the order of its choice. The Supplemental Boring Program Report, containing the final boring logs and laboratory test results, will be shared with all Proposers on or about **May 25, 2010**. The Soil Profile will be modified to include the additional information. Soil and rock samples that are not consumed by testing will be stored for inspection by the Proposers at the ODOT Office of Geotechnical Engineering Laboratory. Furthermore, if requested, all of the samples not consumed by testing, including disturbed samples, undisturbed samples, and rock cores, will be turned over to the DBT or disposed of 60 days after the contract is awarded.

The actual locations, shape, and other geometrics of the project features will be determined by the DBT within certain constraints set forth in the RFP and Contract. Beyond the aforementioned Supplemental Boring Program, it is the responsibility of each Proposer to determine the need for and conduct additional subsurface explorations as it deems necessary to familiarize itself completely with all pertinent existing subsurface conditions, and thus allow the Proposer to properly design, price, and construct the Project. Proposal submission will be considered conclusive evidence that the Proposer has determined that it has performed a reasonable site exploration. Subsurface explorations refer to geotechnical borings, cone penetration tests, geophysical methods, and other in-situ testing methods; and laboratory tests conducted to support the analysis and design of subgrades, embankments, fills, bridges, walls, and large culverts.

After the award of the contract, if the DBT determines additional subsurface explorations are necessary to properly design and construct the Work, the DBT shall perform the additional subsurface explorations and analysis at its own expense. The DBT shall selectively locate additional subsurface explorations on the basis of field observations, and design considerations. Location of explorations shall be as topography, site conditions, soil conditions, and design factors dictate. The DBT shall add all additional

subsurface exploration information to the provided Soil Profile, in accordance with the Specifications for Geotechnical Explorations.

For all additional subsurface explorations performed at the Proposer/DBT's expense, the Proposer/DBT shall secure an access permit from the appropriate agency, if required, which may require the preparation of an equipment access plan, description of equipment types, a plan of the test locations, etc. The Proposer/DBT shall adhere to all traffic control requirements when taking samples on existing roadways. A traffic control plan may be required. Additional subsurface explorations may take place at any time before or after submission of the Proposal. In conjunction with Section 8.1, the Proposer/DBT shall not enter any private property without permission from the private property owner. If prior to project award, the Proposer shall not enter any private property acting as an agent of the State of Ohio. If prior to award, the Proposer wishes to enter State of Ohio property, they must apply for the proper permit through the ODOT District 12 Office of Permits. After award, the selected DBT may enter any State of Ohio property in the project limits at any time, and parcels not yet purchased by the State of Ohio for this project may not be accessible without specific permission from the property owner. All subsurface explorations, including sampling and laboratory testing, shall be performed in accordance with the latest Specifications for Geotechnical Explorations, AASHTO standards, and ASTM standards. The DBT shall perform all laboratory testing at an ODOT pre-qualified geotechnical testing laboratory.

### **9.3 DESIGN REQUIREMENTS**

#### **9.3.1 Geotechnical Design Reports**

All geotechnical design and additional geotechnical explorations performed by the DBT shall be completed and submitted to ODOT in a report format following the guidelines of Section 700 of the Specifications for Geotechnical Explorations.

#### **9.3.2 Foundation Analysis and Design**

The DBT shall use the subsurface exploration information provided along with any supplemental information gathered to design foundations for each structure. The DBT shall exercise due diligence when conducting geotechnical engineering design, and all technical aspects must be evaluated to find appropriate engineering solution for the design under consideration. The DBT shall perform all foundation analyses and designs using the Load Resistance Factor Design (LRFD) method. Allowable Stress Design Method (ASD) shall only be used where LRFD design methods do not yet exist in the specified documents.

The DBT shall produce and submit a Foundation Analysis and Design Report (Foundation Report as defined in BDM and SGE) for each structure. The report shall include all engineering analyses and design recommendations.

The DBT shall not utilize any existing or abandoned substructure or foundations for either the main spans or the approach spans of the I-90 Viaduct Bridge.

### **9.3.3 Geotechnical Instrumentation**

#### **9.3.3.1 ODOT Instrumentation**

ODOT has instrumented the west slope region of the existing I-90 Viaduct Bridge as described in Section 9.2. Data collection and reporting is ongoing, being performed by ODOT representatives, and will continue through the end of 2013.

A plan of existing and proposed instrumentation is included in Appendix GE-01. Existing instrumentation that is expected to be destroyed in performing the proposed work is identified. Existing instrumentation that must be protected by the DBT during construction is identified. Proposed instrumentation that will be installed by ODOT before and after the excavation of the west slope is also identified. If the DBT fails to protect the designated instrumentation, the DBT shall reinstall it at no cost to the Department within two weeks after instrument is destroyed. The DBT shall assist ODOT in gaining access to sites where new instrumentation will be installed, as identified on the plan. ODOT will maintain and read all instruments identified for the duration of the project.

Historic instrumentation reports and data are included in the Appendices. Data from readings taken during the course of the project will be provided to the DBT.

#### **9.3.3.2 Supplemental Instrumentation**

The DBT shall evaluate and determine the need for geotechnical instrumentation for the purpose of geotechnical design verification. The DBT shall submit a supplemental instrumentation plan to ODOT. As monitoring data becomes available, the DBT shall submit results, in the form of a supplementary instrumentation report, to ODOT on a regular basis. This report shall include a comparison of the results to design predictions. (Refer to Section 9.3.5 for settlement monitoring criteria.)

### **9.3.4 Vibration Monitoring and Control Requirements**

Blasting and explosives are not permitted on this project. The DBT shall control and monitor vibrations when performing construction activities near buildings, structures (including the existing Central Viaduct), or utilities that may be subject to damage from construction induced ground vibrations. Construction activities include pile driving, use of vibratory rollers, or any other operation that causes vibration. Vibration control and monitoring shall conform to C&MS 208.15, except as modified below:

- A. All references to blasting shall instead apply to construction activities.
- B. The vibration specialist's experience requirement shall apply for vibration monitoring and need not be specific to rock blasting projects.

The DBT shall conduct a pre-construction survey of any buildings, structures, and utilities located within limits determined by the vibration specialist. The DBT shall use a survey method acceptable to its insurance company. The DBT is responsible for any damage resulting from construction activities. If owners or occupants fail to allow access to a property for the pre-construction survey, the DBT shall send a certified letter to the owner or occupant, and shall make the notification effort and the certified

letter part of the pre-construction survey records. The DBT shall deliver a copy of the pre-construction survey to the Engineer before beginning construction operations at critical locations. Critical locations shall include, but not be limited to, existing bridges, utilities, the Annunciation Greek Orthodox Church, and the Norfolk Southern Vertical Lift Bridge over the Cuyahoga River. The DBT shall submit deliverables in accordance with C&MS 208.

### **9.3.5 Settlement Monitoring**

Where predicted primary settlements are more than 3.0 inches, the DBT shall install a minimum of two settlement platforms with no less than one platform for every 100 longitudinal feet of representative section. The settlement platforms shall be constructed in accordance with the Office of Geotechnical Engineering (OGE) Settlement Platform/Cells Details & Notes in Appendix GE-12.

The DBT shall submit the Settlement Monitoring Plan to ODOT. The DBT shall submit, at minimum, weekly monitoring reports as readings become available.

### **9.3.6 Reinforced Soil Slopes**

Reinforced soil slopes shall not be designed at a slope ratio less than one (1) Horizontal to one (1) Vertical. Reinforced soil slopes shall be designed in accordance with design procedures presented in the latest version of Publication No. FHWA NHI-00-043, "Mechanically Stabilized Earth Walls and Reinforced Soil Slopes." Geogrid for reinforced soil slopes shall be furnished and installed in accordance with the Special Provision, "Geogrid Reinforcement of Soil Embankment," presented in Appendix GE-07.

### **9.3.7 Subgrade Compaction and Proof Rolling**

The Contractor shall prepare suitable subgrade in conformance to C&MS 204. The contractor is responsible for identifying the method, location and dimensions (including depth) of subgrade stabilization in the plans. For areas where the proposed subgrade is at the same elevation as existing subgrade or is below existing elevation, the contractor shall use the guidelines in ODOT Geotechnical Bulletin 1, Plan Subgrades, Section H, to identify any unsuitable existing subgrade soil and rock. For areas where the proposed subgrade shall be constructed using embankment materials, the restrictions listed in C&MS 203.03 on embankment materials shall apply.

Permanent rutting of subgrade in excess of ½ inch shall be considered failure. In addition, elastic (rebound) movement in excess of ½ inch shall be considered failure.

## **10 BUILDING DEMOLITION**

### **10.1 BUILDING REMOVALS**

The DBT shall remove all existing buildings limits per the project right of way plans. See Appendix RW-03. The Contractor shall remove and dispose of all objects encountered on the building removal parcels not otherwise designated for salvage or reuse, including pavements, sidewalks, driveways, minor structures and obstructions, fencing, pipes, culverts, and underground tanks. See Section 5 and 16 for additional Historic Mitigation requirements. The use of explosives is forbidden for the demolition of structures on this project. The DBT shall coordinate and pay for all utility disconnects. See Section 6 for additional details.

### **10.2 ASSESSMENT/INSPECTION**

The Department will perform regulated material assessment/inspection of buildings to be removed on the Project in accordance with Section 5 - Environmental Commitments. The DBT shall remove and dispose of all hazardous materials in accordance with Section 5 - Environmental Commitments. Other regulated material shall be removed and disposed of according to applicable regulations.

### **10.3 DEMOLITION**

Once the remediation work is complete and the disposal is verified, the DBT shall be responsible for the demolition and disposal of all structures. The cost associated with demolition and disposal shall be included in the DBT's Proposal Price. Appendix RW-04 lists information regarding properties associated with this project.

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**11 PAVEMENTS**

The DBT shall construct pavements as required by this section. Subgrade requirements are indicated in Section 9.3.7. For drainage requirements including underdrains see Section 13 - Drainage. Requirements for Specialty Resurfacing/Paving are included in Section 16 - Aesthetics and Enhancements.

**11.1 PAVEMENT DESIGN**

Pavement compositions for the Project shall be as follows. Item numbers reference C&MS and notes in Section 11.2 modifying C&MS.

The DBT is responsible for reviewing all routes to be resurfaced in accordance with 11.1.5 and 11.1.11 and determining the necessary types and quantities of Item 250 pavement repairs. Repairs on most routes/streets are expected to consist of zero to five percent of the resurfacing area. Repairs are not to exceed ten percent of the resurfacing area.

The DBT will be responsible for maintaining all pavements resurfaced in sections 11.1.5 and 11.1.11 until the end of the project. At the end of the project, the DBT will be responsible for performing Item 250 repairs to all disintegrated areas including but not limited to delamination, potholes, raveling and alligator cracked pavement. The DBT will also be responsible for sealing cracks in accordance with the requirements of Item 423 Cracksealing, Type IV.

The DBT is responsible to review all routes and pavements constructed under Section 11. The DBT shall determine and complete the necessary amounts of adjustments and / or replacements of the roadway castings for the safe travel of the public. All castings shall be "bicycle friendly".

**11.1.1 Full Depth Pavement for New or Reconstructed Urban Interstate**

New pavement and replacement pavement for I-90 shall consist of:

1.5 inches	443	Stone Matrix Asphalt Concrete, 12.5mm, PG 70-22M (446)
	407	Tack Coat for Intermediate Course
1.75 inches	442	Asphalt Concrete Intermediate Course, 19mm, Type A (446)
	407	Tack Coat
8 inches	302	Asphalt Concrete Base
6 inches	304	Aggregate Base

(Note: Shoulder composition shall be the same as mainline pavement)

### 11.1.2 Full Depth Pavement for New or Reconstructed Ramps

New pavement and replacement pavement for ramps shall consist of:

12 inches	452	Non-Reinforced Portland Cement Concrete Pavement
6 inches	304	Aggregate Base

(Note: Shoulder composition shall be the same as ramp pavement, including doweled joints.)

### 11.1.3 Full Depth Pavement for Urban Arterial, Collector and Local Roads on New Alignment

New pavement and replacement pavement for urban arterial, collector and local roads shall consist of:

10 inches	452	Non-Reinforced Portland Cement Concrete Pavement
6 inches	304	Aggregate Base

### 11.1.4 Full Depth Pavement for Urban Arterial, Collector, and Local Roads on Existing Alignment

For City of Cleveland Street on existing alignment, pavement shall match existing composition provided composition meets or exceeds the following minimum City of Cleveland requirements.

1.25 inches	446	Asphalt Concrete Surface Course, Type 1H
	407	Tack Coat for Intermediate Course
1.75 inches	446	Asphalt Concrete Intermediate Course, Type 2, PG 64-28
	407	Tack Coat
9 inches	305	Portland Cement Concrete Base
6 inches	304	Aggregate Base
	or	
10 inches	452	Non-Reinforced Portland Cement Concrete Pavement
6 inches	304	Aggregate Base

### 11.1.5 Pavement Resurfacing for Urban Arterial, Collector and Local Road

Resurfacing urban arterial, collector, and local roads as indicated in Section 12 - Roadway and Appendix PA-02 shall have the following pavement build.

1.25 inches	446	Asphalt Concrete Surface Course, Type 1H
	407	Tack Coat for Intermediate Course

1.75 inches	446	Asphalt Concrete Intermediate Course, Type 2, PG 64-28
	407	Tack Coat
	250	Pavement Repairs
3 inches	254	Pavement Planing

**11.1.6 Shared Use Paths**

1.25 inches	448	Asphalt Concrete Surface Course, Type 1, PG 64-22
	407	Tack Coat for Intermediate Course
1.75 inches	448	Asphalt Concrete Intermediate Course, Type 2, PG 64-22
6 inches	304	Aggregate Base

**11.1.7 City of Cleveland Apron & Drive Walks and Sidewalks (Concrete)**

**Downtown, Commercial Districts & Commercial Drives:**

Apron and Drive Walks	8 inches	608	Walks, Curb Ramps and Steps
Sidewalk	6 inches	608	Walks, Curb Ramps and Steps

**Residential:**

Apron and Drive Walks	6 inches	608	Walks, Curb Ramps and Steps
Sidewalk	4 inches	608	Walks, Curb Ramps and Steps

(Note: 2 ½-inch 304 Aggregate Base required for all aprons, drive walks and sidewalks.)

**11.1.8 City of Cleveland Bus Pads**

If bus stops are encountered within the limits of roadways, bus pads conforming to City of Cleveland Standard Construction Drawing BP-1 (4-8-08) shall be installed.

**11.1.9 Curbs**

Use light gray granite curb per City of Cleveland Standard Construction Drawing CR 1 for all City of Cleveland maintained roads (per Section 1.8) that are north of I-90 and east of the Cuyahoga River.

Use Type 2A curb for other concrete roads.

Use Type 6 curb for all other locations.

### 11.1.10 Parking Lots

The pavement buildup for parking lots is as below, unless noted otherwise:

1.5 inches	448	Asphalt Concrete Surface Course, Type 1, PG 64-22
	407	Tack Coat for Intermediate Course
6 inches	301	Asphalt Concrete Base
6 inches	304	Aggregate Base

### 11.1.11 Pavement Resurfacing for Interstate and Ramps

The Alternate Routes that have a Flexible Pavement Surface shall be resurfaced prior to implementation of Alternate Route Plan as indicated below. After substantial completion and prior to implementation of Bi-Directional Condition, each Alternate Route's Flexible Pavement shall be resurfaced by planing 1.5 inches, tack coat and 1.5 inches of surface course.

1.5 inches	442	Asphalt Concrete Surface Course, 12.5 mm, Type A (446)
	407	Tack Coat for Intermediate Course
1.75 inches	442	Asphalt Concrete Intermediate Course, 19 mm, Type A (446)
	407	Tack Coat
	250	Pavement Repairs
3 inches	254	Pavement Planing

## 11.2 PAVEMENT NOTES

### 11.2.1 C&MS 442 - Asphalt Concrete Surface Course, 12.5 mm, Type A (446)

The coarse aggregate for this item shall be limited to a blend of air cooled blast furnace slag (ACBFS) or Ontario Trap Rock and limestone. The Contractor shall use a minimum of 50% of ACBFS or Ontario Trap Rock with limestone comprising the remaining percentage.

When ACBFS is used for a fraction of the coarse aggregate, all requirements of C&MS 442 apply, except use an Ndes of 50, an Nmax of 75 and provide a total asphalt binder content greater than or equal to 6.5 percent. These requirements do not apply if ACBFS makes up 100% of the coarse aggregate.

### 11.2.2 C&MS 443 - Stone Matrix Asphalt Concrete, 12.5mm, PG 70-22M, (446)

The coarse aggregate for this item of work shall be limited to Ontario Trap Rock.

### **11.2.3 C&MS 452 – Non-Reinforced Portland Cement Concrete Pavement**

The contraction and/or expansion joints in the proposed ramp shoulders shall be constructed with dowels, as per the ramp pavement and as detailed in SCD BP-2.2.

### **11.2.4 C&MS 446 - Asphalt Concrete Surface Course, Type 1H**

The gradation for this item shall as per table 441.02-1, Type 1 Surface Medium.

In addition, the coarse aggregate for this item shall be limited to a blend of air cooled blast furnace slag (ACBFS) or Ontario Trap Rock and limestone. The Contractor shall use a minimum of 50% of ACBFS or Ontario Trap Rock with limestone comprising the remaining percentage.

### **11.2.5 C&MS 448 - Asphalt Concrete Surface Course, Type 1, PG 64-22**

The course aggregate for this item shall be limited to limestone.

### **11.2.6 C&MS 448 – Asphalt Concrete Intermediate Course, Type 1, Under Guardrail, PG 64-22**

This item shall be placed under all guardrails along the I-90 mainline and ramps.

### **11.2.7 Paving Under Guardrail**

This operation shall include preparation of the graded shoulder using C&MS 209-Linear Grading and paving under the guardrail using three (3) inches of C&MS 448 Asphalt Concrete, Type 1, PG64-22, Under Guardrail. The width shall be two (2) feet wide.

C&MS 209 Linear Grading shall consist of excavating topsoil and placing granular material as specified in the plans and in accordance with the following:

All collected debris and topsoil including rhizomes, roots and other vegetative plant material shall be removed and disposed of as specified in C&MS 105.17.

The removed material shall be replaced with compactable granular material conforming to C&MS 703.15 placed to grade and detailed on the typical section or as approved by the Engineer.

Paving under guardrail shall consist of placing C&MS 448 to the depth specified using one of the following methods:

Method A: 1) Set guardrail posts

2) Place C&MS 448

Method B: 1) Place C&MS 448

2) Bore asphalt at post locations (may be omitted if steel posts are used)

3) Set guardrail posts

4) Patch around posts. The materials used for patching shall be an asphalt concrete approved by the Engineer. Patched areas shall be compacted using either hand or mechanical methods. Finished surfaces shall be smooth and sloped to drain away from the posts.

#### **11.2.8 Asphalt Concrete Surface Courses**

In addition to the gutter sealing requirements specified on SCD BP-3.1 and in C&MS 401.15, after completion of the surface course, the contractor shall seal, with a certified PG binder, the following locations:

- A. All castings including but not limited to monuments, manholes, water valves and catch basins.
- B. Butt joints and feather joints including bridge approaches.
- C. Forward joint for driveway asphalt and trailing joint when butting to existing asphalt drive.
- D. Perimeter of all pavement repairs when pavement repairs are not overlaid with asphalt concrete.

The material used shall be a certified C&MS 702.01 PG binder. The width of the sealer shall be two (2) inches.

#### **11.2.9 Longitudinal Joints (Flexible Pavements)**

Locate longitudinal joints in the surface course subject to the following requirements:

- A. Place the mainline pavement surface course with a single cold longitudinal joint located at the crown. A cold longitudinal joint is permitted between the shoulder and the mainline pavement. In five lane sections, a second cold joint is permitted between lanes 4 and 5. Note: Lane numbering begins with the no. 1 lane being the leftmost high speed lane. No other cold joints are permitted in the surface course of the mainline pavement.
- B. Place the ramp surface course with a single cold longitudinal joint located near the middle of the ramp's total width.
- C. At speed change lanes at ramp merge and diverge areas: place surface course on speed change areas within the same work day as adjacent mainline pavement.

#### **11.2.10 Planed Surfaces**

When paving existing streets, the duration of time between milling and placement of the intermediate course shall be no longer than one (1) day (24 hours). Likewise, the duration of time between placement of the intermediate course and placement of the surface course shall be no longer than seven (7) calendar days.

#### **11.2.11 C&MS 617 – Compacted Aggregate**

The material used for this item of work shall be limited to CCS, RPCC or RACP.

### 11.2.12 C&MS 407 – Tack Coat

**Description.** This work consists of preparing and treating a paved surface with a specialized anionic trackless asphalt emulsion, used primarily for hot mix asphalt construction. All requirements of ODOT 407 Tack Coat specification in the C&MS shall be met except as noted below.

**Material.** Conform to the following typical physical properties:

Parameter	Test Method	MIN.	MAX.
Saybolt Furol Viscosity, SFS @ 25°C	ASTM D88	15	100
Storage Stability, 24 hrs, %	ASTM D244	--	1
Storage Stability, 5 days, %	ASTM D244	--	5
Residue by Distillation, %	ASTM D244	50	--
Oil Distillate, %	ASTM D244	--	1
Sieve Test, %	ASTM D244	--	0.3

#### Test on Residue:

Penetration, @ 25°C,	ASTM D5	--	20
Softening Point Range Deg C	ASTM D36	65	--
Solubility,%	ASTM D2042	97.5	--
Original Binder DSR@82°C			
G*/SIN $\delta$ ,10 rad/sec	AASHTO T111	1	--

Note: Product should not contain filler such as clay, etc

**Equipment.** Provide adequate cleaning equipment and distributor. Use distributors designed, equipped, maintained, and operated to apply asphalt material at the specified rate per square yard (square meter) with uniform pressure over the required width of application. Ensure that the distributor includes a tachometer, pressure gauges, accurate volume measuring devices, or a calibrated tank. Mount an accurate thermometer with a range covering the specified application temperature for asphalt material at approximately center height of the tank with the stem extending into the asphalt material. Ensure that the distributor has a full-circulating system with a spray bar that is adjustable laterally and vertically. Ensure that the spray bar will maintain a constant height above the pavement under variable

load conditions. Supply each distributor with suitable charts showing truck and pump speeds and other pertinent application data necessary to obtain the required results. See manufacturer representative for correct distributor settings.

**Weather Limitations.** Do not apply the asphalt material if the surface temperature is below the minimum placement temperature for the pavement course to be placed, as specified in C&MS 401.06 Specification. Note: Subject to damage if frozen.

**Preparation of Surface.** Ensure that the surface is thoroughly clean and dry when the asphalt material is applied. Remove material cleaned from the surface and dispose of it as the Engineer directs.

**Application of Asphalt Material.** Uniformly apply the asphalt material with a distributor. Surface is to be clean and dry.

Note: NTSS-1HM not compatible with Cationic emulsions (CRS, CQS, CMS, CSS etc...)

All equipment should be thoroughly cleaned if cationic emulsion was previously present. If product is to be stored for an extended period of time the material should be agitated or gently circulated prior to use.

Nozzle spray pattern should be identical to one another along the distributor spray bar. The angle of the nozzle should be a 15 to 30 degree angle to the spray bar axis to maximize overlap.

NTSS-1HM should be applied at a rate of 0.04 to 0.08 gallons per square yard. Recommended application temperature is 140°F to 180° F. Do not exceed 180°F.

For irregular areas such as driveways and intersections, apply the asphalt material using a method the Engineer approves.

Before placing a surface course onto an intermediate course, apply a tack coat on the intermediate course.

Apply the tack coat in a manner that offers the least inconvenience to traffic and that allows one-way traffic without pickup or tracking. Only apply the tack coat to areas that will be covered by a pavement course during the same day.

The Engineer and Manufactures Representative will approve the quantity, rate of application, temperature, distributor settings and areas to be treated before application of the tack coat. Please contact the manufacturer representative for distributor settings and spray nozzles. The Engineer will determine the actual application in gallons per square yard (liters per square meter) by a check on the project. The application is considered satisfactory when the actual rate is within  $\pm 10$  percent of the required rate and the material is applied uniformly with no visible evidence of streaking or ridging.



The rate of application of the C&MS 407 Tack Coat and C&MS 407 Tack Coat for Intermediate Course shall be subject to adjustment as directed by the Engineer. Plan quantities indicate an average application rate of 0.075 gallons per square yard for Tack Coat and 0.045 gallons per square yard for Tack Coat for Intermediate Course.

### **11.3 REFERENCES**

See Appendix PA-01 for Pavement Core Report.

See Appendix PA-02 for Minimum Pavement Limits.

See Section 18.3.6 for information regarding Detour Routes.

See Section 18.8 for additional improvements to existing roadway network.

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## 12 ROADWAY

The DBT shall design and construct all roadways, parking lots and associated roadway items including, but not limited to earthwork, pavements, curbs, medians, islands, barriers, fence, incidentals and other roadside items. This section details the roadway and parking lot requirements for the Project, including the governing regulations and project-specific requirements. This section also defines the approximate Project and Work limits as well as the limits for removal of existing roadway and structure. Additionally, requirements specific to the Bi-Directional Condition are listed.

### 12.1 GOVERNING REGULATIONS

The governing regulations for ODOT and local facilities are indicated in Section 12.1.1 and 12.1.2. The DBT has the ability to modify the design of the Project with regard to adjustments to the physical design and/or function within the limitations provided in Section 1.7. Table 12-1 indicates changes to Location and Design, Volume 1 that govern this Project.

Table 12-1: Location and Design, Volume 1 Revisions

Section	Subject	Revised Language
105.1	Design Exceptions	The designer <del>should</del> <b>shall</b> call attention to any substandard design feature as soon as possible...
105.1	Design Exceptions	Design exceptions <del>should</del> <b>shall</b> be stand alone documents and <del>should</del> <b>shall</b> include attachments for clarity when needed.
201.3	Intersection Sight Distance	If intersections sight distance cannot be provided due to environmental or right-of-way constraints, then as a minimum, the stopping sight distance for vehicles on the major road <del>should</del> <b>shall</b> be provided.
201.3.1	Intersection Sight Distance	In making this determination, it <del>should</del> <b>shall</b> be assumed that the driver's eye is 3.5 ft. [1.08 m] above the roadway surface and the object to be seen is 3.5 ft. [1.08 m] above the surface of the roadway.
301.1.3	Curve Widening	Curve widening <del>should</del> <b>shall</b> be placed on the inside edge of the curve. Where spirals are used, the widening <del>should</del> <b>shall</b> begin at the TS and reach maximum width at the SC. On alignments without spirals, the widening <del>should</del> <b>shall</b> be developed over the same distance as the superelevation transition. See <b>Section 202.4</b> and <b>Figure 301-5a</b> . The transition ends <del>should</del> <b>shall</b> be rounded to avoid an angular break at the pavement edge and intermediate points <del>should</del> <b>shall</b> be widened proportionately. The longitudinal center joint and the centerline pavement marking <del>should</del> <b>shall</b> be placed equidistant from the pavement edges.
301.1.4	Pavement Tapers	Where traveled way widths decrease, the length of transition <del>should</del> <b>shall</b> be calculated using the following:

Section	Subject	Revised Language
301.2.3.1	Right Turn Lane Shoulder Width	The normal mainline shoulder width <del>should</del> <b>shall</b> still be maintained in advance of the diverging taper for the turn lane. The transition between the mainline shoulder width and the reduced shoulder width <del>should</del> <b>shall</b> take place during the span of the right turn taper.
301.2.5	Lateral Clearance	As a minimum, the designer <del>should</del> <b>shall</b> provide a shy line offset of at least 4 ft. [1.2 m].
304.4.2	U-Turn Median Openings	U-turn crossings <del>should</del> <b>shall</b> not be constructed in barrier-type medians.
305.3.1	Position of Curb – Urban Areas w/ less than 50 mph speed	Therefore, all curbs <del>should</del> <b>shall</b> be offset at least 1 foot [0.3 m] and preferably 2 ft. [0.6 m] from the edge of the traffic lane.
305.3.2	Position of Curb – Urban and Rural High Speed Areas	When it is necessary to use curbs on roads where the design speed is 50 mph [80 km/h] or greater, they <del>should</del> <b>shall</b> not be closer to the traffic than 4 ft. [1.2 m] or the edge of the treated shoulder, whichever is greater.
305.3.3	Curb/Guardrail Relationship	Although guardrail is not normally used on curbed roadways having design speeds of less than 50 mph [80 km/h], the same criteria used for roadways with design speeds of 50 mph [80 km/h] <del>should</del> <b>shall</b> be applied.
305.3.3	Curb/Guardrail Relationship	Regardless of the design speed of the roadway, barrier lateral offset (Guardrail and Concrete Barrier) <del>should</del> <b>shall</b> not be located closer than 4 ft. [1.2 m] to the roadway.
305.4.2	Curbed to Uncurbed Transitions	When an urban type section with curbs at the edge of pavement changes to a rural type section without curbs, the curb <del>should</del> <b>shall</b> be transitioned laterally at a 4:1 (longitudinal: lateral) rate to the outside edge of the treated shoulder or 3 ft. [1 m], whichever is greater.
305.4.3	Curbed Approach to Uncurbed Mainline	When a curbed side road intersects a mainline that is not curbed, the curb <del>should</del> <b>shall</b> be terminated no closer to the mainline edge of traveled way than 8 ft. [2.4 m] or the edge of the treated shoulder, whichever is greater.
306.2.5	Sidewalk – Cross Slope	Sidewalks <del>should</del> <b>shall</b> be constructed with a maximum cross slope of 0.02.
306.3.1	Curb Ramp Locations	Curb ramps <del>should</del> <b>shall</b> be provided at other intersections on multi-signal projects if at least one of the signals requires curb ramp work.
306.3.4	Curb Ramp Types	In all cases curb ramps <del>should</del> <b>shall</b> be located entirely within the marked crosswalks (where they exist).
306.3.4	Curb Ramp Types	Drainage grates or inlets <del>should</del> <b>shall</b> not be located within the crosswalk area, where wheelchair casters or canes tips may be caught.

Section	Subject	Revised Language
306.3.5	Detectable Warnings	Truncated domes <del>should</del> <b>shall</b> be used at the following locations:
307.5.1	Interchange Grading – Cross Roads	At a road crossing within an interchange area, bridge spill-through slopes <del>should</del> <b>shall</b> be 2:1, unless otherwise required by structure design. They <del>should</del> <b>shall</b> be flattened to 3:1 or flatter in each corner cone and maintained at 3:1 or flatter if within the interior of an interchange. Elsewhere in interchange interiors, fill slopes <del>should</del> <b>shall</b> not exceed 3:1.
307.5.2	Interchange Grading – Ramps	Roadside design for ramps <del>should</del> <b>shall</b> be based on the mainline grading concept.
401.1	Intersection Locations	The alignment and grade on the mainline roadway <del>should</del> <b>shall</b> , as a minimum, provide stopping sight distance as discussed in <b>Section 201.2</b> .
401.4.1	Intersection Area	The pavement surface within this "intersection area" <del>should</del> <b>shall</b> be visible to drivers within the limits of the minimum stopping sight distance shown on <b>Figure 201-1</b> .
401.4.1	Intersection Area	For this reason, edge of pavement profiles <del>should</del> <b>shall</b> be plotted and graphically graded to provide a smooth profile.
401.4.3	Profile at Stop Intersections	If these grade breaks are exceeded, they <del>should</del> <b>shall</b> be treated according to Note 3 on <b>Figure 401-3</b> .
502.2.2	Approaches to the Structure – Sight Distance	Sight distance on the roadways through an interchange <del>should</del> <b>shall</b> be at a minimum the required stopping sight distance and preferably should be Decision Sight Distance ( <b>Figure 201-6</b> ), particularly along entrances and exits.
601.1.2	Roadside Barrier Warrants – Slopes	<b>Figure 601-1</b> <del>should</del> <b>shall</b> be used to determine roadside barrier warrants for embankments.
602.1.1	Roadside protection – Location/Offset	Although variations from these offsets may occur as a result of reduced graded shoulder width, the face of guardrail <del>should</del> <b>shall</b> not be located closer than 4 ft. [1.2 m] to the edge of the traveled lane.
602.1.5.1	Guardrail with Curb (High Speed)	The curb height <del>should</del> <b>shall</b> be limited to 4 inches [100 mm] or less when used in conjunction with guardrail on high speed roadways.
603.1.1	Steel Beam Guardrail Posts	For guardrail installations to perform properly during an impact, adequate soil support must be provided for the posts in the guardrail run. To ensure this support is provided, 9.0 ft. [2.75 m] long posts <del>should</del> <b>shall</b> be specified at locations where the distance from the face of the barrier to the slope break point is less than 2.0 ft. [0.6 m].
802.2.9	Location of High Volume Drives	A new driveway <del>should</del> <b>shall</b> not be located where it will create an offset intersection opposite an existing street, highway, or major commercial driveway.

### 12.1.1 ODOT Facilities

In the event of a conflict among the standards listed in Section 1.17 related to roadway, the Department’s standards shall take precedence. The design of the mainline and ramps shall be according to the manuals and guidelines in Section 1.17 with the exception of approved design exceptions. Approved design exceptions for known substandard design features are available in the appendices. The DBT design shall meet the criteria established in the design exception documents.

The Interchange Justification Study (IJS) was approved as a basis for the design of this Project. The IJS is available in the appendices. It contains the operational aspects and the storage requirements of each intersection. It is based on many different factors: environmental, operational, geometric and safety.

### 12.1.2 Local Facilities

The DBT shall construct items on local roads according to the applicable local government agency-issued Standard Construction Drawing. If the local government agency does not have an appropriate Standard Construction Drawing, the DBT shall use ODOT SCDs.

## 12.2 PROJECT REQUIREMENTS

### 12.2.1 Work Limits and Project Limits

Project limits define limits of full-depth replacement. Work Limits, exclusive of Project Limits, define pavement resurfacing. The Stationing is based on CCG1 Roadway Engineering Conceptual Plans in Appendix LD-01. For bridge deck work, see Section 14 - Structures. See Appendix PA-02 for a plan view of the minimum paving limits.

Table 12-2 Minimum Work Limits

Alignment	Stationing
Proposed Mainline I-90 westbound	STA. 101+00 to STA. 178+00
Temporary Mainline I-90 westbound	STA. 500+00 to STA. 526+00
Existing Mainline I-90 eastbound/westbound	STA. 510+00 to STA. 526+00 (along Temporary Mainline I-90 westbound stationing)
Ramp A7 (I-90 westbound to I-90 westbound)	STA. 1000+00 to STA. 1011+00
Ramp A6 (I-90 westbound to W.14 <sup>th</sup> Street)	STA. 800+00 to STA. 818+99
Ramp A5 (southbound Ontario Street to I-90 westbound)	STA. 698+00 to STA. 720+00
Ramp A4 (southbound Existing E.9 <sup>th</sup> Street to I-90 westbound)	STA. 600+00 to STA. 615+00
Temporary Ramp A3 (southbound E.14 <sup>th</sup> Street)	Intersection with East 14 <sup>th</sup> Street to STA. 3000+00, continuing south to STA. 170+00 (Proposed Mainline I-90 westbound)

<b>Alignment</b>	<b>Stationing</b>
<b>Starkweather Avenue</b>	Proposed I-90 and I-71 footprint plus 150 feet (75 feet on each side of bridge)
<b>Kenilworth Avenue</b>	Proposed I-90 footprint plus 150 feet (75 feet on each side of bridge)
<b>Fairfield Avenue</b>	Proposed I-90 footprint plus 150 feet (75 feet on each side of bridge)
<b>W.14<sup>th</sup> Street / W.14<sup>th</sup> Street Extension</b>	STA. 100+00 to STA. 108+80
<b>Abbey Avenue</b>	From Gehring Street to W.11 <sup>th</sup> Street, including the proposed I-90 footprint
<b>University Road</b>	Cul-de-sac plus 50 feet northwest
<b>W. 13<sup>th</sup> Place</b>	Reconfigured W.13 <sup>th</sup> Place and University Road intersection plus 100 feet (50 feet each leg of intersection)
<b>W. 3<sup>rd</sup> Street</b>	Proposed I-90 footprint plus 150 feet (75 feet on each side of bridge)
<b>Canal Road</b>	Intersection with W. 9 <sup>th</sup> Street plus 150 feet (75 feet each leg of intersection), and proposed I-90 footprint plus 150 feet (75 feet on each side of bridge)
<b>E.14<sup>th</sup> Street</b>	STA. 10+02 to STA. 14+50 and continuing north to Carnegie Avenue
<b>Commercial Road</b>	STA. 10+00 to STA. 20+01
<b>Central Viaduct Way</b>	STA. 100+00 to STA. 105+77
<b>Ontario Street</b>	STA. 27+25 to STA. 40+75, including proposed I-90 footprint
<b>E.9<sup>th</sup> Street</b>	Intersection with Carnegie, continuing southeast to proposed I-90 bridge footprint plus 75 feet, and STA. 11+55 to STA. 26+60
<b>Broadway Avenue</b>	STA. 10+00 to STA. 24+73, plus 75' southeast
<b>Orange Avenue</b>	Intersection with E.14 <sup>th</sup> Street plus 75 feet each intersection leg, eastbound direction only
<b>Carnegie Avenue</b>	STA. 11+50 to STA. 27+50

Table 12-3: Minimum Project Limits

<b>Alignment</b>	<b>Stationing</b>
<b>Proposed Mainline I-90 westbound</b>	STA. 101+00 to STA. 178+00
<b>Temporary Mainline I-90 westbound</b>	STA. 500+00 to STA. 515+50
<b>Existing Mainline I-90 eastbound/westbound</b>	Structures only, STA. 510+75 to STA. 526+00 (along Temporary Mainline I-90 westbound stationing)
<b>Ramp A7 (I-90 westbound to I-90 westbound)</b>	STA. 1000+00 to STA. 1011+00

<b>Alignment</b>	<b>Stationing</b>
<b>Ramp A6 (I-90 westbound to W. 14<sup>th</sup> Street)</b>	STA. 800+00 to STA. 818+99
<b>Ramp A5 (southbound Ontario Street to I-90 westbound)</b>	STA. 698+00 to STA. 720+00
<b>Ramp A4 (southbound E.9<sup>th</sup> St. to I-90 westbound)</b>	STA. 600+00 to STA. 615+00
<b>Temporary Ramp A3 (southbound E.14<sup>th</sup> Street)</b>	STA. 3000+00 to STA. 170+00 (Proposed Mainline I-90 westbound)
<b>W.14<sup>th</sup> Street Extension</b>	STA. 100+00 to STA. 108+80
<b>Abbey Avenue</b>	From intersection with W.19 <sup>th</sup> Street to intersection with W.13 <sup>th</sup> Place, including the proposed I-90 footprint
<b>University Road</b>	Cul-de-sac
<b>W.13<sup>th</sup> Place</b>	W.13 <sup>th</sup> Place and University Road intersection
<b>Commercial Road</b>	STA. 10+00 to STA. 14+46 and STA. 17+20 to STA. 20+01
<b>Central Viaduct Way</b>	STA. 100+00 to STA. 105+77
<b>Ontario Street</b>	STA. 28+00 to STA. 32+00 (full width) and STA 32+00 to STA. 40+00 (southbound only)
<b>E.9<sup>th</sup> Street</b>	STA. 11+55 to STA. 26+60
<b>Broadway Avenue</b>	STA. 10+00 to STA. 24+73
<b>Carnegie Avenue</b>	STA. 13+20 to STA. 23+16
<b>E.14<sup>th</sup> Street</b>	STA. 10+02 to STA. 14+50

### 12.2.2 Roadway Design

In addition to the governing regulations per Section 12.1 and Section 12.1.2, the DBT shall adhere to the following requirements:

- A. For directional roadways or ramps with three (3) or more lanes, the left shoulder width shall be set equal to the right shoulder width.
- B. For consecutive entrance ramps, the deceleration lane of the first ramp shall end at a point prior to the theoretical gore (23 feet separation between lanes) of the succeeding ramp.
- C. Ramp grades shall not exceed 5%.
- D. Vertical curve low points are not permitted within any bridge limits of the Project. Flanking inlets shall not be allowed on the structure.
- E. For horizontal curves, the minimum radius allowed for a 25 mph design speed is 150 feet.
- F. The beginning of a ramp diverge shall be located a minimum of 100 feet from a preceding intersection.
- G. A minimum horizontal clearance of two (2) feet shall be provided from the face of curb to vertical obstructions with the following exceptions:
  - a. Three (3) feet at intersections to accommodate turning trucks and improve sight distance.



- H. A minimum offset of two (2) feet shall be provided from the back of proposed sidewalk to the slope break point of any back slope steeper than 6:1.
- I. For Stop Condition crossroad profiles as shown in L&D Volume 1, Figures 401-2 and 401-3, the maximum allowable grade in the intersection area shall not exceed 3%.
- J. The maximum intersection area grade for E.9<sup>th</sup> Street at Broadway Avenue is 2%.
- K. The minimum grade for the I-90 Viaduct Bridge shall not be less than 0.5% and shall allow the drainage requirements established in Section 13 and Section 14 to be met.
- L. Pedestrian and bicycle facilities shall be provided per the CCG1 Roadway Engineering Conceptual Plans – Typical Sections in Appendix LD-01.
- M. ADA-compliant curb ramps shall be provided at all corners of all intersections within the Project limits and at the Ontario-Eagle signalized pedestrian crossing according to Location and Design Manual Volume 1, Section 306.
- N. All roadway and drainage elements shall not impede a 23 feet vertical clearance (as measured from the top of rail) for both existing and potential future GCRTA railroad lines. The 23-foot vertical clearance shall be measured from the highest top of the rail at any particular cross section. Horizontally, the vertical clearance window limits shall be between the faces of the existing retaining walls flanking the existing GCRTA railroad lines.
- O. The DBT shall design and construct guardrail, concrete barrier, and other roadside design features (including end treatments) for the Interim Condition per ODOT L&D Volume 1, Section 600. In cases where this roadside treatment does not satisfy the Section 600 requirements for the Bi-Directional Condition, additional roadside design features shall be designed and constructed as necessary.
- P. A minimum 10-foot offset from the inside edge of paving for the multi-use path along the west side of E.9<sup>th</sup> Street to the inside face of curb of the roadway (per the CCG1 Roadway Engineering Conceptual Plans) is required along the roadway and across the bridge over the GCRTA tracks.
- Q. Curb returns shall be designed for design vehicles as provided in Appendix LD-10.
- R. The maximum grade for E.9<sup>th</sup> Street is 6%
- S. Curbed channelizing islands shall be constructed or reconstructed at the following locations:
  - a. Northwest corner, intersection of Fairfield Avenue and W.14<sup>th</sup> Street
  - b. Northwest corner and southeast corner, intersection of Carnegie Avenue and Ontario Street
- T. Curbed, raised medians shall be constructed as directed in Section 16 - Aesthetics and Enhancements
- U. Mountable curb shall be provided as directed in Section 16 - Aesthetics and Enhancements. Raised areas (infield) bounded by mountable curb shall have a pavement strength matching the adjacent proposed roadway pavement.
- V. The DBT shall provide ISD diagrams for all intersections and driveways within the project area during design development.

W. Profile of E.14<sup>th</sup> Street between Broadway and Orange Avenue shall be designed and constructed to avoid impacts to existing AT&T facilities

### **12.2.3 Removal of Existing Roadway and Structure Elements**

In the case of existing roadway and structure to be abandoned under this Project, affected areas shall be restored to reasonable conditions, removing visible evidence of their previous existence beyond existing tie-in points. Abandoned I-90 westbound mainline shall not be removed except at tie-in locations where necessary to construct proposed I-90 westbound mainline. In areas of roadway removal, this shall include pavement and base course removal, fill as necessary, at least six (6) inches of topsoil, and seeding. In areas of structure removal, this shall include removal of all superstructure and removal of all substructure per the C&MS. Removal of existing tie-ins shall include design and construction of (not limited to) pavement, walk, curb, guardrail and potential drainage elements as necessary to restore the site to a continuous, consistent facility.

Affected areas for removal include the following, but are not limited to:

- A. **Existing Ramp W2 & W3 (I-90 westbound to W.14<sup>th</sup> Street/Abbey Avenue).** The approximate minimum northern limit of removal of existing shall be the existing pier immediately north of Abbey Avenue. The edge of existing roadway above the pier shall be treated with portable concrete barrier placed parallel to or diverging from existing I-90.
- B. **Existing Ramp E1 (Ontario Street to I-90 westbound).** The approximate minimum southern limit of removal of existing shall be the existing pier immediately north of existing Commercial Road. The edge of existing roadway above the pier shall be treated with portable concrete barrier placed parallel to or diverging from existing I-90.
- C. **Existing Ramp E3 (E.9<sup>th</sup> Street to I-90 westbound).** The approximate minimum southern/western limit of removal of existing shall be the existing substructure unit immediately north/east of existing Ontario Street/Broadway Avenue. The edge of existing roadway above the pier shall be treated with portable concrete barrier placed parallel to or diverging from existing I-90. The entire ramp (both roadway and structure) shall be removed north/east of this limit, including ramp termini at E.9<sup>th</sup> Street and at Carnegie Avenue.
- D. **Existing Ramp E5 (E.14<sup>th</sup> Street to I-90 westbound).** The approximate limits of removal of existing shall be from Bridge Location 5 to the eastern tie-in to the existing ramp. (approximately Station 3000+00) The edge of existing roadway shall be treated with portable concrete barrier placed parallel to or diverging from existing I-90.
- E. **Existing Ramp E7 (I-90 eastbound to I-77 southbound).** The approximate limits of removal of existing shall be from the existing Ramp E6 to existing Ramp E15 (at the northern/western edge of the approach slab to the bridge carrying Ramp E15 over E.14<sup>th</sup> Street). Pavement removal and reconstruction of appropriate permanent roadside (including guardrail and/or permanent concrete barrier) and drainage elements on Ramp E6 and Ramp E15 shall be performed as necessary to remove the existing gores and reconstruct the affected portion of these ramps to a

continuous, consistent facility. The existing structure carrying Ramp E7 and Ramp E15 over E.14<sup>th</sup> Street shall not be altered.

- F. **Existing Ramp E8 (I-77 northbound to I-90 westbound).** The approximate limits of removal of existing shall be the entire Ramp E8 alignment. The existing bridge carrying Ramp E10 and Ramp E16 over Ramp E8 shall not be removed. Pavement removal and reconstruction of appropriate permanent roadside (including guardrail and/or permanent concrete barrier) and drainage elements on I-77 shall be performed as necessary to remove the existing gore and reconstruct the affected portion of these ramps to a continuous, consistent facility. The existing structure carrying Ramp E8 and I-77 over E.14<sup>th</sup> Street shall not be altered.
- G. **Existing University Avenue.** The approximate limits of removal of existing shall be from the Norfolk Southern RR crossing to West 13<sup>th</sup> Place.
- H. **Existing Broadway Avenue.** The approximate limits of removal shall be from approximately Station 14+00 to Orange Avenue.
- I. **Existing W.14<sup>th</sup> Street.** The approximate limits of removal shall be from University Avenue to Abbey Avenue. Additionally, removal of southbound existing West 14<sup>th</sup> Street shall be performed from Abbey Avenue to approximately Station 104+00 of proposed West 14<sup>th</sup> Street Extension.
- J. **Existing W.15<sup>th</sup> Street .** Entire West 15<sup>th</sup> Street within the project limits.
- K. **Existing Crown Avenue.** Entire Crown Avenue within the project limits.
- L. **Existing Commercial Road.** The approximate limits of removal of existing shall be from Canal Road to proposed Station 13+50.

#### **12.2.4 Parking Lots**

Parking Lots are part of the Project as a result of right-of-way acquisition processes and stakeholder commitments. Stakeholder commitments are a result of a stakeholder involvement process to determine the aesthetic and enhancements requirements for the Project.

##### ***12.2.4.1 Parking Lot Locations***

The DBT shall design and construct parking lots in the following locations:

- A. **Tremont Neighborhood Parking.** The DBT shall design and construct a parking lot consisting of approximately 50 stalls underneath the proposed I-90 westbound Bridge between W.14<sup>th</sup> Extension and Abbey Avenue. The DBT's design shall maximize the number of spaces under the proposed bridge configuration. The parking lot design shall include paving, curb, ornamental perimeter fence, lighting and landscaping. Additionally, four (4) wireless IP security cameras (compatible with Tremont West Community Development Corporation's existing neighborhood security system) shall be provided and installed providing coverage of the lot and adjacent streets. The power for the lighting of this parking lot and cameras shall be separately metered. (See Appendix AE-01 for aesthetic exhibits providing further guidance.)

- B. **Downtown Neighborhood Parking.** The DBT shall design and construct a parking lot consisting of approximately 60 stalls underneath WB I-90 between the GCRTA tracks and Commercial Road. The DBT's design shall maximize the number of spaces under the proposed bridge configuration. The parking lot design shall include paving, curb, ornamental perimeter fence, lighting, and landscaping. A retaining wall shall be constructed between the proposed parking area and the access drive to Commercial Road to maximize the available space for parking. The lighting for this parking lot shall be separately metered. (See Appendix AE-01 for aesthetic exhibits providing further guidance.)
- C. **Abbey South Parking.** The DBT shall design and construct a parking lot consisting of a minimum of 30 stalls on the south side of Abbey Avenue in the location shown in the exhibits referenced in Appendix AE-01. The parking lot design shall include paving, curb, ornamental perimeter fence and landscaping.
- D. **Abbey North Parking.** The DBT shall design and construct a parking lot consisting of a minimum of 31 stalls on the north side of Abbey Avenue next to the Gateway Animal Clinic at 1502 Abbey Avenue. The location is shown in the exhibits referenced in Appendix AE-01. The parking lot design shall include paving, curb, ornamental perimeter fence and landscaping. A retaining wall shall be designed and constructed as required to support the parking lot above the proposed West Slope excavation. At all times, the DBT shall provide and maintain access to no less than 30 parking stalls in the region of the Abbey Parking. These 30 stalls shall be in either the Abbey South or Abbey North parking lots or at a location immediately adjacent to these proposed locations, or a combination thereof. The temporary parking lots shall be paved or gravel surfaced and shall meet the US Access Board ADA Accessibility Guidelines for number of and features of ADA accessible stalls.
- E. **Cuyahoga Community College Parking.** The DBT shall reconstruct the existing parking lot and construct new parking on the east side of the property as shown in the exhibits referenced in Appendix AE-05. The parking lot design shall include paving, curb, ornamental perimeter fence and landscaping. A retaining wall shall be designed and constructed as required to separate the parking lot from I-90 westbound construction. See Section 14 and 16 for additional retaining wall requirements.

#### ***12.2.4.2 Parking Lot Requirements***

In addition to the governing regulations and City of Cleveland Codified Ordinances, the DBT shall design and construct all parking lots and associated items to the following specifications:

- A. All angled or perpendicular parking stalls shall be a minimum size of 9 feet wide by 18 feet long. All parallel parking stalls shall be a minimum size of 8 feet wide by 22 feet long.
- B. All parking lots shall be designed for a passenger car to make each turn within the parking lot aisles in one forward motion without encroaching on any parking stall. Each parking stall shall be accessible by a passenger vehicle in one forward motion without encroaching on any other stall. Each stall shall be designed and constructed so that a forward facing passenger vehicle

parked in that stall shall have access to the lot exit using a path consisting of no more than one reverse movement, encroaching on no other stall. This one reverse movement shall contain no more than one turn. More than one turn is permitted in the forward direction.

- C. The number and design of ADA-accessible spaces for each parking lot shall be per the ADA Accessibility Guidelines published by the US Access Board.
- D. Maximum grade in any direction shall be: 5%.
- E. Minimum vertical clearance for all parking lots shall be 10 feet.
- F. Pavement shall be per Section 11 - Pavement.
- G. All edges of all paving shall be ODOT Type 6 concrete curb.
- H. The DBT shall design and construct storm sewer systems for the parking lots per Section 13 - Drainage. All parking lots are considered to be within the Project Drainage Area.
- I. The DBT shall design and furnish concrete parking blocks for all parking stalls along the perimeter of all lots except for parallel parking stalls. The DBT shall design and furnish concrete parking blocks for any parking stalls where encroachment of the vehicle beyond the forward limits of the parking stall would have a negative effect on safety or pedestrian accessibility. The wheel stops shall be designed and constructed per ODOT SCD RM-6.1.
- J. The DBT shall apply paint striping for all parking stalls and other pavement markings as necessary per C&MS 642. Glass beads are not required.
- K. Appropriate intersection sight distance should be provided at all parking access driveways where possible. If intersection sight distance cannot be provided due to environmental or right-of-way constraints, then, as a minimum, the stopping sight distance for vehicles on the major road shall be provided.
- L. See Section 16 for additional requirements.

#### **12.2.5 Right-of-Way Fencing**

The DBT shall locate and construct right-of-way fencing as required per ODOT Location & Design, Volume 1, Section 606. All fencing shall be new material. The DBT shall furnish and install type CLT fence as per C&MS 607 and ODOT SCD F-1.1 with the following revisions:

- A. Fabric shall consist of a 2-inch diamond mesh using 0.148-inch diameter (9 gauge) wire conforming to ASTM F668 Class 2A or 2B except as noted. The PVC coating shall be black in color closely approaching federal standard color no. 595b-27038. Selvages shall be knuckled at both ends. Handle all PVC coated fabric with care. If the PVC coating is damaged, replace the damaged portion at no cost to the department.
- B. Fabric ties and hog rings shall be 0.148-inch core diameter galvanized PVC coated steel wire conforming to ASTM A478 respectively. To connect the fabric to the line posts, supply one fabric tie for each one foot of fabric height. Connect the fabric to the tension wire using hog rings 2-3 inches on each side of the posts and at spacing not to exceed 12 inches between posts. The PVC coating shall be the same as that for the steel fabric.

- C. All posts, rails, rods, caps, and any other visible hardware shall be galvanized and coated black to match the fabric.

### **12.3 BI-DIRECTIONAL CONDITION**

The Bi-Directional Condition shall be designed and constructed to the following standards:

- A. Curves at the North terminal of the bi-directional segment for the connection to existing I-90 eastbound shall have a minimum design speed of 40 mph.
- B. Curves at the North terminal of the bi-directional segment for the connection to existing I-90 westbound shall have a minimum design speed of 45 mph.
- C. Curves at the South terminal of the bi-directional segment for the connection to existing I-90 eastbound shall have a minimum design speed of 50 mph.
- D. The remaining bidirectional corridor shall have a design speed of 50 mph.
- E. The speed limit for the Bi-Directional Condition shall be posted at 50 mph with advisory speeds for 45 mph for the westbound curves at the North terminal and 40 mph for the eastbound curves at the North Terminal.
- F. Narrowing tapers and lane shifts shall occur at a rate of no less than 50:1.
- G. Acceleration and deceleration lanes, as well as gore geometry shall be per ODOT L&D Volume 1, Section 500 recommendations for high speed entrance and exit ramps.

See Section 14.3.5.2 for additional requirements.

Interstate and ramp lane requirements for the Bi-Directional Condition are indicated on Functional Plan for the Bi-Directional Condition in Appendix LD-06 . During the Bi-Directional Condition (and the EARP described in Section 18), traffic from I-90 eastbound shall not be permitted to exit the Carnegie off-ramp or the E.22<sup>nd</sup> Street off-ramp. Longitudinal channelizers, such as Qwick Kurb, Tuff Curb or approved equivalent, shall be used to appropriately channelize the traffic.

Additional requirements for the Bi-Directional Condition are included in Appendix TC-10 - Street Improvements, Bi-Directional Condition.

### 13 DRAINAGE

The DBT shall design and construct drainage and storm water management facilities and systems including, but not limited to, catch basins, inlets, manholes, pipes, culverts, underdrains, outfalls, storm water Best Management Practices (BMPs) and associated items for the Project Drainage Area as defined in Section 13.2.5. Additional drainage requirements for structures can be found in Section 14.

#### 13.1 GOVERNING REGULATIONS

The governing regulations for ODOT and local facilities are indicated in Section 13.1.1 and 13.1.2. Table 13-1 indicates changes to Location and Design, Volume 2 that govern this Project.

Table 13-1: Location and Design, Volume 2 Revisions

Section	Subject	Revised Language
1002.3.1	Type A Conduits	Where durability requires increased thicknesses of the corrugated steel alternate, the 1-inch corrugation profile <del>should</del> <b>shall</b> be specified for pipe diameters over 48 inches.
1006.2.2.C	Culvert Allowable Headwater - Check Storm Controls	A replacement structure <del>should</del> <b>shall</b> be sized to prevent overtopping by the 100-year flood where such overtopping would not occur with the existing structure.
1006.2.2.D	Culvert Allowable Headwater - Check Storm Controls	A replacement structure <del>should</del> <b>shall</b> be sized such that flooding of upstream productive land is not increased for the 100-year flood when compared to the existing structure.
1006.2.4	Culvert Allowable Headwater – Limitations	Where large structures (greater than or equal to 10 feet in span) are involved, the structure <del>should</del> <b>shall</b> be sized to pass the design storm while maintaining a free water surface through the structure.
1006.2.4	Culvert Allowable Headwater – Limitations	Where the overtopping point on the roadway is outside the watershed break, the ditch break overflow elevation <del>should</del> <b>shall</b> be utilized as a headwater control in lieu of 1006.2.1 A.
1007.1	Pipe Removal Policy	Use the following guidelines to determine whether an existing pipe, regardless of type, being taken out of service <del>should</del> <b>shall</b> be abandoned or removed.
1007.1	Pipe Removal Policy	Pipes 8 inches in diameter or rise, or less, regardless of depth or height of fill, <del>may</del> <b>shall</b> be abandoned in place.
1007.1	Pipe Removal Policy	Pipes 10 inches through 24 inches in diameter or rise with less than 3 feet of final cover <del>should</del> <b>shall</b> be removed or filled; with more than 3 feet of final cover they may be abandoned in place.
1007.1	Pipe Removal Policy	Pipes over 24 inches in diameter or rise <del>should</del> <b>shall</b> generally be removed.

Section	Subject	Revised Language
1008.1.2	Corrugated and Spiral Rib Steel and Aluminum Pipes, and Corrugated Steel and Aluminum Pipe Arches	The thickness <del>should</del> <b>shall</b> be determined for the maximum height of cover and it shall be used for the full length of the structure.
1008.1.2	Corrugated and Spiral Rib Steel and Aluminum Pipes, and Corrugated Steel and Aluminum Pipe Arches	However, where a short length of conduit requiring a higher strength pipe is contiguous with a long run of pipe, then only that short length <del>should</del> <b>shall</b> be specified as requiring the higher strength pipe.
1008.1.3	Cambered Flow Line	Where soil conditions at the site indicate that appreciable settlement may be expected, a cambered flow line <del>should</del> <b>shall</b> be provided.
1008.2	Rigid Pipe	Where soil conditions at the site indicate that appreciable settlement may be expected, a cambered flow line <del>should</del> <b>shall</b> be provided.
1008.2.3.B	Rigid Pipe – Structural Design Criteria	The concrete pipe alternate <del>should</del> <b>shall</b> be specified as 706.02 with special design.
1008.2.3.D	Rigid Pipe – Structural Design Criteria	The required pipe strength <del>should</del> <b>shall</b> be determined for the maximum height of cover and it shall be used for the full length of the pipe. However, where a short length of conduit requiring a higher strength pipe is contiguous with a long run of pipe, then only that short length <del>should</del> <b>shall</b> be specified as requiring the higher strength pipe.
1009.2.1	Pipe Underdrains	The depth of the rock cut underdrain <del>should</del> <b>shall</b> be 6 inches below the cut surface of the rock (Figure 1009-10).
1009.2.1	Pipe Underdrains	Underdrains which outlet to a slope <del>should</del> <b>shall</b> be provided with an outlet per SCD DM-1.1.
1009.2.1	Pipe Underdrains	A fabric filter wrap <del>should</del> <b>shall</b> be used when existing soils consist of a sandy or sandy-silt composition.
1009.2.4	Aggregate Drains	Aggregate drains <del>should</del> <b>shall</b> be located at 50 foot intervals on each side of the pavement and staggered so that each drain is 25 feet longitudinally apart from the adjacent drain on the opposite side.



Section	Subject	Revised Language
1009.2.4	Aggregate Drains	For superelevated pavements, the drains <del>should</del> <b>shall</b> be located on the low side only, at each transverse joint in rigid pavement and at 25 foot intervals for other pavement.
Figures 1008-1 through 1008-9	General Notes	Before a pipe is used under a cover exceeding 100 feet, the structural maximum allowable height of cover and the required bearing pressure <del>should</del> <b>shall</b> be calculated and an investigation of the bearing capacity of the foundation material performed.
Figures 1008-10 through 1008-14	General Notes	Before a pipe is used under a cover exceeding 100 feet, the structural maximum allowable height of cover and the required bearing pressure <del>should</del> <b>shall</b> be calculated and an investigation of the bearing capacity of the foundation material performed.
Figures 1008-15 through 1008-21	General Notes	Before a pipe is used under a cover exceeding 100 feet, the structural maximum allowable height of cover and the required bearing pressure <del>should</del> <b>shall</b> be calculated and an investigation of the bearing capacity of the foundation material performed.
1102.3.4.D	Catch Basin Types	The basin <del>should</del> <b>shall</b> also be located outside the design clear zone or behind guardrail where the protruding feature of the basin is not objectionable.
1103.5	Drainage; Miscellaneous	Inlets or catch basins <del>should</del> <b>shall</b> <del>arbitrarily</del> be placed upstream of all intersections, bridges and pedestrian ramps.
1103.5	Flanking Inlets	The above is prevalent in long flat sag vertical curves, where a flanking inlet (or catch basin) <del>should</del> <b>shall</b> <del>arbitrarily</del> be provided on both sides of the low point in a pavement sag.
1103.6.2	Grate or Combination Grate and Curb Opening Inlet	The curb opening of a combination catch basin on a continuous grade will admit some flow, particularly if there is a partial clogging of the grate; however, the additional capacity <del>should</del> <b>shall</b> be considered as a factor of safety only.
1103.7	Grate Catch Basins and Curb Opening Inlets In Pavement Sags	The spread in the sag <del>should</del> <b>shall</b> be determined from the depth of flow at the edge of grate using Figure 1103-3 and <del>should</del> <b>shall</b> include the total flow (contributions from each side of the sag vertical curve) reaching the inlet or catch basin.
1104.2.2	Storm Sewer Access	Small sewers (under 36 inches in diameter) located under or near the edge of pavement, <del>should</del> <b>shall</b> be accessible at intervals not to exceed 300 feet. For sewers sized 36 to 60 inches manholes <del>should</del> <b>shall</b> be spaced every 500 feet maximum. Manholes should be provided every 750 to 1000 feet maximum for larger sewers.
1104.4.2	Hydraulic Grade Line	Starting at the storm sewer system outlet and working upstream, the elevation of the hydraulic grade line at the upper end of each sewer run <del>should</del> <b>shall</b> be determined using a 25-year frequency.
1104.4.2	Hydraulic Grade Line	One directional lane of a multiple lane highway or one-half of a lane on a 2-lane highway <del>should</del> <b>shall</b> be passable when the sewer system is discharging the 50-year storm.

Section	Subject	Revised Language
1106.1	End Treatments	Headwalls <del>should</del> <b>shall</b> also be provided for Type D conduits greater than 24 inches in diameter or rise.
1107.2	Rock Channel Protection	A filter <del>should</del> <b>shall</b> always be specified to prevent soil piping through the rock.
1107.2	Rock Channel Protection	An aggregate filter <del>should</del> <b>shall</b> be used when the RCP is under water.
1117.2	Manufactured Systems	As shown in the figure above, manufactured systems <del>should</del> <b>shall</b> not be provided on sewers that are carrying a water quality flow greater than 6 cfs.

### 13.1.1 ODOT Facilities

All plans and design for ODOT facilities are to be prepared in accordance with the latest standards provided in Section 1.17. ODOT drainage and post-construction storm water BMP facilities are considered to be those items that ODOT owns and maintains after construction. This is based on maintenance responsibility for the respective roadway. A list of roadways and their respective maintaining agencies is available in Section 1.8. Required supplemental specifications controlling drainage related work are listed in Section 1.18.

In the event of a conflict among the standards listed related to drainage, the Department's standards shall take precedence. For drainage components not addressed by the standards listed, other guidelines or specifications that reflect currently accepted industry practice can be used as agreed to by the Department.

For post-construction storm water BMP components not addressed by the standards listed, other guidelines or specifications that reflect currently accepted industry practice and meet the requirements of the Ohio EPA NPDES General Permit for Storm Water Discharge from Small and Large Construction Activities (OEPA Permit #OHC000003) can be used as agreed to by the Department.

### 13.1.2 Local Facilities

All plans and design for local facilities are to be prepared in accordance with the latest standards provided in Section 1.17. Local drainage and post-construction storm water BMP facilities are considered to be those items that the local public agency owns and maintains after construction. This is based on maintenance responsibility for the respective roadway. A list of roadways and their respective maintaining agencies is available in Section 1.9. Required supplemental specifications controlling drainage related work are listed in Section 1.18.

In the event of a conflict among the standards listed related to drainage, use this document (Project Scope) to determine the appropriate criteria. For drainage components not addressed by the standards

listed, other guidelines or specifications that reflect currently accepted industry practice can be used as agreed to by the Department.

For post-construction storm water BMP components not addressed by the standards listed, other guidelines or specifications that reflect currently accepted industry practice and meet the requirements of the Ohio EPA NPDES General Permit for Storm Water Discharge from Small and Large Construction Activities (OEPA Permit #OHC000003) can be used as agreed to by the Department.

## **13.2 REQUIREMENTS**

### **13.2.1 General Drainage Requirements**

- A. Use City of Cleveland Standards for drainage conduit and drainage structures owned and maintained by the City of Cleveland. For conduit sizes 18 inches and larger, use reinforced concrete pipe according to ODOT C&MS 706.02. For conduit sizes smaller than 18 inches, use vitrified clay pipe according to ODOT C&MS 706.08. VCP must be Extra Strength. (See City of Cleveland drainage standards in Appendix DR-11.)
- B. All drainage conduit crossing under any railroad, including any drainage conduit crossing under an elevated railroad shall be in accordance with railroad governing regulations. (See Section 1.17 and Section 7)
- C. Adjusting rings are not permitted for casting adjustments in pavement. The DBT shall adjust the height of supporting walls per the C&MS.
- D. Existing conduit to be abandoned shall be filled and plugged per L&D Vol. 2 note D103. Prior to filling and plugging, conduit shall be videotaped to ensure that unknown connections are not impacted.
- E. The DBT shall remove sediment and debris from the existing drainage conduits and drainage structures to provide a functioning drainage system. All materials removed shall be disposed of as per C&MS 105.16 and 105.17. All sewers shall be cleaned out to the satisfaction of the engineer.
- F. The DBT shall provide no less than five (5) feet of cover from the lower of existing or proposed ground on drainage conduit in the region bound by proposed westbound I-90, existing I-90, W.14<sup>th</sup> Street Extension, and Abbey Avenue. The purpose is to accommodate future parking construction.
- G. Premium (water-tight) joints are required for submerged outfalls from outlet to nearest upstream drainage structure.
- H. The DBT shall be responsible for appropriately designed pipe end treatments for all river outfalls.
- I. Provide all final drainage calculations to the Department. Include both PDF and source files.
- J. All underdrains shall have fabric wrap and shall be minimum 6 inch diameter.

- K. The DBT shall design the parking lot drainage system such that ponding is limited to the landscaped areas for rainfall events up to and including the 5-year rainfall event. The maximum depth of ponding shall be 6 inches.

### **13.2.2 West Slope Drainage Requirements**

All proposed storm sewer system facilities between Abbey Avenue and the Cuyahoga River shall meet the following requirements:

- A. Minimum pipe cover shall be 5 feet for any pipe under a 4:1 or steeper slope.
- B. Use mechanical connectors or flanged joints on 4:1 or steeper slope.
- C. All proposed drainage structures shall have premium, water tight joints.
- D. Maximum pipe velocity shall be 15 fps except for any pipe immediately prior to a ring chamber.

In order to introduce turbulence and improve oxygen levels of the West Bank storm water runoff, the DBT shall provide ring chambers in accordance with ODOT Plan Insert Sheets RC-2 and RS-2 (<http://www.dot.state.oh.us/Divisions/HighwayOps/Structures/Hydraulic/Pages/Downloads.aspx>) at the end of all West Bank storm sewer systems that outlet to the Cuyahoga River. In the case of a submerged outlet, the ring chamber section should be provided immediately prior to the section below elevation of 570 feet.

A drainage structure shall be provided to transition from the standard conduit to the ring chamber portion of the storm sewer. The DBT shall match the top of crown for the conduits entering and exiting the drainage structure.

The conduit type for the ring chamber portion shall be reinforced concrete pipe (C&MS 706.02 with premium joints per 706.11). The reinforced concrete conduit strength shall be based on the height of fill (L&D Volume 2, Figure 1008-10). The diameter of the conduit with ring chambers shall be a minimum of 36 inches, but shall be properly sized to meet the requirements of the FHWA/OH-84/007 Internal Energy Dissipaters for Culverts (included in Appendix DR-11) , and the length of ring chamber section shall correspond to Plan Insert Sheet RC-2. Additional design details for the ring chambers and corresponding conduit shall be in accordance with Plan Insert Sheets RC-2 and RS-2. The reinforced concrete pipe material shall be provided from the end of the ring chamber to the ultimate pipe outfall at the river.

### **13.2.3 E.9<sup>th</sup> Street (Commercial Road Hill Area) Storm Sewer**

The proposed storm sewer outfall for the E. 9<sup>th</sup> Street system, from the CSX tracks to the Cuyahoga River, shall have the following requirements:

- A. Provide a pipe design that considers all site conditions including, but not limited to, the following:

- a. Maximum 110 feet height of cover over the pipe with an assumed material density of 140 lbs/cu. ft.
  - b. The proposed pipe will be subjected to varying pile heights/loads due to the temporary stockpiling of materials at this site.
  - c. Soil foundation, including pipe backfill and bedding.
  - d. Any needed dewatering during installation.
- B. DBT shall provide design calculations with two (2) independent PE stamps from individuals qualified in structural design (double stamp does not remove requirement for IQF to verify design submission).

One underground or one above ground aerial sewer crossing across the GCRTA alignment is permissible in the region of the E.9<sup>th</sup> Street Bridge over GCRTA. The drainage system design shall consider ease of maintenance (vehicle accessibility, manholes on each side of crossing, etc.). In addition, the DBT shall refer to the railroad agreements in Appendix RR-01. If an aerial crossing is used see Appendix DR-12 – Aerial Crossing Requirements.

#### **13.2.4 Structure Drainage**

All of the drainage from all of the bridge decks is to be collected and conducted to the storm sewer system. The bridge deck drainage design shall conform to the following:

##### ***13.2.4.1 Bi-Directional Condition spread design***

- A. Two (2) year storm design frequency.
- B. Spread is allowed into one-third (1/3) of the outside traveled lane.

##### ***13.2.4.2 Interim and Future Condition spread design***

- A. Ten (10) year storm design frequency per §1103.2 of ODOT L&D Volume 2.
- B. Allowable spread of zero (0) feet into traveled lane per §1103.2 of ODOT L&D Volume 2.

##### ***13.2.4.3 Structure drainage requirements***

Structure drainage requirements for the I-90 Viaduct and other structures may be found in Section 14 - Structures.

#### **13.2.5 Storm Sewer**

The existing drainage within the Project area is primarily conveyed through various combined sewer systems. The NEORS D relocation of their facilities will include temporary drainage connections to the relocated combined sewers. These temporary connections shall be removed by the DBT and the drainage directed into existing or new storm only systems.

Coordination with NEORS D's Walworth Run Interceptor Realignment project. The DBT shall be responsible for the design and construction of permanent storm sewer outfalls to pick up storm flows which previously entered the NEORS D Interceptor sewer system. The contributing drainage areas for these sewers include the area bounded by Fairfield, W13th, W15th and the Cuyahoga River. See the

Sewer Abandonment plans in UT-03. These storm sewer systems shall include water quality BMPs as required in Section 13.2.6.

No net increase in peak flows (in the 5-, 10-, or 25-year design storm) shall occur to any point on the existing combined sewer system as a result of this Project. This does not preclude the DBT from removing upstream flow and adding an equivalent amount of downstream flow as this would pose no net increase to any point of the existing drainage system. This requirement has been established with Cleveland Water Pollution Control and North East Ohio Regional Sewer District.

Potential storm water outfall locations are shown in Appendix DR-02. Modifications to the planned outfall locations are allowable provided that they meet permit requirements. (See Section 5 - Environmental Commitments for further information.)

The DBT shall adjust or reconstruct catch basins, inlets, manholes and other castings as necessary to accommodate resurfacing.

The minimum Project Drainage Area is defined as follows:

- A. All area within the construction limits or draining to the construction limits of the Project as finalized by the DBT. This includes areas within the construction limits but outside of existing or proposed ODOT right-of-way, including local streets.
- B. All existing I-90 mainline and ramp pavement and bridge area between Starkweather Avenue and the east bank of the Cuyahoga River. This includes areas of I-90 (mainline and ramp) that previously drained into the combined sewer network but have experienced a severed connection to the combined sewer due to the NEORS D Walworth Run relocation project.

The installation of proposed storm-only drainage systems shall be implemented to the greatest extent possible.

### **13.2.6 Storm Water Best Management Practices (BMP)**

#### ***13.2.6.1 General BMP Requirements***

Post-construction storm water BMP treatment options are provided in Appendix DR-02. With respect to post-construction storm water BMPs, the Project is considered a “new construction” project as described in Section 1115.6 of Location and Design Manual, Volume 2.

The DBT shall provide post-construction storm water BMPs according to L&D Volume 2 and the Ohio EPA NPDES General Permit (OHC000003) for Storm Water Discharge from Small and Large Construction Activities to meet the storm water treatment requirements established in the NPDES Permit. Unless site conditions or safety issues preclude their use, use detention-based BMPs sized to treat the water

quality volume as indicated in Appendix DR-02. The BMPs and storm sewer layouts proposed in Appendix DR-02 are for information purposes only and do not represent a prescriptive drainage design.

The DBT shall prepare slope stability analyses on pond side slopes and berms, and settlement analyses on berms. The DBT shall prepare geotechnical recommendations for infiltration zones. The DBT shall perform all detention pond and infiltration zone analyses.

Additional requirements:

- A. For drainage areas tributary to the storm only systems, BMPs shall be sized based on the entire contributing drainage area (offsite and onsite) to the BMP. The treatment approach for BMP design shall be to provide 100% treatment for 100% of the project. If right-of-way, geotechnical, or structural issues do not allow 100% treatment, the DBT shall provide treatment to the maximum extent practicable. The treatment requirement shall not be reduced below the criteria established in the Section 1115.6.2 of Location and Design Manual, Volume 2. See Section 13.2.5 for minimum Project Drainage Area.
- B. Runoff from the Project Drainage Area directed to the combined sewer network is not required to be treated with a post-construction BMP.
- C. Furnish a 6-inch layer of C&MS 601 Detention Basin Aggregate on the bottom of all detention basins.
- D. If a bioretention cell is proposed, the bioretention cell storage area shall include the area above the planting soil and within the planting soil. Assume a porosity of 0.4.
- E. If an extended detention pond is proposed, the pond shall have a sediment forebay and a length to width ratio of 3:1.
- F. Prepare calculations and drainage area mapping for post-construction BMPs.
- G. Provide vehicular access to accommodate equipment necessary for periodic maintenance of detention-based BMPs and manufactured systems. This shall include providing locking gates in fencing as necessary.
- H. At the conclusion of construction activities when the site is stabilized, the DBT shall inspect and perform maintenance activities on any installed BMPs to allow the system to properly function to its full extent.
- I. BMPs shall be located within right-of-way limits as indicated in the Final Right-of-Way Plans in Appendix RW-03 unless a maintenance agreement is in place with the property owner.
- J. The DBT shall provide the following information regarding constructed BMP facilities:
  - a. For Exfiltration Trenches, provide station (downstream edge of box structure), offset, RT/LT, length, and Type (A, B, or C).
  - b. For Manufactured Systems, provide station (mainline manhole location), offset, RT/LT, and Type (1, 2, 3 or 4).
  - c. For Vegetated Biofilter, provide station (begin and end station of VBF), offset, RT/LT, bottom width, and protective lining (selected according to L&D Volume 2, Section 1102).

Protective linings include seed (CMS 659), sodding (CMS 660), ditch erosion protection mat (Type A, B, C, D, E, F, or G), and turf reinforcing mat (Type 1, 2, or 3).

- d. For Extended Detention, provide station (outlet structure), offset, RT/LT, and Type (A – above ground, or B – below ground).
- e. For Bioretention Cell, Infiltration Basin, or Constructed Wetland, provide station (outlet structure or downstream edge of bank), offset, and RT/LT.
- f. For Infiltration Trench, provide station (downstream edge of bank), offset, RT/LT, length, depth, and top width.

#### ***13.2.6.2 Prohibited BMP Systems***

Retention Basins (permanent wet pond) are prohibited from being used as post-construction storm water BMP on this Project.

Detention-based BMPs and infiltration BMPs are not permitted in west slope between Abbey Avenue and the Cuyahoga River.

#### ***13.2.6.3 Permitted BMP Systems – Locally Maintained Facilities***

Any BMP meeting the requirements of Section 13.2.6.1 and Section 13.2.6.2 is considered an acceptable storm water BMP for proposed E.9<sup>th</sup> Street and any proposed city street drainage facilities within the Project Drainage Area.

#### ***13.2.6.4 Permitted BMP Systems – West Bank***

Any BMP meeting the requirements of Section 13.2.6.1 and Section 13.2.6.2 is considered an acceptable storm water BMP for the West Bank (all Project Drainage Area west/south of the Cuyahoga River). One or more extended detention ponds or bio-retention cell BMPs shall be used to treat the water quality volume associated with at least seven (7) acres of the West Bank.

#### ***13.2.6.5 Permitted BMP Systems – East Bank***

Bioretention cells or extended detention basins designed to ODOT L&D Vol. 2 standards are the only acceptable storm water BMP's for any proposed storm-only drainage system receiving runoff from the mainline or ramps (non-local streets) on the East Bank (all Project Drainage Area east/north of the Cuyahoga River).



## **14 STRUCTURES**

The DBT shall design and construct all structures within the project limits in accordance with the scope of services herein. Mainline I-90 Bridges shall be designed and constructed for the Bi-Directional Condition, the Interim Condition (five [5] westbound lanes and shoulders) and the Future Condition as defined in Section 1.5. Structures shall also conform to Section 16 - Aesthetics and Enhancements.

### **14.1 GOVERNING REGULATIONS**

Governing regulations are listed in Section 1.17 and supplemental specifications are listed in Section 1.18. Conceptual plans and additional reference documents are addressed in Section 1.4. For cases where American Association of State Highway and Transportation Officials (AASHTO) Specifications conflict with ODOT Manuals or Standards, ODOT's Manuals or Standards shall take precedence. For structural components not addressed by the standards listed in Section 1.17, other guidelines or specifications that reflect currently accepted industry practice can be used as agreed to by the Department.

All locations in the ODOT Bridge Design Manual (BDM) not identified below or not otherwise restricted or clarified in the Project Scope, noted as "Consult with Office of Structural Engineering" do not require a consultation with ODOT Office of Structural Engineering.

BDM Section 202.2.3.2.b - The maximum Ultimate Bearing Values listed in this section of the BDM will apply to this project.

### **14.2 GENERAL BRIDGE CRITERIA**

The criteria in this section apply to all bridges.

#### **14.2.1 Foundations**

Bridge foundations shall conform to provisions of Section 9 - Geotechnical, in addition to the requirements of this section.

Drilled shafts shall be socketed into bedrock a minimum depth of 1½ times the drilled shaft diameter. Skin friction capacity provided by the top two (2) feet of the drilled shaft rock socket shall be neglected. Drilled shaft friction capacity provided by soil shall be neglected for bridge foundations.

All drilled shafts, including demonstration shafts and production shafts, shall be tested with Crosshole Sonic Logging (CSL) and Gamma-Gamma testing procedures as specified in Appendix GE-08 - Drilled Shaft Testing.

For drilled shafts, the minimum clear distance between longitudinal and lateral reinforcement shall not be less than five (5) times the maximum aggregate size.

See Appendix GE-09 - Demonstration Drilled Shafts for additional requirements.

A substructure foundation with less than four (4) drilled shafts shall be considered non-redundant. For a substructure foundation with less than four (4) drilled shafts, a 20 percent capacity reduction factor shall apply to each drilled shaft.

Major earthwork regrading is prescribed in the west slope region between Abbey Avenue and the Cuyahoga River as part of this Project (CCG1). See Section 9.2.1. The limits of the regrading will be extended in the future with project CCG2, further lowering the finished grade below the CCG1 regrading. See the West Bank Grading Plans in Appendix GE-01. Drilled shafts are required for bridge foundations constructed between Abbey Avenue and the Cuyahoga River. The tops of foundations located between Abbey Avenue and the Cuyahoga River shall be a minimum of one (1) foot below the future CCG2 finished grade (See Appendix GE-14 - West Bank Future [CCG2] Grading Plan).

Construction of foundations in the west slope shall not occur until after the entire construction sequence specified on West Bank Grading Plans (Appendix GE-01).

Spread footings founded on soil are not permitted for any abutment or pier foundation. Spread footings will only be allowed when founded on competent bedrock.

Underreams or belled shafts are not permitted.

Augercast piles, or continuous flight auger (CFA) piles, are not permitted.

Timber piles are not permitted for any permanent structure.

For pile foundations, the DBT shall perform a driveability analysis using the wave equation method to select the pile driving impact hammer and the wall thickness required for installing the piles to the required ultimate bearing value, without damage.

When a significant height of new embankment is constructed over a compressible layer of soil and long term settlement is anticipated, the possibility of downdrag loads on the piles shall be considered. The potential downdrag load shall be computed according to AASHTO LRFD Bridge Design Specifications Article 3.11.8.

#### **14.2.2 Substructures**

All substructures shall be cast-in-place concrete.

The DBT shall reference Appendix LD-04 – No-Build Zones and LD-05 –Clearance Envelopes for substructure location restrictions.

Cap and column piers shall have a minimum of three (3) columns. This provision does not apply to the following:

- A. Main span portion of the I-90 Viaduct Structure, as defined in Section 14.3.1.
- B. Ramp A5 between approximate Stations 160+00 to 161+00

- C. Bridges to be widened:
  - a. Bridge Location No. 1 (CUY-90-1490L)
  - b. Bridge Location No. 2 (CUY-90-1490R)
  - c. Bridge Location No. 3 (CUY-90-1506)
  - d. Bridge Location No. 12 (CUY-77-1651R)

Hollow piers shall have all internal forms removed. The bottom of voids for hollow piers shall not extend below the ground line.

Abutments behind MSE walls shall be supported by deep foundations.

Railway crash walls shall have a minimum height of 10 feet above the top of rail, except where a pier is located within 12 feet of the centerline of tracks and in that instance the minimum height shall be 12 feet above the top of rail. The crash wall shall be at least 2 feet - 6 inches thick. For a cap and column pier, the face of the wall shall extend 12 inches beyond the face of the columns on the track side. The crash wall shall be anchored to the footings and columns.

Full-height abutments shall be used for I-90 Westbound over E.9<sup>th</sup> Street Bridge and the I-90 Westbound Viaduct Bridge.

The profile of the W. 14<sup>th</sup> Street Extension may be lower than the existing ground. The minimum cover over the existing pier footings shall be 1 ft - 0 inches.

### **14.2.3 Structure Type Requirements and Limitations**

The following requirements and limitations shall apply:

- A. Prestressed concrete box beams are not permitted.
- B. Truss type bridges are not permitted.

Non-redundant designs shall be avoided.

For any proposed Alternative Technical Concepts (ATC) that include above deck structural elements (not including parapet, fence, lighting, railing, sign structures), the DBT shall submit provisions to mitigate potential ice build-up with the ATC.

### **14.2.4 Superstructure**

All joints shall be sealed from bridge deck surface drainage. Open-type joints that accept bridge deck surface drainage, such as finger joints, are not permitted.

The DBT shall make all efforts to not develop a structure design that requires fracture critical members. If a bridge design includes any members or their components that are fracture critical, those members and components shall be clearly identified as FRACTURE CRITICAL MEMBERS (FCM) in the plans.

Steel rolled beams or steel girder bridges shall have a minimum of four (4) stringer lines.

For haunched girders, the corner between the flat bottom flange bearing seat area and the curved section of the bottom flange shall be detailed as two plates with a full penetration weld.

Skewed crossframes at intermediate support points shall be avoided.

For the steel ductility requirements of AASHTO LRFD Article 6.10.7.3, the design haunch shall not be included in the determination of  $D_p$  and  $D_t$ .

Prestressed, post-tensioned concrete I-beams shall have a minimum web thickness of eight (8) inches.

For prestressed members without post-tensioning, approximate methods to determine time-dependent losses utilizing AASHTO LRFD Bridge Design Specifications Eq. 5.9.5.3-1 shall be used.

Elastomeric bearings shall be designed based on a selected durometer of either 50 or 60. Field welding of a beam or girder to the bearing load plate shall be controlled so that the temperature that the elastomer is subjected to does not exceed 300 degrees Fahrenheit.

AASHTO LRFD Bridge Design Specifications have both a design and construction section for pot type bearings, disc type bearings and spherical type bearings. The DBT shall use these LRFD sections and the 2007 BDM as a guide in designing, selecting and specifying these bearing types.

All new structural steel shall be painted with the Department's IZEU coating system, per C&MS 514.

Steel box girders shall be painted inside with OZEU or IZEU per C&MS 514. The urethane top coat shall be color approximating FS 595B No. 37875, white. The Epoxy intermediate coat shall be color approximating FS 595B No. 37722, Buff.

#### **14.2.5 Deck**

All bridge decks shall be full depth cast-in-place concrete. However, this requirement does not preclude the use of post-tensioned segmental concrete bridges.

Any superstructure type that utilizes post-tensioning construction methods shall have a Micro-silica Modified Concrete Overlay or a Superplasticized Dense Concrete Overlay. Overlay shall be in accordance with "Specifications for Cast-In-Place Concrete Overlay" in Appendix ST-01. The cast-in-place overlay shall be part of the required 60 psf future wearing surface design load. Screed elevations shall include adjustment for deflections due to the overlay. For post-tensioned segmental concrete box girders, the overlay shall be placed after all segments are erected.

The top slab of post-tensioned segmental concrete box girders shall have an additional thickness of one (1) inch. This one (1) inch thickness shall not be considered in the structural capacity of the bridge. Four (4) overlay replacements are anticipated during the service life of the structure. The additional one (1) inch nonstructural thickness allows ¼-inch of the top slab to be milled off each time the overlay is

removed and replaced. The ¼-inch allowable milling per overlay shall be clearly documented in the final record (as-built) plans.

Metal stay-in-place deck forms are not permitted, except for the following structures:

- A. Main-span portion of the I-90 viaduct as defined in Section 14.3.1.
- B. I-90 viaduct east approach, including the Ontario Street on-ramp, for the span over the GCRTA only
- C. Bridge Location 9; CUY-90-1640; SFN 1807773; I-90 eastbound and westbound over I-77 southbound
- D. Bridge Location 10; CUY-77-1597L; SFN 1807919; I-77 southbound over E.14<sup>th</sup> Street
- E. Bridge Location 11; CUY-90-1651L; SFN 1807900; I-90 westbound over E.14<sup>th</sup> Street
- F. Bridge Location 12; CUY-90-1651R; SFN 1807803; I-90 eastbound over E.14<sup>th</sup> Street
- G. Bridge Location 13; Bridge Number To Be Determined; SFN 1870653; E. 9th Street and Shared-Use Path over GCRTA for the span over the GCRTA only

The flutes of the stay-in-place forms shall be filled with concrete. Synthetic type materials such as Styrofoam are not permitted for filling the flutes. Removable deck form work shall be used for a distance of five (5) feet on both sides of all deck expansion joints and scuppers.

All internal forms for post-tensioned segmental concrete box girders shall be removed.

Precast concrete deck forms (panels) are not permitted.

Full depth precast concrete deck panels are not permitted.

Bituminous type wearing surfaces are not permitted for permanent bridge deck construction.

#### **14.2.6 Approach Slabs**

Approach slabs shall be used for all bridges on this Project.

For the I-90 viaduct structure only, approach slab lengths shall be 50 feet measured along the roadway baseline. The thickness and size of the reinforcing steel for 50-foot long approach slabs shall be based on an approach slab length of 30 feet per ODOT SCD AS-1-81. The thickness T shall be 17 inches, A1004 reinforcing bars shall have dimension A increased to 49 feet-6inches, the spacing of the B501 bars shall remain the same with the total number increased appropriately, and the C504 bars shall be 49 feet-6 inches long.

#### **14.2.7 Barriers**

Barriers and sidewalks shall not be considered part of the cross section for calculation of structural capacity.

Slip forming of concrete barriers is not permitted, except as noted in Section 14.4.2. (See specific bridge location requirements.)

#### **14.2.8 Material Properties**

Concrete shall conform to the Specifications for QC/QA Concrete as listed in Appendix ST-01.

The design concrete compressive strengths listed in the ODOT BDM shall be considered minimum values.

Lightweight concrete is not permitted to be used for cast-in-place concrete decks or overlays.

All coarse aggregate shall have an absorption of one (1) percent or greater as defined per ASTM C127. This requirement shall be included as a note in the release for construction drawings.

#### **14.2.9 Mass Concrete**

Mass concrete shall be considered any concrete element for which its minimum dimension measured in any direction is four (4) feet or greater. The DBT shall provide the following for mass concrete elements to cope with the generation of heat of hydration and attendant volume change to minimize cracking:

- A. Analysis of the anticipated thermal developments in the mass concrete for all expected project temperature ranges using the proposed mix design, casting procedures, and materials.
- B. Description of the measures and procedures intended for use in maintaining a maximum temperature of less than 160 degrees Fahrenheit and maintaining a temperature differential of 35 degrees Fahrenheit or less between the interior and exterior portions of the designated mass concrete elements during curing. The 35 degrees Fahrenheit temperature differential does not apply to drilled shaft foundations below grade.

The DBT shall submit both the mass concrete mix design and the proposed plan to monitor and control the temperature differential concurrently to the Independent Design Quality Manager (IDQM) for acceptance prior to concrete placement.

The DBT shall provide temperature monitoring devices accepted by the IDQM to record temperature development between the interior and exterior portions of the elements at points acceptable to the IDQM.

The DBT shall read the monitoring devices and record the readings at not greater than six (6) hour intervals, as accepted by the IDQM, beginning when casting is complete and continuing until the maximum temperature differential is reached and begins dropping. If monitoring indicates the 35 degree Fahrenheit temperature differential has been exceeded, the DBT shall take immediate action to retard further growth in the temperature differential and make the necessary revisions to the accepted plan to maintain the 35 degree Fahrenheit or less temperature differential on any remaining placements. The DBT shall obtain the IDQM's and the Engineer's acceptance of all revisions to the approved plan prior to implementation.

#### **14.2.10 Fencing**

Six (6) feet high ODOT standard vandal protective fencing (1" mesh) per ODOT SCD VPF-1-90 is required on Bridge Location 13 (E. 9<sup>th</sup> Street over GCRTA) and Bridge Location No. 15 (Abbey Avenue Bridge) modified as necessary through aesthetic considerations (see Section 16). 1" vandal protective mesh shall be attached to the proposed ornamental metal fence for south parapet only of Bridge Location No. 14 (Carnegie Avenue over GCRTA) (see Section 16). Vandal protective fencing is not required on I-90 mainline bridges, including ramp structures.

#### **14.2.11 Sealing of Concrete Surfaces – Epoxy-urethane**

For prestressed concrete I-beams or bulb-tees, the limits of sealing shall be per ODOT BDM Figure 302.1.4.3-1.

For steel beams, steel I-girders or steel box girders, the limits of sealing shall be per ODOT BDM Figure 302.1.4.3-2, except that the limits of sealing for the underside of the deck overhang shall extend to the flange of the fascia beam or girder.

Exterior surfaces of post-tensioned segmental concrete bridges shall be sealed completely, except for the bridge deck driving surface (as shown in ODOT BDM Figures 302.1.4.3-1 and 302.1.4.3-2).

Continuous or single span concrete slab bridges shall be sealed as per ODOT BDM Section 302.1.4.3.

All exposed concrete surfaces of substructures and retaining walls shall be sealed. See ODOT BDM Figures 303.1-1, 303.1-2 and 303.1-3 for the sealing limits of substructures.

#### **14.2.12 Bridge Load Ratings**

All bridges shall be load rated per Section 900 of the ODOT BDM with the following clarifications and exceptions:

- A. Rate all bridges using both the Load Factor Rating (LFR) method and the Load and Resistance Factor Rating (LRFR) method.
- B. The bridge load rating shall be based on the Future Condition of the bridge. The load rating shall address the Bi-Directional Condition as well as the Interim Condition. (See Section 1.5 for definitions of these Conditions.)
- C. The DBT shall provide a rating manual for any bridge type that is not compatible with BARS-PC or AASHTO Virtis software. The rating manual shall include a Microsoft Excel compatible spreadsheet in electronic format to load rate the bridge for future permit vehicles (e.g., overweight or superload vehicles). Such vehicles may range up to 600,000 pounds, have as many as 25 axles with two (2) to eight (8) tires per axle, and have a width of 20 feet and a length of 200 feet.
- D. Each bridge load rating submission shall include the computer files in electronic format.
- E. The bridge load rating report and rating manual shall be submitted to ODOT before the bridge is open to traffic.

- F. Load ratings are not required for Bridge Location 14 (Carnegie Avenue over GCRTA) or Bridge Location 15 (Abbey Avenue Bridge) provided no material changes are made to the conceptual repair plans included in the project documents.

### **14.3 CRITERIA FOR I-90 VIADUCT STRUCTURE**

These criteria apply to the Approach Spans and Main Spans of the I-90 viaduct structure.

#### **14.3.1 Approximate Limits of I-90 Viaduct Structure and Main-Span Portion**

The approximate bridge limits of the entire I-90 viaduct structure, including the approach spans, are considered to be from I-90 Station 123+10 to Station 170+00 (approximate length of 4,690 feet).

The approximate limits of the main-span portion only of the I-90 viaduct are from I-90 Station 127+00 to Station 159+00 (approximate length of 3,200 feet).

#### **14.3.2 Operational Importance**

The operational importance load modifier shall be 1.05 for the I-90 Viaduct Structure. (See Section S1.3.5 of the 2007 ODOT BDM.)

#### **14.3.3 Structure Type – Approach Spans**

The following structure types for the approach spans of the I-90 viaduct structure do not require a proposal for an Alternative Technical Concept (ATC):

- A. Steel beam or girder
- B. Prestressed concrete bulb-tee or I-girder
- C. Concrete slab without voids

All other structure types require an ATC to be considered as per Section 6.0 of the Design Build Selection Criteria.

#### **14.3.4 Structure Type – Main Spans**

The following structure types for the main-span portion of the I-90 viaduct structure do not require a proposal for an Alternative Technical Concept (ATC):

- A. Steel box girder
- B. Steel girder
- C. Post-tensioned segmental concrete box
- D. Prestressed or post-tensioned concrete bulb-tee or I-girder

All other structure types require an ATC to be considered as per Section 6.0 of the Design Build Selection Criteria.



## **14.3.5 Barriers**

### ***14.3.5.1 Viaduct Bridge Barrier***

The barrier of the entire I-90 Viaduct Structure, defined in Section 14.3.1 and including the Ontario on-ramp structure, shall conform to the Texas Department of Transportation Type T80HT Traffic Rail (TL-5 Rating). The elliptical tube with rail details shall be used (not the rectangular pipe rail details). (Refer to Appendix AE-04.) The metal railing and supports shall be hot-dip galvanized and powder coated (including appropriate surface preparation). The tube rail shall be tied into the structure grounding system (See Section 17).

### ***14.3.5.2 Portable Concrete Median Barrier for Bi-Directional Condition***

To accommodate the Bi-Directional Condition, the DBT shall provide a design that anchors a 32-inch portable concrete median barrier with glare screen per ODOT SCD PCB-91 or equal as approved by the Department. The DBT shall design and implement an anchorage system that does not compromise the structural integrity, long-term durability, and rideability of the deck. The DBT shall not perform drilling of post-tensioned superstructure and deck systems. The portable concrete median barrier shall be designed and constructed to accommodate movement at expansion joints. See TEM Section 605-14 for additional details.

## **14.3.6 Piers Adjacent to Cuyahoga River Dock Walls**

The face of pier footings shall be a minimum of 10 feet from the back face of dock walls.

Ducts shall be utilized if dock wall tie-backs are placed through the pier substructure or pier foundations. The ducts shall not be grouted.

## **14.3.7 Expansion Joints**

It is preferred to have a minimum number of joints.

## **14.3.8 Drainage System**

In addition to the requirements of Section 13 - Drainage, the bridge deck surface drainage design shall conform to the following:

- A. Deck drainage shall be collected at the gutter lines (toe of parapet) by scuppers. Over-the-side drainage is not permitted.
- B. Transverse deck drains are not permitted.
- C. Welding of scuppers, downspouts, or drainage supports shall not be allowed in tension areas of main steel members.
- D. The drainage system shall consist of closed conduit from the deck elevation to the point of discharge into the ground drainage system. Dropping drainage directly from the deck elevation to the ground elevation is not permitted.
- E. Conduit enclosed within box type superstructures is not permitted.
- F. Conduit enclosed in substructures is not permitted.

- G. The conduit shall be polyvinyl chloride (PVC) plastic pipe per ODOT material specification 707.45.
- H. The minimum conduit diameter is 15 inches.
- I. The conduit shall have sufficient slope to maintain a minimum velocity of three (3) feet per second. Provide slopes as steep as can be practically incorporated with the geometry of the structure. The slope of horizontal conductors shall not be less than 15 percent.
- J. Vertical conduit runs to the ground drainage system shall only be located at piers.
- K. All bridge drainage inlets/scuppers shall be located within 20 feet of a substructure unit.
- L. Vertical conduit runs to the ground drainage system shall consist of closed conduit except for a free fall of two (2) feet above the ground. The drainage shall be controlled at the point of discharge (i.e. bottom of the vertical conduit) by permanent features that completely contain the discharge and prevent erosion to the adjacent ground while discharging up to the 25-year design storm.
- M. The maximum conduit bend angle is 45 degrees.
- N. Cleanouts shall be provided immediately upstream of each bend, on vertical downspouts accessible from the ground, and at the end of each horizontal segment.

### 14.3.9 Clearance Requirements

**Table 14-1: I-90 Viaduct Clearance Requirements**

Location	Required Vertical Clearance	Comments
W.14 <sup>th</sup> Street Extension	14.5 feet	I-90 and the W.14 <sup>th</sup> Street Extension Ramp shall not be supported on embankment in the area between the W.14 <sup>th</sup> Street Extension and Abbey Avenue.
Abbey Avenue	14.5 feet	I-90 and the W.14 <sup>th</sup> Street Extension Ramp shall not be supported on embankment in the area between the W.14 <sup>th</sup> Street Extension and Abbey Avenue.
Cuyahoga River	100 feet above elevation 569.4 NAVD88 for the 200-foot wide navigation channel	The U.S. Coast Guard (USCG) vertical clearance requirement for the Cuyahoga River is 100 feet above elevation 569.2 LWD (Low Water Datum) based on IGLD85 (International Great Lakes Datum of 1985). At this location, 569.2 IGLD85 converts to 569.4 NAVD88 (North American Vertical Datum of 1988).  The DBT is directed to Section 5 - Environmental Commitment for USCG and Waterway Permit Requirements.

Location	Required Vertical Clearance	Comments
		The DBT is also directed to Section 17 - Traffic Control for Navigation Channel Lighting Requirements.
Norfolk Southern Railroad	23 feet	
W.3 <sup>rd</sup> Street	14.5 feet	
CSX Willow Industrial Track	23 feet	
Canal Road	14.5 feet	
Central Viaduct Way	15.5 feet	
Commercial Road	15.5 feet	
GCRTA	23 feet	
Ontario Street	15.5 feet	

#### 14.3.10 Construction Plan Submittals for the I-90 Viaduct Structure

Construction plans for the I-90 viaduct structure (approach spans and main spans) shall be submitted in accordance with the provisions of Section 2 - Quality Management.

The technical proposal shall be equivalent to 30% plan development. The technical proposal at a minimum shall meet the requirements listed for the Bridge Preliminary Design Report per Section 202.2 of ODOT's BDM. The technical proposal shall include the following as a minimum:

- A. Final Structure Site Plan.
- B. General Bridge Elevation View.
- C. Plan views, elevation views and cross sections of the foundations and substructures.
- D. Superstructure transverse sections for the approach spans and main spans.

### 14.4 CRITERIA FOR NON-VIADUCT BRIDGES

#### 14.4.1 Structure Type - Non-Viaduct Bridges

The following structure types for the non-viaduct bridges listed below do not require a proposal for an Alternative Technical Concept:

- A. Steel beam or girder
- B. Prestressed concrete bulb-tee or I-girder
- C. Concrete slab without voids

All other structure types require an ATC to be considered as per Section 6.0 of the Design Build Selection Criteria.

#### **14.4.2 Requirements for Non-Viaduct Structures**

- A. The barriers on the outside edge of the deck shall be 42-inch high straight face deflector type per ODOT SCD SBR-1-99. This does not apply to Bridge Location 13 (E. 9<sup>th</sup> Street over GCRTA), Bridge Location 14 (Carnegie Avenue over GCRTA), or Bridge Location 15 (Abbey Avenue Bridge).
- B. All ends of cover plates and beam continuity welds with splice plates shall be retrofitted. This does not apply to Bridge Location 15 (Abbey Avenue Bridge).
- C. All new bridges shall use elastomeric bearings based on a selected durometer of either 50 or 60.
- D. For existing structures being redecked or widened, the existing bearings shall be replaced with elastomeric bearings based on a selected durometer of either 50 or 60, except as noted below.
- E. Beam seat pedestals are not permitted.
- F. When raising a structure, the adjustment in beam seat elevations shall be accomplished by steel shims if the amount raised is four (4) inches or less. If the structure is raised more than four (4) inches, the bridge seat shall be raised for its entire length by adding a reinforced concrete cap dowelled into the existing concrete.
- G. For existing structures being redecked or widened, the approach slabs shall be replaced.
- H. For existing structures being redecked or widened, remove and replace the existing porous backfill and install new porous backfill with filter fabric and drainage pipe behind the abutments, except as noted below.
- I. Proposed piers for widened structures shall be independent of existing piers. It is not required to check the capacity of existing substructures that are being re-used.
- J. Deck surface drainage shall be collected in a closed system off the end of all bridges. Over the side drainage is not permitted. If not required, any existing scuppers shall be removed. See Section 13 - Drainage, for additional requirements.

#### **Bridge Location 1**

Bridge No. CUY-90-1490L

I-90 westbound over Starkweather Avenue

Structure File Number: 1809342

General scope of work:	Deck replacement with minor widening
Required vertical clearance:	14 feet-6 inches
Required toe-to-toe of barriers:	42 feet-0 inches
Required no. of lanes on structure:	Two (2) @ 12 feet-0 inches
Edge of travelled lane to toe of barrier:	6 feet-0 inches inside/12 feet-0 inches outside

C&MS 519 – Patching of Concrete Structure

Rear Abutment: Approximately 100 square feet of patching  
Pier 1: Not Required  
Pier 2: Not Required  
Forward Abutment: Approximately 80 square feet of patching

Comments:

- A. The existing steel shall receive a new coating system using OZEU per C&MS 514.
- B. Any new steel shall receive a coating using system using IZEU per C&MS 514.
- C. Underpass lighting shall be replaced, see Section 17.6.

**Bridge Location 2**

Bridge No. CUY-90-1490R  
I-71/I-90 over Starkweather Avenue  
Structure File Number: 1807625

General scope of work: Deck replacement with minor widening  
Required vertical clearance: 14 feet-6 inches  
Required toe-to-toe of barriers: 55 feet-6 inches ±  
Required no. of lanes on structure: Three (3) @ 12 feet-0 inches  
Edge of travelled lane to toe of barrier: 5 feet-6 inches ± inside (the horizontal location of the proposed toe of median barrier shall match the existing horizontal location of the toe of median barrier)/14 feet-0 inches outside

C&MS 519 – Patching of Concrete Structure

Rear Abutment: Approximately 250 square feet of patching  
Pier 1: Not Required  
Pier 2: Not Required  
Forward Abutment: Approximately 250 square feet of patching

Steel repair – end crossframe replacement: Approximately 150 pounds of structural steel needed to replace end crossframe at the forward abutment.

Comments:

- A. Deck replacement and minor widening only on existing I-71 southbound portion of bridge. Existing I-90 eastbound/I-71 northbound portion of bridge will have deck replaced and widened with future CCG2.
- B. Bridge deck median barrier shall match approach roadway median barrier.
- C. The existing steel shall receive a new coating system using OZEU per C&MS 514.
- D. Any new steel shall receive a coating using system using IZEU per C&MS 514.
- E. Underpass lighting shall be replaced, see Section 17.6.

### Bridge Location 3

Bridge No. CUY-90-1506  
I-90 over Kenilworth Avenue  
Structure File Number: 1807684

General scope of work:	Deck replacement with widening
Required vertical clearance:	14 feet-6 inches
Required toe-to-toe of barriers:	Varies
Required no. of lanes on structure:	Two (2) @ 12 feet-0 inches I-90 westbound and three (3) @ 12 feet-0 inches I-71 southbound
Edge of travelled lane to toe of barrier:	Varies inside/14 feet-0 inches outside

#### C&MS 519 – Patching of Concrete Structure

Rear Abutment:	Approximately 100 square feet of patching
Pier 1:	Not Required
Pier 2:	Not Required
Forward Abutment:	Approximately 150 square feet of patching

Steel repair – end crossframe replacement: Approximately 150 pounds of structural steel is needed to replace the end crossframe at the forward abutment.

#### Comments:

- A. Deck replacement and minor widening only on I-90 westbound/I-71 southbound portion of bridge. Existing I-90 eastbound portion of bridge will have deck replaced and widened with future CCG2.
- B. Bridge deck median barrier shall match the proposed approach roadway median barrier.
- C. The existing steel shall receive a new coating system using OZEU per C&MS 514.
- D. The new steel shall receive a coating using system using IZEU per C&MS 514.
- E. Gore area occurs on this bridge, so required bridge width is variable and actual width will need to be included with the Technical Proposal.
- F. Underpass lighting shall be replaced, see Section 17.6.

### Bridge Location 4

Bridge No. CUY-90-1527  
I-90 over Fairfield Avenue  
Structure File Number: 1809636

General scope of work:	New structure on new alignment
Required vertical clearance:	15 feet-0 inches
Required toe-to-toe of barriers:	84 feet-0 inches
Required no. of lanes on structure:	Five (5) @ 12 feet-0 inches

Edge of travelled lane to toe of barrier: 12 feet-0 inches left/12 feet-0 inches right

### **Bridge Location 5**

Bridge No. CUY-90-1628EW  
Ramp I-77 northbound to I-90 westbound over E.9<sup>th</sup> Street  
Structure File Number: 1807552

General scope of work: This bridge shall be removed.

### **Bridge Location 6**

Bridge No. CUY-90-1627  
E.14<sup>th</sup> Street on-ramp to I-90 westbound and future (CCG3) mainline I-90 westbound over E.9<sup>th</sup> Street  
Structure File Number: 1809687

General scope of work:	New structure on new alignment
Required vertical clearance:	15 feet-6 inches
Required toe-to-toe of barriers:	Varies
Required no. of lanes on structure:	One (1) @ 16 feet-0 inches for E.14 <sup>th</sup> Street on-ramp and three (3) @ 12 feet-0 inches for future mainline I-90 westbound (see the CCG3 Roadway Engineering Conceptual Plans)
Edge of travelled lane to toe of barrier:	Varies on E.14 <sup>th</sup> Street on-ramp side (see the CCG3 Roadway Engineering Conceptual Plans for the mainline I-90 westbound side)

#### Comments:

- A. This bridge is being overbuilt on the mainline I-90 westbound side (south side of bridge) in CCG1 to accommodate the Future Condition being constructed as part of CCG3. Portable concrete barrier shall be designed and installed in CCG1 between the E.14<sup>th</sup> Street on-ramp portion and the future (CCG3) mainline I-90 westbound over E.9<sup>th</sup> Street portion. (See the CCG3 Roadway Engineering Conceptual Plans.)
- B. Gore area occurs on this bridge, so the required bridge width is variable and actual width will need to be included with the Technical Proposal.

### **Bridge Location 7**

Bridge No. CUY-90-1628L  
I-90 westbound over E.9<sup>th</sup> Street  
Structure File Number: 1807498

General scope of work:	Deck replacement
Required vertical clearance:	Proposed vertical clearance shall not be less than existing. Existing minimum vertical clearance is 17 feet-3 inches.
Required toe-to-toe of barriers:	Varies – Proposed toe-to-toe of barriers shall not be less than existing toe-to-toe of barriers
Required no. of lanes on structure:	Three (3) @ 12 feet-0 inches
Edge of travelled lane to toe of barrier:	Inside shoulder width varies, but shall not be less than the existing inside shoulder width/outside shoulder width varies (see Comment A below)

**C&MS 519 – Patching of Concrete Structure**

Rear Abutment:	Approximately 200 square feet of patching
Pier 1:	Approximately 30 square feet of patching
Pier 2:	Approximately 75 square feet of patching
Forward Abutment:	Approximately 50 square feet of patching

Steel repair – end crossframe replacement: Approximately 450 pounds of structural steel is needed to replace the end crossframes at the rear and forward abutments.

**Comments:**

- A. Proposed outside edge of deck shall match the existing outside edge of deck.
- B. Bridge deck median barrier shall match approach roadway median barrier.
- C. Painting is not required for this structure.
- D. Underpass lighting shall be replaced, see Section 17.6.
- E. The existing timber subdecking shall be removed.

**Bridge Location 8**

Bridge No. CUY-90-1628R  
 I-90 eastbound over E.9<sup>th</sup> Street  
 Structure File Number: 1807714

General scope of work:	Deck replacement
Required vertical clearance:	Proposed vertical clearance shall not be less than existing. Existing minimum vertical clearance is 15 feet-6 inches.
Required toe-to-toe of barriers:	Varies – Proposed toe-to-toe of barriers shall not be less than existing toe-to-toe of barriers
Required no. of lanes on structure:	Three (3) @ 12 feet-0 inches + one (1) @ Varies ramp to E.9 <sup>th</sup> Street
Edge of travelled lane to toe of barrier:	Proposed inside shoulder width shall not be less than the existing inside shoulder width/outside shoulder width varies (see Comment A below)



C&MS 519 – Patching of Concrete Structure

Rear Abutment: Approximately 100 square feet of patching

Pier 1: Not Required

Pier 2: Not Required

Forward Abutment: Approximately 150 square feet of patching

Steel repair – end crossframe replacement: Approximately 150 pounds of structural steel is needed to replace the end crossframes at the rear and forward abutments.

Comments:

- A. Proposed outside edge of deck shall match the existing outside edge of deck.
- B. Bridge deck median barrier shall match approach roadway median barrier.
- C. Painting is not required for this structure.
- D. Underpass lighting shall be replaced, see Section 17.6.
- E. The existing timber subdecking shall be removed.
- F. Deck replacement shall be completed and open to traffic by December 1, 2011.

**Bridge Location 9**

Bridge No. CUY-90-1640

I-90 eastbound and westbound over I-77 southbound

Structure File Number: 1807773

General scope of work:	Deck replacement
Required vertical clearance:	Proposed vertical clearance shall not be less than existing
Required toe-to-toe of barriers:	Proposed toe-to-toe of barriers shall not be less than existing toe-to-toe of barriers
Required no. of lanes on structure:	Three (3) @ 12 feet-0 inches I-90 westbound / three (3) @ 12 feet-0 inches I-90 eastbound
Edge of travelled lane to toe of barrier:	Proposed shoulder widths shall not be less than the existing shoulder widths (see Comment A below)

C&MS 519 – Patching of Concrete Structure

Rear Abutment: Approximately 100 square feet of patching

Pier 1: Approximately 150 square feet of patching

Pier 2: Approximately 25 square feet of patching

Forward Abutment: Approximately 100 square feet of patching

Steel repair – end crossframe replacement: Approximately 300 pounds of structural steel needed to replace end crossframe at the rear abutment.

Comments:

- A. Proposed outside edge of deck shall match the existing outside edge of deck.

- B. Bridge deck median barrier shall match approach roadway median barrier.
- C. I-90 westbound superstructure shall be independent of I-90 eastbound superstructure.
- D. Painting is not required for this structure.
- E. The existing conduit on Pier 2 shall be preserved and protected.
- F. Deck replacement shall be completed and open to traffic by December 1, 2011.

**Bridge Location 10**

Bridge No. CUY-77-1597L  
 I-77 southbound over E.14<sup>th</sup> Street  
 Structure File Number: 1807919

General scope of work:	Deck replacement
Required vertical clearance:	Proposed vertical clearance shall not be less than existing. Existing minimum vertical clearance is 16 feet-9 inches.
Required toe-to-toe of barriers:	Varies – Proposed toe-to-toe of barriers shall not be less than existing toe-to-toe of barriers
Required no. of lanes on structure:	Two (2) @ 12 feet-0 inches
Edge of travelled lane to toe of barrier:	Proposed shoulder widths shall not be less than the existing shoulder widths (see Comment A below)

**C&MS 519 – Patching of Concrete Structure**

Rear Abutment:	Approximately 70 square feet of patching
Pier 1:	Not required
Pier 2:	Not required
Pier 3:	Not required
Forward Abutment:	Approximately 50 square feet of patching

**Comments:**

- A. Proposed outside edge of deck shall match the existing outside edge of deck.
- B. It is not required to replace the existing bearings for this structure.
- C. Painting is not required for this structure.
- D. It is not required to remove and replace the existing porous backfill and install new porous backfill with filter fabric and drainage pipe behind the abutments.
- E. Underpass lighting shall be replaced, see Section 17.6.
- F. The existing timber subdecking shall be removed.
- G. Gore area occurs on this bridge, so the required bridge width is variable and the actual width will need to be included with the Technical Proposal.
- H. Deck replacement shall be completed and open to traffic by December 1, 2011.

**Bridge Location 11**

Bridge No. CUY-90-1651L  
 I-90 westbound over E.14<sup>th</sup> Street

Structure File Number: 1807900

General scope of work:	Deck replacement
Required vertical clearance:	Proposed vertical clearance shall not be less than existing. Existing minimum vertical clearance is 18 feet- 0 inches.
Required toe-to-toe of barriers:	Varies – Proposed toe-to-toe of barriers shall not be less than existing toe-to-toe of barriers
Required no. of lanes on structure:	Three (3) @ 12 feet-0 inches
Edge of travelled lane to toe of barrier:	Proposed shoulder widths shall not be less than the existing shoulder widths (see Comment A below)

**C&MS 519 – Patching of Concrete Structure**

Rear Abutment:	Approximately 50 square feet of patching
Pier 1:	Approximately 25 square feet of patching
Pier 2:	Approximately 20 square feet of patching
Pier 3:	Not required
Forward Abutment:	Approximately 50 square feet of patching

**Comments:**

- A. Proposed outside edge of deck shall match the existing outside edge of deck.
- B. Bridge deck median barrier shall match approach roadway median barrier.
- C. Slipforming is permitted for the median barrier only.
- D. It is not required to replace the existing bearings for this structure.
- E. Painting is not required for this structure.
- F. It is not required to remove and replace the existing porous backfill and install new porous backfill with filter fabric and drainage pipe behind the abutments.
- G. Underpass lighting shall be replaced, see Section 17.6.
- H. The existing timber subdecking shall be removed.
- I. Gore area occurs on this bridge, so the required bridge width is variable and the actual width will need to be included with the Technical Proposal.
- J. Deck replacement shall be completed and open to traffic by December 1, 2011.

**Bridge Location 12**

Bridge No. CUY-90-1651R  
I-90 eastbound over E.14<sup>th</sup> Street  
Structure File Number: 1807803

General scope of work:	Deck replacement and widening
Required vertical clearance:	Proposed vertical clearance shall not be less than existing. Existing minimum vertical clearance is 15 feet-0 inches.
Required toe-to-toe of barriers:	Varies

Required no. of lanes on structure:	Three (3) @ 12 feet-0 inches on I-90 eastbound and two (2) @ 13 feet – 6 inches on Ramp I-77 northbound to I-90 eastbound
Edge of travelled lane to toe of barrier:	The I-90 eastbound median shoulder width shall not be less than the existing median shoulder width. The Ramp I-77 northbound to I-90 eastbound shoulder widths shall not be less than 4 feet.

**C&MS 519 – Patching of Concrete Structure**

Rear Abutment:	Approximately 50 square feet of patching
Pier 1:	Approximately 25 square feet of patching
Pier 2:	Approximately 20 square feet of patching
Pier 3:	Not required
Forward Abutment:	Approximately 50 square feet of patching

**Comments:**

- A. This bridge includes the I-77 northbound to I-90 eastbound ramp portion of the structure. This bridge will need to be widened for Ramp I-77 northbound to I-90 eastbound to accommodate the Bi-Directional Condition. Additional widening may be required for maintaining traffic (see Section 18 - Maintenance of Traffic).
- B. Proposed I-90 eastbound median edge of deck shall match the existing I-90 eastbound median edge of deck. For the I-77 ramp portion of the structure, the proposed left edge of deck shall match the existing left edge of deck.
- C. Bridge deck median barrier shall match approach roadway median barrier.
- D. Slipforming is permitted for the median barrier only.
- E. It is not required to replace the existing bearings for this structure. The bearing type for any new beam/girder lines shall match the existing bearing type.
- F. Painting of the existing steel is not required for this structure.
- G. Any new steel shall receive a coating using system using IZEU per C&MS 514.
- H. It is not required to remove and replace the existing porous backfill and install new porous backfill with filter fabric and drainage pipe behind the abutments.
- I. Gore area occurs on this bridge, so required bridge width is variable and actual width will need to be included with the Technical Proposal.
- J. Underpass lighting shall be replaced, see Section 17.6.
- K. The existing timber subdecking shall be removed.
- L. Deck replacement shall be completed and open to traffic by December 1, 2011.

**Bridge Location 13**

E.9<sup>th</sup> Street and Shared-Use Path over GCRTA

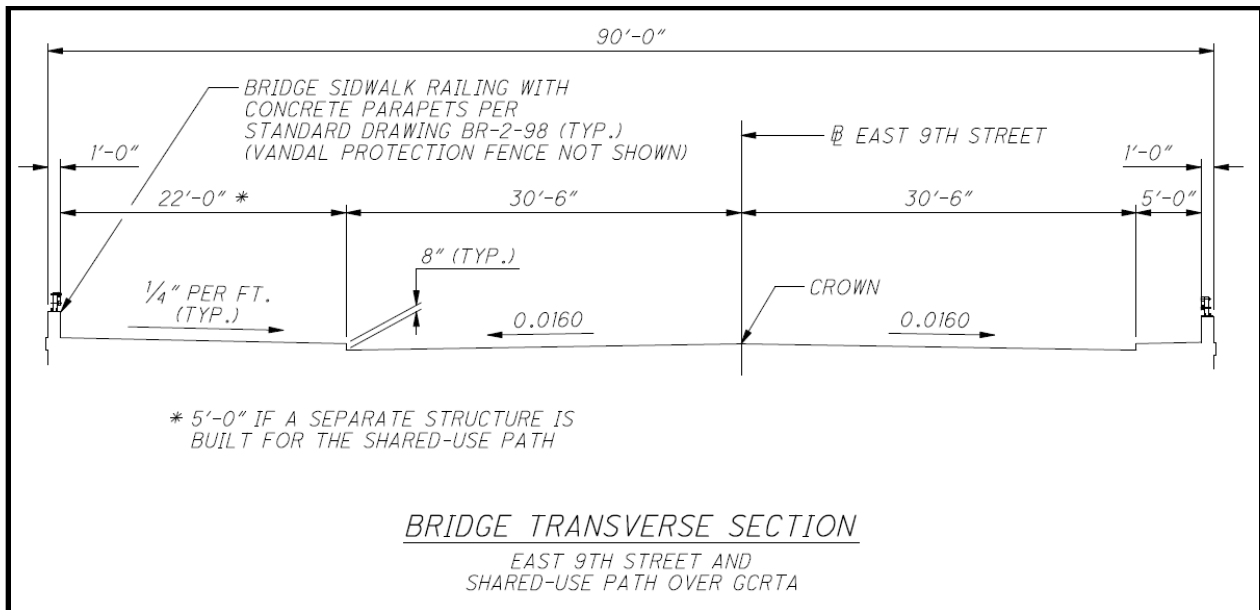
Structure File Number: 1870653

General scope of work: New structure on new alignment  
Structure horizontal dimensions: See Bridge Transverse Section below  
Required vertical clearance: 23 feet-0 inches

Comments:

- A. This structure shall not have piers located between the existing retaining walls adjacent to the GCRTA tracks. This requirement is also shown in the No Build Zone drawings provided in the Appendix.

Figure 14-1: E.9<sup>th</sup> Street over GCRTA Transverse Section



### Bridge Location 14

Bridge No. CUY-10-1685  
Carnegie Avenue over GCRTA  
Structure File Number: 1801511

General scope of work: Relocated curb lines (widened sidewalks), remove concrete traffic island and resurface with micro-silica modified concrete wearing course, specialty sidewalk paving and ornamental railing (south sidewalk only).

Structure horizontal dimensions: Varies, see conceptual roadway plans

Required vertical clearance: Existing (no work below deck level)

Comments:

- A. Do not disturb existing parapet on north sidewalk.
- B. No work proposed below top of existing concrete slab.
- C. See Enhancement Drawings in Appendix AE.

**Bridge Location 15**

Bridge No. CUY-ABBEY-1001M

Abbey Avenue Viaduct over CSX RR, Norfolk Southern RR, and Scranton Road

Structure File Number: 1870084

General scope of work: Remove splash barriers, sidewalks, parapets, fence and lighting. Reconstruct the deck cantilever with new parapets and sidewalks. Repair and overlay existing concrete bridge deck, retrofit modular expansion joints, install 6'-0" vandal protective fence, parapet mounted roadway lighting, pavement markings.

Structure horizontal dimensions: 32 feet-0 inches curb-to-curb, two (2) 11-foot 0-inch lanes, two (2) 5-foot 0-inch bike lanes, two (2) 5-foot 0-inch sidewalks

Required vertical clearance: Existing (no work below deck level)

Comments:

- A. Refer to Appendix AE-03 – Abbey Avenue Bridge Conceptual Rehabilitation Plan.
- B. Modular expansions joint retrofit or replacement shall include localized deck and/or abutment removal, retrofit and extension of structural joint to match relocated curb line. New neoprene seals shall be installed for the full-width of the bridge.
- C. Travelled way widening shall extend the existing 3/16 inch per foot cross slope to the new sidewalk curb line. Remove scuppers and install bicycle friendly scuppers at the new curb line. Touch-up paint structural steel per OZEU where the structural alterations are performed, including scupper/downspouts and expansion joints.
- D. Repair and/or replace approach slabs to match bridge retrofits.
- E. Replace street and pedestrian lighting.
- F. Refer to Section 16 for Aesthetic and Enhancement requirements.
- G. Itemize work related to the bridge deck overlay separately in the cost loaded schedule. Overlay items of work are funded separately from the other work on this bridge.

#### **14.4.3 Construction Plan Submittals for Non-Viaduct Structures**

Construction plans for non-viaduct structures shall be submitted in accordance with provisions of Section 2 - Quality Management.

The technical proposal shall be equivalent to 30% plan development. The technical proposal at a minimum shall meet the requirements listed for the Bridge Preliminary Design Report per Section 202.2 of ODOT's Bridge Design Manual. The technical proposal shall include the following as a minimum:

- A. Final Structure Site Plan.
- B. Plan views, elevation views and cross sections of the foundations and substructures.
- C. Superstructure transverse sections.

#### **14.5 CRITERIA FOR PERMANENT RETAINING WALLS**

As described in Section 1.5.1 and 1.5.2, the DBT shall consider the bi-directional, interim and future conditions in design and construction of CCG1 Project Elements, including but not limited to the retaining wall along Temporary Ramp A3. The DBT shall design and construct the retaining wall along Temporary Ramp A3 to accommodate (in place – with no further raising and/or extension required) the alignment and profile for Ramp A3 in the Future Condition (CCG3) as well as Bi-Directional Condition (CCG1). The grading assumption for the Future Condition shall be based on a standard guardrail typical section, with slopes no steeper than 2H:1V. The top of the retaining wall constructed as part of CCG1 shall not be higher than the elevation of the temporary pavement. The retaining wall shall not impact the existing 66" combined sewer adjacent to this ramp. See Appendix LD-14 for a conceptual layout of a retaining wall that meets the above requirements.

Cast-in-place concrete facings are required for soil nail walls, soldier pile walls and secant walls (adjacent drilled shafts).

Modular block walls are not permitted for walls greater than three (3) feet of total overall wall height.

For retaining walls required adjacent to private (non-state or non-City) property at the toe of slope, locate face of retaining walls 10' from Limited Access lines to provide adequate room for ditches/maintenance/access. This restriction does not apply to walls for E. 9<sup>th</sup> and E. 14<sup>th</sup> Street On-ramps adjacent to Tri-C and Hilton Garden Inn, respectively.

No utilities shall be placed within the reinforced soil mass of all MSE walls with the exception of roadway/storm drainage systems. Type A conduits are not permitted through MSE walls or the fill of MSE walls. Type B conduits placed through MSE walls or in the fill of MSE walls are limited to 706.02, with joints per 706.11. (See ODOT L&D Volume 2, Section 1002.3.2.)

For retaining wall foundations, it is not required to socket drilled shaft foundations into bedrock. Drilled shaft friction capacity provided by soil is permitted for retaining wall foundations.

### **14.5.1 Green Retaining Walls**

This specification applies to Wall #1 and Wall #2 located at Fairfield Avenue and proposed Ramp A6, respectively. Provisions of Supplemental Specification 840 - Mechanically Stabilized Earth Wall shall apply unless modified below. Submit requests for deviations from SS 840 to ODOT for approval. Design precast concrete facing panels to provide for plantings that meet the goals for Wall #1 and Wall #2 of vegetated retaining wall structures. (Refer to Appendix AE for conceptual drawings depicting the aesthetic goals for a mature vegetated wall.)

The needs of the site and the goals of the “mature” green wall/slope system should be completely assessed for geographic region, micro-climates within the system, media depth and composition, drainage, functional design intent, light conditions, aesthetics, relevant history of species use in similar applications, maintenance constraints and accessibility to the wall/slope face. Wall/slope plant location schematic per project stationing and plant list should be shown on the landscape plan to be submitted for approval. The vegetated wall shall be designed to survive without an irrigation system.

The wall system supplier shall be approved by the Engineer. Soil Reinforcement shall be as per manufacturer’s recommendations. Soil Reinforcement shall be connected to every precast panel, block, or basket.

The vegetated wall shall be designed to minimize maintenance. Include maintenance recommendations with the landscaping plan and plant list for approval. Maintain vegetation during the period of establishment according to C&MS 661.17 or until project completion, whichever is later.

### **14.6 CUYAHOGA RIVER BULKHEAD WALL**

Steel sheet pile vertical bulkheads shall be designed in accordance with Waterway Permits and other environmental commitments as described in Section 5.2 and constructed within the Project limits as shown in Appendix ST-03 - Bulkhead Conceptual Plans. The DBT shall refer to City of Cleveland City Ordinance, Title XI – Port Control, Chapter 573 for design criteria and requirements, and Chapter 575 for dock line alignment. Design of sheet pile bulkhead shall be coordinated with Section 9 - Geotechnical.

### **14.7 GREEN BULKHEADS**

The DBT shall construct two Green Bulkhead additions to provide larval fish habitats along the Cuyahoga River. The proposed additions shall serve as pocket habitats. Green Bulkhead additions shall be within Project right-of-way on the Cuyahoga River and outside of the footprint of the proposed structure. The Green Bulkhead additions shall be located on the East Bank of the Cuyahoga River within the limits of the proposed bulkheads. The Green Bulkhead additions shall be designed to be self-sustainable and require minimal maintenance. The DBT shall consult an environmental professional for design of the pocket habitat with respect to plantings and issues related to establishing a functional habitat.

General Scope of Work includes:



- A. Remove shoreline material from behind the wall as follows:
  - a. Excavate to a depth approximately 10 feet below the top of the bulkhead (measured perpendicular to the bulkhead). The excavation shall extend for 10 feet behind the wall at approximately the same depth.
  - b. Beyond the first 10 feet behind the wall, the excavation will follow a 1.5:1 max slope until existing grade is met.
- B. Provide geotextile fabric along the bottom of the excavated section.
- C. Place a clean soil layer (4-6 inches thick) immediately landward of the waterside bulkhead structure.
- D. Place a gravel fill layer over the new soil layer.
- E. Cut vertical slots in the webs of the wall along the entire length of the excavated area to accommodate habitat access to the excavated area. Vertical slots shall be approximately four (4) inches wide. The top of the slots shall be no more than three (3) inches below the OHWM. The bottom of the slots shall be six (6) inches above the top of the newly placed soil layer.
- F. Install aquatic plantings to provide cover for the fish and aid in increasing dissolved oxygen levels.

Each Green Bulkhead addition shall be 20 to 25 feet wide (measured parallel to the bulkhead), and the entire length of work, including grading, along the wall shall not exceed 60 feet for each pocket habitat. Pocket habitats shall be separated by a minimum of 50 feet.

For additional reference information, the DBT may contact the Cuyahoga RAP Executive Director:

Cuyahoga RAP Executive Director  
1299 Superior Avenue  
Cleveland, OH 44114  
Attention: Jim White  
216-241-2414 x307  
whitej@cuyahogariverrap.org

Green Bulkhead conceptual details and listing of native plant species are provided in Appendix ST-02.

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## 15 NOISE ANALYSIS, NOISE BARRIERS and VEGETATIVE SCREENING

Noise analysis is not required and noise barriers are not to be constructed as part of this contract.

The DBT shall construct vegetative screening (landscaping) along I-90 westbound in accordance with this section. Vegetation shall be provided in lieu of noise barriers; however this vegetation is not intended as a noise abatement measure. Drawings in AE-02 illustrate the required design for vegetative screening between I-490 and University Avenue.

In addition to the requirements of Drawings in AE-02, the following requirements apply to the vegetative screening:

- A. No trees shall be planted within 15-feet of guardrail adjacent to roadway.
- B. No trees shall be planted within 10-feet of retaining walls.
- C. No trees shall be planted within drainage ditches.
- D. Provide a 3-foot clear zone along the L/A fence. A row of ornamental plants will be planted parallel to the L/A fence. The ornamental plants will be a mixture of lilacs and viburnum.
- E. All areas outside of the clear zones defined above and within the construction limits for the roadway shall be planted with trees. Place trees in an offset pattern with rows 15-foot apart and trees 15-foot on center in each row. Plant trees in single species masses of at least 15 trees. Plant trees from the following list of acceptable trees:

**Table 15-1: Acceptable Trees for Vegetative Screening**

<b>Deciduous species</b>	<b>Evergreen species</b>
<b>Hawthorn</b>	Austrian Pine Pinus nigra
<b>Crabapple</b>	Blue spruce Picea pungens
<b>Honey Locust</b>	
<b>Sugar Maple</b>	
<b>Linden</b>	
<b>Goldenrain tree "Gymnocladus"</b>	

- F. Dead and potentially hazardous trees are to be removed from the area outside of the roadway construction limits yet within the existing limited access of I-90 between Branch Avenue and Kenilworth Avenue. One replacement tree will be planted for each tree removed.

A copy of the Noise Barrier Public Involvement Summary is included in Appendix NB-01.

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## **16 AESTHETICS and ENHANCEMENTS**

### **16.1 INTRODUCTION**

As part of the overall Project development, the Ohio Department of Transportation has received considerable input from local residents, community groups, Project stakeholders, local officials and other groups regarding Project aesthetic preferences to be incorporated into the final design of the Project. The standards defined herein represent the minimum bridge aesthetic requirements to be considered and addressed by the DBT during the design development of the Project. The requirements of this specification apply to the design and construction of all permanent structures including but not limited to bridges, retaining walls, barriers, lighting, sidewalk/bicycle paths, streetscape and landscape enhancements, and drainage facilities.

The DBT shall conduct all work necessary to meet the requirements for aesthetics and enhancements management, including: provision of an Aesthetics and Enhancements Manager and Aesthetics and Enhancements Graphic Support Team; development and execution of an Aesthetics and Enhancements Implementation Plan; and presentation to and collaboration with an Aesthetics and Enhancements Management Advisory Team (AEM Team), inclusive of key stakeholders. The DBT, in collaboration with the AEM Team, shall develop informed aesthetics and enhancements decisions, produce an AEM Team “Record of Recommendations and Decisions” document, and construct the aesthetic details and enhancements.

The DBT shall itemize enhancement costs as detailed in Appendix AE-01 separately for payment and budgetary reporting purposes to ODOT via the cost loaded schedule.

### **16.2 AESTHETICS and ENHANCEMENTS IMPLEMENTATION PLAN**

The DBT shall develop an Aesthetics and Enhancements Implementation Plan (AEI Plan). This plan will be based on the Aesthetics and Enhancement Management Plan submitted as part of the Technical Proposal. The AEI Plan will provide details and elaborate on the qualifications, responsibilities, and authority of the Aesthetics and Enhancements Manager; the responsibilities of the Aesthetics and Enhancements Management Graphic Support Team; the methods for coordinating and interacting with the AEM Team; and the format and distribution of the AEM Team’s “Record of Recommendations and Decisions” document.

#### **16.2.1 Aesthetics and Enhancements Manager**

The DBT shall assign an Aesthetics and Enhancements Manager to the Project.

The Aesthetics and Enhancements Manager shall have the responsibility to:

- A. Develop and execute the Aesthetics and Enhancements Implementation Plan
- B. Coordinate aesthetics and enhancements issues with the AEM Team, ODOT, and the DBT’s design and construction teams

- C. Oversee the preparation of 2D or 3D CAD drawings, renderings, or photo simulations as needed to depict conceptual and detailed solutions to address aesthetics and enhancements issues

The Aesthetics and Enhancements Manager shall have experience with developing and directing aesthetic and enhancement work for transportation projects. The qualifications of the DBT's Aesthetics and Enhancements Manager shall be submitted as part of the Technical Proposal.

## **16.2.2 Methodology**

### ***16.2.2.1 Establishing an AEM Team***

The AEM Team shall be assembled by ODOT and shall consist of representatives from ODOT and local stakeholders. The intent of the AEM Team is to maintain continuity and compatibility in the final design with efforts to establish a framework for aesthetics and visual quality set forth in earlier design phases by the Innerbelt Bridge Subcommittee.

Local stakeholder representation on the AEM Team will be determined by ODOT and will include staff from the City of Cleveland, Cuyahoga County, local affected agencies, and local neighborhood / community development groups. The DBT shall be responsible for working with ODOT to schedule meetings with the AEM Team, as described below, and shall assist ODOT with identifying appropriate facilities and producing appropriate graphics and exhibits for the meetings. ODOT will provide a list defining representation of the AEM Team to the DBT upon Notice to Proceed. ODOT reserves the right to make changes to the makeup of the AEM Team during Project development.

### ***16.2.2.2 Commitment to Context Sensitive Design and Solutions***

The DBT's work shall be consistent with the Record of Recommendations and Decisions and the DBT shall make every effort to conform to the following general principles:

- A. Use an interdisciplinary team tailored to project needs.
- B. Apply flexibility inherent in design standards.
- C. Incorporate aesthetics and enhancements considerations throughout project development.

### ***16.2.2.3 Producing an Aesthetics and Enhancements Implementation Plan***

The DBT shall produce an Aesthetics and Enhancements Implementation Plan (AEI Plan) in accordance with the requirements of this Section.

The AEI Plan shall:

- A. Establish a plan for presenting final detailed aesthetics options to the AEM Team and public for feedback. Stakeholder involvement requirements are defined in Section 16.4. Elements of the design for which the DBT shall develop and present options are, at a minimum, listed below in Table 16-1 Aesthetic Options.

Table 16-1: Aesthetic Options

Project Section	Presentation Requirements
<b>Viaduct Bridge (Main Spans and Approach Spans)</b>	Three fully-integrated concepts illustrating: <ol style="list-style-type: none"> <li>a. Color</li> <li>b. Finished surface treatment (reveals, chamfers, texture etc.)</li> <li>c. Pier shapes</li> <li>d. Architectural lighting</li> </ol>
<b>I-90 westbound over Fairfield Avenue</b>	Three fully-integrated concepts illustrating: <ol style="list-style-type: none"> <li>a. Color</li> <li>b. Finished surface treatment (reveals, chamfers, texture etc.)</li> <li>c. Pier detailing</li> </ol> Concepts shall consider and conform to requirements of Fairfield Avenue streetscape plan
<b>I-90 westbound over E.9<sup>th</sup> Street</b>	Three fully-integrated concepts illustrating: <ol style="list-style-type: none"> <li>a. Color</li> <li>b. Finished surface treatment (reveals, chamfers, texture etc.)</li> <li>c. Pier detailing</li> </ol> Concepts shall consider and be consistent with aesthetic details for the I-90 viaduct over Ontario Avenue and the retaining walls for the I-90 westbound on-ramps from E.9 <sup>th</sup> Street and E.14 <sup>th</sup> Street
<b>E.9<sup>th</sup> Street over GCRTA</b>	Three fully-integrated concepts illustrating: <ol style="list-style-type: none"> <li>a. Color</li> <li>b. Finished surface treatment (reveals, chamfers, texture etc.)</li> </ol> Concepts shall recognize and appropriately address the presence of a multi-use path at this structure. If the multi-use path is placed on a separate independent structure and not on the E.9 <sup>th</sup> Street over GCRTA structure, similar and consistent aesthetic treatments shall be used on the two structures.
<b>Tremont Non-Viaduct Structures (Deck Replacements at Starkweather and Kenilworth)</b>	Two schemes illustrating: <ol style="list-style-type: none"> <li>a. Color options</li> <li>b. Parapet surface treatment options</li> </ol> The same aesthetic scheme shall be used for both structures. Schemes shall consider and be consistent with proposed aesthetic details for the I-90 viaduct structure over Fairfield Avenue Aesthetic schemes shall include replacement of the existing painted illustrations on the pier columns.
<b>Downtown Non-Viaduct Structures (Deck Replacements on Existing Mainline over E.9th Street and E.14<sup>th</sup> Street)</b>	No presentation is required. Treatments shall match the aesthetic treatments selected for the I-90 west bound structures over E.9 <sup>th</sup> Street and Ontario Avenue where applicable.

<b>Project Section</b>	<b>Presentation Requirements</b>
<b>Retaining Walls Along E.14<sup>th</sup> Street and E.9<sup>th</sup> Street On-ramps to I-90 westbound</b>	Three options for form liner texture, illustrated with photos and physical samples. Reference is made to additional criteria in this document regarding green wall treatments for these walls.
<b>Retaining Walls for Abbey Avenue / W.14<sup>th</sup> Street Ramp and Fairfield Avenue</b>	Illustrations and/or physical samples of walls as prescribed in this document.
<b>All Other Retaining Walls</b>	Three integrated schemes showing color and surface treatments. It is assumed that the same scheme will apply to all retaining walls not previously listed in this table, unless otherwise recommended by the DBT. For presentation purposes, the DBT may illustrate the proposed schemes using one or more wall location, and the DBT is not required to provide illustrations of all schemes at each wall location.
<b>Broadway Mills Wall and Historic Commemorative Display</b>	Three options using salvaged materials from the Broadway Mills Building, including presentation of a commemorative plaque. Include location in reference to existing building site and overlook plaza per Appendix AE-02.
<b>Abbey Ave Bridge over Scranton</b>	Three fully-integrated concepts illustrating: <ul style="list-style-type: none"> <li>a. Color</li> <li>b. Parapet surface treatment (formed reveals/ textures)</li> <li>c. Decorative Vandal Protective Fence</li> </ul>
<b>Lorain Carnegie Bridge over GCRTA</b>	Two schemes illustrating: <ul style="list-style-type: none"> <li>a. Ornamental Metal Railing (w/1"x1" vandal protective mesh)</li> <li>b. Color</li> </ul> <p>The bridge aesthetics shall be coordinated with streetscape enhancements for Central Viaduct Way.</p>
<b>Local Facility – Street and Pedestrian Lighting</b>	Bring three light fixture options from the approved list in Appendix TC-12 to stakeholders for selection

The plan shall establish the DBT's methodology for determining public preference on these options for presentation to the AEM Team. Elements of the Project prescribed elsewhere in the Contract, CUY-90-14.90, PID 85531, Innerbelt Bridge Construction Contract Group 1, shall not be included in the options presented to the public for feedback, except as noted in the table above.

- B. Establish the methods for coordinating and interacting with the AEM Team. At a minimum, the DBT's shall conduct two (2) meetings, as defined in Section 16.4 "Stakeholder Involvement Requirements" below. The first is to be held before the public meeting described above, and the second is to be held after the public meeting, at which final recommendations will be obtained from the AEM Team on the detailed aesthetic options described above. The plan shall also define the methodology by which the DBT will obtain from the AEM Team a final recommendation on each of the detailed aesthetic options.



- C. Define the role of the Aesthetics and Enhancements Manager in identifying areas or elements of the proposed bridge, roadway, and surroundings that present opportunities in the development of a visually acceptable design.
- D. Define the responsibilities and authority the Aesthetics and Enhancements Manager will have in overseeing and reviewing the overall bridge design, design details, full-scale mock-ups, samples, and other submittals relating to the development of a visually acceptable design.
- E. Define the authority of the Aesthetics and Enhancements Manager and the process for which the Aesthetics and Enhancements Manager will coordinate the recommendations from the AEM Team with the DBT's design and construction teams.
- F. Establish a schedule for aforementioned public and AEM Team meetings, and for submittal of the Record of Recommendations and Decisions document.
- G. Define the process of producing and submitting the Record of Recommendations and Decisions document, including review of the document by ODOT staff.

### **16.2.3 Deliverables**

#### ***16.2.3.1 Aesthetics and Enhancements Implementation Plan***

The DBT shall submit to ODOT an Aesthetics and Enhancements Implementation Plan.

The DBT shall develop and submit 10 individually bound, full-color, printed copies of the Aesthetics and Enhancements Implementation Plan to ODOT for approval. The Guide for addressing Aesthetics and Enhancements Issues shall outline the methods to be employed for coordinating and interacting with the AEM Team.

The DBT shall submit to ODOT 40 full-color printed copies of the Approved Guide for addressing Aesthetics and Enhancements Issues. The covers of these copies shall have the words "Approved Aesthetics and Enhancements Implementation Plan," the name of the DBT, the name of the Project, and the date of ODOT Approval printed on them. The Aesthetics and Enhancements Manual shall be bound in a 3-ring binder with waterproof cover. The contents shall be printed on 11-inch by 17-inch bond paper, landscape format.

In addition to the printed Approved AEI Plan, the DBT shall provide ODOT within 10 Business Days of ODOT Approval, five CD/DVD copies of the AEI Plan in pdf. format. Each CD/DVD shall be supplied in a plastic, re-sealable case and printed with the words "Approved Aesthetics and Enhancements Implementation Plan," the name of the Project, and the date of ODOT Approval. The printing shall be readable through the CD/DVD case.

#### ***16.2.3.2 Record of Recommendations and Decisions***

The DBT shall compile and maintain a "Record of Recommendations and Decisions" as determined through Stakeholder Involvement specified in Section 16.4. Submit the completed Record of Recommendations and Decisions document at least 30 days prior to construction of elements affected

by the aesthetic and enhancement decisions and no later than 30 days after City Planning Commission meeting.

#### ***16.2.3.3 Aesthetics and Enhancements Graphic Support***

The DBT shall provide sketches, 2D and 3D CAD drawings, renderings, photo simulations as necessary to adequately portray design and detail concepts or solutions for the AEM Team Meetings, Public Meeting, and City Planning Commission Meeting. Because of the nature of this Project, the need for and number of graphics will be determined by the DBT's approach to coordination with the Aesthetics and Enhancements Advisory Team.

#### ***16.2.3.4 Aesthetics and Enhancements Mock-ups and Samples***

The DBT shall provide mock-ups or samples for consent by the AEM Team and the Approval of ODOT as defined by Section 16, including mock-ups of retaining walls, slope protection, parapets, samples of lighting elements, architectural materials/textures, and architectural finishes a minimum of 15 Days prior to the construction or installation of any of these elements.

#### ***16.2.3.5 ODOT Review of AEI Plan***

The AEI Plan shall be submitted to ODOT for review. ODOT will review the AEI Plan within 10 Business Days of receipt from the DBT. The DBT shall not conduct the initial stakeholder meeting prior to ODOT review of the AEI Plan and resolution of ODOT comments on the proposed plan.

### **16.3 DESIGN REQUIREMENTS**

#### **16.3.1 Viaduct Bridge Design Principles**

As part of ODOT's continuing public involvement effort, an Innerbelt Bridge Subcommittee was formed consisting of key stakeholders and agency representatives. DBTs are encouraged to visit the Project website ([www.innerbelt.org](http://www.innerbelt.org)), at which notes from Subcommittee meetings have been posted, and to become familiar with the preferences and recommendations of this Subcommittee over the course of its work.

As part of the effort put forth by the Innerbelt Bridge Subcommittee, a series of Design Principles was developed as listed below. DBTs are encouraged to develop designs and aesthetic details that address, to the greatest extent possible, the recommendations reflected in these principles:

- A. The design should be inspired by Cleveland's civic, industrial and bridge design history, and should be the next contribution to the rich bridge architectural history of the valley. It should respect the aesthetic history of this place.
- B. The new bridge should reflect consistent design themes of existing bridges in the valley, and should strive for similar attention to form and detail, while not being imitative.
- C. The new bridge should advance architecture and technology of our time, not be nostalgic.
- D. The design of the approaches and main spans should be consistent and coherent across the entire valley, and speak with a single design vocabulary.

- E. The design should maximize the possibility to create a visual image or statement.
- F. Bridge design should focus on principles of form, rhythm and scale. The scale of bridge elements should invoke and be in proper proportion with the dimensions of the overall valley.
- G. Consideration of the people and environment adjacent to, and under, the bridge is important. Design should recognize the potential for future pedestrian use on the land under the bridge and consider lighting or other means to increase safety and user-friendliness.
- H. The design should be sensitive to the scale and appearance of the neighborhoods where it touches down and should respect the special character of Tremont and Gateway.
- I. The bridge and placement of its supports should be conducive to positive and beneficial future land use adjacent to the underside of the structure.
- J. Treat side, under, and above deck views with comparable effort and attention as global views.
- K. Design should incorporate opportunities for architectural lighting, including the underside of the structure, in keeping with the lighting schemes common to existing bridges in the valley.
- L. The design should consider improvements to bicycle and pedestrian access around the new structure

### **16.3.2 General Aesthetic and Enhancement Requirements**

The DBT shall design and build a Project that responds to the Project's context and develops design solutions that address the Innerbelt Bridge Subcommittee Design Principles defined above, create visual harmony with the natural environment, visual order with the community setting, and design coherence within the highway corridor.

The DBT shall develop designs for and build all aesthetics and enhancements elements of the project considering the aesthetics and enhancements recommendations generated by the AEM Team and articulated in the "Record of Recommendations and Decisions".

The DBT shall coordinate the architectural character and surface treatments used on bridges and retaining structures, so that a consistent surface treatment or family of complementary surface treatments is used throughout the Project corridor, as recommended by the AEM Team.

The DBT shall design and construct all aesthetics and enhancements elements so that the experience of travelers and neighbors is visually harmonious, orderly, and coherent in accordance with ODOT's Design Policy—Design Excellence through Context Sensitive Design and Solutions.

Aesthetic and Enhancement elements may consist of the following:

- A. bridges (including but not limited to pier details, parapet details, texture, and color of vinyl coated fence where required, concrete sealers for parapet/superstructure/piers/abutments and painted steel surfaces)
- B. streetscape enhancements
- C. bicycle and pedestrian facilities

- D. grading
- E. retaining structures (texture, color, architectural details)
- F. slope protection
- G. vegetation
- H. architectural lighting
- I. fencing
- J. architectural concrete textures
- K. architectural surface finishes

### **16.3.3 Historic Mitigation Requirements**

As part of the Project historic mitigation requirements,(See Section 5.2.3) the DBT is responsible for designing and constructing a Broadway Mills Wall and Historic Commemorative Display. The Broadway Mills wall shall incorporate elements from the existing Broadway Mills building, to be demolished as part of this Project. See Appendix AE-02 for additional details. In accordance with Table 16-1 above, the DBT is required to develop three options for the Broadway Mills Wall including integration of the historic commemorative plaque into the overlook area. Details of the commemorative plaque are included in Appendix EC-07.

The display shall incorporate references to the location of the existing building site in relation to the proposed overlook plaza in the vicinity of the existing building site. The DBT shall propose the location of the display; however, consideration should be given to placing the display as close to the existing building site as possible, while maximizing the opportunity for visibility and accessibility of the public.

The DBT's design of this display shall give consideration and preference to the reuse of the large circular medallions on the façade of the existing structure, and the unique brickwork of the upper parapets.

The DBT's AEI Plan shall describe the DBT's approach to developing the designs for the Broadway Mills Historic Commemorative Display. The AEI Plan shall also identify key staff that will be responsible for the planning and execution of the display, including at a minimum the following:

- A. An experienced historian with demonstrated previous experience in the documentation of historic structures.
- B. An experienced landscape architect with demonstrated previous experience in the incorporation of historic elements in public displays or public art.

The key staff identified above shall be used for any Project work that involves incorporation of historic interpretation.

### **16.3.4 Main Viaduct Bridge Design Requirements**

The DBT shall design and construct all structural components necessary to provide a complete and functional system that meets the following requirements:

- A. The bridge limits of the I-90 viaduct bridge are defined in Structures Section 14.3.1.
- B. The I-90 viaduct bridge has been further defined within the context of aesthetics and enhancements to consist of low level approaches in Tremont (W.14<sup>th</sup> Street Extension to Abbey Ave), main spans over the valley (Abbey Ave to existing Commercial Road), and low level approaches in Downtown (existing Commercial Road to Ontario Street).
- C. The main span portion of the I-90 viaduct (including adjacent portions of the Ontario on-ramp structure) shall consist of haunched girders. The approximate limits of the main span portion are as defined in Section 14.3.1. Constant depth girders are not permitted for the main span portion of the I-90 viaduct (including adjacent portions of the Ontario on-ramp structure).
- D. The girder depth for the main span portion of the I-90 viaduct shall vary parabolically, with a depth of structure over the piers approximately two (2) times the depth of the structure at midspan. Every effort shall be made by the DBT to provide this desired 2:1 depth ratio, however anything less than a 1.5:1 ratio will be deemed unacceptable.
- E. The girder depth at the piers at each end of the main span portion of the I-90 viaduct shall match as closely as possible the midspan depth of the adjacent span in the main span portion of the I-90 viaduct.
- F. The girder depth of approach spans adjacent to the main span portion of the I-90 viaduct shall preferably match the girder depth at the end of the adjacent span in the main span portion of the I-90 viaduct. Abrupt changes in girder depth at these locations are discouraged.
- G. Abrupt girder depth transitions will only be allowed at the end piers defining the transition between the low level approaches and the main viaduct spans.
- H. The entire limit of the I-90 viaduct structure, including the approach spans, as defined in Section 14.3.1, shall have a consistent superstructure material type (steel or concrete).
- I. The main span portion of the I-90 viaduct structure, as defined in Section 14.3.1, shall have both a consistent superstructure material type (steel or concrete) and a consistent superstructure shape (I-girder or box).

#### **16.3.4.1 Piers**

- A. Piers for main span multiple girder superstructures shall have no more than two (2) columns. For main span superstructures that consist of a single box superstructure, piers shall consist of single stem columns. For main span twin box superstructures, piers shall consist of twin columns in line with the box girders.
- B. Piers for the haunched girder spans shall have rectilinear cross sections.
- C. The design of piers for the main viaduct spans shall respond to the curved haunches of the superstructure. For single column piers supporting a multi-girder superstructure, a curved transition between the top portion of the column and the base of the pier cap shall be used. For twin column piers with multi-girder superstructures, the column-cap transition shall incorporate curves / arches of sufficient radii. Piers supporting concrete box superstructures shall include an efficient taper or curved form. No abrupt transitions in the depth of the cap or in the cross section of the columns will be permitted for piers of any type in the haunched girder spans.

- D. For piers of haunched girder spans, incorporate formed reveals, chamfers, and/or texture of sufficient depth/relief where appropriate to articulate the verticality of the piers.
- E. Piers for the low level approaches shall be cap-and-column type, having rectilinear dimensions (no circular columns). The end piers shall be proportioned to convey visual significance of the main valley crossing transition to the low-level approaches. The pier design shall include integrated curtain walls to conceal any abrupt girder depth transition.

#### **16.3.4.2 Deck / Fascia**

- A. Steel plate girder bridges shall have no stiffeners or attachment that functions or appears like a stiffener on the outside of the fascia girders with the exception of bearing stiffeners.
- B. The deck overhang of main valley crossing shall be proportioned to accentuate the appearance of superstructure slenderness.

#### **16.3.4.3 Structure Drainage / Inspection Access Systems**

- A. Scuppers and downspouts shall be integrated into the aesthetics plan of the main viaduct structure to minimize the negative visual impact of these elements.
- B. Integrate drainage geometry with superstructure and pier column geometry.
- C. Keep horizontal runs from extending beyond the bottom plane of the superstructure.
- D. Minimize jogs and connections; keep connection details clean and simple.
- E. All external drainage systems shall be colored to match adjacent concrete / steel bridge items.
- F. Inspection access systems shall be designed in an integral fashion with superstructure and substructure elements to minimize negative visual impact.
- G. Minimize jogs, keep connection details simple
- H. Keep inspection access systems from protruding below the bottom flange (bottom plane) of the superstructure except where necessary at piers.
- I. Paint steel components to match superstructure / substructure elements.

#### **16.3.4.4 Architectural Lighting**

Per the requirements of Table 16-1, the DBT shall be required to design and construct architectural lighting of the main spans of the I-90 westbound viaduct from Abbey Avenue to the existing Commercial Road. The lighting plans shall complement the lighting of the existing downtown Cleveland bridges over the Cuyahoga River (Detroit-Superior, Main Avenue, etc.) and shall conform to the following requirements, at a minimum:

- A. The architectural lighting plan shall be developed by an experienced architectural bridge lighting designer. The qualifications of the DBT's lighting designer shall be submitted as part of the Technical Proposal.
- B. The DBT and its lighting designer shall develop architectural lighting options that maximize the use of low-energy lighting and sustainable solutions. The lighting plan shall be coordinated with and be an integral element of the DBT's Sustainability Management Plan. The lighting options

shall incorporate the use of state-of-the art lighting techniques to provide dramatic lighting that maximizes sustainability and minimizes energy usage to the greatest extent possible.

- C. The lighting plan shall include, but not be limited to:
  - a. Demonstration of the long-term durability of the lighting fixtures in consideration of vibration and weather exposure anticipated on the structure, to the satisfaction of the Engineer.
  - b. Demonstration of commitment to sustainability by maximizing the use of low energy LED fixtures.
  - c. Integration of conduit, power and control wiring into the bridge construction.
  - d. Type of master controller, including ease of use and capabilities, such as time clock, color changing programs, etc.
  - e. Location of master controller and methods to facilitate security and access.
  - f. Plans for field adjustment of lighting installations.
  - g. Plans for owner training and demonstration upon completion.
- D. The lighting plan shall include illumination of the main viaduct piers to emphasize and highlight the verticality of the piers.
- E. The lighting plan shall include provisions for illumination of the underside and exterior fascia of the superstructure elements to highlight the structural form of the superstructure elements.
- F. The lighting plan shall include provisions for illumination of the I-90 westbound mainline abutment at W.14<sup>th</sup> Street and the I-90 westbound mainline abutment at Ontario Street.
- G. Design standards for lighting shall be in accordance with Section 17.6.
- H. Submit a conceptual architectural lighting plan as part of the I90 Viaduct aesthetic requirements of the Technical Proposal to demonstrate an understanding of the lighting design requirements. Conceptual architectural lighting plan shall include renderings and/or sketches to illustrate conformance and understanding of the architectural lighting requirements, as well as a brief narrative that addresses the sustainability considerations.

### **16.3.5 Fencing**

Right-of-way fence, vandal protective fence on structures, and any other chain link fence required on the Project shall be galvanized, vinyl coated fabric (black).

Ornamental fencing constructed around parking lots shall be coated black.

### **16.3.6 Landscape / Streetscape Enhancements**

Design and construct all landscape and streetscape enhancements incorporated in Innerbelt CCG1 Project Landscape / Streetscape Enhancements Appendix AE-02 and described in AE-01.

## **16.4 STAKEHOLDER INVOLVEMENT REQUIREMENTS**

The DBT shall be responsible for conducting meetings with project stakeholders and the public to discuss aesthetics and enhancements, as described in Table 16-1 – Aesthetic Options. The DBT shall notify ODOT

45 days in advance of the first scheduled meeting, and provide a proposed schedule of stakeholder and public meetings. The presentation requirements are as follows:

**16.4.1 Stakeholder Meeting #1:**

The DBT shall present detailed aesthetics options to the AEM Team for feedback.

**16.4.2 Public Meeting:**

After considering feedback from the AEM Team, the DBT shall conduct a public meeting to present options to the public on detailed aesthetic options. Preference polling of the unified project concepts is required. DBT shall notify ODOT at least 60 days prior to the planned public meeting date.

**16.4.3 Stakeholder Meeting #2:**

The DBT shall present the preferred unified project concept from the public meeting for AEM Team approval. The AEM Team will recommend to the DBT preferred detailed aesthetics treatments for further consideration by the DBT. .

**16.4.4 City Design Review and City Planning Commission:**

After considering feedback from the AEM Team, the DBT shall lead a joint presentation with ODOT representatives to the Cleveland City Design Review and Planning Commission. The presentation shall address the process, feedback from the public and recommendations of the AEM Team. The DBT shall provide ODOT with at least 45 days advance notice to schedule the City Design Review and Planning Commission Meetings. Final recommendations from the options presented to the City Planning Commission shall be coordinated with ODOT for incorporation into the final Record of Recommendations and Decisions.



## **17 TRAFFIC CONTROL**

The DBT shall design and construct traffic and pedestrian signals, signing, pavement markings, lighting and other traffic control in accordance with the requirements in this section.

### **17.1 GOVERNING REGULATIONS**

The DBT shall furnish and install the traffic control devices, systems and measures as described within Section 17. Governing regulations are listed in Section 1.17 and supplemental specifications are listed in Section 1.18. For cases where guidance provided in the MUTCD conflicts with the OMUTCD, the OMUTCD shall govern unless specifically directed otherwise. For cases where City specifications conflict with ODOT standards for work at the City's signalized intersections, City specifications shall govern.

All supplied items shall be listed on ODOT's Qualified Products List (QPL) or Approved Lists, as applicable. Fabricators must be on ODOT's Certified Fabricators list.

Guarantees and warranties for all materials and equipment are required per the Project Scope and specifications.

### **17.2 TRAFFIC SIGNALS**

Traffic signal work shall be addressed at intersections in the project area. The DBT is responsible for the design and construction of traffic signals for the Project. The design and construction shall consider Interim and Future Conditions; of specific concern are signal structure foundation locations, signal head types and locations. Where new lanes are to be added in later phases, the holes in the mast arm and the associated mounting of the signal heads shall be appropriately aligned with the future lane configuration. Similarly, the signal structure foundations shall be placed so that future relocation will not be necessary, in addition to avoiding utility conflicts. The affected intersections are listed below. A general overview of the anticipated work required for each intersection is described in Section 17.2.1. All traffic signal materials and equipment shall be new. Requirements that apply to all intersections are provided in subsequent sections, including specific equipment requirements. Refer to Section 6 for utility requirements. The signal warrant analysis report is provided in Appendix TC-07.

- A. Carnegie/Ontario (reconstruct signal)
- B. Ontario/Eagle (reconstruct as pedestrian-activated signalized pedestrian crossing)
- C. Carnegie/E.4<sup>th</sup> Street-Commercial (remove signal)
- D. E.9<sup>th</sup> Street/Ontario-Orange (reconfigure signalized intersection)
- E. E.9<sup>th</sup> Street/Broadway (new intersection, to be signalized as a Future Condition but not in CCG1)
- F. E.9<sup>th</sup> Street/Carnegie (reconstruct signal)
- G. E.9<sup>th</sup> Street/Bolivar (provide signal interconnect)
- H. E.14<sup>th</sup> Street/Orange (reconstruct signal)
- I. E.14<sup>th</sup> Street/Broadway (new intersection, construct new signal)
- J. E.22<sup>nd</sup> Street/Orange (provide signal interconnect)
- K. E.30<sup>th</sup> Street/Orange (provide signal interconnect)

## **17.2.1 General Description of Work by Intersection**

### **17.2.1.1 Carnegie/Ontario (formerly Ontario-Broadway)**

- A. Reconstruct signalized intersection.
- B. Remove existing traffic signal and associated equipment.
- C. Provide new mast arm signal. Provide crosswalks and pedestrian heads on all northbound, southbound, eastbound and westbound approaches. Signalization of this intersection will require at least three (3) mast arm structures with one (1) mast arm mounted on one (1) pole, one (1) mast arm structures with two (2) mast arms mounted on one (1) pole, and six (6) pedestal-mounted pedestrian heads. This is conceptual information based upon providing a signal that is similarly configured to the existing intersection signal with mast arm structures. The DBT is responsible for signal layout and design of the intersection in accordance with applicable design standards.
- D. Furnish and install new controller (local MS52 controller; EPAC), cabinet and cabinet hardware.
- E. Furnish and install all necessary materials and equipment for a fully functioning traffic signal, including loop detectors, pull boxes, etc., in accordance with design standards.
- F. Provide signal interconnect, with connections to the Ontario/Eagle, E.9<sup>th</sup> Street/Ontario-Orange and E.9<sup>th</sup> Street/Carnegie intersections.
- G. Optimize network and intersection signal timing and phasing, as appropriate.
- H. Provide mast arm mounted street name signs for all approaches
- I. Westbound left turns from Carnegie to the I-90 ramps shall be prohibited. Likewise, southbound left turns from both southbound approaches shall be prohibited. Westbound left turns from Carnegie to southbound Ontario shall be permitted. Provide appropriate signs for prohibited turning movements, as well as other supplemental signing, as needed for clarity.
- J. Power supply shall be coordinated with the Cleveland Electric Illuminating Company (CEI).
- K. Provide meter for power supply.
- L. Provide uninterruptible power supply.

### **17.2.1.2 Ontario/Eagle**

- A. Reconstruct as pedestrian-activated signalized pedestrian crossing.
- B. Convert the existing intersection to a pedestrian-actuated signal that functions within the network. Remove the two existing mast arm structures for southbound traffic and the single mast arm structures for eastbound and northbound traffic. Install new mast arm structures for northbound and southbound traffic. Provide signalized pedestrian-actuated crossing, with pedestrian heads, on the north side of the intersection. Modification of this signalized intersection will require at least two (2) mast arm structures with one (1) mast arm mounted on one (1) pole. This is conceptual information based upon providing a signal that is similarly configured to the existing intersection layout. The DBT is responsible for signal layout and design of the intersection in accordance with applicable design standards.
- C. Provide crosswalk and pedestrian heads.

- D. Furnish and install new controller (local MS52 controller; EPAC), cabinet and cabinet hardware.
- E. Furnish and install all necessary materials and equipment for a fully functioning traffic signal, including loop detectors, pull boxes, etc., in accordance with design standards.
- F. Provide signal interconnect, with connection to the Carnegie/Ontario intersection.
- G. Optimize network and intersection signal timing and phasing, as appropriate.
- H. Power supply shall be coordinated with the CEI.
- I. Provide meter for power supply.

**17.2.1.3 Carnegie/E.4th Street-Commercial**

- A. Remove existing traffic signal.
- B. Power supply shall be coordinated with the CEI.

**17.2.1.4 E.9th Street/Ontario-Orange (formerly Broadway-Orange)**

- A. Reconfigure the signalized intersection from a four (4) leg into a three (3) leg intersection.
- B. Existing span wire signal shall remain. (The signal will be upgraded in the next phase of the project.) Signal heads for the existing eastbound approach (existing Broadway) shall be removed. Signal timing and phasing adjustments shall be made, as necessary.
- C. Provide signal interconnect, with connections to the Carnegie / Ontario and E.14<sup>th</sup> Street / Orange intersections. The interconnect will require a pull box appropriately located for the future alignment of the E.9<sup>th</sup> Street / Ontario-Orange intersection (northwest of the existing intersection, to be accomplished in the next phase of the Innerbelt project) as well as a pull box appropriately located for the existing E.9<sup>th</sup> Street-Broadway/Orange-Broadway intersection.
- D. Optimize network and intersection signal timing and phasing, as appropriate.
- E. Power supply shall be coordinated with Cleveland Public Power (CPP).
- F. Provide uninterruptible power supply.

**17.2.1.5 E.9th Street/Broadway**

This new intersection will be constructed as part of CCG1. The intersection will not meet signal warrants until the E.9<sup>th</sup> Street/Ontario-Orange intersection is reconfigured and connected to the E.9<sup>th</sup> Street extension in a Future Condition. This project will install the intersection with no traffic control. There are no conflicting movements at this intersection, as configured in CCG1.

**17.2.1.6 E.9th Street/Carnegie**

- A. Reconstruct signalized intersection.
- B. Remove existing traffic signal and associated equipment.
- C. Provide new mast arm signal with crosswalks and pedestrian heads on the northbound, southbound, eastbound and westbound approaches. Signalization of this intersection will require at least four (4) mast arm structures with one (1) mast arm mounted on one pole. This is conceptual information based upon providing a signal that is similarly configured to the existing intersection signal with mast arm structures. The DBT is responsible for signal layout and design of the intersection in accordance with applicable design standards.

- D. Furnish and install new controller (master MS52 controller; SCMARC), cabinet and cabinet hardware.
- E. Furnish and install all necessary materials and equipment for a fully functioning traffic signal, including loop detectors, pull boxes, etc., in accordance with design standards.
- F. Provide signal interconnect, with connections to the Carnegie/Ontario and E.9<sup>th</sup> Street/Bolivar intersections. The E.9<sup>th</sup> Street/Carnegie intersection is the signal master.
- G. Maintain (or remove and replace) existing phone drop.
- H. Provide laptop for this central monitoring station. See Section 17.2.21 for additional requirements.
- I. Optimize network and intersection signal timing and phasing, as appropriate.
- J. Provide mast arm mounted street name signs for all approaches
- K. Power supply shall be coordinated with the CEI.
- L. Provide meter for power supply.

**17.2.1.7 E.9th Street/Bolivar**

- A. Provide signal interconnect, with connection to the E.9<sup>th</sup> Street/Carnegie intersection.
- B. Optimize network and intersection signal timing and phasing, as appropriate.
- C. Power supply shall be coordinated with CPP.

**17.2.1.8 E.14th Street/Orange**

- A. Reconstruct signalized intersection.
- B. Remove existing traffic signal and associated equipment.
- C. Provide new mast arm signal with crosswalks and pedestrian heads on the northbound, southbound, eastbound and westbound approaches. Signalization of the pedestrian crossings on the north side of the intersection across the two right turn bypass islands is not required. Signalization of this intersection will require at least four (4) mast arm structures with one (1) mast arm mounted on one (1) pole. This is conceptual information based upon providing a signal that provides similar traffic control to the existing span wire signal. The DBT is responsible for signal layout and design of the intersection in accordance with applicable design standards.
- D. Furnish and install new controller (local MS52 controller; EPAC), cabinet and cabinet hardware.
- E. Furnish and install all necessary materials and equipment for a fully functioning traffic signal, including loop detectors, pull boxes, etc., in accordance with design standards.
- F. Provide signal interconnect, with connections to the E.9<sup>th</sup> Street/Broadway, E.22<sup>nd</sup> Street/Orange and E.14<sup>th</sup> Street/Broadway intersections.
- G. Optimize network and intersection signal timing and phasing, as appropriate.
- H. Provide mast arm mounted street name signs for all approaches
- I. Provide mast arm mounted left turn prohibition signs for the two southbound approaches.
- J. Power supply shall be coordinated with CPP.
- K. Provide meter for power supply.

#### **17.2.1.9 E.14th Street/Broadway**

- A. This new intersection will be constructed as part of CCG1. The intersection meets signal warrants based on the 2015 Build certified traffic volumes.
- B. Construct the new signalized intersection.
- C. Provide new mast arm signal. Provide crosswalks and pedestrian heads on all approaches. Signalization of this intersection will require at least three (3) mast arm structures with one (1) mast arm mounted on one (1) pole. This is conceptual information based upon providing a signal that is similarly configured to the City's existing signalized intersections with mast arm structures. The DBT is responsible for signal layout and design of the intersection in accordance with applicable design standards.
- D. Furnish and install new controller (local MS52 controller; EPAC), cabinet and cabinet hardware.
- E. Furnish and install all necessary materials and equipment for a fully functioning traffic signal, including loop detectors, pull boxes, etc., in accordance with design standards.
- F. Provide signal interconnect, with a connection to the E.14<sup>th</sup> Street / Orange intersection.
- G. Optimize network and intersection signal timing and phasing, as appropriate.
- H. Provide mast arm mounted street name signs for all approaches
- I. Power supply shall be coordinated with CPP.
- J. Provide meter for power supply.

#### **17.2.1.10 E.22nd Street/Orange**

- A. Provide signal interconnect, with connection to the E.14<sup>th</sup> Street/Orange and E.30<sup>th</sup> Street/Orange intersections.
- B. Optimize network and intersection signal timing and phasing, as appropriate.
- C. Power supply shall be coordinated with CPP.

#### **17.2.1.11 E.30th Street/Orange**

- A. Provide signal interconnect, with connection to the E.22<sup>nd</sup> Street/Orange intersection.
- B. Optimize network and intersection signal timing and phasing, as appropriate.
- C. Power supply shall be coordinated with CPP.

### **17.2.2 System Requirements**

All the intersections listed above function within the same coordinated network. The signal interconnect requirements are described in Section 17.2.11. As such, signal interconnect shall be provided to those signals; the signal master is located at the E.9<sup>th</sup> Street/Carnegie intersection. In addition, the equipment used to run the network shall be compatible with the City's system, using Eagle controllers and cabinets, as defined below. The DBT shall optimize the signal timing for each intersection in the network and for the network as a whole for the three timing plans. Given the traffic volume at the Carnegie / Ontario intersection, it may be necessary for this intersection to operate independently from the other intersections. However, the DBT shall first attempt to optimize this intersection within the network.

The signalized intersections function with three (3) signal timing patterns: AM peak, PM peak and Average (non-peak). AM and PM peaks are run during weekdays only. Signal timing for weekends is run with the Average signal timing plan. Cycle lengths for the affected intersections in the project area are shown in the Table 17-1 below. Projected opening year traffic volume projections are included in the Cleveland Innerbelt: Interchange Justification Study.

**Table 17-1: Cycle Lengths**

<b>Intersection</b>	<b>AM Plan</b>	<b>PM Plan</b>	<b>Average Plan</b>
<b>Carnegie/Ontario</b>	170 sec	180 sec	130 sec
<b>Ontario/Eagle</b>	170 sec	180 sec	130 sec
<b>E.9<sup>th</sup> Street/Ontario-Orange</b>	120 sec	150 sec	90 sec
<b>E.9<sup>th</sup> Street/Carnegie</b>	120 sec	120 sec	100 sec
<b>E.9<sup>th</sup> Street/Bolivar</b>	120 sec	120 sec	100 sec
<b>E.14<sup>th</sup> Street/Orange</b>	120 sec	150 sec	90 sec
<b>E.22<sup>nd</sup> Street/Orange</b>	120 sec	150 sec	90 sec

### **17.2.3 Points of Contact for Traffic Signals**

Points of contact for coordination of traffic signal work are:

Rob Mavec  
 Commissioner of Traffic  
 City of Cleveland  
 601 Lakeside  
 Cleveland, Ohio 44114  
 (216) 664-3194  
 RMavec@city.cleveland.oh.us

James A. Ferguson  
 Chief, Bureau of Street Lighting  
 Department of Public Utilities  
 Cleveland Public Power  
 1300 Lakeside Avenue  
 Cleveland, OH 44114  
 (216) 420-7701, Ext. 183  
 JFerguson@cpp.org

Mark Robinson  
Public Works Coordinator  
Cleveland Electric Illuminating Company  
6896 Miller Rd.  
Brecksville, OH 44141  
(440) 717-6845  
robinsonme@firstenergycorp.com

#### **17.2.4 Signal Supports**

Signal supports shall be galvanized steel mast arm design (TC-81.21). Wood poles are not permitted. A structure that diagonally spans the intersection and carries signal heads for multiple approaches is not permitted.

Signal supports shall comply with City of Cleveland standard specifications. Signal supports shall be painted Dark Bronze, Federal Color Number F-283. All supports shall be hot-dip galvanized prior to painting. Refer to Appendix TC-04 for additional information on the City of Cleveland paint specification.

Location of the mast arm signal supports shall be as per the Traffic Engineering Manual and shall conform to ADA requirements for clearance and placement. Signal support locations shall be designed to minimize utility conflicts.

Minimum clearance from overhead electric wires shall comply with requirements of the National Electric Safety Code, Rule 232, and the requirements of the local power companies providing electrical service.

Mast arm signal supports shall not include luminaire extensions. All street lighting shall be provided on poles that are separate from the traffic signals. Additionally, street lighting shall be metered separately from the signalized intersections. Refer to Section 17.6 Lighting for more information.

Signal supports shall comply with C&MS 632.15 and 732.11.

Signal supports shall be grounded in accordance with C&MS 625.16. In addition, the DBT shall furnish and run a seven (7) strand #4 copper wire from the top of the ground rod and attach it to the neutral bar in the cabinet for each of the reconstructed signalized intersections in the project area.

Pedestal-mounted traffic signal supports shall not be permitted, except for those needed for pedestrian heads at the intersections, as noted above. Pedestals shall comply with C&MS 632.19 and 732.15.

#### **17.2.5 Vehicular Signal Heads with Light Emitting Diode (LED) Lamp Units**

Vehicular signal heads shall comply with C&MS 632 and 732, ODOT Qualified Products List, SCDs and the TEM. In addition, the following requirements shall also apply:

Lamps: LED signal lamp units shall meet the requirements of C&MS 732. All lamp units shall be the 12-inch size. LED signal lamp units shall be provided for all signal lens types.

Signal Sections:

- A. Signal heads and visors shall be constructed of polycarbonate plastic.
- B. Pipe, spacers and fittings constructed of polycarbonate plastic may be used in lieu of galvanized steel or aluminum.
- C. Proper exterior colors shall be obtained by use of colored plastic material rather than painting.
- D. The vehicular signal heads shall be BLACK in color.
- E. All visors shall be cowl visors (cut-away).

Mounting Hardware: (see Section 17.2.5.4)

#### ***17.2.5.1 Lamps***

LED signal lamp units shall meet the requirements of C&MS 632.06 and 732.04.

All lamp units shall be the 12-inch size. LED signal lamp units shall be provided for all circular red, circular yellow, circular green, red arrow, yellow arrow and green arrow indications.

All lamp units shall have a five (5) year minimum warranty. The warranty shall be transferred to the City of Cleveland at the completion of the project.

#### ***17.2.5.2 Signal Sections:***

Signal heads and visors shall be constructed of polycarbonate plastic. The signal head housing and outside of visor shall be yellow, and the inside of the visors shall be flat black.

Pipe, spacers and fittings constructed of polycarbonate plastic may be used in lieu of galvanized steel or aluminum.

Proper exterior colors shall be obtained by use of colored plastic material rather than painting.

#### ***17.2.5.3 Back Plates***

Back plates shall be provided on all mast arm-mounted signal heads, in accordance with C&MS 732.22 and SCDs.

#### ***17.2.5.4 Mounting Hardware:***

All signal heads shall be rigidly mounted to the mast arm. The signal head mounted on highest portion of the mast arm (closest to the roadway centerline, highest vertical clearance) shall center the red lens in front of and in line with the mast arm. The other signal heads shall be placed so that the red balls of all the signal heads are horizontally in line with the signal head on the highest portion of the mast arm. A minimum 16 feet of clearance shall be provided under all signal heads.



All upper signal support hardware and piping, up to and including the wire inlet fitting, shall be ferrous metal for signal displays of two (2) or more sections.

All straps, hardware and nuts and bolts shall be galvanized.

The entrance fitting shall be of the tri-stud design with serrated rings in order to achieve positive locking.

Use of drop pipes shall not be permitted.

Signal heads shall be mounted vertically. Horizontally mounted signals shall not be permitted.

#### **17.2.5.5 Additional Requirements**

The number and placement of signal heads shall be per the FHWA MUTCD (i.e., one head per lane for primary movements).

Optically programmed lenses shall not be used.

Near side signal heads shall only be used as supplemental indications for far side signal heads following the requirements of the OMUTCD and TEM.

Supplemental signals shall be provided if the distance between the stop bar and the signal heads on the mast arm is greater than 180 feet, in accordance with the FHWA MUTCD.

For protected/permissive operation of five-section signal heads (either left or right turn), the location of the signal head shall be over an extension of the channelizing line.

Mast arm heights and mast arm-mounted signal heads shall be designed to comply with ODOT's vertical clearance requirements, as per the SCD TC 85.20.

#### **17.2.6 Pedestrian Heads, Features and Accommodations**

Pedestrian accommodations shall be provided on all approaches of the signalized intersections in the project area, to include sidewalks, curb ramps, cross walks and pedestrian heads with countdown timers. Pedestal mounted pedestrian heads shall be used, as identified in Section 17.2.1, as necessary.

All pedestrian accommodations shall be ADA compliant.

Pedestrian heads with countdown timer displays (single unit hand/man overlay, countdown, LED, Type D [filled indication], 16-inch by 18-inch) shall be provided for all pedestrian movements, in accordance with C&MS 632.08 and 732.05 and the TEM. In addition, the following requirements shall also apply:

- A. The LED lamp unit shall display the symbols for the upraised hand or the walking person. A count-down timer shall be displayed during the clearance interval.
- B. Signal heads and visors shall be constructed of polycarbonate plastic.

- C. Pipe, spacers and fittings constructed of polycarbonate plastic may be used in lieu of galvanized steel or aluminum.
- D. Housings shall be black. Proper exterior colors shall be obtained by use of colored plastic material rather than painting.
- E. All lamp units shall have a five (5) year minimum warranty. The warranty shall be transferred to the City of Cleveland at the completion of the project.
- F. All pedestrian heads shall be installed with half-blind couplings.
- G. Pedestrian heads with audible signals shall not be provided or installed.

Pedestrian push buttons (PPBs) shall be provided for all pedestrian crossings.

PPBs shall comply with C&MS 632 and 732. In addition, this item shall consist of furnishing and installing ADA compliant PPBs.

Signing for PPBs shall comply with the OMUTCD. These shall be R10-32 (R or L) signs, one (1) for each PPB, with Type G sheeting and all mounting hardware.

#### **17.2.7 Pedestrian Treatments**

ADA-compliant pedestrian ramps and associated treatments shall be provided per Section 12.2.2.

Crosswalks shall be provided in accordance with Section 17.5.2.

#### **17.2.8 Street Name Signs**

Mast arm-mounted street name signs shall be provided on new mast arm structures for intersections in the project area.

Street name signs shall comply with City of Cleveland standards, provided in the Appendix TC-04.

#### **17.2.9 Traffic Control Equipment**

The DBT shall furnish and install an actuated, 8-phase, solid state digital microprocessor type controller with secondary coordinator, menu driven prompts, internal TBC, telemetry unit, and all other accessories that are necessary to make the controller completely functional and operation at each of the signalized intersections with a reconstructed signal. The controllers shall be Eagle TS-2 Type 1 controllers. The controllers shall be installed in Eagle TS-2 Type 1 cabinets (ground-mounted). The controllers shall be shelf-mounted. The controllers shall conform to C&MS 633 and 733.

Controllers and cabinets shall include the following features:

The following switches shall be mounted on the switch panel in the cabinet:

- A. Run / stop time
- B. Controller time power
- C. Coordination / free
- D. Detector test

E. Flash control

The following switches shall be accessible via a police panel door:

- A. Signal shutdown
- B. Flash control
- C. Manual pushbutton and 10-foot extension cord
- D. Automatic / manual transfer

A service lamp with door activated on / off switch

A riser with a minimum height of 12 inches shall be installed at the base controller cabinet in accordance with C&MS 733.04, Part A.

The cabinet door shall be keyed with a Corbin #2 lock.

Lightning protection

The controllers shall be pre-programmed with all current settings.

Eagle TS-2 Type 1 cabinets (ground-mounted) and Eagle TS-2 Type 1 controllers (local and master) shall be provided and installed at the signalized intersections, as listed in Section 17.2.1. All controller cabinets shall be capable of running a minimum of eight (8) vehicle phases with four (4) pedestrian phases and four (4) overlaps.

Traffic control equipment shall comply with C&MS 633 and 733. Master controllers shall comply with C&MS 733.06.

Controller cabinets shall be ground mounted and shall have 12-inch minimum risers.

Cabinets and risers shall be painted Dark Bronze, Federal Color Number F-283. Refer to Appendix TC-04 for additional information on the City of Cleveland paint specification.

Controller cabinet placement requirements:

- A. Adhere to ADA space requirements.
- B. Locate cabinet as far back from the curb as possible for technician access, while still being within the right-of-way.
- C. Allow for maximum visibility of signal heads.
- D. Allow for logical cable routing.
- E. The area in front of the cabinet door shall provide sufficient work space for technicians to access the equipment and remain within the right-of-way.
- F. Provide sidewalk and/or work pads for cabinet access. Work pad/access area shall be at least 6 feet by 4 feet.

All traffic signal installations shall be designed and equipped for approach monitoring. If a two-phase signal is used, a dual ring controller and cabinet wiring utilizing phases 2+6 and 4+8 shall be furnished and installed.

An 8-phase control box shall be provided at all intersections.

Two-channel, rack-mounted detector units shall be provided for each loop detector.

#### **17.2.10 Foundations**

Provide foundations for all mast arm and pedestal structures. Foundations shall comply with C&MS 625, 632 and 633, SCDs and the TEM.

Mast arm structure foundations shall be installed prior to ordering the mast arm structures to ensure appropriate sizing of mast arms.

In accordance with C&MS 633.10 and SCD TC-83.20 and the TEM, a new cabinet foundation shall be constructed at each signalized intersection with a reconstructed signal.

#### **17.2.11 Signal Interconnect (Hard Wire)**

Signal interconnect shall be provided between the intersections listed below, with the signal master at E. 9<sup>th</sup> Street/Carnegie. Signal interconnect shall run east-west along Carnegie and north-south along Ontario-Orange with a spur to the E.14<sup>th</sup> Street/Broadway intersection. The link between the north-south and east-west runs shall be made at Carnegie/Ontario and along Carnegie to E.9<sup>th</sup> Street. The Orange intersections shall not be connected to the signal master at E.9<sup>th</sup> Street/Carnegie via E.9<sup>th</sup> Street due to work along E.9<sup>th</sup> Street in future phases of the Innerbelt project.

- A. Ontario/Eagle (connect to Carnegie/Ontario)
- B. Carnegie/Ontario (connect to Ontario/Eagle, E.9<sup>th</sup> Street/Ontario-Orange, and E.9<sup>th</sup> Street/Carnegie)
- C. E.9<sup>th</sup> Street/Carnegie (signal master; connect to Carnegie/Ontario and E.9<sup>th</sup> Street/Bolivar)
- D. Carnegie/Bolivar (connect to E.9<sup>th</sup> Street/Carnegie)
- E. E.9<sup>th</sup> Street/Ontario-Orange (connect to Carnegie/Ontario and E.14<sup>th</sup> Street/Orange)
- F. E.14<sup>th</sup> Street/Orange (connect to E.9<sup>th</sup> Street/Ontario-Orange, E.22<sup>nd</sup> Street/Orange and E.14<sup>th</sup> Street/Broadway)
- G. E.14<sup>th</sup> Street/Broadway (connect to E.14<sup>th</sup> Street/Orange)
- H. E.22<sup>nd</sup> Street/Orange (connect to E.14<sup>th</sup> Street/Orange and E.30<sup>th</sup> Street/Orange)
- I. E.30<sup>th</sup> Street/Orange (connect to E.22<sup>nd</sup> Street/Orange)

Interconnect at the existing (configuration to be modified) E.9<sup>th</sup> Street/Ontario-Orange intersection shall be provided via a pull box connection located at the existing intersection. Another pull box shall be provided at the future location of the E.9<sup>th</sup> Street/Ontario-Orange intersection. This new intersection will be established as part of the next project phase (CCG2). This pull box is in addition to the pull boxes

that will be required to maintain the maximum length conduit runs and pull box separation distance. Installing a pull box for the signal interconnect cable at the future (CCG2) intersection location will prevent rework or splicing of the interconnect cable in the future.

Interconnect shall be overhead from E.14<sup>th</sup> Street/Orange south to E.22<sup>nd</sup> Street/Orange and E.30<sup>th</sup> Street/Orange. All other interconnects shall be underground. The DBT shall coordinate with and get approval from appropriate utility company(ies) for attachment of signal interconnect to utility poles.

Interconnect shall be provided by continuous twisted pair cable between intersections; splicing shall not be permitted. Only shielded 6-pair twisted pair interconnect cable shall be used. Alternate means of providing signal interconnect shall not be permitted within this defined network.

Existing conduit shall not be reused.

Interconnect for underground connections shall be provided in a separate 3-inch PVC conduit buried at least 3 feet under the pavement surface. Conduit shall include a tone/wire and/or pull cord. Interconnect conduit shall not be shared with other types of cable. Interconnect conduit shall be placed under unpaved areas or the sidewalk rather than the roadway, where possible.

The location of underground conduit shall be marked by the use of continuous identifying tape buried in the trench above the line. The identifying tape shall be an inert material, approximately 6-inches wide composed of polyethylene plastic highly resistant to alkalis, acids, or other chemical components likely to be encountered in soils. The tape shall be bright red with identifying print "FIBER OPTIC" in black letters, on one side only. The tape shall be supplied in continuous rolls with the identifying lettering repeated continuously the full length of the tape. Identifying tape shall be buried over the conduit with one strip approximately 6-inches to 10-inches below the final finished grade. The tape shall be placed in the trench with the printed side up and shall be essentially parallel with the finished surface. The DBT shall take necessary precautions to ensure that the tape is not pulled, distorted, or otherwise misplaced in completing the trench backfill.

A telephone account for the interconnect service shall be maintained by the DBT until final acceptance of the project. The existing telephone drop at E.9<sup>th</sup> Street/Carnegie shall be used and maintained with the new (replaced) signal at this intersection. That is the only telephone drop to be used by a signalized intersection in the project area.

#### **17.2.12 Power Service**

Electric power shall be obtained from CPP and the CEI, as indicated.

Power supply shall be 120V.

The DBT shall be responsible for requesting and scheduling any inspections the power company may require for the power service hook up. The DBT shall be responsible for contacting the power company

for the electrical service connection. Under no circumstances shall the DBT splice power cable into the power company's circuits. The DBT is responsible for obtaining any necessary permits and the paying of all fees. The DBT shall pay all power charges until the signals are accepted by the City of Cleveland.

Location and use of the power sources shall be confirmed with CPP and CEI, as appropriate. Refer to Section 17.2.1 for the power provider at each intersection.

Power service shall comply with C&MS 625.15.

Disconnect switches shall not be mounted to controller cabinets.

Aerial power service and/or service cables shall not be attached to mast arms.

The DBT shall furnish and install the foundations, signal support structures, cables, and other necessary equipment at intersection locations. The DBT shall supply all materials and labor for power source tie-ins except for final splice. The final splice shall be performed by the power company.

Electric service metering shall be provided at the signalized intersections identified in Section 17.2.1.

All new or relocated electric service enclosures are to be inspected by a licensed inspector prior to connection to a utility distribution line. The DBT shall apply for all inspections, pay the appropriate fees, and advise ODOT and the City of Cleveland of the time of inspections so that those agencies may have a representative in attendance. This inspection is not a substitute for final inspection by ODOT and the City of Cleveland, nor does it supersede requirements of the plans and specifications.

### **17.2.13 Loop Detectors and Loop Detector Units**

Loop detectors shall be used for vehicle detection. Alternate means of detection shall not be permitted.

Existing loop detectors shall not be reused.

#### **17.2.13.1 Features**

Loop detectors and loop detector units shall comply with C&MS 632, 732.07 and 732.08, SCDs and the TEM. In addition, loop detectors shall have the following features:

- A. The output device shall be a relay, and all contacts shall be in the wiring harness.
- B. The unit shall be self-tuning.
- C. The unit shall be a two-channel amplifier.
- D. Each unit shall be labeled to correspond to its phase and direction.
- E. Delay inhibit shall be connected on all detector harnesses for their respective phase greens.

#### **17.2.13.2 Installation**

Loop detectors shall be installed in compliance with the TEM, SCDs and C&MS. In addition, the following requirements shall be met:

- A. Loop detectors shall be installed in the intermediate course of the pavement.
- B. Loop detectors shall be centered in the lane.

### **17.2.13.3 Locations**

Loop detectors shall be used in all approach lanes at the constructed and rebuilt signalized intersections, with the exception of the main street through lanes. (Loop detectors are not required in the main street through lanes.) The main street movement is defined in the intersection list below.

- A. Carnegie/Ontario (Ontario is main street)
- B. E.9th Street/Ontario-Orange (Ontario-Orange is main street)
- C. E.9th Street/Carnegie (E.9th Street is main street)
- D. E.14th Street/Orange (Orange is main street)
- E. E.14<sup>th</sup> Street/Broadway (Broadway is main street)

Two loops shall be installed per lane, one located immediately behind the other, to provide system redundancy. Each loop detector shall be connected to its own detector unit.

Turn lanes with dedicated signal phases must have their own loop detectors.

### **17.2.14 Emergency Vehicle Preemption**

Emergency vehicle preemption shall not be provided.

### **17.2.15 Pull Boxes**

Pull boxes shall comply with the City of Cleveland Pull Box Specification, provided in the Appendix TC-04, C&MS 625.11, SCDs and the TEM.

Pull boxes shall be appropriately sized for the number of conduit entrances, with a minimum size of 17 inches by 30 inches (nominal).

Pull boxes located adjacent to controller cabinets shall be 24 inches by 30 inches (nominal) fiberglass reinforced polymer.

Pull boxes shall not be located in curb ramp areas or in areas subject to vehicular traffic.

Pull box lids shall have the word "TRAFFIC" attached or embossed into the lid.

Existing pull boxes shall not be reused.

### **17.2.16 Conduit**

Conduit shall be furnished and installed in accordance with the requirements of the C&MS, SCDs and the TEM.

All conduits shall be PVC. Other materials, including metal, shall not be permitted.

Conduit run lengths between pullboxes and/or signal poles shall not exceed 200 ft. Interim pull boxes, appropriately sized, shall be provided to connect intersections or features that are separated at distances greater than 200 ft.

Conduit must be used for all signal wiring. Direct burial of cables is not permitted.

Existing conduit shall not be reused.

Conduit under roadway pavement shall be at least 3-inch diameter.

Conduit must be sized for the number and size of the conductors contained in the conduit. Cable fill shall meet the requirements of the National Electric Code and the TEM.

All conduits shall be buried at a minimum depth of 3 ft below the pavement surface.

All conduits shall be installed with open trenching, in accordance with C&MS Items 603 and 625. Jacking and boring shall not be permitted.

The location of underground conduit and buried electrical cables shall be marked by the use of continuous identifying tape buried in the trench above the line. The identifying tape shall be an inert material, approximately 6-inches wide composed of polyethylene plastic highly resistant to alkalis, acids, or other chemical components likely to be encountered in soils. The tape shall be bright red with identifying print "ELECTRIC" and/or "FIBER OPTIC" in black letters, one side only. The tape shall be supplied in continuous rolls with the identifying lettering repeated continuously the full length of the tape. Identifying tape shall be buried over the conduit with one strip approximately 6-inches to 10-inches below the final finished grade. The tape shall be placed in the trench with the printed side up and shall be essentially parallel with the finished surface. The DBT shall take necessary precautions to ensure that the tape is not pulled, distorted, or otherwise misplaced in completing the trench backfill.

#### **17.2.17 Cable and Wire**

Cable and wire shall be furnished and installed in compliance with C&MS 625 and 732.19, SCDs and the TEM.

Unswitched power cable shall not be run inside of conduit, poles or pull boxes containing other signal cables; power cable must be run in its own individual conduit run. PPB cables and signal cables may be run within the same conduit.

Lighting cables operating at voltages higher than 120 volts to ground shall not be run inside of conduit, poles or pull boxes with signal cables. Lighting circuit conductors shall be kept physically separated from signal cables if the lighting circuit does not originate in the signal switchgear. Lighting structures shall be separate from signal structures, as noted in the Lighting section.



Utility company approval shall be obtained for the attachment of any interconnect cables to utility poles.

All abandoned cables shall be removed from aerial spans, conduit and pull boxes. Direct burial cables may be abandoned in place. Removed cables shall be disposed of by the DBT.

Signal messenger wire size shall be 3/8-inch diameter, if used.

The minimum number of signal conductors shall be 9/C.

Lead-in cable shall be provided in conduit. A minimum length of 4-foot slack shall be provided for all cable ends in pull boxes.

Interconnect cable shall be #6 twisted pairs copper, color coded, solid, specification/type RUS PE-38 or RUS PE-39. The interconnect cable shall be underground, except from Broadway-Orange/E.14th Street south to E.22<sup>nd</sup> Street/Orange; this locations shall be aerial.

#### **17.2.18 Supplemental Systems**

The DBT shall furnish and install uninterruptable power supply (UPS) systems at the intersections identified in Section 17.2.1. The UPS systems shall comply with C&MS 633.18 and 733.09.

An external generator panel shall be provided on all controller cabinets at all signalized intersections that are to be removed and replaced. The external generator panel shall comply with ODOT standards:

- A. Generator Power Panel: This item shall comply with Plan Insert Sheet (PIS) 203010.
- B. The generator inlet shall be 30 AMP, locking, four wire grounding and meet the NEMA 114-30-P 30A 125/250V specification. The inlet shall be a Hubble Catalog #2715.
- C. The line voltage generator switch shall be 30 AMP, 125/250V AC, two (2) pole, three (3) position, (On, Off, On Hubble #1388).
- D. The line voltage indicator light shall be 125V AC light emitting diode with a red lens.
- E. The line voltage circuit breaker shall be single pole, single throw and a minimum of 30 AMPS. The amperage shall be increased to accommodate greater loads, if necessary. The gauge of the power cable shall be of proper size per the National Electric Code (NEC).

#### **17.2.19 Intersection Analysis and Signal Timing**

Traffic volume data is provided in the Cleveland Innerbelt: Interchange Justification Study (IJS). Traffic volumes for the preferred (build) alternative shall be used for the development of signal phasing and other signal design elements (e.g., turn lanes, storage lengths, etc.) that are based upon final build (2035) traffic volumes.

The existing Innerbelt traffic model data shall be provided to the DBT. The model provides preferred build traffic volumes for 2015 and 2035, with the results as shown in the IJS. Additionally, the Synchro model and its results for the Bi-Directional Condition shall be provided to the DBT. This data covers the

street network bounded by Carnegie-Orange-E.22<sup>nd</sup> Street. The traffic volumes to be provided, as well as the supplemental traffic count information to be collected by the DBT shall be used to develop signal timing plans for the Interim Condition, which will later be field-verified for acceptable operational performance prior to final acceptance, as defined below in Final System Adjustment. See Section 18.3.5 for more information on the traffic count program.

The DBT shall perform system timing and analysis in accordance with C&MS 633 and the TEM. The DBT shall provide signal timing plans for AM Peak, PM Peak and Average periods. Existing cycle lengths at the project area intersections are provided in the introductory section. The DBT shall provide signal timing and phasing analysis and plans, including capacity analysis and time-space diagrams for the three peaks. The DBT shall optimize signal timing and phasing within the network cycle lengths. The DBT shall provide signal phasing, timing, clearance intervals, min/max green, yellow interval, and other parameters necessary to optimize signalized intersection performance. The DBT shall field verify the timing plans and make necessary in-field adjustments. The signal timing plans for each intersection and for the network as a whole shall be optimized. Given the traffic volume at the Carnegie/Ontario intersection, it may be necessary for this intersection to operate independently from the other intersections. However, the DBT shall first attempt to optimize this intersection within the network. The signals included in this phase of the Innerbelt project never run free or on flash.

Signal timing and phasing plans as well as in-field adjustments shall be coordinated with ODOT and the City of Cleveland.

The current version of Synchro shall be used for signal timing plan analysis and development. Final timing plan models and Synchro files shall be provided to the City of Cleveland for future use.

23 CFR 940 documentation will not be required. See Section 17.4 Intelligent Transportation Systems for more information.

Provision of protected and protected/permissive left turns shall be based upon safety and/or capacity. Lead versus lag phasing shall be based upon optimization of signal network coordination. Lagging left turns shall not be permitted where a left turn trap (yellow-trap) would be created.

#### **17.2.20 Final System Timing Adjustment and System Testing**

The DBT shall provide final signal system timing adjustments to field verify operational effectiveness and efficiency of the traffic signals and the signal system network. The DBT shall complete testing in accordance with C&MS 632.28 and 633.06. The DBT shall furnish the signal timing plans and work with City of Cleveland (Traffic) staff for implementation of signal timing into the intersections within the network. City staff will implement all signal timing adjustments into the controllers; the DBT will not have access to the controllers. See Section 18.3.5 for more information on the traffic count

#### **17.2.21 Remote Monitoring Station**

The remote monitoring station shall comply with C&MS 733.07.

The DBT shall provide one laptop computer with appropriate hardware and software compatible with operating the City of Cleveland's signal systems to the City of Cleveland for field operations of the network, with the master controller located at the E.9<sup>th</sup> Street/Carnegie intersection.

The DBT shall provide the current version of Synchro (licensing for one work station) to the City of Cleveland for management of the signal network's signal timing and associated operations.

#### **17.2.22 Equipment Removal, Salvage and Disposal**

Existing traffic signal installations, including signal heads, cable, messenger wire, strain poles, pedestrian poles, luminaires, cabinet, controller, pullboxes, etc., shall be removed in accordance with C&MS 632.26.

The DBT shall notify ODOT and the City of Cleveland 48 hours prior to the removal of any existing traffic signal equipment. All removals shall be performed in the presence of a designated representative of ODOT. Items shall not be removed until a new installation is in operation, unless otherwise directed by the Engineer.

Removed items as indicated by City staff shall be returned to the City of Cleveland to the following location:

Traffic Signal Unit  
4150 E. 49<sup>th</sup> St. Bldg. #4  
Cleveland, OH 44105

Items to be returned shall include traffic signal heads, controllers, pedestrian pushbuttons, pedestrian signal heads, cabinets, pedestrian poles, and luminaires. Other materials shall be disposed of by the DBT. The DBT shall notify City of Cleveland-Traffic and store the materials on site, suitably protected, at a designated location for inspection by City staff within five (5) Business Days of notification by the DBT. City staff will indicate which removed items will be returned to their facility. The DBT will deliver these removed items to the City facility. The DBT may dispose of materials that are not indicated for return within the five-day timeframe.

#### **17.2.23 Final Acceptance and Guarantee**

The DBT shall guarantee that the traffic control systems installed as part of this contract shall operate satisfactorily for a period of ninety (90) days following completion of the 10-day performance test. In the event of unsatisfactory operation, the DBT shall correct faulty installations, make repairs and replace defective parts with new parts of equal or better quality. Equipment, material and labor costs incurred in correcting an unsatisfactory operation shall be borne by the DBT.

The guarantee shall cover the following items of the traffic control system: controllers, cabinet and associated equipment, detector units and interconnections items. Customary manufacturers'

guarantees for the foregoing items and all traffic control equipment shall be turned over to the City of Cleveland following acceptance of the equipment.

#### **17.2.24 Continuous Intersection Signalization**

Signalized traffic control operations shall be maintained at all times by use of existing, temporary or new traffic signals.

### **17.3 SIGNING**

The DBT shall design and construct signing for the project, to include informational, guide, regulatory, warning, wayfinding, American Recovery and Reinvestment Act (ARRA) signs and any other required signs. The DBT shall prepare the signing plan and determine sign sizing and placement. The DBT is responsible for sign layouts.

The signing shall be complete and appropriate for the Bi-Directional Condition and the Interim Condition as required in Section 1.5. All signs shown in Appendix TC-01 - Bi-Directional Signing Conceptual Plans shall be provided by the DBT. However, the plan should not be considered all-inclusive; additional signs that may be required shall be provided by the DBT.

City of Cleveland lane use control signs mounted on overhead sign supports as shown in the Conceptual Signing plan shall have a minimum size of 30 inches by 36 inches per sign.

Relocation and placement of the Intelligent Transportation System (ITS) devices and related equipment that are a part of the Cleveland Freeway Management System shall be included as a component of the sign plan. See the Intelligent Transportation Systems section for more information.

The overhead diagrammatic signs shall conform to the format per the FHWA MUTCD. This requirement applies to the use of arrows and appropriate lane configurations instead of down arrows over lanes, which were specified in the 2003 edition of the MUTCD.

#### **17.3.1 Points of Contact for Signing**

Points of contact for coordination of signing are:

Frank Konopka  
Sign Coordinator  
ODOT District 12  
5500 Transportation Blvd  
Garfield Heights, OH 44125  
(216) 584-2105  
fkonopka@dot.state.oh.us

Andy Cross  
Division of Traffic  
City of Cleveland

601 Lakeside  
Cleveland, Ohio 44114  
(216) 664-3197  
ACross@city.cleveland.oh.us

### **17.3.2 Signing Design**

All freeway mainline major guide signs shall be overhead-mounted using standard ODOT support designs. The DBT shall use median-mounted Interchange Sequence Signs (as per OMUTCD Section 2E.37) throughout the length of the project

The mounting of overhead sign supports on bridges and other structures shall be minimized. For overhead sign supports mounted on bridges or other structures, where practicable, they shall be mounted directly to piers. If that is not possible, they shall be mounted to the barrier over the piers. No overhead sign supports shall be mounted mid-span.

TC-18.26 structure-mounted signs shall not be permitted; signs that fall into this category must be placed prior to the structure on an independent support.

Beam supports of sizes larger than S4 x 7.7 that are subject to multidirectional impacts at intersections shall use the alternate connection. Support assemblies shall comply with TEM Section 240.

A minimum vertical clearance of 17 feet shall be maintained between the bottom of the sign and the highest pavement elevation at all overhead sign locations, to include all interstate and non-interstate roadways.

Sign post reflectors shall be provided on applicable post-mounted signs. See C&MS 630.04 for signs that shall have reflectors. All listed post-mounted signs in 630.04 shall have reflector strips.

Mainline signs shall be within 100 feet of locations shown in Appendix TC-01 - Bi-Directional Signing Conceptual Plans, except in the case of signs mounted on bridges (see above).

The sign plan shall include relocation and placement of the ITS devices and related equipment that are a part of the Cleveland Freeway Management System. For more information, refer to Section 17.4 Intelligent Transportation Systems.

### **17.3.3 Signs**

All signs and supports shall be new. Signs shall conform to the C&MS, OMUTCD, the TEM, and the ODOT Sign Design Manual. Signs shall use Clearview font and upper/lower case legends in accordance with C&MS 630.04. Signage for left hand exits shall comply with the FHWA MUTCD.

All signs shown on Appendix TC-01 - Bi-Directional Signing Conceptual Plans shall be furnished and installed by the DBT, as well as any other signs required by the OMUTCD.

Street name signs shall comply with City of Cleveland standards, provided in the Appendix TC-04.

Signing that complies with ARRA requirements shall be furnished and installed at locations identified in Appendix TC-01 - Bi-Directional Signing Conceptual Plans, in accordance with the requirements defined at: <http://www.dot.state.oh.us/Divisions/HighwayOps/Traffic/miscellaneous/Pages/ARRAsigning.aspx>

#### **17.3.4 Shared-Use Paths**

Stop signs shall be mounted where shared-use paths cross streets. Speed limit and “pass with care” signs shall not be used. These signs shall be sized as pedestrian-scale.

#### **17.3.5 Sign Poles and Structures**

Sign pole and sign structure coating shall comply with C&MS. Refer to Section 16 - Aesthetics and Enhancements for additional information on color and coating requirements.

#### **17.3.6 Sign Lighting**

Sign lighting shall not be provided.

#### **17.3.7 Tourist-Oriented Directional Signs (TODS)**

Tourist-Oriented Directional Signs (TODS) and logo signs are installed and maintained by Ohio Logos, Inc., under contract with and in locations approved by ODOT. Under the terms of that contract, Ohio Logos may be required to temporarily remove or relocate the signs during construction. They may also be required to permanently remove or relocate the signs. Contact Ohio Logos at 1-800-860-5646 to coordinate removals or relocations of TODS and logo signs.

#### **17.3.8 Removal and Disposal**

The DBT shall remove and dispose of existing signs and supports. This applies to both ODOT and City of Cleveland signs that are to be eliminated or replaced.

The DBT shall remove and dispose of the existing changeable message sign (CMS) located across northbound Ontario adjacent to Progressive Field.

### **17.4 INTELLIGENT TRANSPORTATION SYSTEMS (ITS) COORDINATION**

ODOT is in the process of installing a regional freeway management system that incorporates multiple ITS devices, including Highway Advisory Radio (HAR), closed circuit television (CCTV), dynamic message signs (DMS), vehicle detectors, and related support technologies. The Cleveland Freeway Management System (FMS) is intended to improve safety through better congestion management and traveler information throughout the greater Cleveland region. The system covers portions of Cuyahoga, Lake, Lorain, Medina, Portage and Summit Counties. Based on the current schedule, the project will be complete and the complete system will be in place by September 2011. This system shall be used in conjunction with the portable changeable message signs (PCMS) to inform drivers of relevant travel information during the project.

The ITS devices and related equipment are located throughout the Innerbelt project area. The construction documents detailing the FMS, along with change orders, shall be made available to the DBT. Relocation of ITS equipment is not anticipated. However, due to the location of the pole-mounted camera at E.9<sup>th</sup> Street and the anticipated construction activity that will take place in the vicinity, the DBT may want to temporarily relocate the camera for part or all of the duration of construction. The pole-mounted camera at Kenilworth will not likely interfere with construction operations depending on DBT design and construction. The FMS shall remain operational with continuous function for the duration of this project.

The DBT shall maintain the FMS communication systems and infrastructure and provide continuous function of the FMS within the Work Limits. This includes appropriate and safe location of the ITS items and equipment based on construction operations. The ITS items and equipment include cameras, DMS, CCTV, vehicle detectors, speed monitoring devices, HAR, communication function, systems and elements, etc.

Based upon the nature and components of the project, ODOT has determined that the project, as currently defined, is a non-ITS project (23 CFR 940 does not apply). However, if changes are made that would give the signal system a capability that it did not previously have, the non-ITS determination could change.

## **17.5 PAVEMENT MARKINGS, DELINEATION and RELATED ITEMS**

The DBT shall design and construct all pavement markings and delineations within the Work Limits.

### **17.5.1 Pavement Marking and Delineation Requirements**

Pavement marking and delineations shall be in conformance with the TEM, C&MS, SCDs and the OMUTCD. Where pavement markings are optional in these manuals, they shall be provided. Pavement markings and delineations to be provided are:

- A. Edge lines
- B. Lane lines
- C. Center lines
- D. Channelizing lines
- E. Stop lines
- F. Crosswalk lines
- G. Transverse lines
- H. Island markings
- I. Handicap symbol markings
- J. Railroad symbol markings
- K. School symbol markings
- L. Parking lot stall markings
- M. Lane arrows (see range of spacing distances on TC-71.10)

- N. Words on pavement (see range of spacing distances on TC-71.10)
- O. Dotted lines
- P. Raised pavement markers (RPMs)
- Q. Rumble strips on shoulders
- R. Delineators and delineator posts
- S. Barrier reflectors
- T. Islands
- U. Object markers
- V. Barricades and channelizing devices

### **17.5.2 Pavement Marking and Delineation Design**

Pavement markings on all ODOT facilities shall be epoxy pavement markings, including auxiliary markings. On City facilities, thermoplastic pavement markings shall be used on all asphalt pavement, including auxiliary markings; and epoxy pavement markings shall be used on all concrete surfaces, including auxiliary markings,.

Crosswalks shall be placed parallel to the flow line, and with a maximum distance of 10 feet between the flow line and the nearest edge of the crosswalk. Crosswalks at the intersections listed below shall be 12feet wide, ladder-style.

- A. Carnegie/Ontario
- B. Ontario/Eagle
- C. E.9<sup>th</sup> Street/Carnegie

Crosswalks at other intersections shall be 6 feet wide and marked with two (2) parallel lines that are each 8 inches wide.

The DBT shall provide appropriate turn, through, or combination arrows on all lanes of all approaches at the Ontario/Carnegie intersection, all lanes of the southbound approach of the E.9<sup>th</sup> Street/Carnegie intersection, and all turning lanes at all intersections. Each lane to which the above applies shall be treated with two arrows. One arrow shall be placed approximately 30 feet behind the stop bar, and the second arrow shall be placed approximately 80 feet behind the stop bar. Both arrows shall be centered transversely in the lane and be of appropriate scale.

Arrows shall be provided for two-way left turn lanes. Two-way left turn lane arrows shall be placed no further than 16 feet apart.

Dotted lane line extensions shall be provided through intersections for all lane shifts less than or equal to half the lane width. Solid lane line extensions shall be provided through intersections for all lane shifts greater than half the lane width. Dotted lane line extensions shall be provided for the southbound double through movement from Ontario Street to the I-90 westbound ramp. Dotted lane line extensions shall be provided for all double left turns.



Variable spacing for intersection striping shall be provided in accordance with the TEM.

Snowplowable raised pavement markers shall be new and conform to C&MS 621. Raised pavement markers shall be used only to supplement thermoplastic or epoxy pavement markings, not as a substitute for these markers. Color, type and spacing shall be in accordance with the C&MS and SCDs.

During construction, the DBT shall install RPMs for delineation of the west bound alternate route plan (WARP) and east bound alternative route plan (EARP), with installation of permanent RPMs during winter months (Dec 1 through Mar 31) and either temporary or permanent RPMs during non-winter months (Apr 1 through Nov 30).

Permanent RPMs shall be placed on all streets and highways within the project area at project completion, with the exception of the roads maintained by the City of Cleveland. RPMs shall be provided on City of Cleveland streets as follows:

- A. E.14th Street to delineate center line striping
- B. To delineate double-left turn dashed line striping at intersections
- C. Southbound Ontario at Carnegie to delineate the southbound through movement to the I-90 westbound ramp.

Barrier reflectors shall be new and conform to C&MS 626, SCDs and the TEM. They shall be placed on bridge parapets, concrete barrier walls, retaining walls and guardrails in accordance with current design standards. Guardrail blockout reflectors shall be installed on the side of the blockout away from traffic.

Object markers shall conform to C&MS 630, Sign, Flat Sheet Type G.

Turn lane storage lengths shall be based on L&D standards for final build traffic conditions. Final build traffic conditions are provided in the IJS. The design year is 2035.

Multi-use paths shall be painted with yellow dashed centerline striping along the center line of the trails. White stop bars and stop signs shall be provided where multi-use trails cross streets.

Appendix LD-12 – Tremont Bike Connectivity Plan indicates additional bike lane and bike route requirements.

## **17.6 LIGHTING**

The DBT shall design and construct all lighting for the Project. Lighting work shall include the design and construction of lighting for ODOT and Local Facilities. ODOT Facility lighting includes: Highway Lighting, Underpass Lighting which illuminates ODOT Facilities, Architectural Lighting, Navigational Lighting and Obstruction Lighting. Local Facility Lighting includes: Street Lighting, Pedestrian Lighting, Underpass Lighting which illuminates Local Facilities, and Parking Lot Lighting.

All lighting materials and equipment shall be new. Existing lighting equipment (luminaires, supports, pullboxes, etc.) no longer in service shall be removed and disposed of by the DBT.

The DBT shall ground all structures. The grounding system shall ground all metal items and appurtenances on all structures, including any and all decorative items. The grounding system shall include parallels for redundancy. At a minimum, the grounding plan shall include structures to be grounded, laterals, jumpers, and the use of structures. The grounding system shall be constructed in accordance with SCD HL-50.21, with additional items as needed to provide a complete and acceptable grounding system.

The DBT shall maintain lighting and power service to customers within the Project Limits.

Lighting for the Project shall be maintained at all times by use of existing, temporary or new lighting.

Lighting design shall minimize spillover lighting into residential area.

All new lighting systems shall be connected via underground wiring. Overhead wiring is prohibited.

Where minimum foot candle requirements for lighting types overlap, the higher foot candle values shall be provided.

Lighting shall remain separate from traffic signal structures; luminaire extensions on mast arm structures shall not be permitted.

IQF will verify that installed lighting systems meet minimum foot candle requirements of the contract.

Lighting on bridges shall be designed and installed to accommodate structurally-induced vibration.

Refer to Section 16 - Aesthetics and Enhancements for more information on lighting.

### **17.6.1 ODOT Facility Lighting**

Power service for ODOT facility highway lighting shall be provided on separately metered, dedicated circuits. Underpass lighting illuminating ODOT Facilities can be on the same circuit as the Highway Lighting. Architectural, Navigation Channel and Obstruction Lighting will each have its own separately metered dedicated circuit. Meter locations for all ODOT Facility Lighting shall be coordinated with the Engineer.

#### ***17.6.1.1 Highway Lighting and Underpass Lighting Illuminating ODOT Facilities***

DBT shall provide continuous freeway lighting for new and reconstructed ODOT facilities in accordance with the TEM and ODOT standards.

New underpass lighting illuminating ODOT facilities shall be provided at the following locations:

- A. **Bridge 9.** I-90 Mainline I-90 over I-77 Ramps.

The DBT shall furnish and install 400 watt high pressure sodium luminaires for tower lighting and/or 200 watt conventional highway lighting for ODOT facilities.

Power for ODOT street lighting shall be 240/480 volt, single-phase, 3-wire, grounded neutral.

For all ODOT highway lighting, the DBT shall furnish and install the light poles, luminaires, foundations, conduit, cables, and all other necessary equipment for the highway lighting systems. The DBT shall supply all materials and labor for power source tie-ins. The DBT shall coordinate power tie in with the appropriate power company.

All light poles used for illumination shall be either natural finish aluminum or galvanized steel.

#### ***17.6.1.2 Architectural Lighting***

Application and installation of architectural lighting must be accomplished in a manner that minimizes potential vandalism.

Architectural lighting shall be accessible without the use of specialized equipment (i.e., maximum height is accessible via the use of ODOT's 80-ft bucket truck).

Power supply for architectural lighting shall be provided on its own dedicated, separately metered circuit.

See Section 16 - Aesthetics and Enhancements for additional information on architectural lighting.

#### ***17.6.1.3 Navigation Channel Lighting***

Lighting over the navigation channel shall conform with U.S. Coast Guard (USCG) requirements, as provided for in USCG Bridge Permit Application Guide, USCG Bridge Lighting Manual and as listed in 33 CFR Part 118 for fixed bridges.

The DBT shall determine navigation channel lighting requirements with USCG.

The DBT must provide a set of engineering plans illustrating the minimum navigational clearances over the river to the USCG for advertisement in the USCG Public Notice and as part of the Federal bridge permit. The same engineering plans are used to designate required navigational lighting. Until the engineering plans are submitted and approved, specific bridge lighting cannot be designated by USCG. USCG will require at a minimum upstream and downstream lights that show the centerline and the limits of the navigation channel. The lighting over the new bridge will likely be similar to the bridge lighting on the existing I-90 Central Viaduct Bridge over the Cuyahoga River.

Power supply for navigational lighting shall be provided on its own dedicated, separately metered circuit.

Navigation lighting shall be either multiple lamped with an automatic lamp changer or lamped with multiple LEDs.

Navigational lighting shall be accessible without the use of specialized equipment (i.e., maximum height is accessible via the use of ODOT's 80-ft bucket truck).

#### ***17.6.1.4 Obstruction Lighting***

If the DBT determines that Obstruction Lighting is required through coordination with FAA based on the DBT's design then the general requirements for Obstruction Lighting are as follows with detailed requirements to be determined by DBT.

Power supply for obstruction lighting shall be provided on its own dedicated, separately metered circuit.

Obstruction lighting shall be either multiple lamped with an automatic lamp changer or lamped with multiple LEDs.

Obstruction lighting shall be accessible without the use of specialized equipment (i.e., maximum height is accessible via the use of ODOT's 80-ft bucket truck).

#### ***17.6.2 Local Facility Lighting***

Local facility lighting for the City of Cleveland shall be provided in accordance with CPP standards, Traffic Control Project Provisions provided in the Appendix TC-04, and applicable referenced standards stated in the following subsections.

Conduit shall comply with CPP standards and the requirements set forth in Section 17.2.17.

Street lighting on City of Cleveland roadways shall be separately metered from the ODOT system. Street lighting, pedestrian lighting and underpass lighting illuminating local facilities can be on the same metered circuit. Parking Lot lighting shall be provided on separately metered, dedicated circuits for each lot. Meter locations shall be coordinated with CPP.

Existing light poles removed along Carnegie and Ontario shall be returned to CPP. The DBT shall notify CPP and store the materials on site, suitably protected, at a designated location for pick up by CPP staff within five (5) Business Days of notification by the DBT. The DBT may dispose of materials that are not picked up within the five-day timeframe. All other equipment and materials that are no longer in service shall be removed and disposed of by the DBT.

##### ***17.6.2.1 Street Lighting, Pedestrian Lighting and Underpass Lighting Illuminating Local Facilities***

See Appendix TC-12 – Lighting Provision for additional requirements.

Underpass lighting shall comply with ODOT standards.

Street lighting shall be provided for all new and reconstructed local facilities. For minimum limits of street lighting see PA-02. Existing street lighting in the northern quadrant of the intersection of Carnegie

and Ontario can be incorporated into the DBT's proposed lighting plan and remain in place if DBT elects not to impact the curb line in this location.

All new and reconstructed pedestrian facilities including but not limited to sidewalks and shared-use paths shall be illuminated.

Provide new underpass lighting at the following underpass locations:

- A. **Bridge 1.** I-90 westbound over Starkweather Avenue.
- B. **Bridge 2.** I-71/I-90 over Starkweather Avenue.
- C. **Bridge 3.** I-90 over Kenilworth Avenue.
- D. **Bridge 4.** I-90 over Fairfield Avenue.
- E. **Bridge 6.** E.14<sup>th</sup> Street ramp to I-90 westbound (and future Mainline I-90 westbound) over E.9<sup>th</sup> Street.
- F. **Bridge 7.** I-90 westbound over E.9<sup>th</sup> Street.
- G. **Bridge 8.** I-90 eastbound over E.9<sup>th</sup> Street.
- H. **Bridge 10.** I-77 southbound over E.14<sup>th</sup> Street.
- I. **Bridge 11.** I-90 westbound over E.14<sup>th</sup> Street.
- J. **Bridge 12.** I-90 eastbound over E.14<sup>th</sup> Street.

Light poles shall be fiberglass.

Luminaires shall be 400 watt high pressure sodium.

Power shall be 240 volt; 480 volt shall not be permitted.

#### ***17.6.2.2 Parking Lot Lighting***

Lighting shall be provided for all parking lots in accordance with IESNA Standards. Power service for parking lot lighting shall be provided on separately metered, dedicated circuits for each lot.

#### **17.6.3 Points of Contact for Lighting**

Points of contact for coordination of lighting work are:

James A. Ferguson  
Chief, Bureau of Street Lighting  
Department of Public Utilities  
Cleveland Public Power  
1300 Lakeside Avenue  
Cleveland, OH 44114  
(216) 420-7701, Ext. 183  
JFerguson@cpp.org

Mark Robinson  
Public Works Coordinator  
Cleveland Electric Illuminating Company  
6896 Miller Rd.  
Brecksville, OH 44141  
(440) 717-6845  
robinsonme@firstenergycorp.com

Scot M. Striffler  
Bridge Program Manager, Ninth Coast Guard District Bridge Program  
U.S. Coast Guard  
1240 E.9th Street  
Cleveland, OH 44199  
(216) 902-6087  
Scot.M.Striffler@uscg.mil

### **17.7 WEATHER STATION COORDINATION**

The existing weather station on the existing I-90 Central Viaduct Bridge near the West End Pier shall be maintained and remain functional for the duration of the project. ODOT District 12 will perform necessary maintenance. However, the DBT shall ensure that the power supply and communication feeds are maintained for the duration of the project. If outages are anticipated to either (or both) service, temporary services shall be provided by the DBT. Power to the existing weather station is supplied by CPP.

## **18 MAINTENANCE OF TRAFFIC**

The DBT shall be responsible for designing and maintaining safe and effective traffic control 24 hours a day for the duration of this project. All traffic control devices shall be furnished, erected, maintained, and removed by the DBT. Maintenance of Traffic, (MOT) for this project shall be implemented in a manner that minimizes both construction duration and impact to the traveling public. This section defines specific requirements, restrictions and allowable closure durations for travel lanes. Due to the complex nature of this project and the associated MOT issues and concerns, the DBT shall submit a Traffic Management Plan (TMP) to ODOT. The TMP shall comply with standards in Section 1.17.

If in the opinion of the Engineer, the DBT fails to comply with the requirements of the TMP and the contract, the Engineer shall suspend work until all requirements are met. Any costs or delays incurred as a result of the failure shall be the full responsibility of the DBT.

This section includes the requirements for allowable outages and number of lanes to maintain; many of these requirements affect the construction of the tie-ins and the mainline bridge rehabilitations. There is also a requirement for the implementation of a Westbound Alternate Route Plan (WARP) and an Eastbound Alternate Route Plan (EARP). It is a requirement that during long term closures of lanes on I-90, the appropriate alternate route plan (along I-490 and I-77) will be in place.

Another complicating factor is the construction of the interchanges in the Tremont and Gateway Districts. Supporting the goal to minimize impacts, a clear and well communicated MOT scheme that addresses the phase construction of the ramps to and from these Districts is required. It is recognized that due to the ramp closures, there will be impacts to the local street grid beyond the project limits. The DBT shall perform additional traffic count and analysis at intersections to be determined. These locations will be dependent upon the TMP proposed by the DBT. An outcome of this effort is to supply Synchro data so that the City of Cleveland Traffic can adjust existing signal timings on the local street grid for the anticipated changes in traffic patterns during construction.

### **18.1 NOTIFICATION and COORDINATION REQUIREMENTS**

The DBT shall provide 14 days advance notice of pending changes in maintenance of traffic or traffic patterns to the agencies listed below.

The DBT shall notify ODOT District 12 Traffic Operations Center of upcoming changes to the traffic patterns 14 calendar days in advance of such changes. The DBT shall coordinate MOT activities with the ODOT District 12 Traffic Operations Center during business hours for effective messaging and operations of Cleveland's Freeway Management System (FMS). The DBT shall provide information to ODOT District 12 for FMS updates.

Updates to the FMS may be required due to incidents or other unplanned events. During normal business hours the DBT shall contact ODOT District 12 Traffic Operations Center. During non-business

hours, the DBT shall contact Advanced Regional Traffic Interactive Management & Information System, (ARTIMIS) in Cincinnati at 513-564-6102.

These notification and coordination requirements should be coordinated with the requirements of Section 4 - Public Communications and Involvement and included in the Public Information Plan (PIP).

Capt. John McKenna  
Fire Prevention  
City of Cleveland Division of Fire  
1645 Superior Ave.  
Cleveland, Ohio 44114  
(216) 664-6664  
JMckenna@city.cleveland.oh.us

Lt. Robert Stitt  
Traffic Unit, Officer in Charge  
City of Cleveland Division of Police  
2001 Payne Ave.  
Cleveland, Ohio 44114  
(216) 623-5179  
RStitt@city.cleveland.oh.us

Rob Mavec  
Commissioner of Traffic  
City of Cleveland Division of Traffic  
City of Cleveland  
601 Lakeside Ave  
Cleveland, Ohio 44114  
(216) 664-3194  
RMavec@city.cleveland.oh.us

Nick Jackson  
Deputy Chief of Business Operations  
Cleveland Metropolitan School District  
CMSD  
1380 E.6<sup>th</sup> Street  
Cleveland, Ohio 44114  
(216) 574-8147  
Nicholas.jackson@cmsdnet.net



Mike Schipper  
Deputy General Manager, Engineering & Project Management  
Greater Cleveland Regional Transit Authority  
GCRTA  
1240 W.6th Street  
Cleveland, OH 44113  
(216) 566-5084  
MSCHIPPER@gcrta.org

## **18.2 TRAFFIC MANAGEMENT PLAN (TMP)**

The DBT shall prepare and submit a TMP to ODOT after accepted by the IQF. The TMP shall be stamped by a professional engineer licensed in Ohio. The TMP shall serve as a manual for the Department and affected stakeholders to enable understanding of all components of the DBT's plan for maintaining traffic during construction. The TMP shall cover all phases of construction, from project start to completion, defining and detailing specific MOT plans for each construction phase. It is recognized that some items that are required in the PIP discussed in Section 4 - Public Communications and Involvement would be relevant to include in the TMP. The TMP will consist, at a minimum, of:

- A. Cover page/title sheet sealed by an Ohio registered professional engineer.
- B. Name, all contact information and applicable certifications for the Workzone Traffic Supervisor.
- C. PIP sections relevant to the TMP.
- D. Incident Management Plan.
- E. Contact information included in Section 18.1 and additional contacts as deemed necessary by the DBT/Department.
- F. Schedule showing MOT phases and durations, including closure durations.
- G. Discussion of sequence of operations and MOT procedures.
- H. Traffic data and analysis.
- I. Plans at an appropriate scale showing: the work area; begin/end tapers; temporary pavement and/or structures; location or signs (existing overhead signs and all proposed, covered, or modified signs); locations of typical sections; detour routes, alternate routes, Portable Changeable Message Signs (PCMS) locations; and references to applicable SCDs.
- J. Typical sections showing: lane widths, pavement markings, drums, portable concrete barrier (PCB), etc.; limiting stations; work area and drop-offs.
- K. Sign details for proposed signs and overlays/modifications.

Any changes to or modifications of the TMP must be submitted to ODOT a minimum of seven (7) calendar days prior to desired implementation of the proposed change(s).

The TMP shall identify all long term lane closures and all complete directional roadway closures (short term or long term).

The TMP shall take into consideration snow or ice operations from December 1 through March 31. Lane shifts, restrictions, and closures may not be approved if they adversely affect snow removal operations.

The TMP shall include information and guidance for signing and detour routes, including color-coded definitions of detour routes.

The TMP shall identify and include the use of Law Enforcement Officers (LEO).

### **18.3 MAINTENANCE OF TRAFFIC REQUIREMENTS**

The DBT shall maintain all existing lanes of traffic at all times during construction on existing, temporary or new pavements and/or structures except as noted herein. Allowable durations for lane closures, ramp closures, and road closures are defined below in Tables 18-1, 18-2 and 18-3. A waiver from the Maintenance of Traffic Exception Committee is not required for any reductions or closures included in the Project Scope.

Pedestrian traffic shall be maintained at all times. Pedestrian Traffic shall be maintained per OMUTCD, TEM Section 640-25, C&MS 614.02 and ADA requirements.

Widened structures for maintaining traffic shall meet the requirements of Section 14 - Structures. It is anticipated that increases to structure width for maintaining traffic may be necessary for the deck replacement for mainline and ramp structures over E.14<sup>th</sup> Street and E.9<sup>th</sup> Street.

The DBT shall maintain or provide lighting for all travelled lanes and pedestrian routes by use of existing, temporary or new lighting facilities.

#### **18.3.1 Disincentives for Closures**

Disincentives shall be applied at a rate of \$500 per minute up to a maximum of \$30,000 per day, unless IQF provides acceptable QUEWZ-98 analysis justification for a lower rate.

Disincentives shall be applied to the DBT for closures as follows:

- A. Closure durations on the interstates, ramps and local streets that exceed closure duration limits set forth in the TMP or the contract.
- B. Closures between 7 am and 9 am, 3:30 pm and 6 pm, or during Special Events on the following local roads: Ontario Avenue, Broadway Avenue, Orange Avenue, Carnegie Avenue, E.14<sup>th</sup> Street, E.22<sup>nd</sup> Street, and E.9<sup>th</sup> Street.

#### **18.3.2 Closure Requirements**

Lane closures or restrictions over segments of the Project in which no work is anticipated within a reasonable time frame, as determined by the Engineer, shall not be permitted. The level of utilization of maintenance of traffic devices shall be commensurate with the work in progress.

Special Events shall be considered events at venues with a seating capacity greater than 25,000 or events at any downtown venue with a projected attendance of 20,000 or greater. The DBT shall not close additional lane(s) in the inbound direction two (2) hours before an event and in the outbound direction two (2) hours after an event ends.

Lane closures (except for long-term stationary closures) are prohibited during Special Events.

The Permitted Lane Closure Map (PLCM) is found at:

<http://www.dot.state.oh.us/districts/D12/HighwayManagement/Pages/PermittedLaneClosures.aspx>

The PLCM, effective date May 15, 2010, shall apply to lane closures not defined in the Project Scope.

The DBT shall not close any lanes (except for long-term stationary closures) during periods when snow accumulation is probable. During these periods daily isolated lane closures may be used during non-peak hours, weather permitting.

A Holiday Weekend, for traffic maintenance purposes, begins at noon on the last normal weekday preceding the weekend. The Holiday Weekend is considered to end at 6:00 am on the first normal weekday following the holiday. A day between the holiday and Saturday or Sunday is considered part of the Holiday Weekend.

The DBT shall not close lanes (except for long-term stationary closures) during holidays and Holiday Weekends. National holidays and Holiday Weekends include New Years, Memorial Day, Fourth of July, Labor Day, Thanksgiving, Christmas, and Easter.

Reduction of lanes on I-90 requires implementation of appropriate alternate route plan described in Section 18.3.3.

**Table 18-1: Allowable Interstate Closures**

Interstates	Allowable Closure(s)	Additional Requirements
I-90	<p>Complete closures with traffic detoured are permitted as defined below. Without the ARP in place:</p> <ul style="list-style-type: none"> <li>A. Weekday overnight closure: 9:00 pm through 5:00 am (Sunday-Thursday)</li> <li>B. Weekend closure: No full weekend closures</li> </ul> <p>With the ARP in place:</p> <ul style="list-style-type: none"> <li>A. Weekday overnight closure: 8:00 pm through 6:00 am (Sunday-Thursday)</li> <li>B. Weekend closure: 8:00 pm Friday through 6:00 am Monday</li> </ul>	

<b>Interstates</b>	<b>Allowable Closure(s)</b>	<b>Additional Requirements</b>
<b>I-90 westbound</b>	May be reduced to two (2) lanes of traffic for up to 720 days	WARP implementation is required
<b>I-90 eastbound</b>	May be reduced to two (2) lanes of traffic for up to 360 days	EARP implementation is required
<b>I-90 westbound to I-71 southbound</b>	May be reduced to two (2) lanes for up to 240 days (concurrently with the 720 days noted above) during construction of the new mainline alignment tie-in of the western project limits	At no time shall fewer than two (2) lanes be provided for in this direction of travel
<b>Mainline I-90 westbound over Starkweather Avenue</b>	May be reduced to one (1) lane for up to 90 days for the phase construction of the bridge rehabilitation	This lane reduction is only allowed when all lanes of I-90 westbound to I-71 southbound are open to traffic

Table 18-2: Allowable Ramp Closures

<b>Ramps</b>	<b>Allowable Closure(s)</b>	<b>Additional Requirements</b>
<b>I-90 westbound ramp to Abbey (existing ramp W-3; proposed ramp A-6)</b>	May be closed to traffic for up to 540 days and detoured to Fairfield/W.11th Street	I-90 westbound ramp to Abbey shall not be closed concurrently with any closure on Fairfield Avenue
<b>I-90 westbound ramp to Fairfield/W.14th Street (existing ramp W-2; proposed ramp W.14th Street Extension)</b>	May be closed to traffic with its traffic detoured to Abbey/W.11th Street for up to 90 days	I-90 westbound ramp to Fairfield/W.14th Street shall not be closed concurrently with any closure on Abbey Avenue

Ramps	Allowable Closure(s)	Additional Requirements
<b>Ontario/Carnegie ramp to I-90 westbound/I-71 southbound (existing ramp E-1, proposed ramp A-5)</b>	May be closed to traffic with its traffic detoured to ramp westbound I-90 through traffic to I-77/I-490 for up to 240 days	The Ontario/Carnegie ramp to I-90 westbound/I-71 southbound may not be closed concurrently with any closure of E.9th Street/Carnegie ramp to I-90 westbound/I-71 southbound or E.14th Street/Carnegie ramp to I-90 westbound
<b>E.9th Street/Carnegie ramp to I-90 westbound/I-71 southbound (existing ramp E-3, proposed ramp A-4)</b>	May be closed and traffic detoured for up to 270 days	E.9th Street/Carnegie ramp to I-90 westbound/I-71 southbound may not be closed concurrently with any closure of Ontario/Carnegie ramp to I-90 westbound/I-71 southbound or E.14th Street/Carnegie ramp to I-90 westbound
<b>I-77 northbound ramp to I-90 eastbound (ramp E-9)</b>	<p>Shall be maintained with a minimum of one (1) lane at all times during construction</p> <p>Two (2) lanes shall be maintained at all times during implementation of EARP</p>	
<b>I-90 westbound ramp to I-77 southbound (ramp E-10)</b>	<p>Shall be maintained with a minimum of one (1) lane at all times during construction except ramp may be closed with traffic detoured for up to two (2) separate (non-consecutive) days</p> <p>Two (2) lanes shall be maintained at all times during implementation of WARP</p>	Ramp closure is restricted to weekends

Ramps	Allowable Closure(s)	Additional Requirements
E.21st Street ramp to I-77 southbound (ramp E-13)	Shall be closed with traffic detoured while the WARP is implemented	
I-90 eastbound ramp to E.9th Street (ramp E-6)	May be closed with traffic detoured for up to 90 days	

Table 18-3: Allowable Local Street Closures

Local Street	Allowable Closure(s)	Additional Requirements
<b>All Local Streets</b>	<p>Overnight and weekend complete closures of local streets with traffic detoured are permitted with overnight and weekend closures defined as:</p> <p>A. Weekday overnight closure: 8:00 p.m. through 6:00 a.m. (Sunday-Thursday)</p> <p>B. Weekend closure: 8:00 p.m. Friday through 6:00 a.m. Monday</p>	<p>Complete closures on W.3<sup>rd</sup>, Central Viaduct Way and Canal Road are limited to 15 minutes every hour for up to a total closure time of eight (8) hours for erection of superstructure elements</p> <p>Concurrent closure restrictions detailed below for individual streets apply to overnight and weekend complete closures</p>
<b>All Local Streets</b>	<p>Lane closures (except for long-term stationary closures) with traffic maintained are permitted on all local streets except as noted below:</p> <p>Lane closures (except for long-term stationary closures) are prohibited on Ontario Avenue, E.9th Street, Carnegie Avenue, Orange Avenue, and W.3<sup>rd</sup> Street between 7 am and 9 am, and 3:30 pm and 6 pm weekdays</p>	

Local Street	Allowable Closure(s)	Additional Requirements
<b>Fairfield Avenue</b>	May be closed and traffic detoured for up to 14 consecutive days	Fairfield Avenue shall not be closed concurrently with any closure on Starkweather Avenue, Kenilworth Avenue or Abbey Avenue
<b>Kenilworth Avenue</b>	May be closed and traffic detoured for up to 14 consecutive days	Kenilworth Avenue shall not be closed concurrently with any closure on Starkweather Avenue or Fairfield Avenue
<b>Starkweather Avenue</b>	May be closed and traffic detoured for up to 14 consecutive days	Starkweather Avenue shall not be closed concurrently with any closure on Fairfield Avenue or Kenilworth Avenue
<b>Abbey Avenue</b>	<p>May be closed and traffic detoured for up to 14 consecutive days under the new Central Viaduct only</p> <p>Abbey Avenue may be reduced to one (1) lane of uni-directional traffic for up to 120 days for the construction on Abbey Avenue Bridge (Bridge Location 15 per Section 16 - Structures) and street reconstruction</p>	<p>Abbey Avenue shall not be closed concurrently with any closure on Fairfield Avenue, W14th Street or Kenilworth Avenue</p> <p>DBT shall determine with the contacts in Section 18.1 the direction for the one (1) lane maintained</p>
<b>W.14th Street southbound between Abbey and Fairfield</b>	May be closed and traffic detoured to W.11 <sup>th</sup> Street for up to 90 consecutive days	Access to I-90 eastbound entrance ramp from W14th Street northbound shall be maintained at all times, except as permitted during Bidirectional Condition implementation

Local Street	Allowable Closure(s)	Additional Requirements
<b>Ontario Street</b>	<p>May be reduced to two (2) lanes of eastbound traffic for up to 180 days while maintaining all lanes of westbound traffic</p> <p>May be reduced to two (2) lanes in each direction (maintaining four (4) lanes) for up to 14 days</p>	Ontario Street may not be completely closed at the same time as any closure on E.9th Street
<b>Carnegie Avenue</b>	May be reduced to two (2) lanes in each direction for up to 14 days	
<b>E. 9th Street</b>	May be reduced to two (2) lanes in each direction for up to 14 days	E.9th Street may not be completely closed concurrently with any closure on Ontario Street
<b>Commercial Road/new E.9<sup>th</sup> Street</b>	All traffic and all lanes on Commercial Road shall be maintained at all times via the existing Commercial Road or the new E.9th Street	
<b>The E.14th Street/Carnegie ramp to I-90 westbound (existing ramp E-5, proposed ramp A-3)</b>	May be closed and traffic detoured for up to 210 days	The E.14th Street/ Carnegie ramp to I-90 westbound may not be closed concurrently with any closure on the Ontario/Carnegie ramp to I-90 westbound/I-71 southbound, the E.9th Street/Carnegie ramp to I-90 westbound/I-71 southbound, or the E.21st Street ramp to I-77 southbound



Local Street	Allowable Closure(s)	Additional Requirements
<b>Access between the Fire Station on Central Viaduct Way Road and Canal Road for emergency egress of emergency response vehicles</b>	<p>Shall be maintained at all times</p> <p>A minimum lane width of 12 feet with curves widened to accommodate outbound emergency response vehicles shall be provided</p>	<p>This access may be provided by either the existing Commercial Road or by the new connection to E.9th Street and Canal Road</p>
<b>Canal Road</b>	<p>May be closed and traffic detoured for up to seven (7) consecutive days</p>	<p>Emergency vehicle access through the site must be provided during any and all closures of Canal Road. The project shall be able to accommodate emergency vehicle passage on Canal Road</p>
<b>Broadway-E 9<sup>th</sup>-Orange corridor between the I-90 eastbound to the northbound Ontario ramp and E.22<sup>nd</sup> Street</b>	<p>May be reduced to two (2) lanes of traffic in each direction during construction of the intersection for one continuous period lasting up to 180 days for the duration of the project</p>	

### 18.3.3 Alternate Route Plan Requirements

All long-term stationary lane closures on I-90 will require concurrent implementation of an Alternate Route Plan (ARP) along I-490 and I-77. Westbound implementation of the ARP will be referred to as the westbound alternative route plan (WARP). Eastbound implementation of the ARP will be referred to as the eastbound alternative route plan (EARP). The WARP must be in place any time that westbound I-90 long-term stationary lane closures occur. The EARP must be in place any time that eastbound I-90 long-term stationary lane closures occur. Only long-term stationary closures require implementation of either ARP. Each Alternate Route Plans will require modification to the system interchanges of I-490/I-90, I490/I-77 and I-77/I-90 with the use of existing structures and existing and temporary pavements, as necessary. See Appendix MT-04 for additional requirements of the EARP and the WARP.

Implementation of the EARP shall not exceed 360 days during the Project. The following lane configurations shall be provided during the implementation of the EARP on the path bound by the I-490/I-71/I-90 interchange and the I-77/I-90 interchange:

I-90 eastbound to I-490 eastbound: three (3) lanes

I-490 eastbound: five (5) lanes

I-490 eastbound to I-77 northbound: two (2) lanes

I-77 northbound: four (4) lanes

I-77 northbound to I-90 eastbound: two (2) lanes

All ramp closures shown for the EARP are required closures that shall be implemented for the full duration of the EARP. During the EARP, traffic from I-90 eastbound shall not be permitted to exit the Carnegie off-ramp or the E.22<sup>nd</sup> Street off-ramp. Longitudinal channelizers, such as Qwick Kurb, Tuff Curb or approved equivalent, shall be used to appropriately channelize the traffic. This channelization shall be in place during EARP operations as well as upon Project completion with the Bi-Directional Condition.

Implementation of the WARP shall not exceed 720 days. The following lane configurations shall be provided during the implementation of the WARP on the path bound by the I-77/I-90 interchange and the I-490/I-71/I-90 interchange:

I-90 westbound to I-77 southbound: two (2) lanes

I-77 southbound: four (4) lanes (except the three (3) lane section in the region of East 30<sup>th</sup> Street)

I-77 southbound to I-490 westbound: two (2) lanes

I-490 westbound: four (4) lanes

I-490 westbound to I-90 westbound: two (2) lanes

All ramp closures shown for the WARP are required closures that shall be implemented for the full duration of the WARP.

Stage 3 Plans for an ARP were developed and are available to the DBT for use in developing the detailed plans for the WARP and EARP. These can be found in Appendix MT-02. The DBT is responsible for the final plan development of the both Alternate Route Plans.

#### **18.3.4 Permanent Road Closures**

Permanent road closures shall be advanced signed at a minimum of 14 days prior to closure. Permanent closures include:

- A. I-77 northbound ramp to I-90 westbound (ramp E-8) shall be closed with traffic permanently rerouted via I-490 to I-90.

- B. I-90 eastbound ramp to I-77 southbound (ramp E-7) shall be closed with traffic permanently rerouted via I-490 to I-77.
- C. University Road shall be closed within the project work limits with traffic permanently rerouted via the city street grid. University Avenue shall be closed with Gates and Barricades 21 days in advance of construction activity affecting University Avenue.

Permanent road closures do not require implementation of a detour. Guide signs and local signs shall be modified to reflect the closures.

### **18.3.5 MOT Phases and Local Street Traffic Counts and Operational Analyses**

The DBT shall complete appropriate traffic analyses of the project area roadways, together with the adjacent, affected roadways and intersections, for each MOT phase to be implemented during the project. To support this, the DBT shall undertake a traffic count program for the development of the MOT phase analysis, as well as the Bi-Directional Condition, as directed by the Engineer. AM and PM peak hour counts shall be conducted at up to 15 intersections for each of the phases; based on eight (8) phases resulting in a maximum of 120 intersection counts for the AM and PM peaks. Traffic counts shall be three (3) hour minimum for rush hours from 6:30 am to 9:30 am and 3:00 pm to 6:00 pm. Similarly, the DBT shall conduct up to 30 24-hour bi-directional automated traffic recorder (ATR) counts for each of the phases; this will result in a maximum of 240 ATR counts. The signal timing, capacity and progression analyses shall be done by the DBT, using Synchro traffic simulation software. The Synchro model may be developed from the Bi-Directional Condition Synchro model that will be provided to the DBT. (See Section 17.2.19 for more information.)

The DBT shall furnish signal timing plans for each analysis phase (AM, PM and Average timing plans) within each MOT phase. The DBT shall work with City of Cleveland (Traffic) staff for implementation of the timing plans into the intersections within the network. City staff will implement all signal timing adjustments into the controllers; the DBT will not have access to the controllers.

### **18.3.6 Detour Routes**

The MOT requirements indicate required detours. Some detour routes have been specified. Unspecified detour routes shall be determined by DBT. Additional detour routes not indicated may be required depending on the DBT's TMP.

Scranton Avenue shall not be used as a truck detour.

A detour is currently maintained by ODOT for I-90 truck traffic. The existing eastbound I-90 detour for trucks shall be maintained by the DBT at all times. The DBT shall supply three (3) PCMS to replace the ODOT supplied PCMS for the eastbound truck detour. PCMS shall be Class A per Section 18.5. PCMS shall include communication with and interconnection to the Freeway Management System and District 12's Traffic Operations Center.

During the time that traffic is detoured, the DBT shall maintain the detour routes in a condition that is reasonably smooth and free from holes, ruts, ridges, bumps, dust and standing water. Once the detour is removed and traffic returned to its normal pattern, the detour routes shall be restored to a condition that is equivalent to that which existed prior to its use for this purpose. All such work shall be performed when and as determined by the Engineer.

The DBT shall resurface per Section 11 - Pavements and install new pavement markings per Section 17 - Traffic Control at substantial completion of the project all the detour routes for detours that exceed 14 consecutive days. Resurfacing limits for detours excludes project full depth pavement replacement and resurfacing limits.

### **18.3.7 Haul Roads**

DBT shall comply with any and all load restrictions.

Scranton Avenue and W.14<sup>th</sup> Street shall not be used as Haul Roads.

## **18.4 GENERAL MOT CRITERIA**

In addition to the applicable governing regulations, the information listed below is to govern the development of the TMP.

- A. Design speed
  - a. Urban Interstate = 50 mph (posted 50 mph)
  - b. Urban Arterial = 25 mph, 30 mph or 35 mph, as posted
  - c. Urban Collector = 25 mph, 30 mph or 35 mph, as posted
  - d. Urban Local = 25 mph
- B. 11-foot lane width minimum for ODOT Facilities
- C. 10-foot lane width minimum for Cleveland Facilities
- D. 1.5-foot minimum clearance from lane edge to toe of barrier.

Where existing, new or temporary shoulder pavement is used for maintaining traffic, the cross slope shall be transitioned using the MOT design speed applicable superelevation transition relative gradient in L&D Volume 1. These criteria shall govern, but not be limited to, the transition of the roadway shoulder to the approach slab/bridge deck.

## **18.5 TEMPORARY TRAFFIC CONTROL ZONE DEVICES**

The DBT shall provide, erect and maintain drums, signs, barriers and all other traffic devices used for maintenance of traffic. The DBT shall maintain all devices in satisfactory condition in accordance with ODOT's Quality Guidelines for Temporary Traffic Control Devices & Features.

The DBT shall provide, install and maintain 12 PCMS for use during the entire duration of construction. Four (4) PCMS shall be small, and eight (8) PCMS shall be large. Three (3) of the Class A PCMS will be dedicated to the eastbound Truck Detour route at the beginning of the project. The large signs shall be

Class A on ODOT's approved list at:

<http://www.dot.state.oh.us/Divisions/ConstructionMgt/Materials/Pages/PORTABLE-CHANGEABLE.aspx>.

Dimensions of the small signs shall be a minimum of 90 inches by 42 inches and a maximum of 102 inches by 60 inches. They shall be full matrix and trailer mounted. The small signs must have all the same communication links as the Class 'A' PCMS; however, the small signs do not have to be on ODOT's approved list. Placement and relocation of the signs shall be in accordance with the TEM, OMUTCD or as directed by the Engineer in the field. The DBT shall provide ODOT with licensed software and wireless connection to supply control of the PCMS via laptop from a remote location. The PCMS shall have a communication link to District 12's Traffic Operation Center (TOC). The TOC shall be able to read messages and display messages on the PCMS.

SCD MT-101.70 shall be used to delineate PCB and guardrail. PCB on bridge decks shall be installed per the Bridge Design Data sheet PCB-DD.

The DBT shall remove conflicting pavement markings by use of high pressure water.

## **18.6 LAW ENFORCEMENT OFFICER (LEO) WITH PATROL CAR**

LEOs will be required for the following situations:

- A. LEOs shall be positioned to direct traffic at the point of lane restriction or road closure and to manually control traffic movements through intersections in work zones.
- B. For lane closures, the use of LEOs is required during initial setup periods, tear down periods, substantial shifts of a closure point, or when new lane closure arrangements are initiated.
- C. LEOs shall be used when construction vehicles are entering/exiting the work zone directly from/to an open lane of traffic.
- D. Use of LEOs is required during the entire advance preparation and closure sequence where complete blockage of traffic is required, and during traffic signal installation when impacting the normal function of the signal or the flow of traffic, or when traffic needs to be directed through an energized traffic signal contrary to the signal display. LEOs shall not be used where the OMUTCD intends that flaggers be used.

Law enforcement officers (LEOs) with patrol cars are effective for slowing traffic speed through work zones. Their use shall be specifically identified in the construction plans. Their primary purpose is to ensure the safe, efficient and orderly movement of traffic.

In general, LEOs should be positioned to direct traffic at the point of lane restriction or road closure and to manually control traffic movements through intersections in work zones. If a lane has been closed to provide an acceleration/deceleration lane for the vehicles, then the LEO is not required.

## 18.7 WORK ZONE TRAFFIC SUPERVISOR

The DBT shall provide and use a Work Zone Traffic Supervisor (WTS). The requirements of the WTS shall be in accordance with the TEM note 642-44. The WTS shall be available 24 hours per day, seven (7) days per week for the duration of construction.

## 18.8 IMPROVEMENTS TO EXISTING ROADWAY NETWORK

The DBT shall make improvements to the existing roadway network including:

- A. **I-490 eastbound.** Tack weld the top plates over the joints along the I-490 eastbound and westbound shoulders prior to implementation of EARP.
- B. **I-490 shoulders.** The swales in front of the concrete inlets shall be leveled and existing rumble strips shall be milled/filled to allow for 60 mph travel prior to implementation of ARP.
- C. **I-90 eastbound.** Improve the outside shoulder of I-90 eastbound from the Carnegie exit gore to the Chester off ramp prior to implementation of EARP. The existing 10-foot wide shoulders made up of 301 asphalt (6 inches) shall be removed and replaced. The DBT shall remove the 301 and another 3 inches of subbase and place 6 inches of 301 asphalt, 1.75 inches of 448 intermediate Type 2 asphalt, and 1.25 inches of 448 Type 1 asphalt.
- D. **Alternate Routes.** The DBT shall check the barrier length of need for each Alternate Route. If necessary, the DBT shall install additional barrier, terminals and associated work along the Alternate Route based on the length of need calculations prior to implementation of ARP. The DBT shall maintain all barrier end treatments and attenuators.
- E. **East 34<sup>th</sup> Street/Broadway Avenue/GCRTA Driveway Intersection.** The DBT shall install prior to any long-term lane closures, maintain and remove a temporary signal with vehicle detection on the East 34<sup>th</sup> Street approach.
- F. **Alternate Route Travelled Lanes and Treated Shoulders.** The DBT shall resurface per Section 11 and provide pavement markings including RPMs and rumble strips per Section 17 prior to implementation of each ARP. Permanent RPMs are required during winter months (December 1 through March 31). DBT shall resurface and restore pavement markings including RPMs and rumble strips each ARP after project substantial completion prior to implementation of the Bi-Directional Condition.
- G. **SR 14 (Broadway and E.34<sup>th</sup> Street) Travelled Lanes between I-77 and Project Limits.** The DBT shall resurface per Section 11 and provide pavement markings per Section 17.
- H. **W.25<sup>th</sup> Street and E.22<sup>nd</sup> Street.** Signal controller and interconnect per Section 17 - Traffic Control and E.22<sup>nd</sup> Street widening and conversion to two-way per Section 12 - Roadway shall be completed prior to implementation of either ARP to assist with traffic congestion mitigation.
- I. **E.14th Street between Carnegie and Orange.** The DBT shall resurface per Section 11 and provide pavement markings per Section 17.