

Welcome! Before we begin, please go to
www.menti.com and enter code **8285 9922**
or scan QR code:



***Session C5: Scoping Your Active
Transportation Plan for Success***

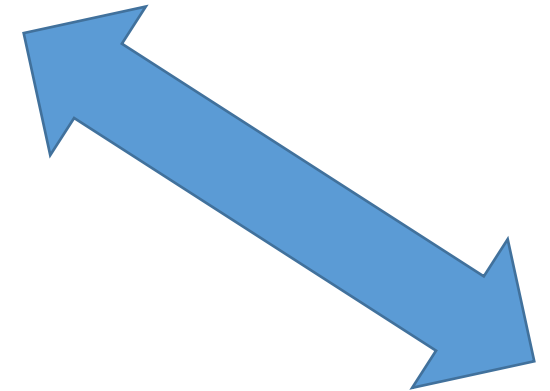
Matt Ludwig, AICP, PE, WEDG

N|V|5

Active Transportation Development Process



Destination

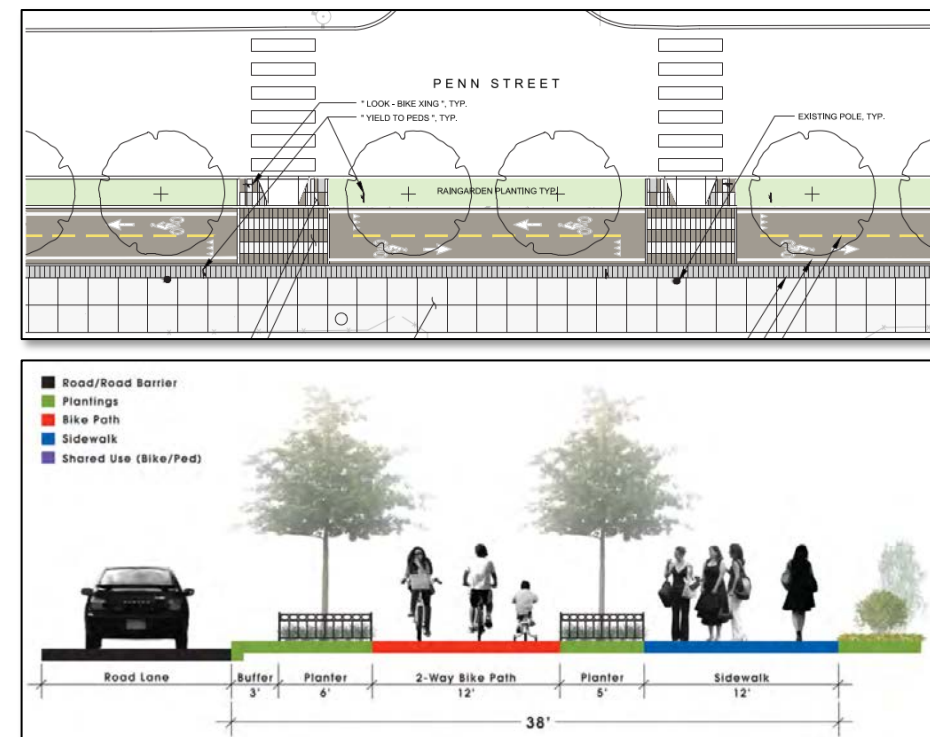
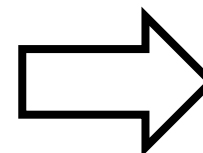


Destination

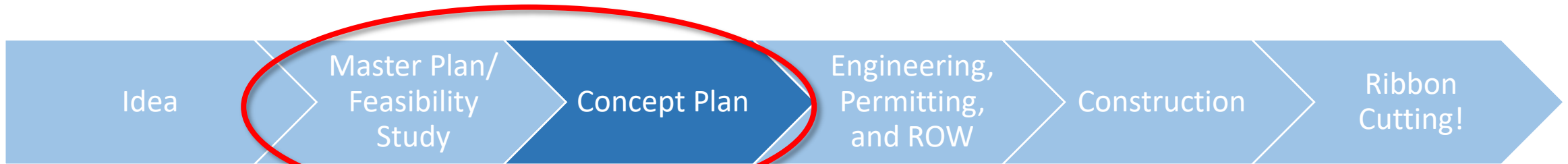
Active Transportation Development Process



MASTER PLAN FOR THE CENTRAL DELAWARE
TRANSFORMING PHILADELPHIA'S WATERFRONT



Active Transportation Development Process



Active Transportation Development Process

Idea

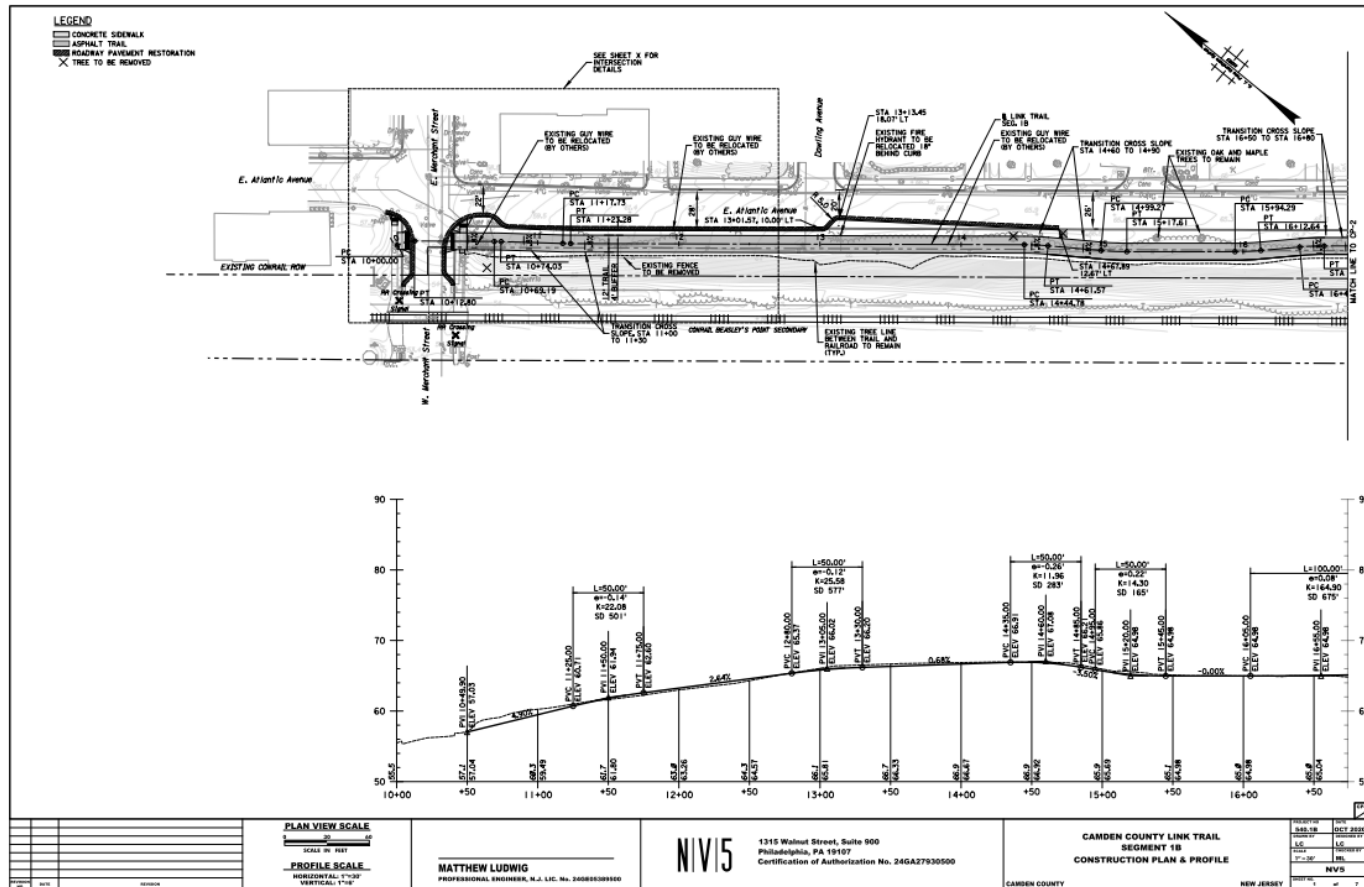
Master Plan/
Feasibility
Study

Concept Plan

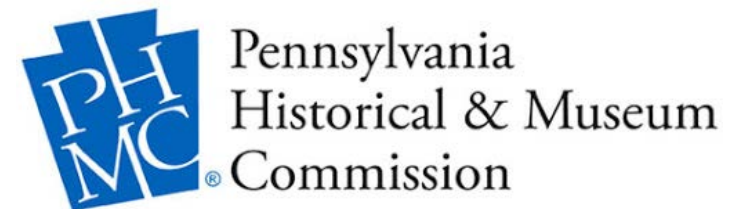
Engineering,
Permitting,
and ROW

Construction

Ribbon
Cutting!



**US Army Corps
of Engineers.**



Active Transportation Development Process

Idea

Master Plan/
Feasibility
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Active Transportation Development Process

Idea

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Scoping for success!

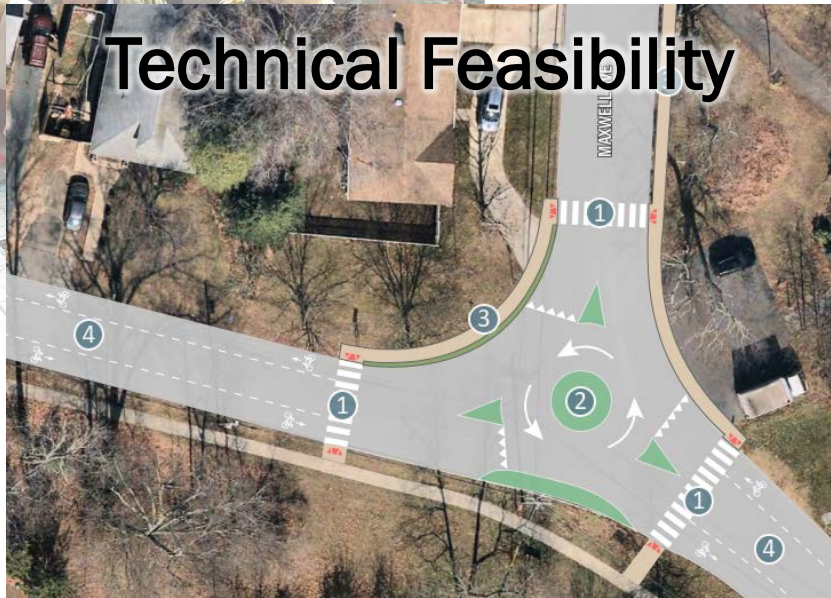


Proper investment in each phase makes the next phase easier!

Public Engagement



Technical Feasibility



Economic Benefits Study

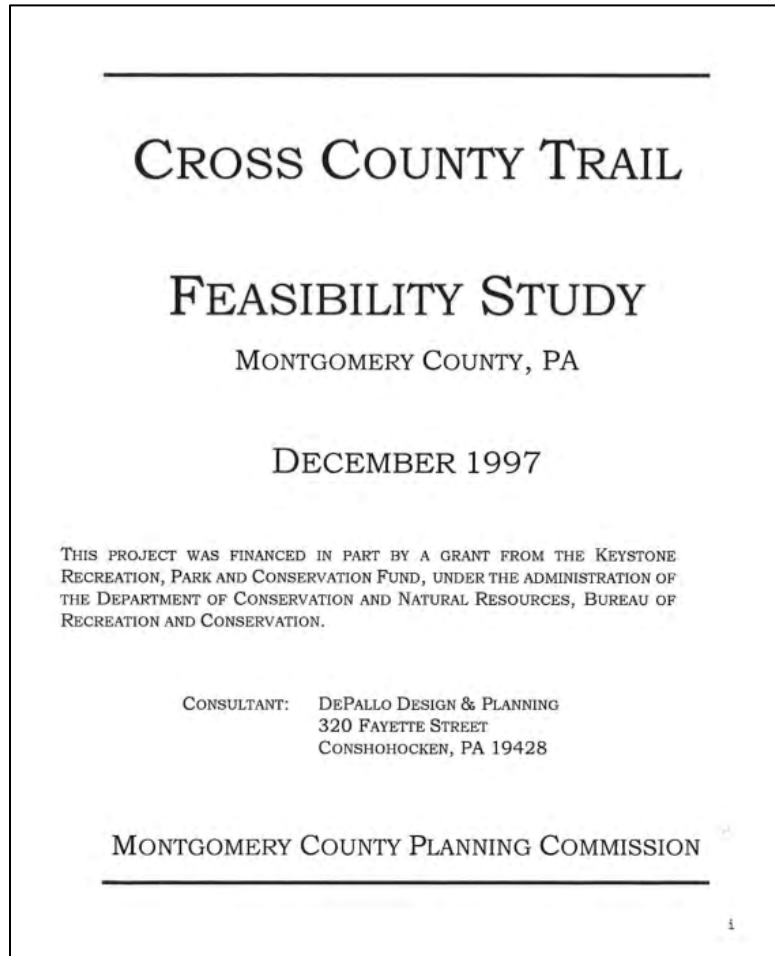


Accurate Cost Estimate



Consideration #1: Trail Routing

Cross County Trail, Montgomery County



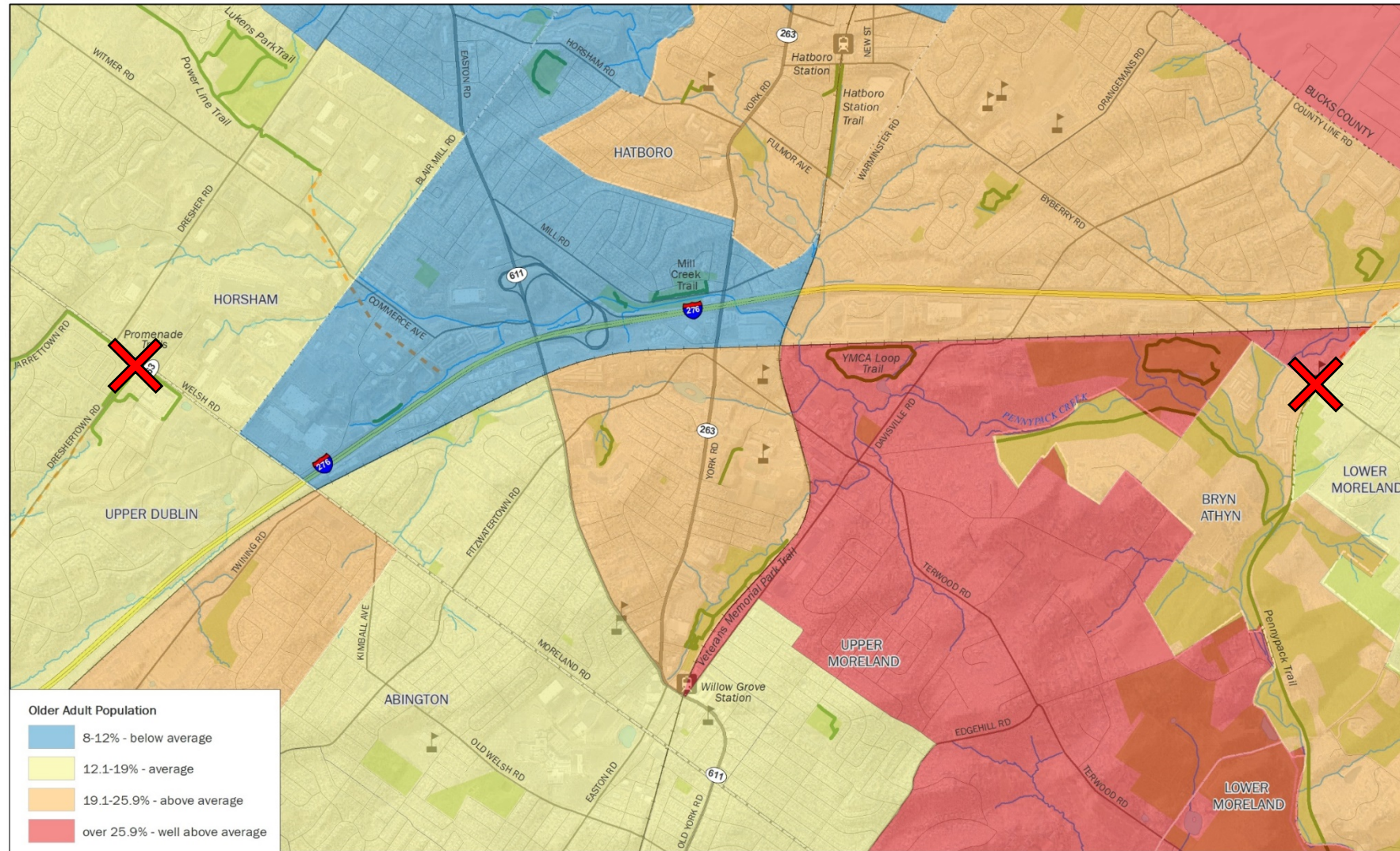
Consideration #1: Trail Routing

Cross County Trail, Montgomery County

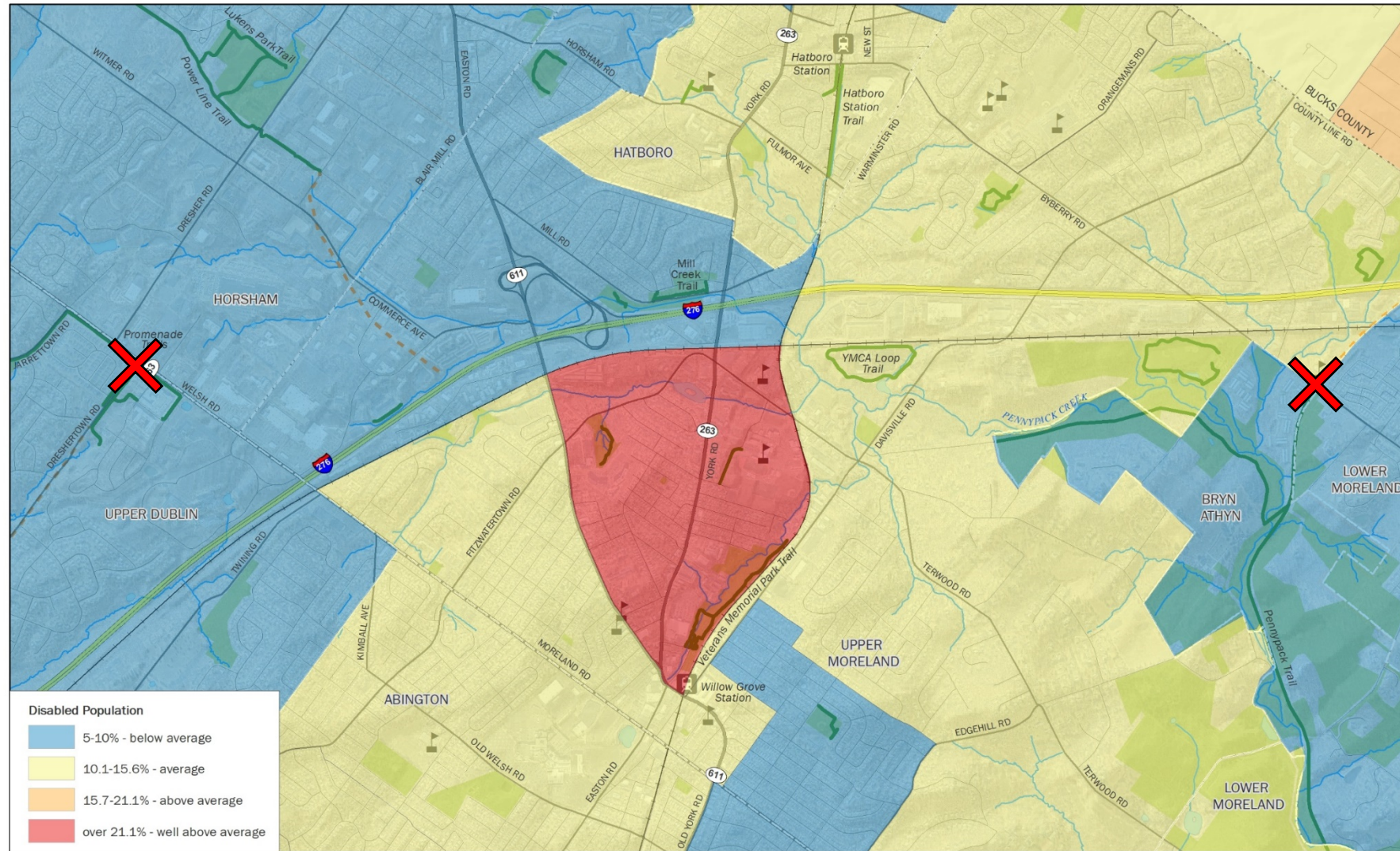
The New York Times

***Rival Railroads Agree on Conrail's
Assets***

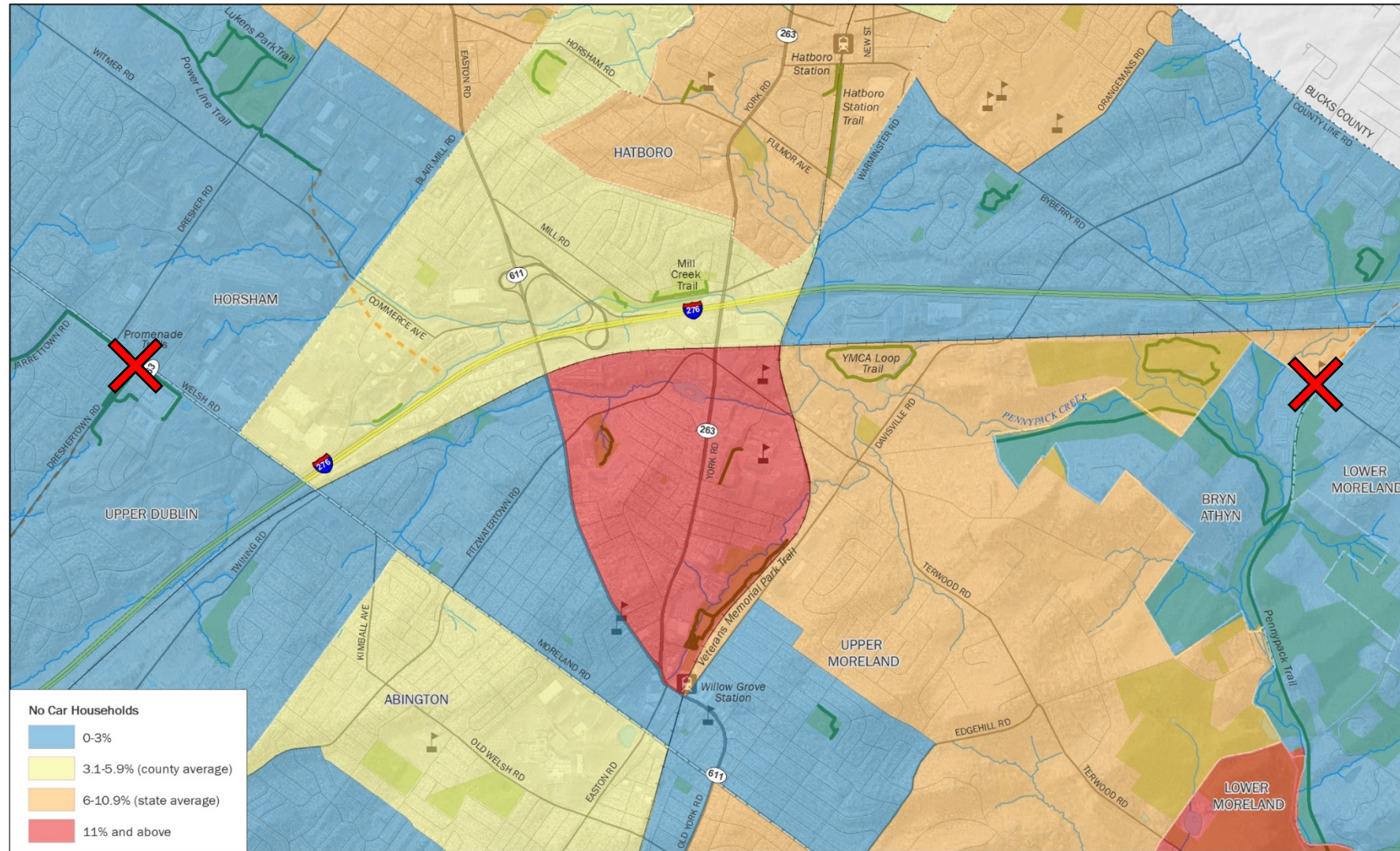
Consideration #1: Trail Routing



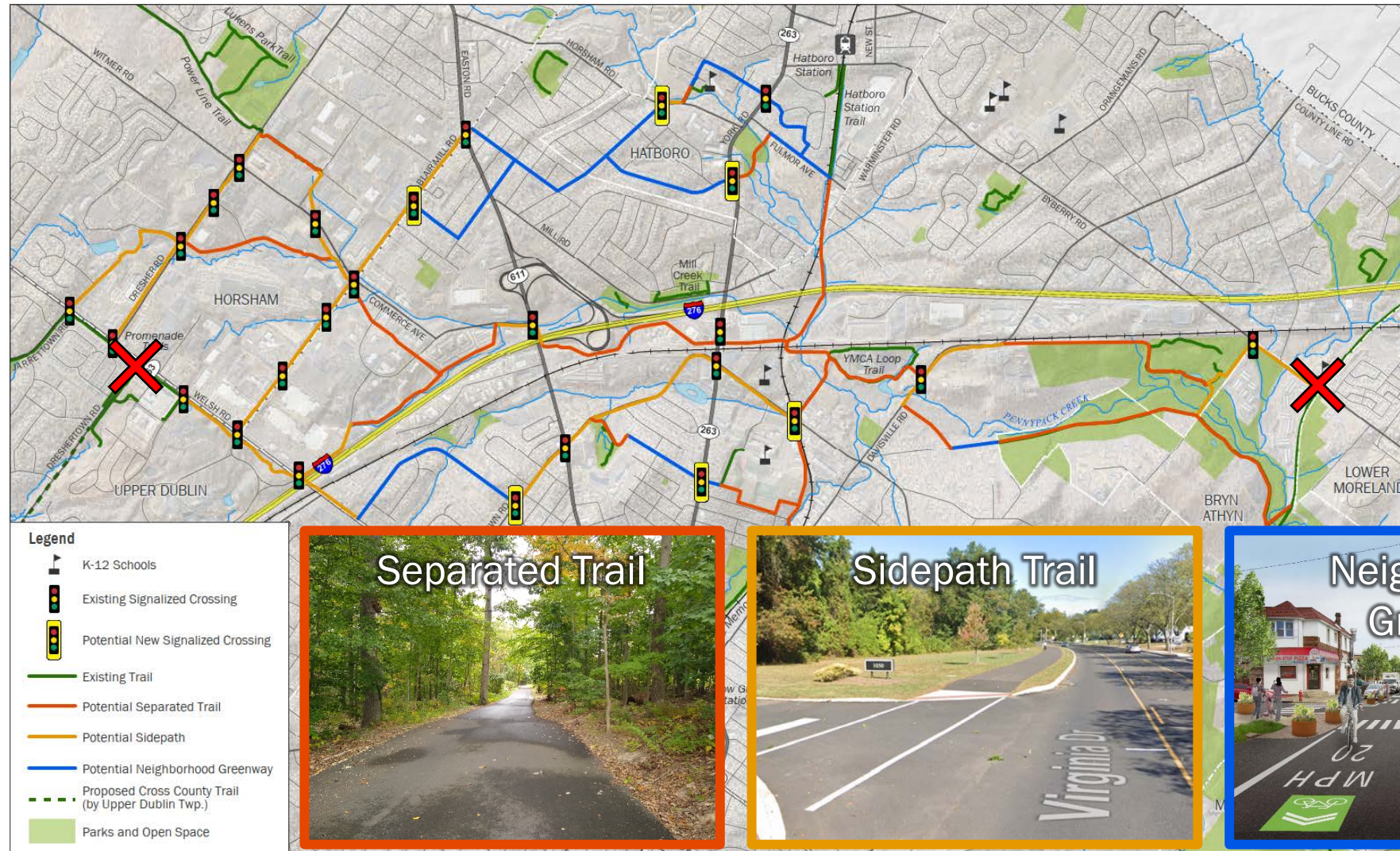
Consideration #1: Trail Routing



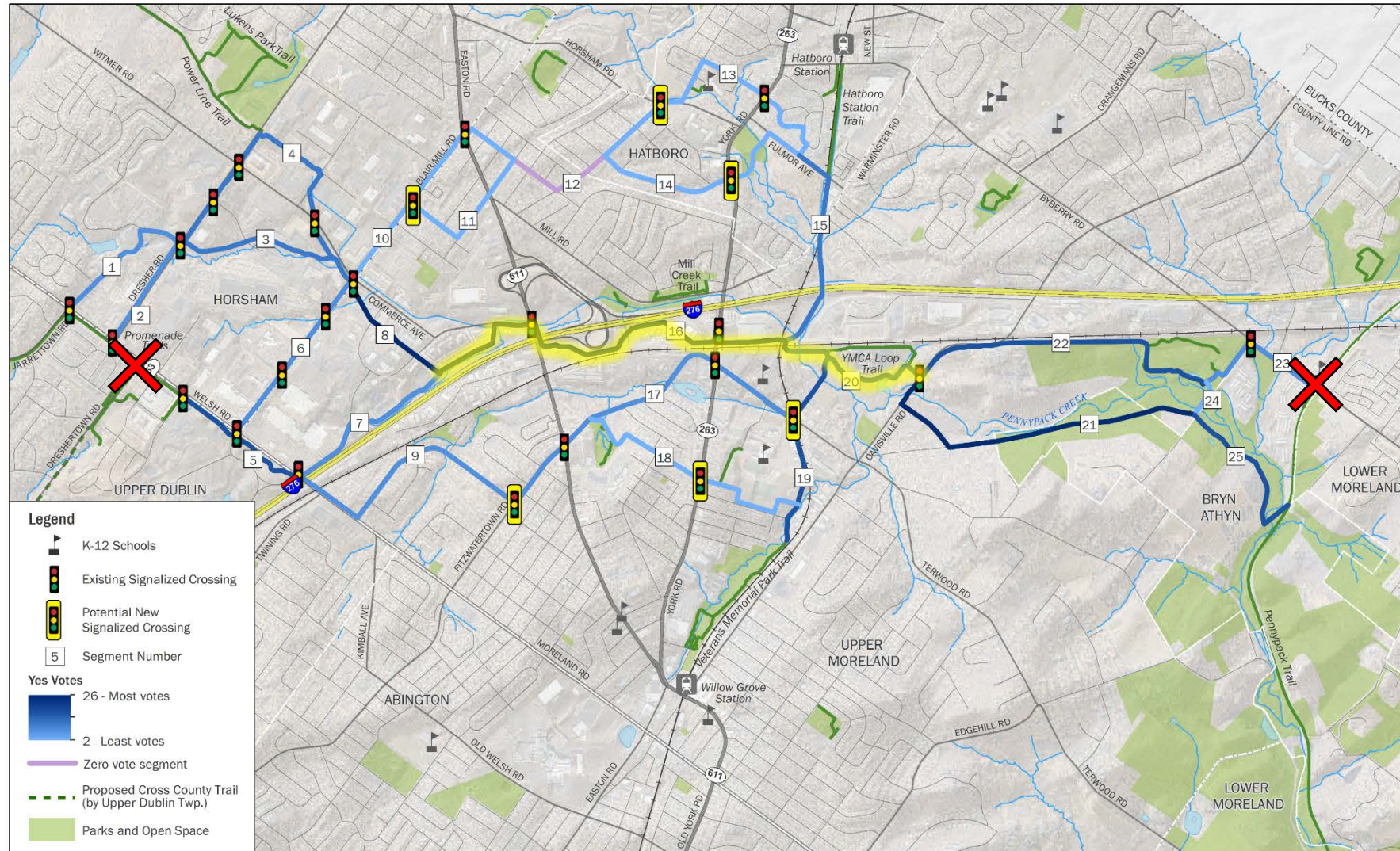
Consideration #1: Trail Routing



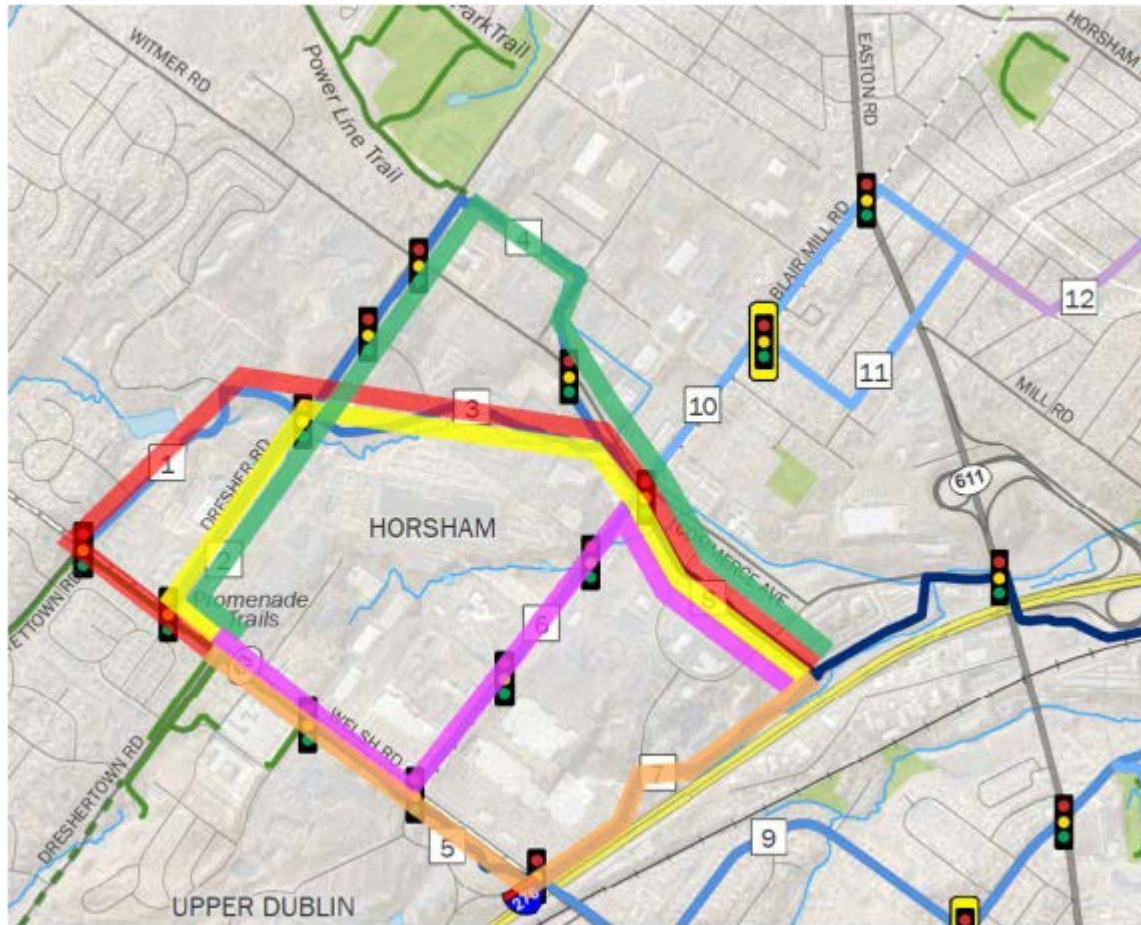
Consideration #1: Trail Routing



Consideration #1: Trail Routing

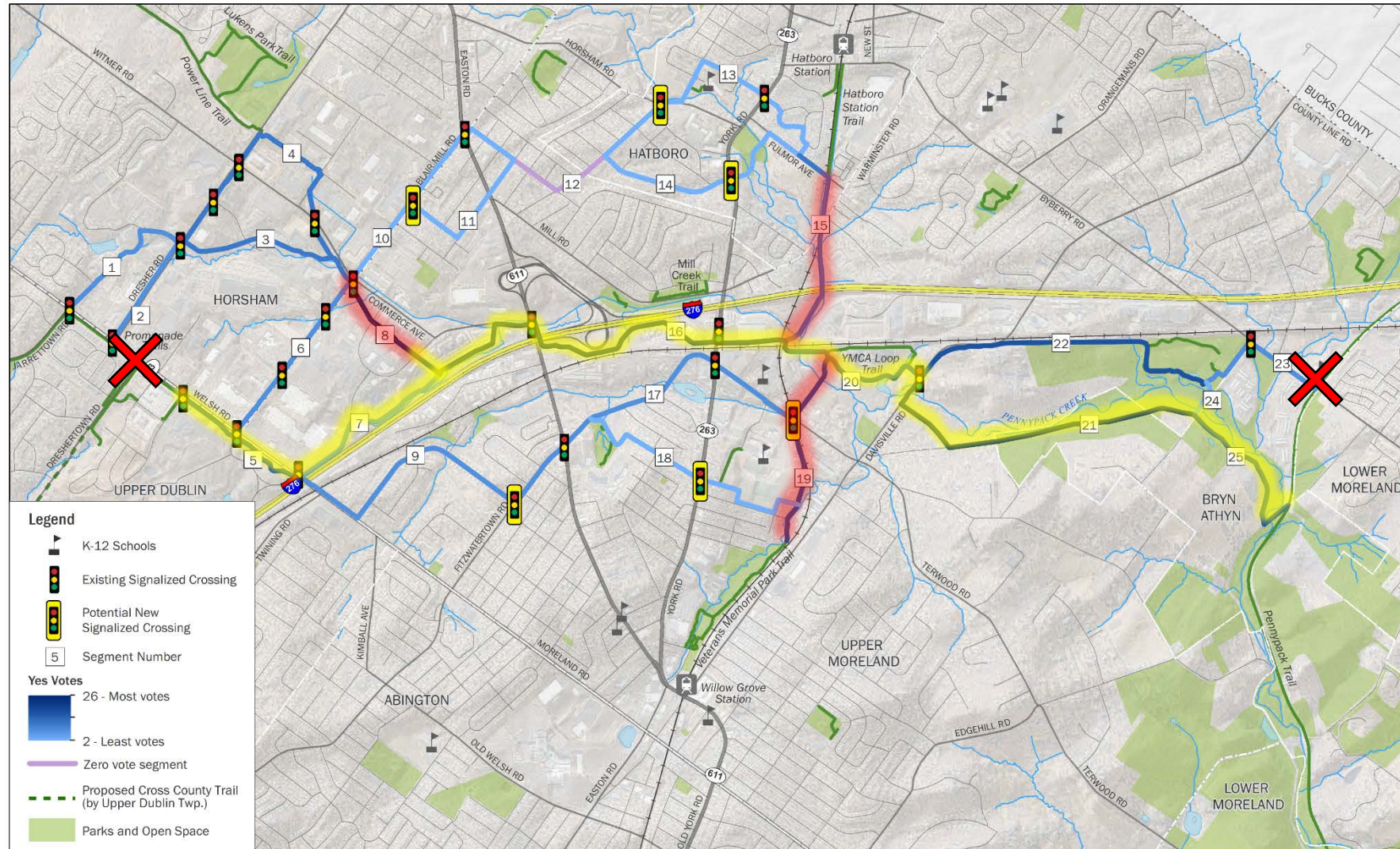


Consideration #1: Trail Routing



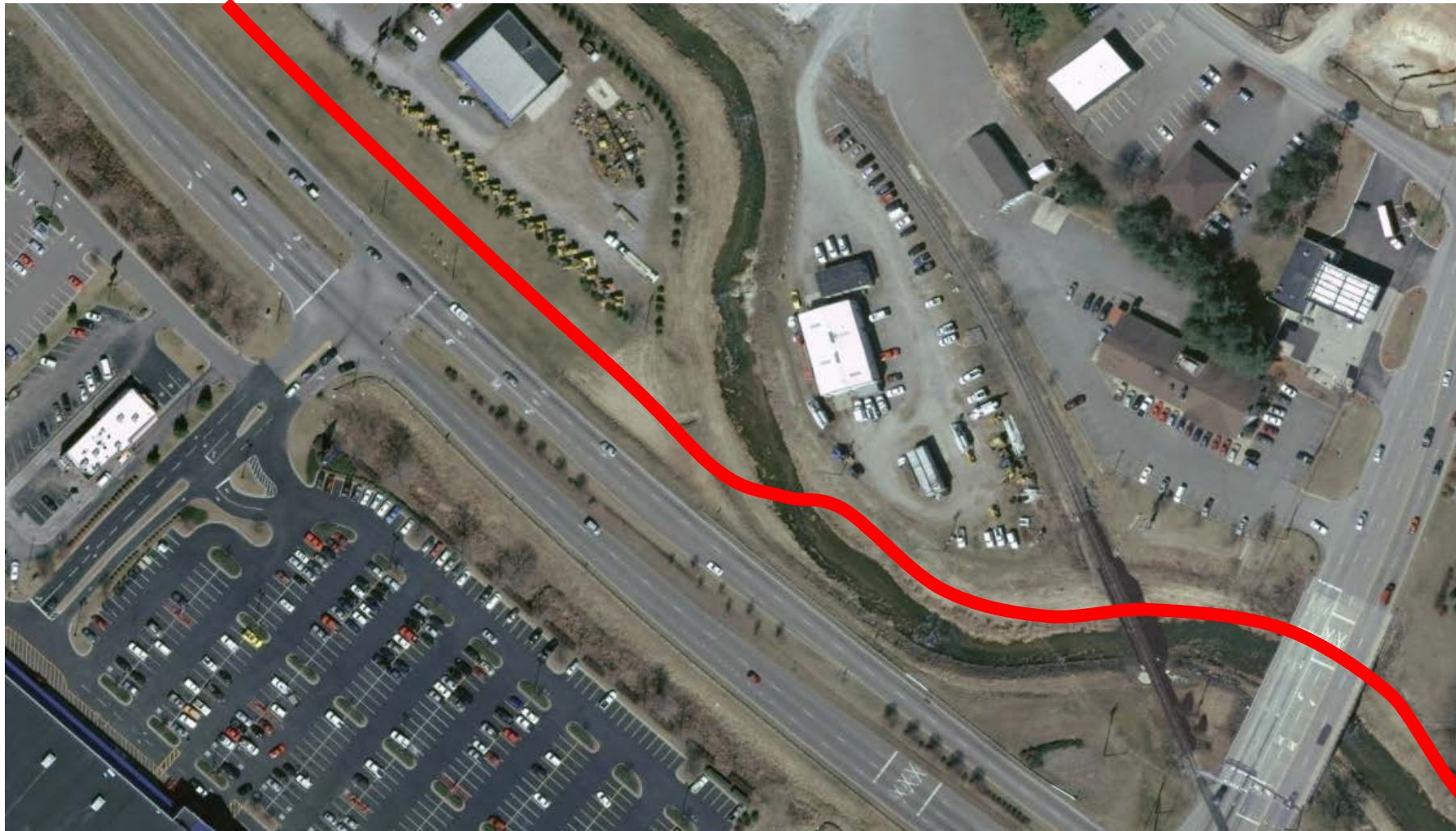
Route	Consists of Segments	Signalized Crossings	Driveway/non-signalized street crossings	Privately Owned Parcels Affected*	Separate Property Owners Affected*	Parcel Notes
Red	1, 3, 8	4	7	14	8	7 Workspace Property Parcels
Yellow	2, 3, 8	4	9	16	7	6 Workspace Property Parcels
Green	2, 4, 8	7	14	14	9	5 Workspace Property Parcels
Pink	5, 6, 8	4	8	10	9	
Orange	5, 7	4	2	9	6	One parcel already likely has easement (apartments)

Consideration #1: Trail Routing



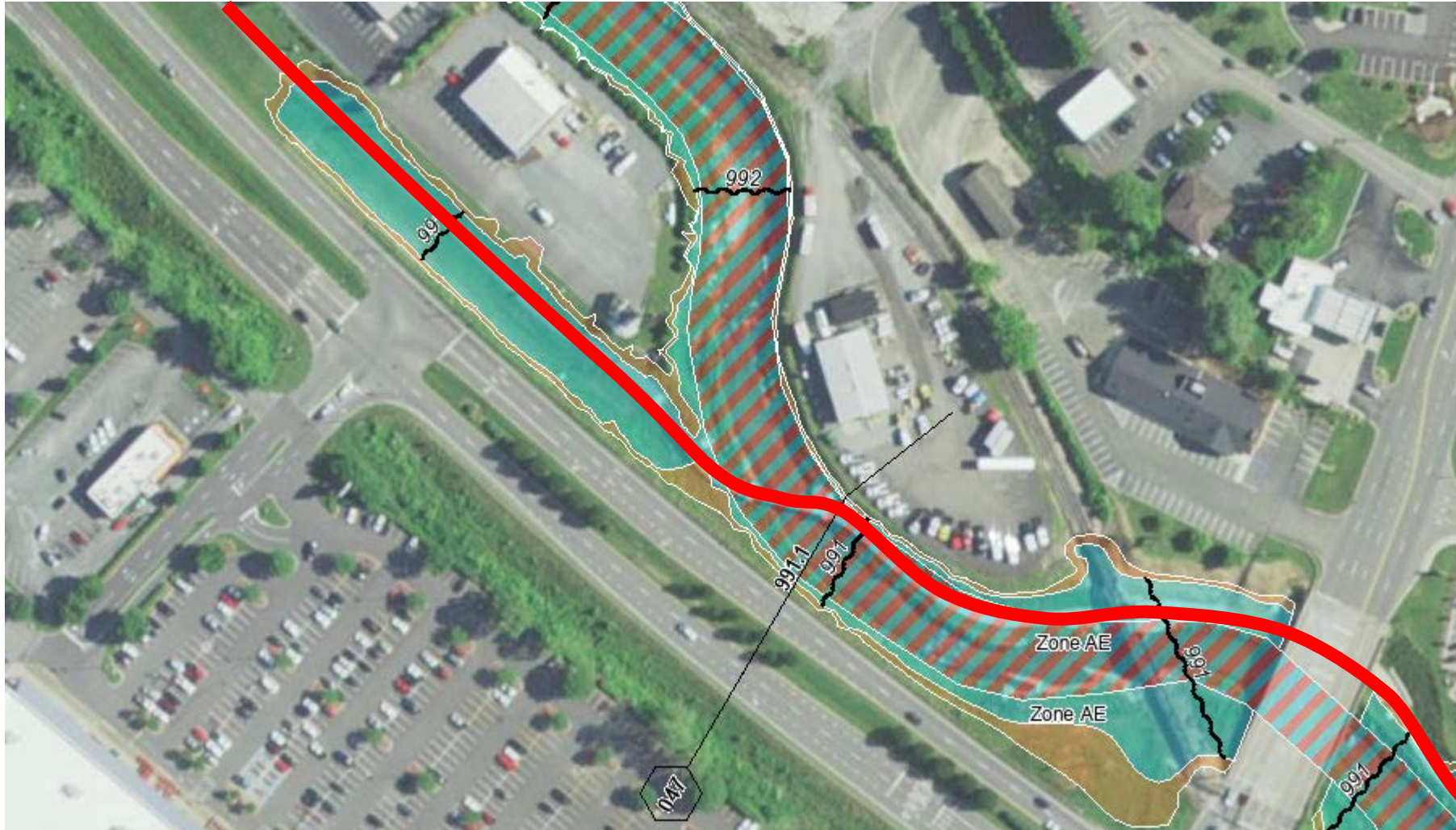
Consideration #2: Structure Identification

Bridge and Boardwalk Lengths



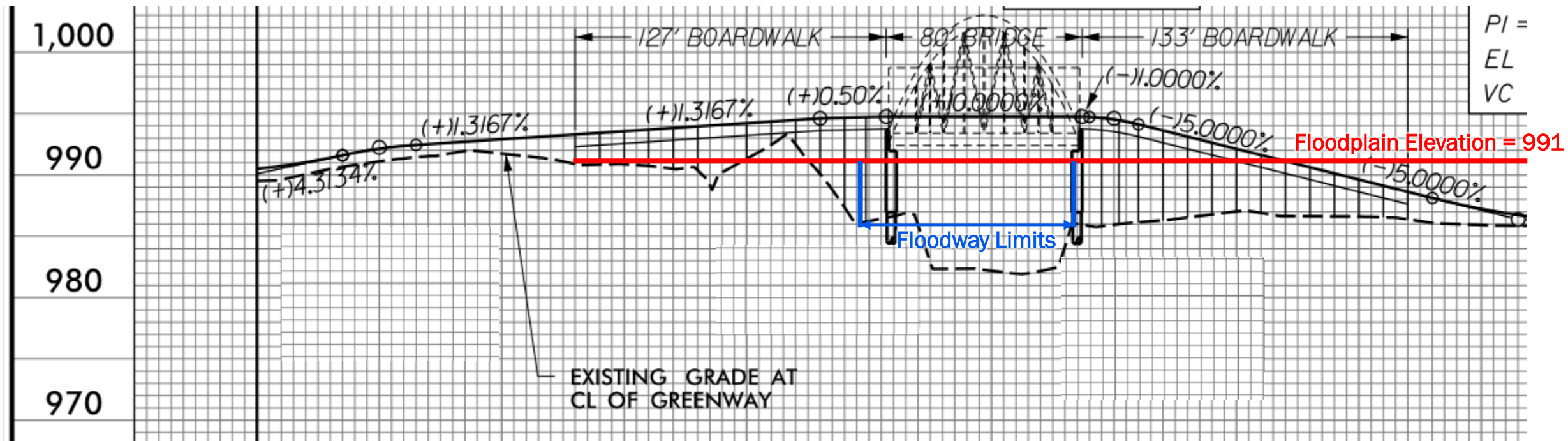
Consideration #2: Structure Identification

Bridge and Boardwalk Lengths



Consideration #2: Structure Identification

Bridge and Boardwalk Lengths



Consideration #2: Structure Identification



Consideration #2: Structure Identification



Consideration #2: Structure Identification



Consideration #2: Structure Identification



Consideration #3: Climate Change



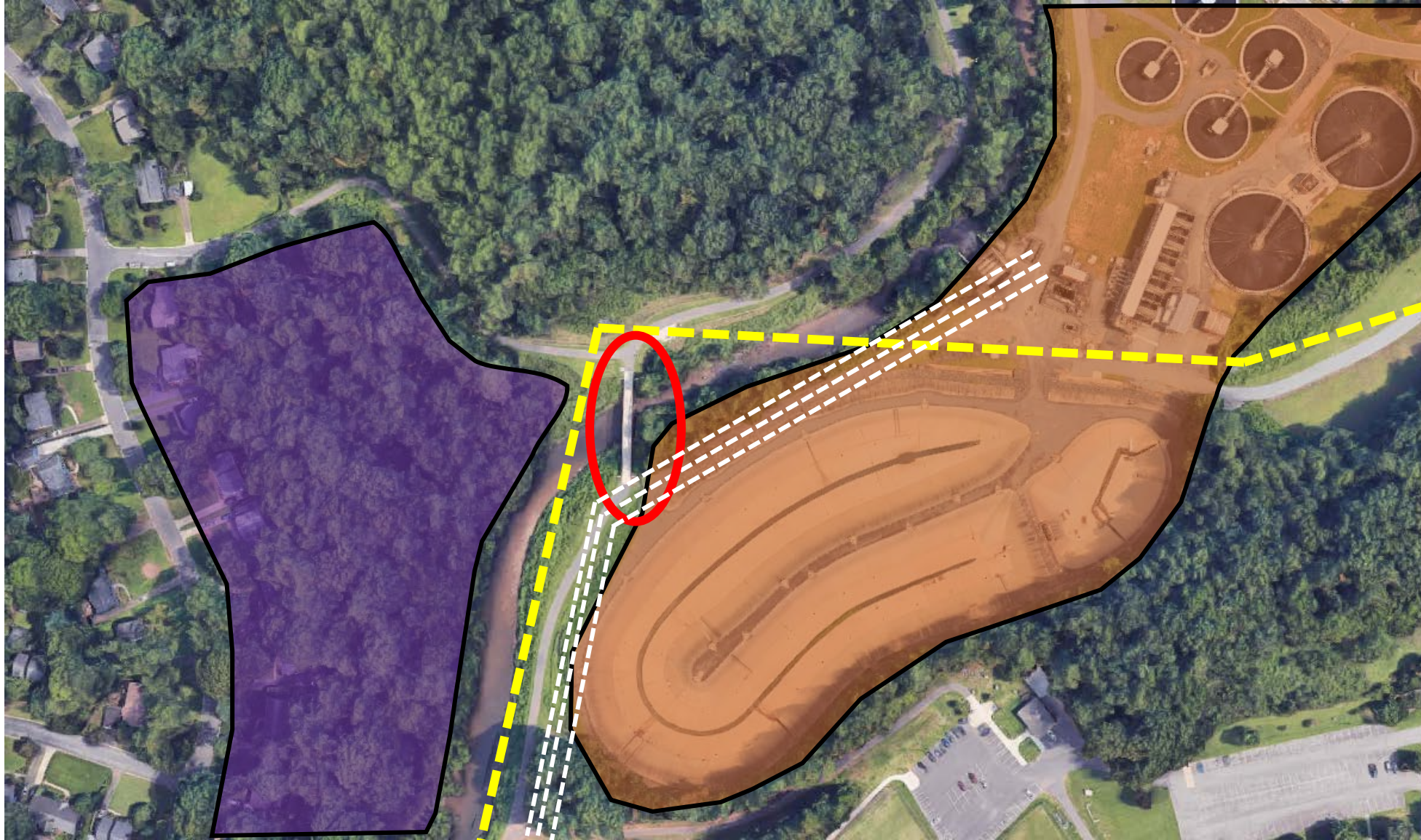
Consideration #3: Climate Change



Consideration #3: Climate Change



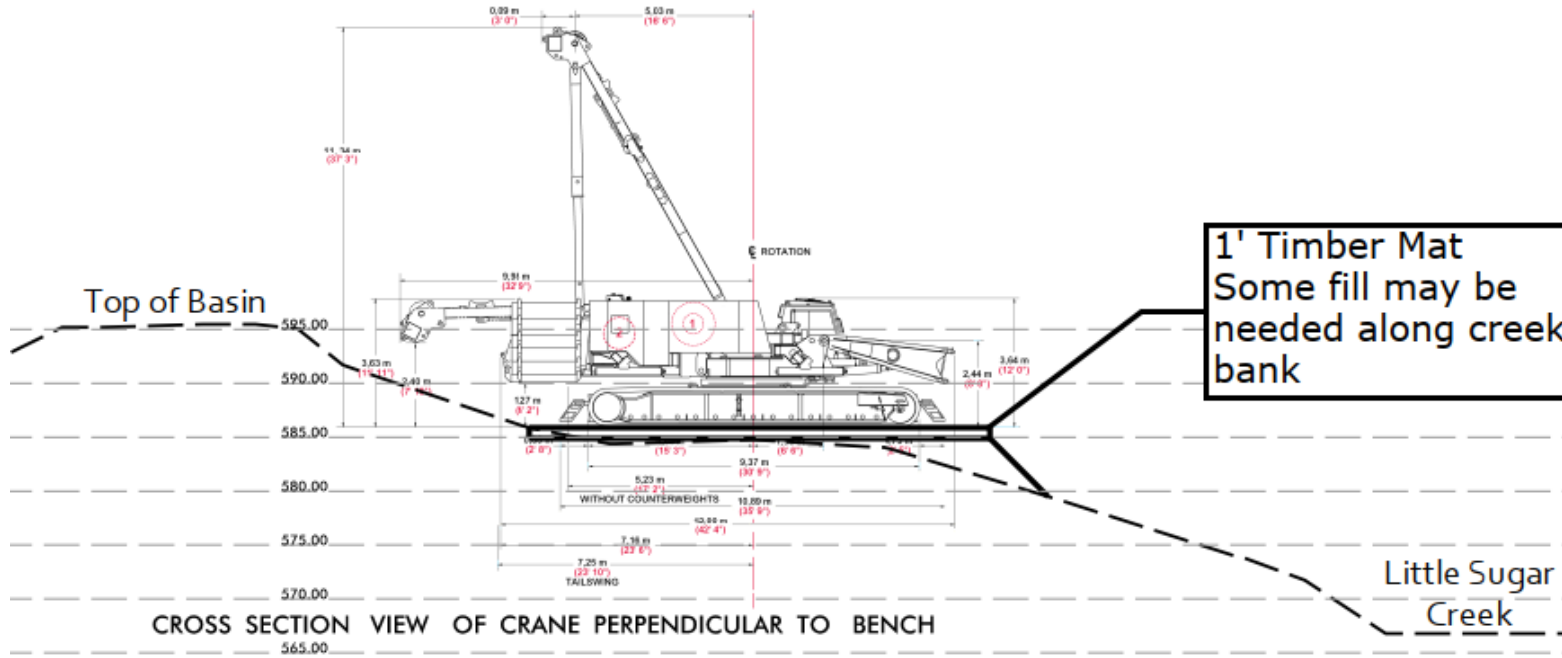
Consideration #4: Utilities and Constructability



Consideration #4: Utilities and Constructability



Consideration #4: Utilities and Constructability



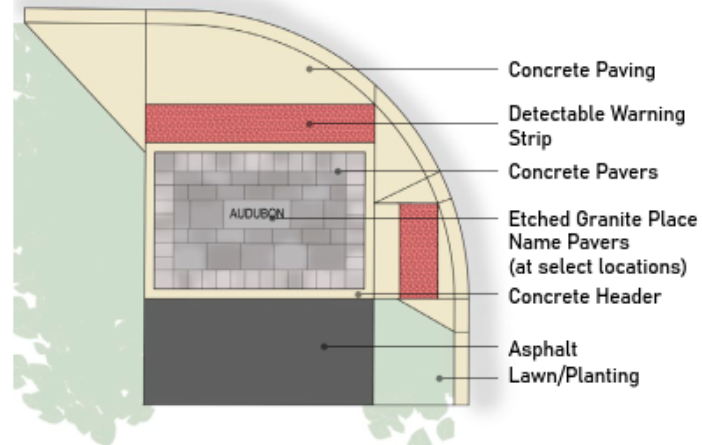
Pipe Data:		Truck Data:	
Pipe ϕ_{INNER} =	36 in.	Crawler Wt., Front =	225.8 k
Pipe ϕ_{OUTER} =	48 in.	Crawler Wt., Rear =	225.8 k
Pipe Class =	Class III	Crawler Spa. =	22 ft.
Pipe Depth =	9.5 ft.	L_{PAD} =	420 in.
		W_{PAD} =	420 in.
			Estimated Bridge lifting weight = 81.6k (from CONTECH) Est Crane wt = 370k (from Manitowac site) 1/2 load per crane crawler; distribute load to crane pad Assumed Pad = 35' x 35' (Conserv. Influence Area) Distribution of Live Load: AASHTO 3.6.1.2.6
IM =	0		Eq. 4.11 - Concrete Pipe Design Manual
Spread A =	44.50 ft.		Illustrations 4.12 & 4.13 - Concrete Pipe Design Manual
Spread B =	44.50 ft.		
Area _{SPREAD} =	1980.3 sq.ft.		
L_e =	49.75 ft.		L_e = effective supporting length of pipe, Concrete Pipe Design Manual Eq. 4.14
P =	451.60 k		Eq. 4.12 - Concrete Pipe Design Manual
W =	0.23 k/ft ²		Eq. 4.13 - Concrete Pipe Design Manual
W_1 =	40.59 k adjusted for crane load in place of lane load		
W_1 =	0.82 k/ft		Eq. 4.14 - Concrete Pipe Design Manual
Soil Load: (Assumes embankment fill)			
Prism Load =	$\gamma_s \left[H + \frac{D_o (4 - \pi)}{8} \right] D_o$		Eq. 4.2 - Concrete Pipe Design Manual
Y_1 =	120 pcf		
Prism Load =	4.77 k/ft		V.A.F. = Vertical Arching Factor
V.A.F. =	1.35 Assumes Type I Installation		Illustration 4.7- Concrete Pipe Design Manual
W_2 =	6.43 k/ft		Eq. 4.1 - Concrete Pipe Design Manual
Fluid Load:			
W_3 =	0.44 k/ft Assumes Pipe Flowing Full		
Bedding Factor:			
B_{FLL} =	2.2		Illustration 4.25
B_{FOD} =	4 Assumes Type I Installation		Illustration 4.22
D-Load:			
D-Load =	$\left[\left(\frac{W_F + W_{F'}}{B_f} \right) + \frac{W_L}{B_{LL}} \right] X \frac{F.S.}{D}$		Eq. 4.24 - Concrete Pipe Design Manual
D-Load =	0.6966 k/ft/ft	Pipe Is Satisfactory	Pipe Allowable Strength 1.35 k/ft/ft

Consideration #5: Placemaking & Standards

GUIDELINE 1 - CELEBRATING TOWN IDENTITY

Hardscape accents and site furniture selection create a continuous trail identity while respecting the diverse town and city environments. Etched "place name" pavers strengthen the relationship between trail and town

HARDSCAPE ACCENTS



At trail transition points, such as intersections, concrete pavers indicate a change. These concrete pavers serve as a sequential element throughout the trail. In select locations, etched "place name" pavers inform trail users of their location, especially when proximate to business districts

SITE FURNITURE



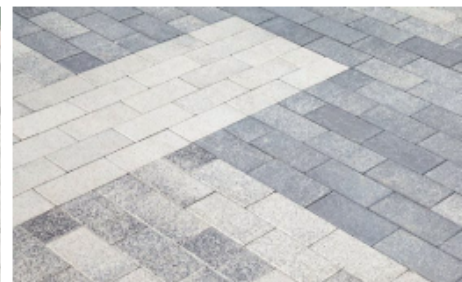
Site furniture form is traditional enough to blend into unique town environments, while wood provides warmth and material consistency throughout the trail



Plainwell bench and litter receptacle, Ring bike rack, all from Landscape Forms



Techobloc Westmount concrete paver



Unilock Umbriano concrete paver



Etched paving precedent



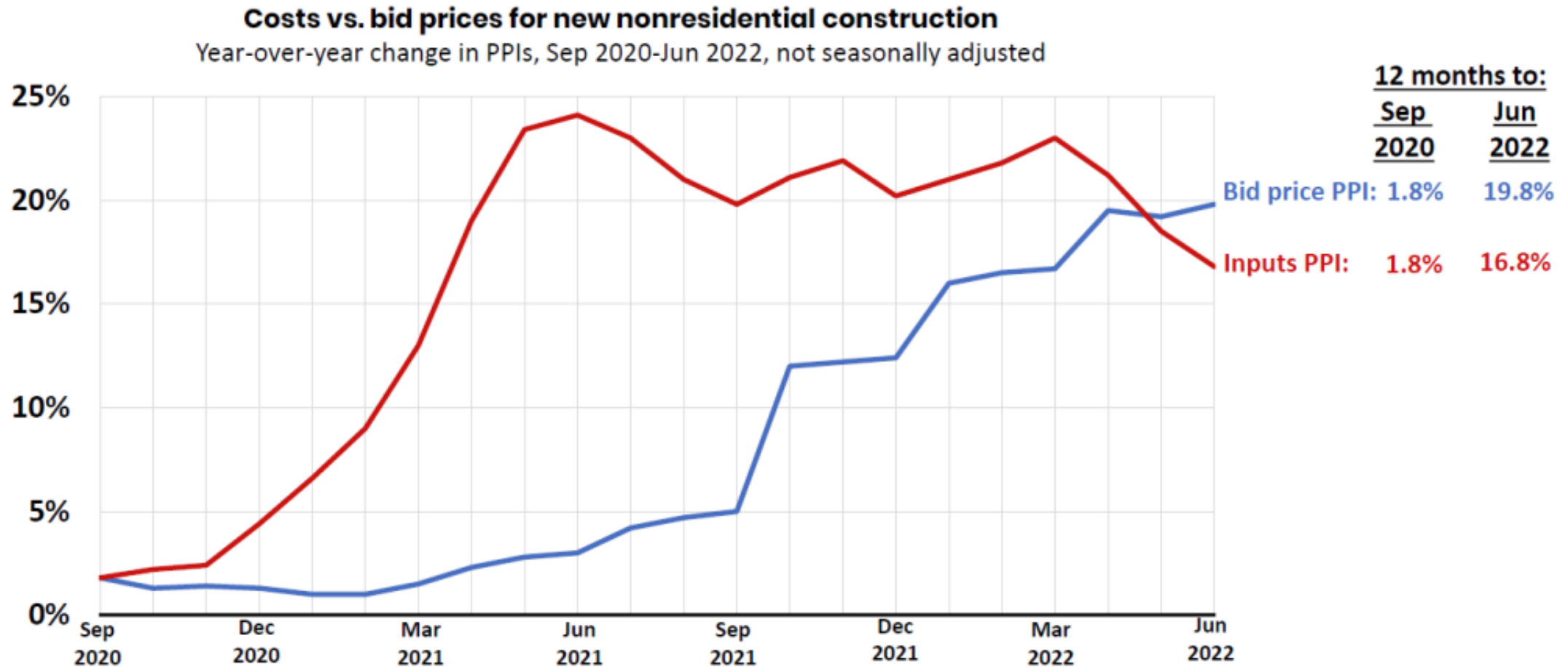
DESIGN
GUIDELINES
FOR
KEY
NODES

N|V|5

camden county
Making It Better, Together.

N|V|5

Accurate Cost Estimating



Source: Bureau of Labor Statistics, producer price indexes, www.bls.gov/ppi

What can be done?

- **Maximize project size**
- **Combine projects**
- **Consider source of funds**
- **Public-private partnerships**

Grants

Local

- Regional Trails Program (DVRPC)
- Transportation and Community Development Initiative (DVRPC)
- Non-Profits
- Counties
- Private Developers or Corporations

State (non-Federal)

- **Community Conservation Partnerships Program (DCNR)**
- Multimodal Transportation Fund (DCED)
- Multimodal Transportation Fund (PennDOT)
- Act 13 (DCED)
 - Greenways, Trails, & Rec
 - Watershed Restoration
 - Flood Mitigation
- Redevelopment Assistance Capital Program (RACP)

MPO/PennDOT (Federal)

- Transportation Alternatives Set-Aside (TASA)
- Congestion Mitigation and Air Quality (CMAQ)
- Safe Routes to School/Transit
- Highway Safety Improvement Program (HSIP)

IIJA Discretionary (Federal)

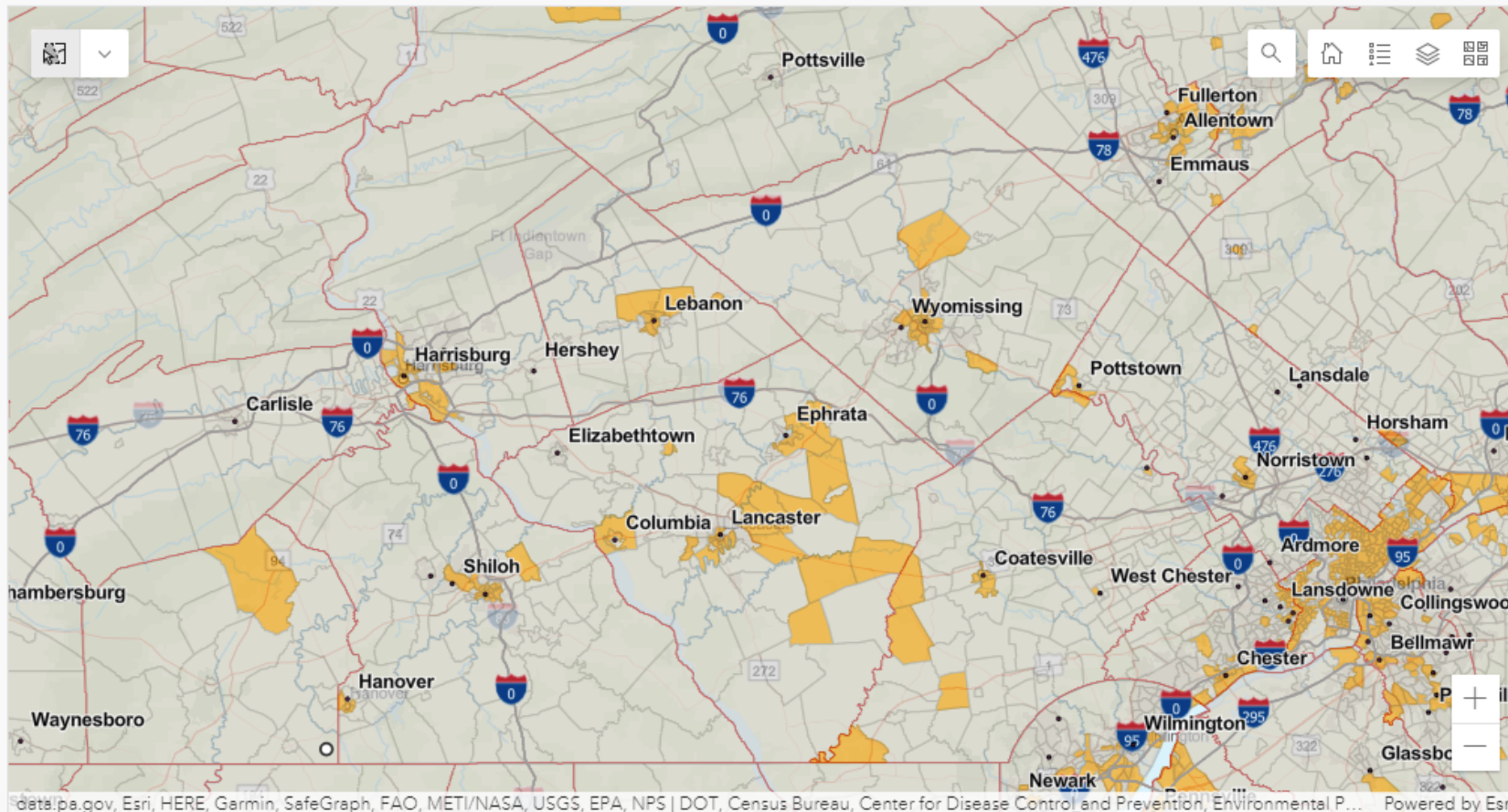
- RAISE (up to \$25m)
- Safe Streets and Roads for All (SS4A)

www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/funding_opportunities.pdf
www.build.gov

Federal Discretionary Grant Emphasis

SS4A Underserved Communities Census Tracts (Historically Disadvantaged Communities)

User Instructions: Select state of interest on the list on the right. Use the magnifying glass tool to search for an address, city or county. Use the +/- icons or mouse wheel to zoom into the map. Click and drag the map area to pan. Use the select tool on the left to select US Census tracts within your area of interest. Use the dropdown on the left to draw a circle, rectangle or lasso around



Consistent with OMB's Interim Guidance, DOT has developed a definition for highly disadvantaged communities using existing, publicly available data sets and where source data did not exist (Tribal lands,

Transportation Disadvantaged Tracts by State

Alabama:	601
Alaska:	33
American Samoa:	1
Arizona:	519
Arkansas:	357
California:	4168
Colorado:	208
Connecticut:	32
Delaware:	39

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