



# The BQE Triple-Cantilever Conundrum

Presented to:

**BQE  
EXPERT  
PANEL**

Presented by:

**Sam  
Schwartz**

**WXY**

As presented to the BQE Expert Panel for informational/background purposes only

<https://bqe-i278.com/en/expert-panel/documents>



# Today's Discussion | The Road Ahead

## 1. Our Perspective

- The Guiding Principles
- The Givens
- BQE physical conditions

## 2. Developing Options

- Alpha
- Beta
- Gamma

## 3. How Do We Get There?

- Congestion Pricing
- Regional Dispersion
- Local Diversions

## 4. Protecting the Community

- Reducing Traffic Demand
- Local Traffic Control Plan
- On-Site Real Time Monitoring
- Rapid Incident Detection and Response

# Our Perspective | The Guiding Principles

*“Insanity is doing the same thing over and over again and expecting different results”* – **Einstein**

*“Those who fail to learn from history are condemned to repeat it”*  
– **Churchill (Santayana)**

*“You can’t always get what you want”*  
– **The Rolling Stones**



# Our Perspective | The Guiding Principles

*“Insanity is doing the same thing over and over again and expecting different results”* – Einstein

*“Those who fail to learn from history are condemned to repeat it”*  
– Churchill (Santayana)

*“You can’t always get what you want”*  
– The Rolling Stones

*“Suffering should be creative, should give birth to something good and lovely.”*  
– Chinua Achebe, Nigerian novelist, author of *Things Fall Apart*

# Our Perspective | The Givens

1

BQE in desperate need of repair

2

Three-level cantilevered structure with a tight right-of-way

3

153,000 vehicles use the road daily

4

For construction, one roadway may have to be closed during phases

5

Heavy truck corridor

6

Only expressway through Brooklyn

7

Direct links to two bridges in this segment

8

Don't touch Brooklyn Bridge Park or Promenade, if possible



# Our Perspective | BQE in Distress

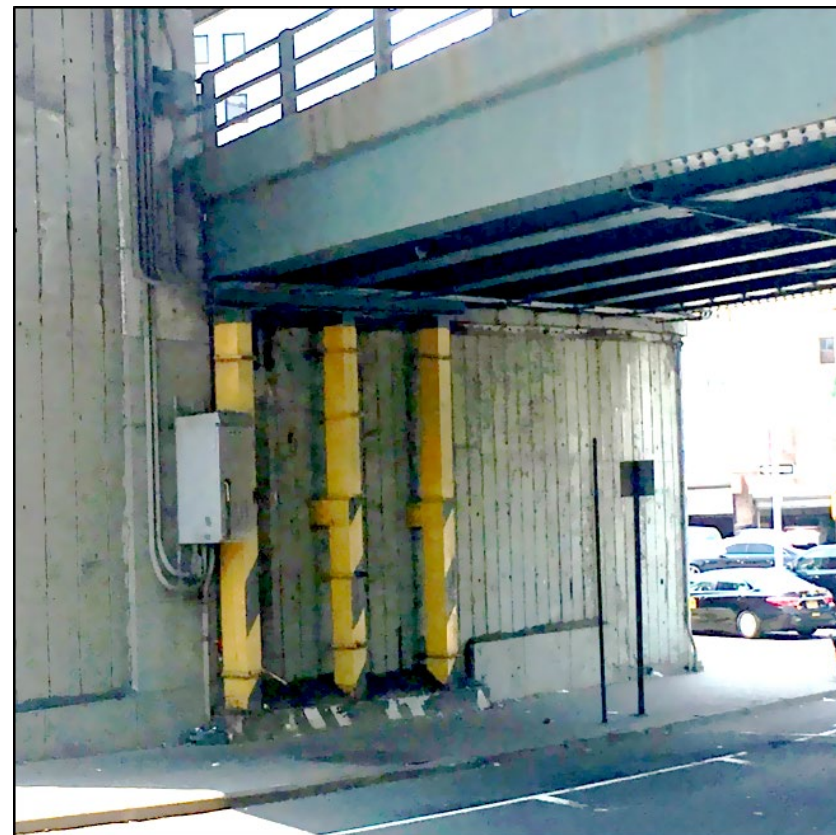
Spalling Concrete  
Corrosion  
Deteriorated Joints



Exposed Reinforcing Bars  
Guard Rails Unsupported  
Walls Weakened



Wood Shoring Structure



Multiple Deck Patches



**I am worried.**  
**I've seen this before**



## Falling concrete smashes car, kills driver



**A 500-POUND CHUNK OF CONCRETE** fell from the underside of the FDR Drive and smashed into a car (above) last night, killing the driver. Traffic Commissioner Ross Sandler ordered an emergency inspection (right) after the 3-by-9-foot slab fell from northbound roadway near 23d St. at 9:30 p.m. Car's driver, whose name was not released, was taken to Bellevue Hospital, where he died of head injuries. Transportation Department officials said slab probably was loosened by water damage. Roadway above the collapse site apparently had been patched several times. **ALAN AARONSON** DAILY NEWS



"All the News  
That's Fit to Print"

# The New York Times

LATE CITY EDITION

Weather: Scattered thundershowers  
today, tonight; chance of rain tomor-  
row. Temperature range: today 70-79;  
yesterday 66-81. Details on page 38.

VOL. CXXX... No. 44,985

Copyright © 1981 The New York Times

NEW YORK, SATURDAY, JUNE 20, 1981

30 cents beyond 50-mile zone from New York City.  
Higher in all delivery cities.

25 CENTS

## Cave-In on F.D.R. Drive







**West Side Highway Collapse**

December 15, 1973



METRO

# Collapse at Brooklyn Bridge injures 5 people

By Matt McNulty

July 2, 2014 | 9:48pm



The scene where a wall collapsed on Prospect Street at Washington Street in Brooklyn

Christopher Sadowski



# Our Perspective | Not Just Ancient History – 2019 Failures

## Tennessee

I-75 Bridge collapses  
3 days after report of  
falling concrete

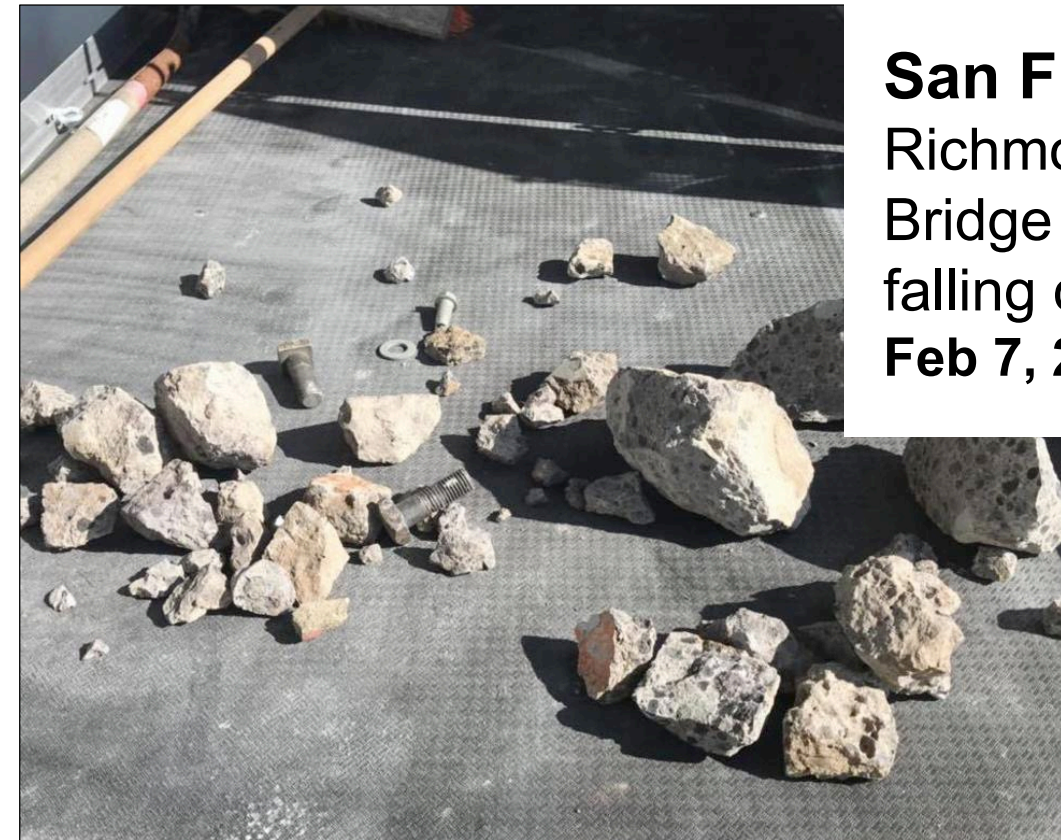
Apr 1, 2019



## San Francisco

Richmond-San Rafael  
Bridge closed due to  
falling concrete

Feb 7, 2019



## Chicago

Lake Shore Drive  
Bridge Closed  
“Scary Crack”

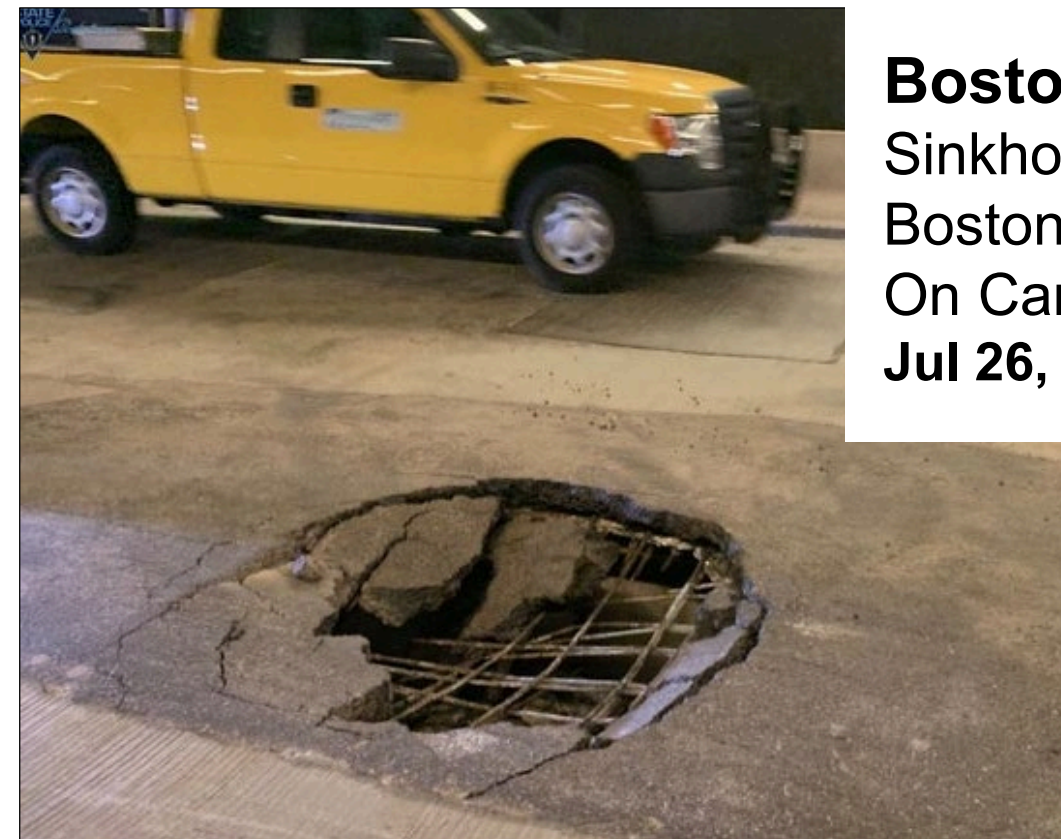
Feb 12, 2019



## Boston:

Sinkhole On I-90 In  
Boston Wreaks Havoc  
On Cars

Jul 26, 2019





# Our Perspective | Response Sequence as a Road Structure Deteriorates\* (An Example)

1. Heavy trucks removed > 20 tons
2. All trucks removed > 5 tons
3. All traffic removed > 5k lbs.
4. Lane closure(s)
5. Complete Closure

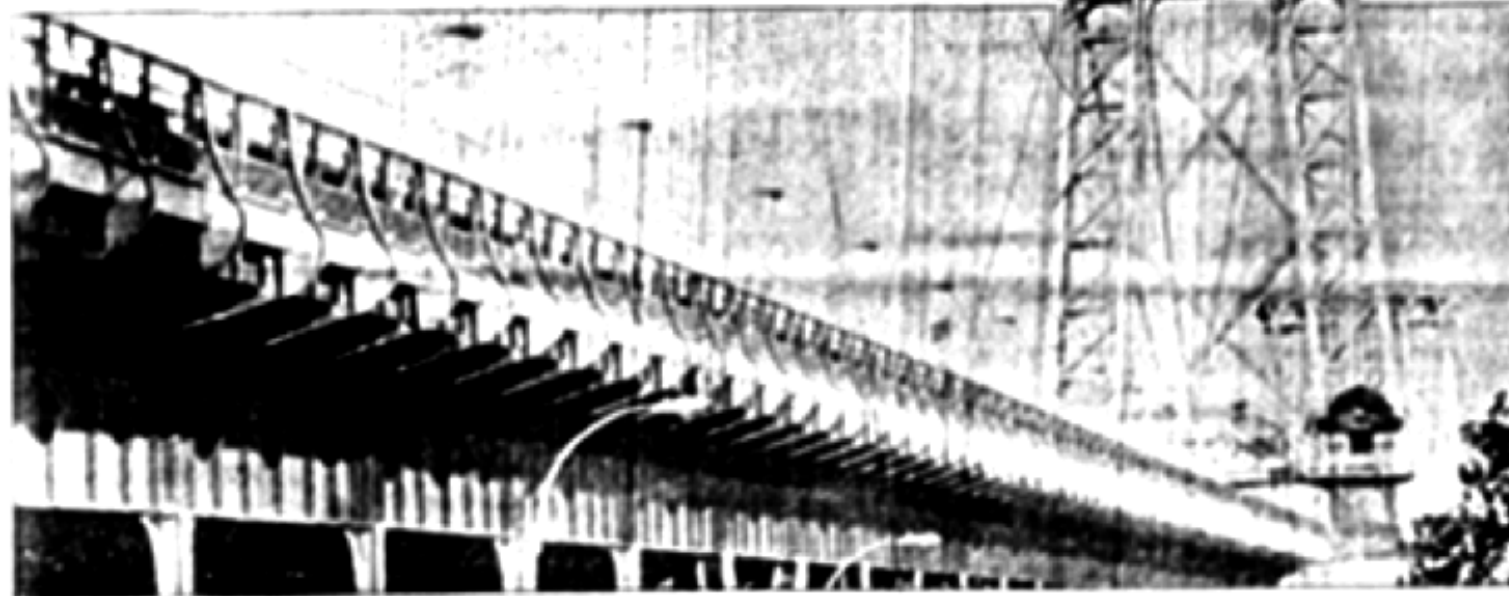


\* Barring a failure





# CLOSED!



## ***Crumbling W'burg bridge shuts — maybe forever***

By TIMOTHY McDARRAN and MARGIE FEINBERG

The Williamsburg Bridge was closed last night — perhaps forever. The decision to ban traffic from the crumbling 65-year-old span indefinitely came last night after inspectors found "holes you could crawl through" in support beams, a source told The Post. Only pedestrian and bicycle traffic will be permitted on the bridge.

Continued on Page 3

GUIDE TO GETTING IN & OUT: PAGE 3

Our point:

**Make a Decision ASAP**

**Advance EIS + Design Process Now**

# Developing Options

## **Our Assumption: Two lanes each direction adequate at -15%**

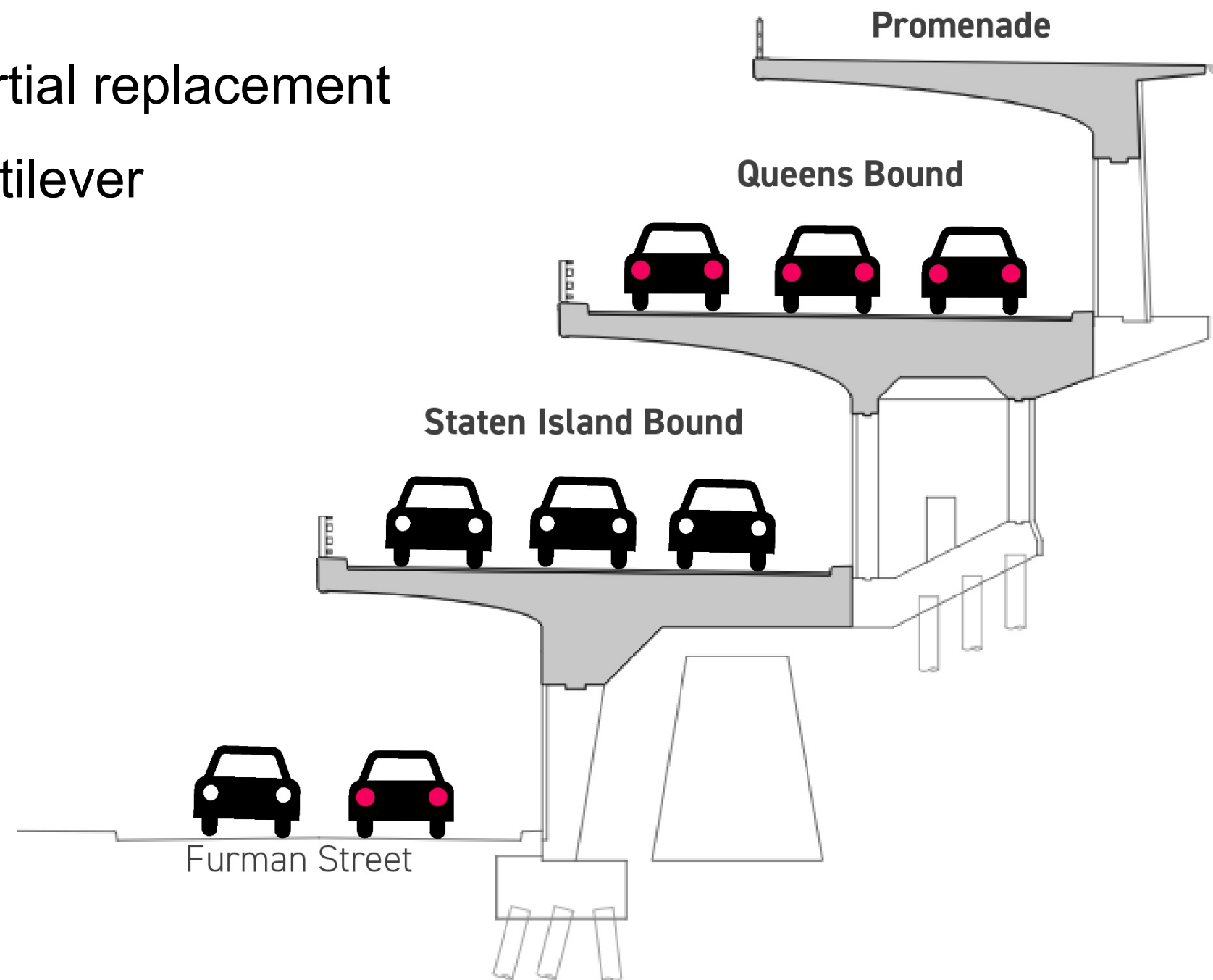
- Congestion Pricing ~10%
- Regional Dispersion/Traffic Disappearance ~5-15%
- Making Brooklyn Battery Tunnel More Attractive ~2-5%
- Small Commercial Vehicles on Belt Parkway ~1-2%
- More...

# Options Considered

**Alpha:** Full Replacement

**Beta:** Partial Rehabilitation, Partial replacement

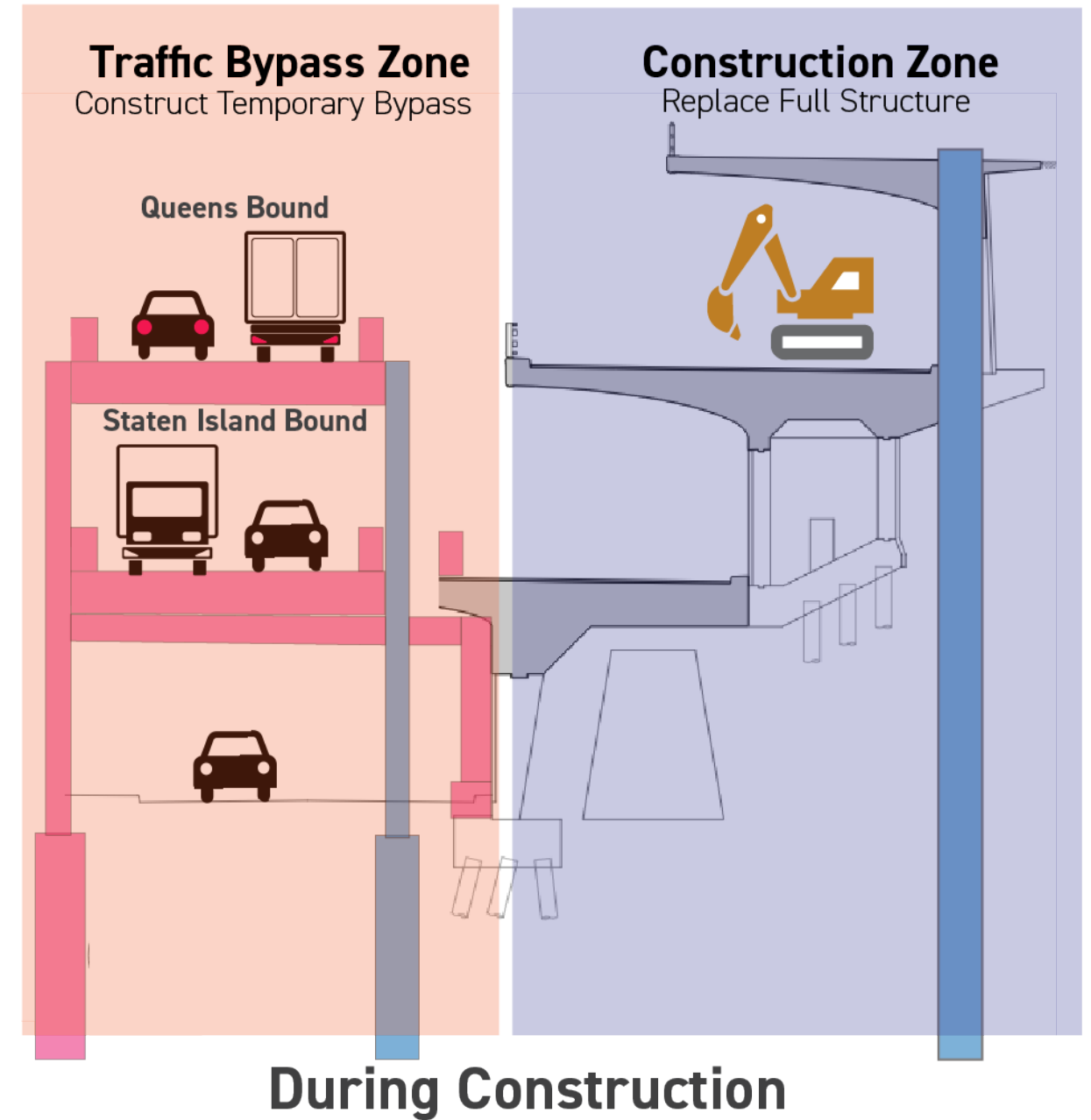
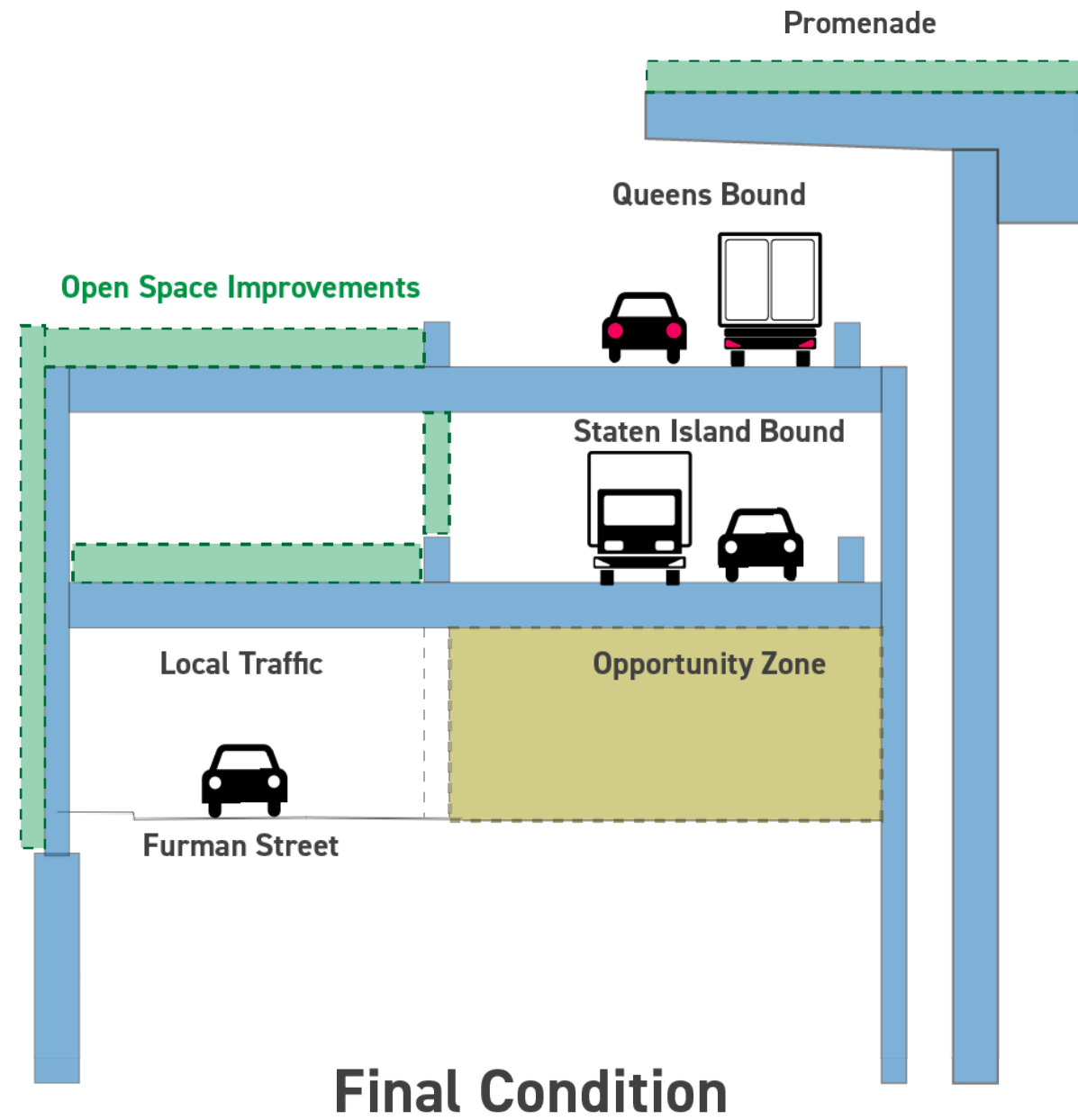
**Gamma:** Rebuilding Triple-Cantilever



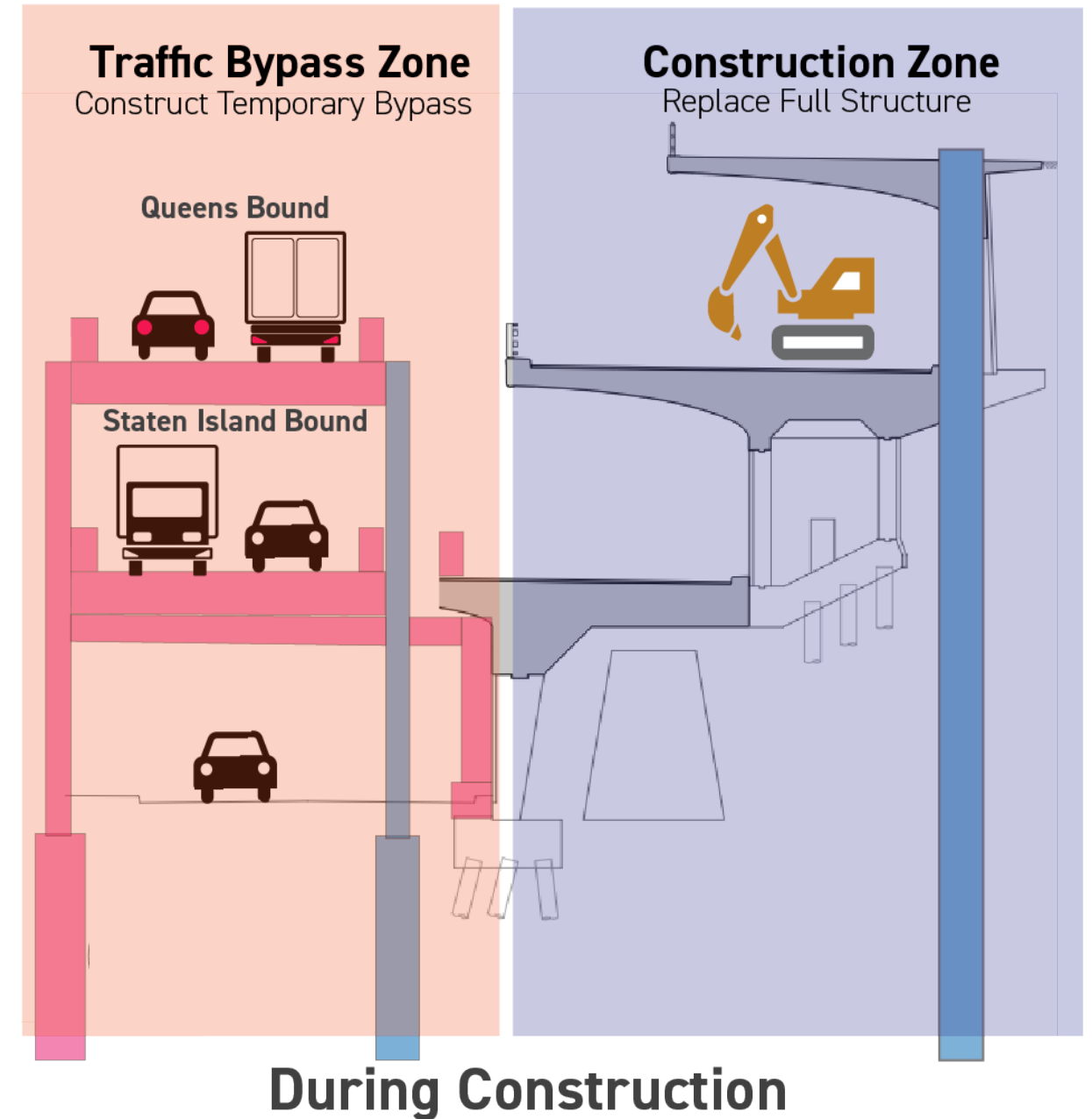
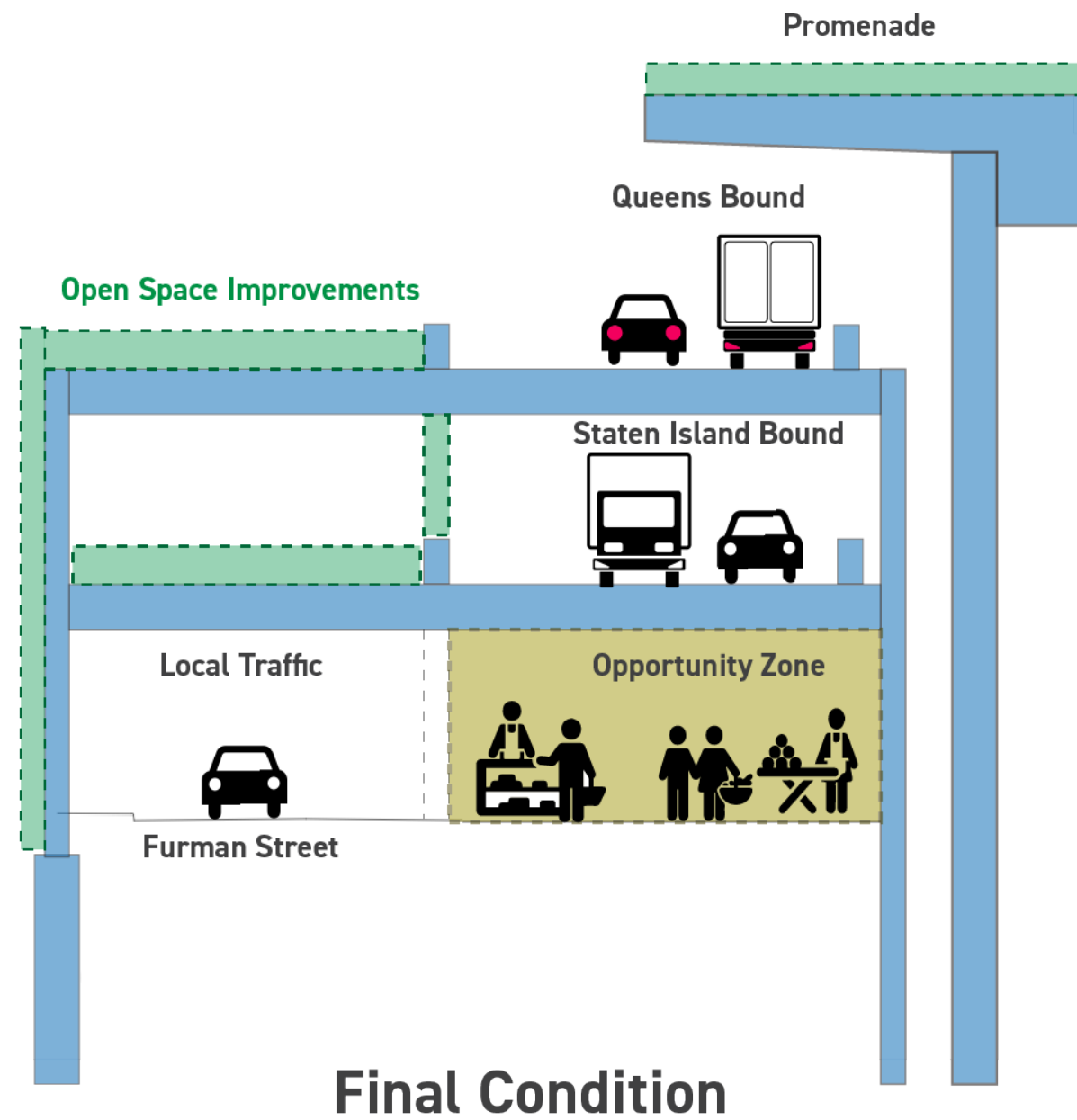
**Existing Condition**



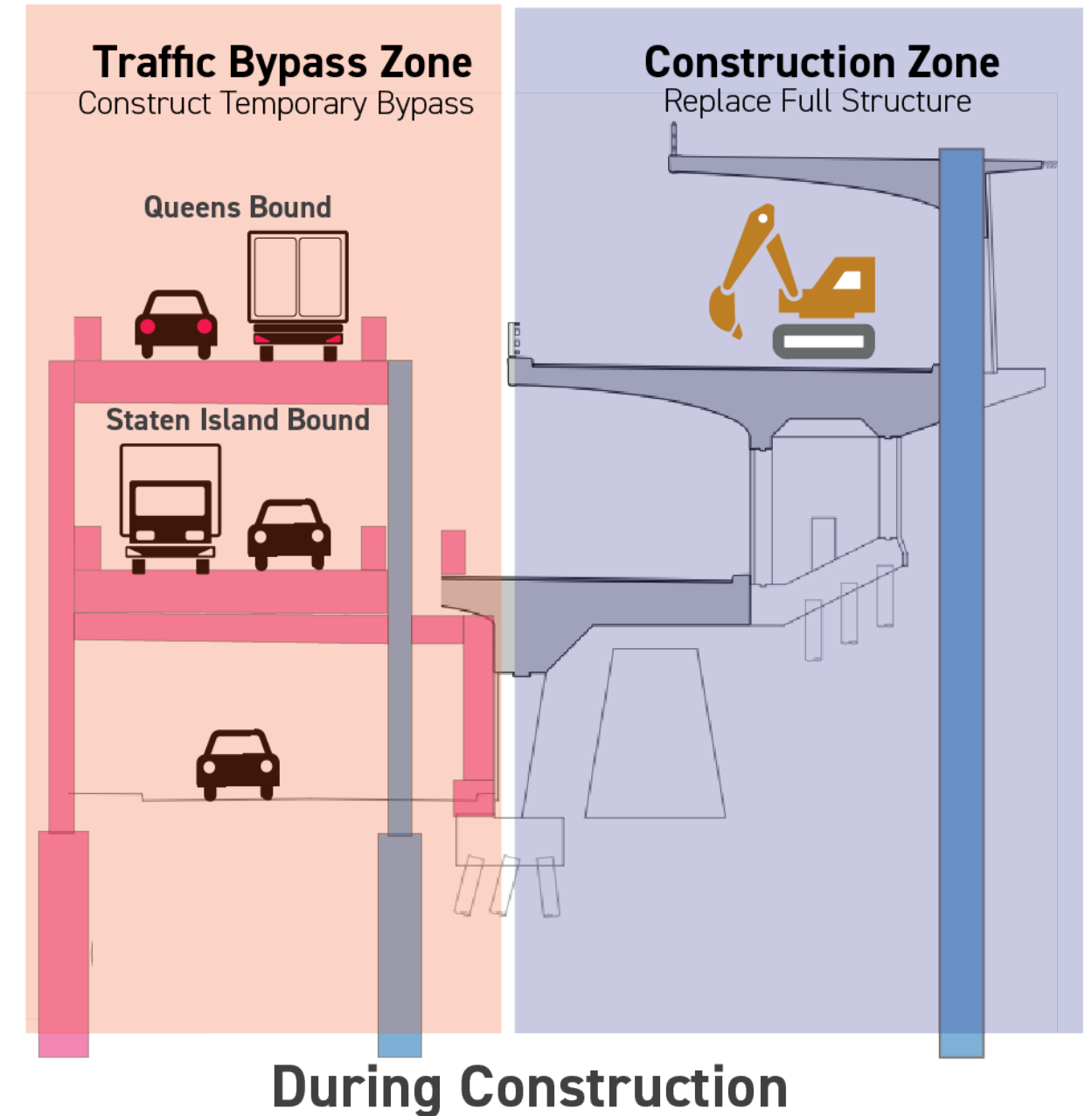
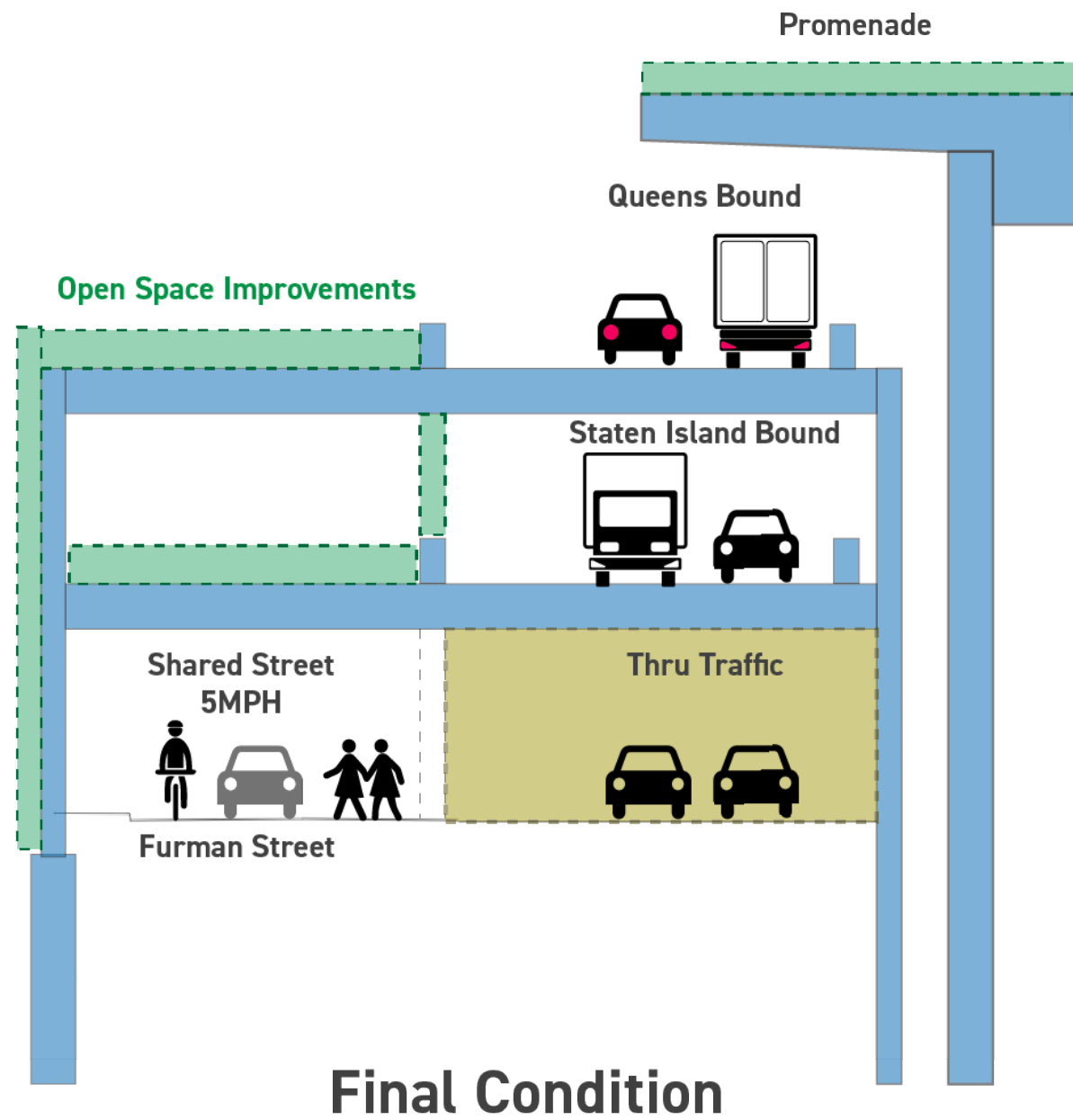
# Alpha | Complete Replacement (Including Reinforcing Wall) | Based on G1 Cantilever Replaced by Box Structure



# Alpha | Complete Replacement (Including Reinforcing Wall) | Based on G1 Cantilever Replaced by Box Structure



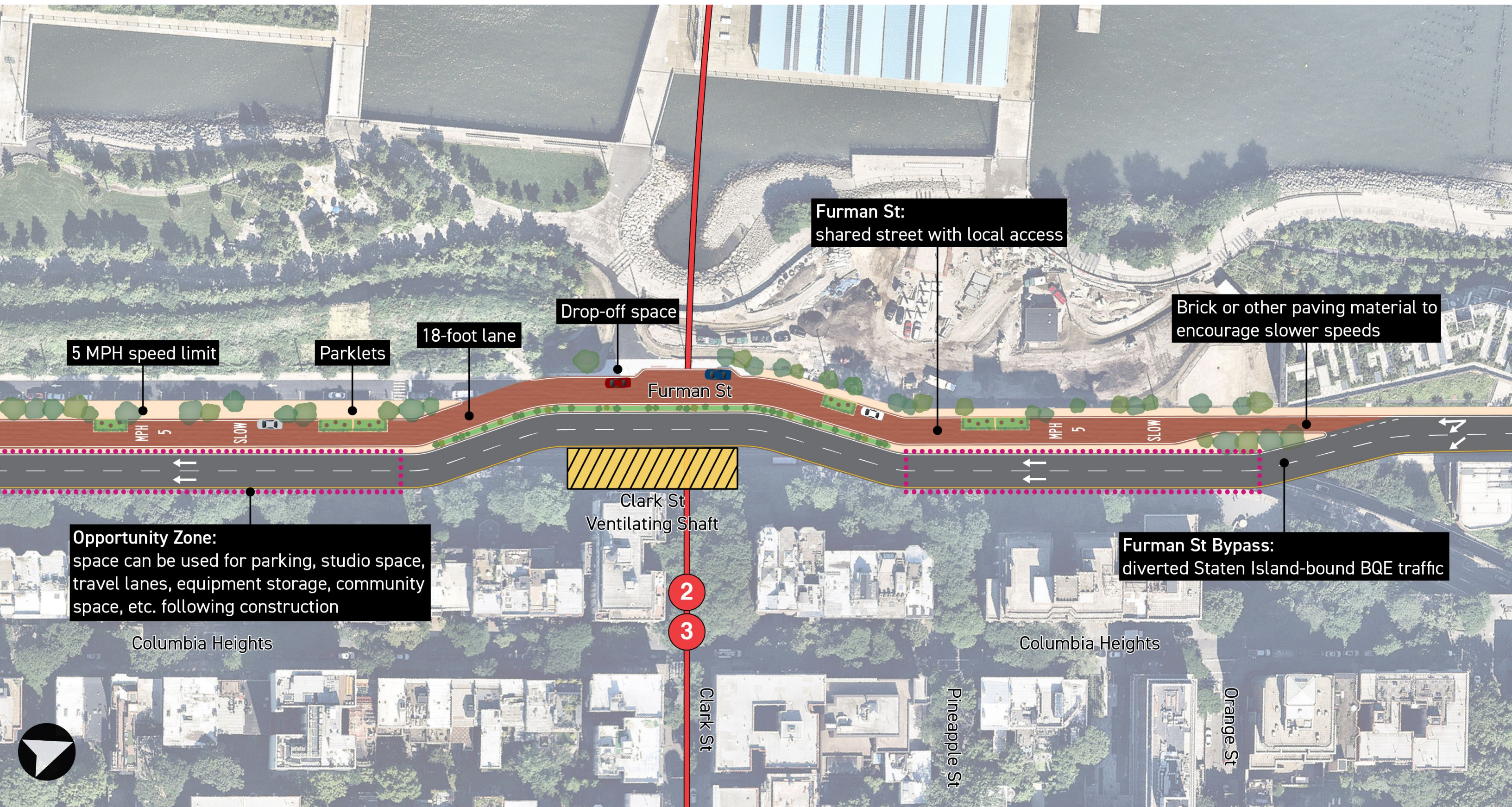
# Alpha | Complete Replacement (Including Reinforcing Wall) | Based on G1 Cantilever Replaced by Box Structure





# Alpha | Complete Replacement (Including Reinforcing Wall)

## Cantilever Replaced by Box Structure



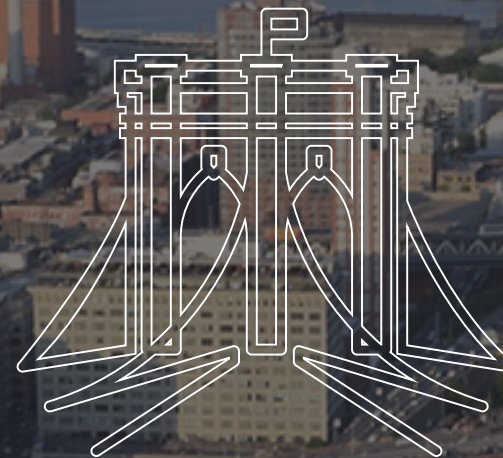




Brooklyn-Queens Expressway



Brooklyn Heights Promenade



Brooklyn Bridge



Brooklyn Bridge Park



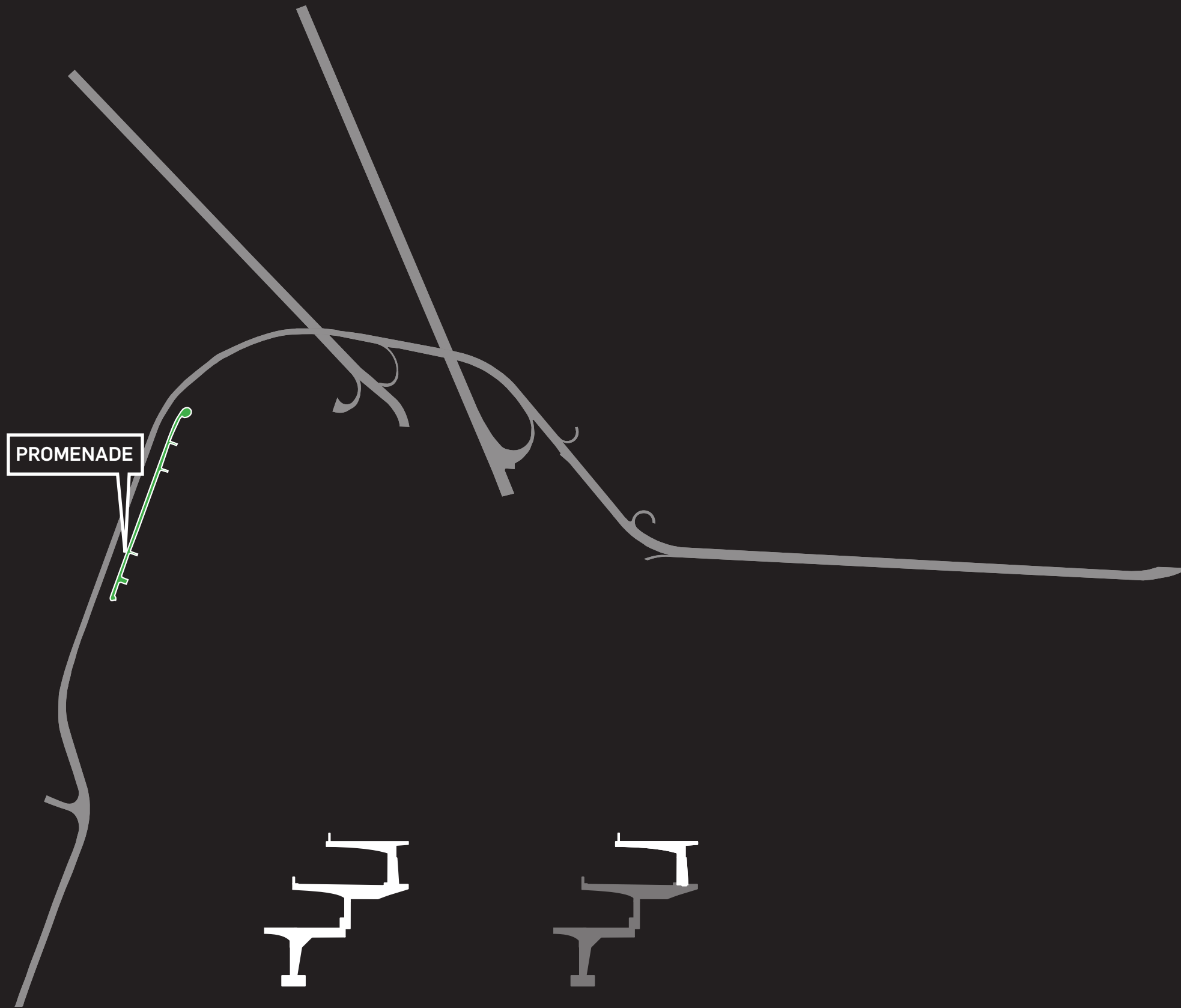






TRIPLE CANTILEVER







BROOKLYN BRIDGE PARK

BROOKLYN BRIDGE

PROMENADE

**Sam Schwartz**

**W X Y**















## Traffic Network





# Public Space Network





- Open Space
- Closure
- New Connection

## Alpha & Beta | Promenade Crossing





## Gamma | Fulton Landing Strip

As presented to the BQE Expert Panel for informational/background purposes only

<https://bqe-i278.com/en/expert-panel/documents>

Sam Schwartz W X Y





Commodore Barry Park

Brooklyn Bridge

Old Fulton Street

Cadman Plaza

Columbus Park

Clark Street

The Promenade

Montague Street

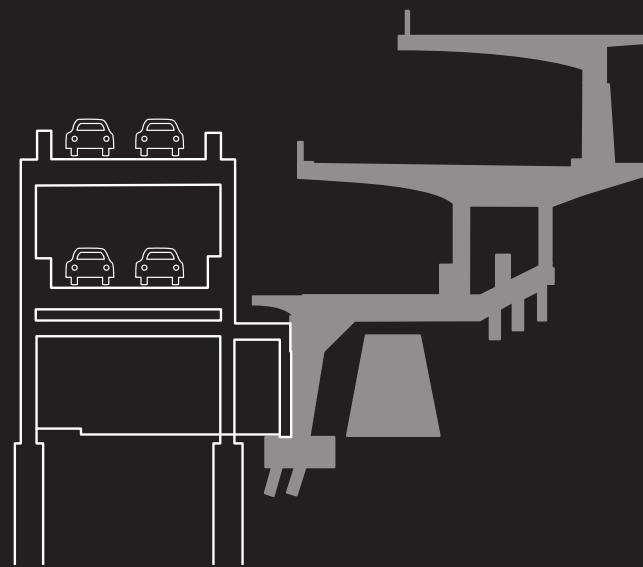
Brooklyn Bridge Park

Van Voorhees Park

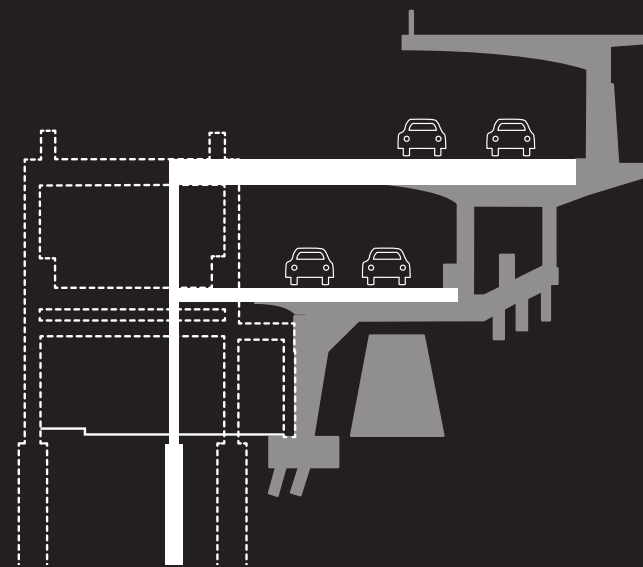


# STRATEGY

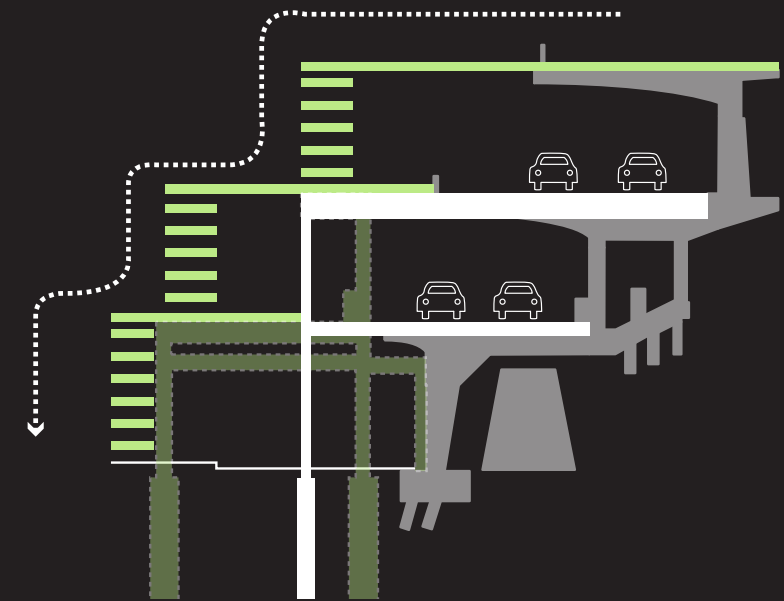
ALPHA & BETA



**SHIFT**



**RECONSTRUCT**



**REUTILIZE**





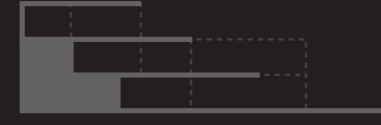
**FLYOVER**

**0**



**ALPHA**

**1**



**BETA**

**2**

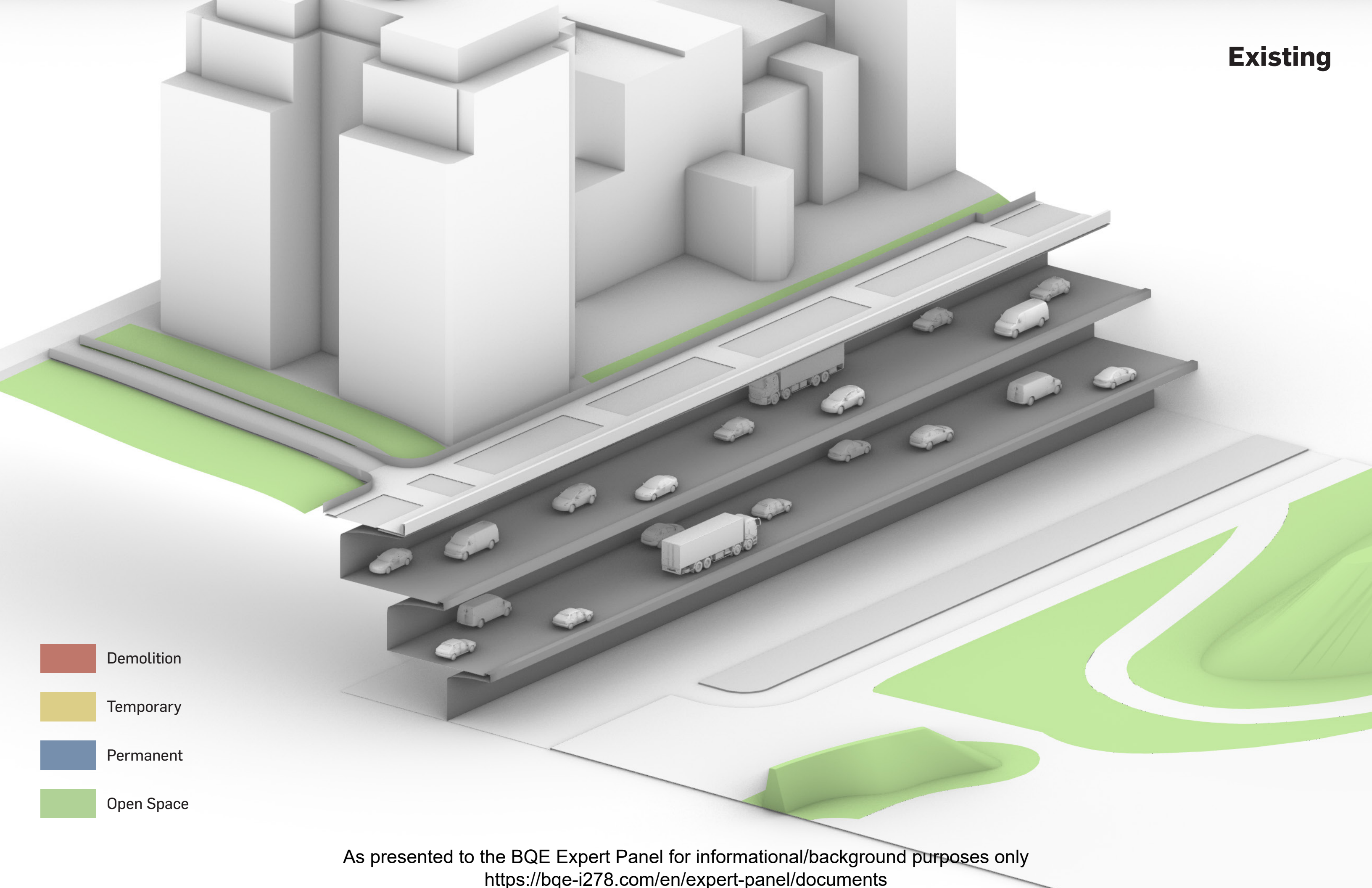






**GAMMA**

**3**



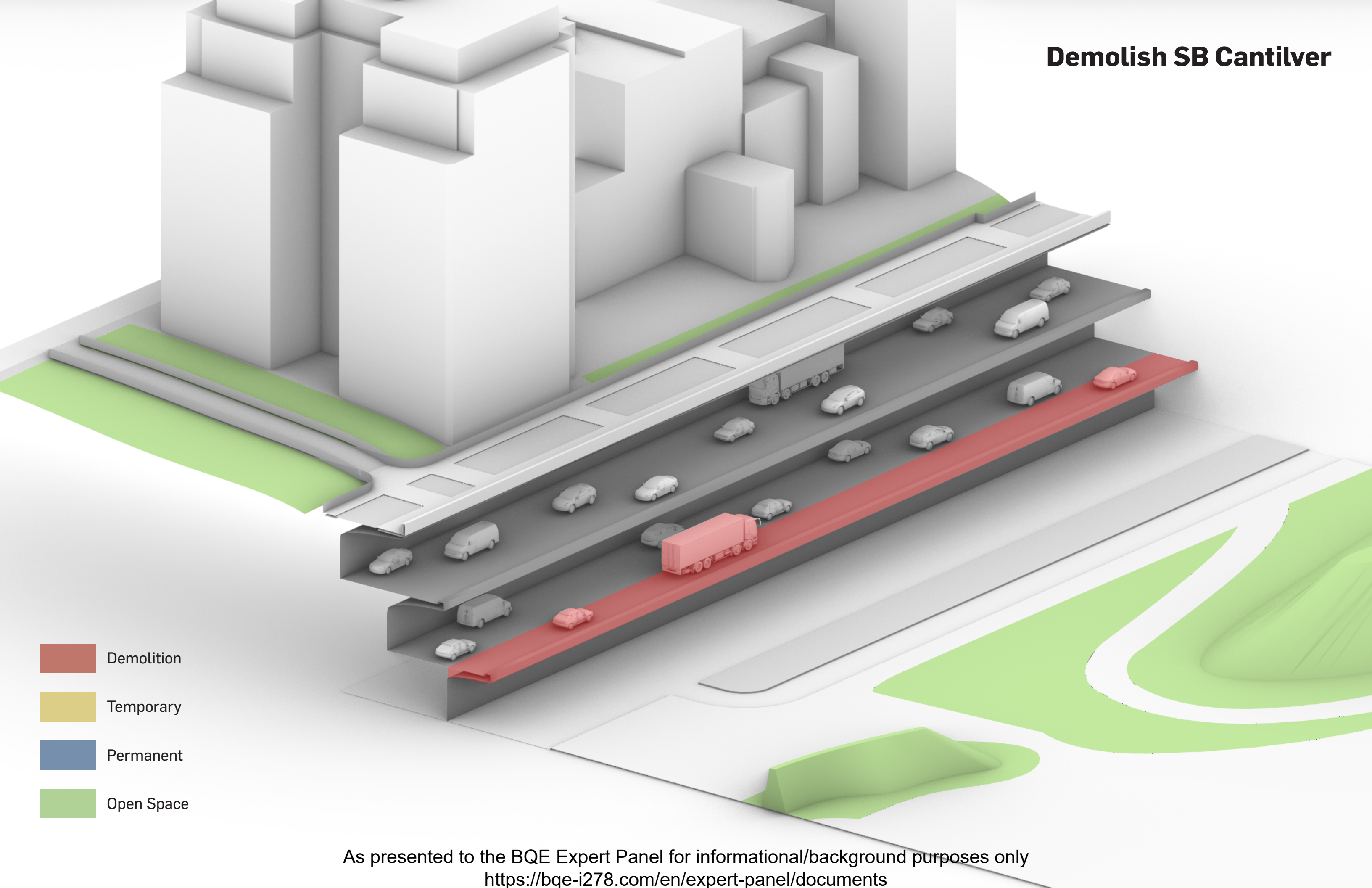
**Existing**



-  Demolition
-  Temporary
-  Permanent
-  Open Space



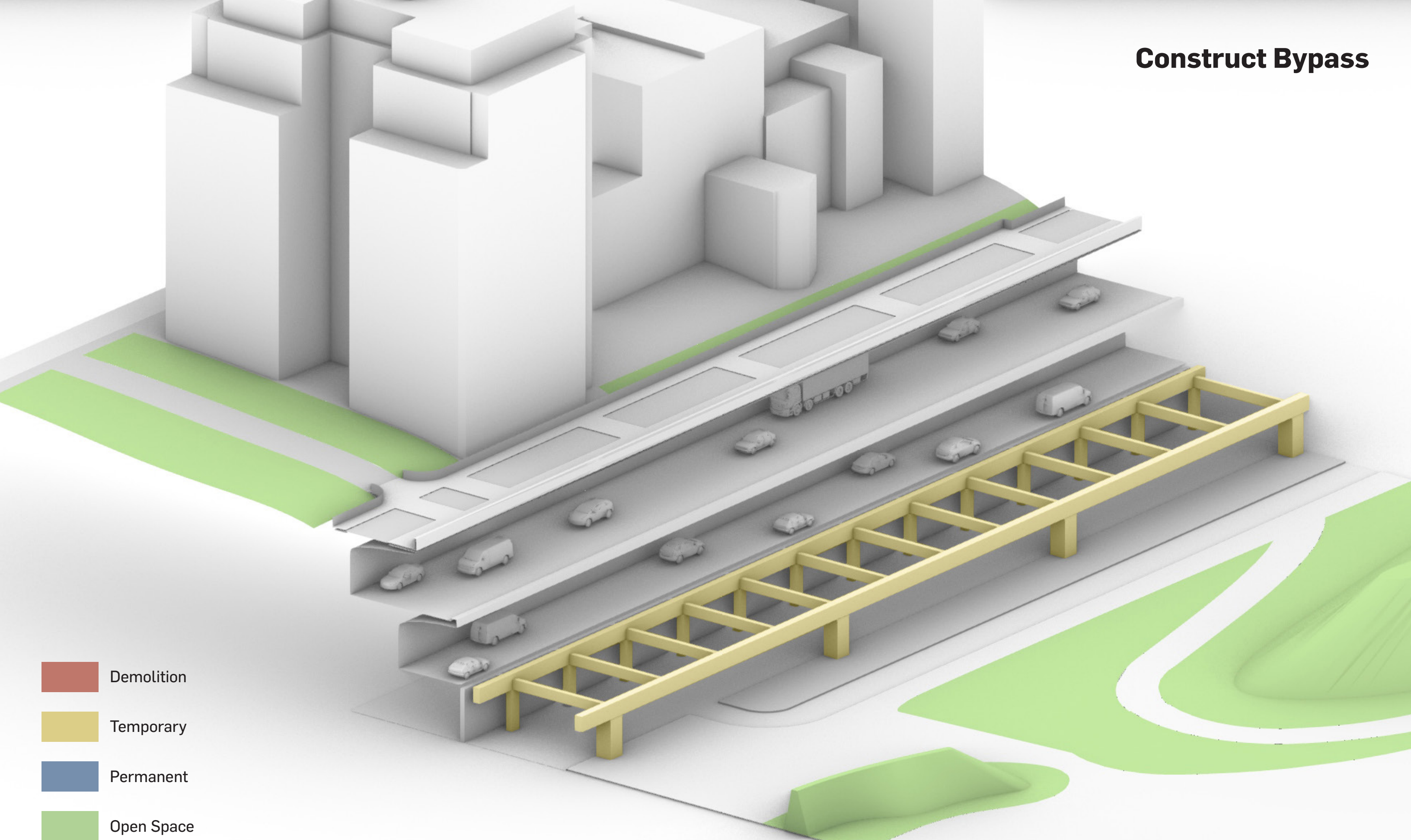
# Demolish SB Cantilver



- Demolition
- Temporary
- Permanent
- Open Space



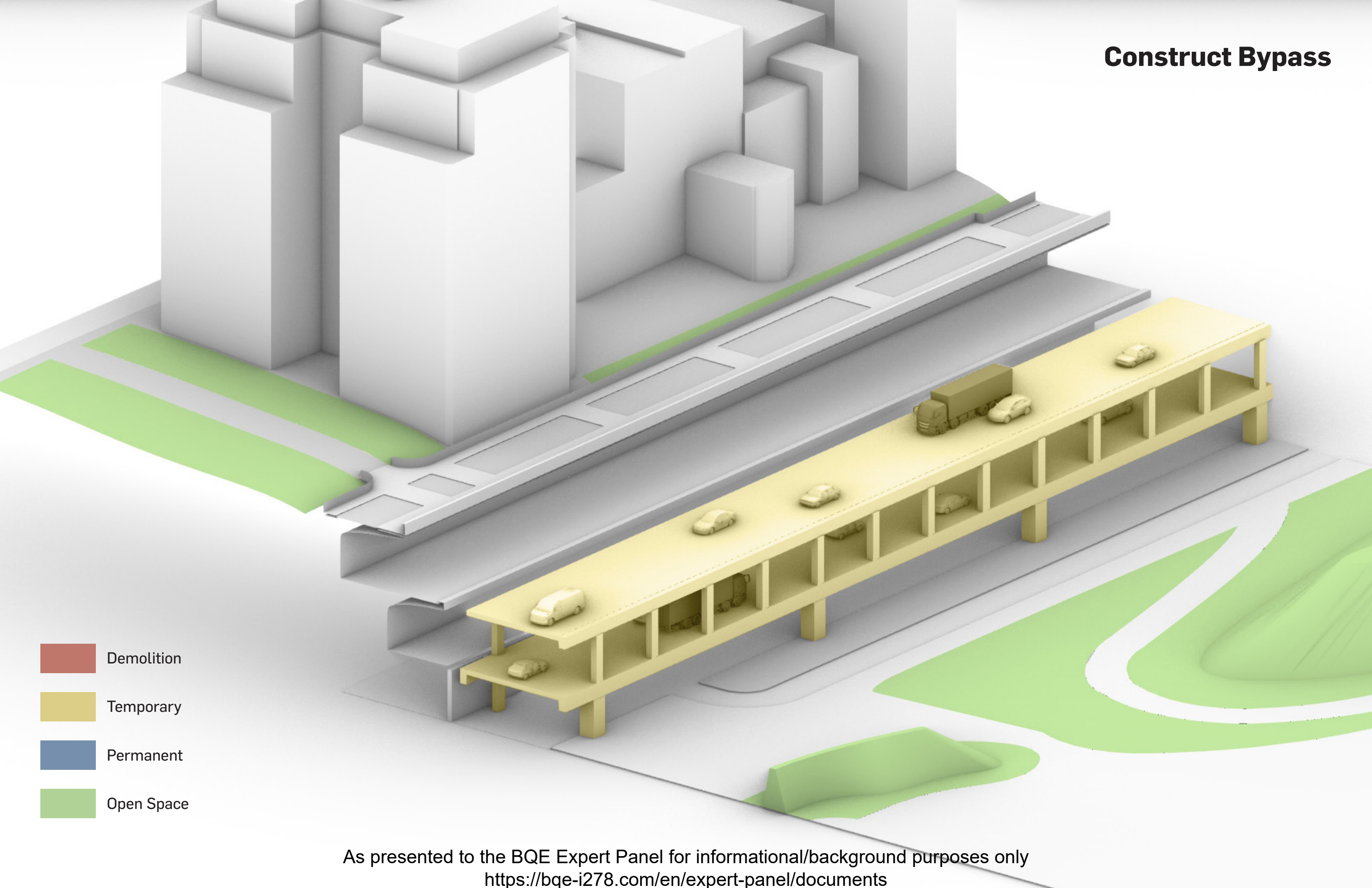
# Construct Bypass



- Demolition
- Temporary
- Permanent
- Open Space



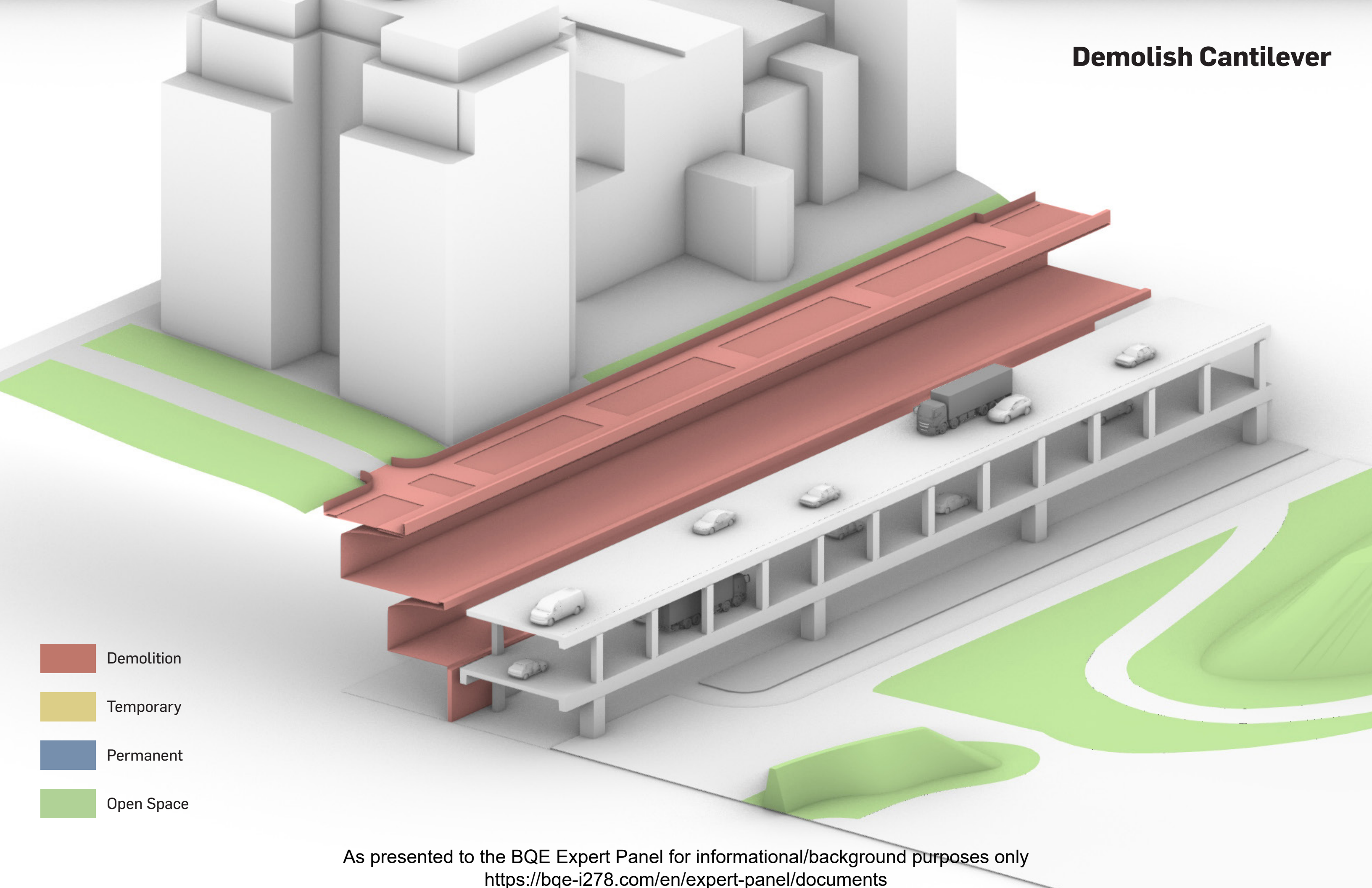
# Construct Bypass



- Demolition
- Temporary
- Permanent
- Open Space



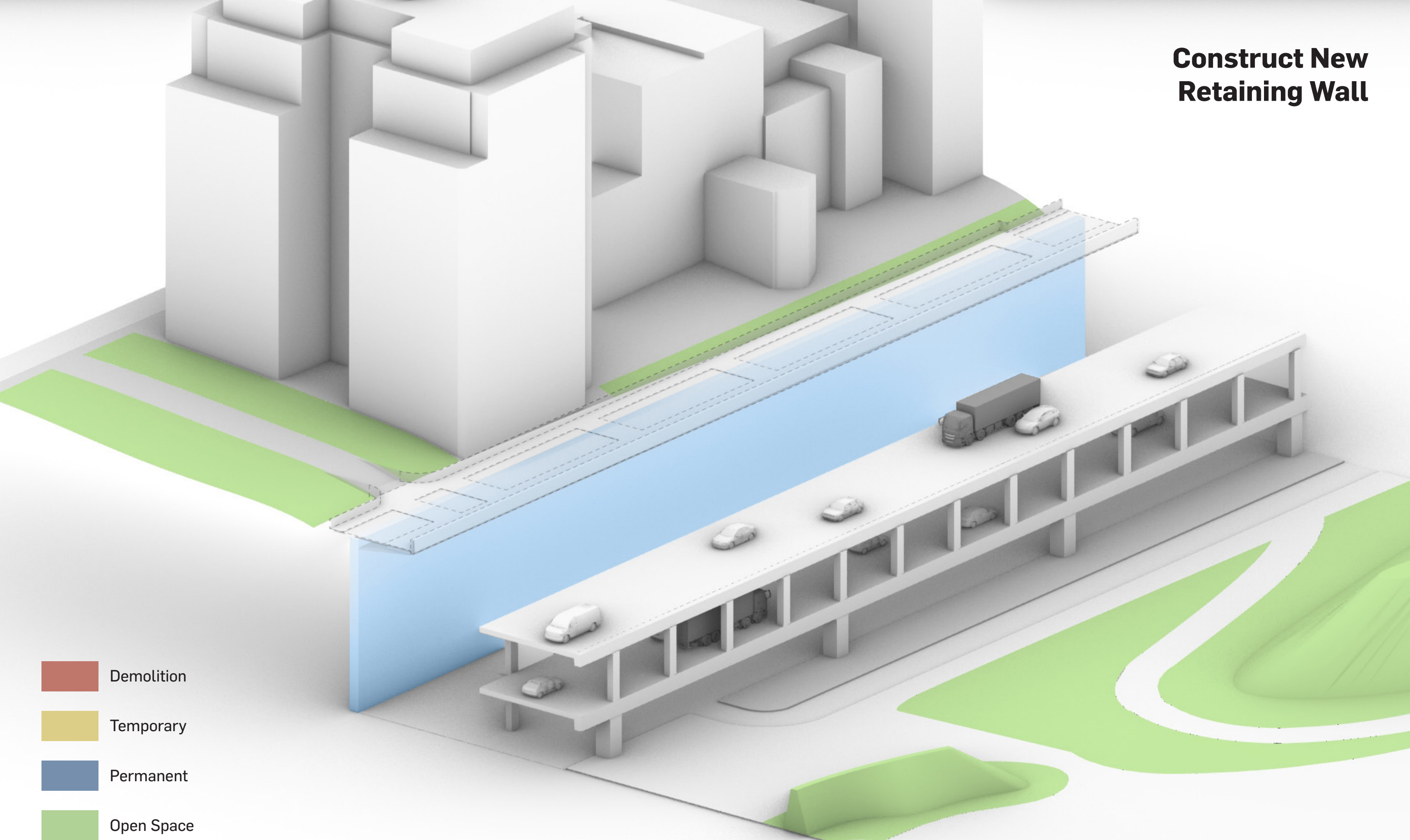
# Demolish Cantilever



- Demolition
- Temporary
- Permanent
- Open Space

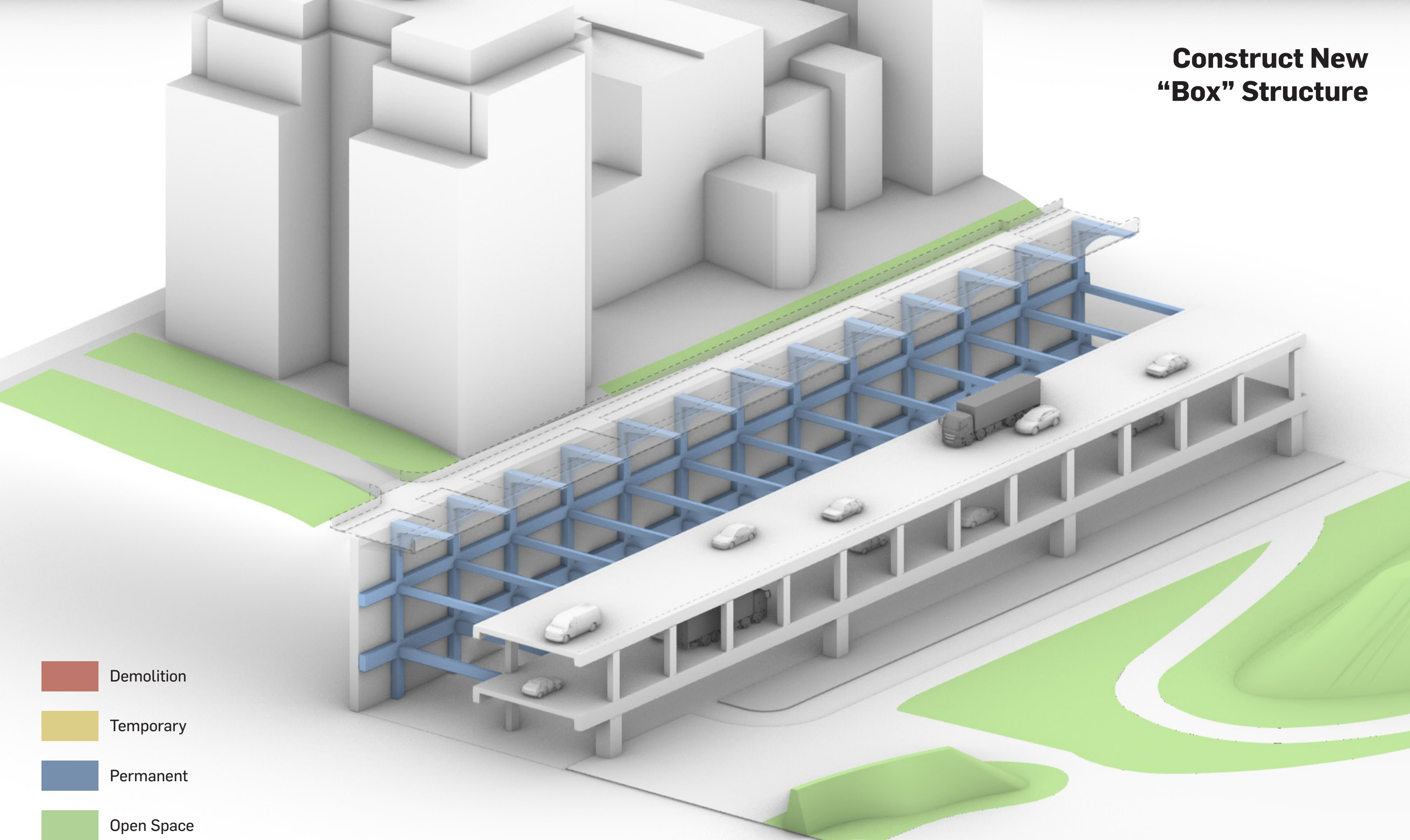


# Construct New Retaining Wall





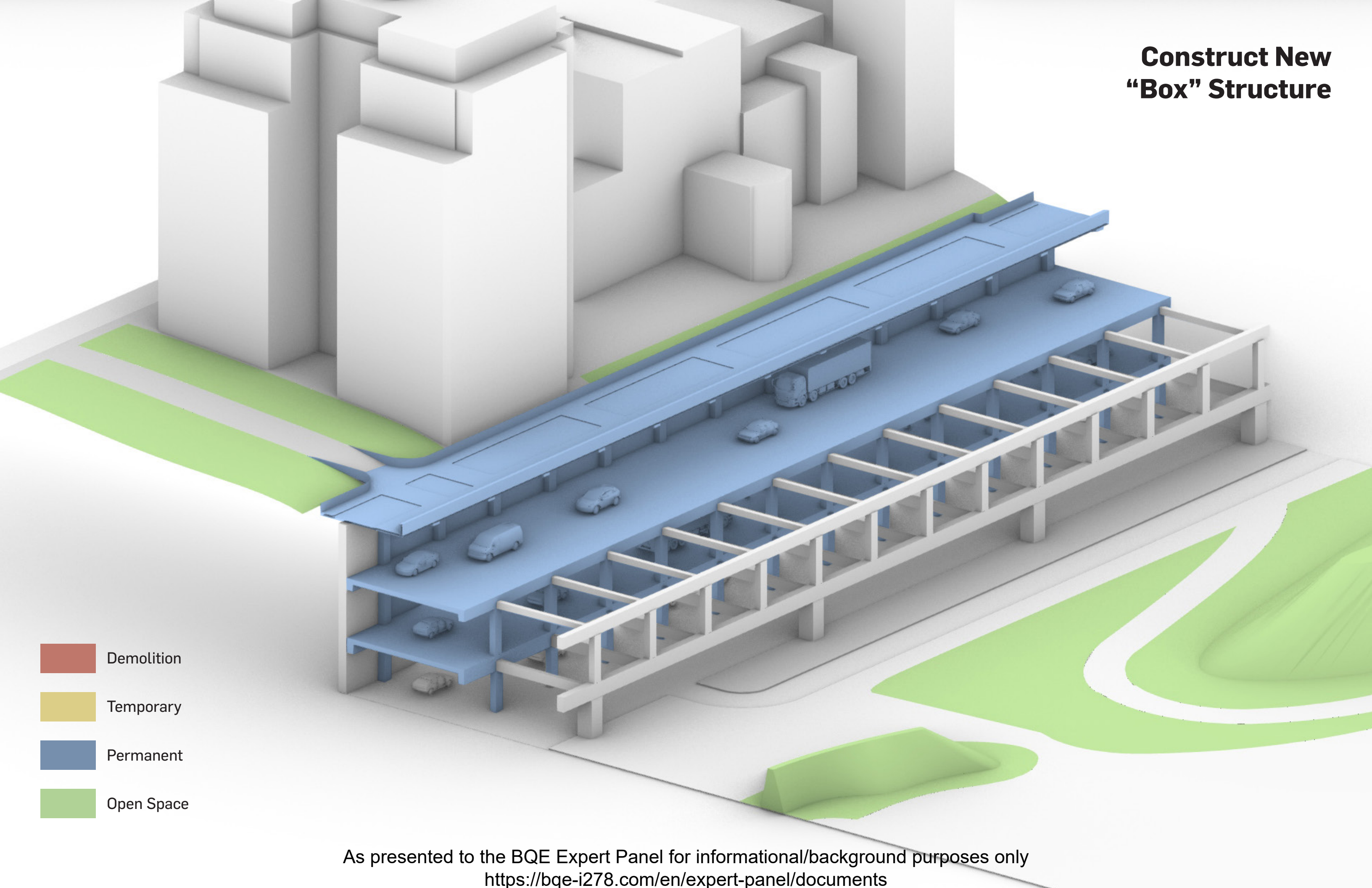
# Construct New "Box" Structure



As presented to the BQE Expert Panel for informational/background purposes only  
<https://bqe-i278.com/en/expert-panel/documents>



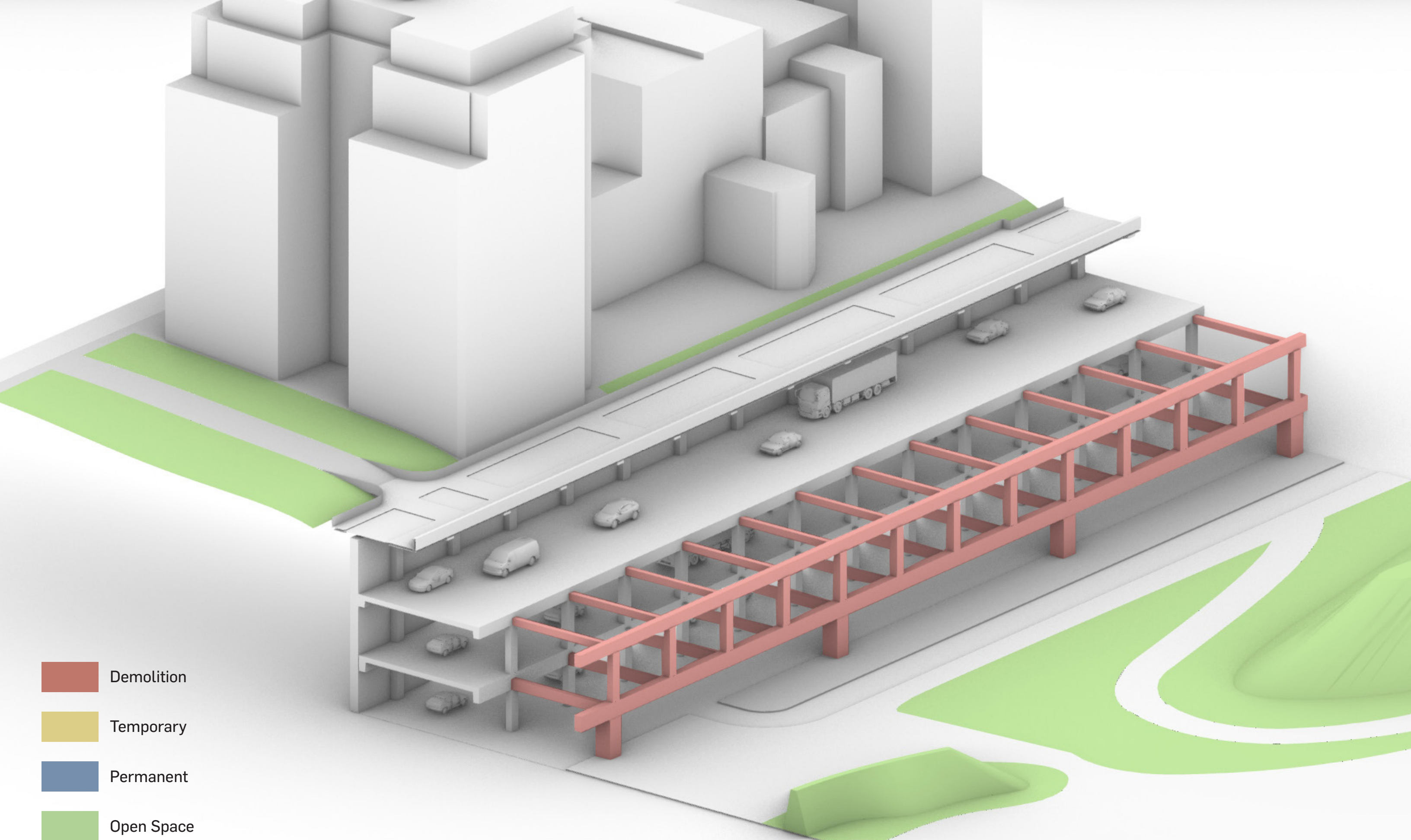
# Construct New "Box" Structure



- Demolition
- Temporary
- Permanent
- Open Space

As presented to the BQE Expert Panel for informational/background purposes only  
<https://bqe-i278.com/en/expert-panel/documents>

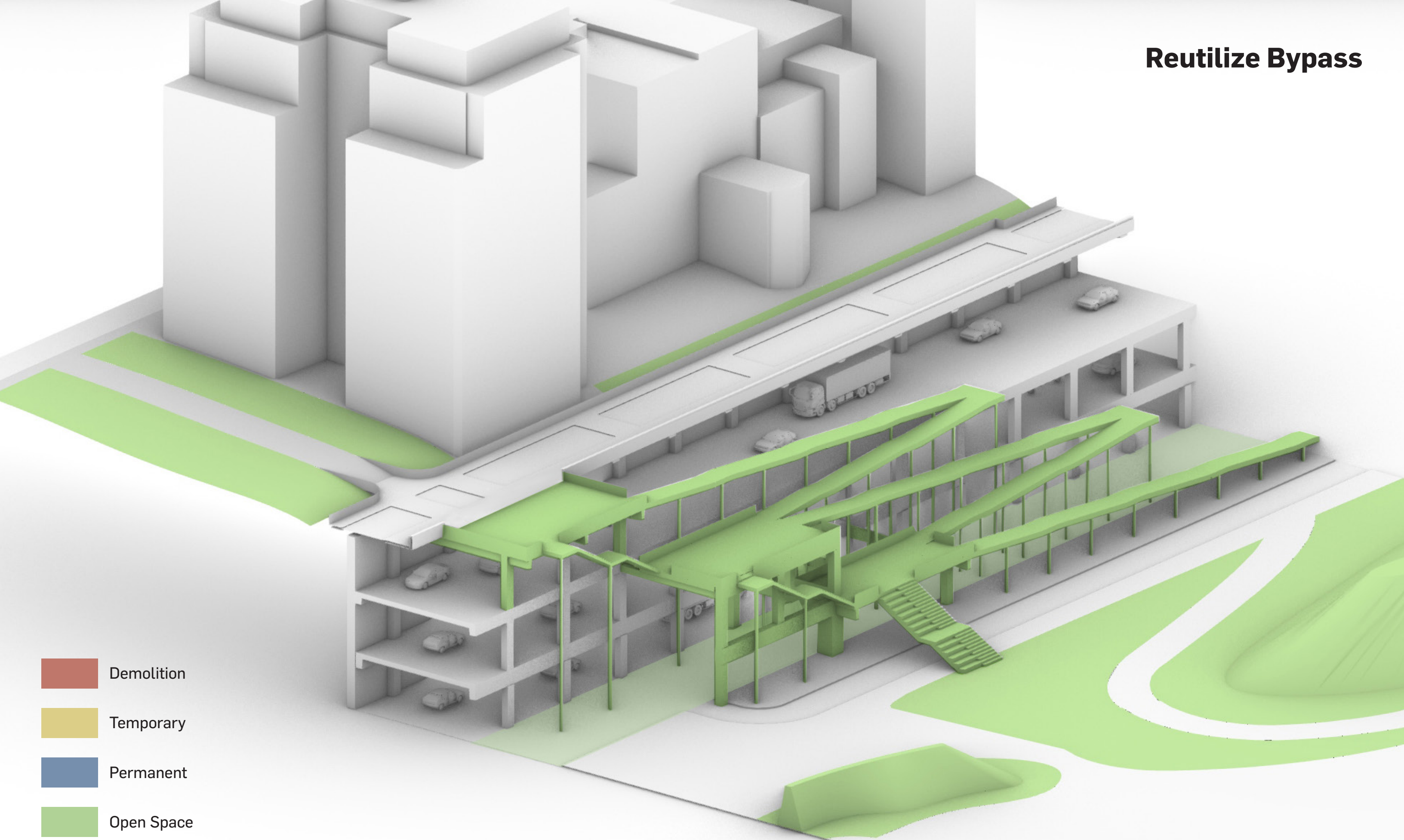




- Demolition
- Temporary
- Permanent
- Open Space



# Reutilize Bypass



- Demolition
- Temporary
- Permanent
- Open Space







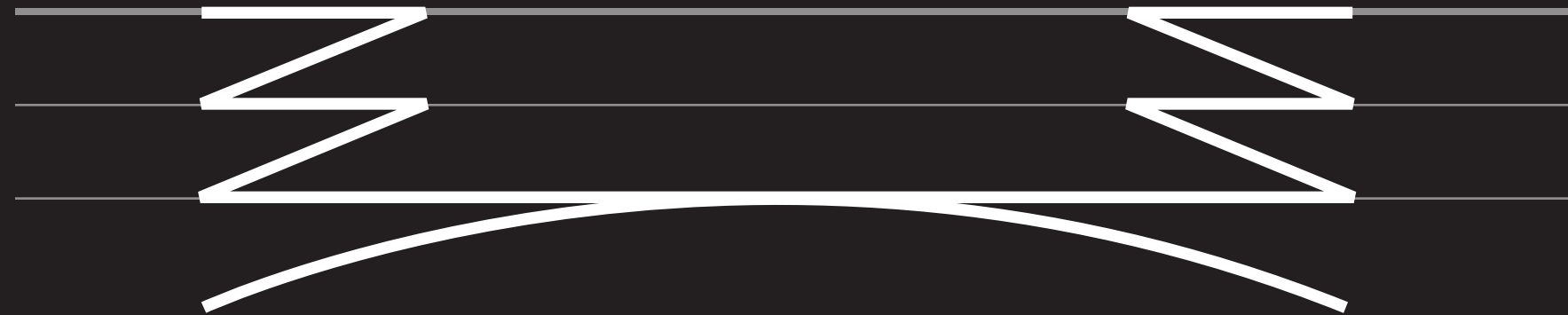






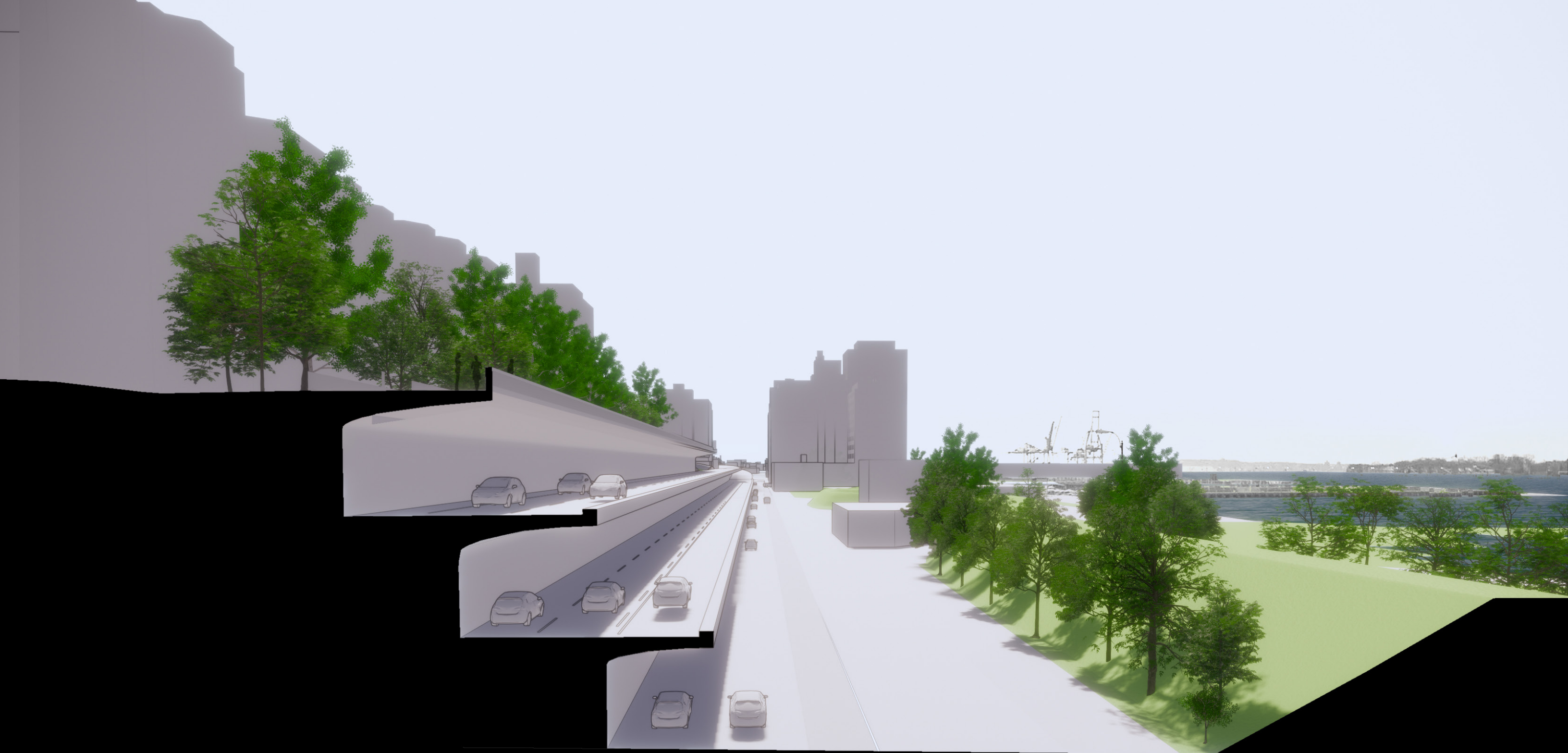


ALPHA

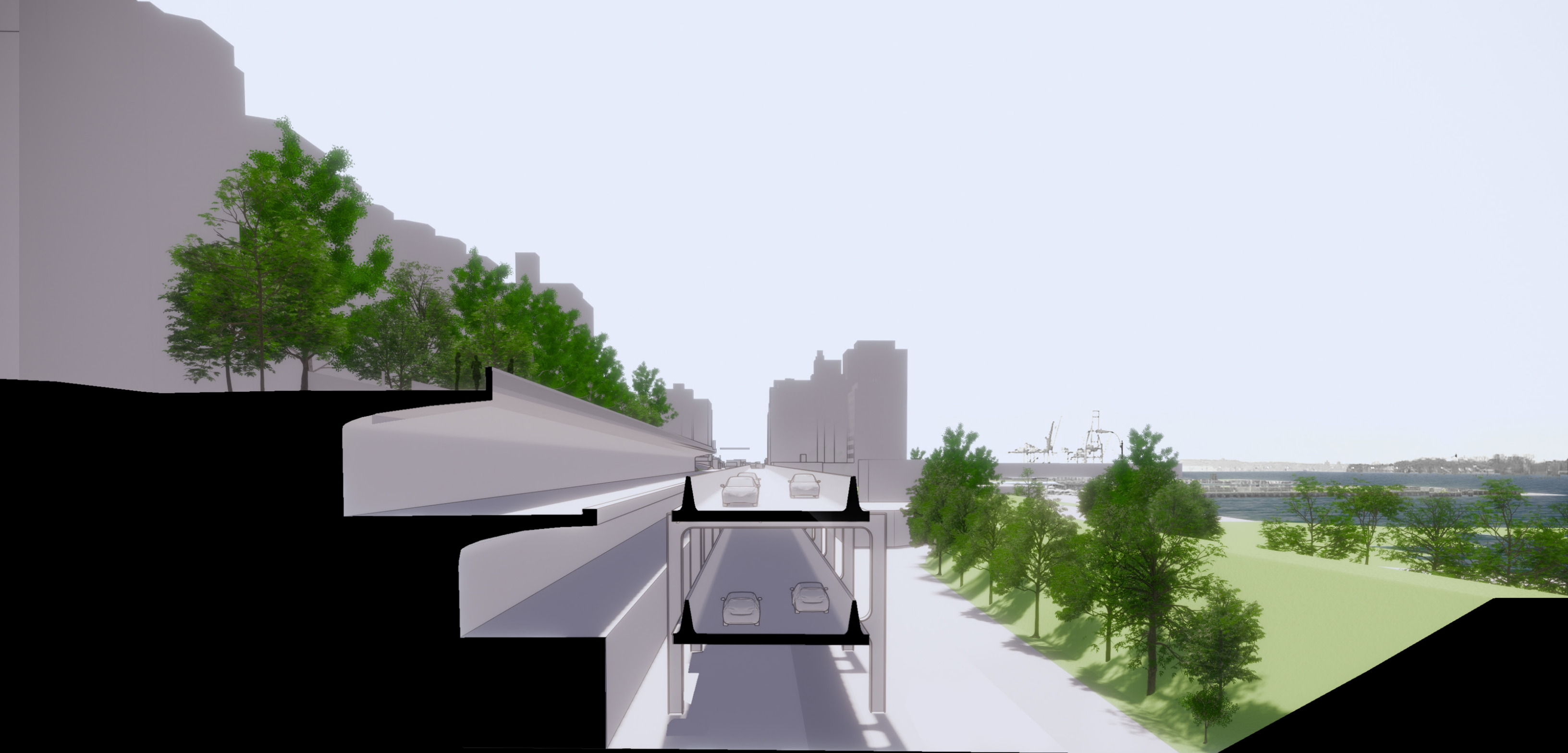


**The Hill**

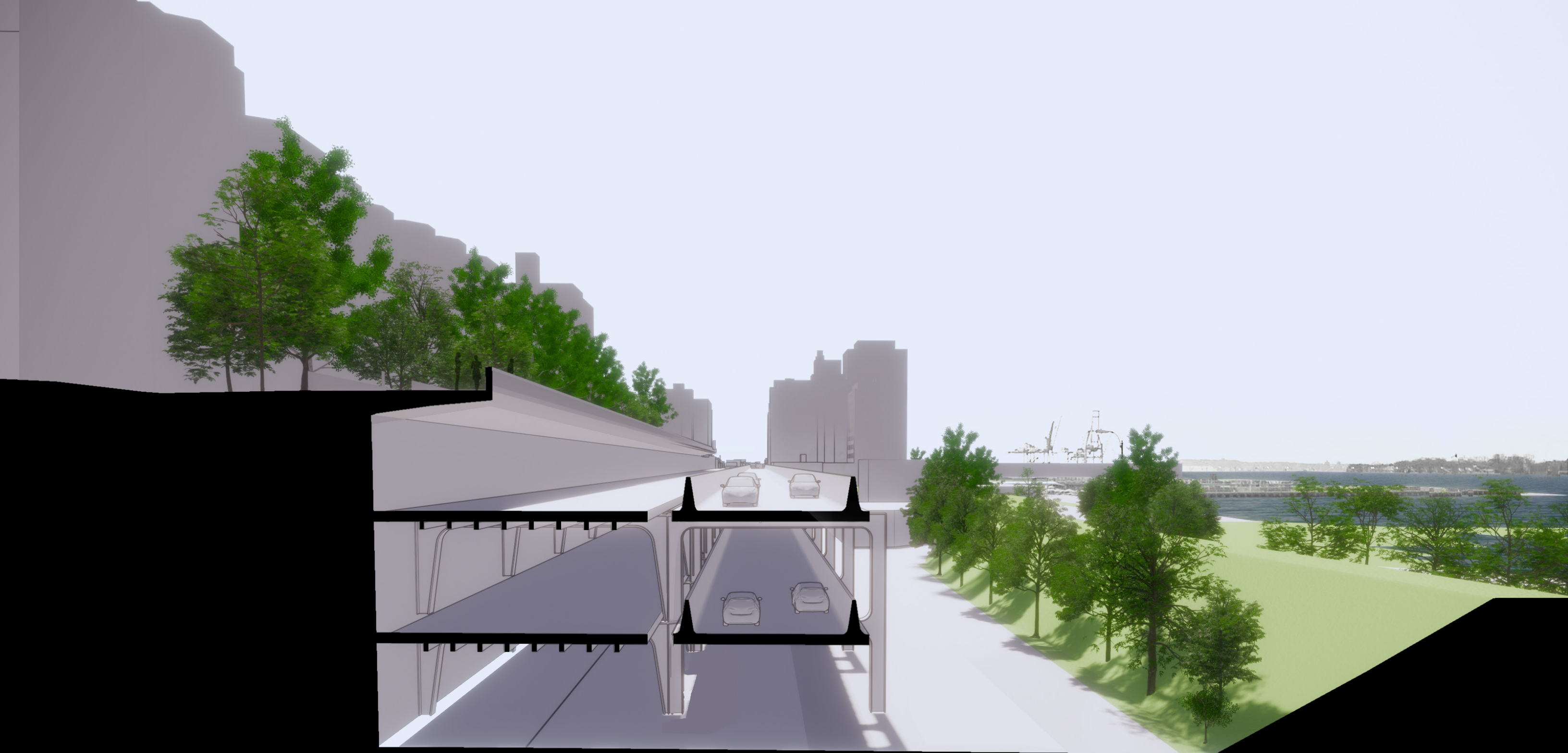




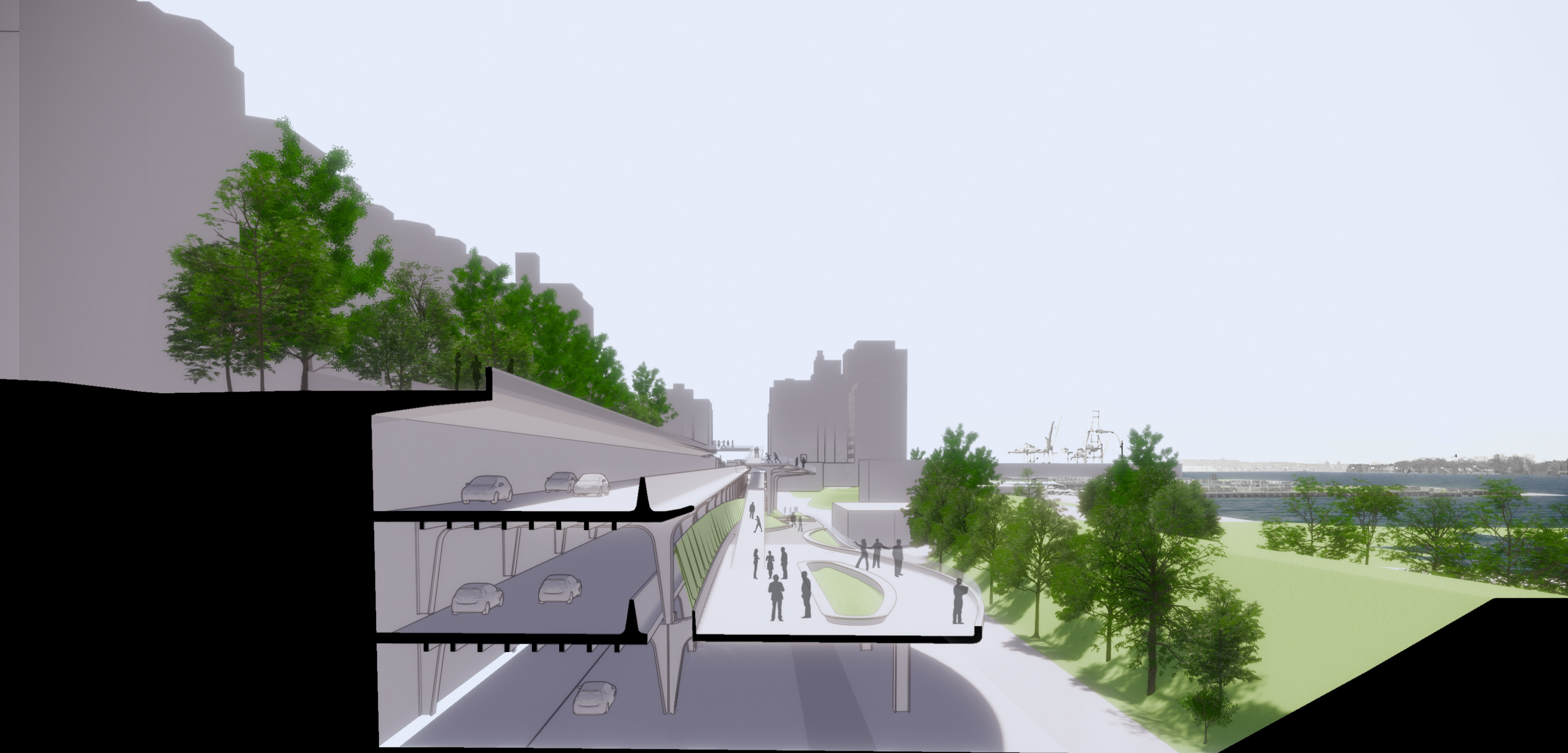












## Re-utilize Bypass Structure

54

As presented to the BQE Expert Panel for informational/background purposes only

<https://bqe-i278.com/en/expert-panel/documents>

**Sam Schwartz**

**W X Y**















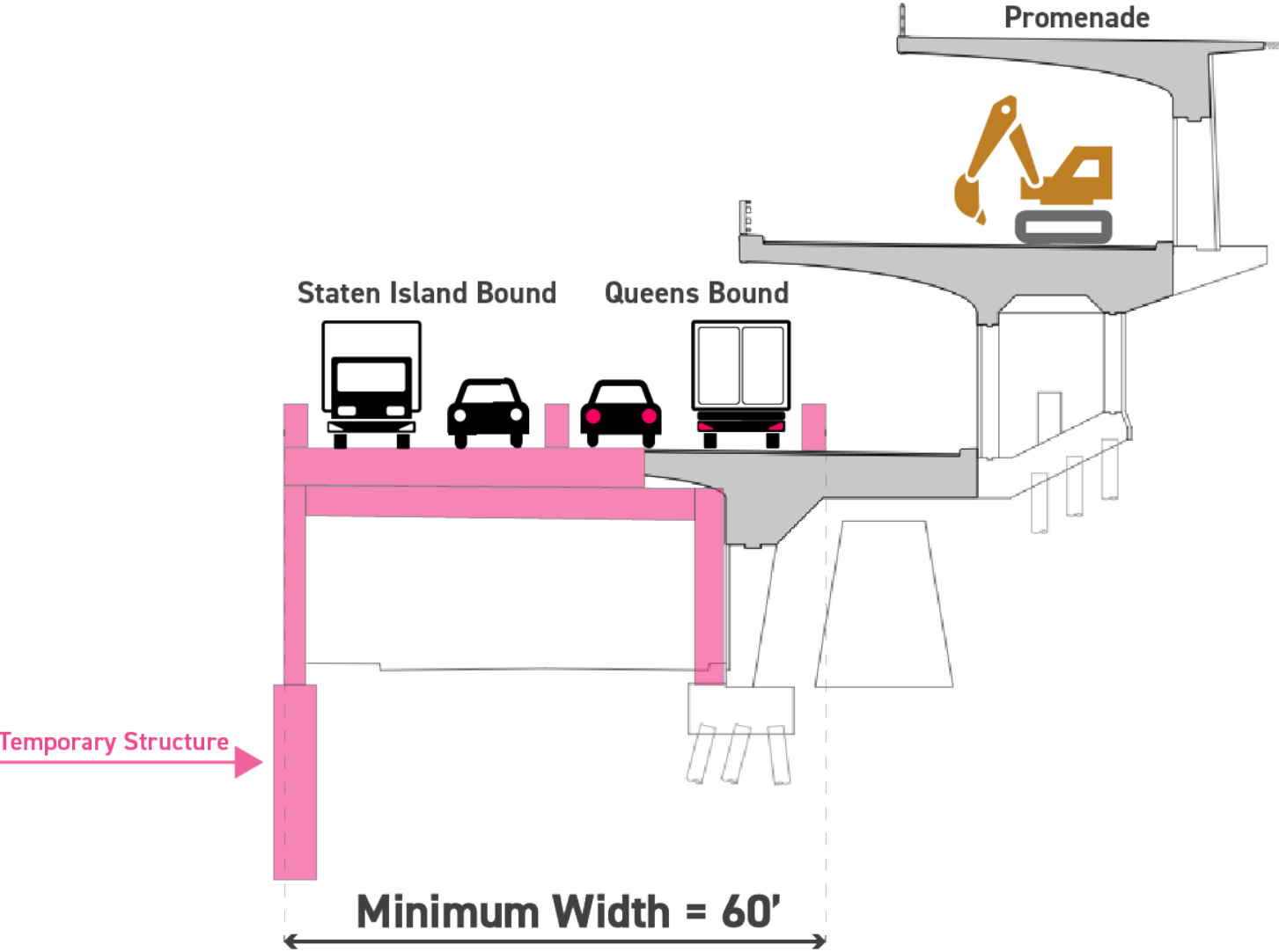
# Video Placeholder



# Beta Exploration

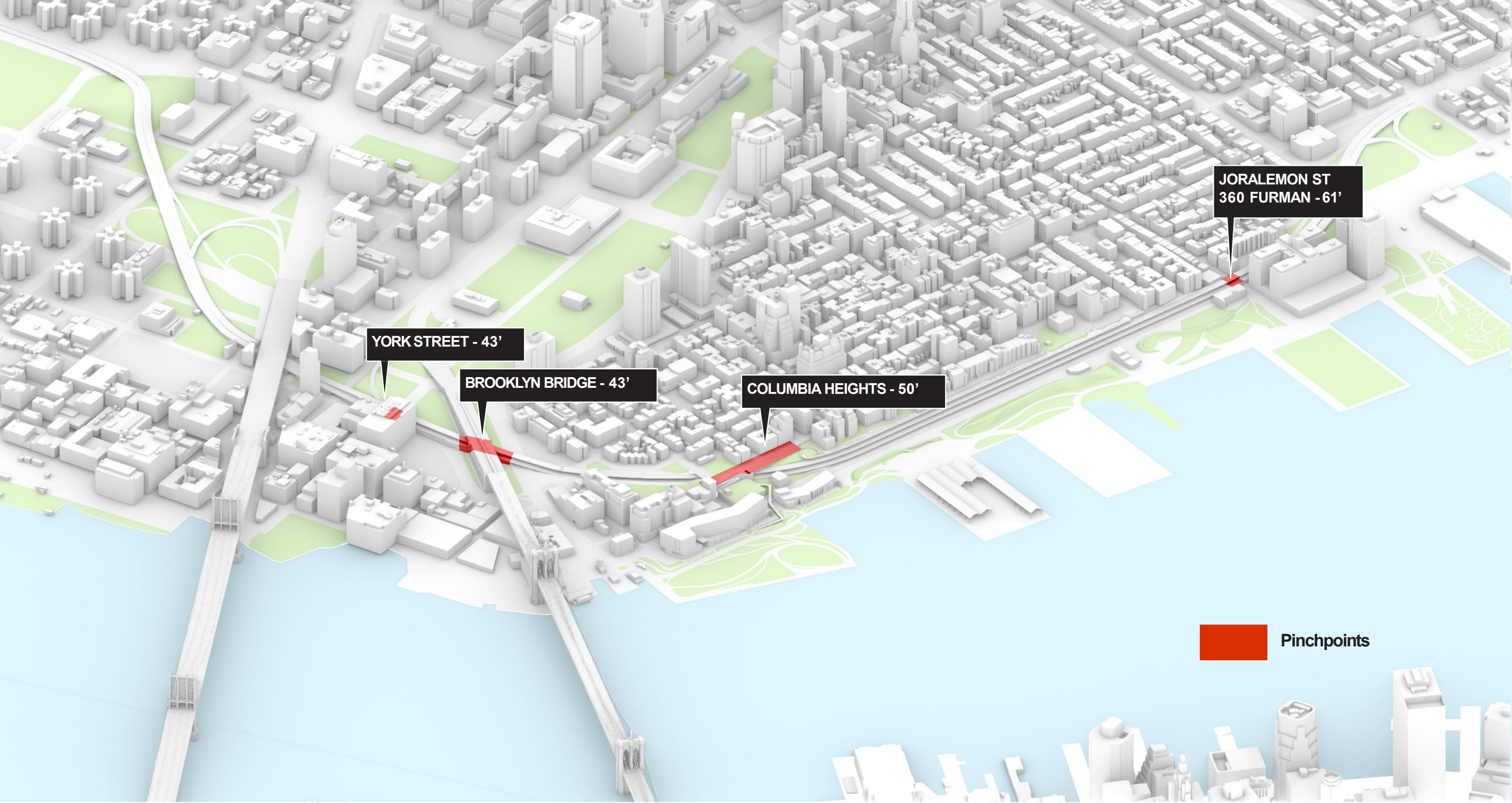


# Beta | Can We Detour Traffic On A Single Level?



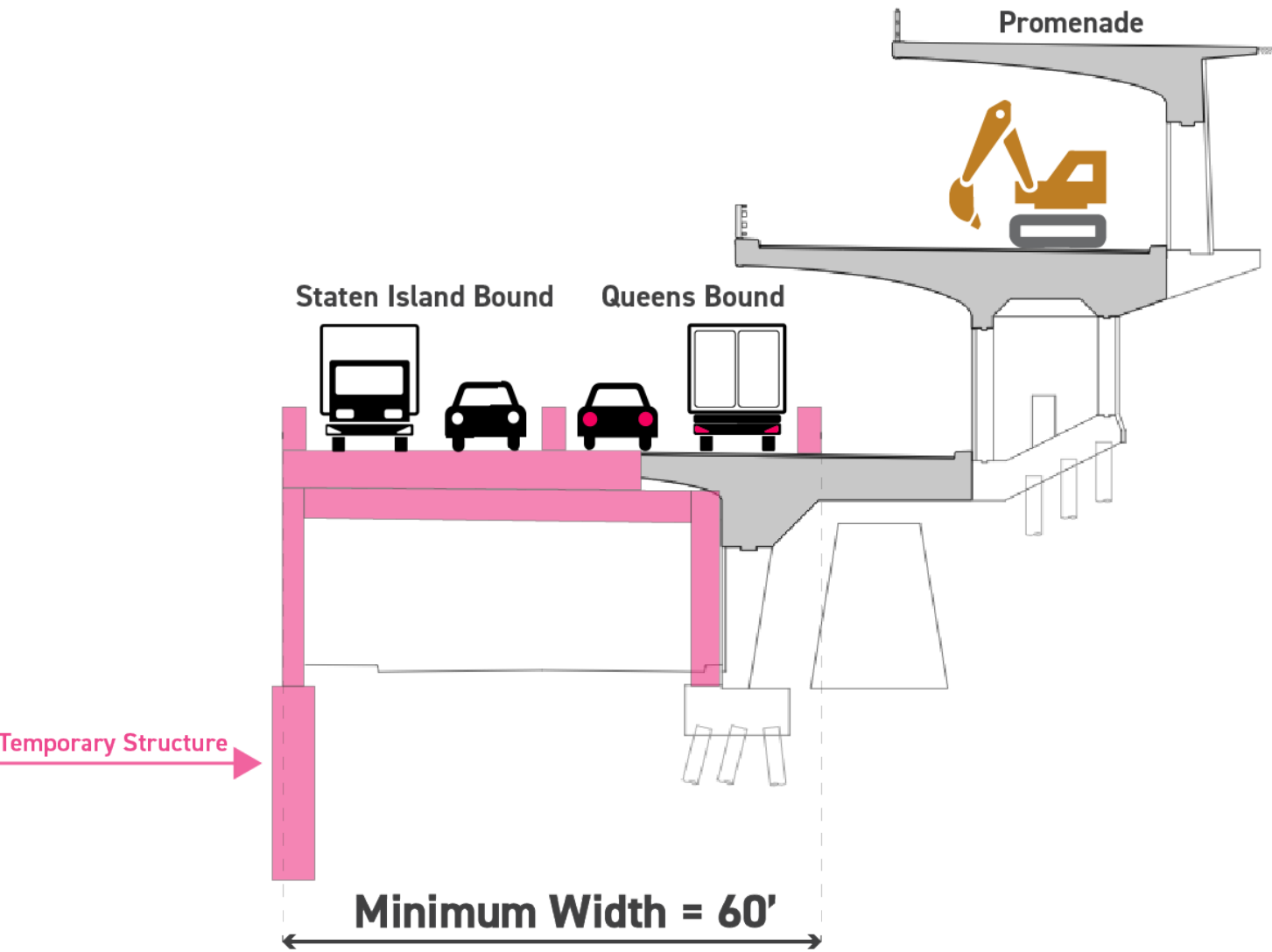


# Beta | Pinch Points in the Corridor



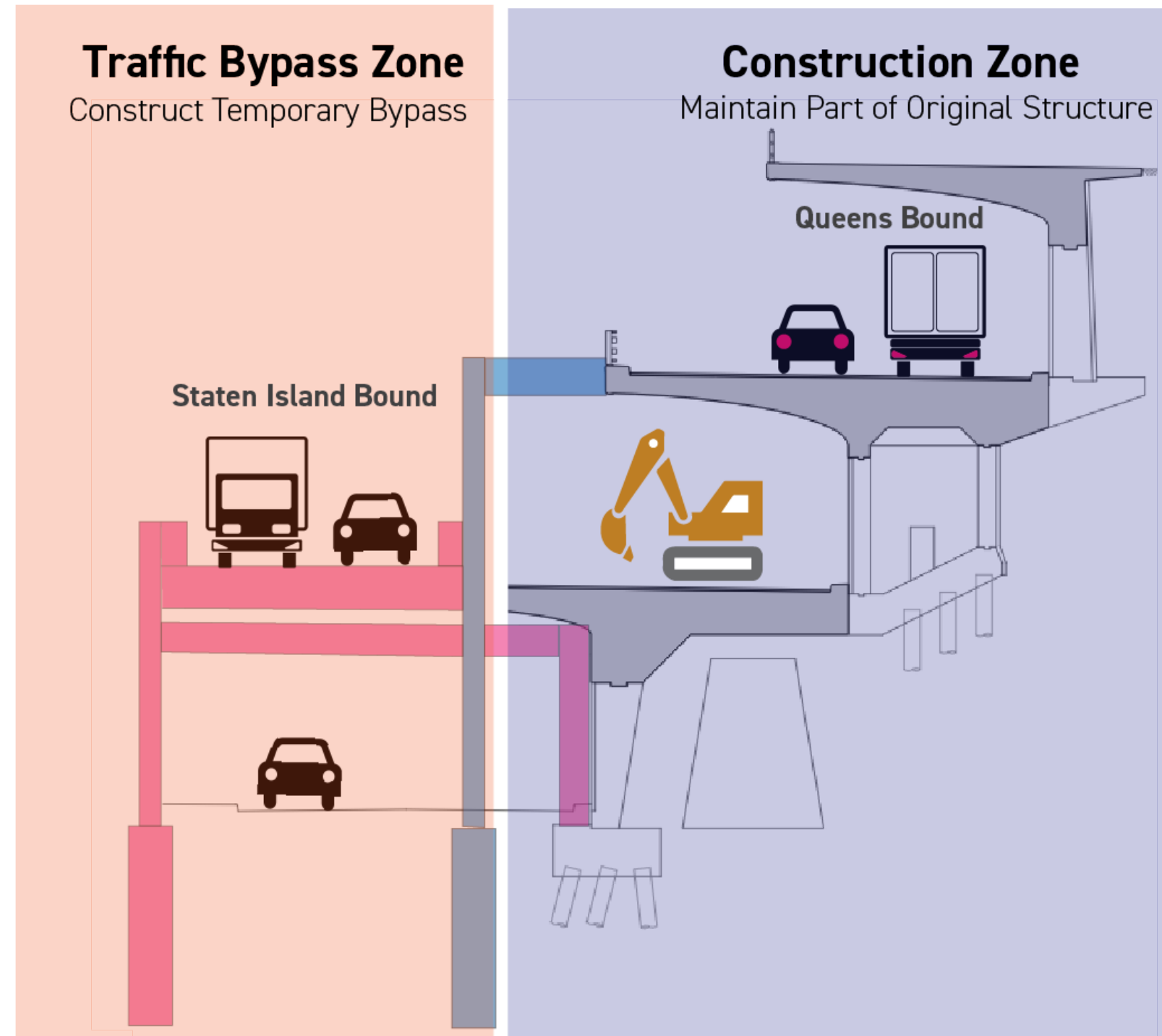


# Beta | Constraints at the Brooklyn Bridge





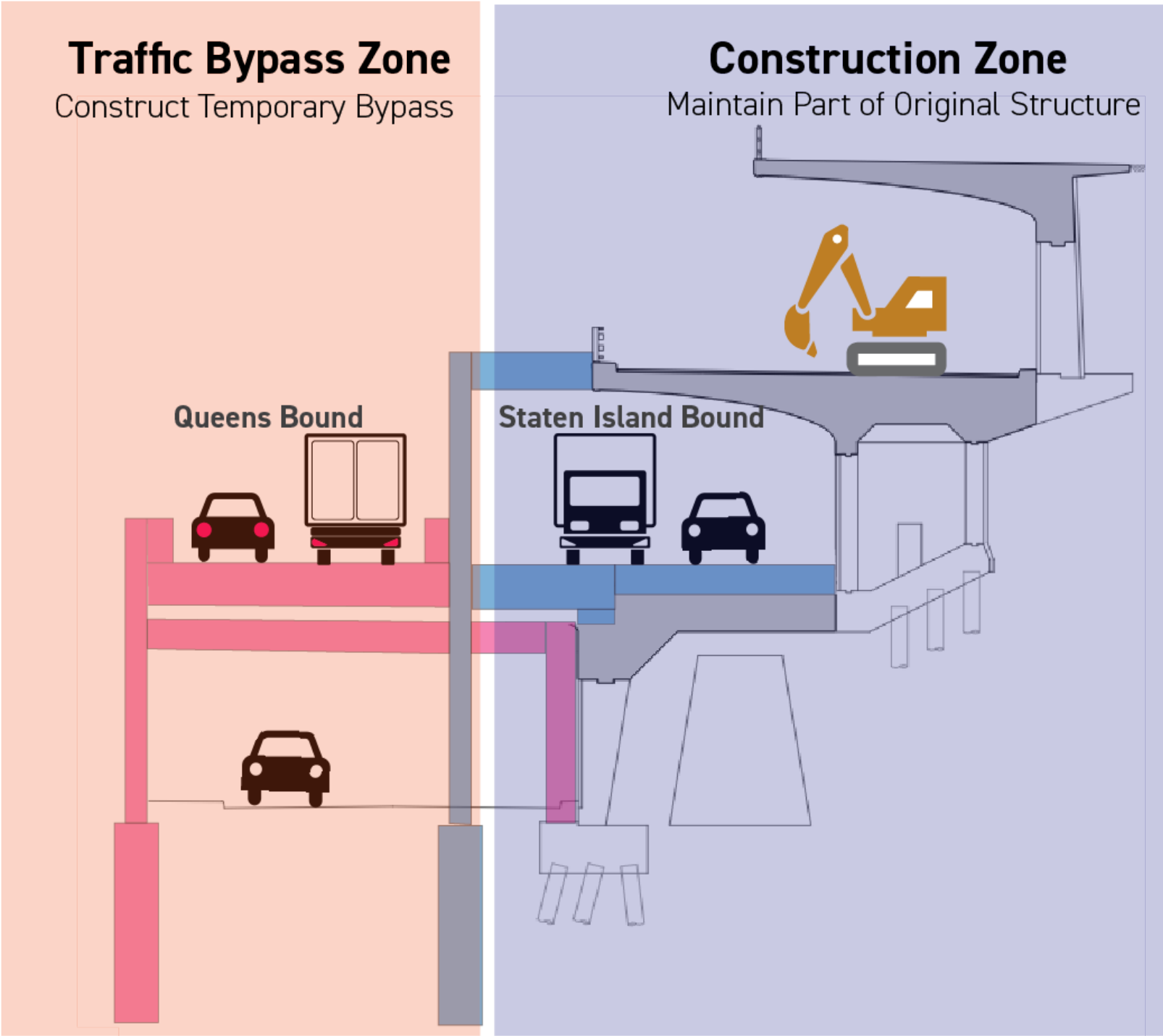
# Beta | Single Level Reversible Detour Option



**During Construction**



# Beta | Single Level Reversible Detour Option

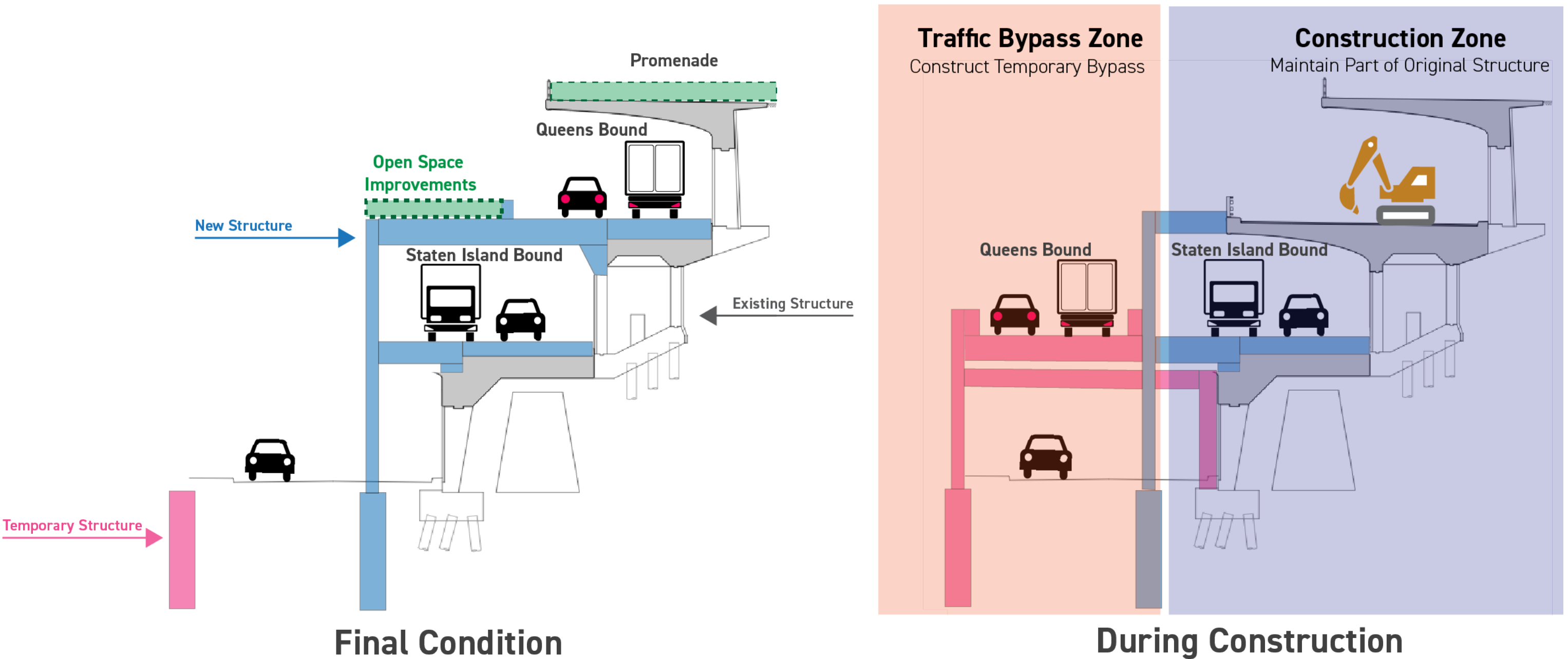


**During Construction**

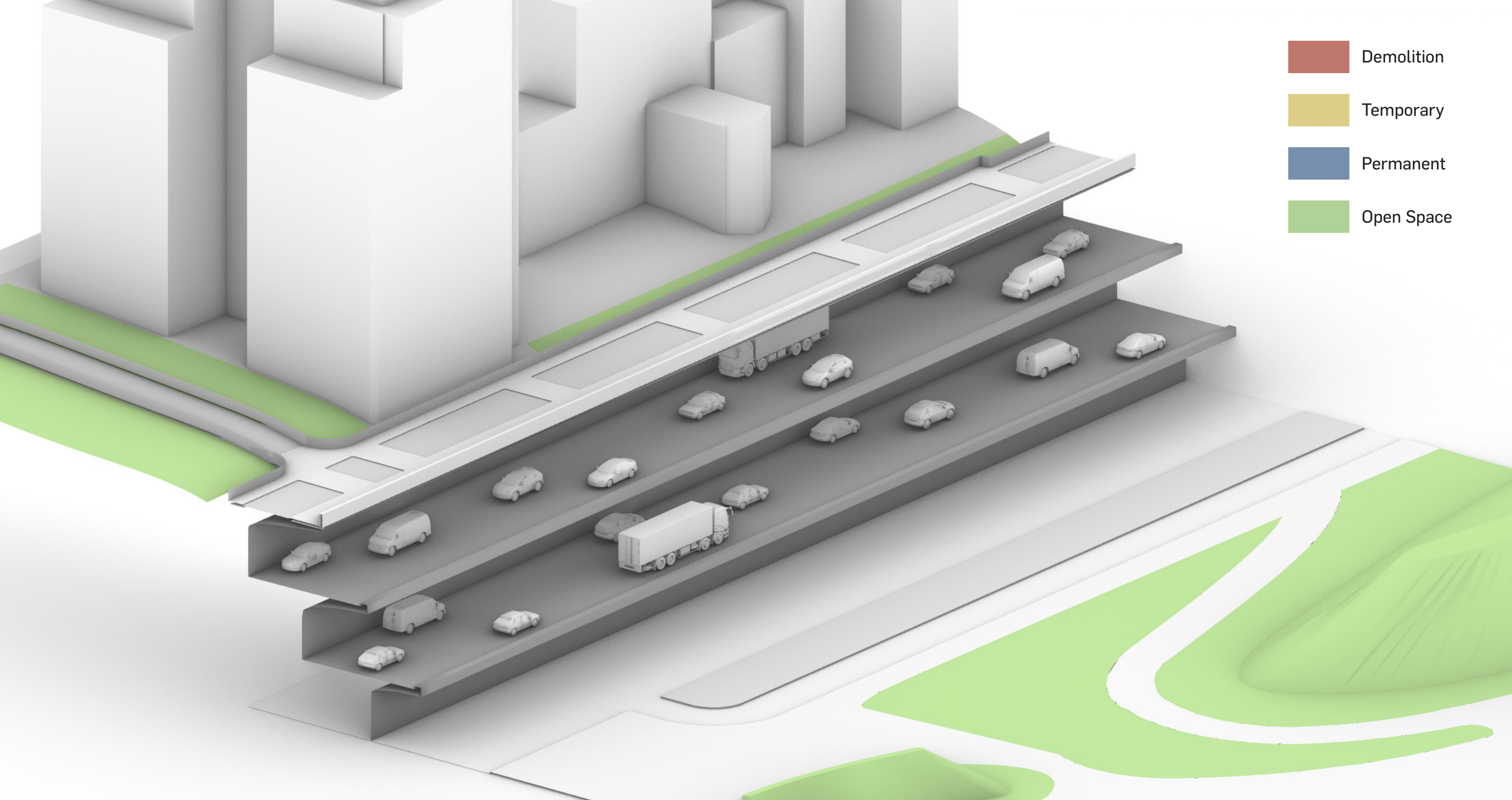


# Beta | Single Level Reversible Detour Option

## Cantilever replaced by box structure

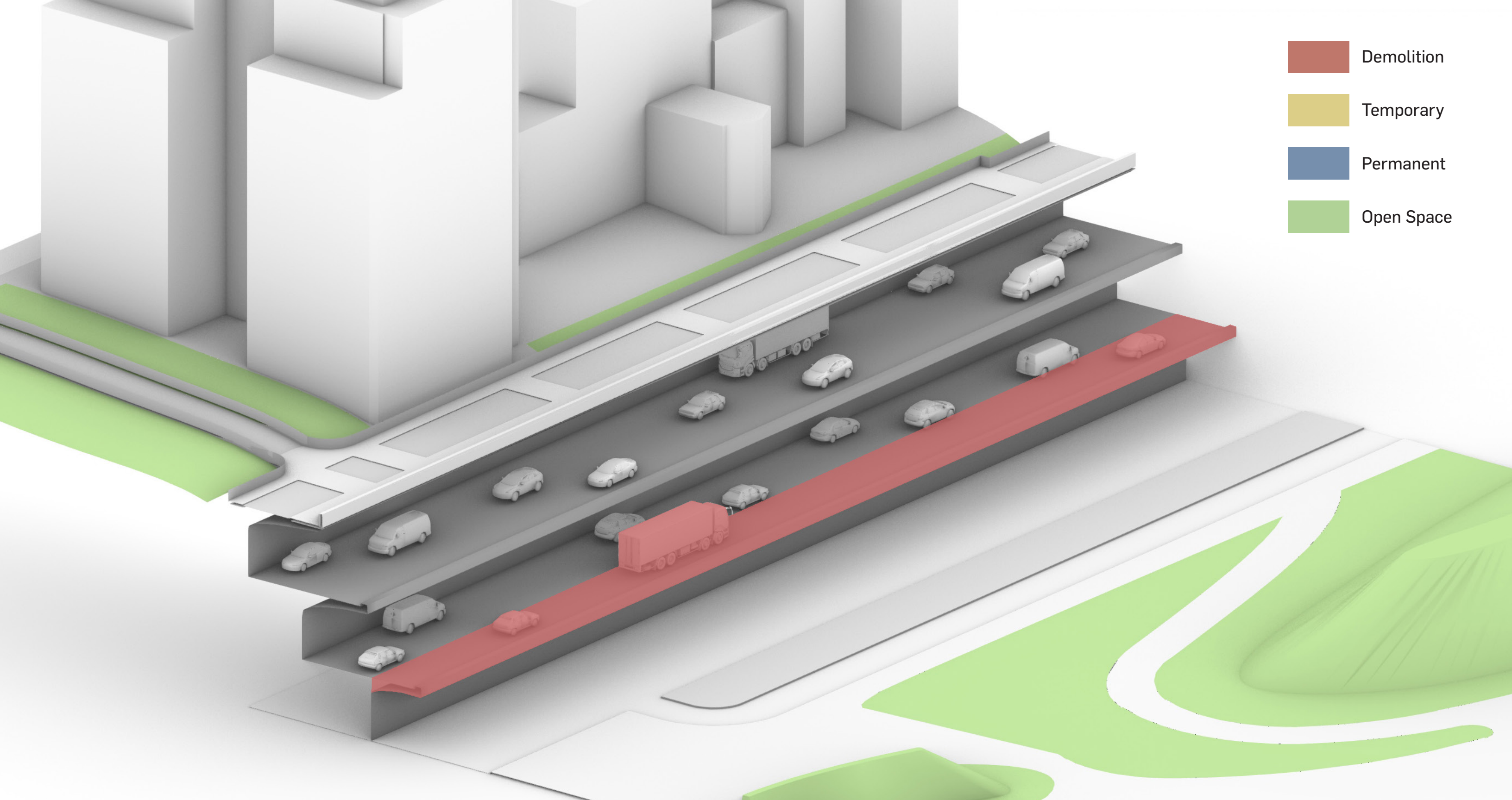






- Demolition
- Temporary
- Permanent
- Open Space





- Demolition
- Temporary
- Permanent
- Open Space

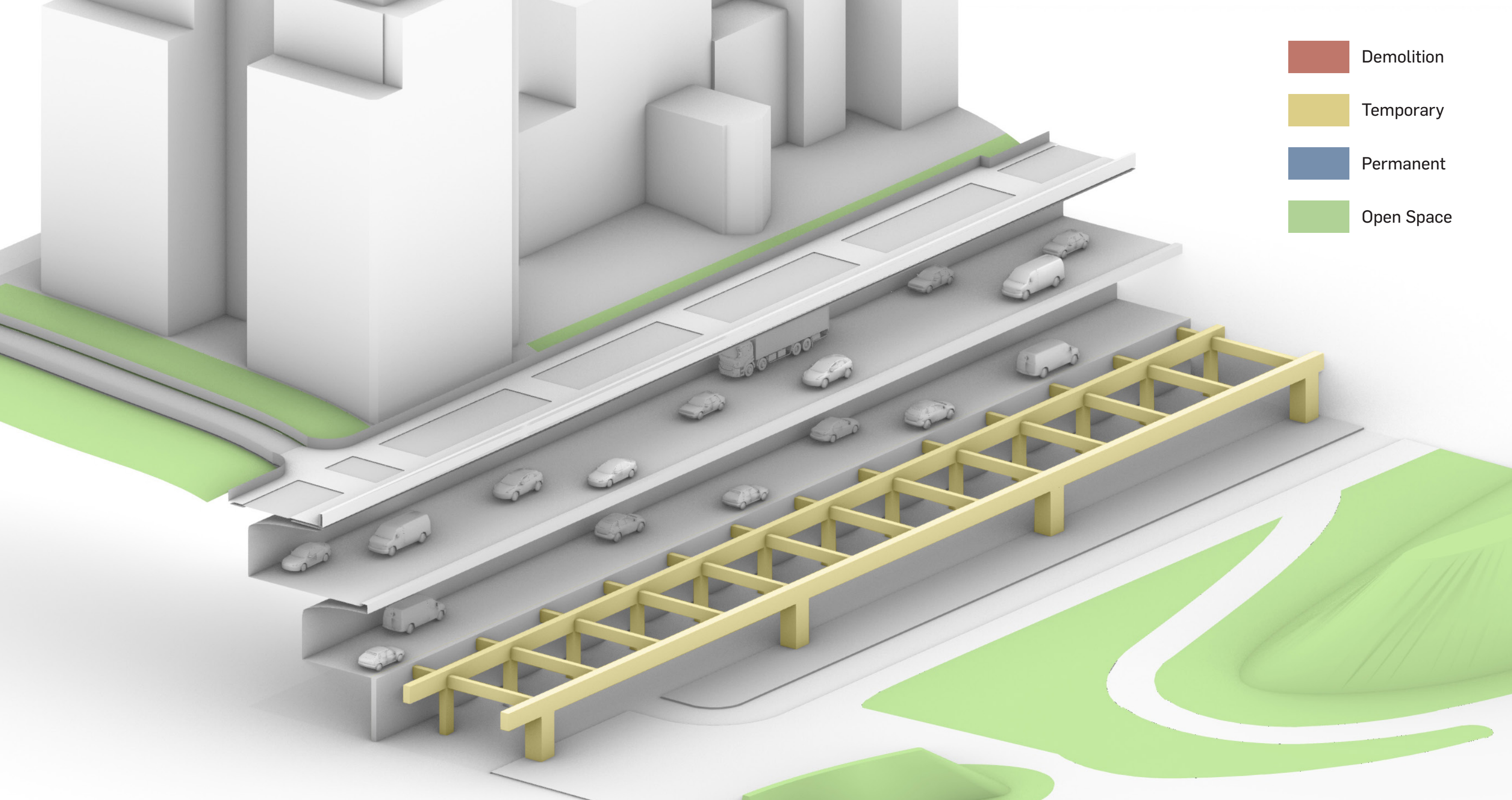
# Deconstruct SB Cantilever

As presented to the BQE Expert Panel for informational/background purposes only

<https://bqe-i278.com/en/expert-panel/documents>

**Sam Schwartz** W X Y

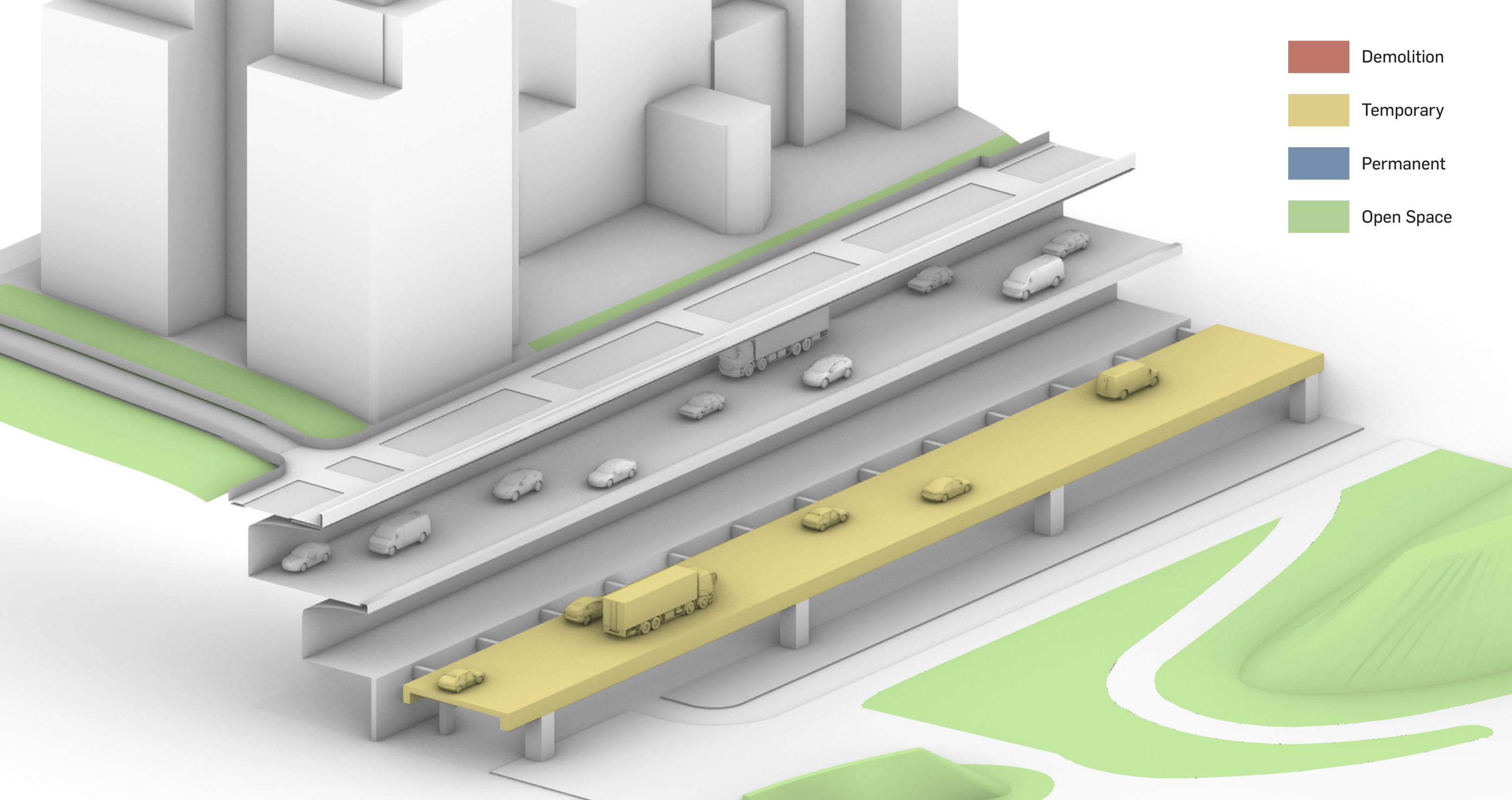




- Demolition
- Temporary
- Permanent
- Open Space

# Construct Bypass

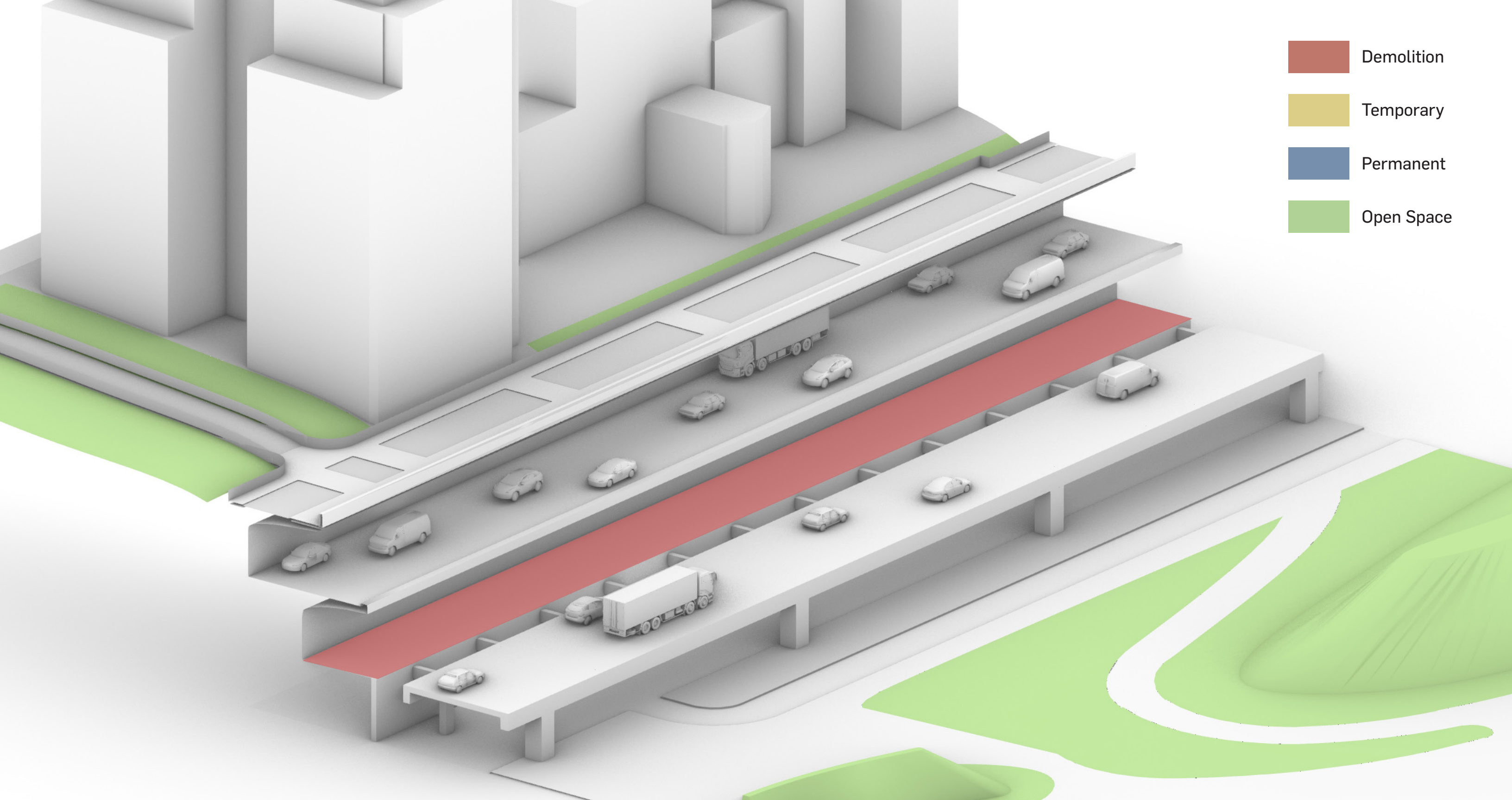




- Demolition
- Temporary
- Permanent
- Open Space

# Construct Bypass

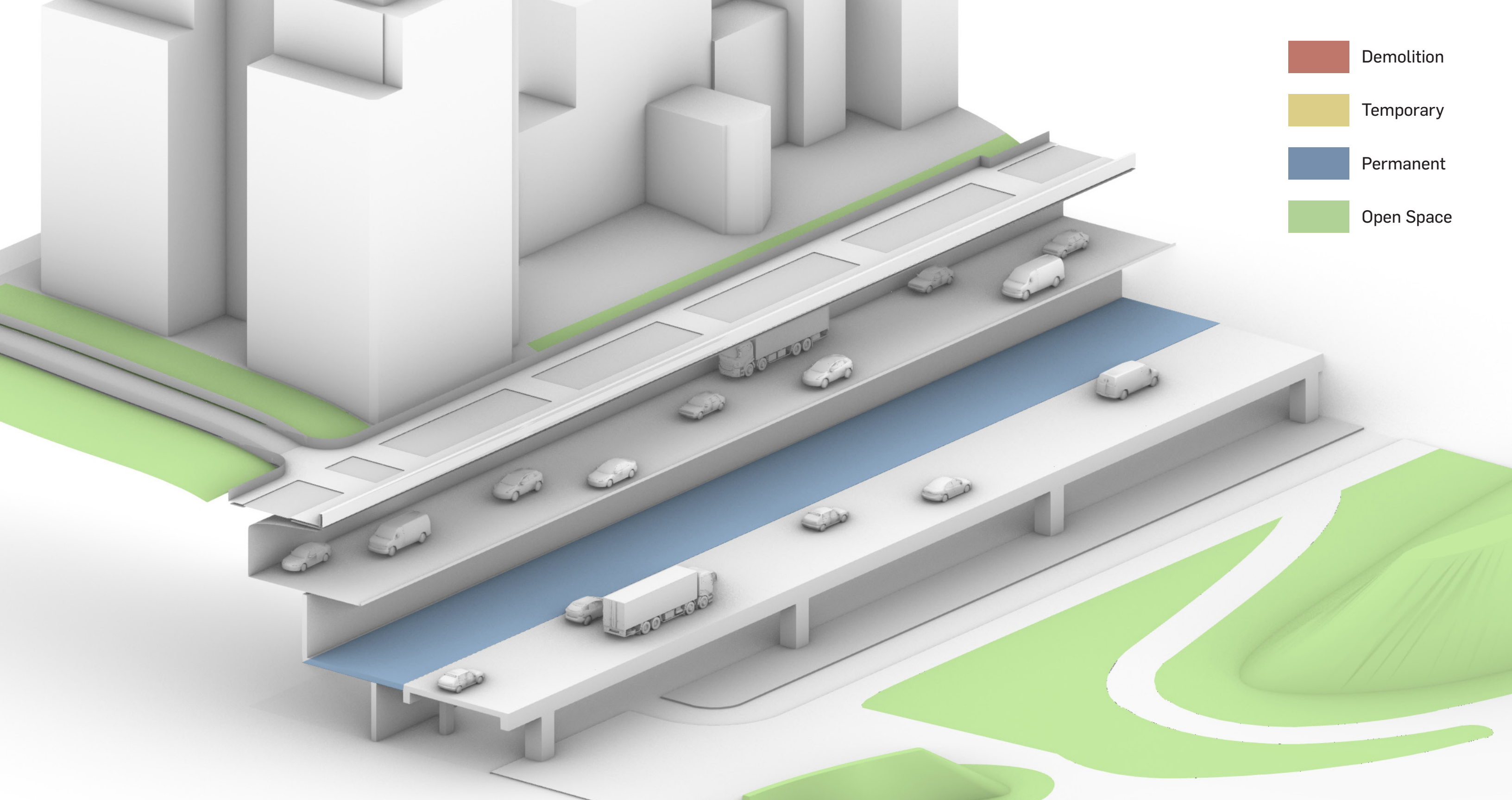




- Demolition
- Temporary
- Permanent
- Open Space

## Demolish SB Roadway





- Demolition
- Temporary
- Permanent
- Open Space

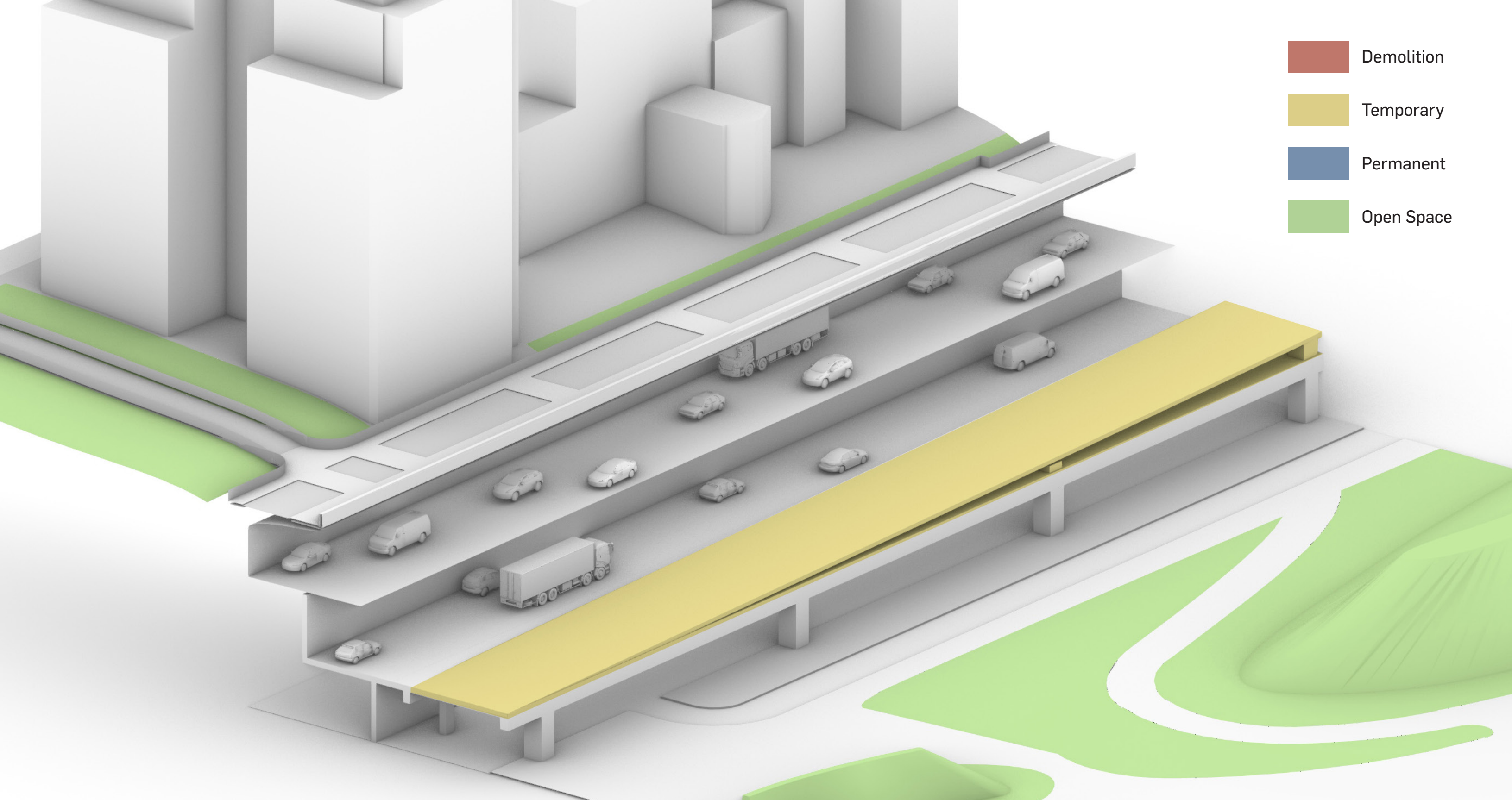
# Construct SB Roadway

As presented to the BQE Expert Panel for informational/background purposes only

<https://bqe-i278.com/en/expert-panel/documents>

**Sam Schwartz** W X Y





- Demolition
- Temporary
- Permanent
- Open Space

# Construct Connecting Ramp

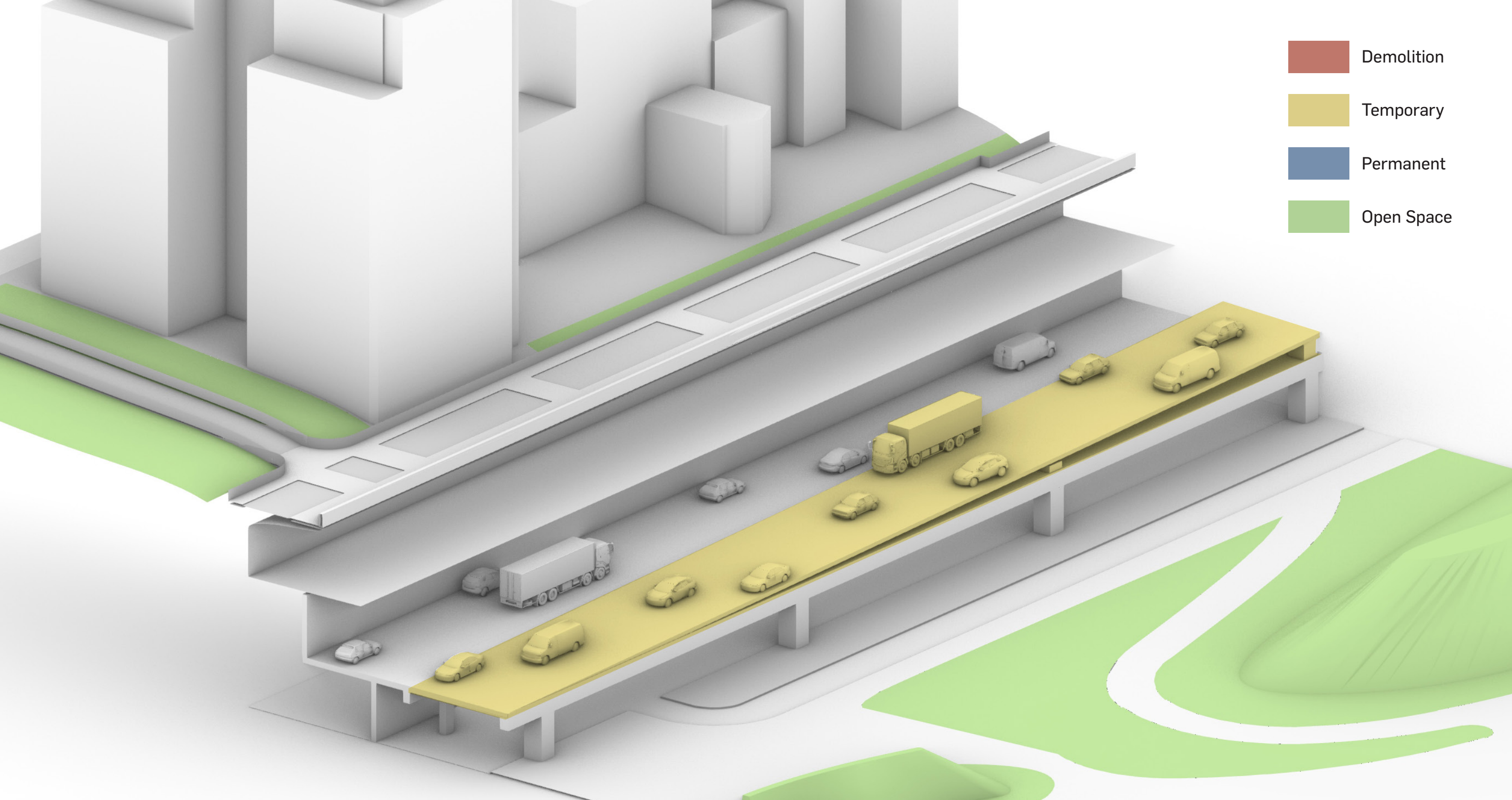
As presented to the BQE Expert Panel for informational/background purposes only

<https://bqe-i278.com/en/expert-panel/documents>

Sam Schwartz

W X Y

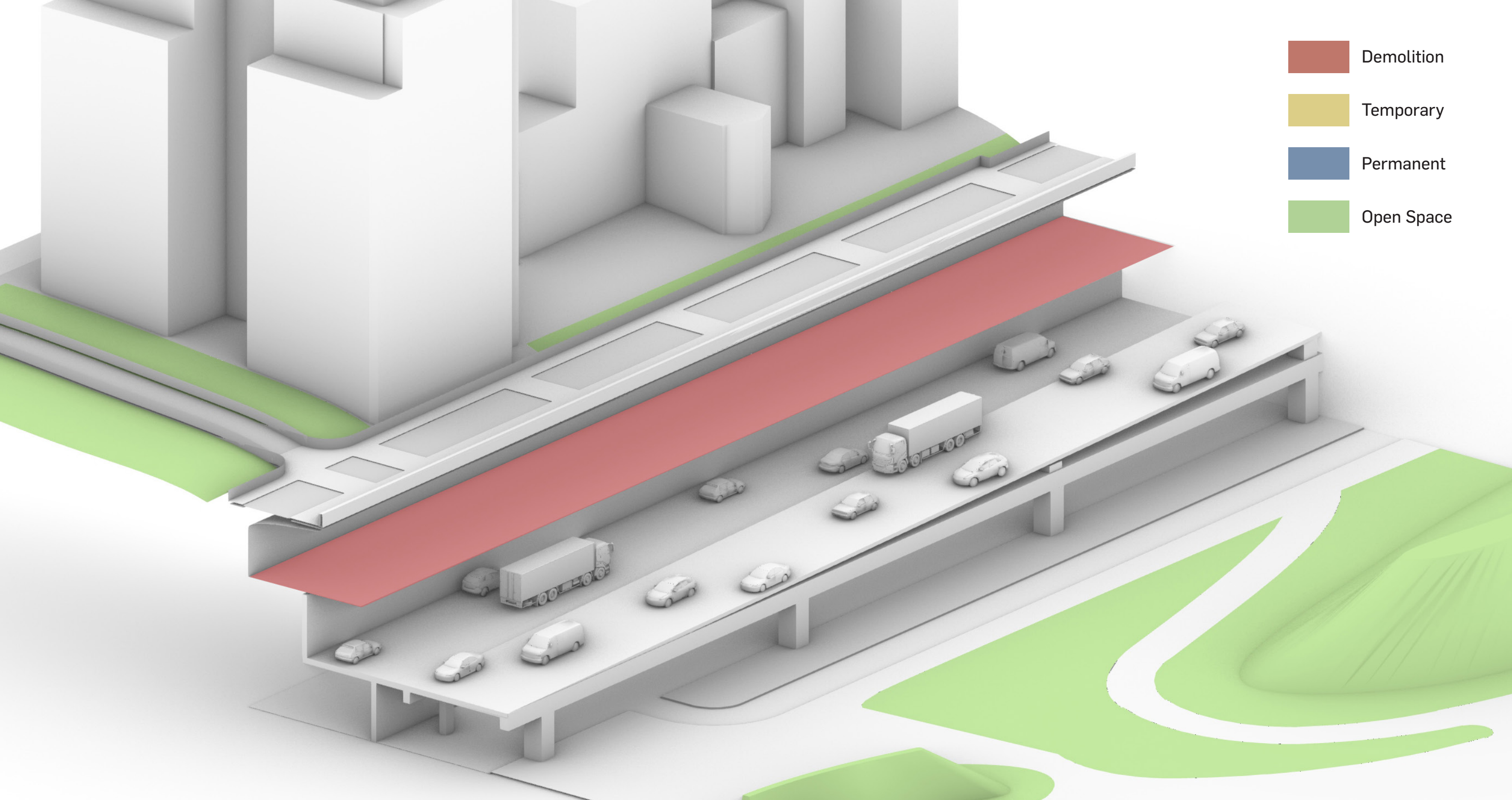




- Demolition
- Temporary
- Permanent
- Open Space

# Shift NB Traffic to Bypass





- Demolition
- Temporary
- Permanent
- Open Space

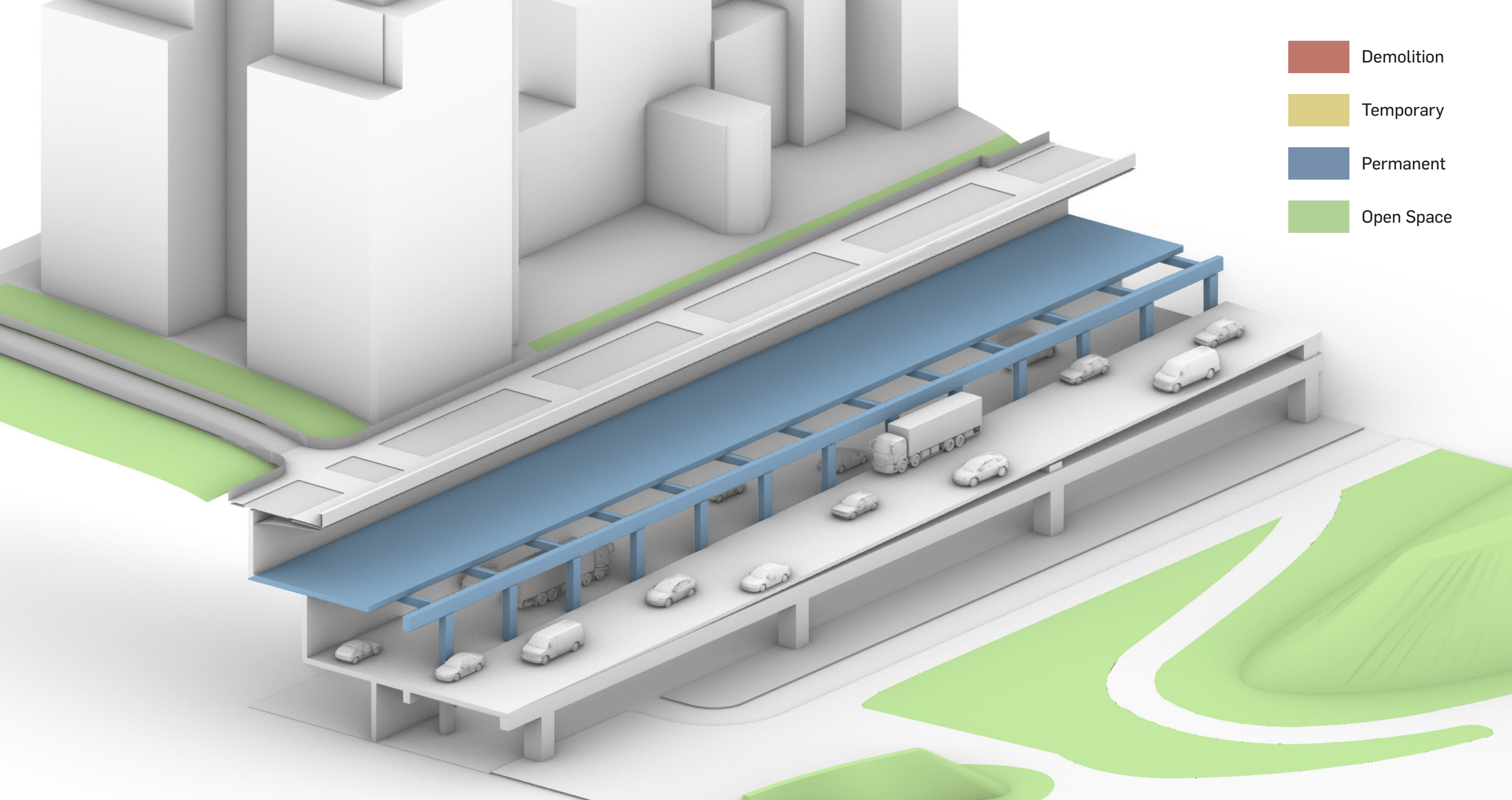
# Demolish NB Roadway

As presented to the BQE Expert Panel for informational/background purposes only

<https://bqe-i278.com/en/expert-panel/documents>

**Sam Schwartz** W X Y





- Demolition
- Temporary
- Permanent
- Open Space

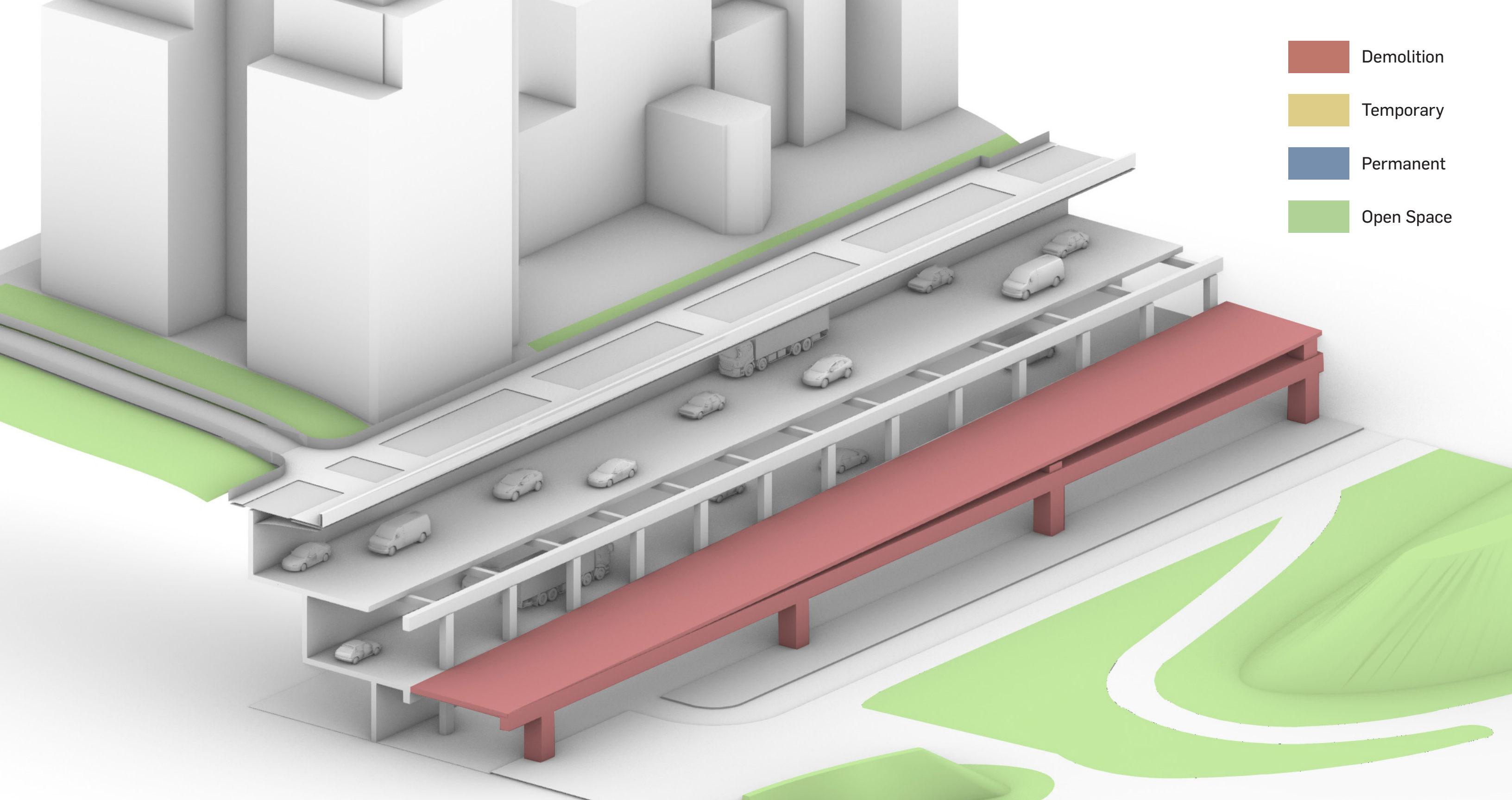
# Construct NB Box Structure

As presented to the BQE Expert Panel for informational/background purposes only

<https://bqe-i278.com/en/expert-panel/documents>

**Sam Schwartz** W X Y





- Demolition
- Temporary
- Permanent
- Open Space

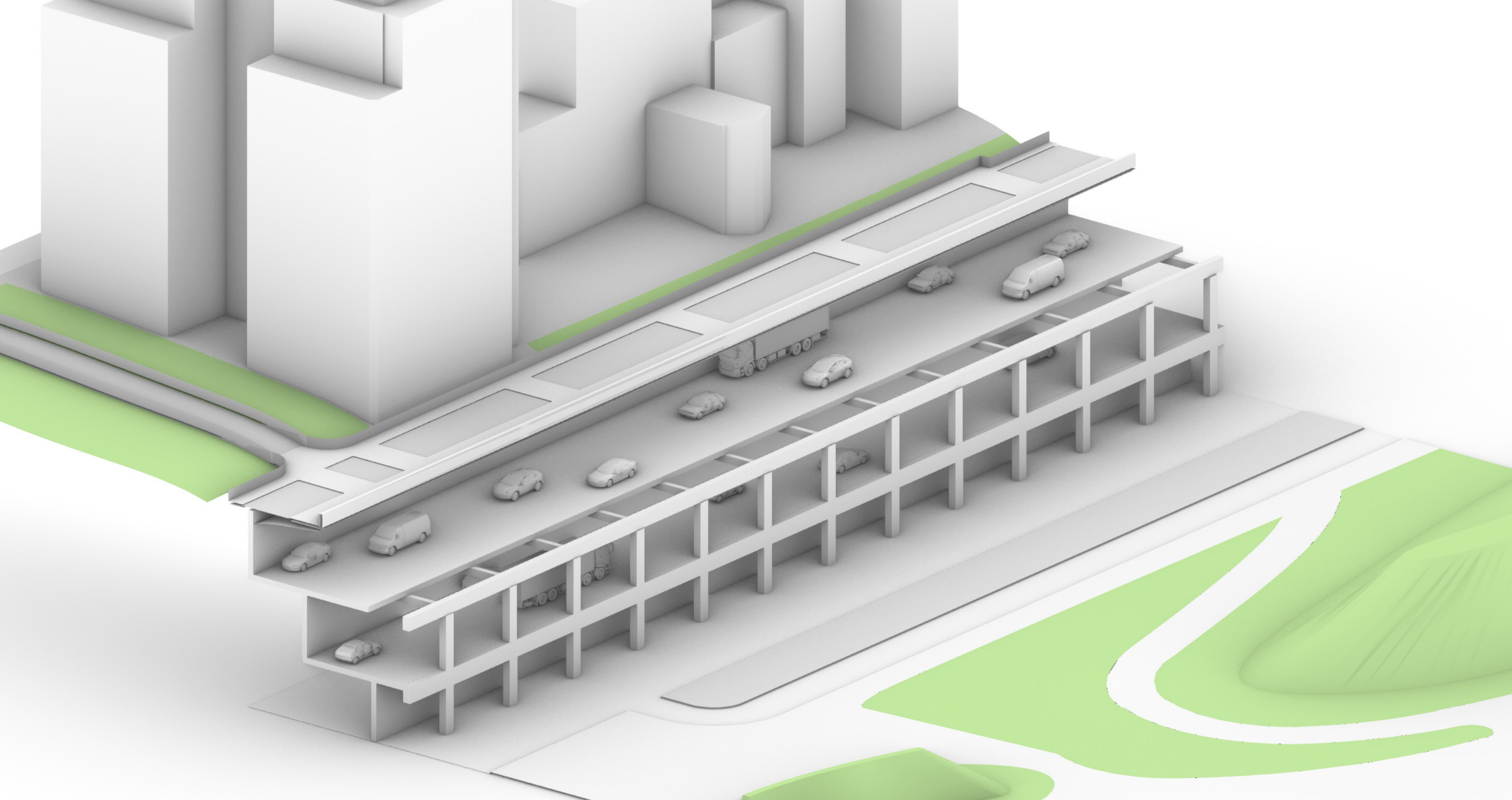
## Demolish Connecting Ramps

As presented to the BQE Expert Panel for informational/background purposes only

<https://bqe-i278.com/en/expert-panel/documents>

Sam Schwartz W X Y









# Existing





## Construct 1-Level Bypass





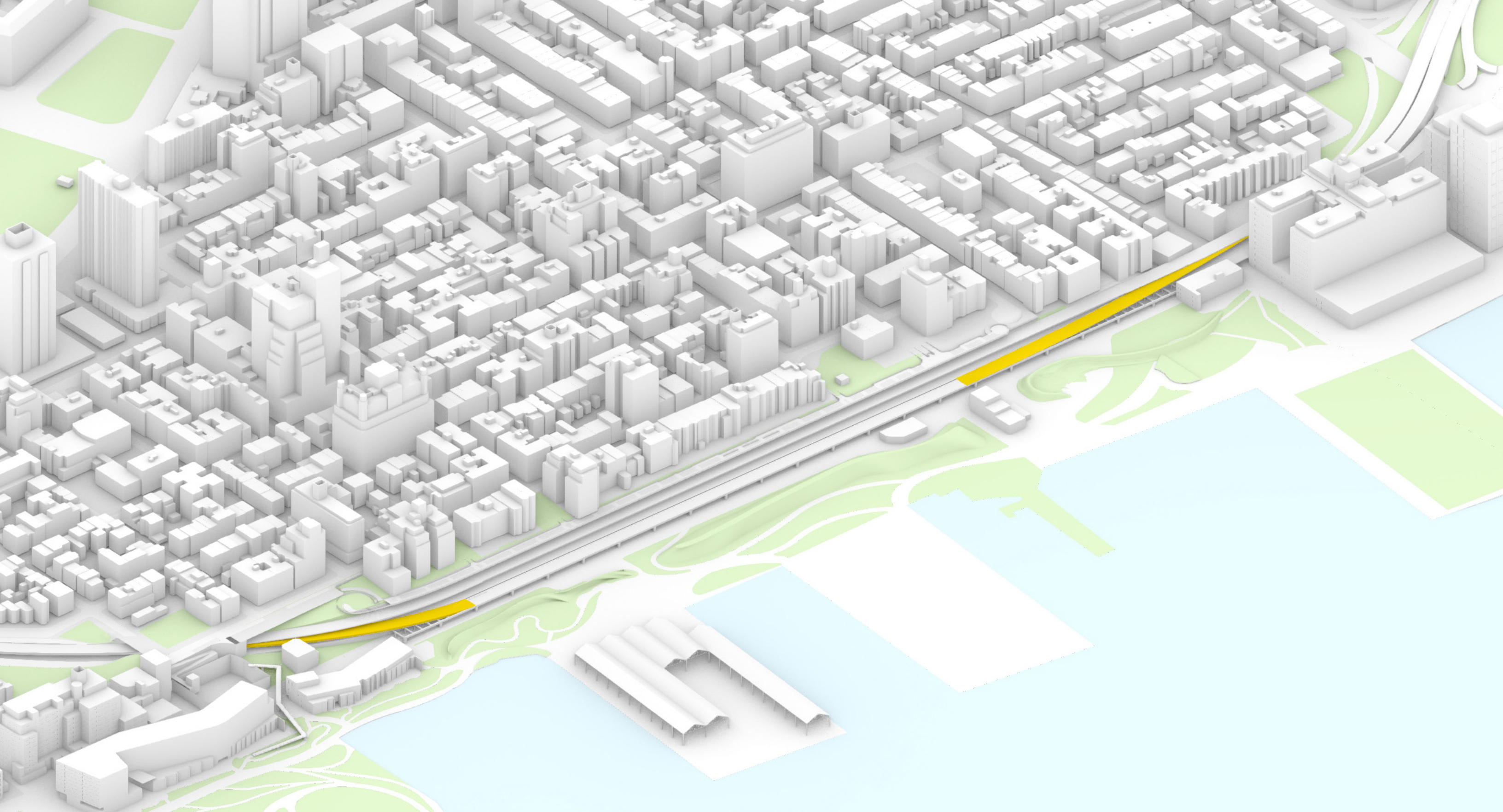
## Demolish SB Roadway





## Reconstruct SB & Shift Traffic





## Build NB Connecting Ramps





## Run NB traffic on bypass





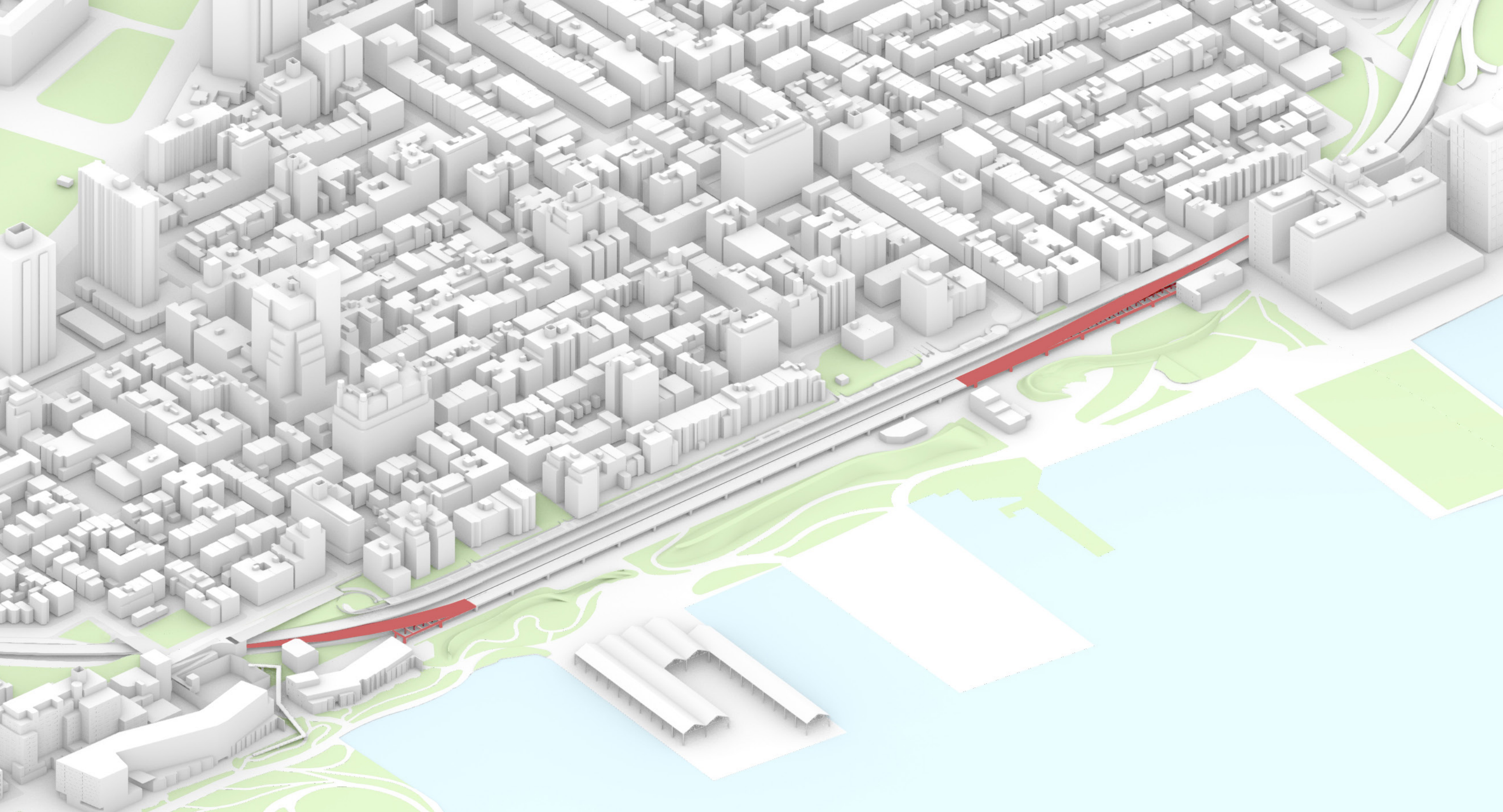
## Demolish NB Roadway





## Construct NB Roadway





## Construct NB Roadway





## Convert Bypass to Open Space



# Beta Slide | FDR Drive East 50s Street

## Section Over River

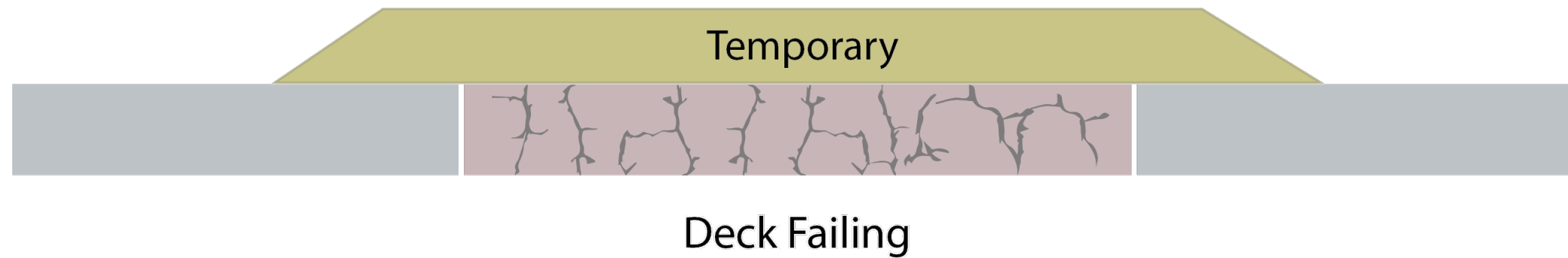


Deck Failing



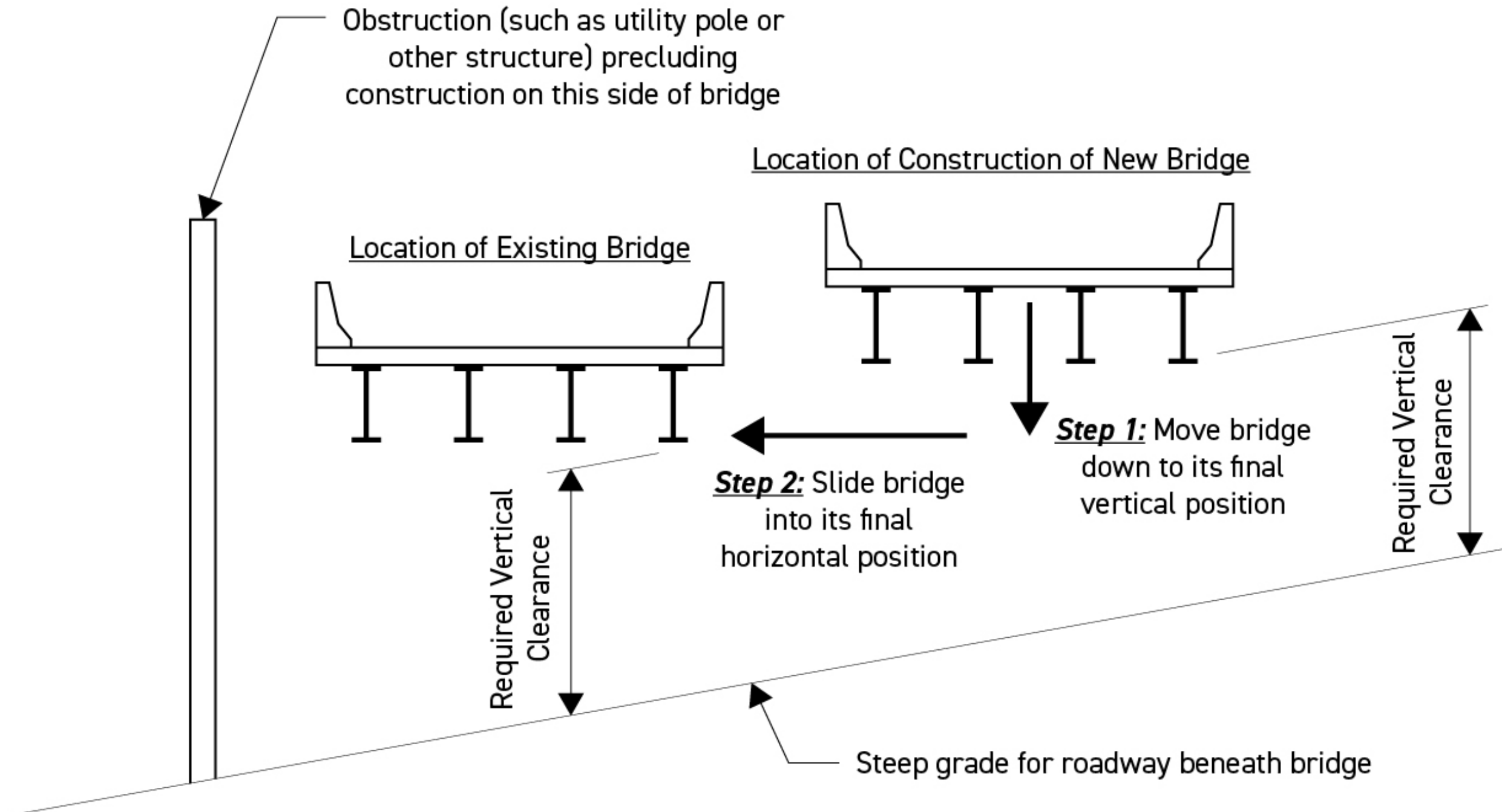
# Beta Slide | FDR Drive East 50s Street

## Section Over River

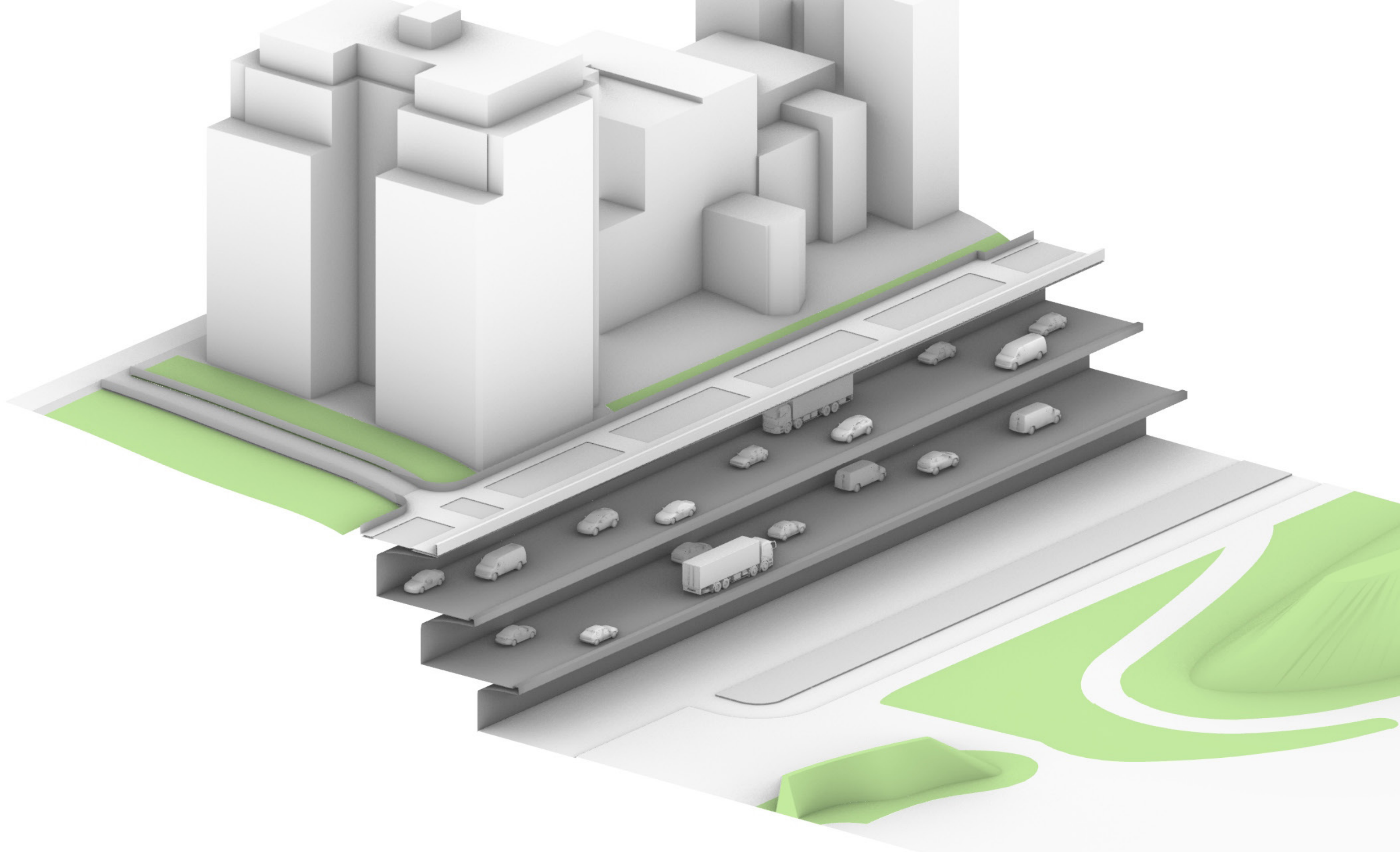




# Beta Slide | Slide-In Bridge Construction Method

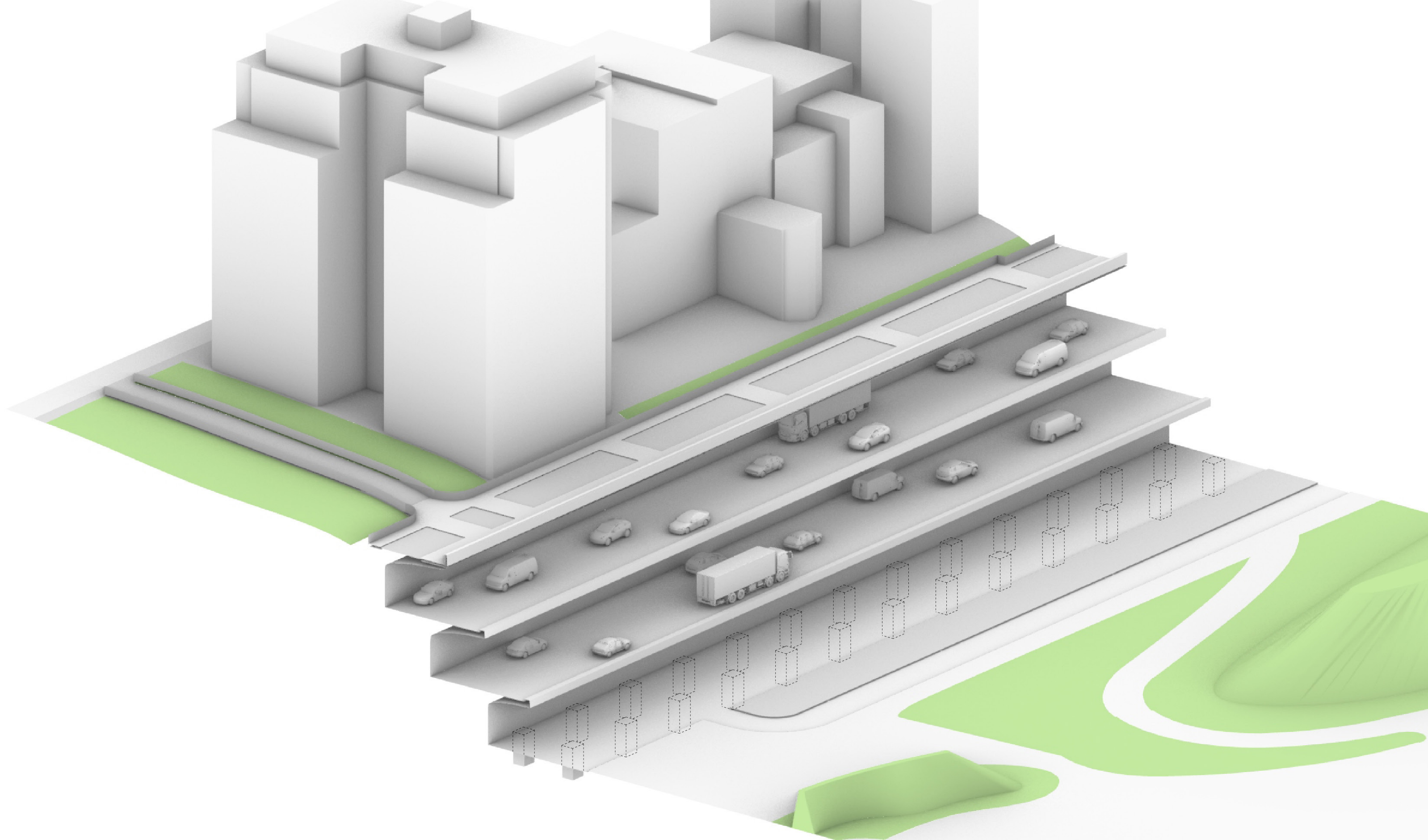




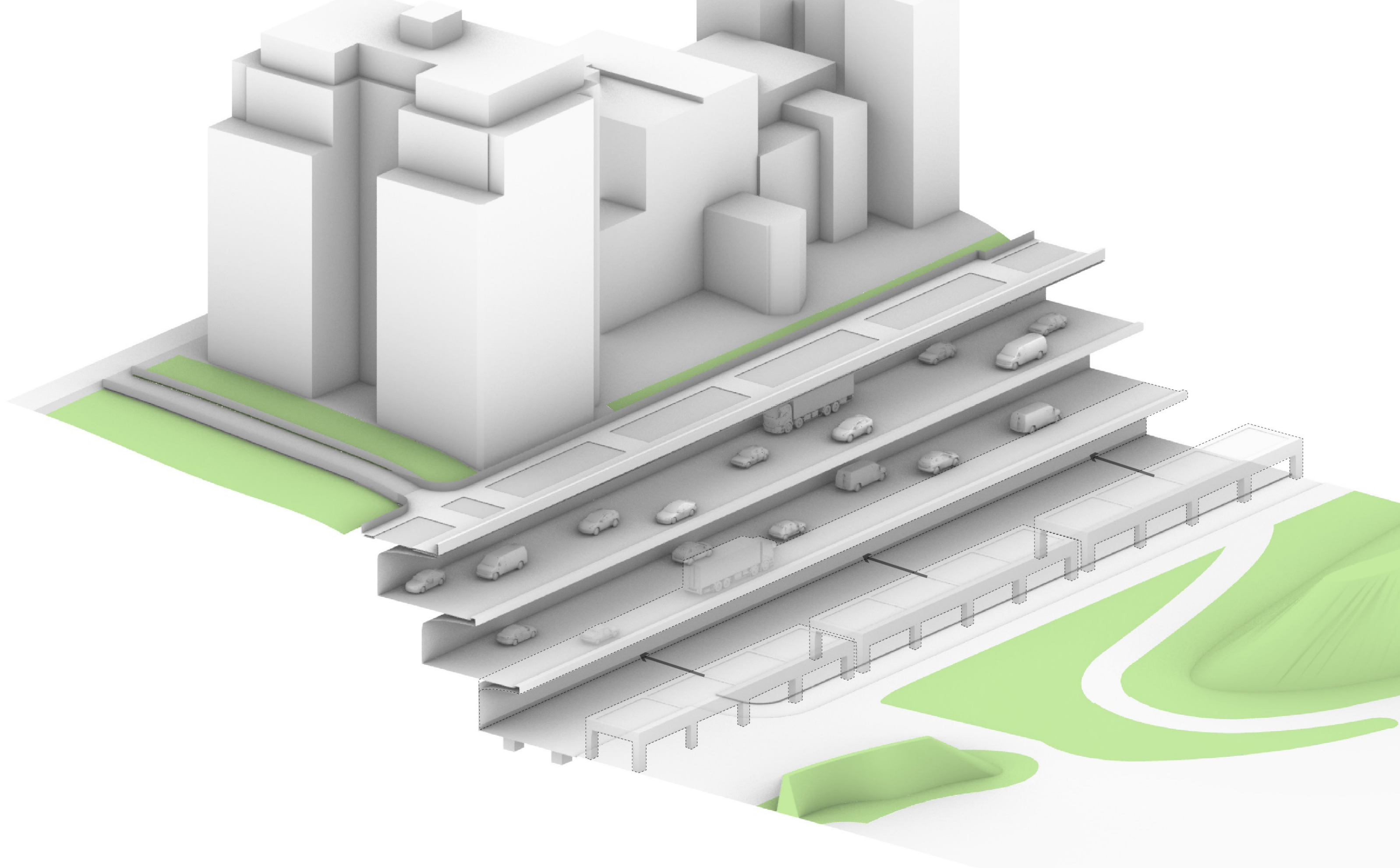


As presented to the BQE Expert Panel for informational/background purposes only  
<https://bqe-i278.com/en/expert-panel/documents>



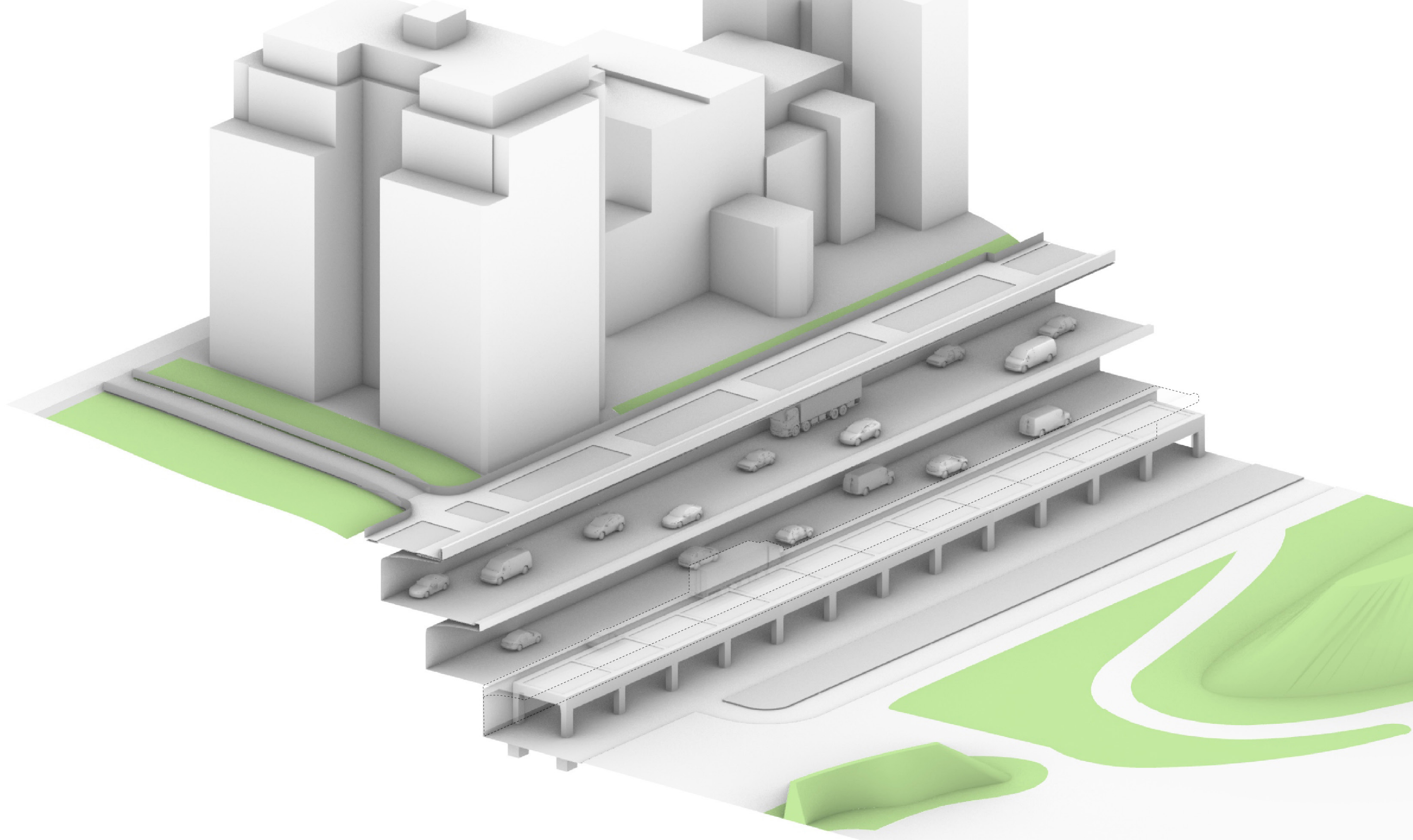




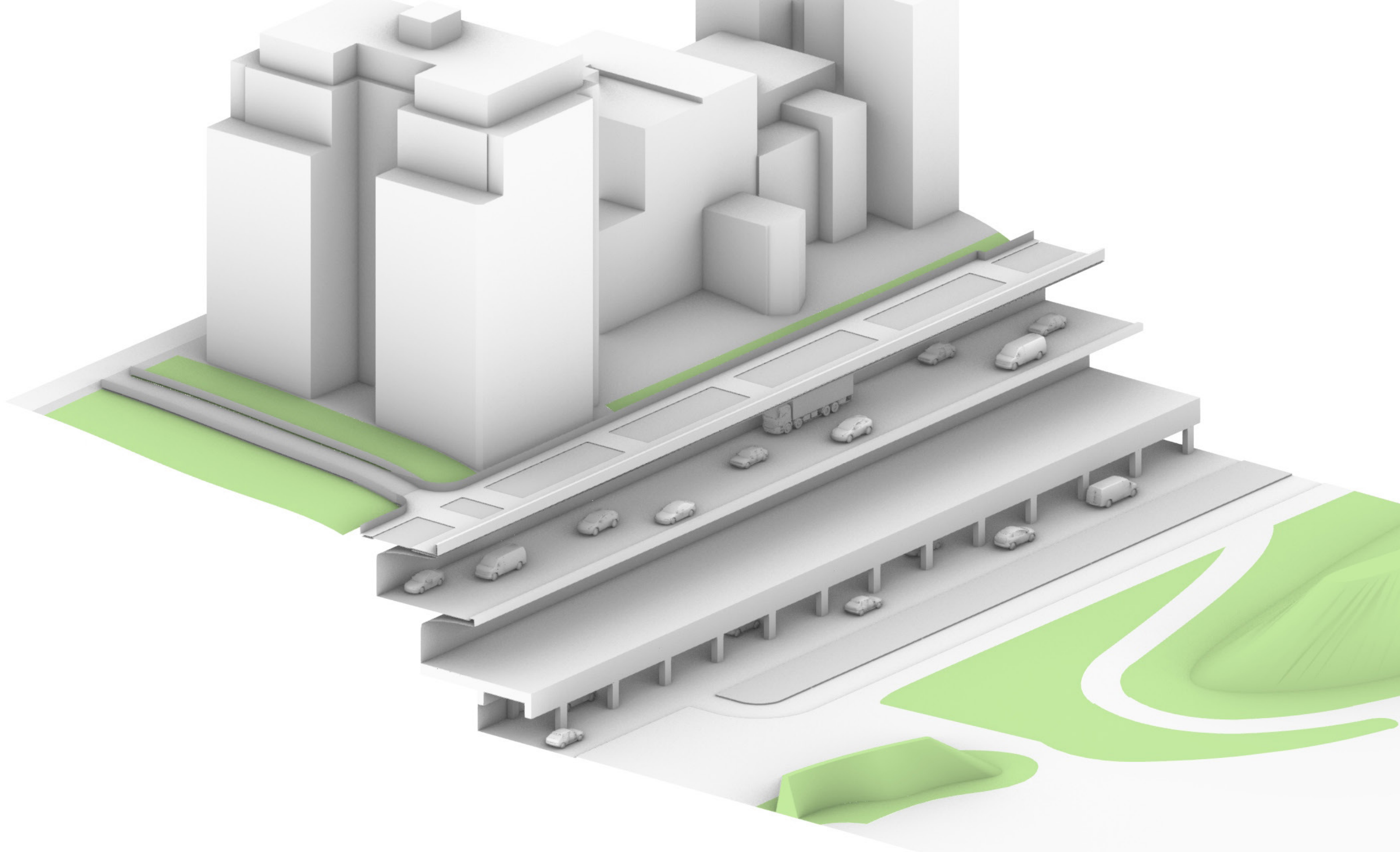


As presented to the BQE Expert Panel for informational/background purposes only  
<https://bqe-i278.com/en/expert-panel/documents>



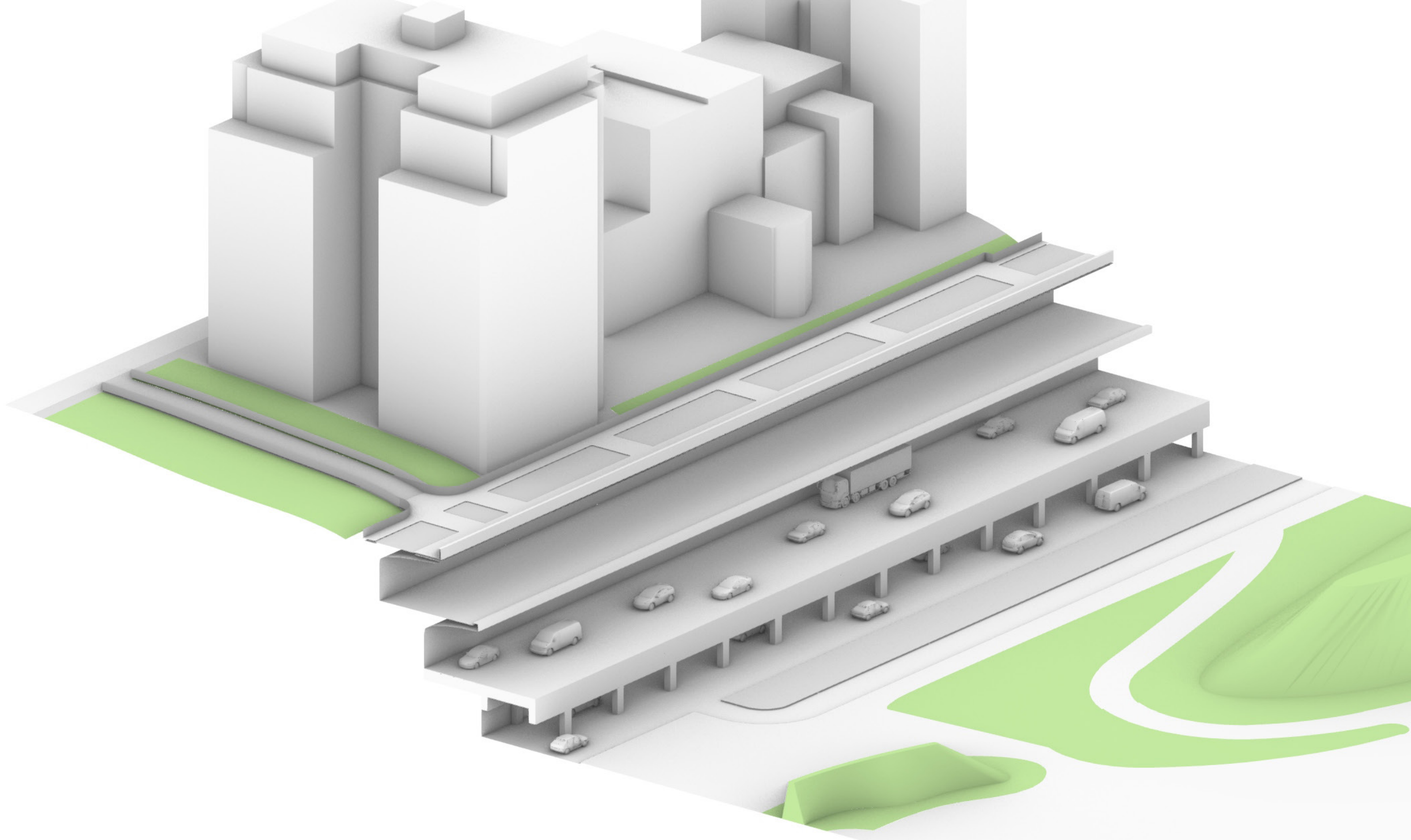






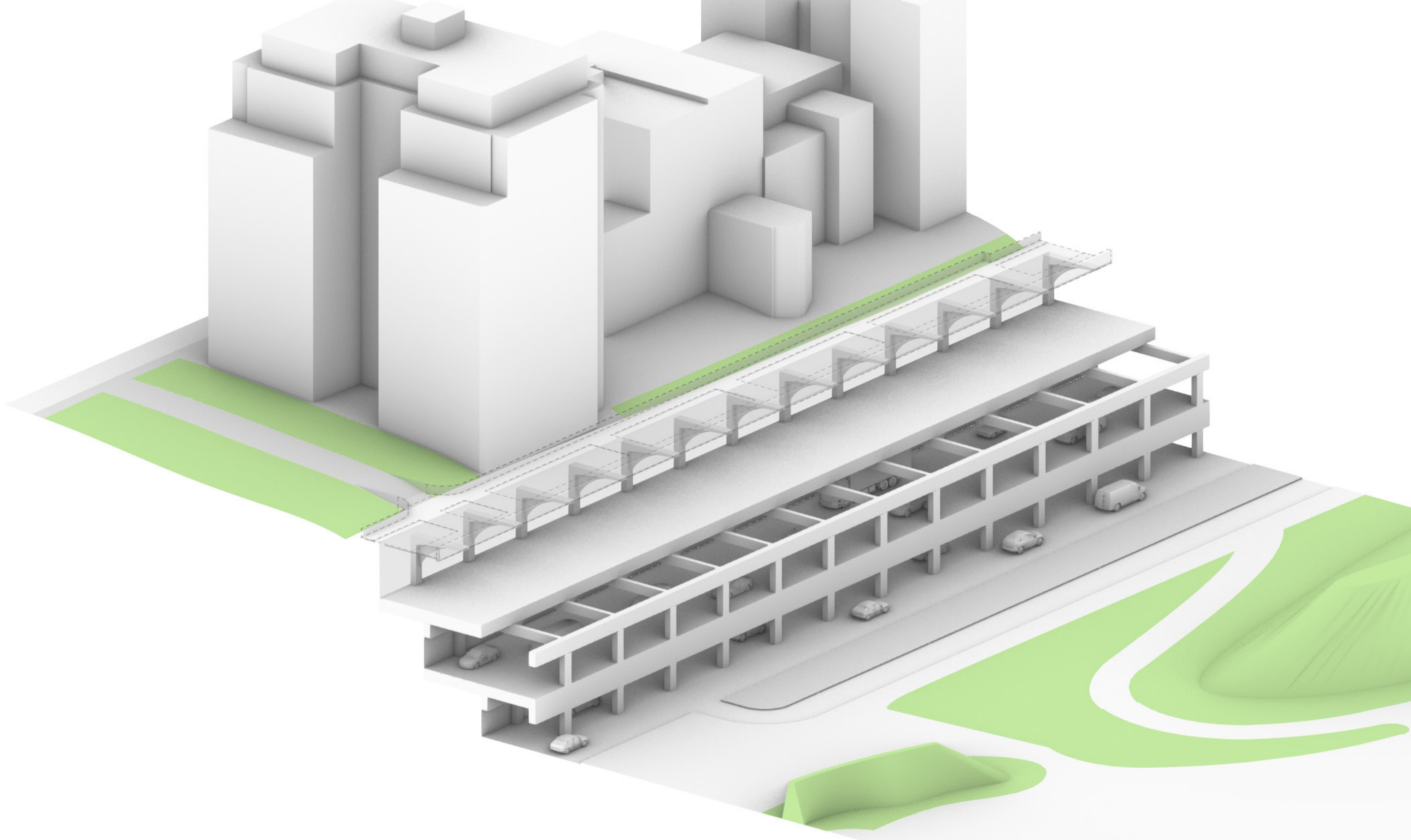
As presented to the BQE Expert Panel for informational/background purposes only  
<https://bqe-i278.com/en/expert-panel/documents>





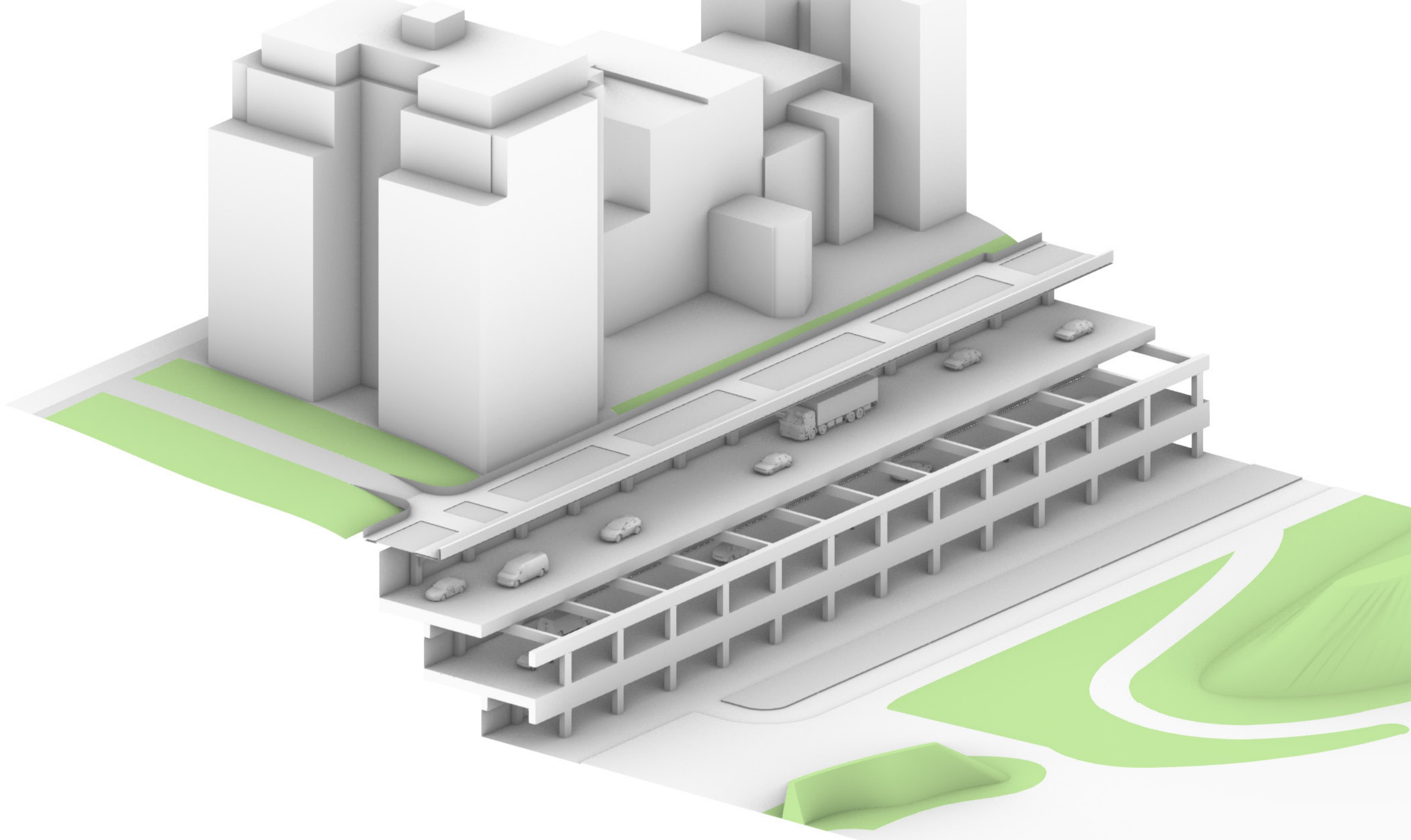
As presented to the BQE Expert Panel for informational/background purposes only  
<https://bqe-i278.com/en/expert-panel/documents>





As presented to the BQE Expert Panel for informational/background purposes only  
<https://bqe-i278.com/en/expert-panel/documents>

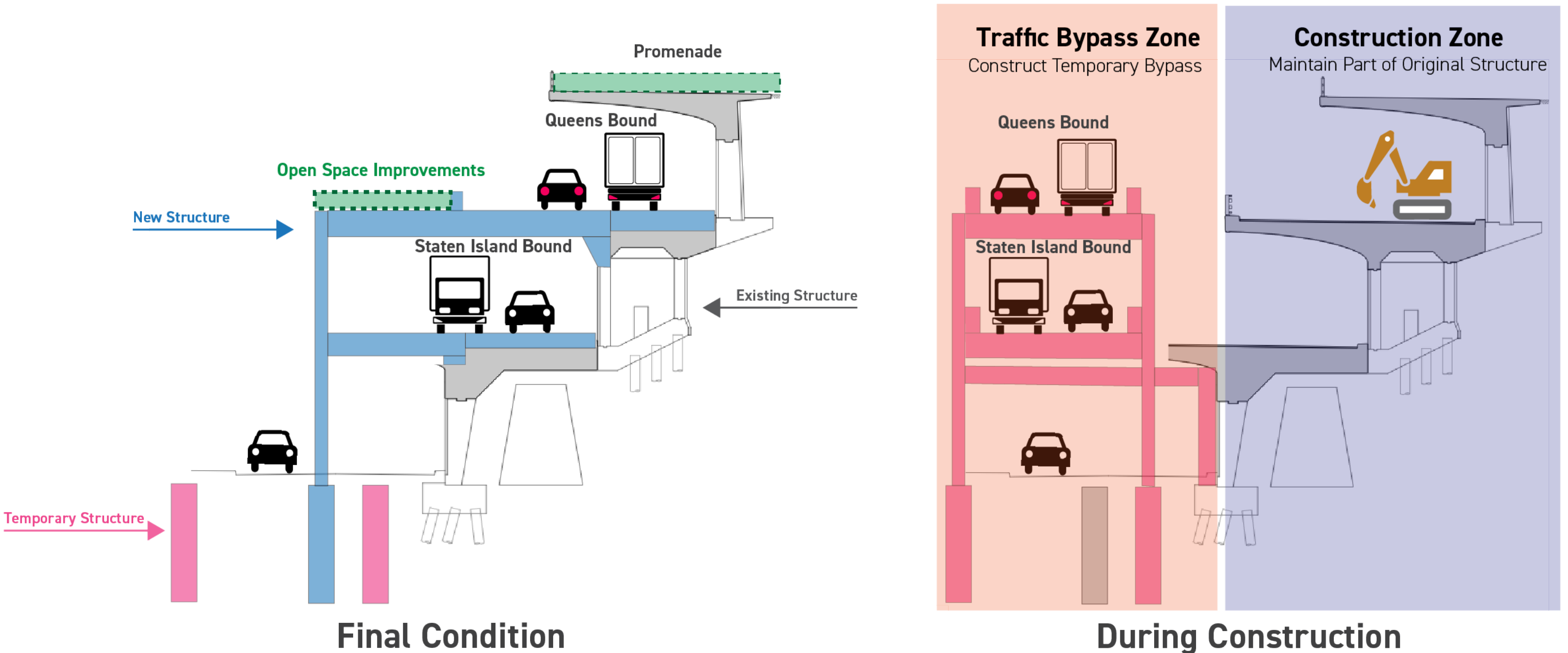




As presented to the BQE Expert Panel for informational/background purposes only  
<https://bqe-i278.com/en/expert-panel/documents>



# Beta Fallback | Partial Rehabilitation + Replacement of Decks | Based on C1 Cantilever Replaced by Box Structure







**FLYOVER**

**0**



**ALPHA**

**1**



**BETA**

**2**

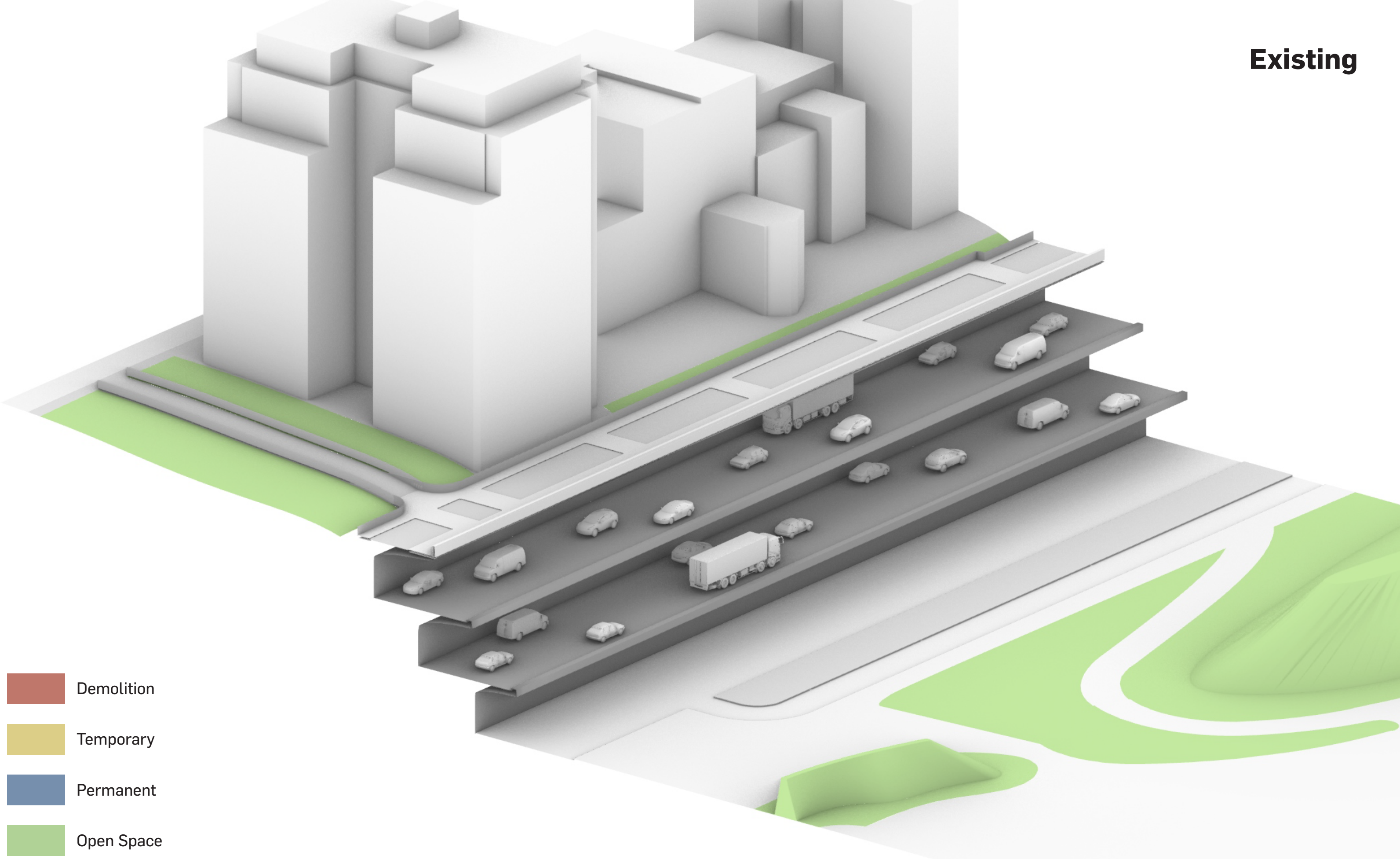


**GAMMA**

**3**



**Existing**

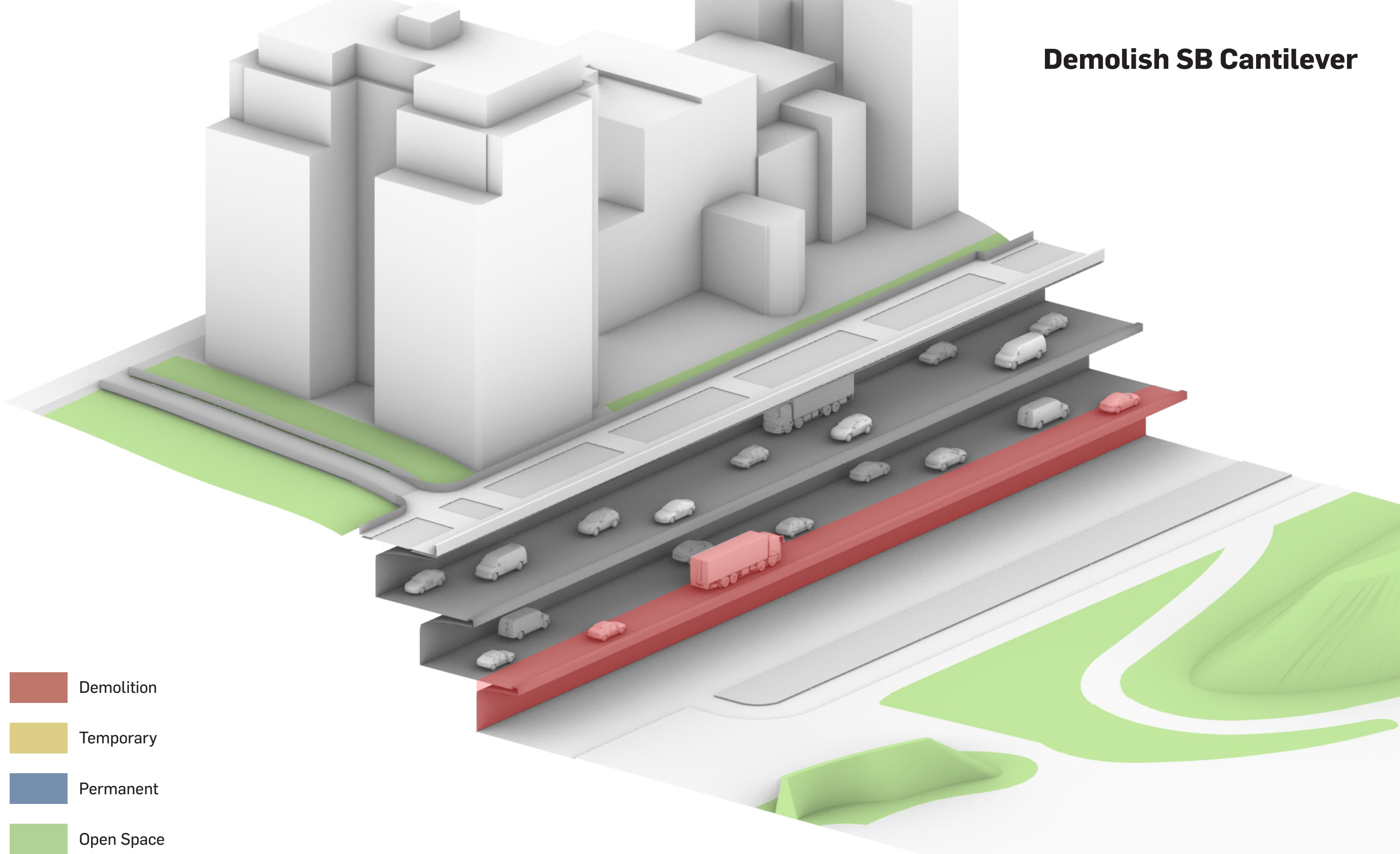


As presented to the BQE Expert Panel for informational/background purposes only

<https://bqe-i278.com/en/expert-panel/documents>



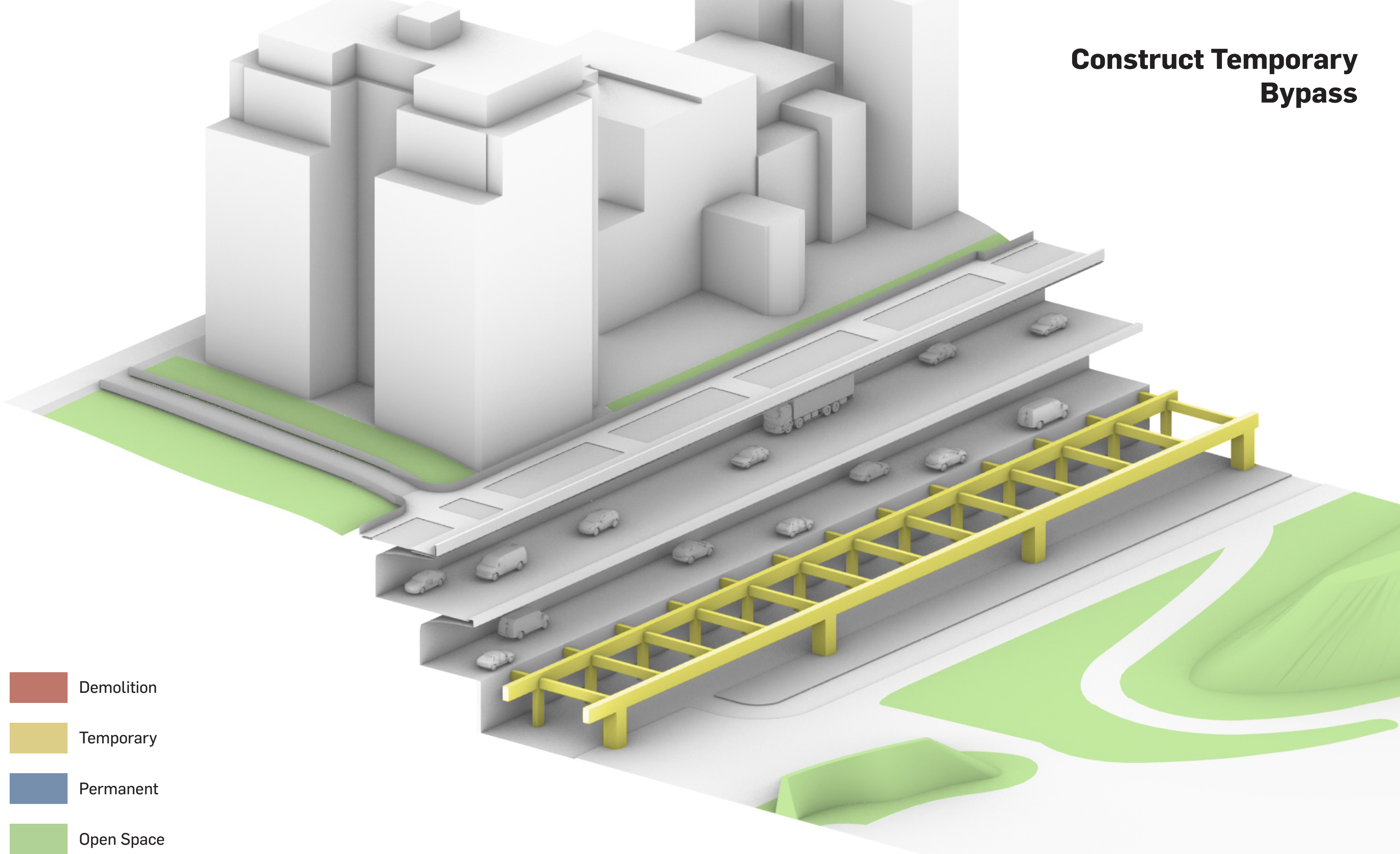
# Demolish SB Cantilever



As presented to the BQE Expert Panel for informational/background purposes only  
<https://bqe-i278.com/en/expert-panel/documents>

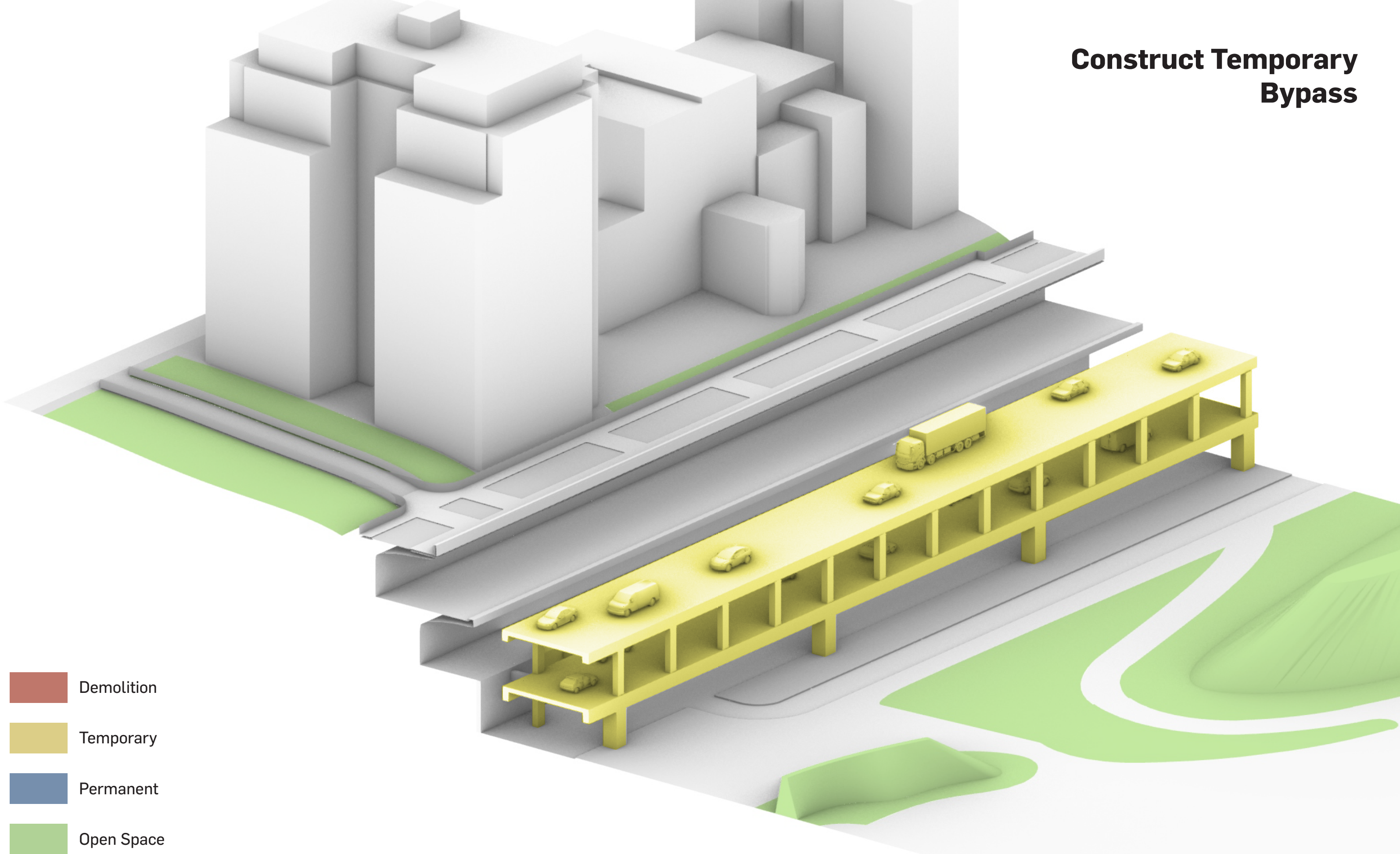


# Construct Temporary Bypass





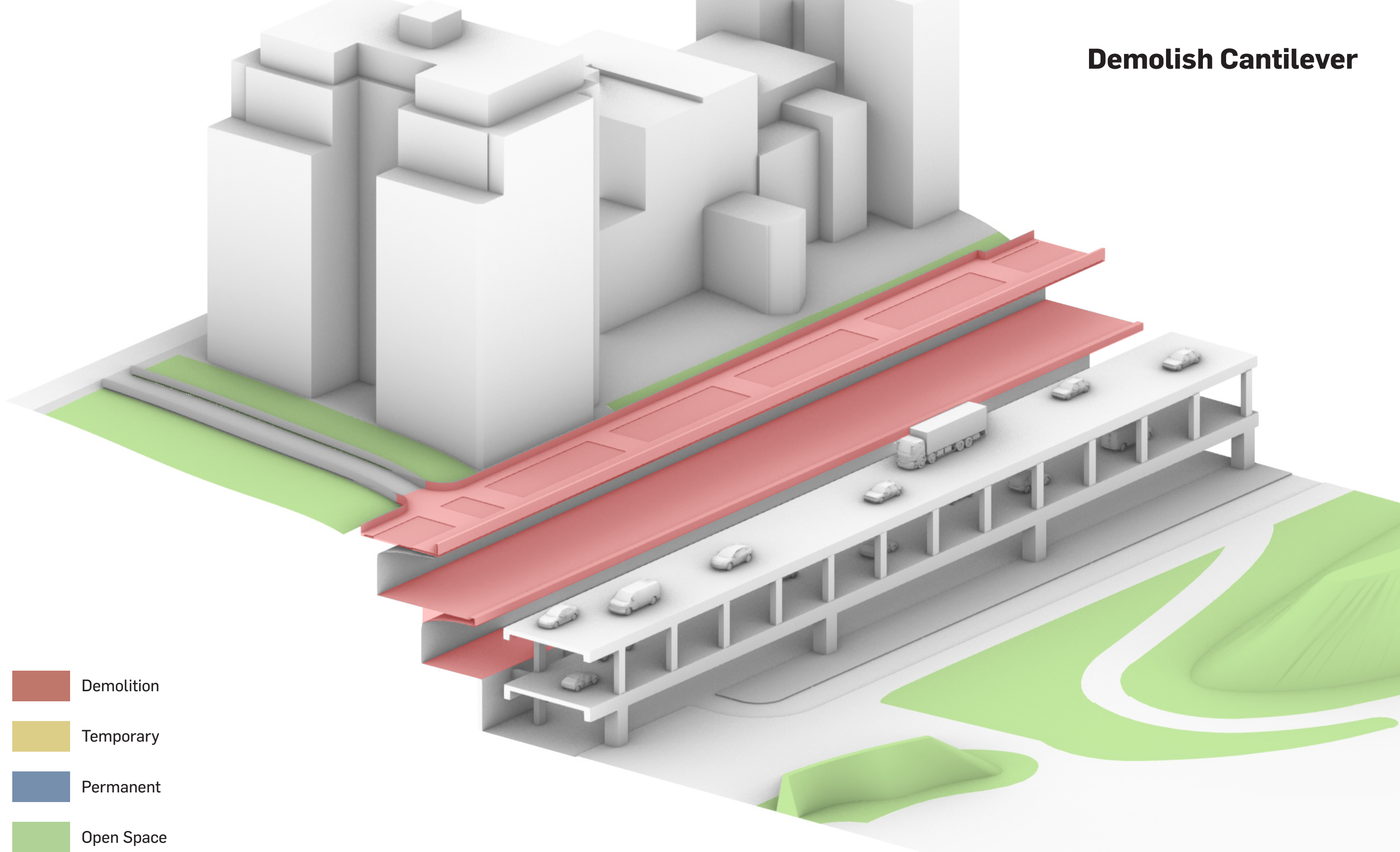
# Construct Temporary Bypass



- Demolition
- Temporary
- Permanent
- Open Space

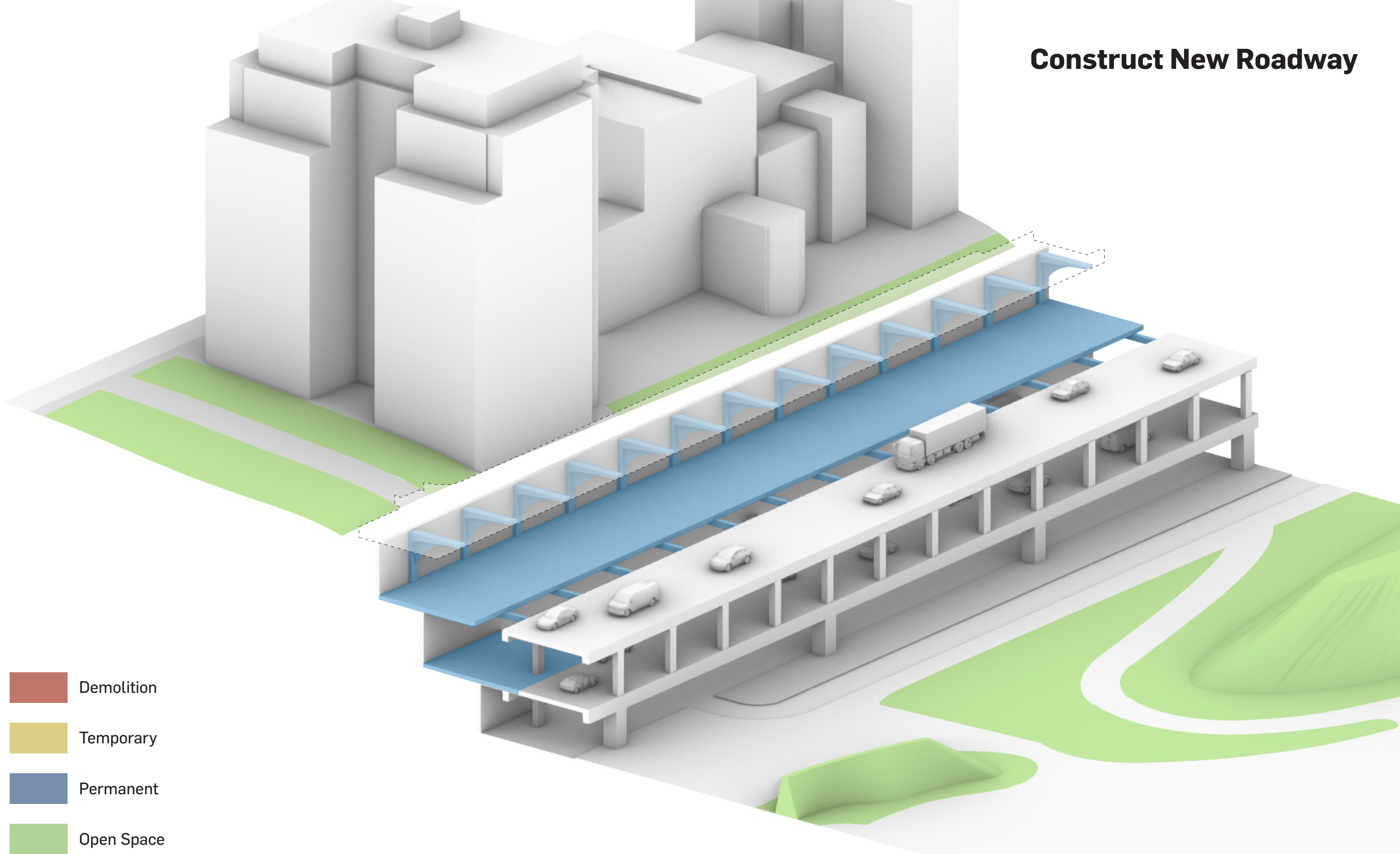


# Demolish Cantilever





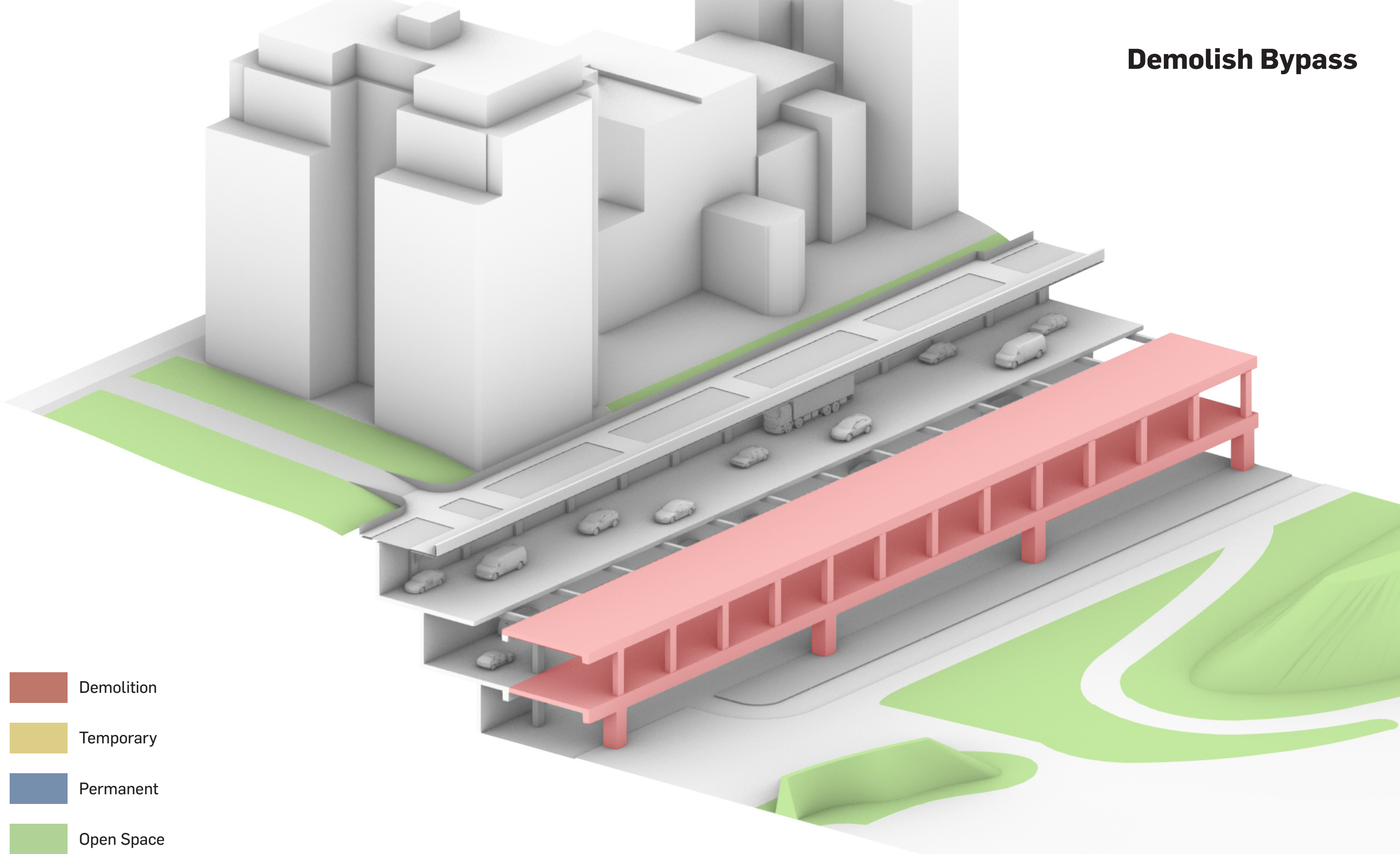
# Construct New Roadway



- Demolition
- Temporary
- Permanent
- Open Space



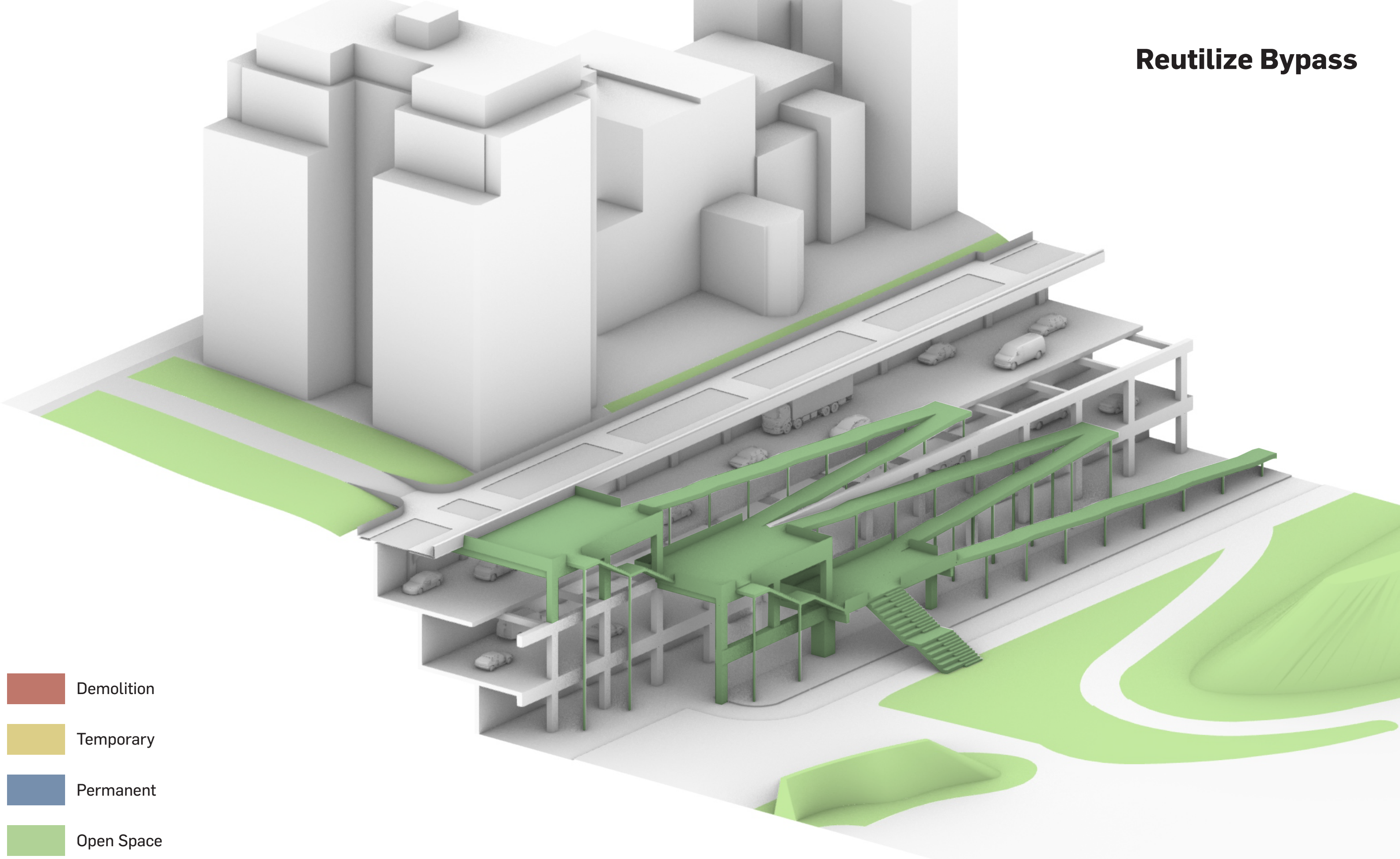
# Demolish Bypass



- Demolition
- Temporary
- Permanent
- Open Space



# Reutilize Bypass



- Demolition
- Temporary
- Permanent
- Open Space





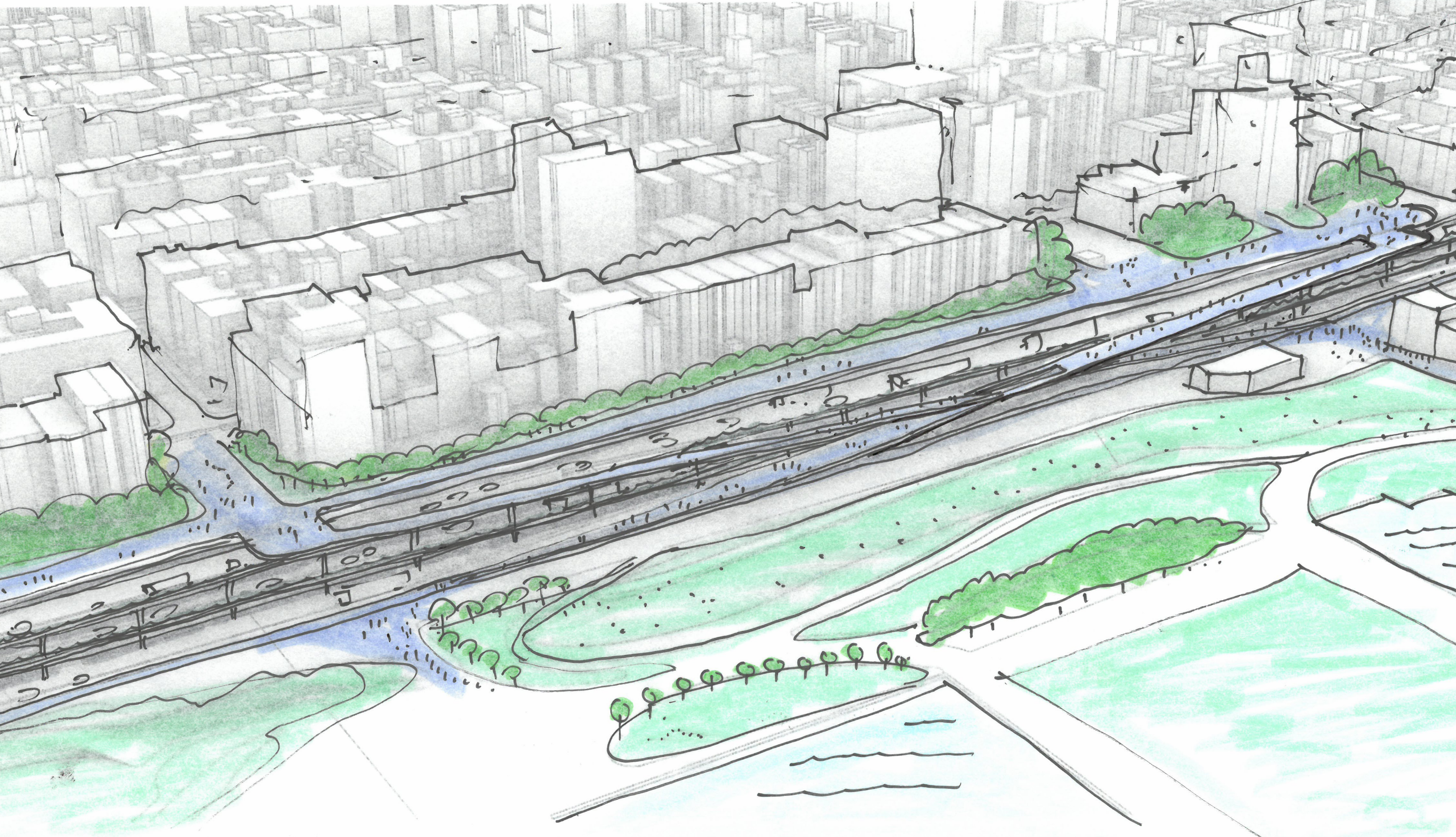












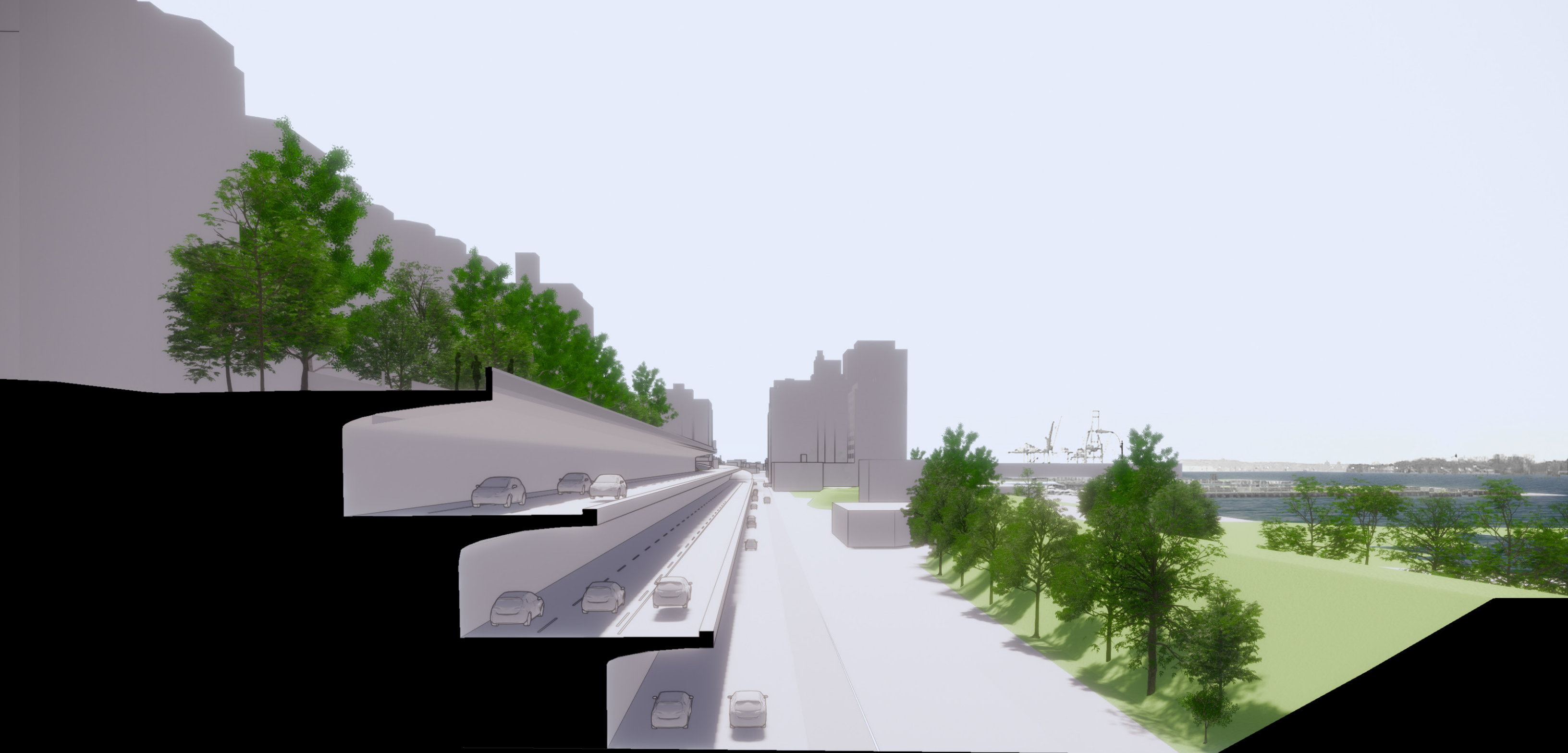


BETA

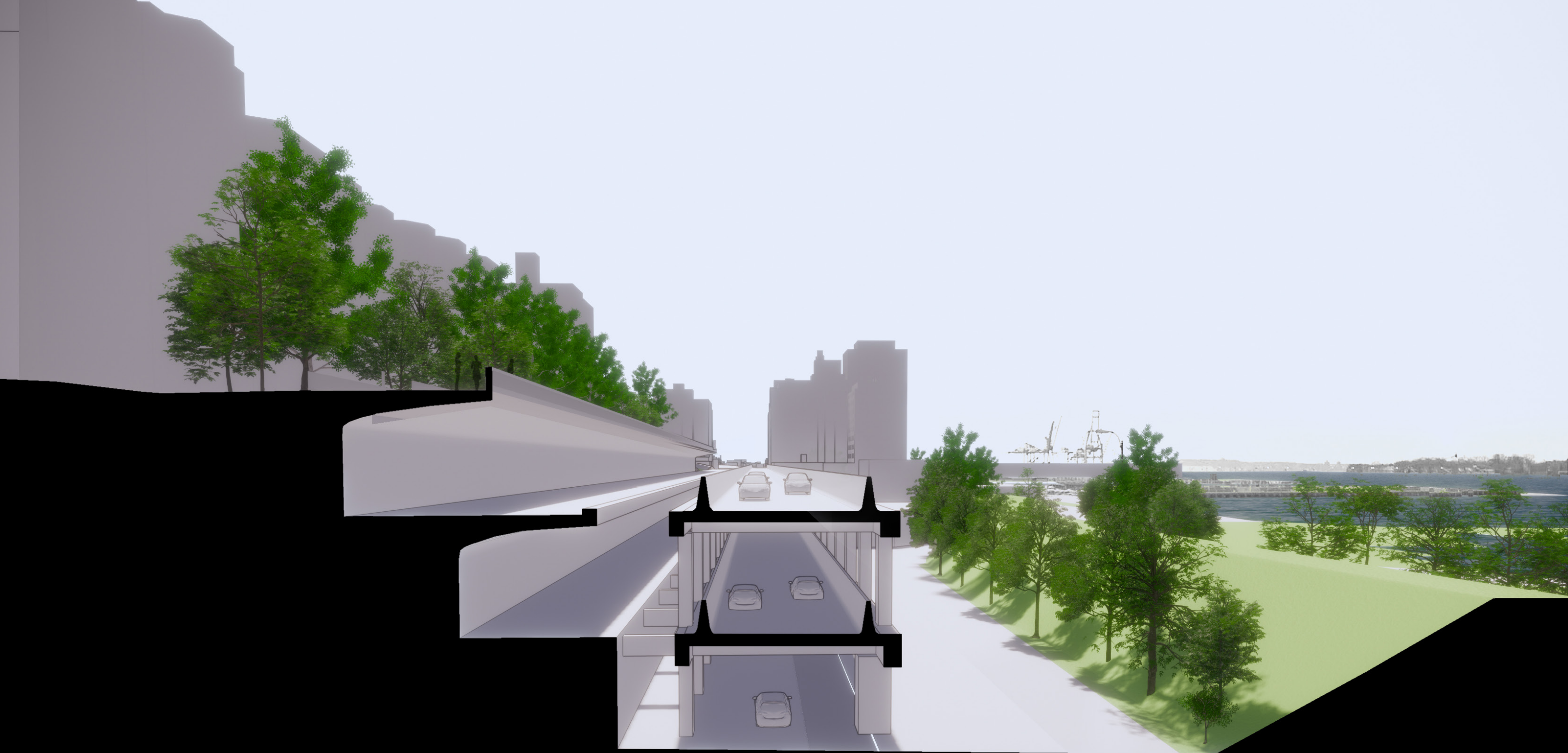


**Promenade Crossing**

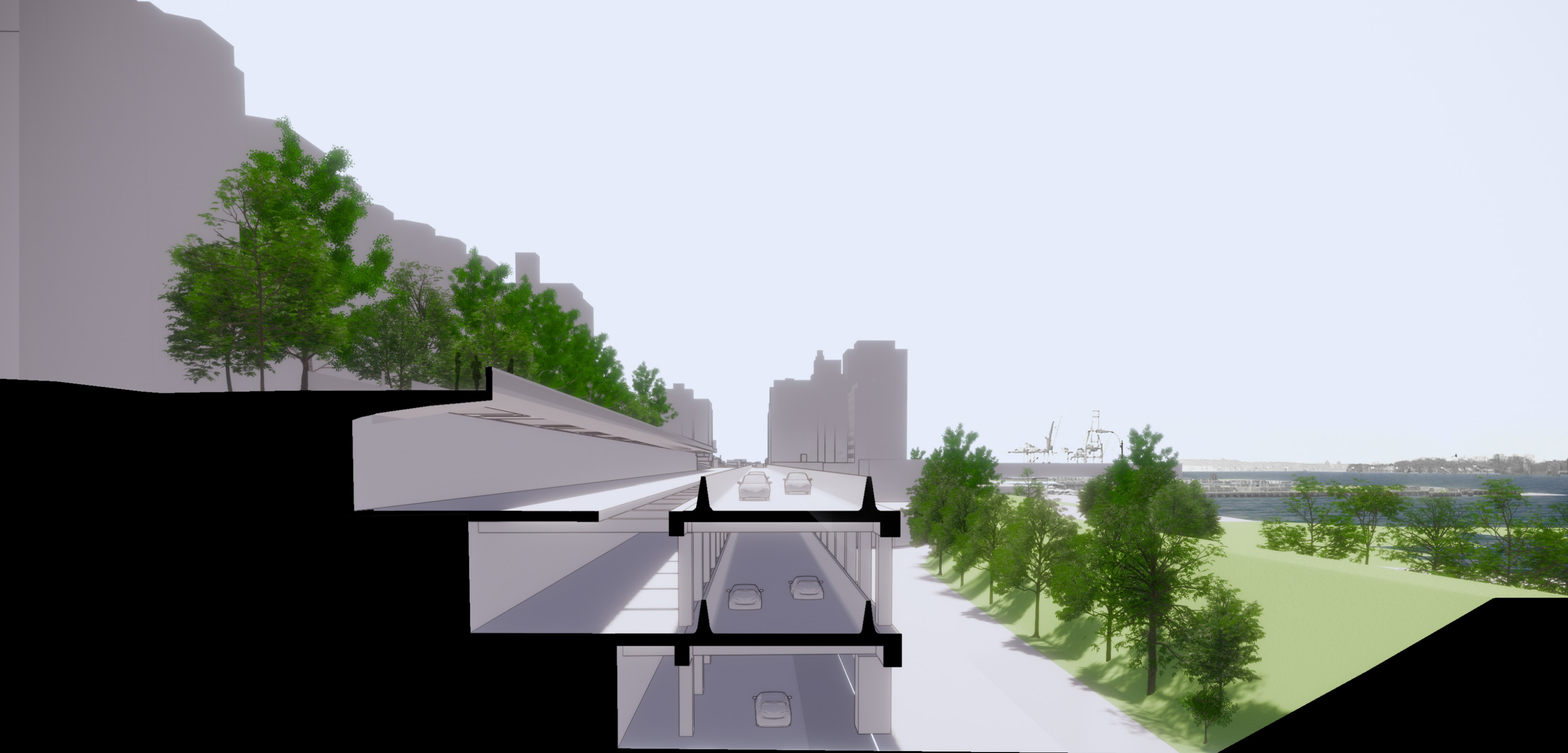




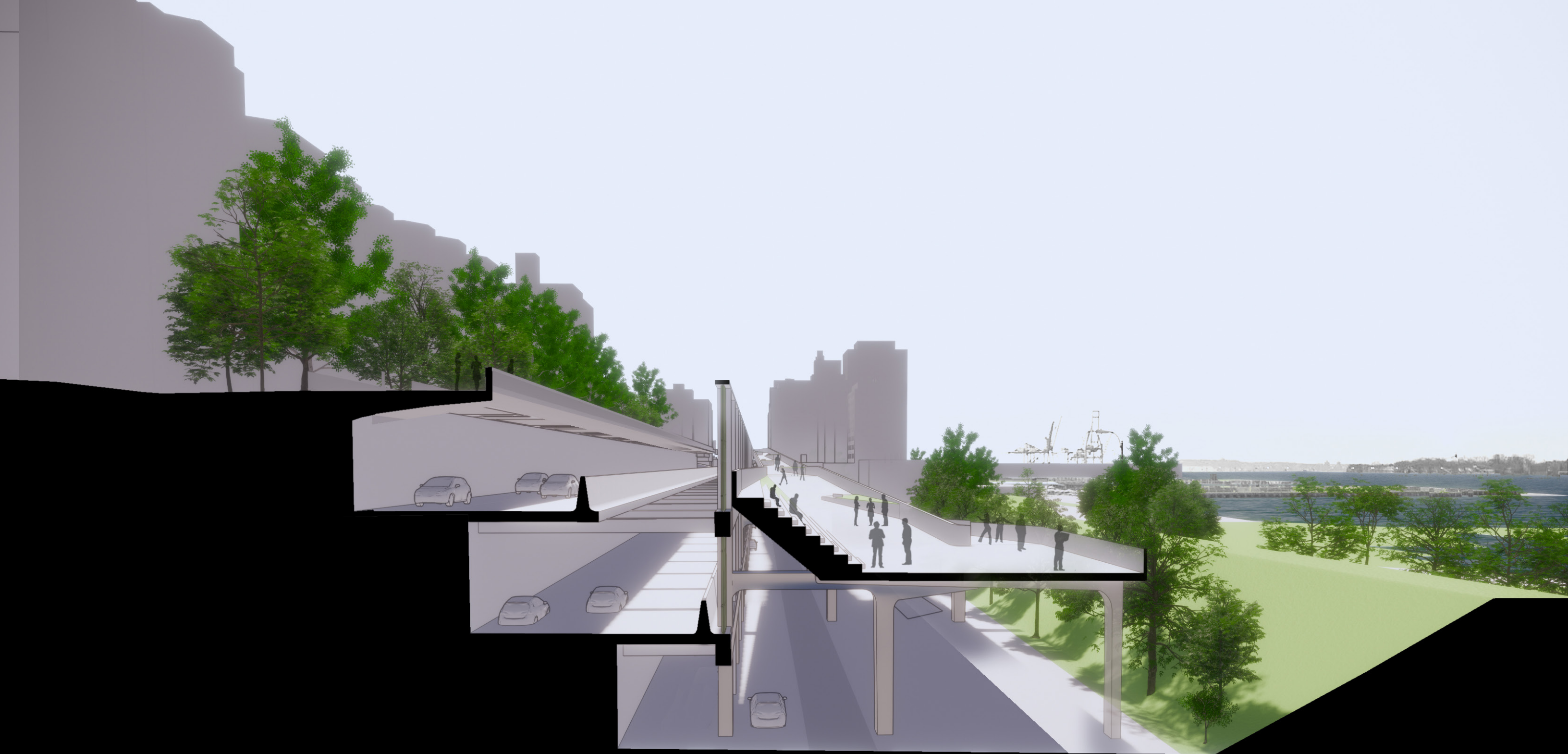












## Re-utilize Bypass Structure

117

As presented to the BQE Expert Panel for informational/background purposes only

<https://bqe-i278.com/en/expert-panel/documents>

**Sam Schwartz**

**W X Y**















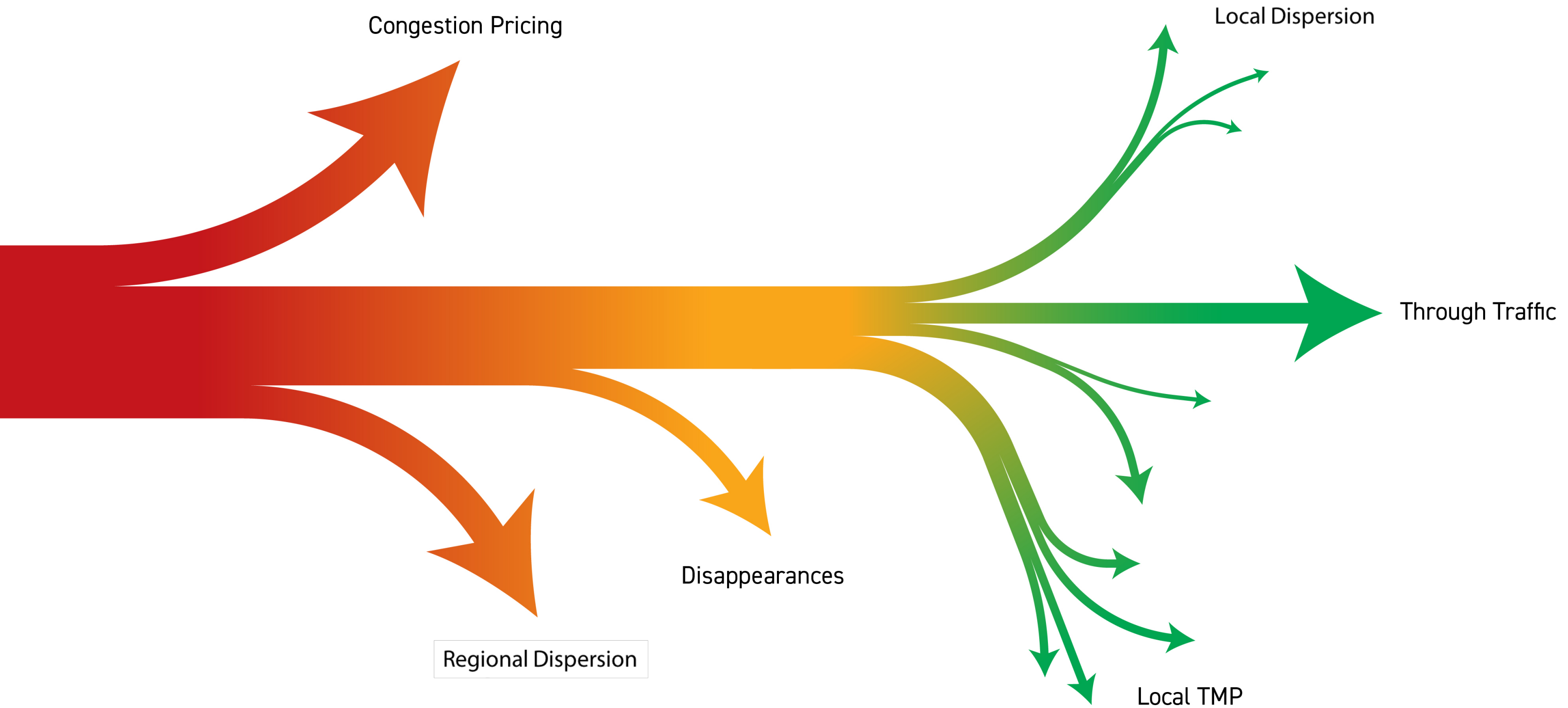
# Video Placeholder



# Gamma Exploration



# Gamma | Dispersing the Traffic Concept

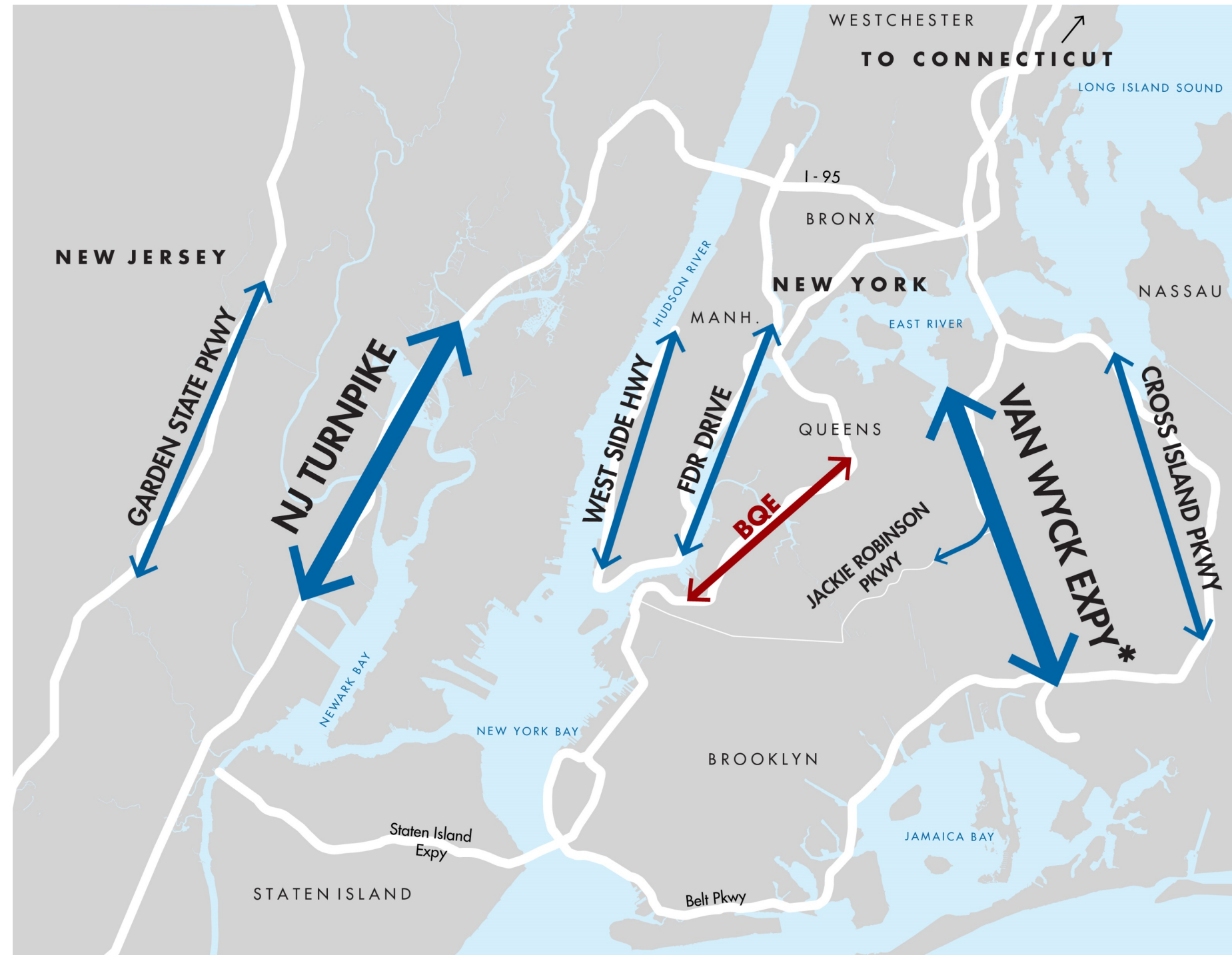




# Gamma | Regional Dispersion

- **Aggressive Info Campaign**
  - Partnerships with GPS apps (Google, Waze, Garmin, etc. )
  - Traffic Media
  - Social media
  - Paid Ads
  - Regional VMS
  - Targeted Communications (TLC, Truckers, AAA, etc.)
- **Improving Alternate Routes**
- **Natural Balancing**
- **Disappearance**

**Estimated reduction 5-15%**



\*Capacity improvement completion date = 2025



# Gamma | Local Diversions

## **Make Brooklyn Battery Tunnel more attractive**

- Convert reversible HOV 3+ to HOT (High-occupancy toll) lane
- Increase Express Bus Capacity thru Tunnel
- Lower Express Bus Prices
- Pricing Differentials: Toll Rebate so BBT cheaper than Brooklyn and Manhattan Bridges
- Tunnel operation coordination with BQE construction
- Dynamic signs to alert drivers of travel time savings by taking BBT

**Estimated reduction 2-5%**

## **Making Williamsburg Bridge more attractive**

- Roadway reversals to match demand: Inbound AM 6 in-2 out | Outbound PM 2 in-6 out
- Channelization favoring Williamsburg Bridge

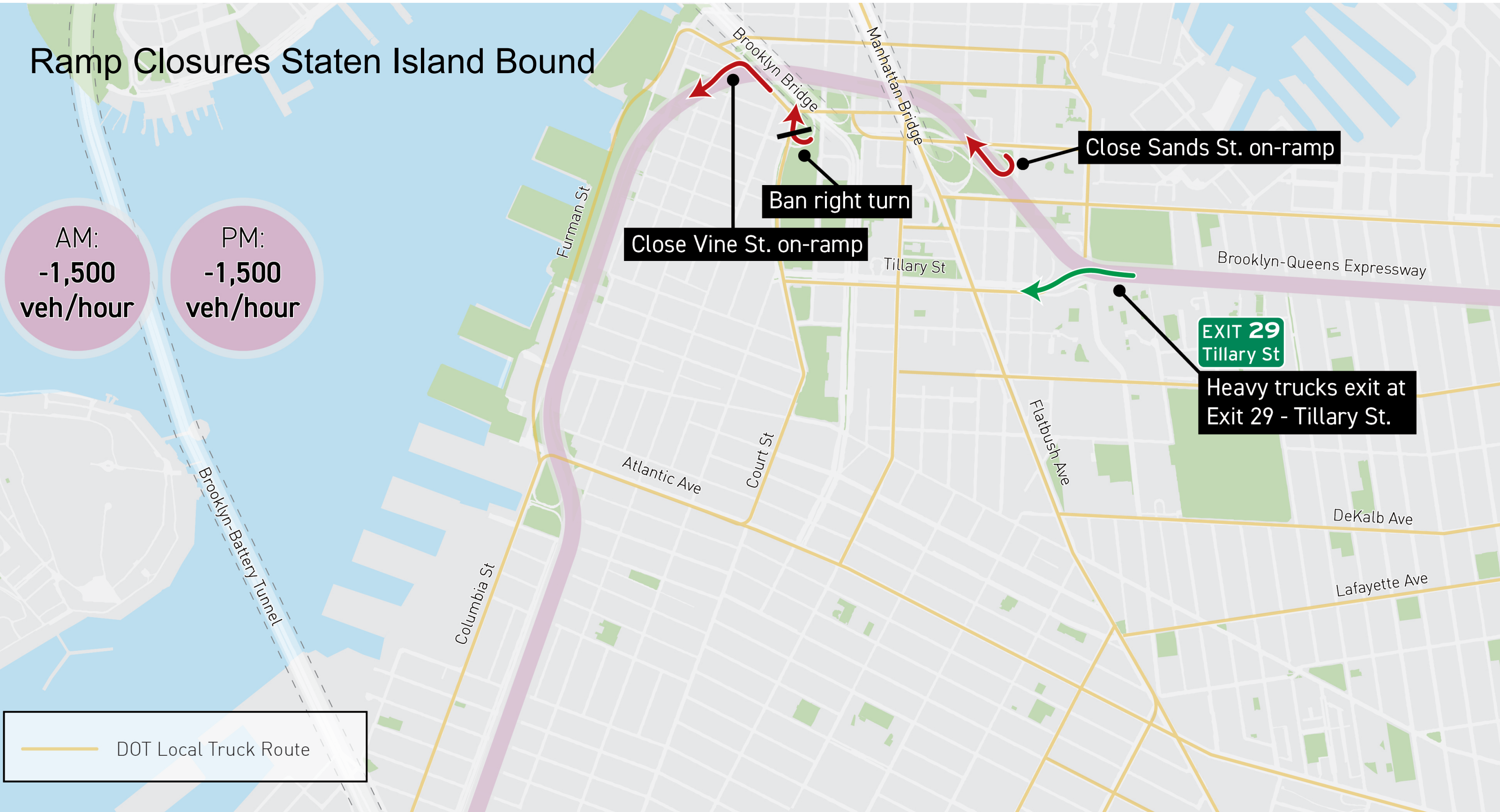


# Gamma | Local Diversions (Continued)

## Ramp Closures Staten Island Bound

AM:  
-1,500  
veh/hour

PM:  
-1,500  
veh/hour



— DOT Local Truck Route



## Gamma | Combination of Strategies to Lessen Demand on BQE

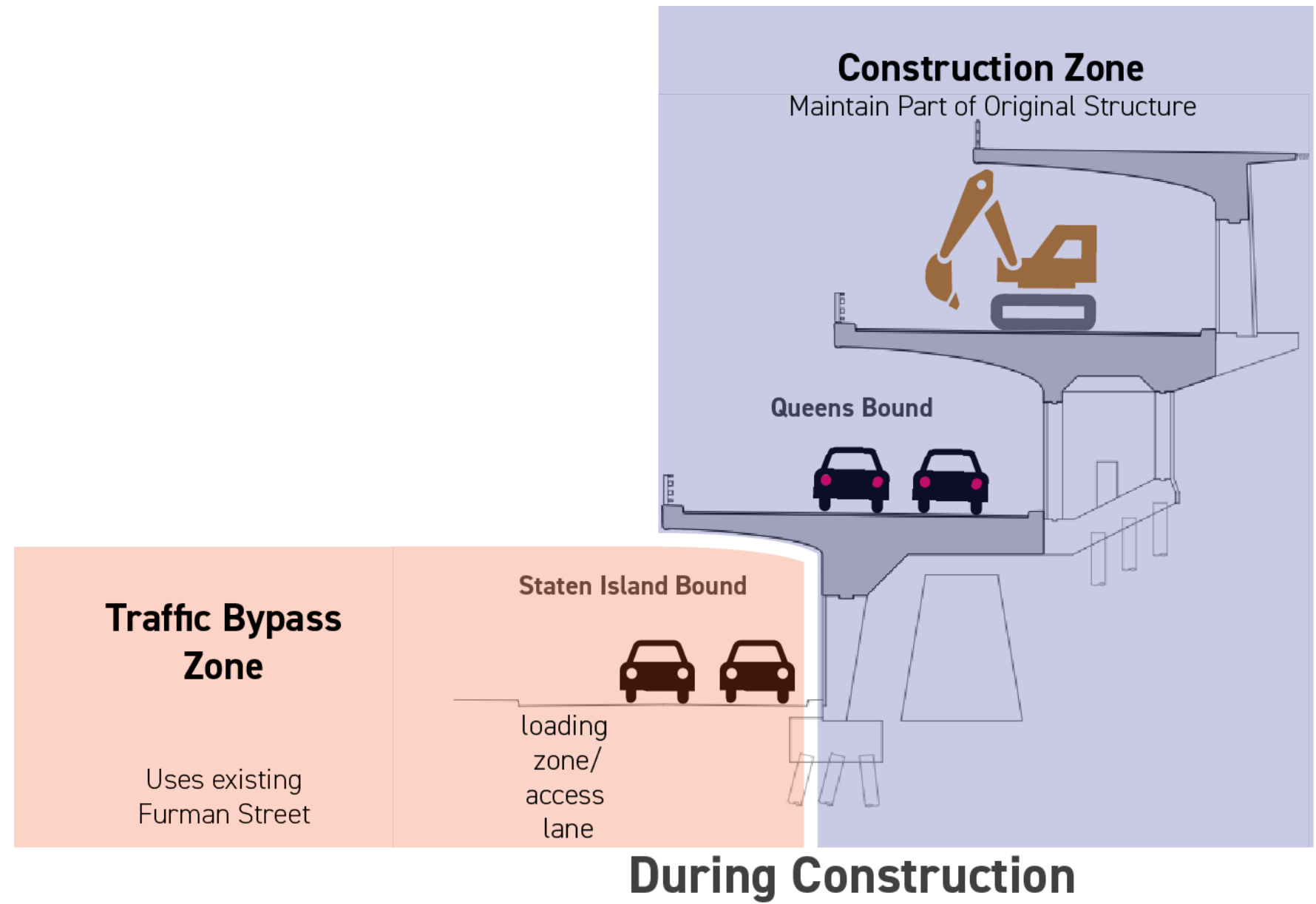
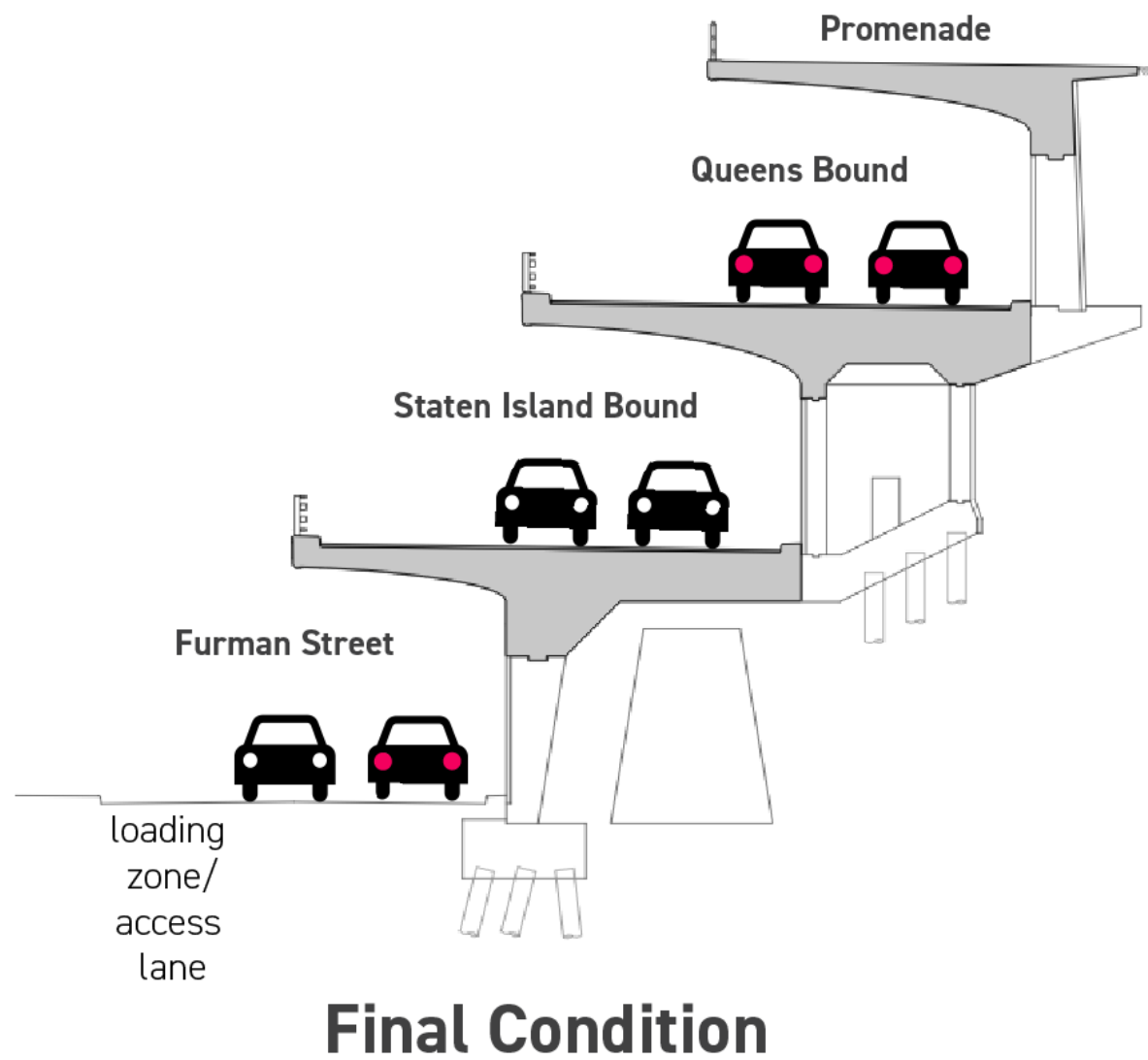
- Congestion Pricing
  - Regional Dispersion
  - Local Dispersion
  - Ramp Closures
  - Commercial Vehicles on Belt Parkway
  - Other TDM strategies
- 

**Remaining Peak Volume:      SI Bound      ~2,200 veh/hour**



# Gamma | Dispersion Plan

Furman as moderate volume, truck-free street except local deliveries







**FLYOVER**

**0**



**ALPHA**

**1**



**BETA**

**2**



**GAMMA**

**3**

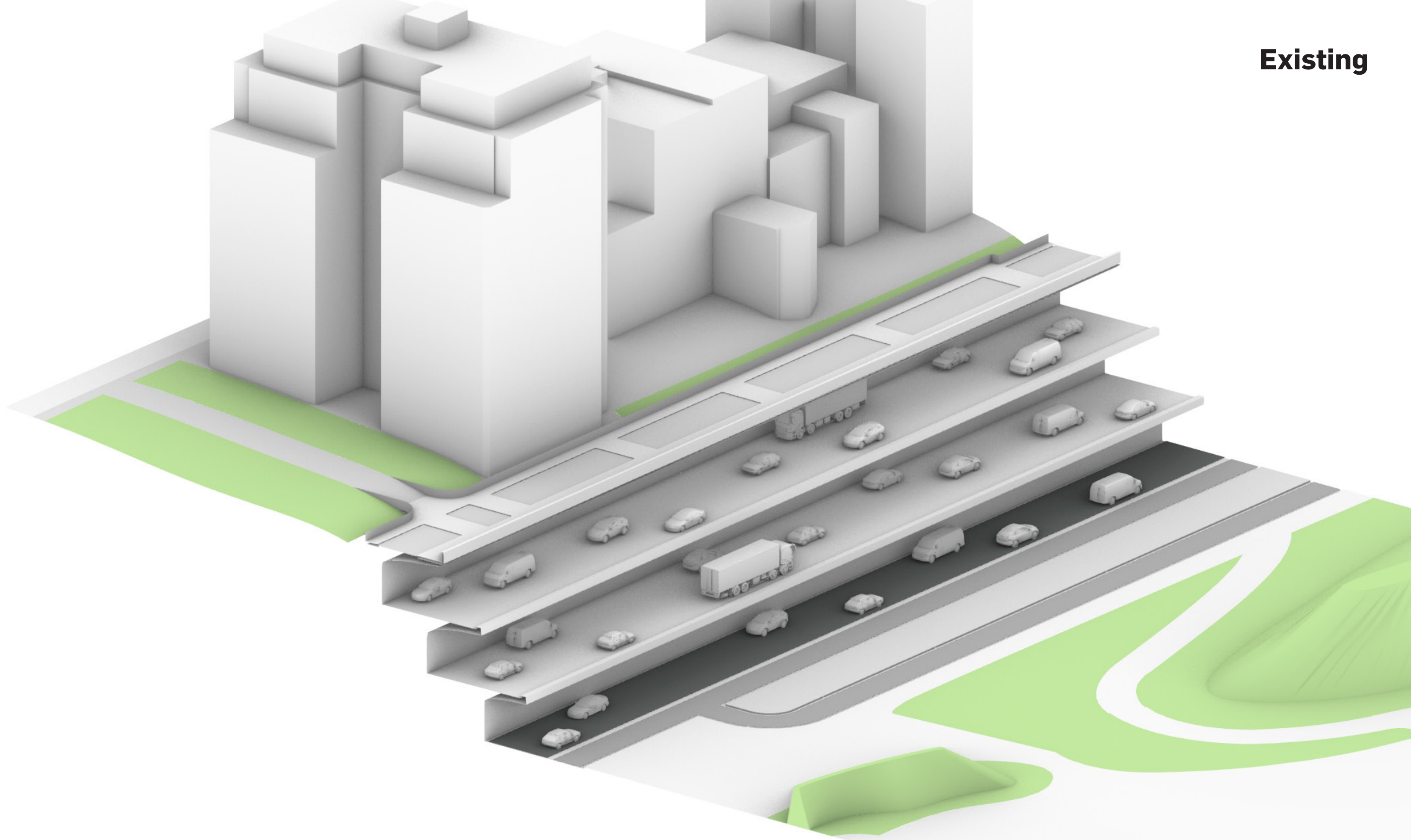




## Multiple Detour Option

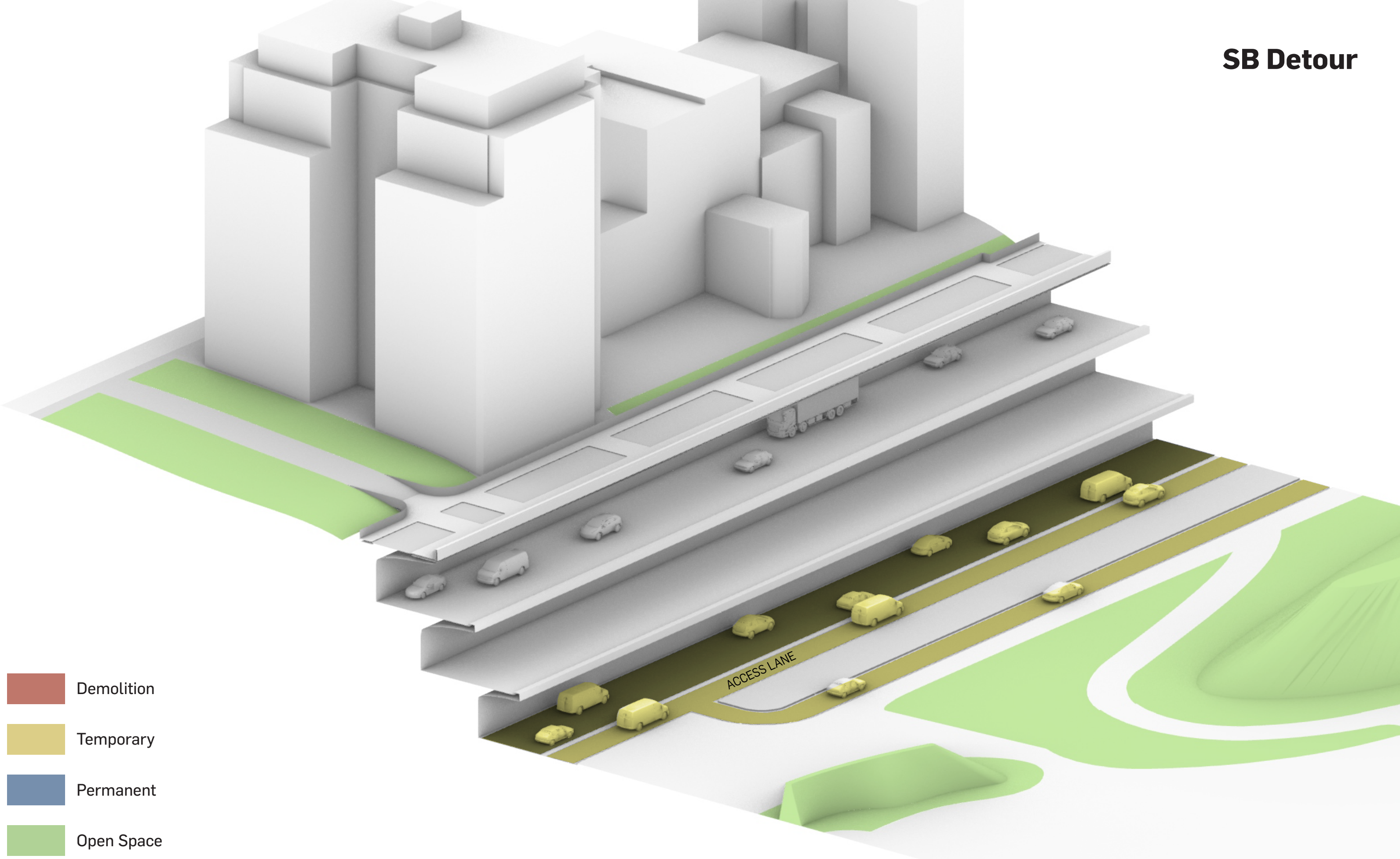


**Existing**





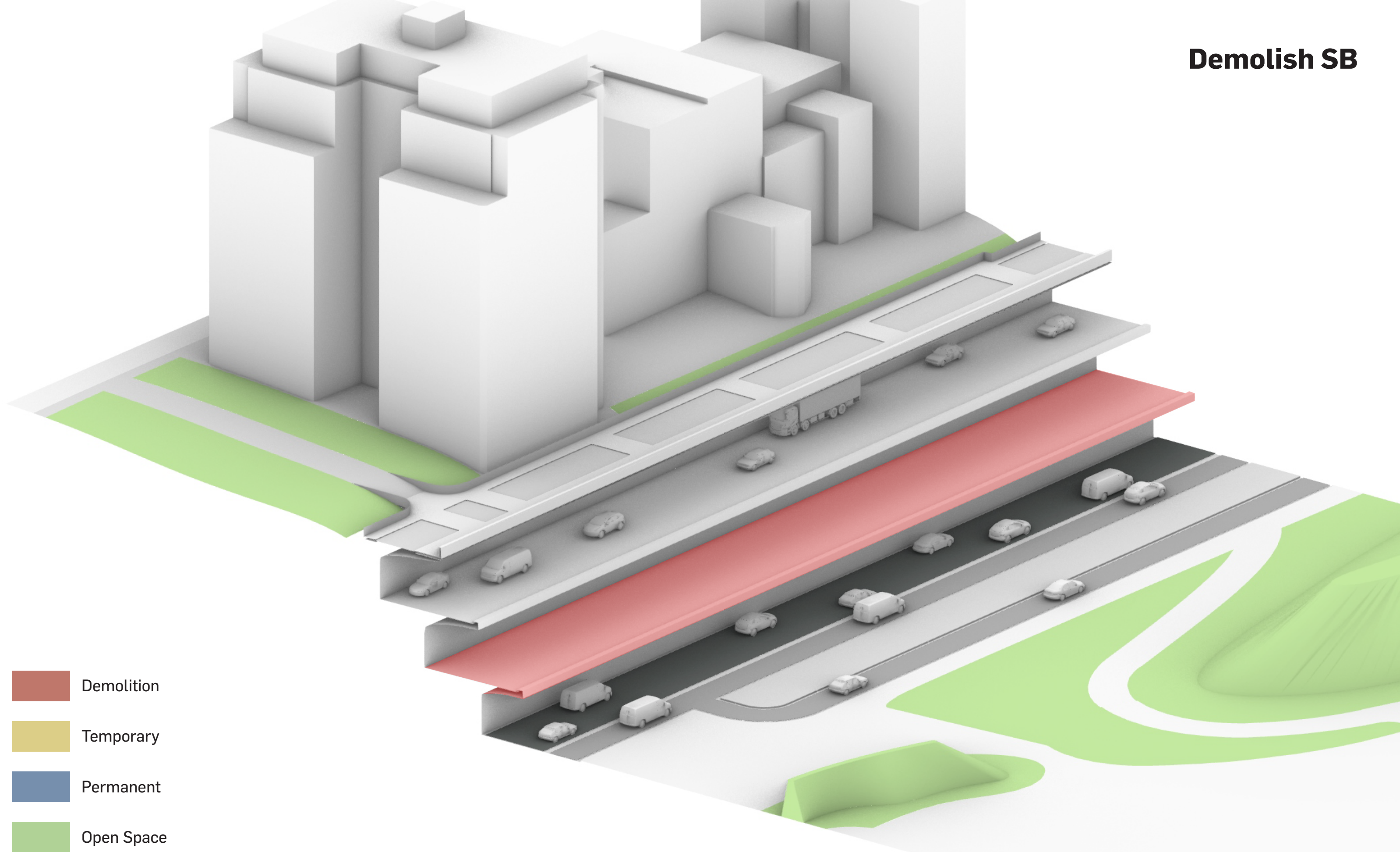
# SB Detour



- Demolition
- Temporary
- Permanent
- Open Space



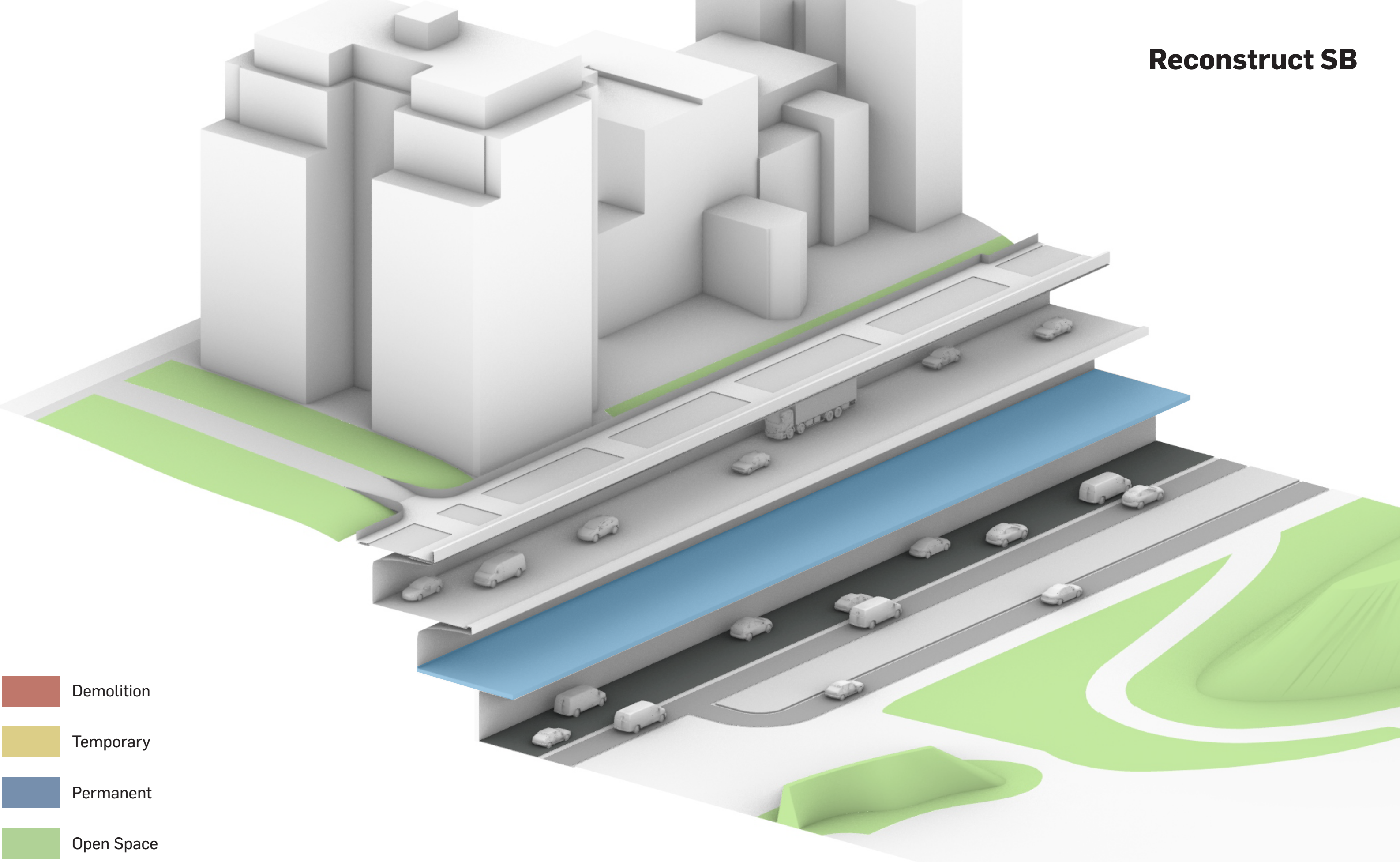
# Demolish SB



- Demolition
- Temporary
- Permanent
- Open Space

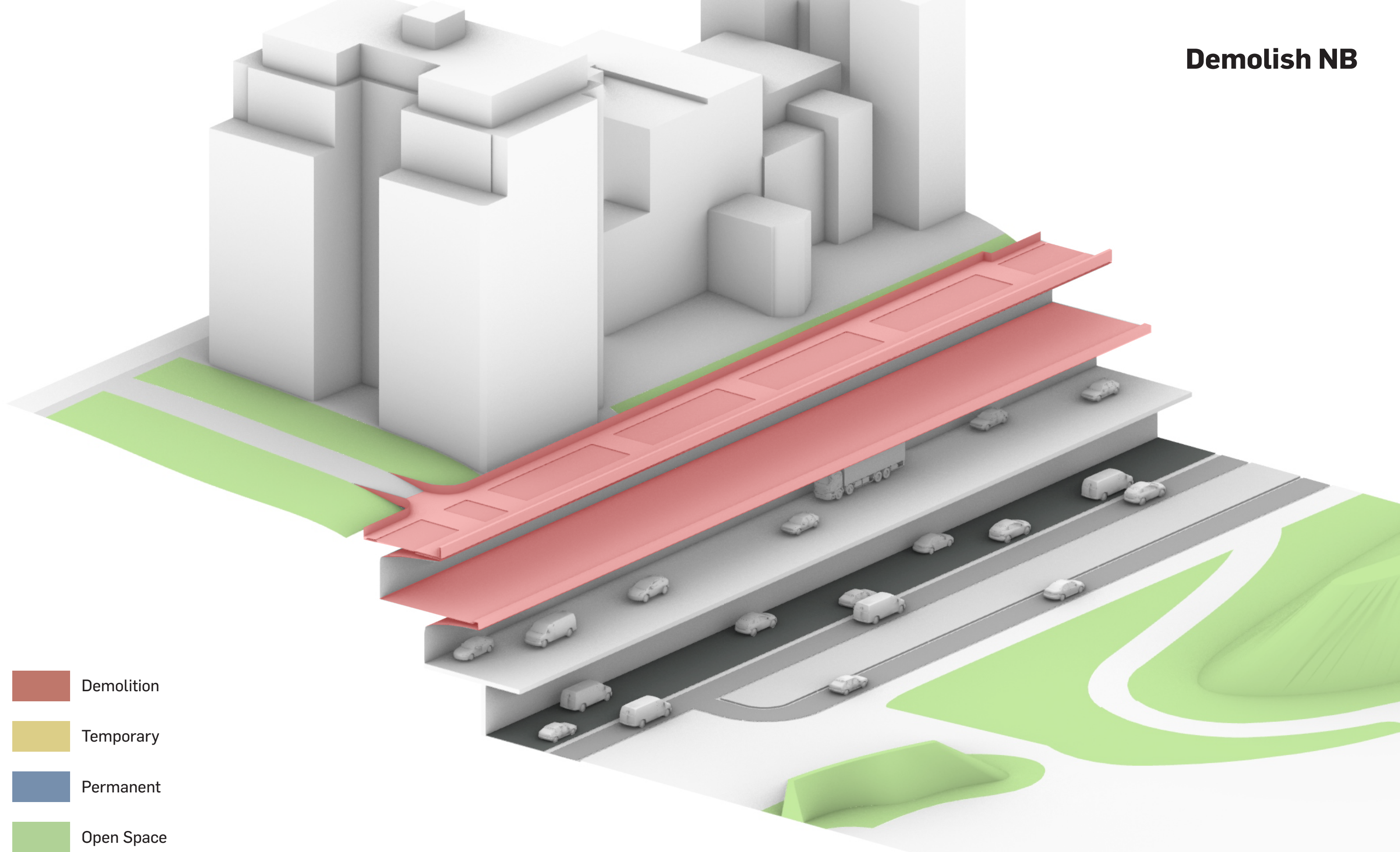


# Reconstruct SB



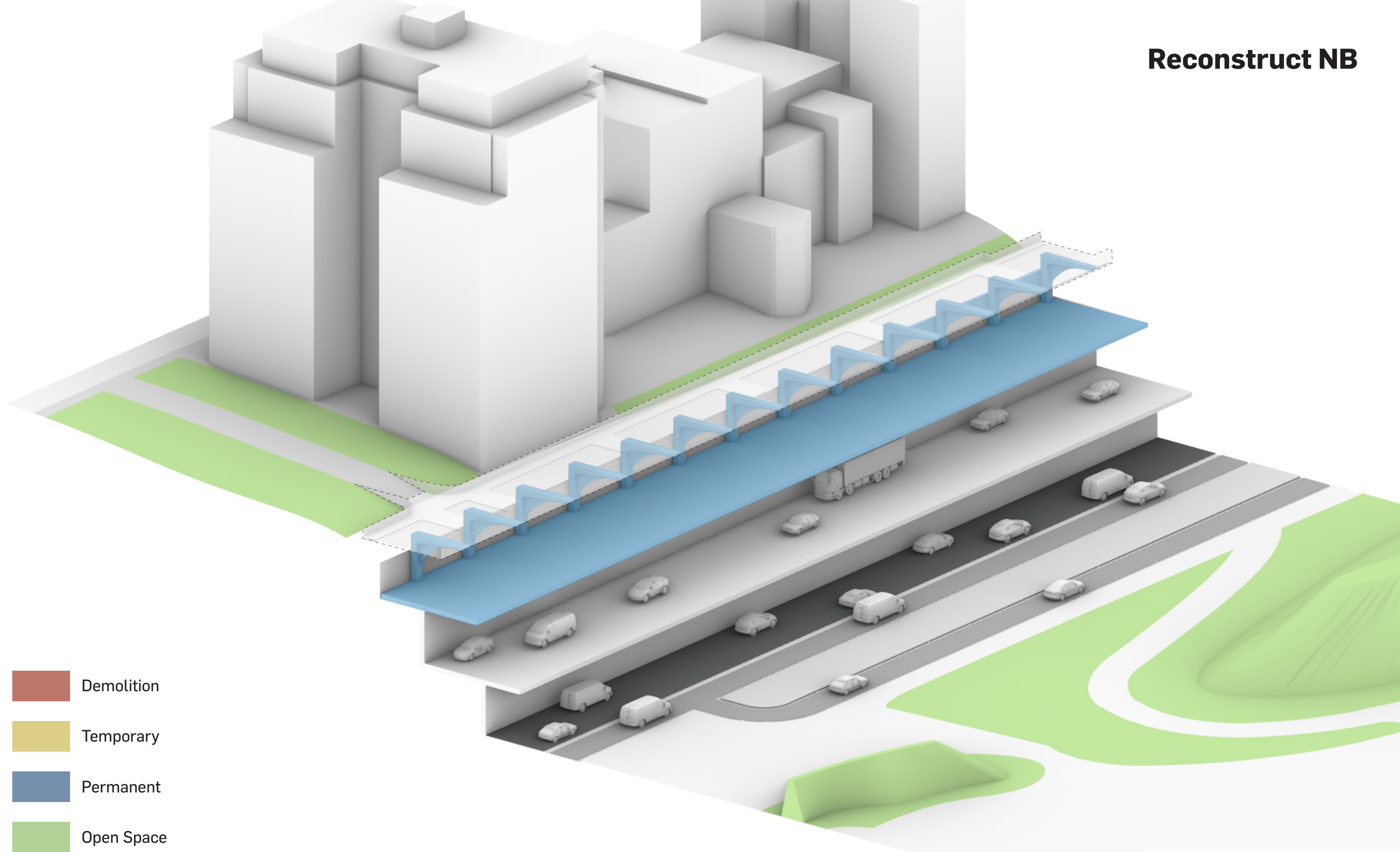


# Demolish NB



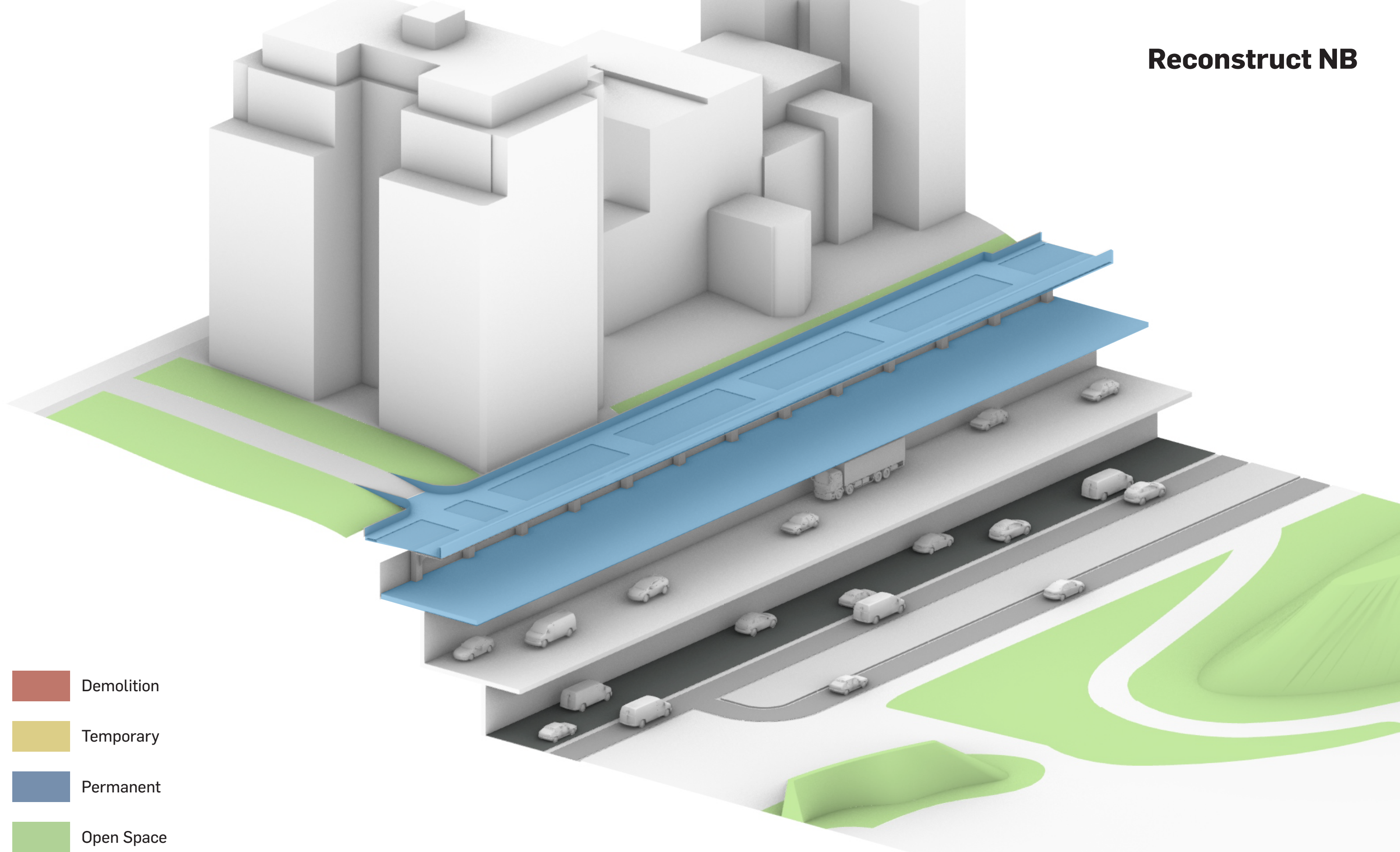


# Reconstruct NB





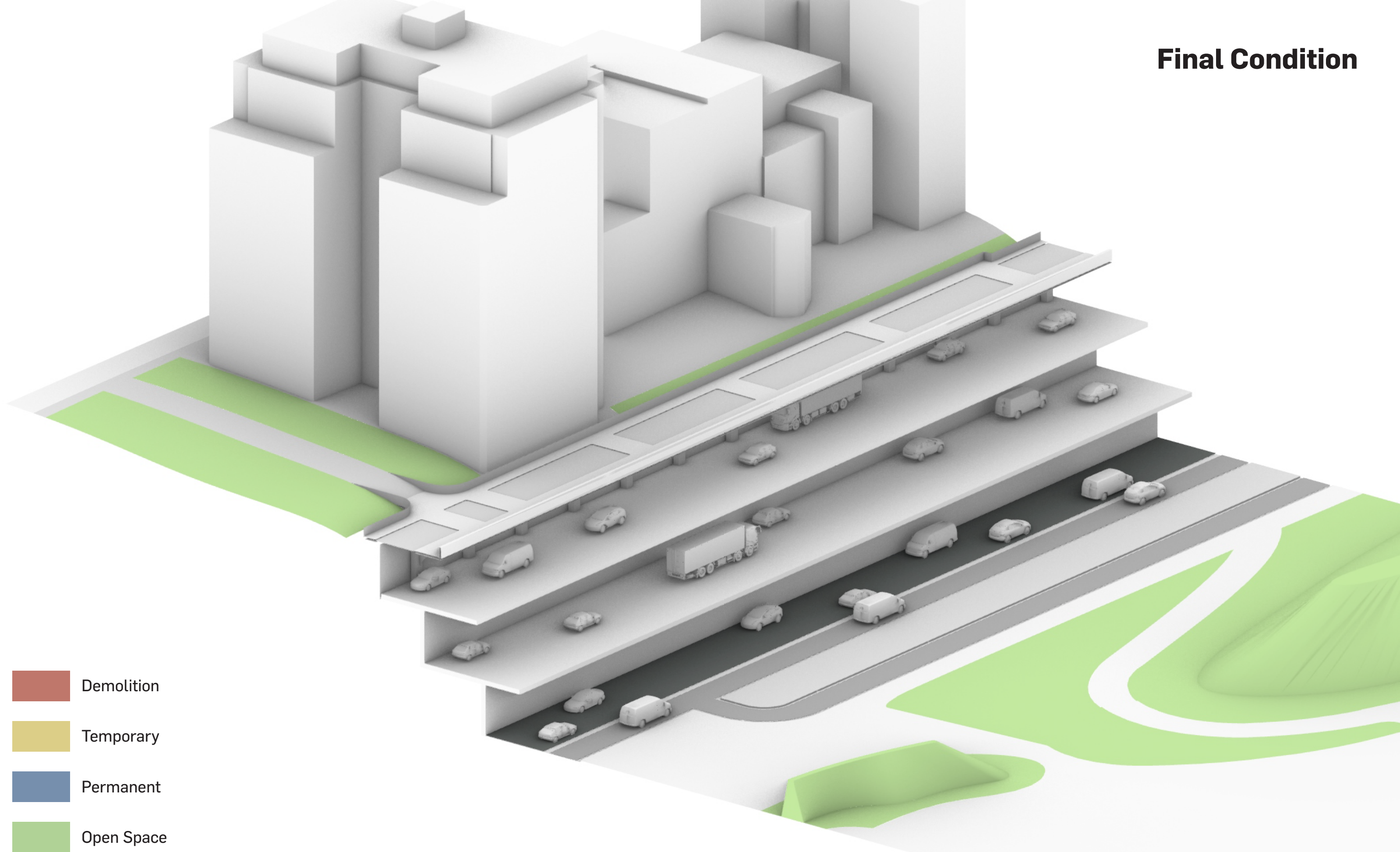
# Reconstruct NB



As presented to the BQE Expert Panel for informational/background purposes only  
<https://bqe-i278.com/en/expert-panel/documents>



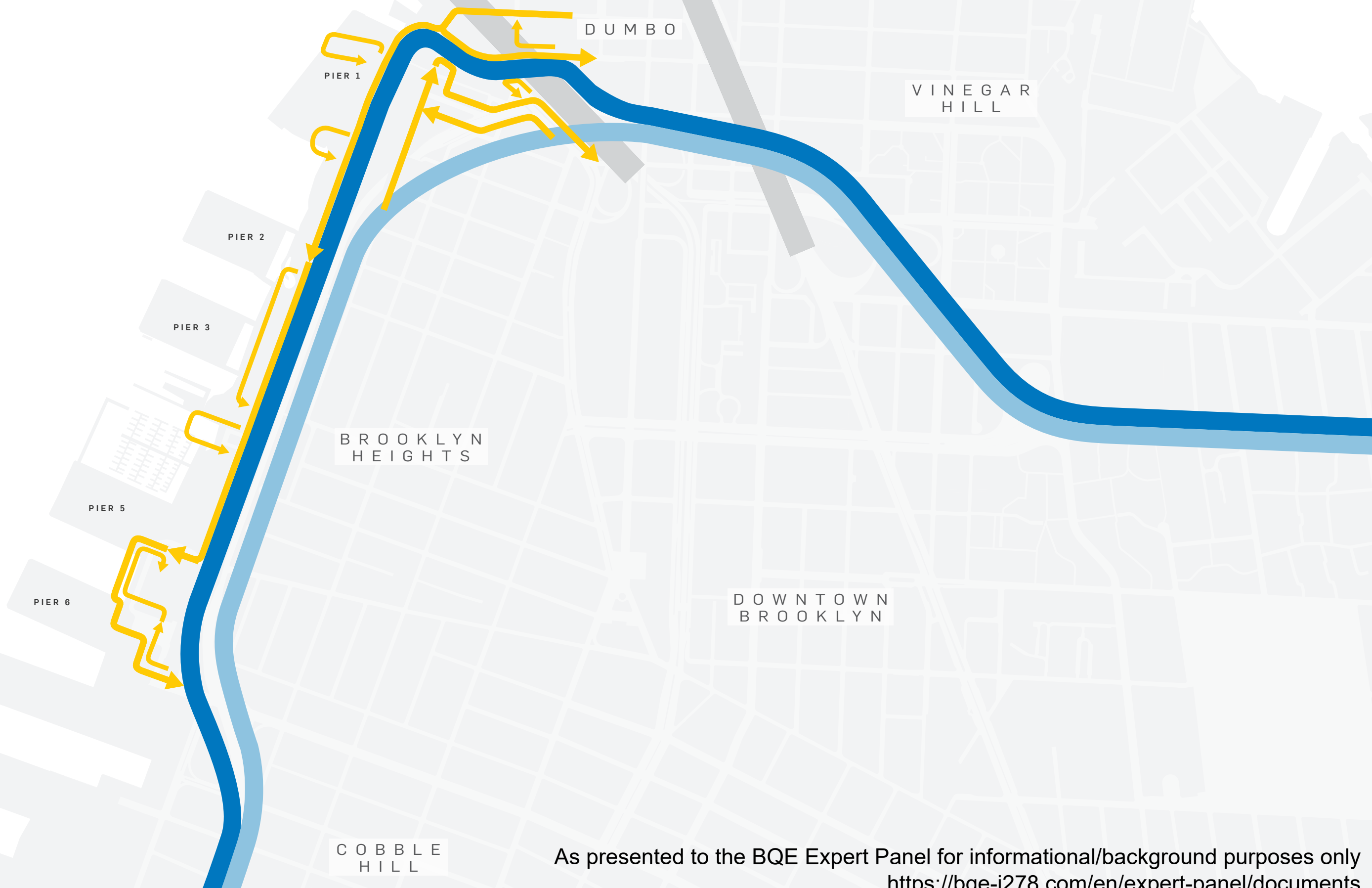
# Final Condition



As presented to the BQE Expert Panel for informational/background purposes only  
<https://bqe-i278.com/en/expert-panel/documents>



# Service & Access





# Traffic

## Multiple Detour

Two lanes for temporary southbound BQE

Space for phased reconstruction

Reduced impacts for people & traffic

# People

## Fulton Landing Strip

Link between Brooklyn Bridge and Brooklyn Bridge Park

Iconic gateway & public space

Reduce conflicts between people & traffic





As presented to the BQE Expert Panel for informational/background purposes only

<https://bqe-i278.com/en/expert-panel/documents>

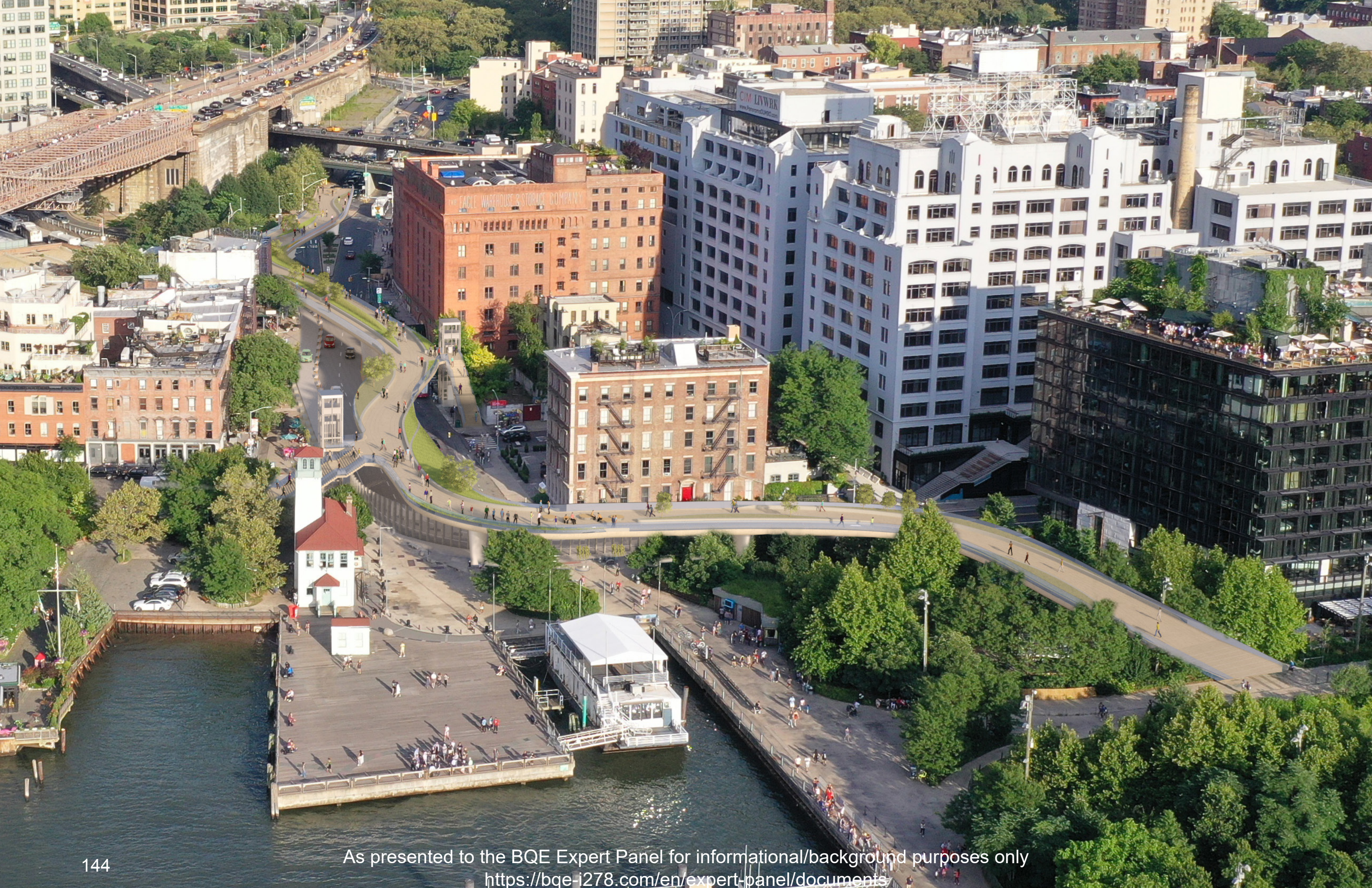
















## Alpha

The Hill



## Beta

Promenade Crossing



## Gamma

Fulton Landing Strip



# Protecting the Community | Reducing Traffic Demand

- Prevent truck intrusion using NYPD (Officers, agents or Paid Detail) paid by contractor
- Investigate electronic GPS truck enforcement
- Consider a version of limited truck zone
- Expansion/enhancements to neighborhood Slow Zone initiatives (lower speed limits, speed humps, lane narrowing, neckdowns, etc.)
- Work with Waze, et al. on shortcut protection plan
- Limit cruising by FHV's (TLC plans to do this in Manhattan CBD)



## Limited Truck Zone-

No operator of a truck shall operate, stall, stop, stand, or park his/her vehicle upon any of the streets designated within these Limited Truck Zones except for the purpose of making a delivery, loading, or servicing within said zone and traveling on the respective routes as designated in Sections 4-13 (d)(1)(3) and 4-13(d)(1)(4) of the NYC Traffic Rules.



# Protecting the Community | Reducing Traffic Demand

- Prevent truck intrusion using NYPD (Officers, agents or Paid Detail) paid by contractor
- Investigate electronic GPS truck enforcement
- Consider a version of limited truck zone
- Expansion/enhancements to neighborhood Slow Zone initiatives (lower speed limits, speed humps, lane narrowing, neckdowns, etc.)
- Work with Waze, et al. on shortcut protection plan
- Limit cruising by FHV's (TLC plans to do this in Manhattan CBD)



## Limited Truck Zone-

No operator of a truck shall operate, stall, stop, stand, or park his/her vehicle upon any of the streets designated within these Limited Truck Zones except for the purpose of making a delivery, loading, or servicing within said zone and traveling on the respective routes as designated in Sections 4-13 (d)(1)(3) and 4-13(d)(1)(4) of the NYC Traffic Rules.



# Protecting the Community | Local Traffic Control Plan

## Assignment of Personnel

- Traffic agents
- NYPD officers
- Pedestrian Traffic Managers

## Street Modifications

- Parking regulations
- Street directions
- Speed humps
- Camera enforcement
- Traffic signal optimization
- Turn restrictions





# Protecting the Community | On-Site Real Time Monitoring



2<sup>nd</sup> Ave. Subway - Community Information Center



LGA - Traffic Control Center



# Protecting the Community | Rapid Incident Detection and Response

- On-site hub to coordinate amongst multiple agencies (24/7)
- Ongoing monitoring of traffic conditions
- Develop protocol document
- Strategically placed **heavy duty** tow trucks for disabled and crashed vehicles
- Rapid deployment of emergency vehicles
- Link to joint NYC NYS Traffic Management Center triggering regional VMS
- Adjustments to signal timing/progressions
- Instant notification to traffic media on change in traffic conditions
- Deployment of TEAs
- Direct lines of communications to Uber/Lyft/TLC for travel alerts
- Direct lines of communications to trucking associations and major local operators (USPS, UPS, FedEx, etc.)



# Conclusion

- Forget the Rolling Stones, Time is **not** on our side
- Come to a conclusion, advance EIS and design process **Now**
- Two lanes are adequate for both construction phases and final condition
- **Carpe Diem!** Seize this moment to connect communities, add beauty and amenities
- The versions presented can be mixed and matched. But, we believe the answer is herein



# Thank You!

Questions & Comments