

Marquam Hill Connector
Green Ribbon Committee Meeting #4
May 8, 2019

Agenda

- 4:02 – 4:15 Public Comment
- 4:15 – 4:20 Review of Previous Discussion
- 4:20 – 4:30 OHSU Marquam Hill Planning & Circulation
- 4:30 – 4:40 Outreach & Public Engagement Summary
- 4:40 – 5:05 Additional Information on Connector Types
- 5:05 – 5:20 Working Group Feedback
- 5:20 – 5:58 Discussion & Additional Information Needs



Marquam Hill Overview

Green Ribbon Committee

DATE: MAY 8, 2019 PRESENTED BY: SARA VONDE VELD, DIRECTOR, CAMPUS PLANNING & REAL ESTATE

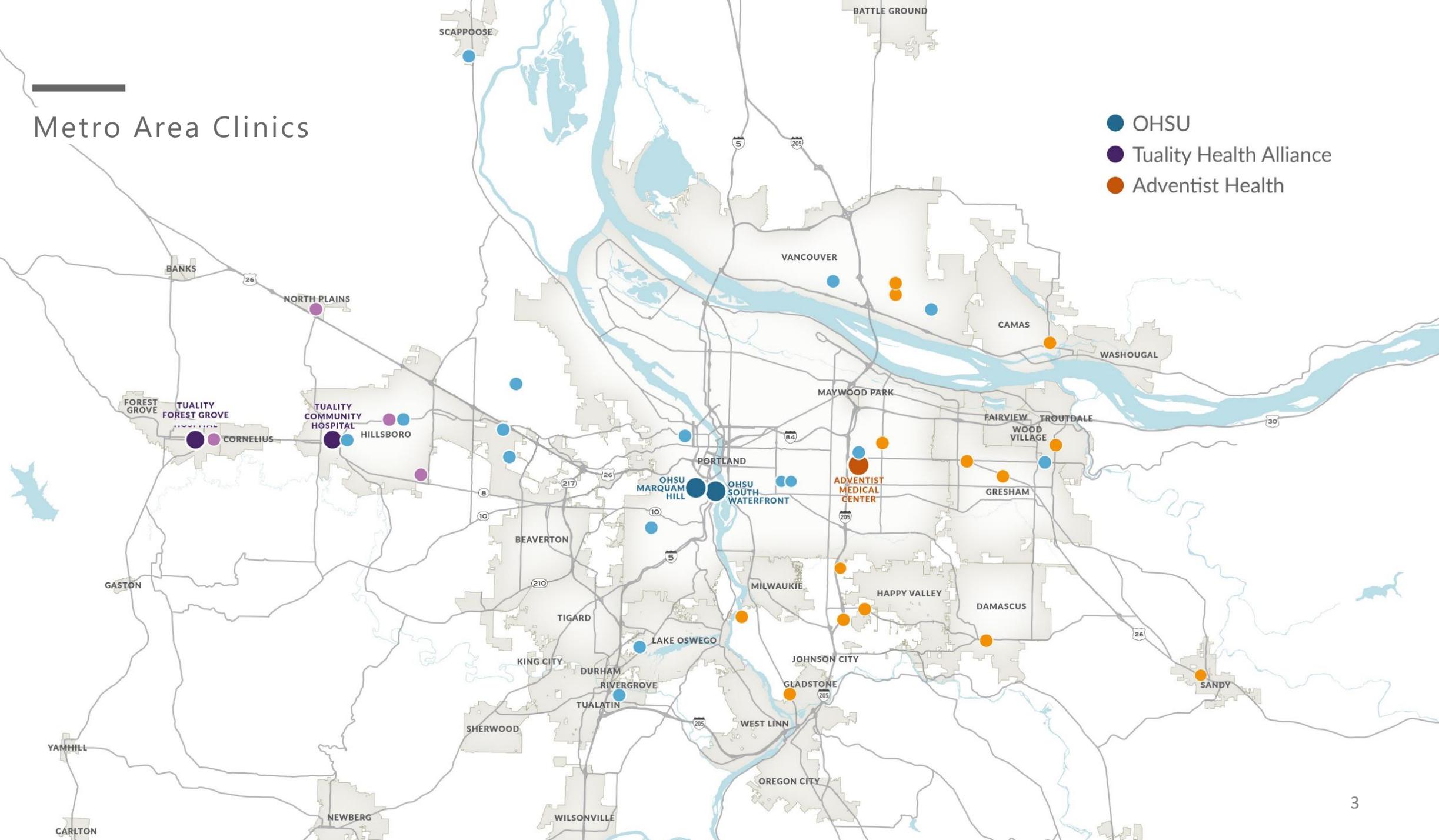
Marquam Hill Plan District



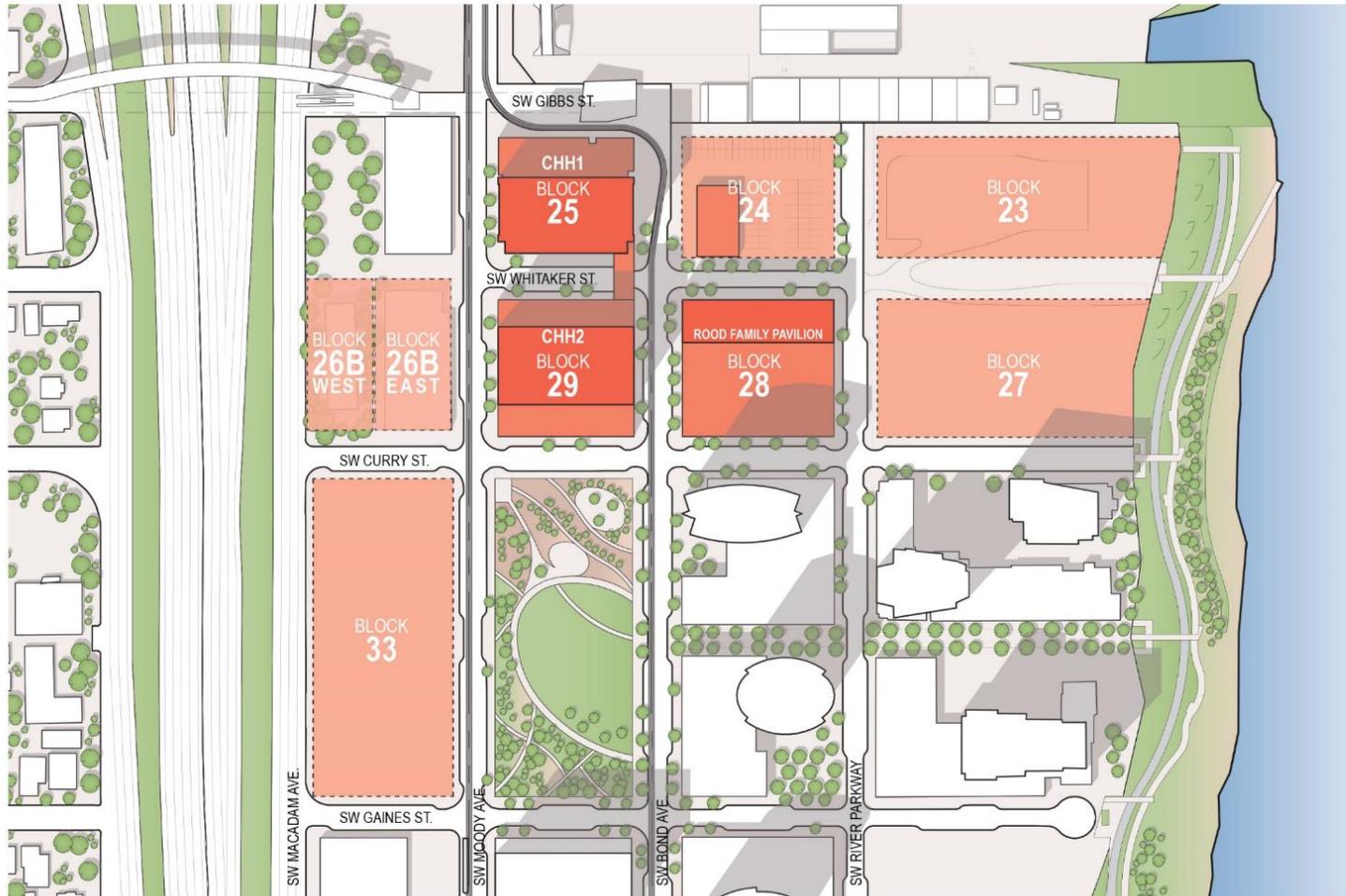
-  Marquam Hill Plan District
-  Development Site

Metro Area Clinics

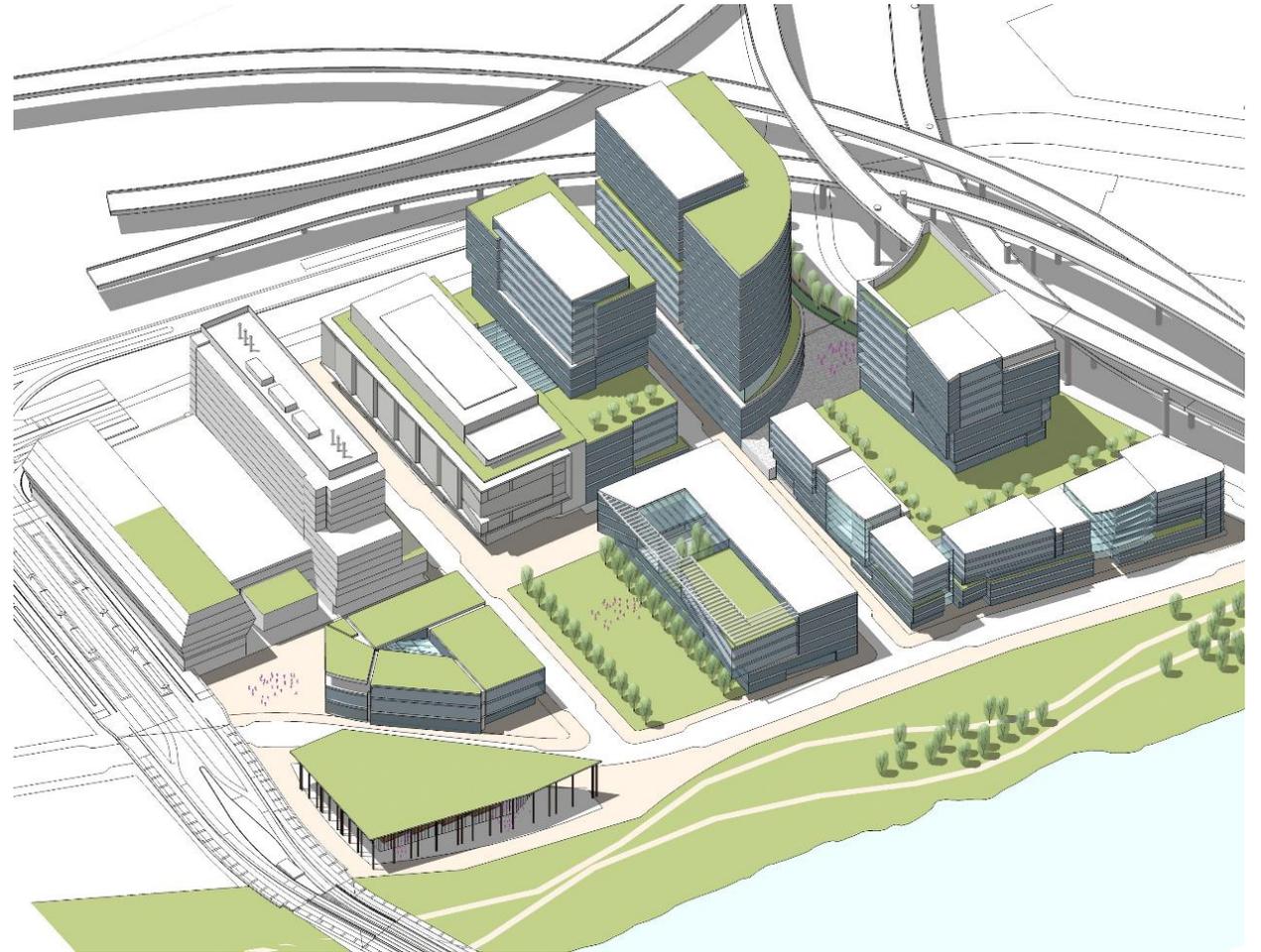
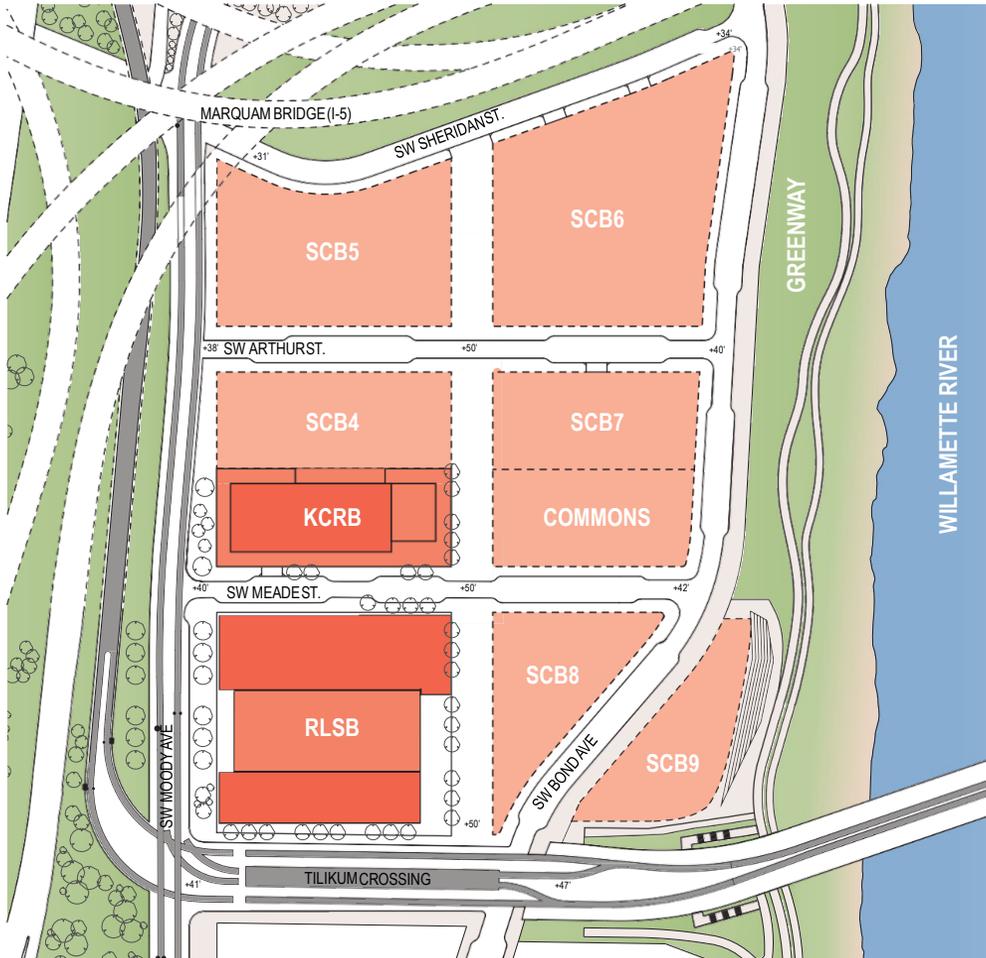
- OHSU
- Tuality Health Alliance
- Adventist Health



South Waterfront Central District Master Plan



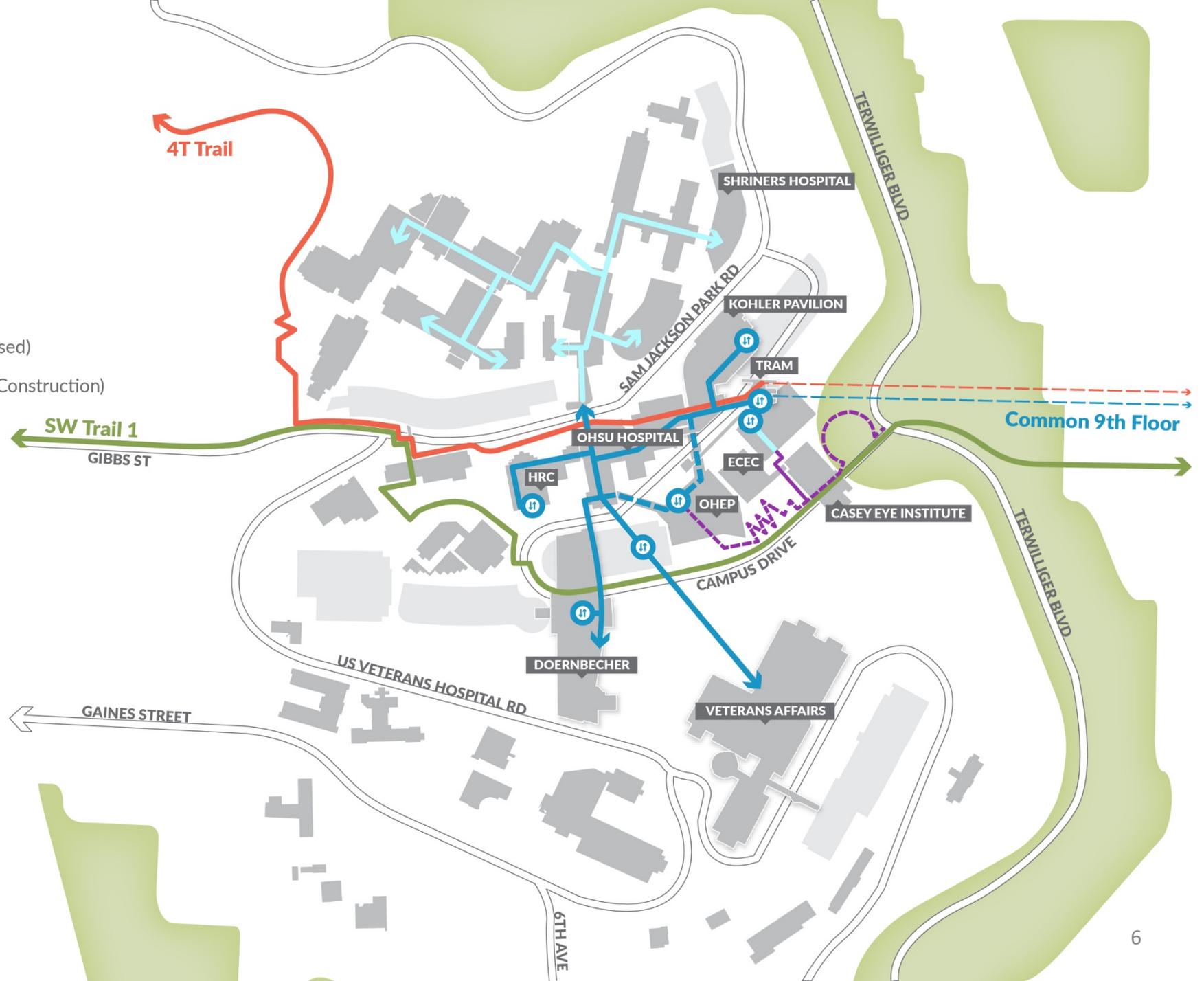
Schnitzer Campus Master Plan



Marquam Hill Access

- OHEP** OHSU Hospital Expansion Project (Proposed)
- ECEC** Oregon Elks Children's Eye Clinic (Under Construction)
- HRC** Hatfield Research Center
-  Common 9th Floor
-  Proposed OHEP 9th Floor Skybridges
-  Elevator to Common 9th Floor
-  Interior ADA-accessible connection
-  Exterior ADA-accessible connection
-  Proposed ADA-accessible pathway
-  SW Trail 1
-  4T Trail

Not to scale



Outreach and Public Engagement Summary



TriMet Committee on Accessible Transportation (CAT)



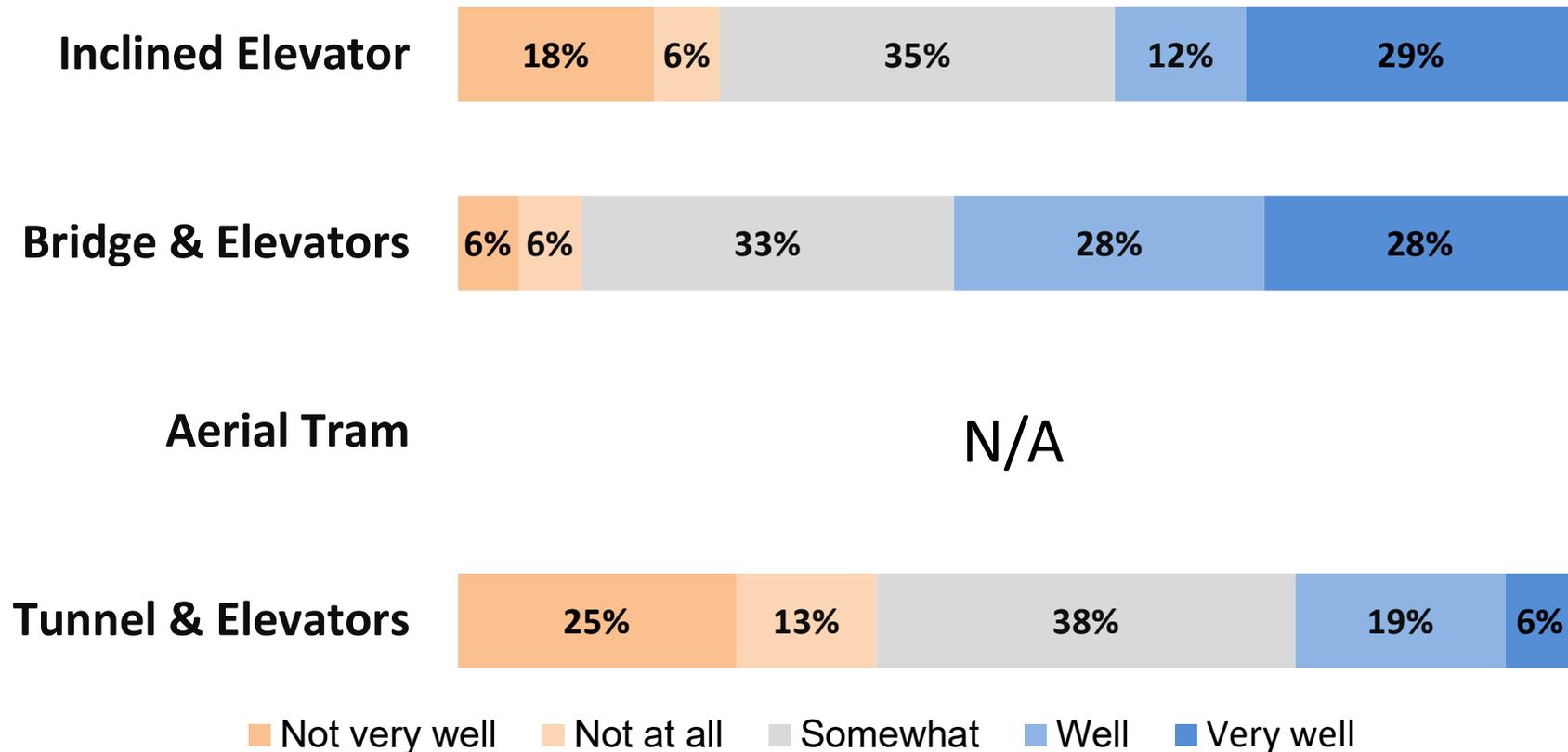
Sub-Committee Discussion
April 11, 2019

Preferred Options

- Bridge + Elevator
- Inclined Elevator

In-Person Open House

How well does the option meet the project goals?

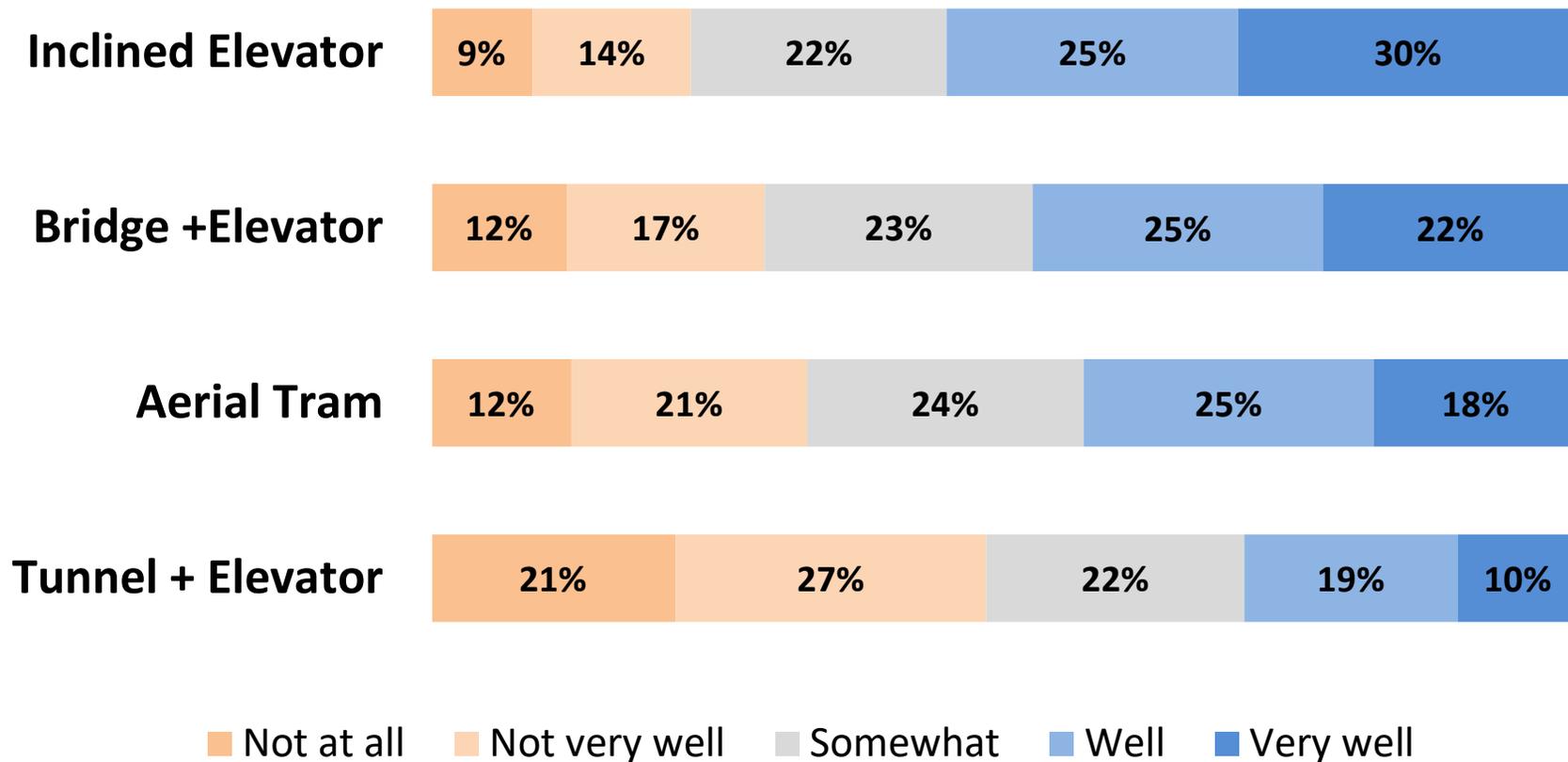


Attendees: 29

Comment Cards: 17

Online Open House

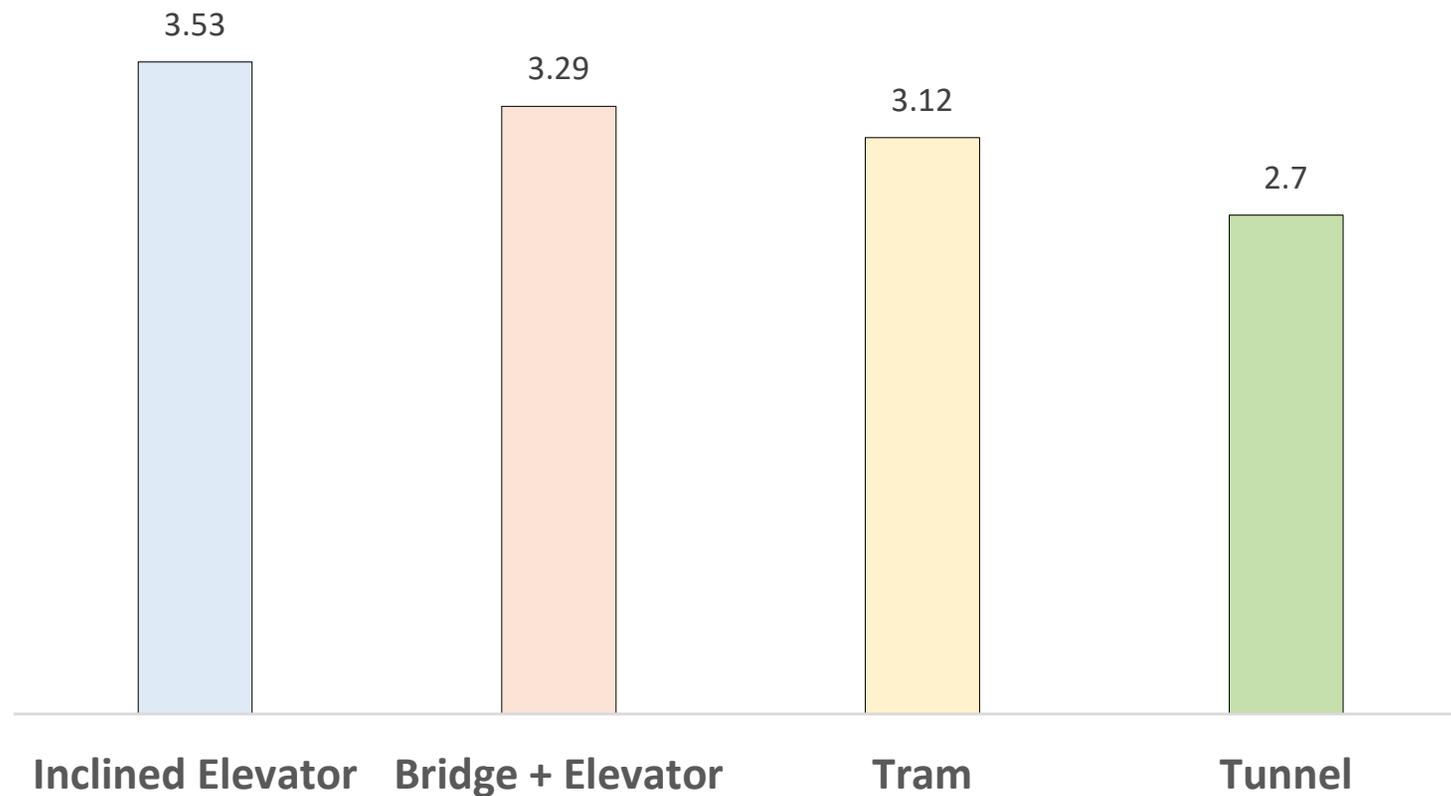
How well does the option meet the project goals?



Responses: 291

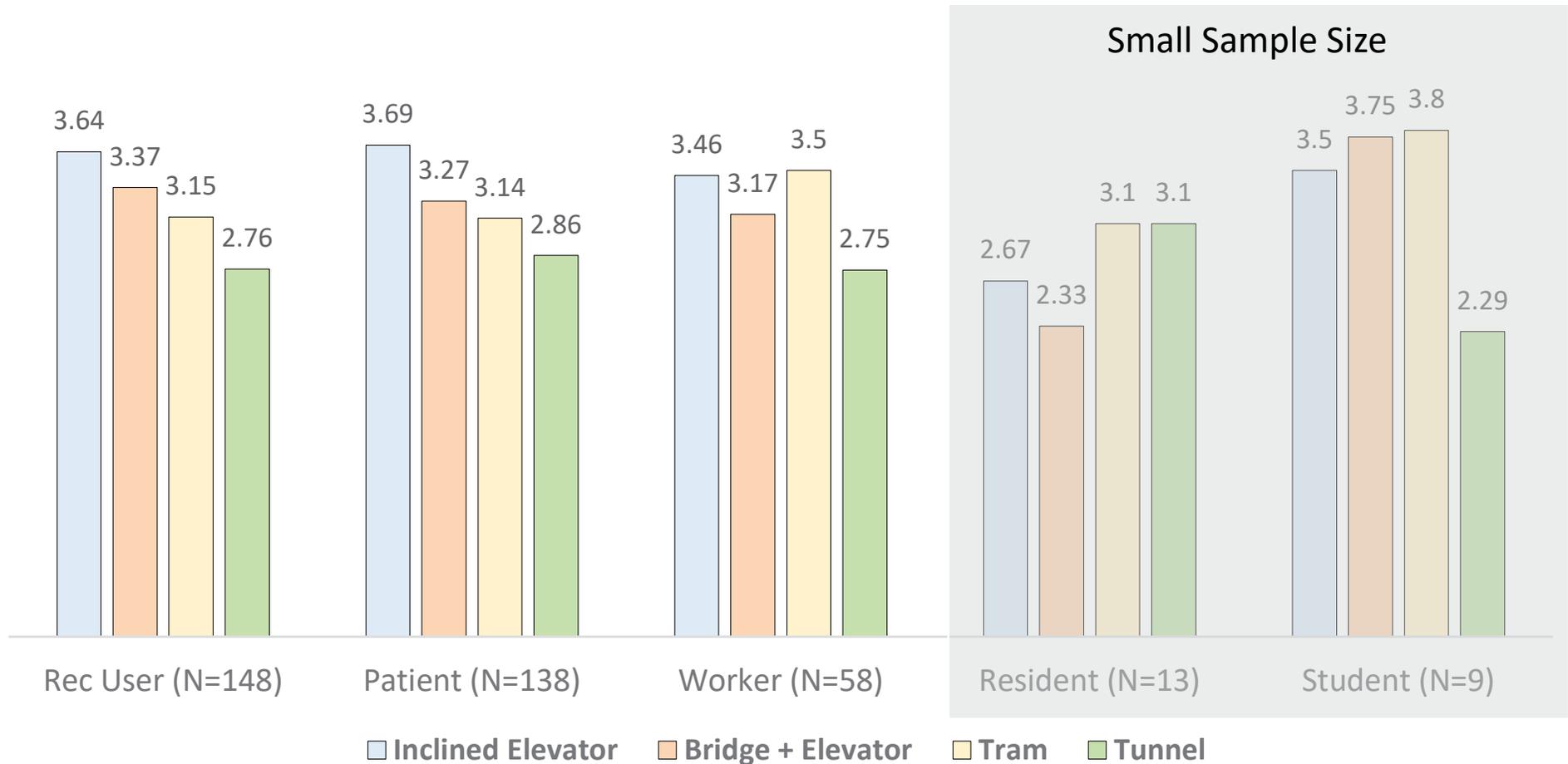
Online Open House

How well does the option meet the project goals?

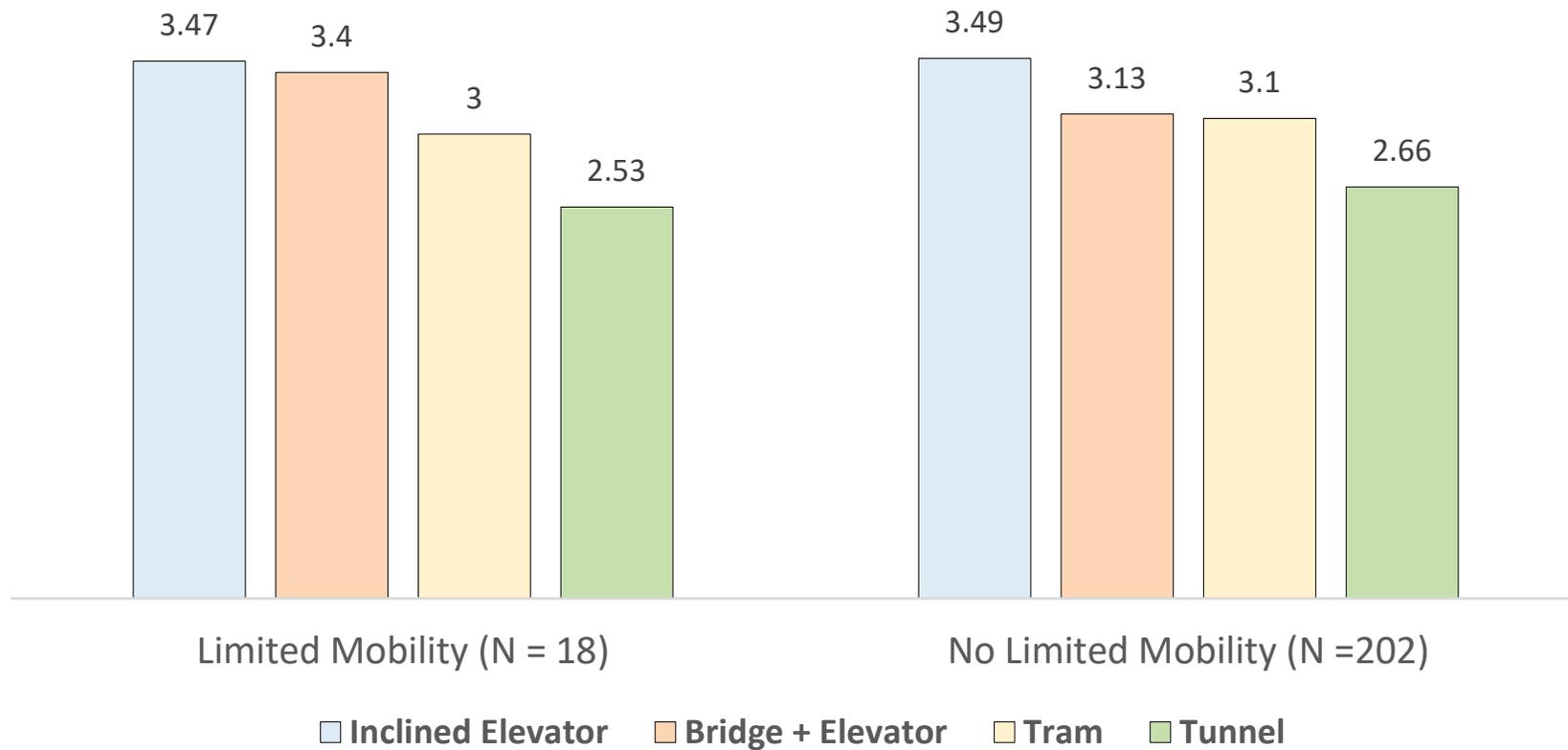


Online Open House

How well does the option meet the project goals?



How well does the option meet the project goals?



Inclined Elevator

Pros:

- Cool, unique, iconic!
- Limited walking required
- Safe and weather-protected



VIEW FROM BASE OF HILL, LOOKING WEST



AERIAL VIEW, LOOKING WEST

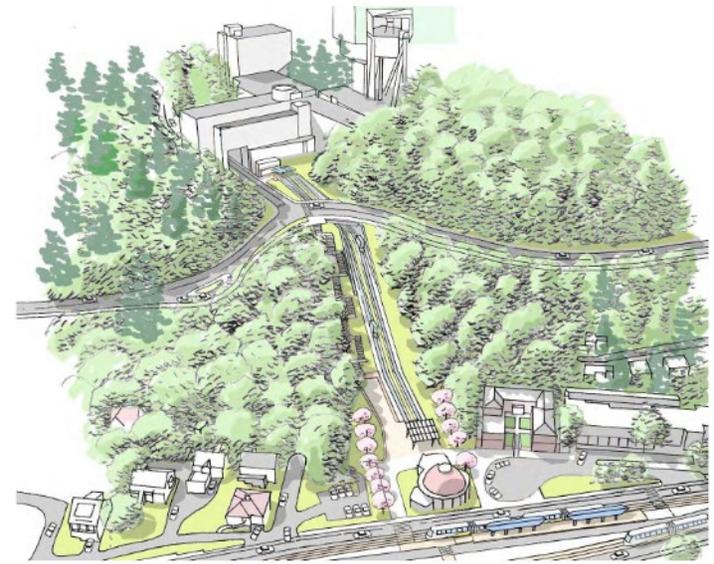
Inclined Elevator

Cons:

- Expensive
- Unfamiliar operations
- Possible impacts to wildlife and the forest



VIEW FROM BASE OF HILL, LOOKING WEST



AERIAL VIEW, LOOKING WEST

Bridge + Elevator

Pros:

- Simple and cost-effective
- Limited impacts on landscape
- Canopy walk and views



VIEW FROM BASE OF CAMPUS DRIVE, LOOKING EAST



VIEW FROM BASE OF HILL, LOOKING WEST

Bridge + Elevator

Cons:

- Long walking distance, limited access
- Reliability concerns (*existing elevators*)
- Safety and exposure to elements



VIEW FROM BASE OF CAMPUS DRIVE, LOOKING EAST



VIEW FROM BASE OF HILL, LOOKING WEST

Aerial Tram

Pros:

- Access to upper campus
- Maintains context of Terwilliger Parkway
- Good views and fun experience



Aerial Tram

Cons:

- Expensive
- Capacity concerns (*existing tram*)
- Possible tower and cable view obstructions



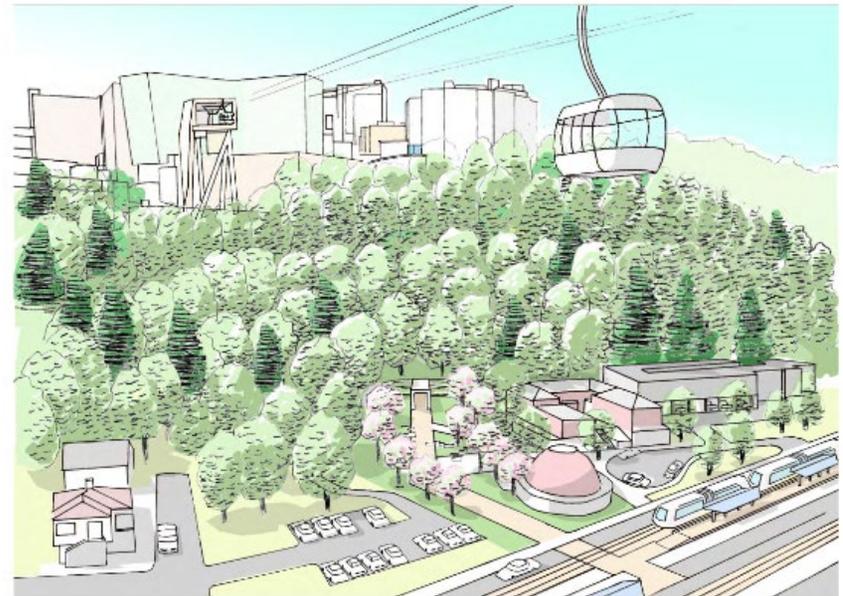
Tunnel + Elevator

Pros:

- Maintains context of Terwilliger Parkway
- Sheltered from the elements



VIEW FROM BASE OF HILL, LOOKING WEST



AERIAL VIEW, LOOKING WEST

Tunnel + Elevator

Cons:

- Expensive
- Safety/security
- Unpleasant experience, long walk



VIEW FROM BASE OF HILL, LOOKING WEST



AERIAL VIEW, LOOKING WEST

Wildlife Corridors



Providing Passage for Urban Fauna

Larger to medium sized mammals – Deer, coyotes

Medium to smaller sized mammals – Raccoons, opossum, skunks, mice

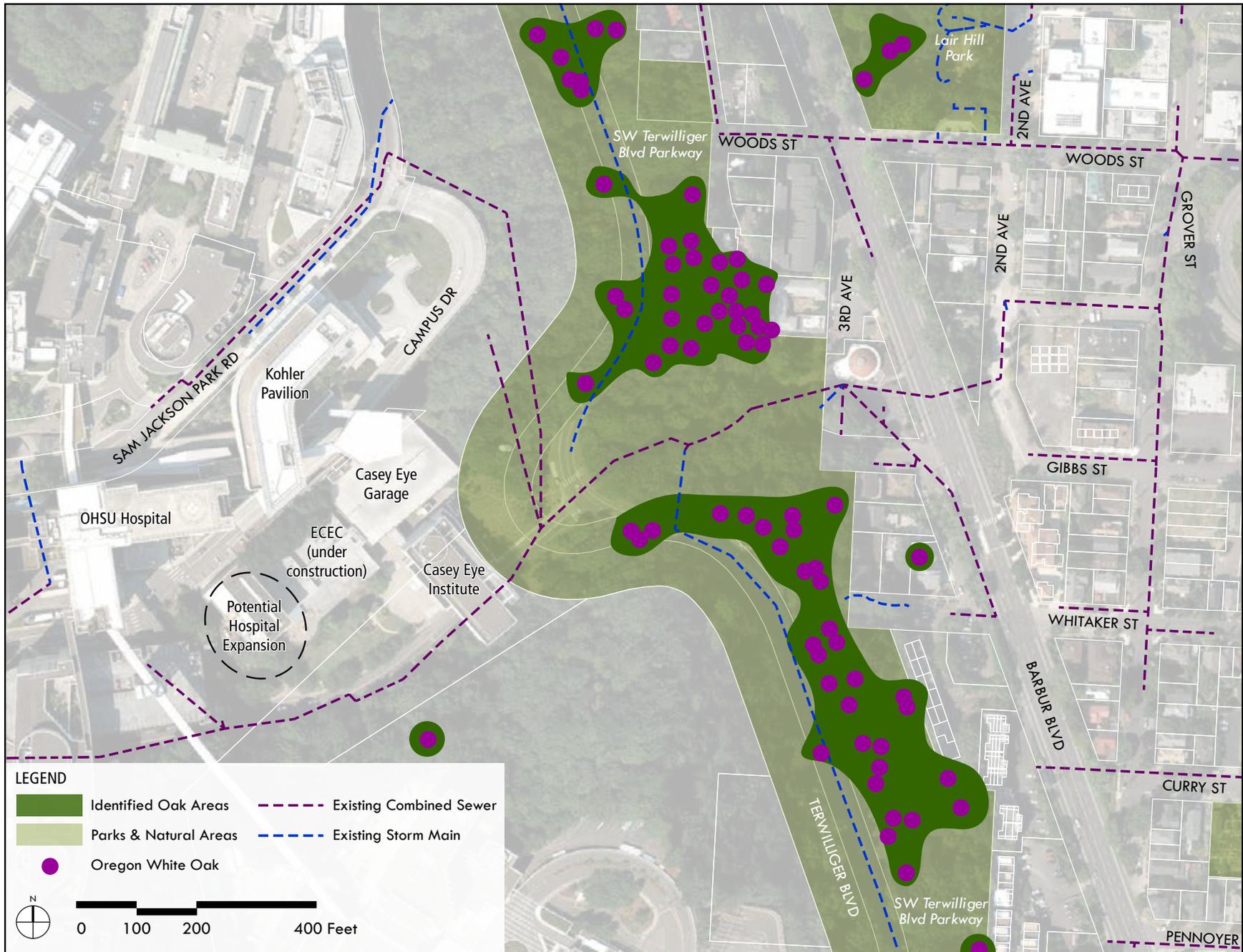
Reptiles – Garter snakes, rubber boas

Amphibians – Salamanders, tree frogs

Birds – Woodpeckers, nuthatches, owls



Wildlife Corridors- Oak Habitat



Oak associated birds in the northern Willamette Valley

Oak obligate - white-breasted nuthatch



Oak associated species:

- American goldfinch
- Bewick's wren
- Black-capped chickadee
- Black-headed grosbeak
- Bushtit
- Downy woodpecker
- Lesser goldfinch
- Spotted towhee
- Scrub-jay
- Western tanager
- Western wood-pewee



www.oregonmetro.gov



Wildlife corridors and permeability
A literature review

April 2010

 Metro | *People places. Open spaces.*

Wildlife Crossings

Providing safe passage
for urban wildlife



 Metro | *People places. Open spaces.*

Wildlife Passage

Minimum passage size:

- Large mammals: 6.5 ft x 10 ft
- Small mammals: 2 ft x 2 ft

Plantings to enhance cover:

- Oregon white oaks
- Dense vegetation to guide passage

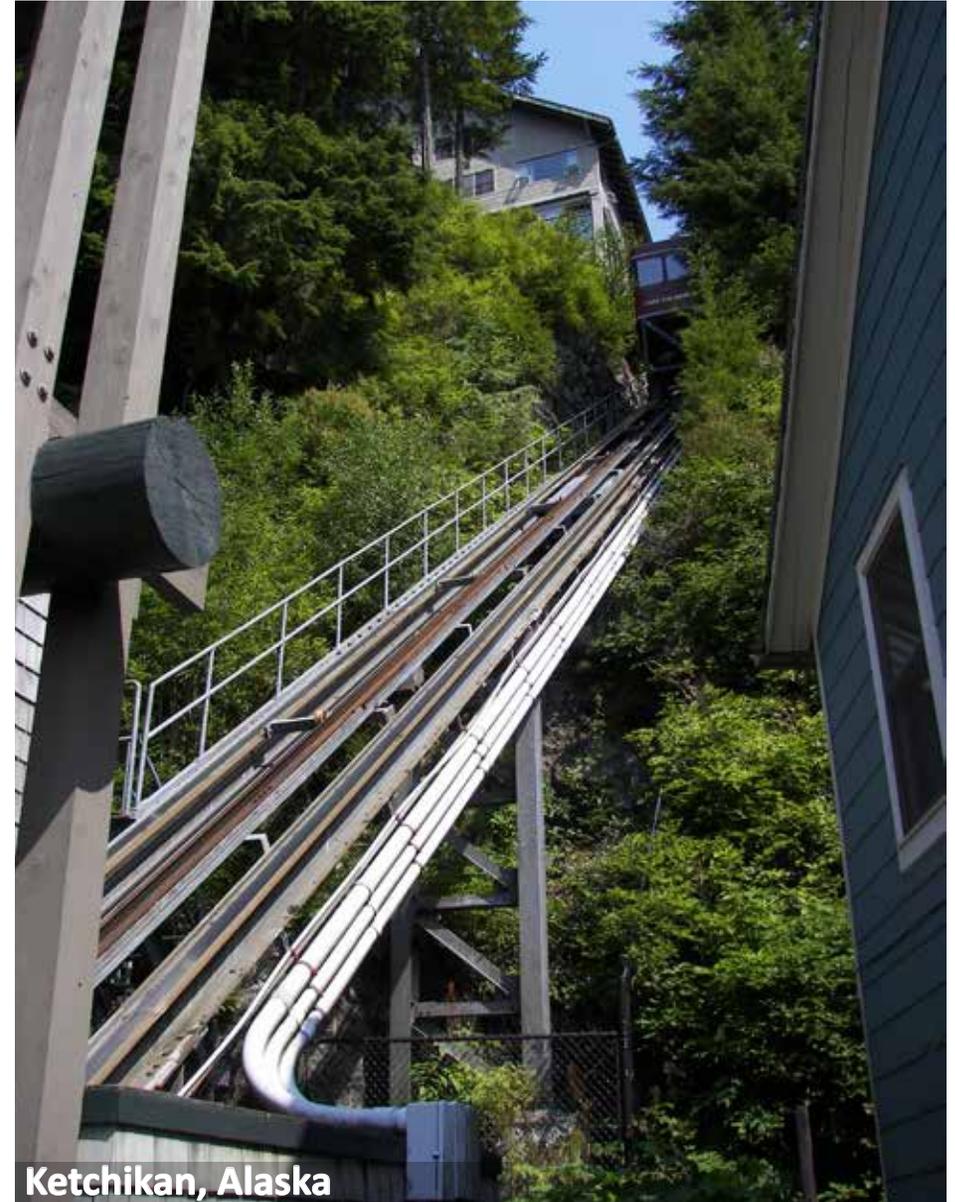
Other considerations:

- Natural light
- Distance between canopies
- Vegetative cover
- Artificial light (inhibitor)
- Fencing
- Line of sight
- Noise
- Time of day of human activity

Inclined Elevator- Elevated Guideways



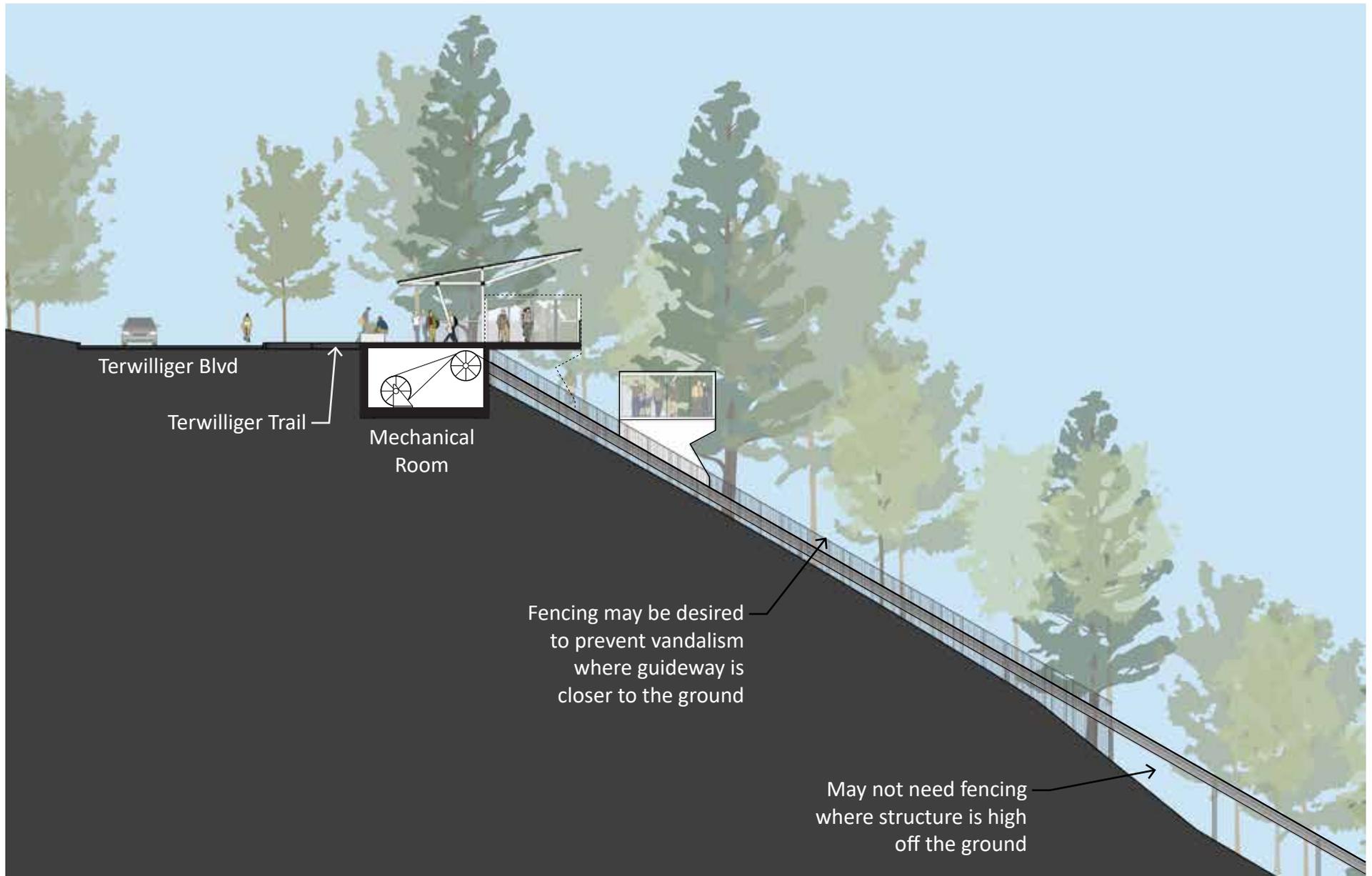
Inclined Elevator- Elevated Guideways



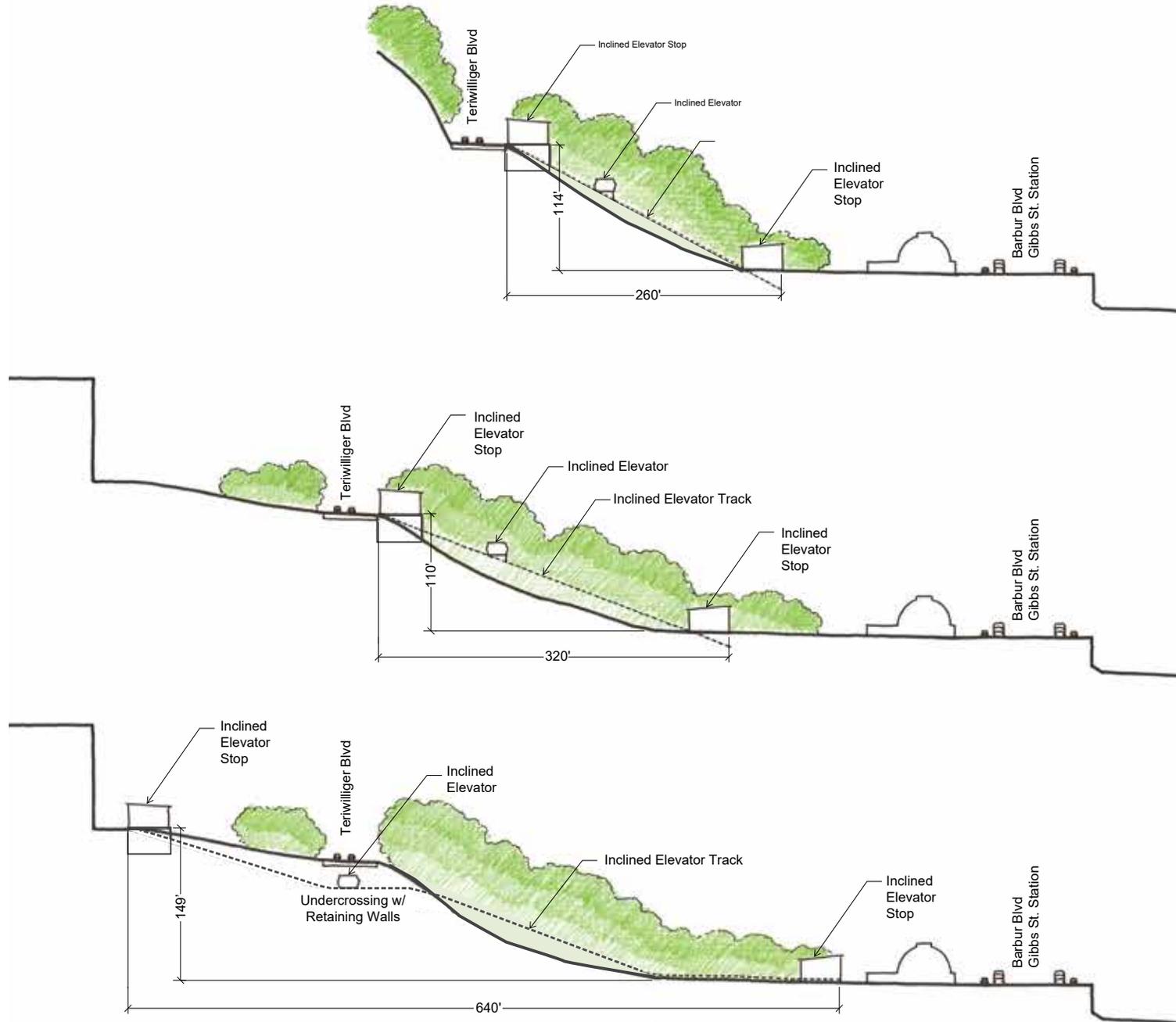
Inclined Elevator- Elevated Guideways



Inclined Elevator- Conceptual Section



Inclined Elevator- Sections



Inclined Elevator- View Uphill



Inclined Elevator- View West



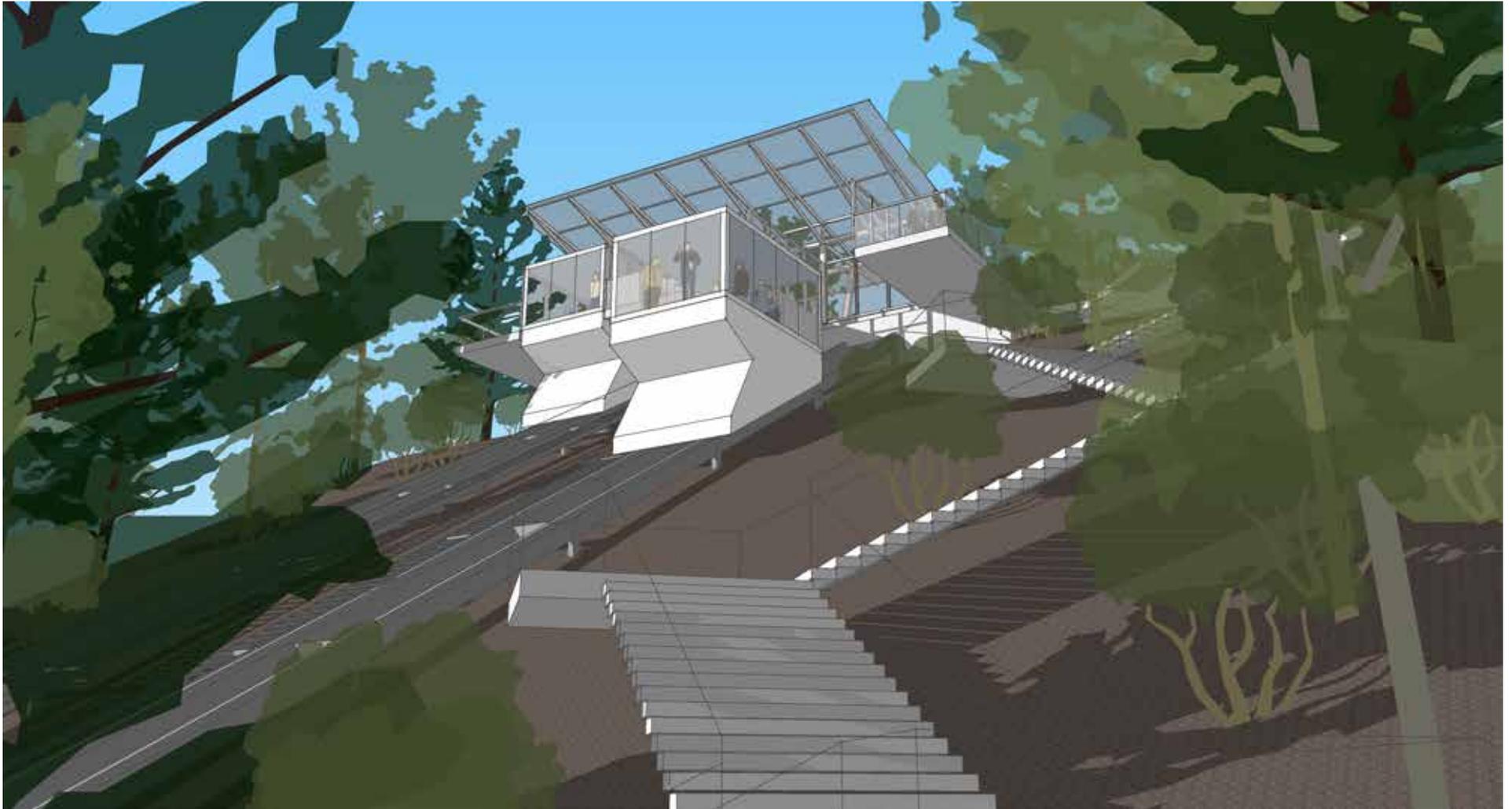
Inclined Elevator- View South



Inclined Elevator- View Northeast



Inclined Elevator- View Uphill



Inclined Elevator- Headhouses



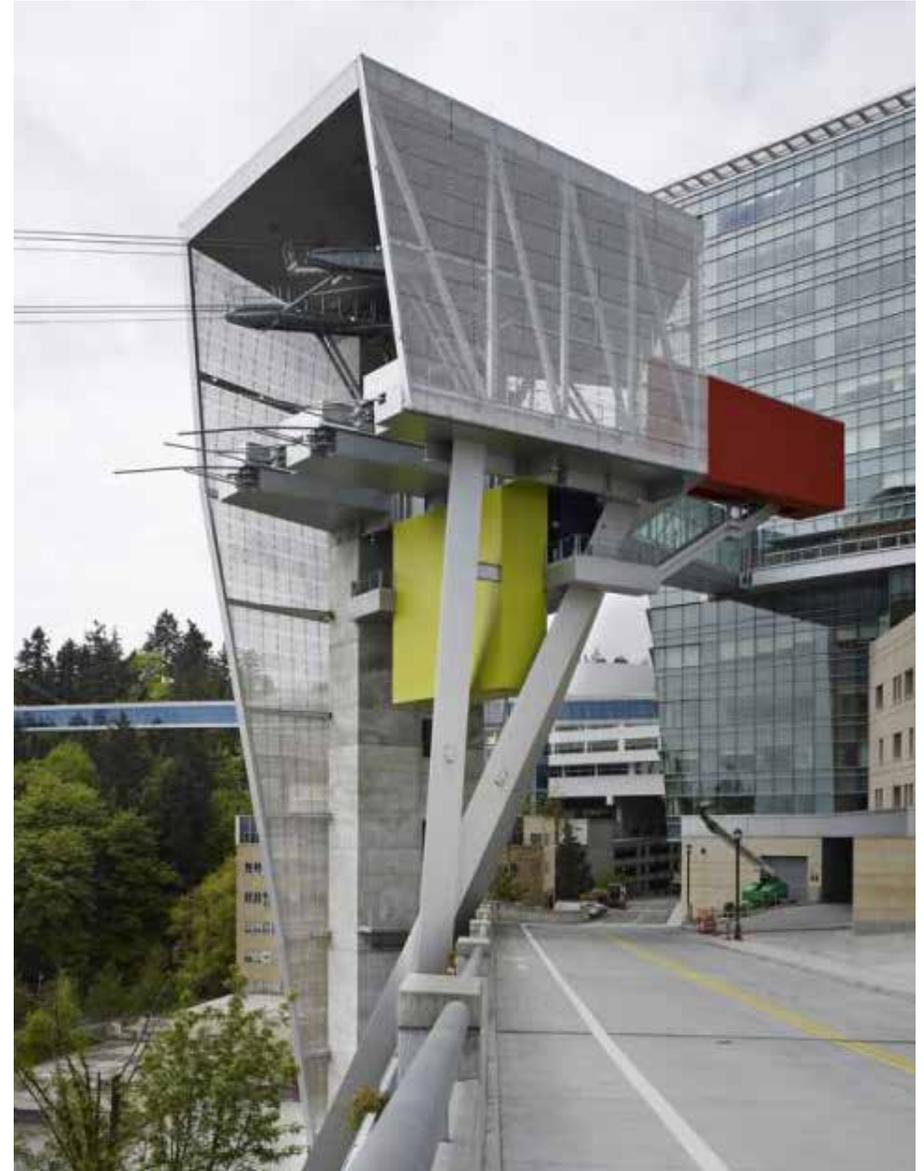
Existing Portland Aerial Tram

- Travel Time: load/travel/unload is ~5 min
- Hours of operation: 5:30a - 9:30p weekdays
- Fare: \$4.90, honors VA & OHSU ID, TriMet, Streetcar & C-Tran passes
- O&M costs: \$1.8 mil annually (split 85%/15% by OHSU/CoP)
- Attendant on-board each cabin, operator at control terminal
- Capacity: 79 people/cabin
- Jig-back operation, bi-cable system
- Redundancy: back up is bus shuttle bridge, no redundancy in cable system



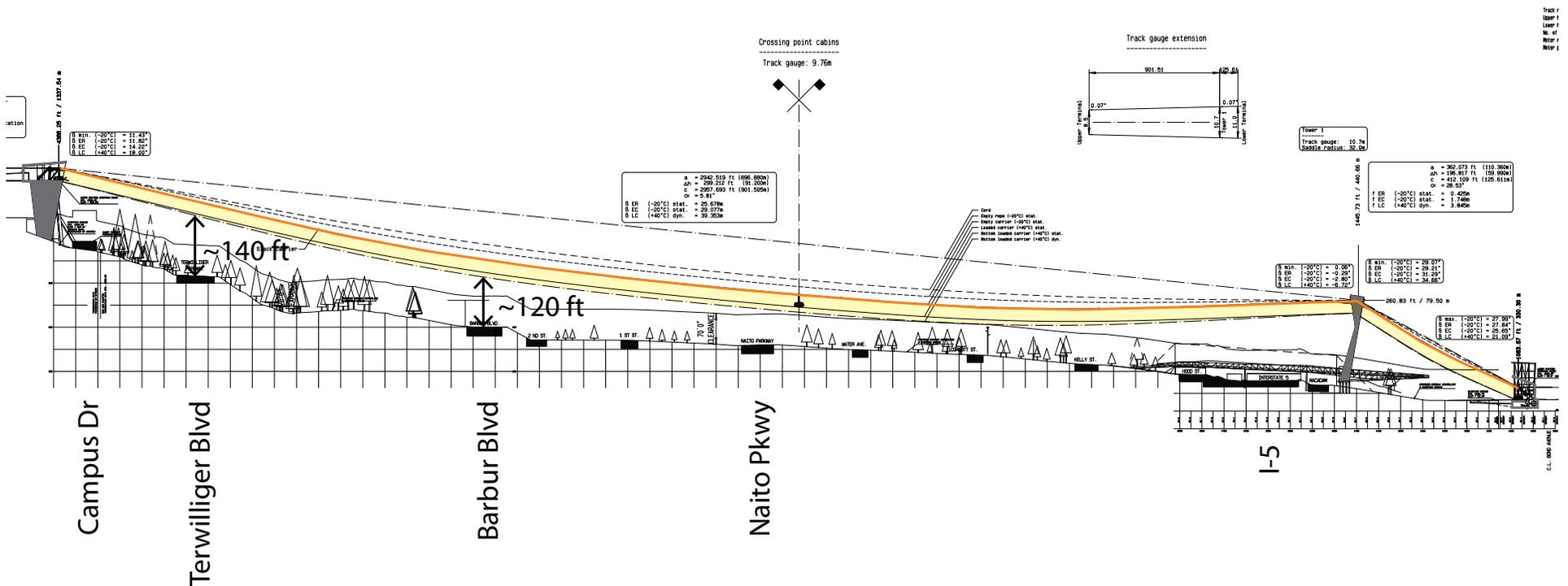
Existing Portland Aerial Tram

- Constructibility: Difficult construction of upper terminal due to limited site, complex structural engineering (Kohler Garage shoring, avoid landing on structure if possible)
- Existing upper terminus cannot be retrofitted for second tram
- Permitting: Followed public ROW, no permanent structures in Parkway

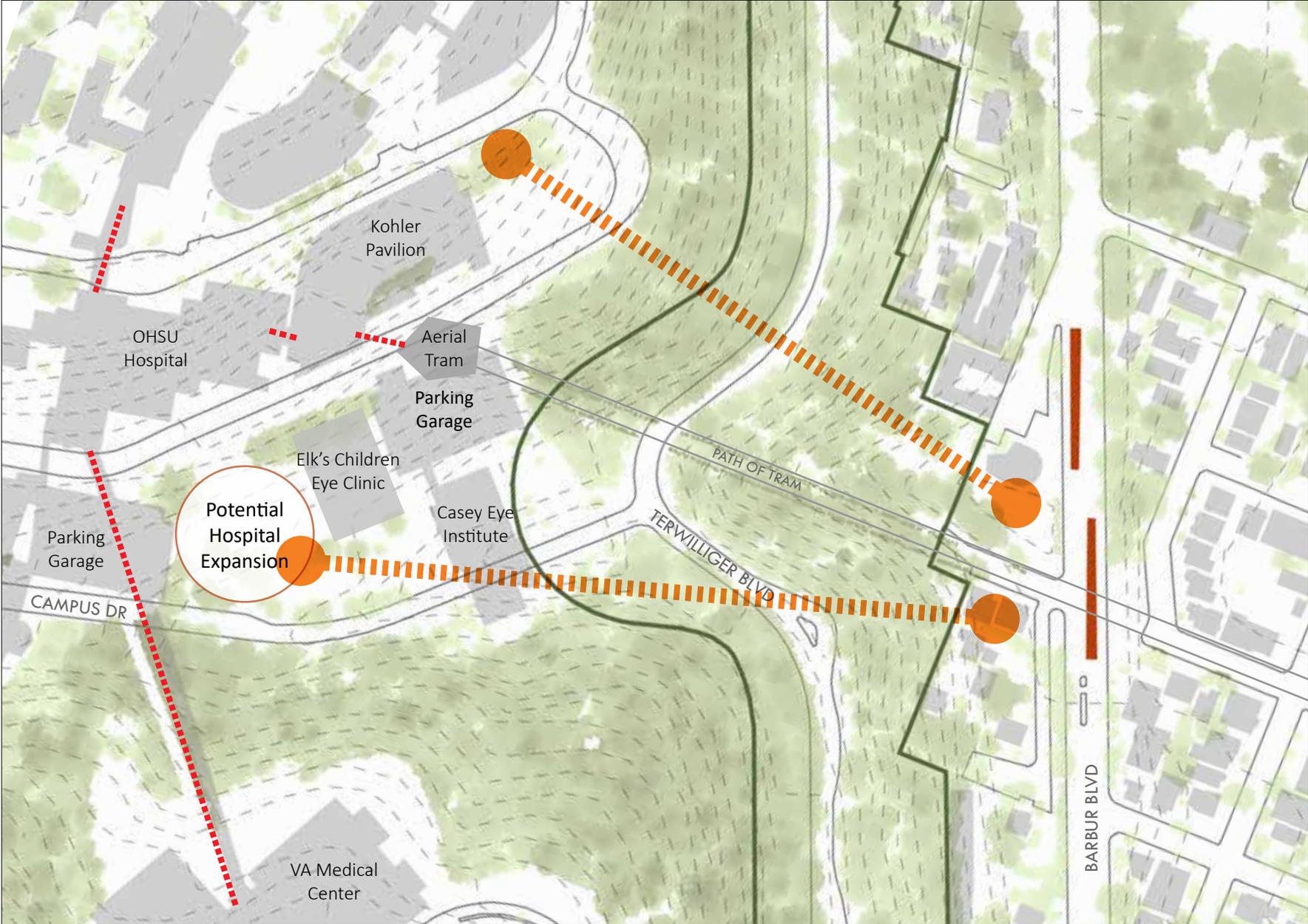


Existing Portland Aerial Tram

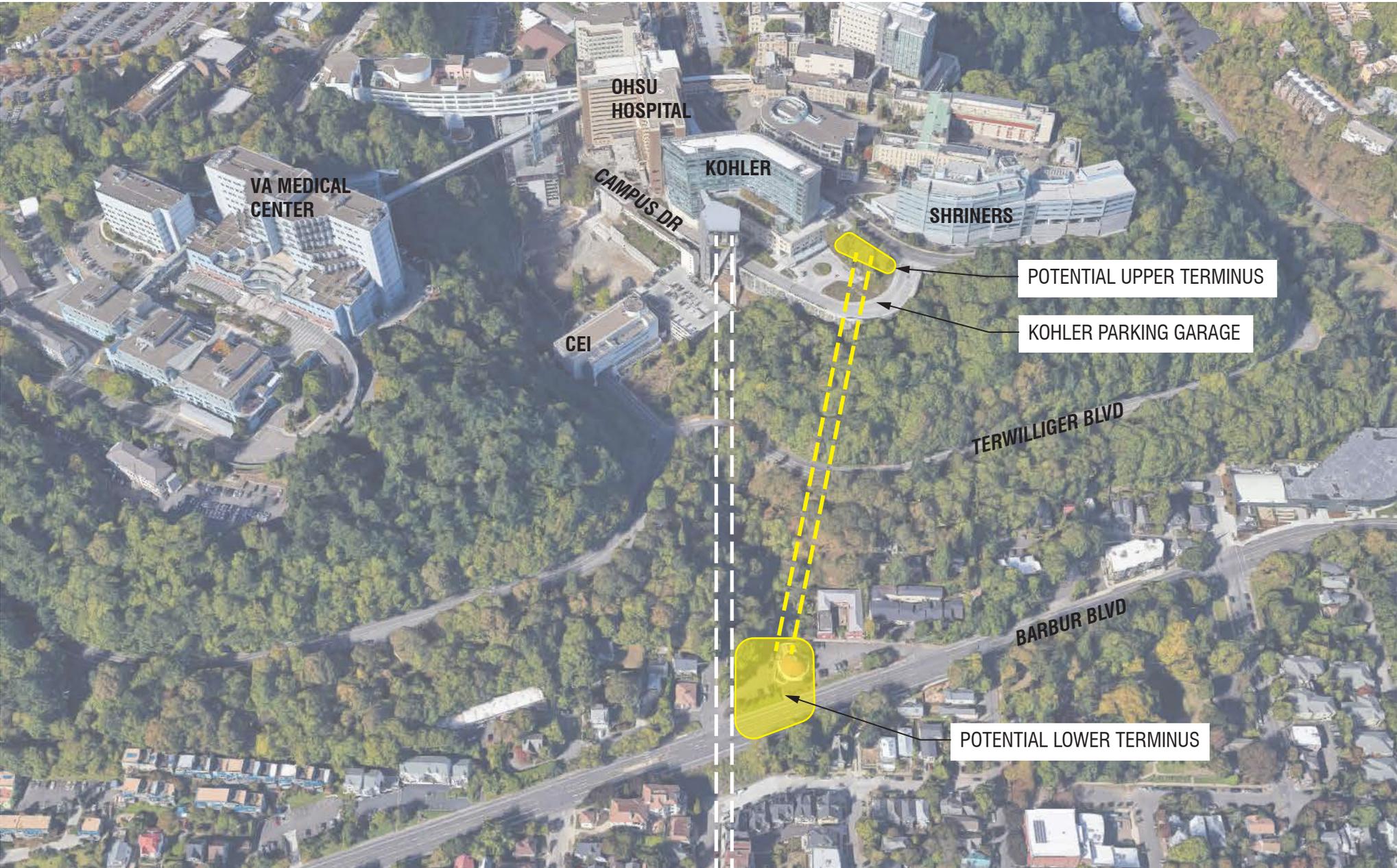
- Upper terminal under 1,000,000 lbs of tension
- Cabins weight 12 tons each
- Engineered to have cable sag w/ min 70 ft clearance over existing ground at lowest point



Aerial Tram



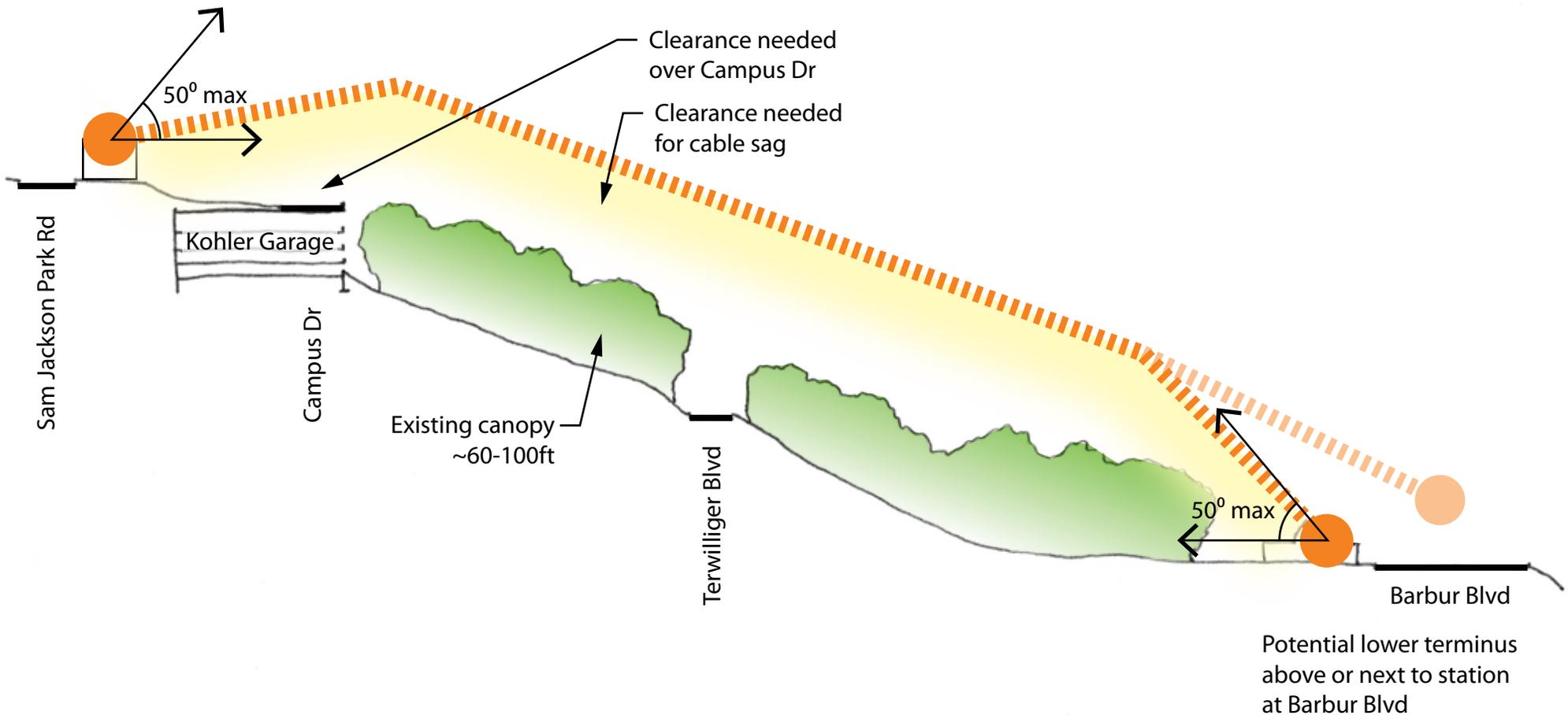
Aerial Tram



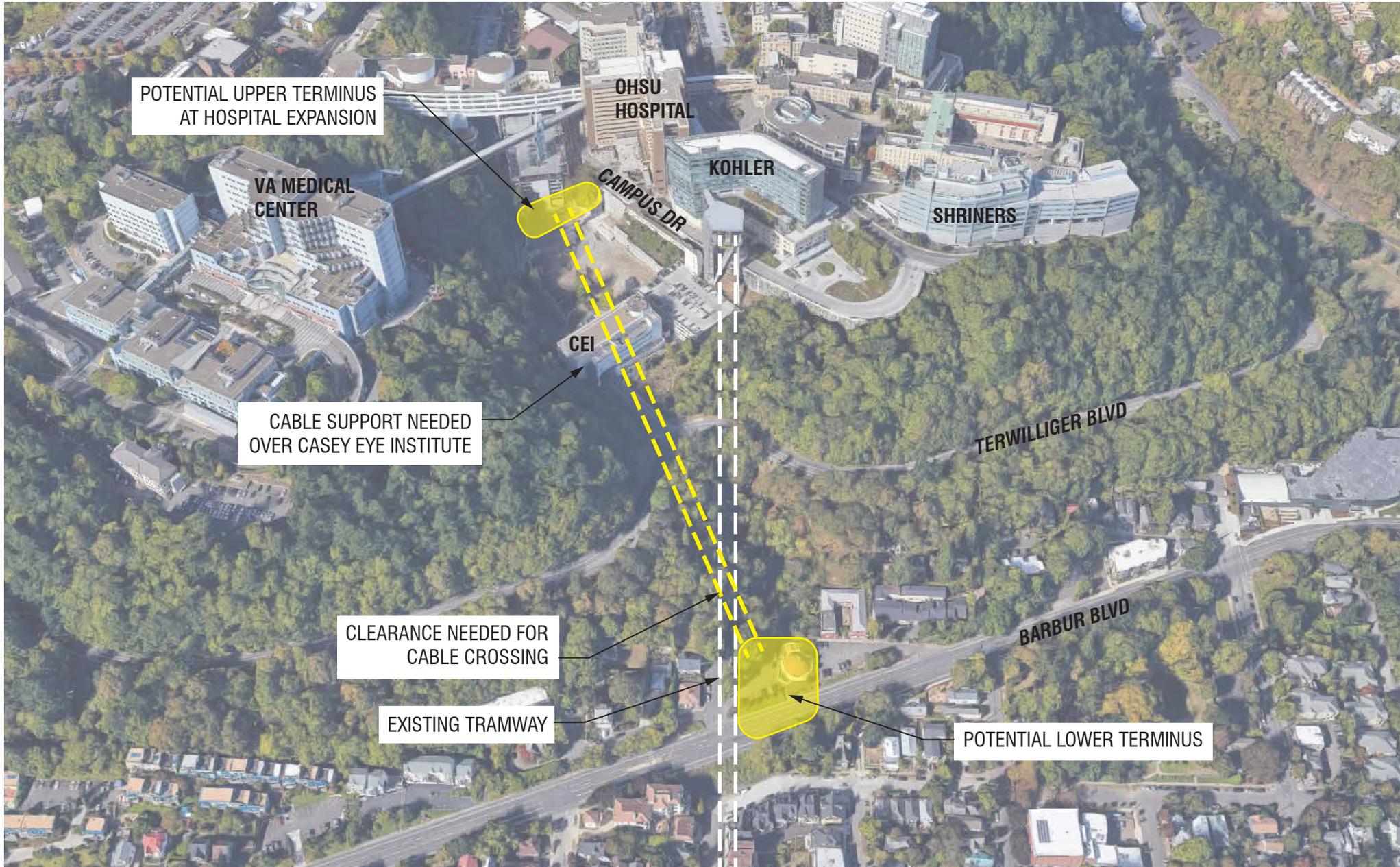
Aerial Tram

- 1-2 support towers needed, exact size & location unknown
- Evacuation & maintenance access needed

Potential upper terminus between roadway & garage: Challenging construction site, approx 3500 SF



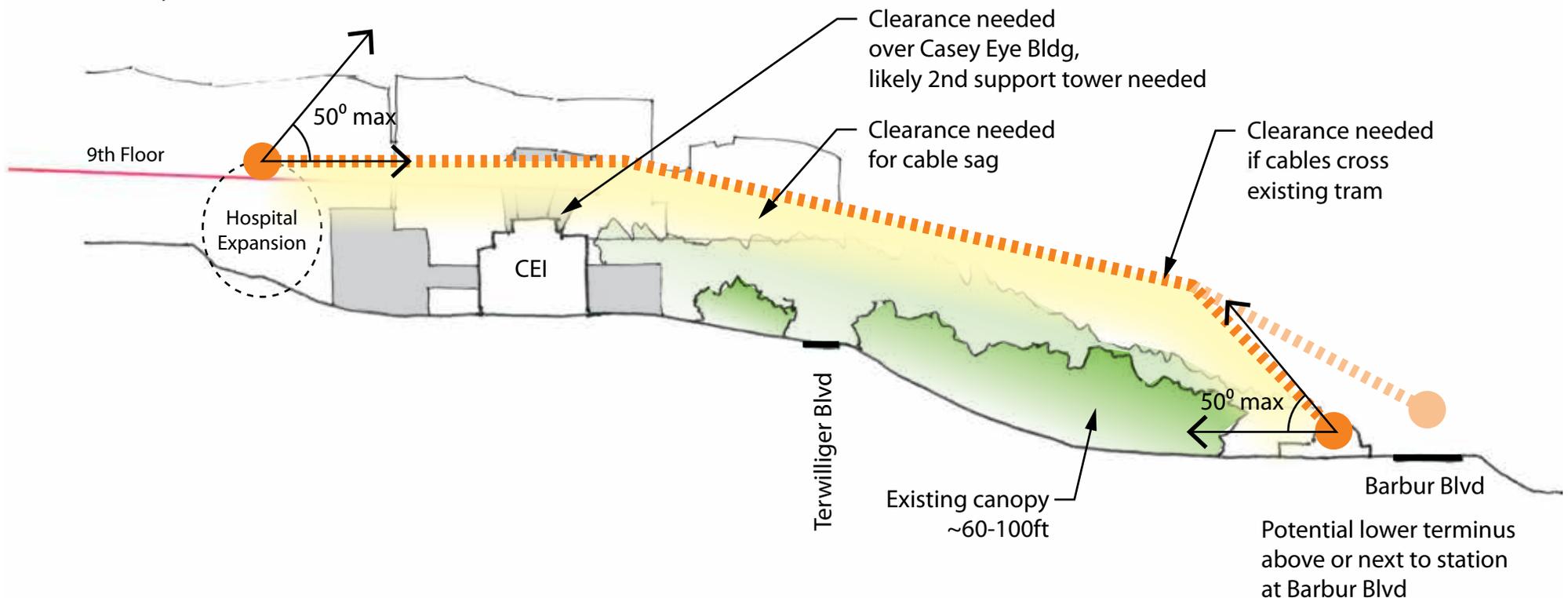
Aerial Tram



Aerial Tram

- 1-2 support towers needed, exact size & location unknown
- Evacuation & maintenance access needed

Potential upper terminus either into Hospital Expansion Bldg (in design) or on separate structure



MHC Key Statistics

1100 people/hour	AM peak estimate in 2035, Gibbs to MHC
140 people	Maximum load, all buses & trains unload at once
1-2 minutes	Pedestrian wait time at a major traffic intersection
5 minutes	Cycle time for Portland Aerial Tram

Estimated Frequency + Capacity

	Inclined Elevator to Casey Eye	Inclined Elevator to Terwilliger	Bridge + Elevator to Terwilliger	Aerial Tram to Campus/Sam Jackson	Tunnel to Campus/Sam Jackson
Capacity Assumption	2 40-person cabins			2 80-person cabins	2 40-person cabins
Total cabin round trip time (minutes)	3.5	2.3	1.5	6	2.9
People/hour	1360	2080	3200	1600	1600
Max load: Number of cycles	4 elevator cycles			2 tram cycles	4 elevator cycles
Max load: Max wait time (minutes)	3.5 - 5.5	2.3 - 3.5	1.5 - 2.3	3	2.9 - 4.3

Travel Time Summary

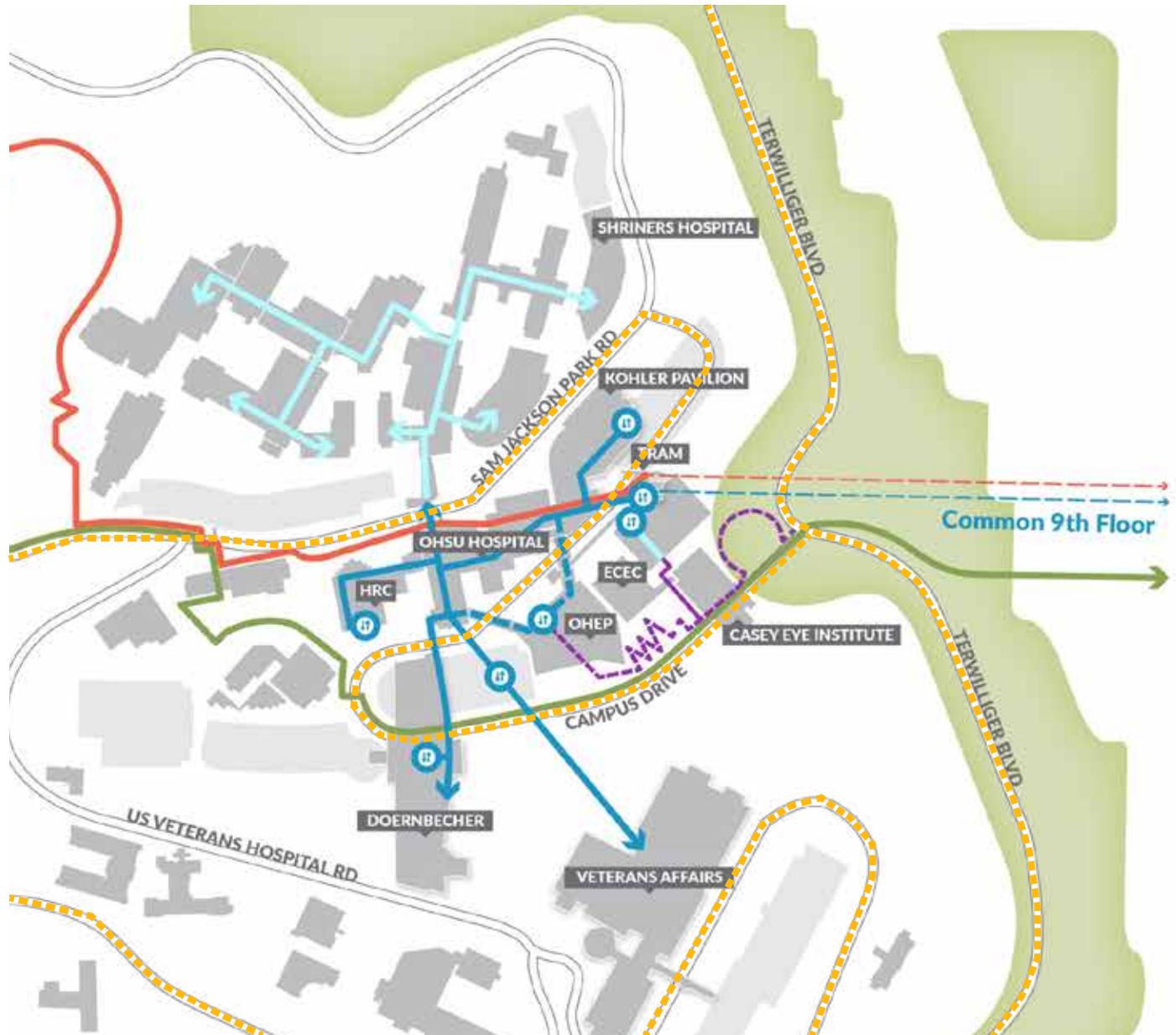
Estimated Average Travel Time from Gibbs Station during AM Peak (Minutes)

Gibbs Station to...	Via LRT to Downtown to #8 (non-MHC trip)	Via LRT to Inclined Elevator to Casey Eye	Via LRT to Bridge + Elevator to East side of Terwilliger	Via LRT to Tunnel + Elevator to Campus/Sam Jackson	Via LRT to Aerial Tram to Campus/Sam Jackson
Time on MHC		3 - 4	3 - 6	5 - 9	3 - 4
Total time to OHSU Hospital	25 - 27	11 - 15	12 - 21	8 - 17	7 - 12
Total time to VA Medical Center	20 - 22	11 - 14	12 - 14	12 - 26	11 - 21
Total time to Shriners Hospital	28 - 32	13 - 24	14 - 24	7 - 14	5 - 9
Total time to OHSU Hospital Expansion	17 - 27	5 - 11	7 - 16	11 - 16	9 - 11

Notes:

1. Aerial Tram travel time very preliminary, assumes 3 min for loading/travel/unloading, assumes landing point at Sam Jackson/Campus
2. Range of time represents range of fastest to slowest users.
3. Assumes existing circulation routes aside from MHC

Network of Routes



Working Group Feedback

Member	Affiliation	Choice 1	Choice 2	Choice 3	Choice 4
Jeb Doran	TriMet	Bridge + Elevator	Inclined Elevator	Aerial Tram	Tunnel
Michael Harrison	OHSU	Bridge + Elevator	Inclined Elevator	Aerial Tram	Tunnel
Brett Horner	PP&R	Inclined Elevator	Bridge + Elevator	Aerial Tram	Tunnel
Teresa Boyle	PBOT	Inclined Elevator	Bridge + Elevator	Aerial Tram	Tunnel
Hillary Adams	BDS	Inclined Elevator	Bridge + Elevator	Aerial Tram	Tunnel
John Dodier	VA Hospital	Inclined Elevator	Bridge + Elevator	Tunnel	Aerial Tram
Don Baack	SW Trails	Inclined Elevator	Bridge + Elevator	Aerial Tram	Tunnel
Jim Gardner	South Portland NA	Inclined Elevator	Aerial Tram	Tunnel	Bridge + Elevator
Ed Fischer	Homestead NA	Inclined Elevator	Aerial Tram	Tunnel	Bridge + Elevator
Anton Vetterlein	Friends of Terwilliger	Inclined Elevator	Aerial Tram	Tunnel	Bridge + Elevator
Chris Ford	Metro	Inclined Elevator & Bridge + Elevator		Aerial Tram & Tunnel	

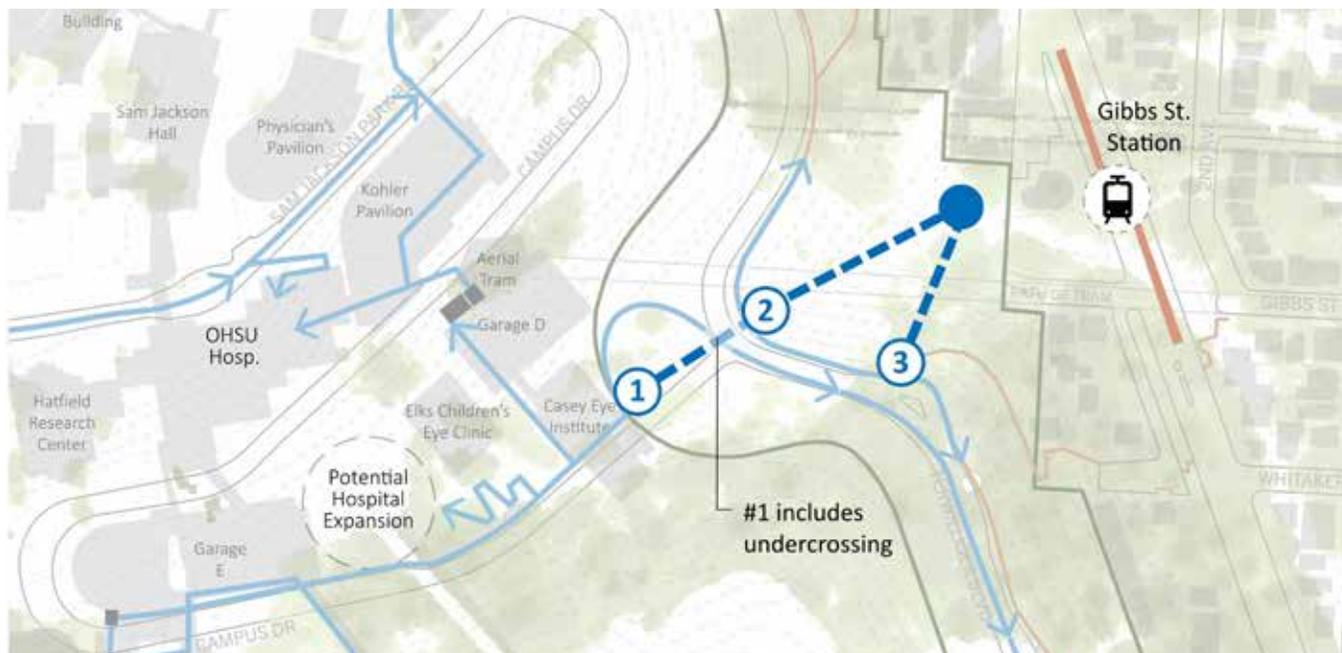
Inclined Elevators

Pros	Cons
Access <ul style="list-style-type: none">• #8 bus connection• Parkway recreation and nature• Centralized dispersal point• Minimal physical effort• Weather protected Context <ul style="list-style-type: none">• Lower profile than other options Experience <ul style="list-style-type: none">• Unique and iconic	Access <ul style="list-style-type: none">• Requires additional connection into campus via pathway or bus Budget (\$35 – 45 million) Operations <ul style="list-style-type: none">• Not fully known cost of O&M Environmental <ul style="list-style-type: none">• Wildlife crossings• Potential impacts to utilities

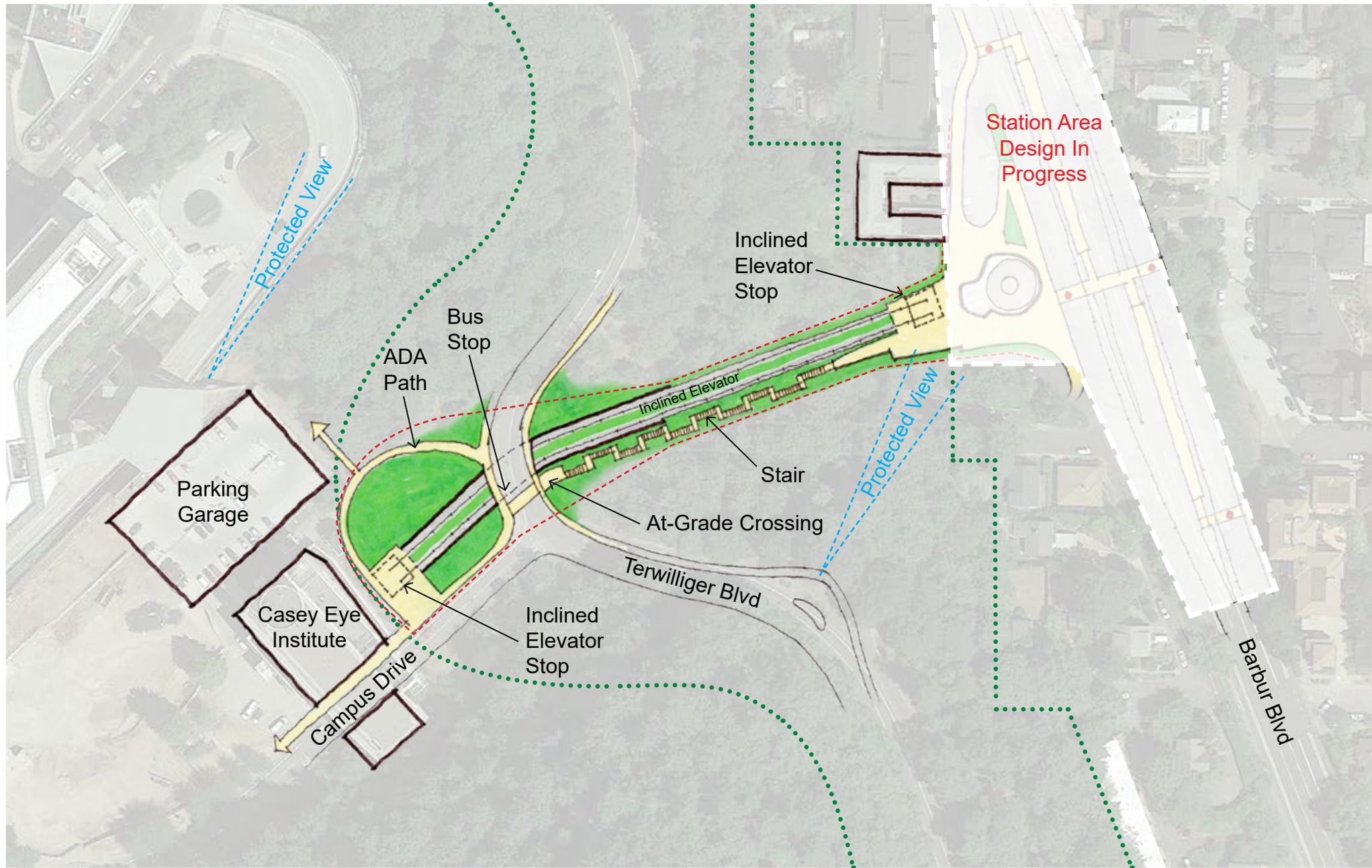


Inclined Elevators- Landing

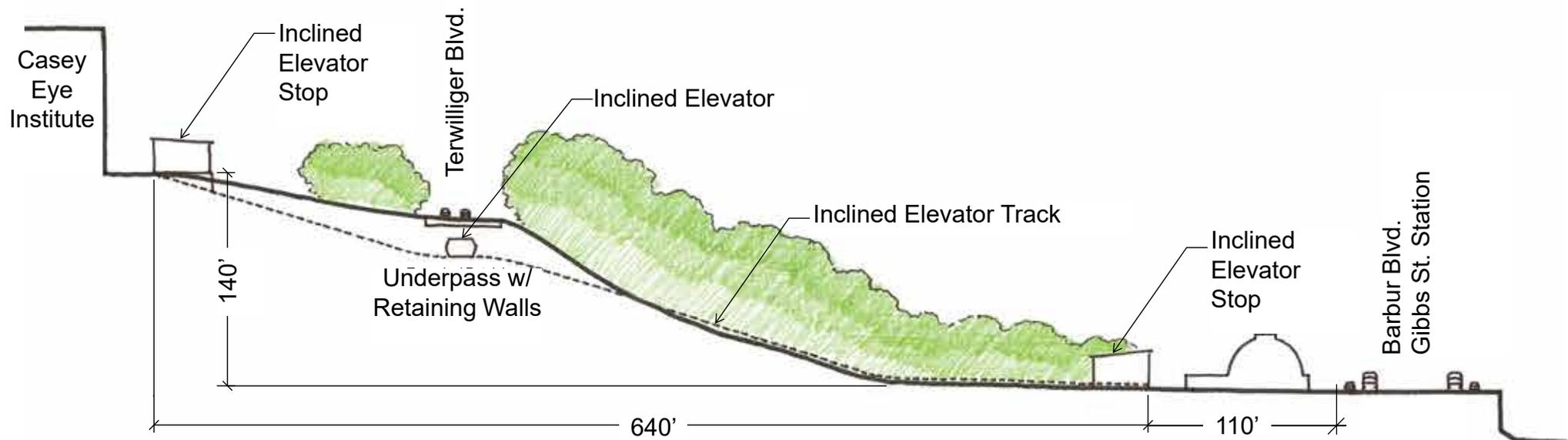
Terminus East of Terwilliger	Terminus West of Terwilliger
<ul style="list-style-type: none"> • Jeb Doran of TriMet • Hillary Adams of BDS • Michael Harrison of OHSU • Brett Horner of PP&R • John Dodier of VA Hospital 	<ul style="list-style-type: none"> • Teresa Boyle of PBOT • Don Baack of SW Trails • Anton Vetterlein of Friends of Terwilliger • Ed Fischer of Homestead NA • Jim Gardner of South Portland NA
Reasoning for Landing Choice	
<ul style="list-style-type: none"> • Minimizes cost • Minimizes construction risks • Improves at-grade crossing 	<ul style="list-style-type: none"> • Undercrossing reduces modal conflicts on Terwilliger • Maintains historic character of Parkway • Lands closer to Hill destinations



Inclined Elevators - Alignment #1



Inclined Elevators - Section



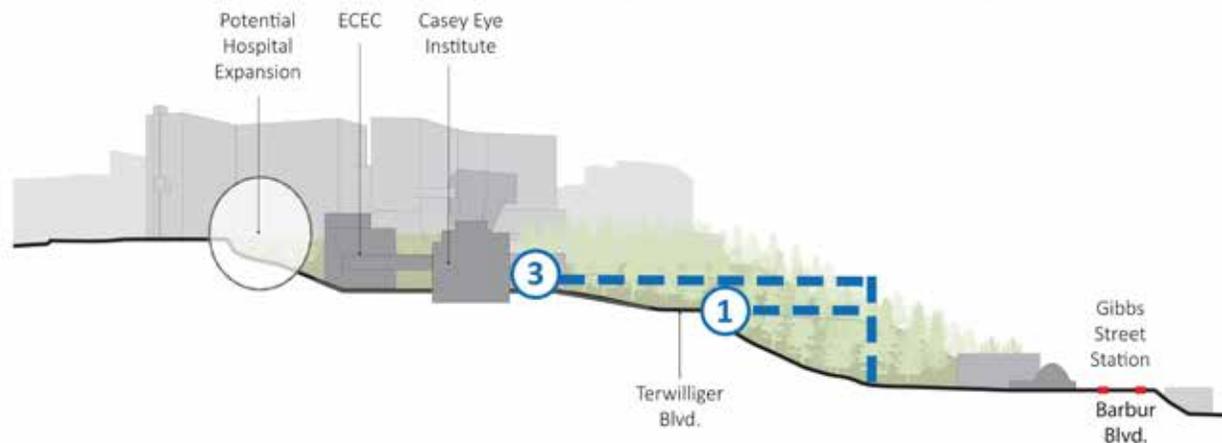
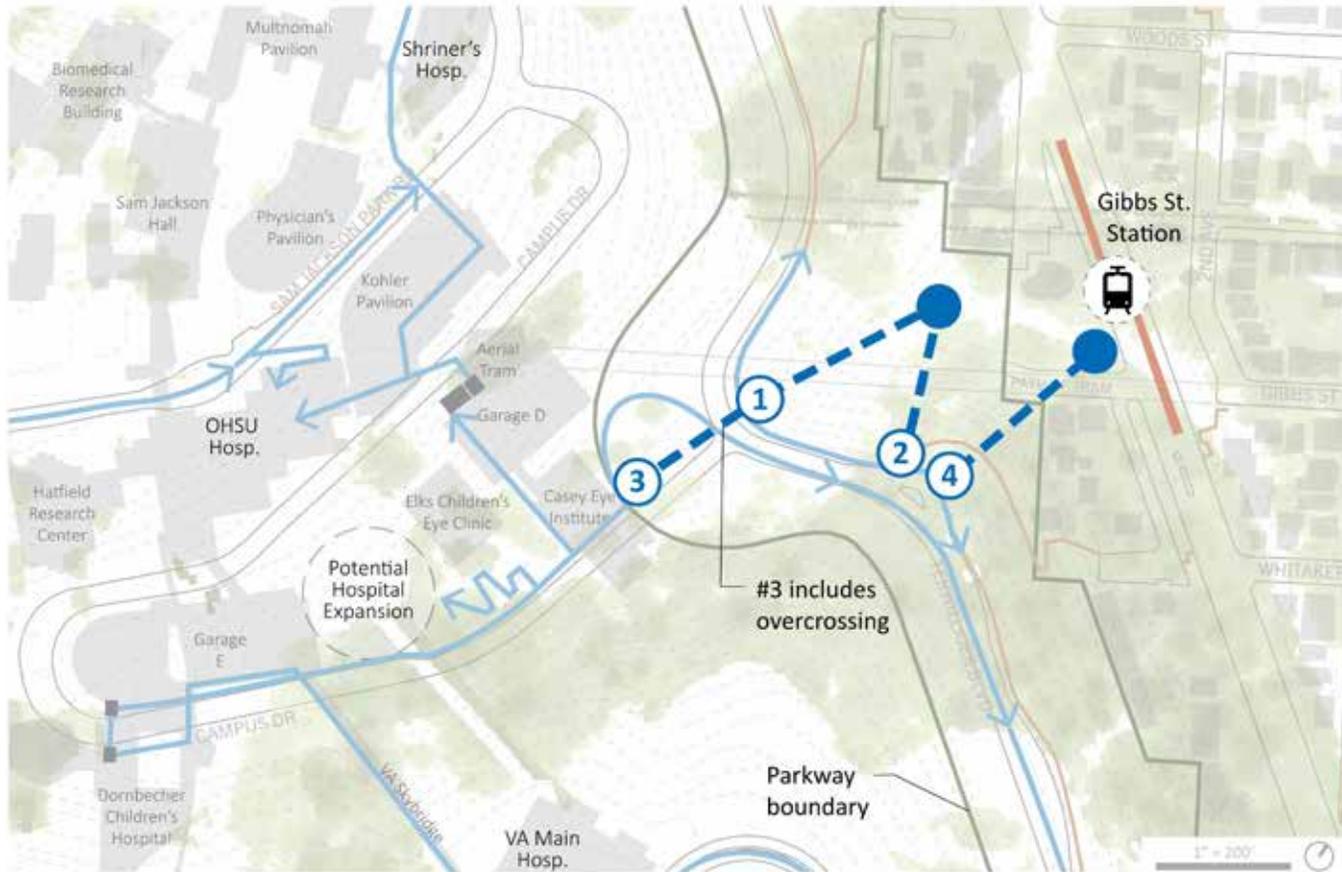
Inclined Elevator- Alignment #2



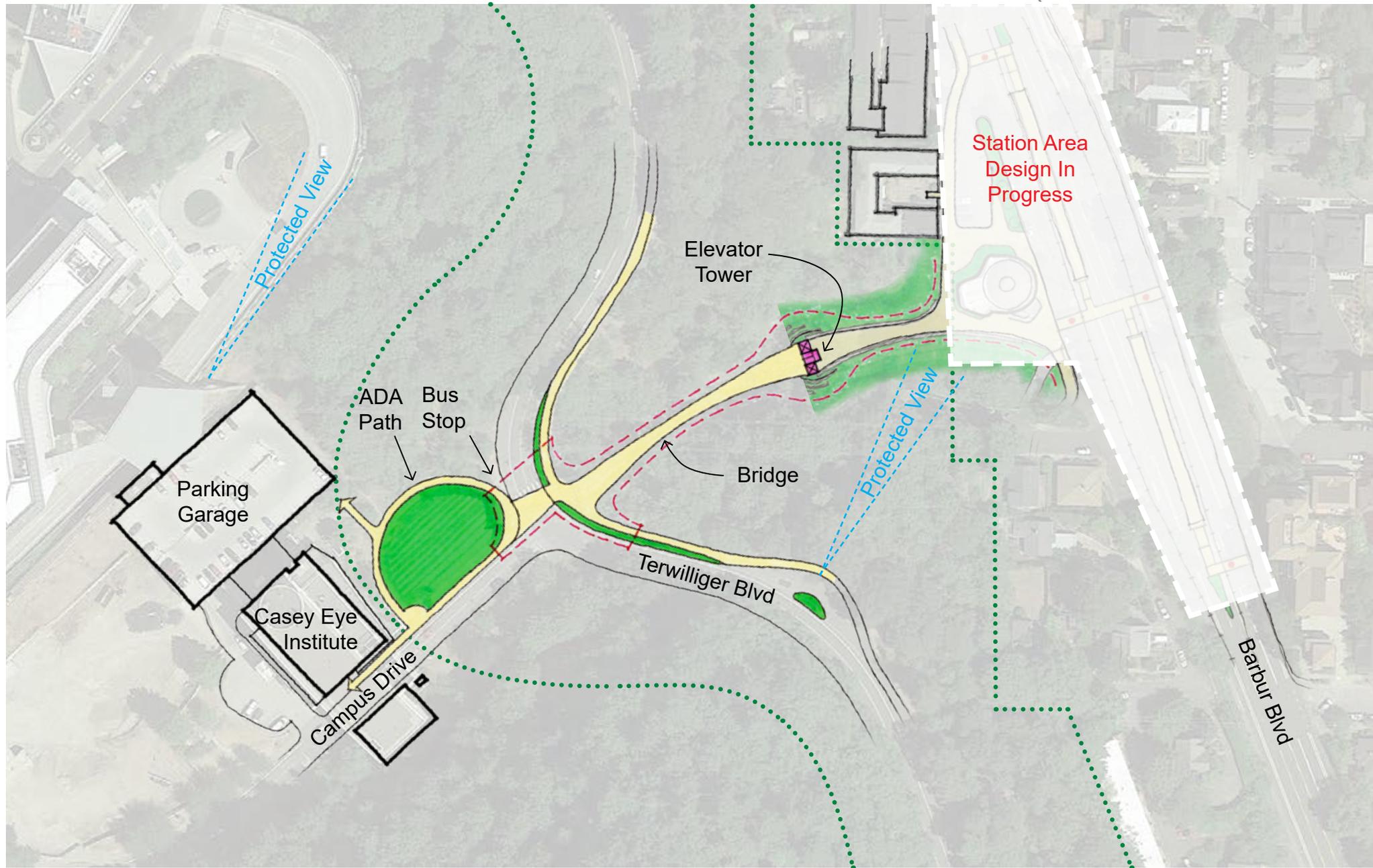
Inclined Elevator- Alignment #3



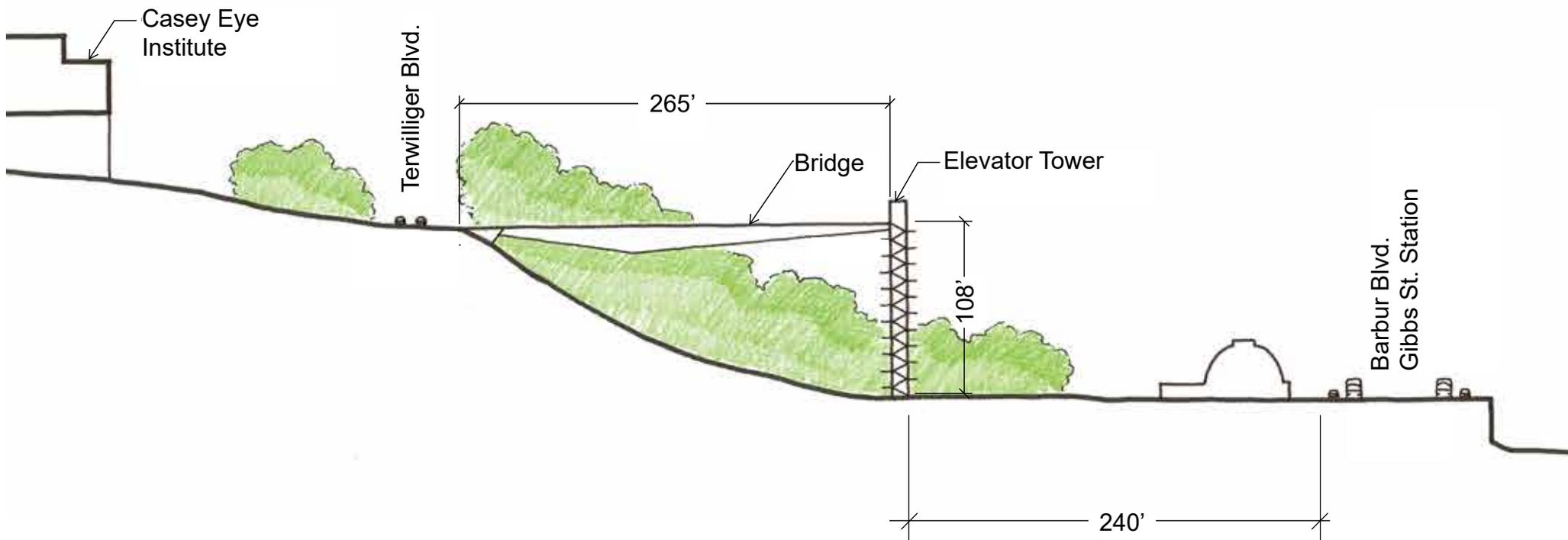
Bridge + Elevators - Potential Alignments



Bridge + Elevators- Alignment #1



Bridge + Elevators - Section

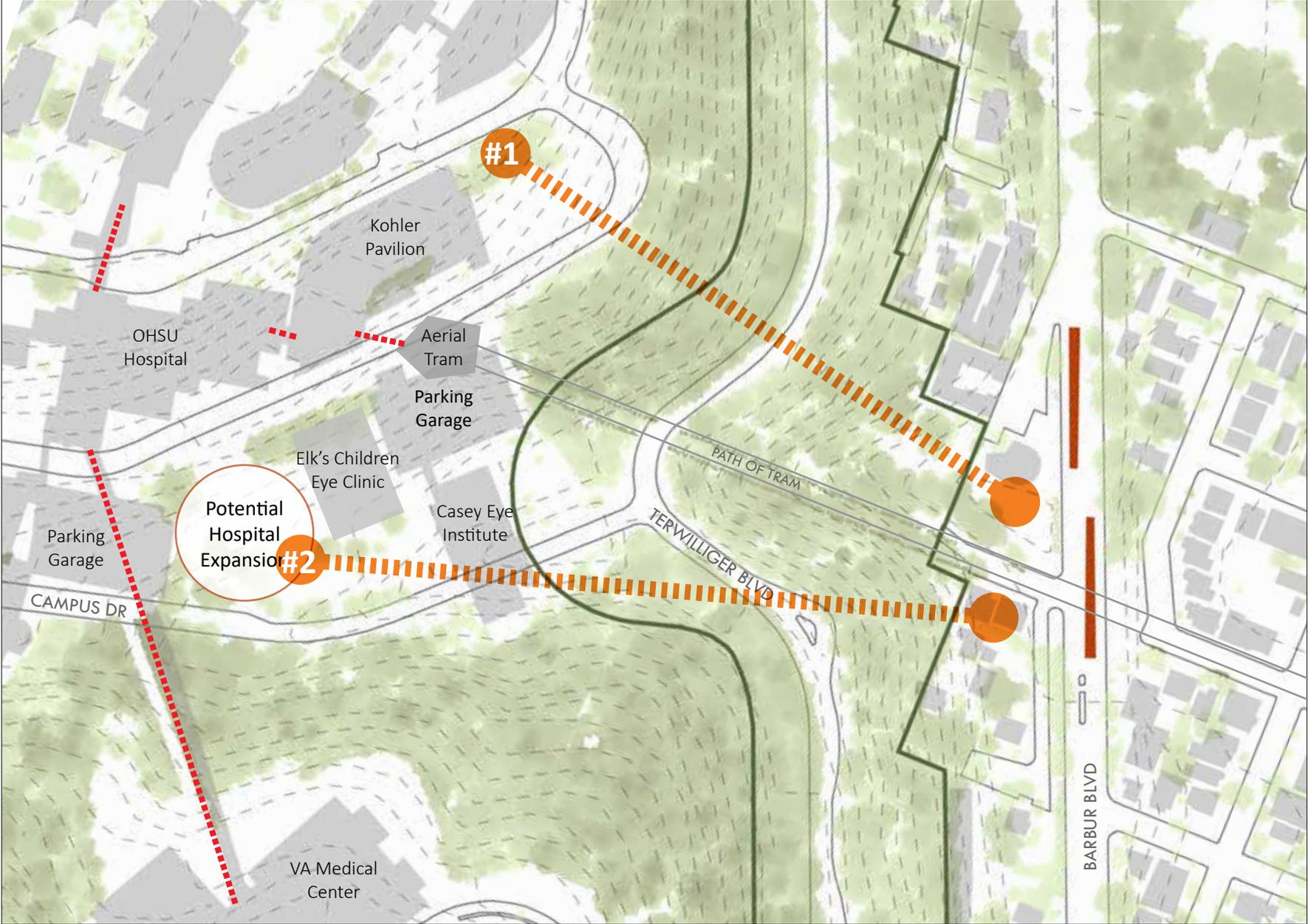


Bridge + Elevators

Pros	Cons
<p>Access</p> <ul style="list-style-type: none">• #8 bus connection• Parkway recreation and nature• Centralized dispersal point <p>Budget (\$15 – 25 million)</p> <p>Operational</p> <ul style="list-style-type: none">• No attendant• Free• Likely to be 24/7 <p>Experience</p> <ul style="list-style-type: none">• Canopy walk• Views	<p>Access</p> <ul style="list-style-type: none">• Walk distance, exposure on bridge• Requires additional connection into campus via pathway or bus <p>Context</p> <ul style="list-style-type: none">• Size/visibility of elevator tower• Width/thickness/visibility of bridge structure & abutment• View corridors• Tree clearing around bridge structure <p>Safety</p> <ul style="list-style-type: none">• Camping under structure• At-grade xing - concerns about sight lines & modal conflicts on Terwilliger• Bridge width – concerns about bike/ped conflicts <p>Environmental</p> <ul style="list-style-type: none">• Tree removal• Potential impacts to utilities



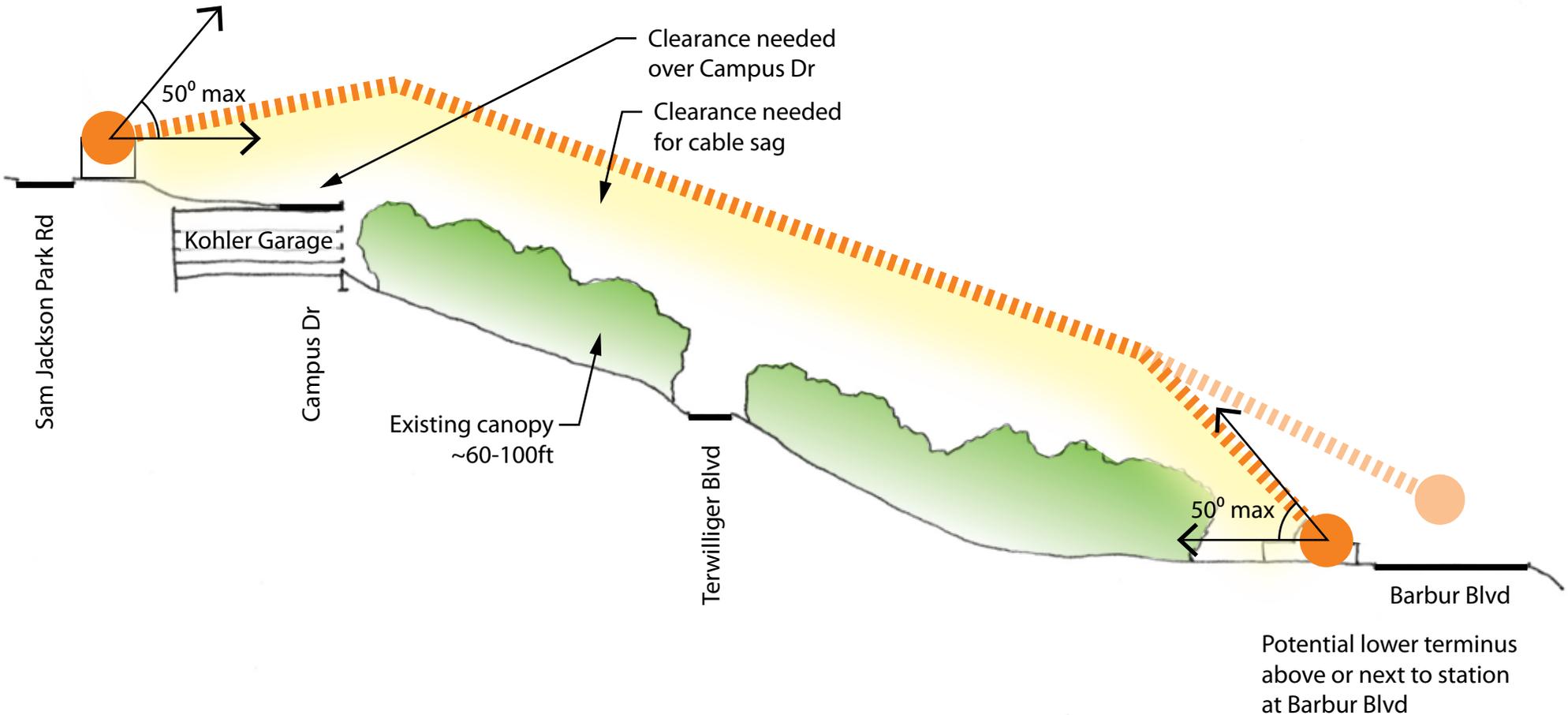
Aerial Tram



Aerial Tram- Alignment #1

- 1-2 support towers needed, exact size & location unknown
- Evacuation & maintenance access needed

Potential upper terminus between roadway & garage: Challenging construction site, approx 3500 SF



Aerial Tram

Pros

Access

- Further into OHSU
- Minimizes physical effort
- Weather protection

Experience

- Nice views, fun

Environmental/Context

- Least long-term impacts to area
- Avoids impacts to habitat/wildlife

Cons

Access

- No Parkway connection
- Long connections to lower campus or VA
- Not preferred by sensitive users (cabin swings, vertigo, etc.)

Budget (\$50 – 85 million)

Operations

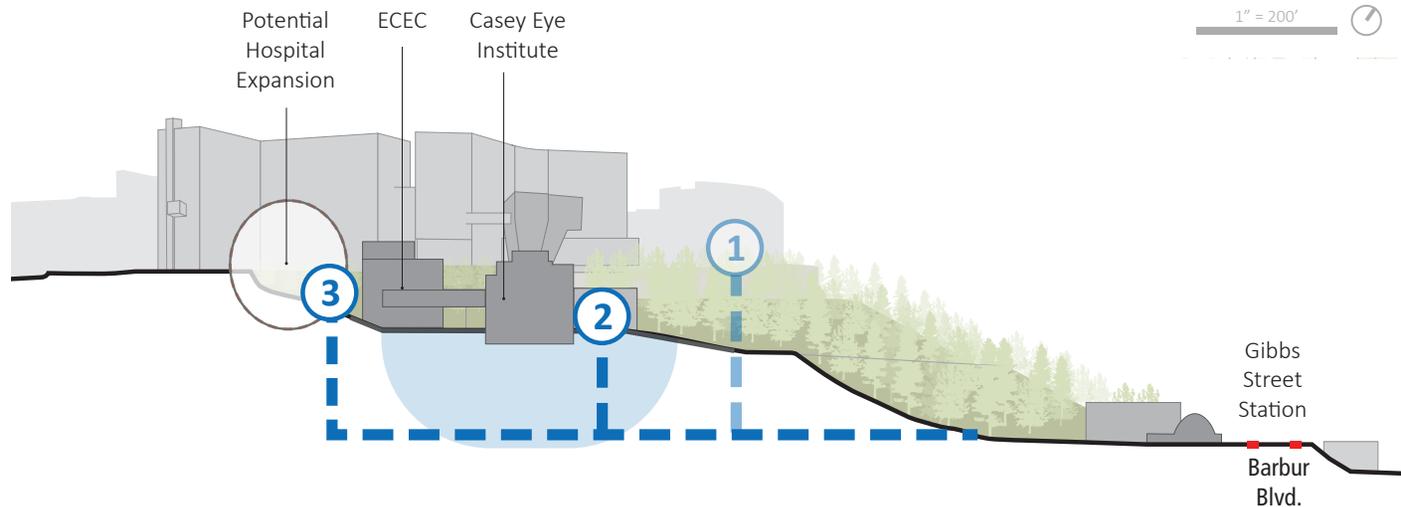
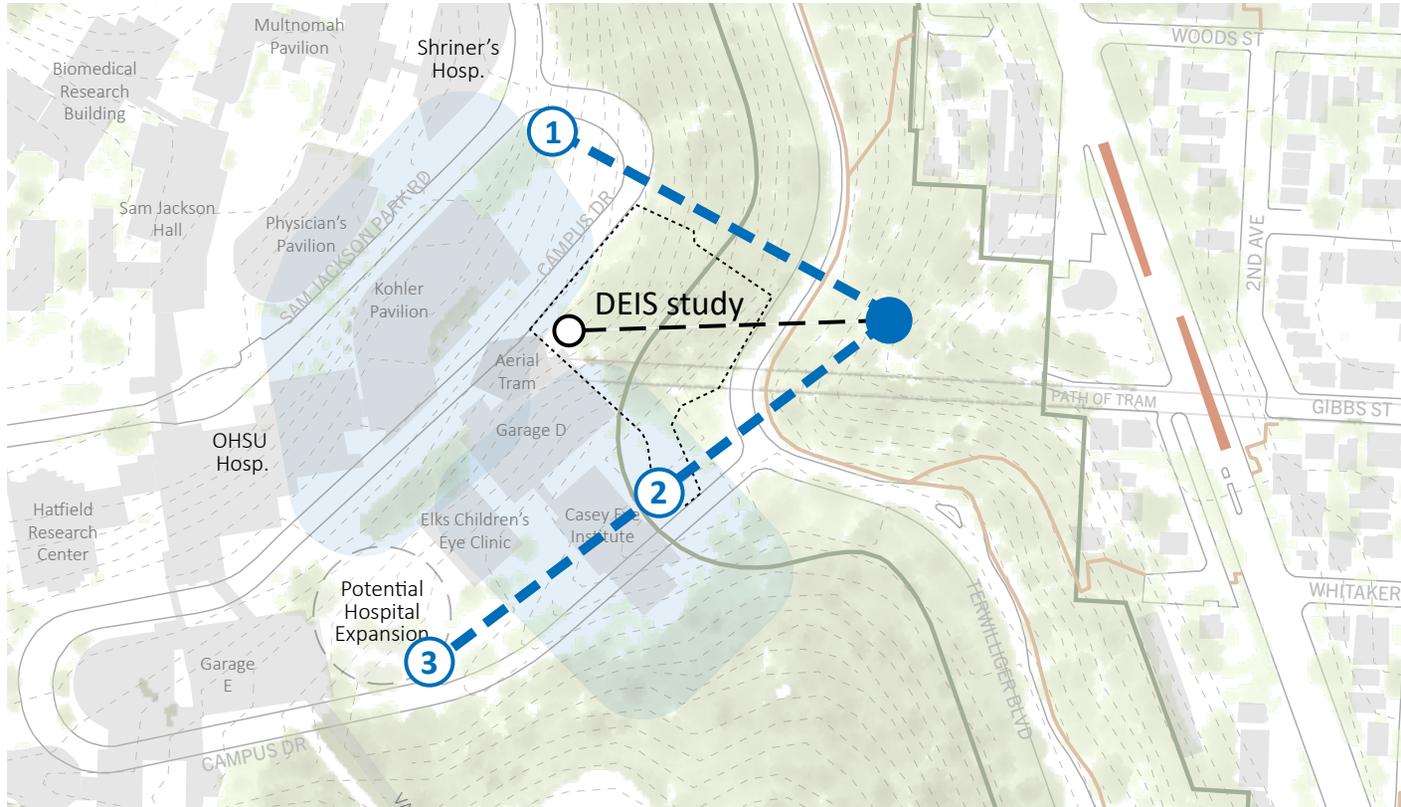
- Likely to require fee
- Likely limited hours of operation
- Requires attendants
- High costs
- Limited ability to expand capacity

Context

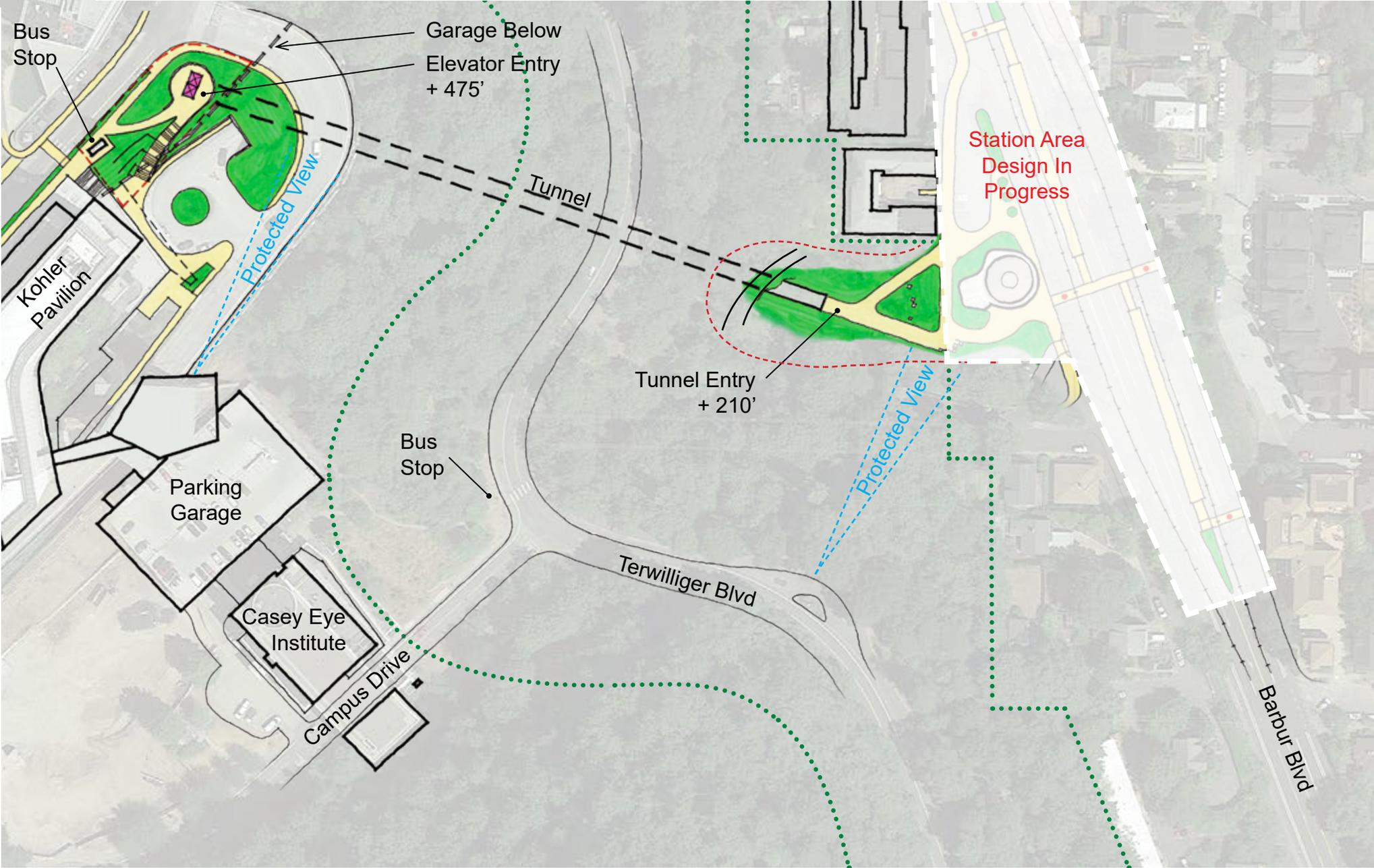
- Visible support towers and cables
- Lower path of travel over Parkway than existing tram



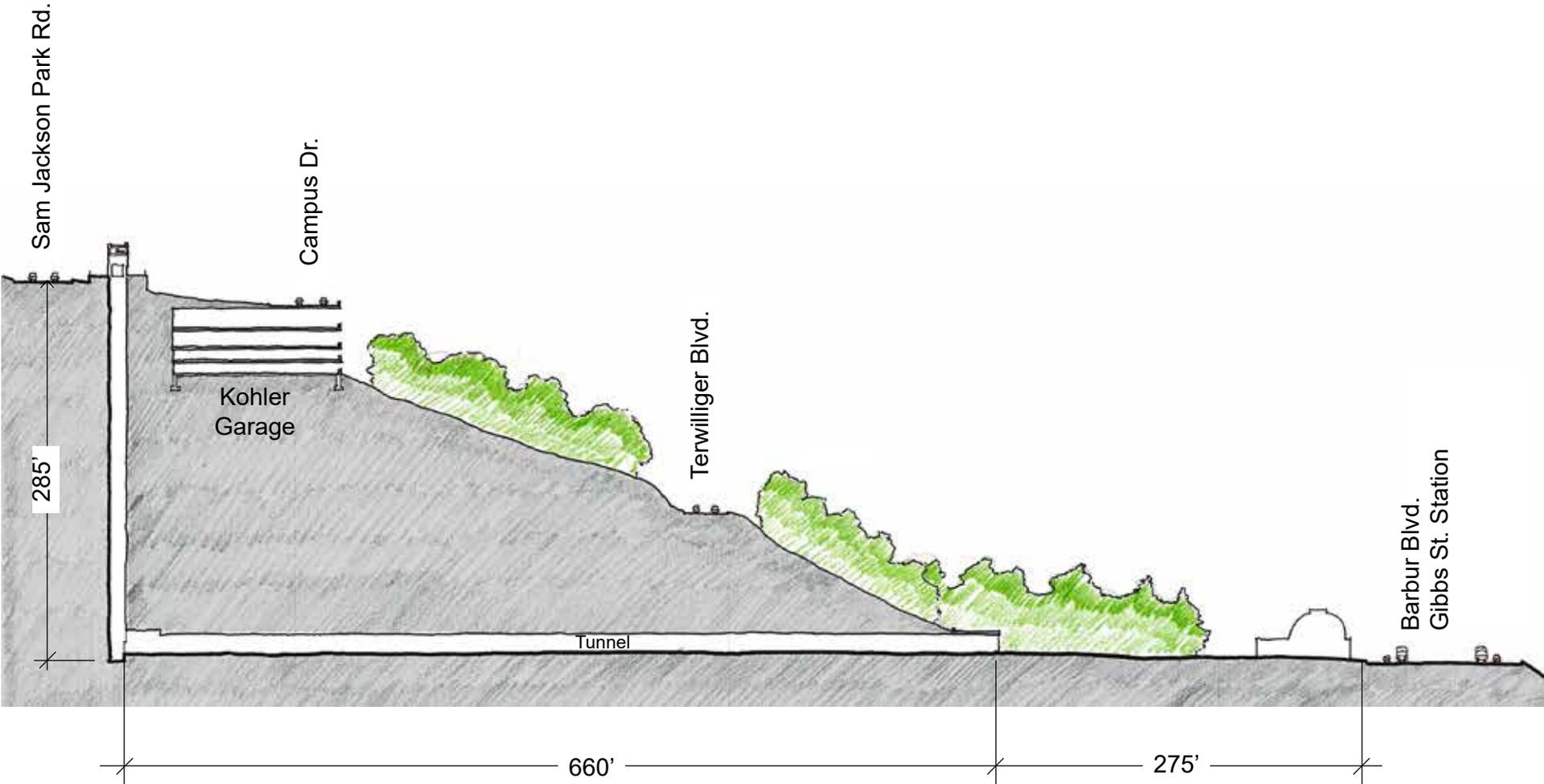
Tunnel + Elevators - Potential Alignments



Tunnel + Elevators- Alignment #1



Tunnel + Elevators - Section



Tunnel + Elevators

Pros

Access

- Weather protection

Context

- Low impact to Parkway

Environmental

- Low long-term impacts to habitat/wildlife

Cons

Safety

- Requires attendants
- Need space to gather at elevators underground

Budget (\$55 – 125 million)

Experience

- Confined spaces create issues for some users

Access

- No Parkway connection
- Walk distance is long & out of direction for some destinations

Operations

- Likely to require fee
- Likely limited hours of operation
- High cost to maintain
- Limited ability to expand capacity
- High risk construction type

