

city of  
CINCINNATI

# Western Hills Viaduct Preliminary Engineering Study Update



May 28, 2014  
ODOT PID 85388



# The Western Hills Viaduct

- The Western Hills Viaduct is one of twenty-six “County bridges” located in Cincinnati.
- County bridges are vehicular bridges within City limits that support improved roads which are of general and public utility running into or through Cincinnati.
- County bridges are owned by Hamilton County but maintained by the City by contractual agreement.
- The agreement has been in place for approximately 40 years.
- The City receives \$1,000,000 each year to maintain the twenty-six County bridges located in Cincinnati.
- All local funds used to date on the project have been County bridge funds.



# Existing Conditions

- **Constructed in 1932 with major rehabilitation in 1977.**
- **Reaching the end of its design life.**
- **Rated 4D (Poor Condition, Temporary Shoring).**
- **Concrete Deterioration and Structural Steel Deterioration.**
- **Structurally deficient (condition rating of 5 or less) and functionally obsolete (geometry does not meet current design standards).**
- **The Viaduct is inspected annually.**
- **The Viaduct is currently safe for all legal vehicles.**



# Purpose and Need

**To rehabilitate or replace the existing Viaduct to provide a minimum condition rating of 7 (Good Condition), remove fracture critical elements, and improve approach geometry while maintaining local and regional connectivity.**

# Project Goals

## Rehabilitate Existing Viaduct

Replace upper and lower decks, remove or retrofit all existing fracture critical details, and provide for the in-depth inspection and repair of any remaining structural elements.

or

## Replace Existing Viaduct

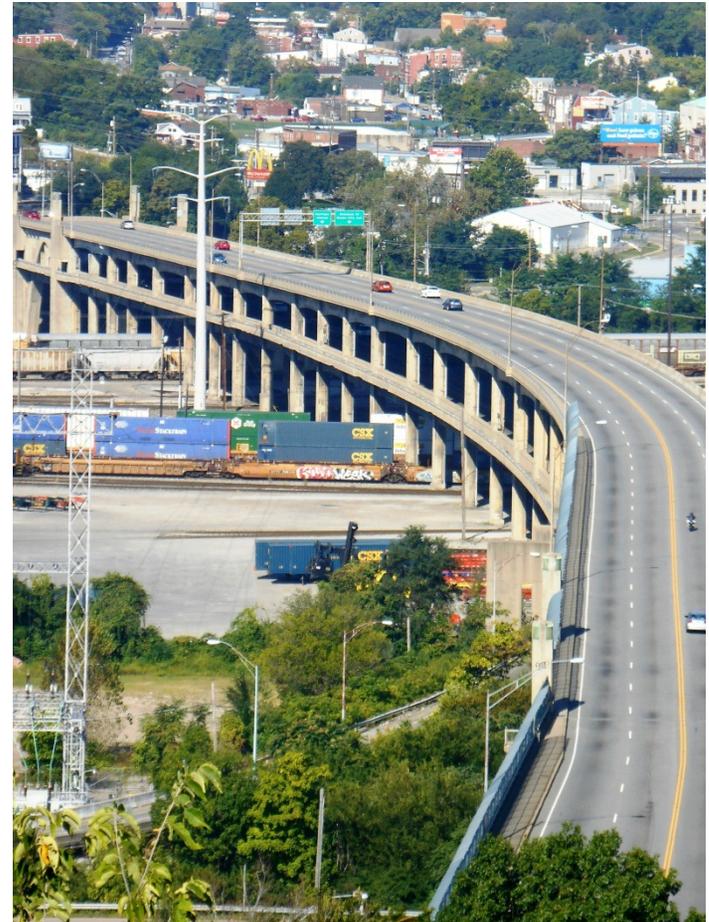
Replace entire viaduct with a new single or double deck structure with access to Westwood, Harrison, Spring Grove, I-75 and Central Parkway.

# Project Goals

- Tie into the revised I-75 Interchange south of the existing Viaduct as proposed by ODOT
- Minimize impacts to railroad operations during and after construction.
- Accommodate the Lick Run Valley Conveyance System (VCS) in South Fairmont being implemented by the MSD.
- Tie into the Westwood Improvement Project proposed by the City of Cincinnati, DOTE in conjunction with the Lick Run VCS.
- Maintain traffic during construction to the extent practical.
- Improve the geometry of the roadway connections.
- Improve pedestrian and bicycle access.

# Project Status/Schedule

- Project Initiated Summer 2011
- Public Meetings January 2012
- Alternatives developed Summer 2012–2013
- Ongoing Coordination with ODOT, Railroads, MSD and other Utilities.
- Public Meetings September 2013
- **Refine Alternatives**
- Public Meetings Summer 2014
- Discuss Preferred Alternative Fall 2014
- Select Preferred Alternative end of 2014
- Secure Funding for Design and Construction- Ongoing



# Input from 2012 Public Meetings

- The Viaduct is mostly used for commuting to Downtown and Uptown from the Western neighborhoods.
- Trip lengths are typically 20-30 minutes.
- Bike and pedestrian accommodations are poor and therefore lightly used.
- Maintain existing connections.
- Make connections more intuitive to simplify wayfinding.
- Improve geometry and safety.
- Acceptable closure period is up to six months.
- <http://www.cincinnati-oh.gov/dote/dote-projects/western-hills-viaduct/>

# Input from 2013 Public Meetings

- Received concurrence that pursuing a new structure on a southern alignment was the most advantageous.
- Received concurrence that pursuing a large span double deck structure was the most advantageous.
- <http://www.cincinnati-oh.gov/dote/dote-projects/western-hills-viaduct/>

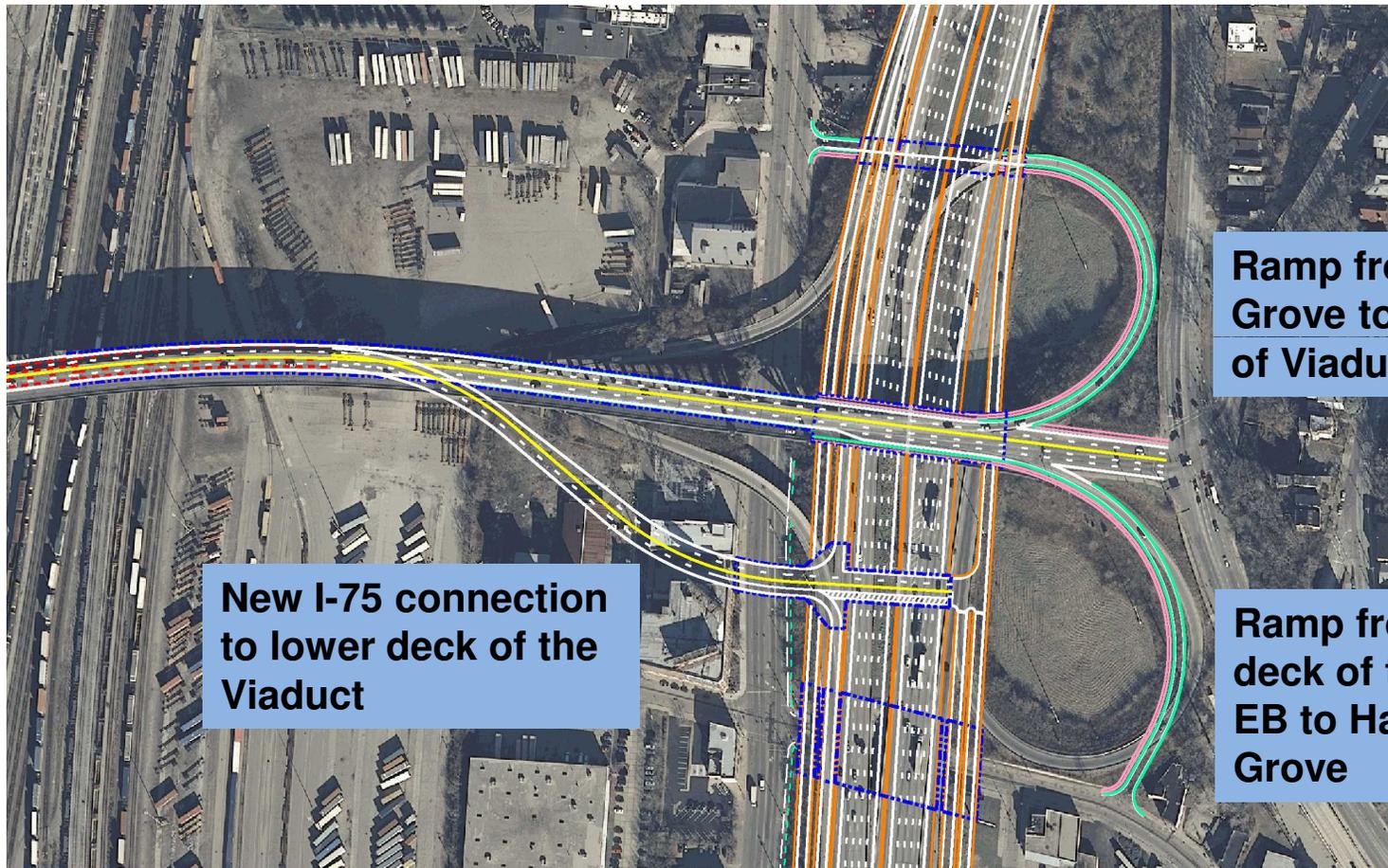
# ODOT Coordination

## Coordination with ODOT for the reconstruction of I-75 interchange at the Western Hills Viaduct

- Construction Schedule
- Maintenance of Traffic
- Utilities
- Funding
- Partial Interchange (I-75 access provided only to and from the west)
- All Interstate Traffic on lower level



# ODOT I-75 Interchange



**New I-75 connection  
to lower deck of the  
Viaduct**

**Ramp from Spring  
Grove to upper deck  
of Viaduct WB**

**Ramp from upper  
deck of the Viaduct  
EB to Harrison/Spring  
Grove**

# Railroad Coordination

Coordination with CSX and Norfolk Southern is a critical element of the project. Railroad operations will need to be considered in design and maintained during construction. Railroad coordination meetings were held during 2012 - 2013. Additional meetings planned.



September 2013

# Railroad Coordination

## Design Issues

- Classification Yard to the North
- Intermodal Yards to the South
- Height above Tracks (Vertical Clearance)
- Clearance to Piers (Horizontal Clearance)
- Relocate Utilities over or under rail yard



# Railroad Coordination

## Construction & Demolition Issues

- Classification Operations Maintained
- Intermodal Operations Maintained
- Limitations on Time available for Construction
- Access to site limited (Rail, Millcreek, I-75)



# MSD Coordination

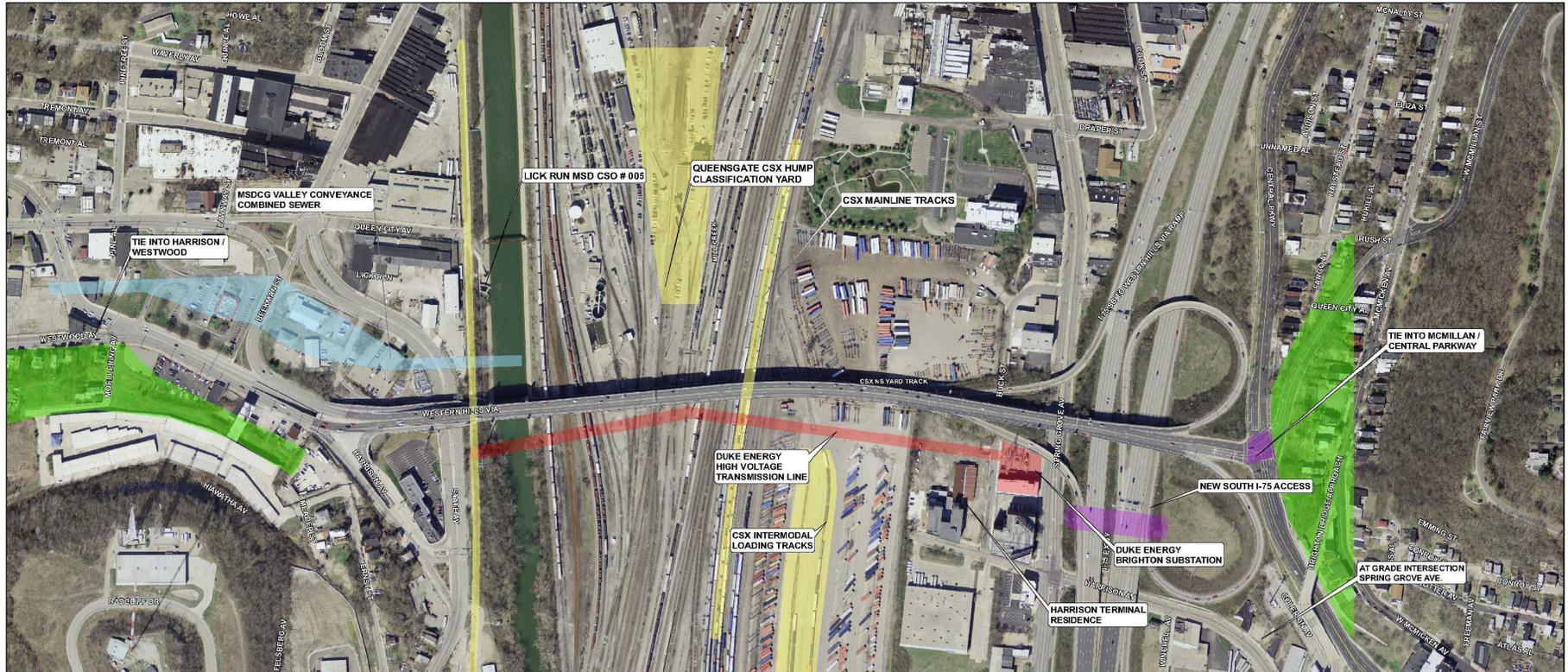
- **MSD is currently in the detail design and property acquisition phase of its Lick Run VCS project.**
- **The VCS will separate storm and sanitary sewers to reduce combined system overflows into the Mill Creek.**
- **The VCS will remove Beekman Street and reconstruct the Harrison and Westwood intersection.**
- **The VCS is a design constraint for northern alignments.**



# MSD Coordination

- **Planning and Design underway (CDOTE/MSD)**
- **VCS construction will precede the Western Hills Viaduct**
- **New stormwater conveyance between Westwood and Queen City**
- **Westwood improved and converted to two-way operation**
- **Queen City converted to two-way operation**
- **Western Hills Viaduct work will tie into new intersection of Harrison and Westwood.**

# Design Constraints



Western Hills Viaduct Preliminary Engineering Study  
 Design Constraints Map  
 September 2013



# Studied Alternatives

**The following general alternatives have been developed and evaluated:**

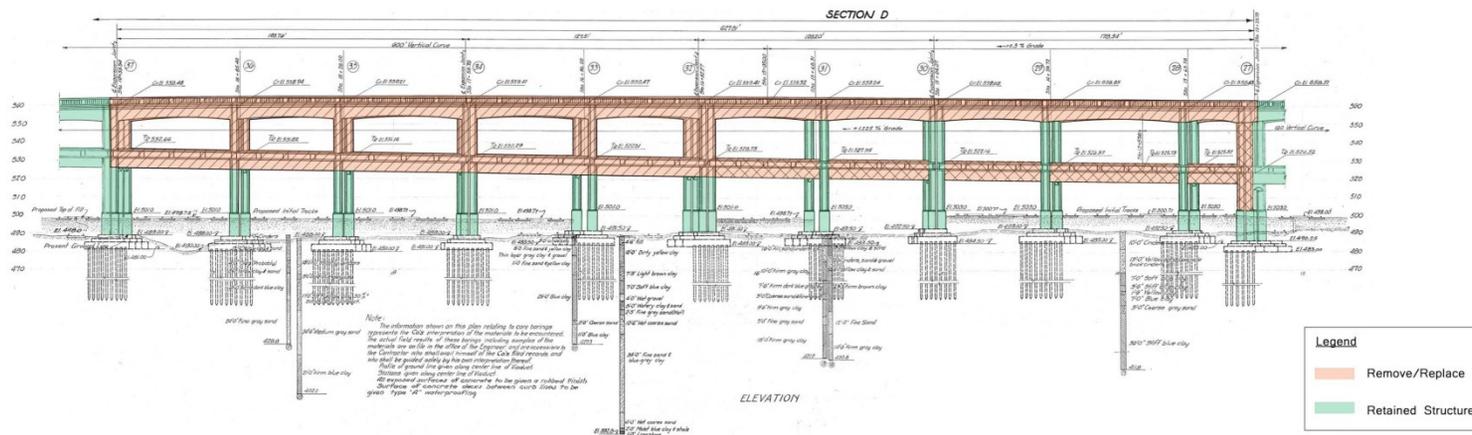
- **Reconstruct the existing Viaduct (replace decks, upper level salvage columns and foundations)**
- **Replace the entire Viaduct with a two level structure. Various alignments and span arrangements.**
- **Replace the entire Viaduct with a single level structure. Various alignments and span arrangements.**
- **Three corridors were analyzed. Along the existing Viaduct (middle), north of the existing bridge, and south of the existing Viaduct.**

# Rehabilitation Alternative



# Rehabilitation Alternative

- Requires major reconstruction
- Remove both decks and superstructure
- Salvages lower columns, arches, and foundations
- New lower ramps to I-75 and Harrison

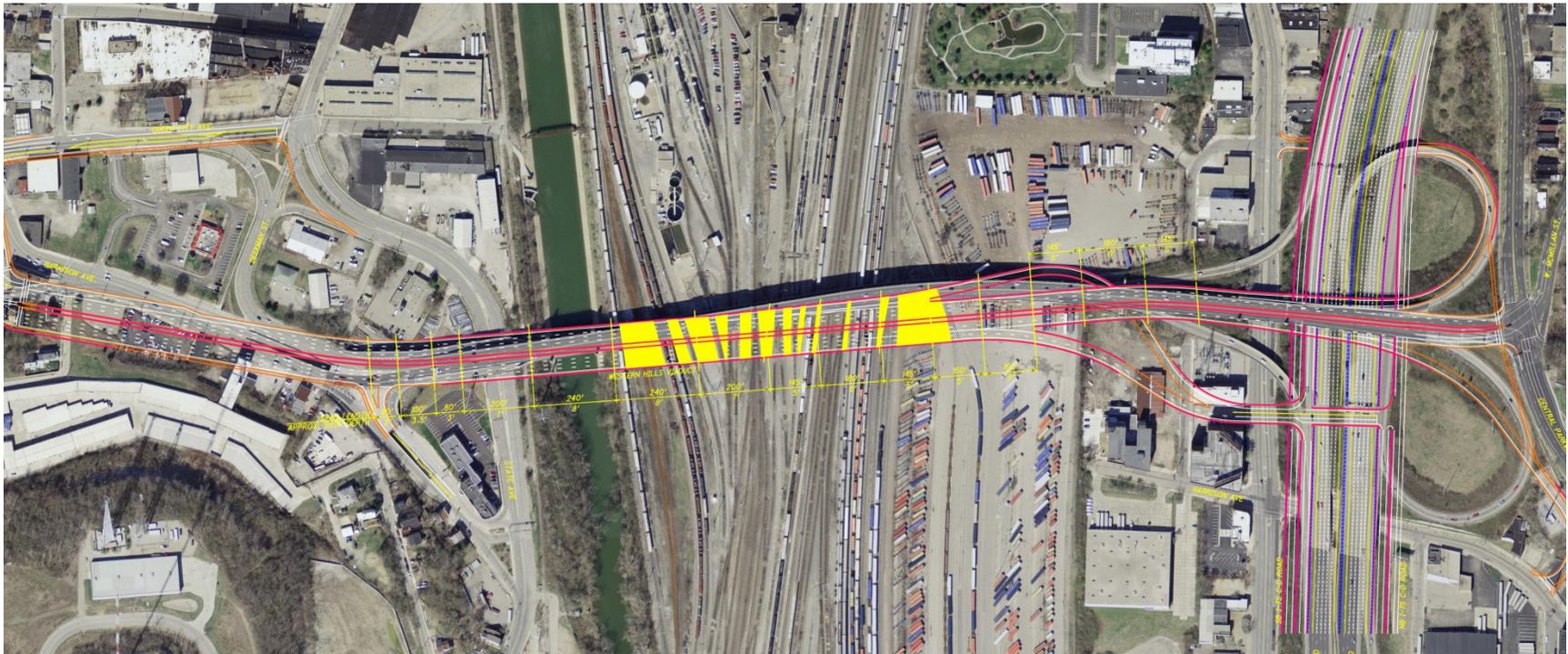


# Rehabilitation Design Issues

- **Can not construct part width**
- **Long term closure (2+ years)**
- **Cannot meet all current design standards**
- **Limited ability to improve bike/pedestrian facilities**
- **Shorter bridge life expectancy**
- **Less right of way requirements**
- **Estimated total project cost \$160M (not including ODOT interchange)**

# Replacement Alternatives

## Representative Middle Alignment



# Replace - Center, Design Issues

- Longest duration closure (3+ years due to required demolition prior to construction)
- Temporary support of utilities during construction needed
- Estimated total project cost \$240M
- Moderate right of way requirements
- Greater bridge life expectancy
- Provides improved bike/pedestrian facilities

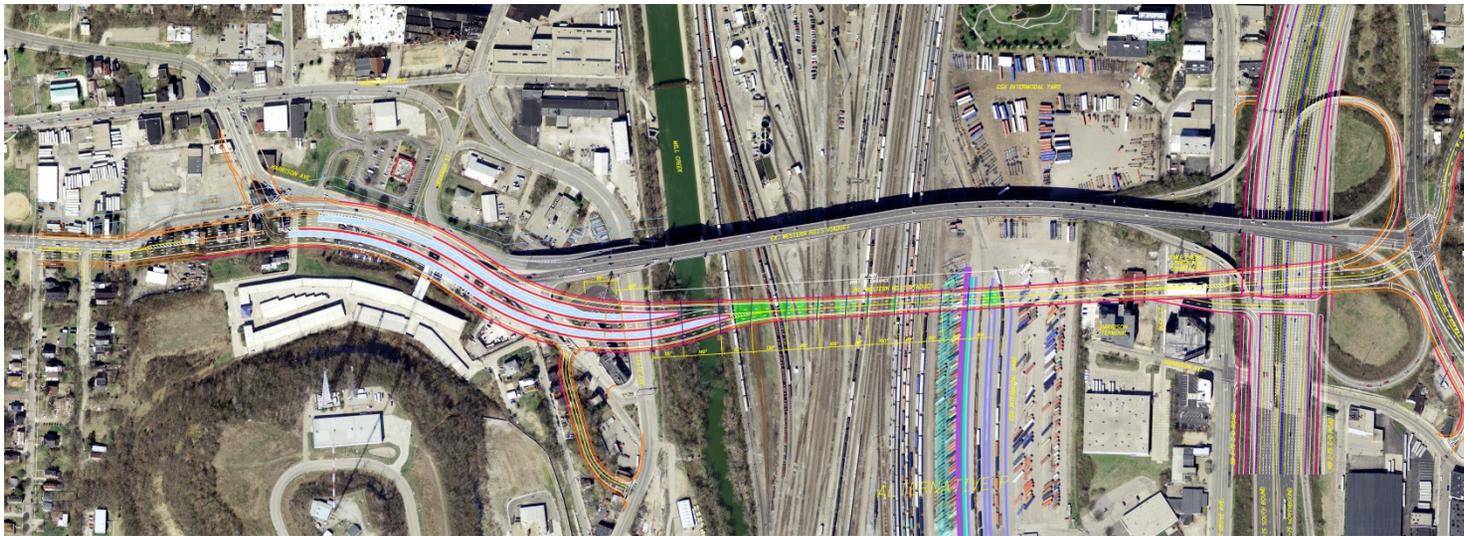


# Replace – North, Design Issues

- **Moderate term closure (1+ year due to partial demolition of Viaduct during construction)**
- **Interferes with Lick Run VCS**
- **Unfavorable approach geometry**
- **Impacts CSX Fuel Storage Facility and Hump Track**
- **Additional right of way requirements**
- **Estimated total project cost \$240M**
- **Greater bridge life expectancy**
- **Avoids CSX Intermodal Yard**
- **Provides improved bike/pedestrian facilities**

# Replacement Alternatives

## Representative Southern Alignment



# Replace – South, Design Issues

- Shortest duration of road closure (6 months or less due to use of existing Viaduct to maintain traffic during construction)
- Favorable approach geometry
- Greater bridge life expectancy
- Provides improved bike/pedestrian facilities
- **Estimated total project cost \$240M**
- **Additional right of way requirements**
- **Impacts CSX Intermodal Yard**

Evaluation Category		Rehabilitation	Northern Alignments	Middle Alignments	Southern Alignments
<b>Purpose and Need Goals</b>	Eliminate Fracture Critical Members	Positive	Positive	Positive	Positive
	Improve Structure Condition Rating	Neutral	Positive	Positive	Positive
	Vehicular Level of Service	Neutral	Positive	Positive	Positive
	Reduce Design Exceptions	Negative	Neutral	Positive	Neutral
	Improved Pedestrian Accommodations	Negative	Positive	Positive	Positive
	Accommodate Bicycle Facilities	Negative	Neutral	Positive	Positive
	Maintain Traffic During Construction	Negative	Neutral	Negative	Positive
	Disruption to Railroad Operations	Negative	Negative	Negative	Negative
<b>Connectivity</b>	Connectivity to Planned I-75 Interchange	Neutral	Negative	Neutral	Positive
	Connectivity to Westwood Blvd.	Neutral	Positive	Neutral	Positive
	Connectivity to State Street	Positive	Negative	Negative	Neutral
	Connectivity to Spring Grove Ave	Neutral	Negative	Neutral	Neutral
	Connectivity to Central Parkway	Neutral	Negative	Neutral	Positive
<b>Railroad/Utility Impacts</b>	Construction Access	Neutral	Negative	Neutral	Negative
	Impacts to Railroad Intermodal Yard	Neutral	Positive	Neutral	Negative
	Impacts to Railroad Classification Yard	Neutral	Negative	Neutral	Positive
	Impacts to Duke Energy Electrical Lines	Neutral	Positive	Neutral	Negative
	Impacts to GCWW Water Main	Negative	Neutral	Negative	Neutral
	Preserve Portions of Existing Bridge	Positive	Negative	Negative	Neutral
	Impacts to Lick Run VCS	Neutral	Negative	Neutral	Positive
<b>Environmental Impacts</b>	ESA sites	Positive	Neutral	Neutral	Negative
	Properties Impacted	Positive	Neutral	Positive	Negative
	Ecological Impacts	Positive	Neutral	Positive	Neutral
	Cultural/Historic or 4F impacts	Positive	Neutral	Neutral	Neutral
	Environmental Justice	Positive	Neutral	Neutral	Neutral
	Relocations	Positive	Neutral	Positive	Neutral

Legend

- Positive
- Neutral
- Negative

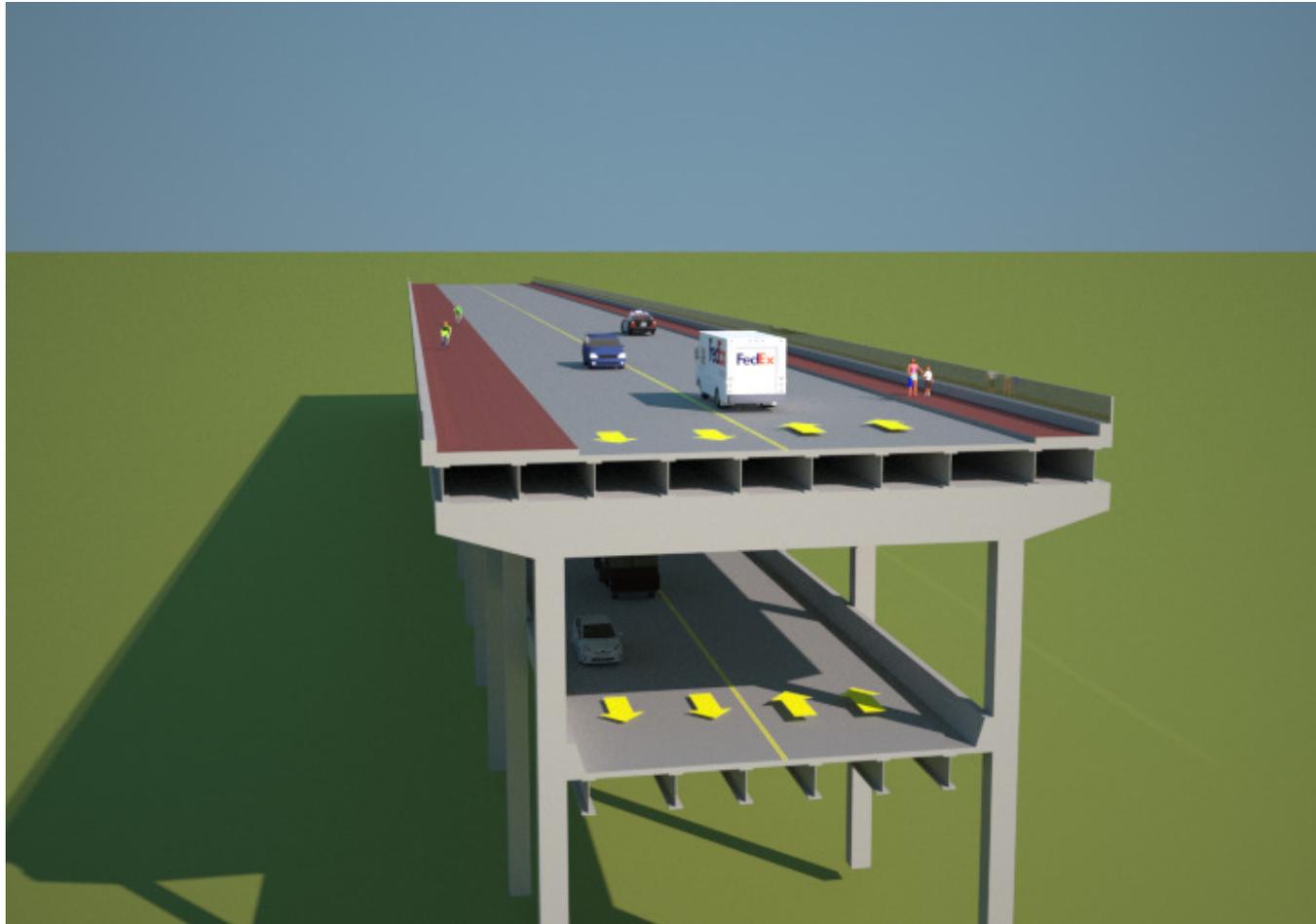
# Single Deck Bridge

(Bike/Pedestrians in Median)



# Double Deck Bridge

(Bike/Pedestrians on Upper Deck)



# Single Deck Bridge Properties

- **Construction and maintenance impacts to Railroad are greater with single deck.**
- **Longer, steeper ramps to I-75 due to elevation differences.**
- **Bike/Pedestrians required to cross ramps to the interstate and Spring Grove unless in median**

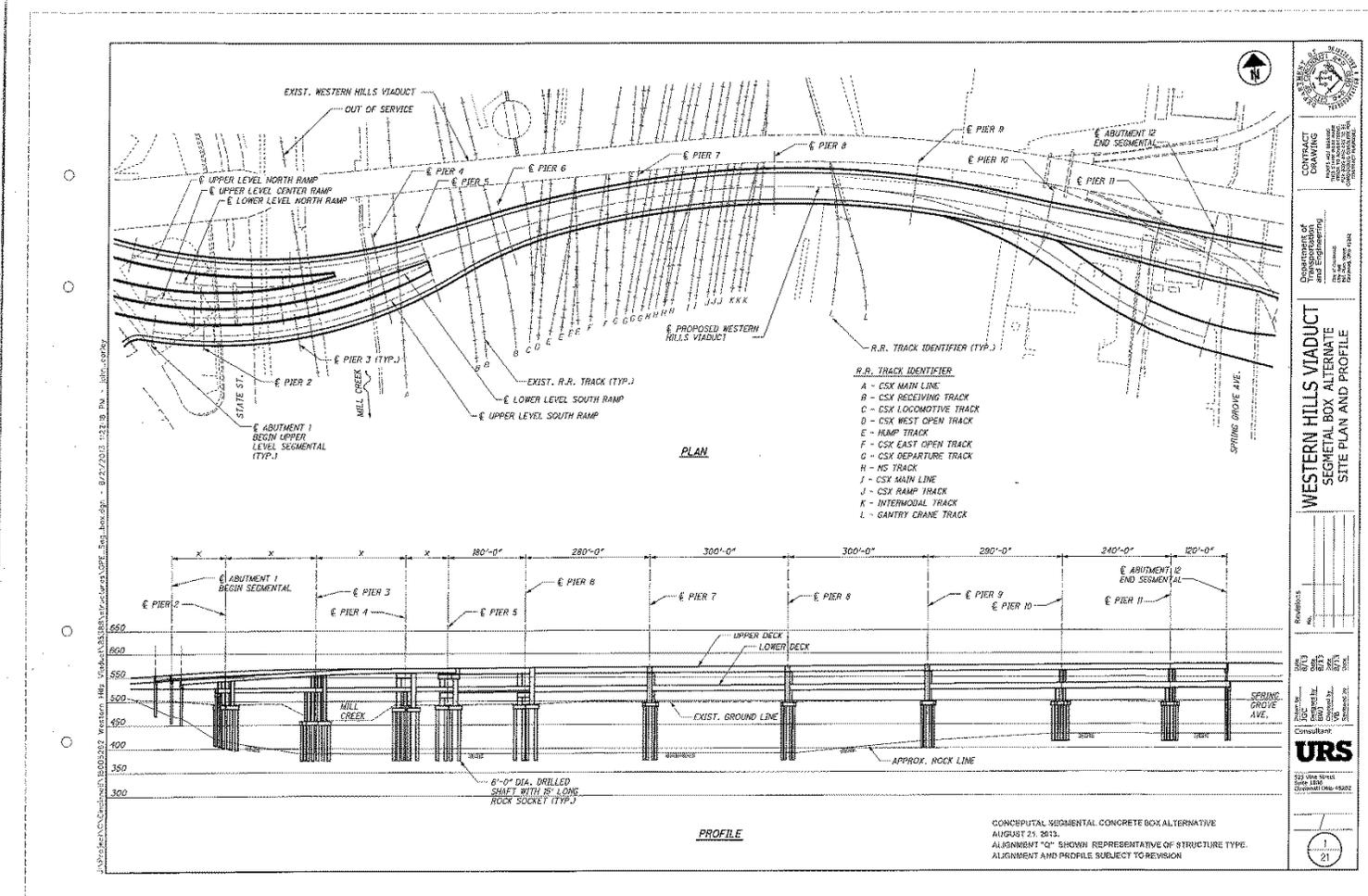
# Double Deck Bridge Properties

- **Will require less right of way.**
- **Upper deck is easier to construct and maintain.**
- **Bike/Pedestrians lanes on upper deck with local traffic only.**
- **Will require a taller structure.**
- **Bike/Pedestrians only cross Spring Grove Ramp unless in median**

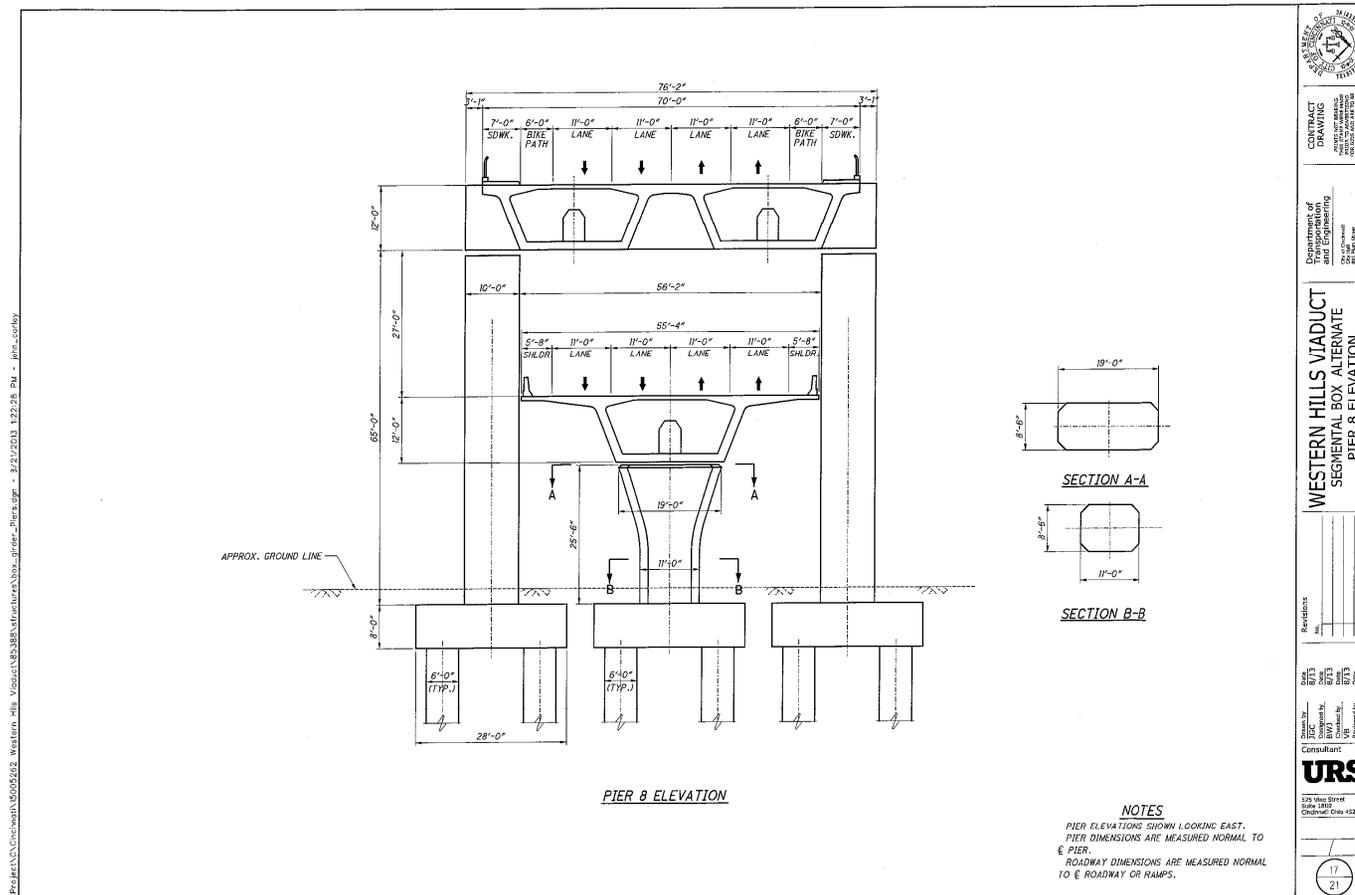
# Alternative for Further Study

- **The Southern Corridor has been identified for further study following this evaluation process.**
- **A large span double deck structure has been identified for further study following this evaluation process.**
- **Feasible alternatives and bridge configuration will be identified following further study.**

# Alternative for Further Study

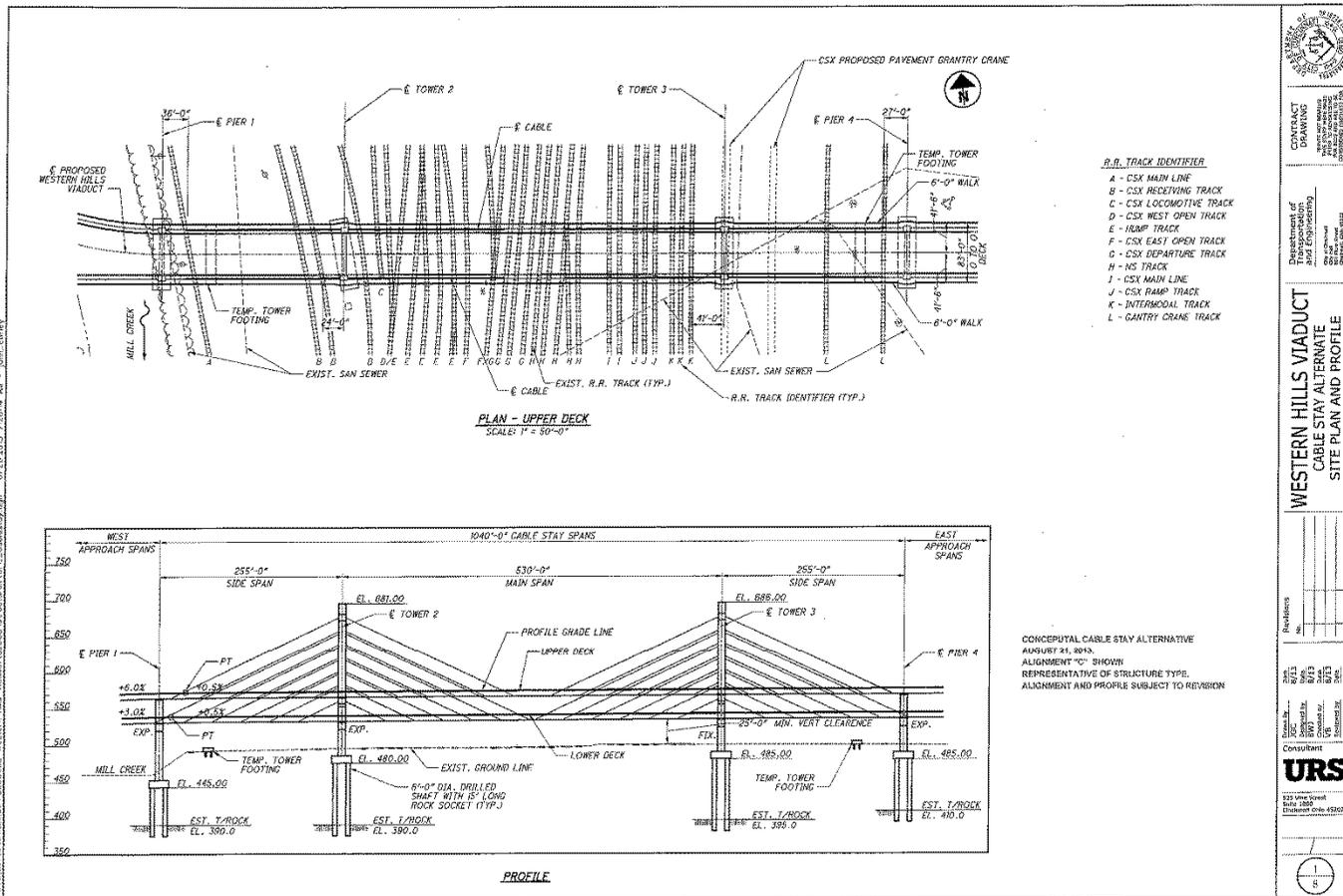


# Alternative for Further Study



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# Alternative for Further Study





# Funding

- Design is currently funded only through Preliminary Engineering using County bridge funds.
- \$4M for right-of-way acquisition previously secured by Hamilton County Engineer's Office through OKI. Second application for remaining \$6M needed was not awarded funding by OKI.
- A joint City/County application to ODOT Local Major Bridge Program has been submitted.
- TRAC application ordinance is in front of Council for approval to submit.
- Additional approx. \$8.5M needed for design unless Design/Build.
- Need approx. \$220M for construction (unknown future construction date).

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# Questions?



May 28, 2014

