

Appendix C

Infrastructure Alignment Plan Process Memoranda

The Berger Partnership PS

Memo

To: Carolyn Hope
From: Guy Michaelsen
Subject: BNSF Light Rail Alignment and Envelope Progress Report

Date: 7.26.10
Page: 1 of 28



The Berger Partnership PS
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Preface: This memo documents the process for evaluating conceptual infrastructure alignment alternatives for the Redmond Central Connector. Any observations and conclusions are preliminary and subject to verification and change as we move forward with this process.

Introduction:

The City of Redmond acquired the Redmond section of the former Burlington Northern Santa Fe (BNSF) Corridor in June 2010. In an effort to achieve the City's goals for improving local and regional transportation connections and create a lively, walkable downtown, a master plan is being prepared to create a vibrant regional trail and downtown promenade within this corridor. The master planning process includes the following milestones:

- Infrastructure Alignment Plan (IAP)
- Draft Master Plan
- Final Master Plan

This memo will be included in the September 2010 IAP, which will serve as the foundation for development in the downtown section of the corridor. A key component of the IAP is locating a feasible alignment for the city's new stormwater trunk line and associated structures. A primary challenge of identifying a feasible alignment for both the trunk line and park trail is the passenger light rail also planned for the downtown portion of the corridor. Each of these elements place demands on the corridor. The purpose of the IAP is to ensure that future conflicts are minimized as multiple infrastructure elements are constructed over time. The IAP will achieve this by identifying the following:

- Identify the City's preferred light rail alignment (to be the basis for commenting on Sound Transit DSEIS)
- Identify feasible envelope for stormwater trunk line and other anticipated utilities.
- Identify feasible envelope for park trail elements

BNSF Light Rail Alignment: Envelope Alternatives

A critical issue in developing the September 2010 IAP is the location and alignment of the future light rail corridor. On June 8, 2010, Sound Transit (ST) shared its preferred alternative for the DSEIS with Redmond, referred to as E2. As currently proposed, light rail corridor improvements have significant impacts on the alignments of all infrastructure projects proposed within the corridor, as well as impacts on "pinch points" along the corridor, which may be mitigated with alternate alignments. As part of this process, we will be studying differing alignment options and will assist the city in generating comments to submit to ST in the DSEIS process. In an effort to provide more real estate to resolve conflicts at pinch points, the City has agreed to include the NE 76th St. ROW as part of the alternate corridor alignment studies.

Summary of light rail analysis process to date:

June 8, 2010: Redmond/Sound Transit (ST) Meeting. Conceptual engineering review of ST's preferred (E2) alignment and discussion presented by Sound Transit. Discussion of potential alternative alignments including: North BNSF corridor, NE 76th side running, and NE 76th St. center-running. At the end of this meeting it was mutually decided to look at alternative alignments.

June 14, 2010: Staff Steering Committee Kick-Off Meeting. Review of BNSF Corridor Master Plan goals, opportunities, and constraints including initial pinch point considerations and potential impacts on parks and trails. Partner projects presented including ST conceptual engineering plan, City stormwater trunk line plan, King County sewer line, City DEWCS project, and City Regional Trail project.

June 16, 2010: Memo Submitted. The Berger Partnership (TBP) described initial alignment alternatives in a draft memo. TBP and City further discussed potential of alternative alignments and determined that concerns over impacts of current ST proposal warrant further studies and should include the entire combined ROW of NE 76th and BNSF. (See Attachment 'A')

June 18, 2010: Redmond/ST Managers Meeting. City proposed to ST that further alignment studies be developed to include the combined ROW of NE 76th and BNSF. The alternative alignments were identified as the "NE 76th St. Side Running" and "NE 76th St. Center Running Alignment." ST expressed willingness to provide resources to further study alternative alignments proposed through the process of this project.

June 30, 2010: Redmond Team Meeting. TBP presented draft alternative alignment studies to internal team. Intersection of Leary Way and NE 76th identified as critical pinch point due to narrow ROW width and wide ST transit way as a result of flaring tracks for center platform and gates for street crossing. Critical factors in this alignment, which were selected to be carried forward, include options that protect the historic Justice White House (a City Landmark) and minimize impacts on private lots north of the corridor. (See Attachment 'B')

July 8, 2010: Redmond/ST Meeting. Follow-up meeting with ST to review alternative alignments and coordinate additional alternatives.

July 13, 2010: Staff Steering Committee #2. TBP presented alternative alignment studies. Discussion identified side station platforms as a potential option for resolving many of the conflicts that many of the alternative alignments pose at the corner of Leary Way and NE 76th because side platforms do not require tracks to flare. TBP agreed to study this option further with "NE 76th St. Side Running" and "NE 76th St. Center Running" alignments.

July 20, 2010: Preliminary Indication of Preferred Alignment. City staff reviewed alignment studies to date and identified the "NE 76th St. Center-Running Alignment w/ Side Platforms" as the preliminary preferred alignment. The project team was given direction to proceed studying this option further across the length of the downtown area to confirm the feasibility of the alignment.

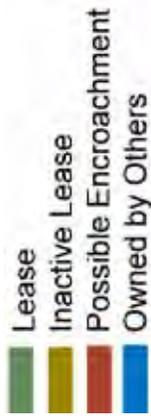
Corridor Pinch Point Considerations

A key consideration in developing and analyzing alignment alternatives for the corridor is identifying how well all of the planned projects will fit. In the Downtown Study area, the Redmond Central Connector property width varies throughout, from 100 feet to less than 50 feet in some areas. As spatial requirements for light rail, auto traffic, and pedestrians are not consistent (primarily variable at intersections), further inventory and analysis along the entire length of the corridor is needed to identify the impacts of each alternative.

Through preliminary pinch point analysis, the intersection at NE 76th and Leary Way was identified as the most critical and challenging for several reasons (see Exhibit 1.01), which include:

- Private development (existing and planned) to north and south. Two properties to the north were sold by BNSF to others, leaving 50 feet of former BNSF ROW at the intersection.
- Existing historic “Justice White House” on southeast corner.
- Adjacent roadways/traffic and transportation needs along Leary Way and NE 76th St.
- Trail and utility demands within this section of the corridor include:
 - 25 to 29 foot trail corridor per King County requirements
 - 4-foot diameter stormwater trunk line located outside of light rail envelope
 - Easements for a King County wastewater utility line
- Typical 30-foot light rail transit way crossing of Leary Way. Potential additional light rail transit way width (approximately 18 feet) required for flaring of tracks to accommodate center platform on west side of Leary Way.
- Additional pedestrian crossings of Leary Way and NE 76th, which require varying additional widths for crossing arms, crosswalks and pedestrian refuges.

With the intersection at Leary Way and NE 76th identified as a critical pinch point, the initial analysis of alternative alignments focused on how light rail, the park, trail, stormwater trunk line, and streets may (or may not) function at this location. The analysis for this intersection is shown in graphic figures for each alternative in the following sections. Analysis of all other pinch points along the corridor will need to be studied and coordinated further to identify other potential critical impacts.



Critical Pinch Point: Leary Way & NE 76th St

- BNSF ROW narrows to approx. 50' (private development to north)
- Must accommodate: City park trail, City stormwater trunk line, S.T. light rail, K.C. sewer line
- S.T. light rail track flare for center platform (widened transit way)
- Gates & signaling for vehicular and pedestrian crossings at street corners
- Historic Justice White House at southeast corner of intersection



Center BNSF Corridor Alignment (ST Preferred Alternative. DSEIS Alignment E2)

The current ST DSEIS alignment was developed to run entirely in the BNSF ROW. The typical transit way profile is 30 feet, but due to required clearances for gates at intersections, the profile widens at intersections to 42 feet plus additional distances along streets required for sidewalks. In addition, the tracks flare approximately 500 feet from the station to prepare for the center platform station. The result is that the location of the transit way is toward the middle of the corridor, leaving little room for other uses. In areas where the former BNSF ROW is 100 feet wide, this fragmentation provides approximately a 30-foot width on the south side (between the rail and 76th Street) and approximately a 38-foot width on the north side. At the Leary Way and NE 76th St. pinch point, the northern edge of the 30-foot transit way falls on the northern private property line, which places additional infrastructure and site elements such as crossing gates, pedestrian crossings and trail on adjacent private property.

Graphic examples include:

- (Exhibit 2.01) Plan: Sound Transit DSEIS Alignment (E2)
- (Exhibit 2.02) Section: Sound Transit typical transit way
- (Exhibit 2.03) Plan: Leary Way & NE 76th St. Pinch Point

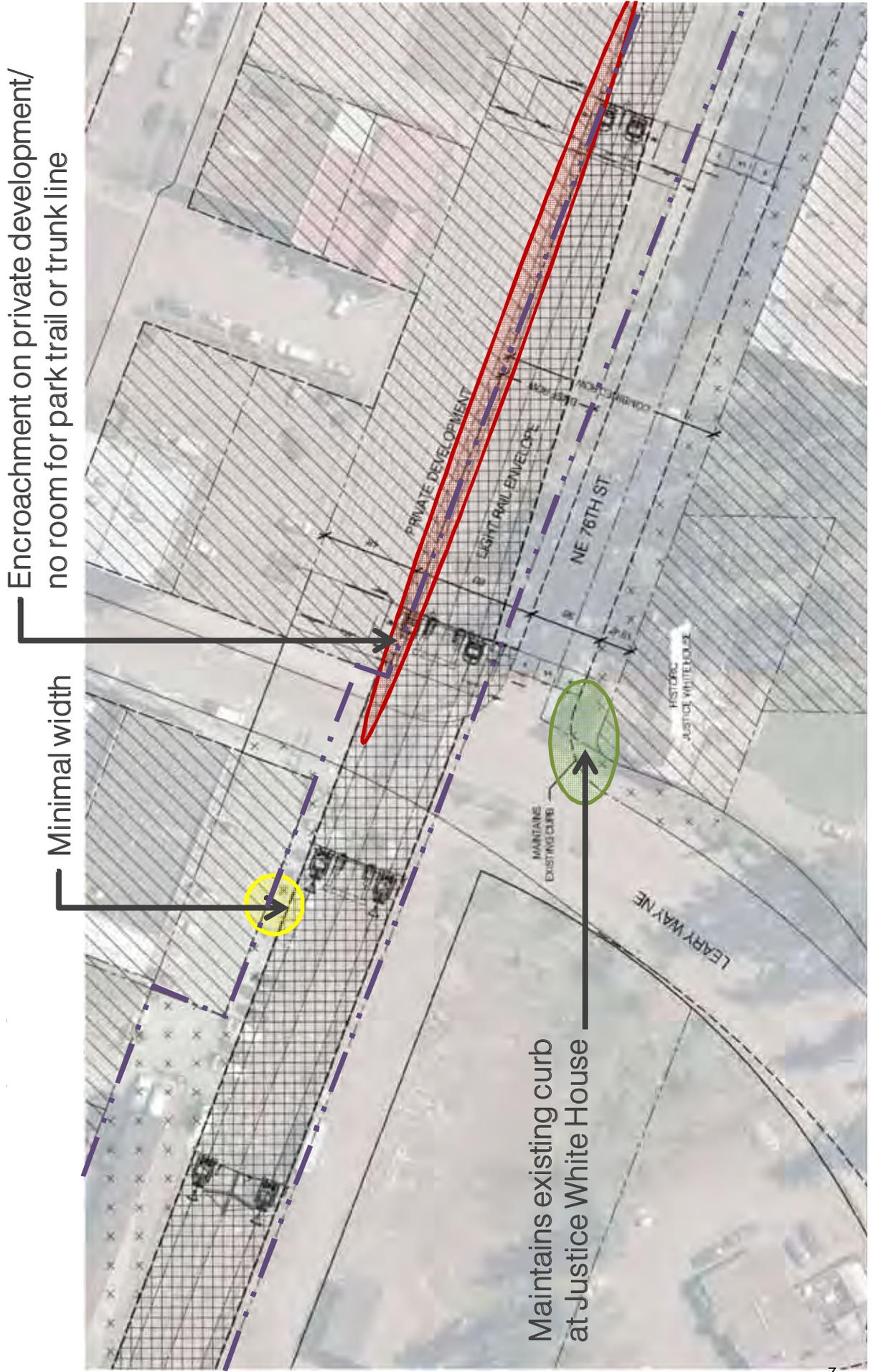
Opportunities:

- Preferred by Sound Transit
- Limit impacts on NE 76th St.

Challenges:

- Impacts on adjacent properties at pinch points due to intersection setbacks for crossing needs. This includes encroachment that would require purchase of land.
- Significant amount of fragmented, underutilized land between the transit way and the properties to the north.
- Limited to no space for park trail at pinch points due to intersection setbacks for crossing needs.
- Conflicts with stormwater trunk line alignment at pinch points, due to property line encroachments and required 10-foot setbacks, result in multiple north/south pipe crossings under tracks.

Exhibit 2.03
Sound Transit Preferred Alternative, SDSEIS
Alignment (E2)



Alternate Alignment Studies

As the center-corridor alignment leaves little room for other uses at pinch points, which does not support the vision that inspired the City to acquire and develop the corridor, the master plan team is studying alternatives for consideration.¹ In considering the alternatives, the City agreed to combine the NE 76th St. ROW running adjacent to the former BNSF corridor and the former BNSF ROW to plan future infrastructure projects. Furthermore, the first set of alternative studies maintains the current ST DSEIS design standard to include a center platform station west of Leary Way. These alternatives include various iterations of:

- North Corridor Alignment
- NE 76th St. North Side Alignment
- NE 76th Center-Running Alignment

Additional alternatives that deviate from current ST DSEIS standards to include side station platforms. These alternatives include:

- NE 76th St. North Side Alignment w/ Side Platforms
- NE 76th Center-Running Alignment w/ Side Platforms

North Corridor Alignment

Shifting the rail to the north of the trail and utility corridor at the typical 100-foot-wide ROW sections would provide 58 feet to 64 feet of space between the rail and NE 76th St.

Opportunities:

- This could reduce (but not eliminate) the fragmentation of the corridor by providing a wider trail and utility corridor to the south.
- Allows construction of stormwater trunk line per current design.

Challenges:

- Significant impacts on adjacent properties (including encroachment that would require purchase of land) wherever ROW is not typical 100 foot width.
- This would assume the rail abuts the historic north corridor limits and would require acquisition from private landowners. This area is redeveloping as mixed use urban development with apartments and condominiums facing the Redmond Central Connector.
- The placement of the park/trail between a fenced transit way and 76th St. would make it an “island” between downtown and Redmond Town Center (RTC), which may reduce the opportunity to forge connections between the two.
- The placement of the transit way along the north edge would preclude development from fronting (spilling out) on the corridor, a key element for infusing the corridor with life and activity.
- Intersection setbacks for crossing needs would still pose problems. The train would cross mid block between Cleveland St. and NE 76th St., which may have impacts on traffic queuing on north-south streets.
- There would continue to be some fragmented, underutilized land between the transit way and the properties to the north. Would divide mixed use development from activities and uses planned for Redmond Central Connector.

¹ These are considered studies, not fully developed designs for the light rail.

- This alignment would potentially interfere with the existing KC sewer line running along the north edge of the corridor east of 17th.

Conclusions:

This option does not meet the city’s desire to maximize use of the former BNSF corridor and new connections between downtown and Redmond Town Center. Nor does it leverage the opportunity of adjacent property/development to energize the park/trail, and it reduces the opportunity of the park/trail to be a catalyst for development along the corridor. For these reasons, the option is not being studied further.

NE 76th St. Side Running Alignment with Center Platform

A side-running transit way could be shifted to the north edge of NE 76th St. This alignment would allow required clearance to signals with minimal “wasted” space between the prototypical transit way and NE 76th St. This alternative allows the park/trail to be located between the transit way and north property lines with varying widths dependent on pinch points. It also allows the trail to cross at the same intersection as vehicles and light rail without crossing the tracks.

Graphic examples include:

- (Exhibit 3.01) Sections: BNSF/ NE 76th St. ROW with typical transit way at (A) intersection, (B) mid-block
- (Exhibit 3.02-3.04) Plans: Leary Way & NE 76th St. Pinch Point Alignment Studies

Opportunities:

- Combines the majority of the non-transit-way land to the north, providing a park/trail width of approximately 20 feet minimum at pinch point intersections to approximately 75 feet at wider mid-block sections.
- Allows properties/developments along the north property line to front on the park/trail and energize the area.
- Simplifies intersection design, as the transit way becomes part of the intersections along 76th St.
- Grades can match either NE 76th St. or railroad grades with wall to provide grade transition to the insulated grades.
- Shifting the transit way to the south provides maximum clearance at pinch points and maximum space adjacent to the future station (assuming the north line stays straight and tracks bow to the south at station).
- Station shifts to the south potentially using adjacent City property.
- Light rail abutting the park/trail could be an energizing and exciting element in the corridor that helps it become a unique park/trail experience (if designed in an atypical manner, yet recognizing ST performance requirements).

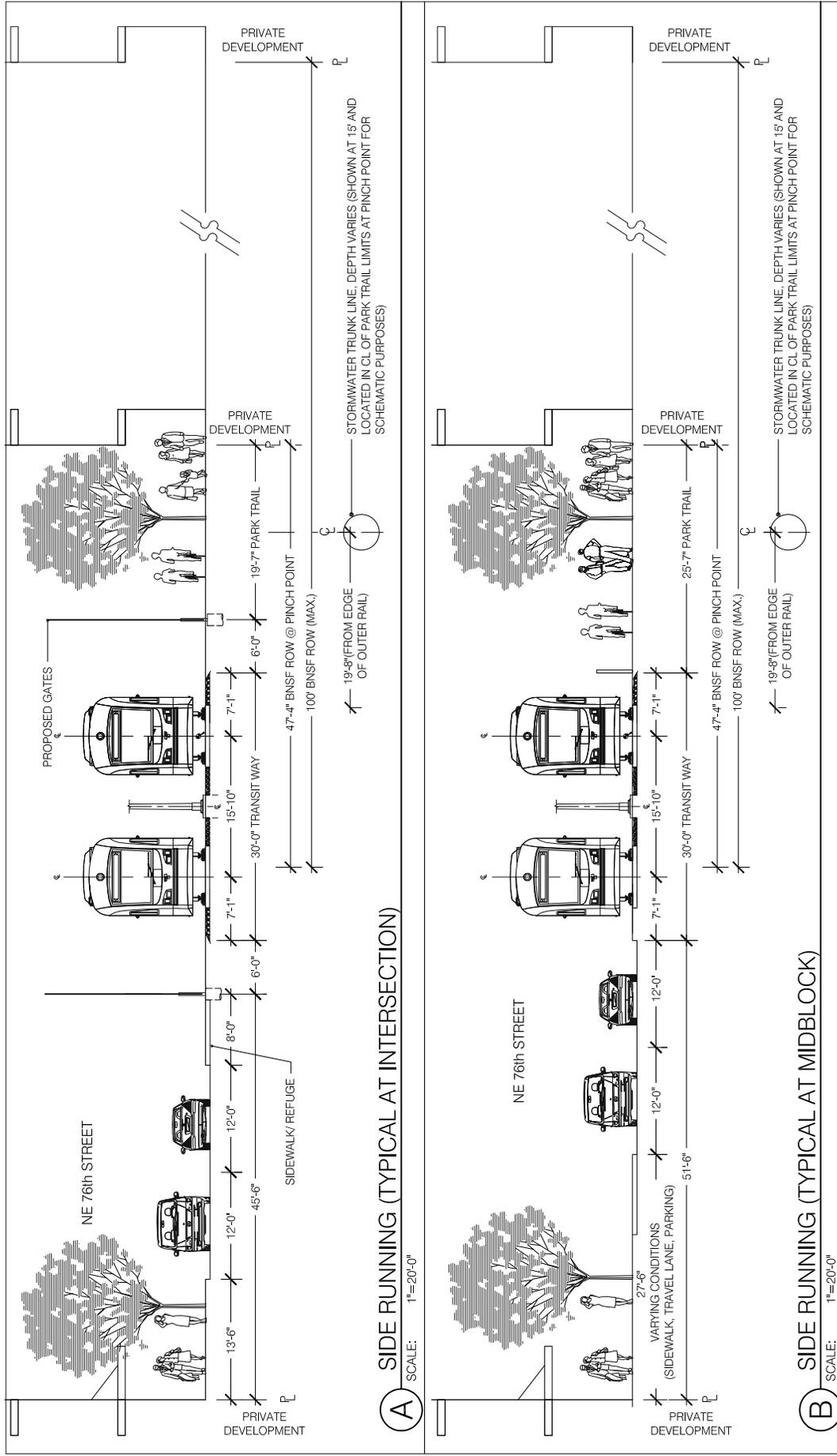
Challenges:

- Modifications to NE 76th St. would include reducing the ROW to two lanes at intersections (eliminating left turn lanes), which could have traffic impacts, although signal modification may mitigate some of these impacts.
- The westernmost portion of NE 76th St. has the most constraints.
- Contiguous to the park/trail. Eventual design of the transit way must embrace the vision of the corridor, likely requiring atypical approaches to the transit way design, even as ST performance standards continue to be met.
- Eventual construction of the transit way will require most or all of the corridor, requiring significant salvage or restoration of all park/trail features constructed prior to the construction of light rail.

Exhibit 3.01

BNSF/ NE 76th St. ROW with typical transit way at

(A) intersection, (B) mid-block



	PROJECT: REDMOND BNSF TRAIL CORRIDOR	TITLE: DOWNTOWN REDMOND LIGHT RAIL ALIGNMENT OPTIONS STUDY (DRAFT)
	SCALE: 1"=20'-0"	DATE: 6.28.2010
	SHEET: 1	

Further Analysis: Leary Way and NE 76th St. Pinch Point Alternatives

- Option: Flare Tracks to North

Additional Opportunities and Challenges:

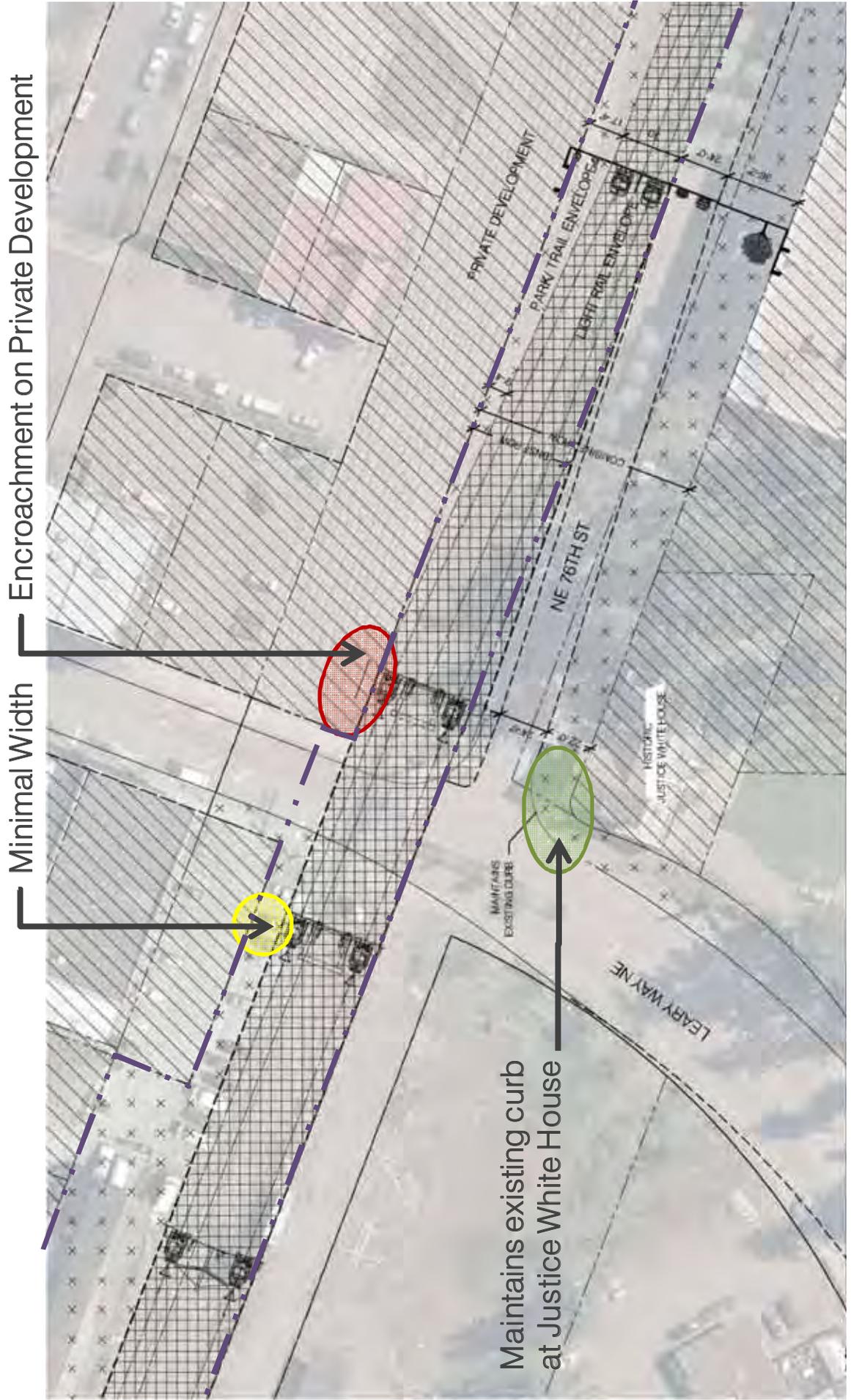
- Opportunities
 - Maintains existing southeast curb at intersection to preserve Justice White House
- Challenges
 - Does not allow minimal 25 foot width for park trail at critical pinch point intersection
 - Encroaches on adjacent properties to north at intersection and would require purchase of adjacent property

- Option: Flare Tracks to North (B)

Additional Opportunities and Challenges:

- Opportunities
 - No additional opportunities
- Challenges
 - Does not provide minimal 25 foot width for park trail at critical pinch point intersection
 - Would require purchase of property to north to provide suitable width for park trail
 - Impacts Justice White House
 - May require elimination of street lane(s)

Exhibit 3.02
NE 76th St. Side Running Alignment
Option: Flare Tracks to North

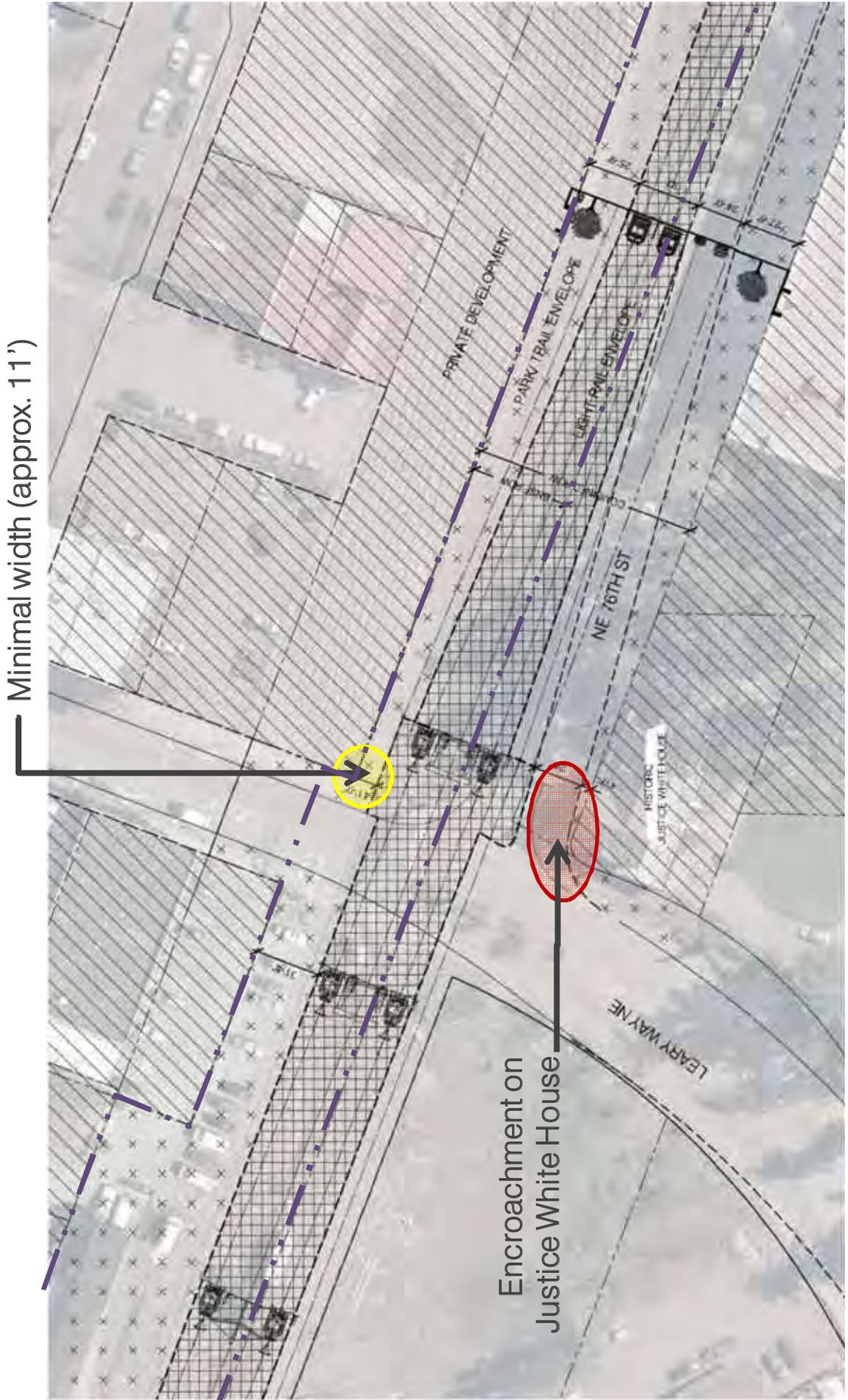


- Option: Flare Tracks to North & South

Additional Opportunities and Challenges:

- Opportunities
 - No additional opportunities
- Challenges
 - Does not provide minimal 25 foot width for park trail at critical pinch point intersection (provides approx.11 feet.)
 - May require purchase of property to north to provide suitable width for park trail
 - Impacts Justice White House
 - Would require elimination of street lane(s)

Exhibit 3.03
NE 76th St. Side Running Alignment
Option: Flare Tracks to North & South



- Option: Flare Tracks to South

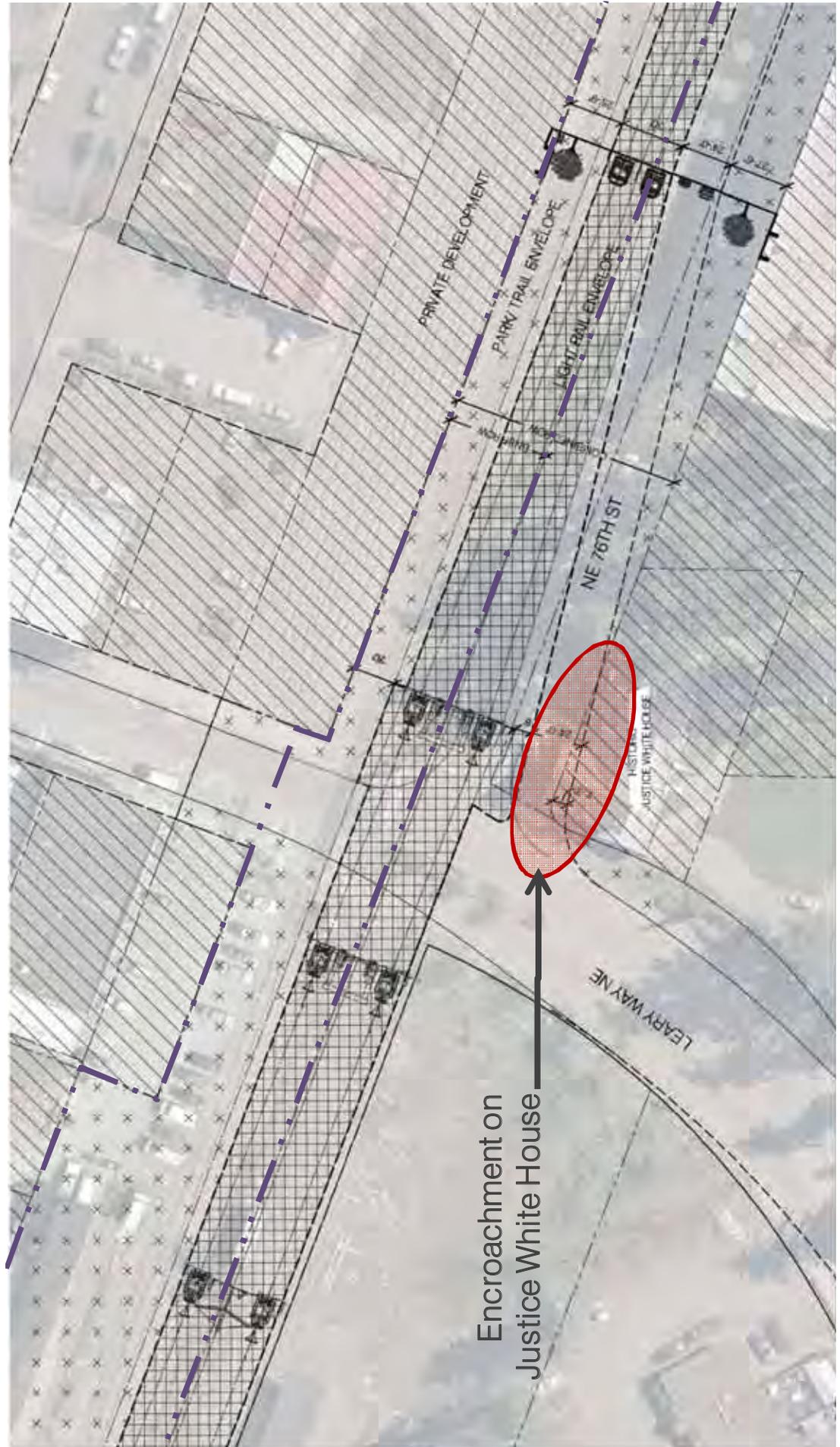
Additional Opportunities and Challenges:

- Opportunities
 - No additional opportunities
- Challenges
 - Does not provide minimal 25 foot width for park trail at critical pinch point intersection (provides approx. 20 feet.)
 - Heavily impacts Justice White House
 - Would require elimination of street lane(s)

Conclusions:

From a design perspective of creating a great public space and meeting utility needs, a side-running alignment, such as flare tracks to south, works well by reducing the fragmentation of remaining space. With much planning and design coordination, light rail running adjacent to the park/trail could be a great element of the space. To be successful, there needs to be a high level of coordination between the development of the trail and light rail to ensure that the utilities and barriers traditionally required along transit way edges are well thought out and do not compromise the human experience. Although current planning efforts will set a vision for how edges should be treated, a contiguous alignment such as this is more prone to conflicts that may emerge through future design efforts.

Exhibit 3.04
NE 76th St. Side Running Alignment
Option: Flare Tracks to South



NE 76th St. Center-Running Alignment

A center-running transit way on NE 76th St. groups cars and transit together and removes the transit way from the park/trail completely, putting the park/trail between westbound NE 76th St. and the north property line, which could be varying width at pinch points.

Graphic examples include:

- (Exhibit 4.01) Sections: BNSF/ NE 76th St. ROW with typical transit way at (A) intersection, (B) mid-block
- (Exhibits 4.02-4.04) Plans: Leary Way & NE 76th St. Pinch Point Alignment Studies

Opportunities:

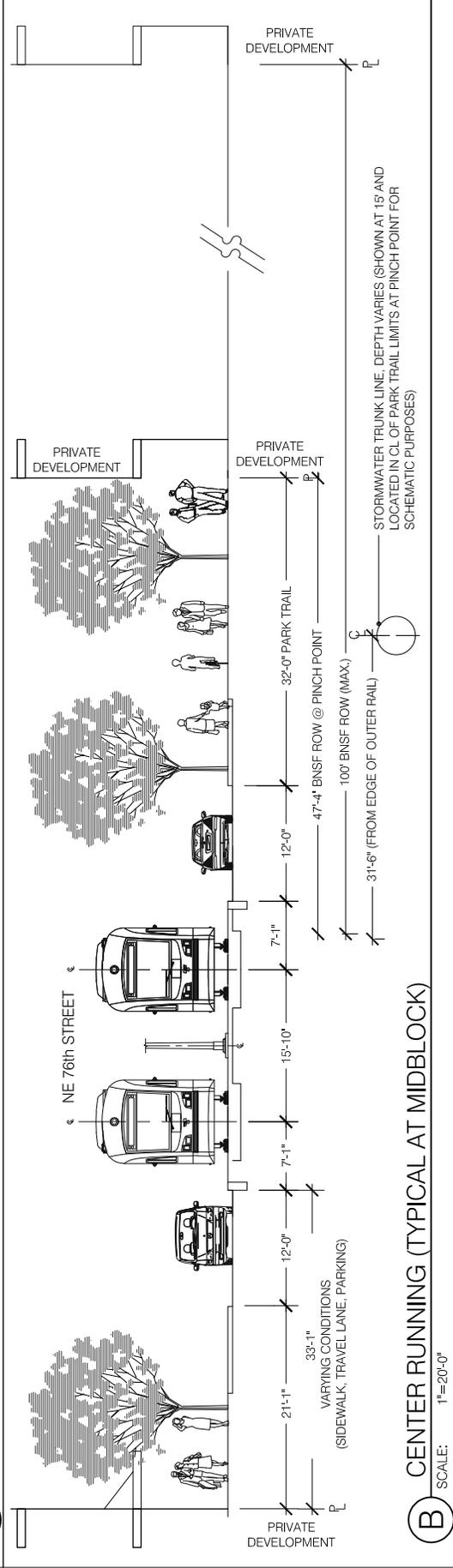
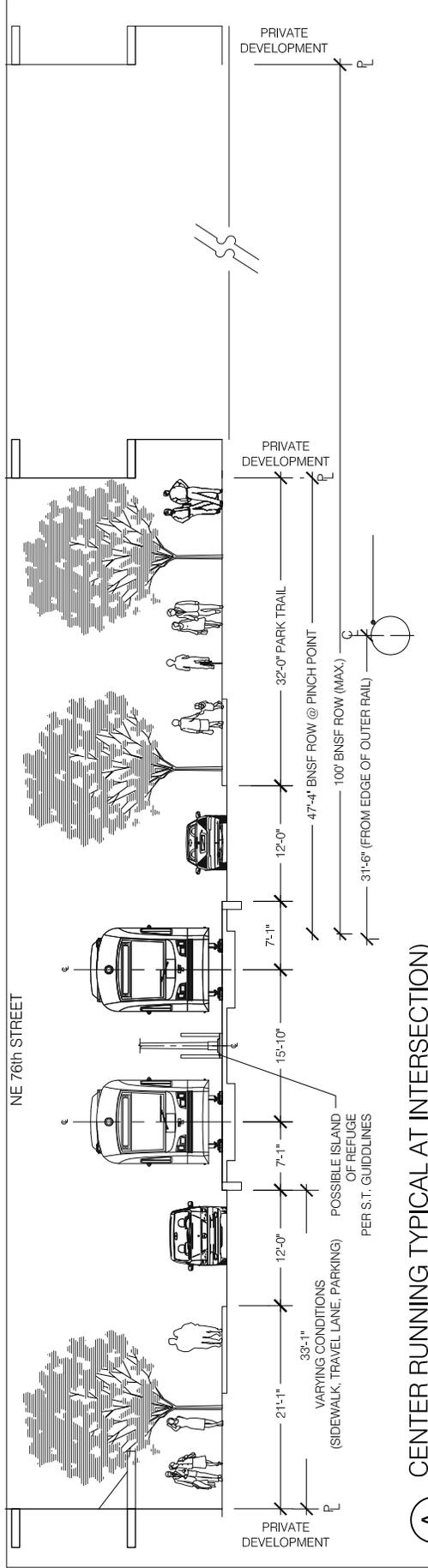
- Combines the NE 76th St. vehicular traffic and the transit way, placing the park/trail corridor with width of approximately 32' maximum at the Leary Way pinch point intersection to approximately 85' at wider midblock sections. Approximately 84' width (varies dependent on pinch points) between westbound NE 76th St. and the north property line.
- Allows development along the north property line to front the park/trail and energize the area.
- Simplifies intersection design as the transit way becomes part of the intersections along NE 76th St.
- Shifting the transit way to center-running provides maximum clearance at pinch points and maximum space adjacent to the future station (assuming the north track stays straight and tracks bow to the south at station).
- Eventual design of the transit way is insulated from the design and construction of the majority of the park/trail. While the vision will still be of a transit way that adds to the whole of the corridor, the burden will be shifted off light rail being the key to realizing that vision.
- Eventual construction of the transit way is largely insulated from the park/trail, which allows improvements to remain intact during and after light rail construction, though trail construction will largely close NE 76th St.
- Minimal impacts to current stormwater trunk line design.

Challenges:

- Light rail becomes less integral to the park/trail experience, potentially taking away a unique element.
- Modifications to NE 76th St. would include reducing the ROW to two lanes throughout by eliminating left turn lanes. This could have traffic impacts, although signal modification may mitigate some of these impacts.
- The left turn into the Redmond Town Center (RTC) garage from NE 76th St. would likely need to be eliminated, which may be of concern to RTC, although there are still two other garage entries visitors can use before or after this entry when driving westbound.
- Grades will match either NE 76th St. with minor modifications during rail construction. Initial studies indicate that the grades of NE 76th St. are acceptable grades for light rail standards.
- Modifications to NE 76th St. would require coordination with the Fire Department to ensure emergency access is maintained. Current design standards require that each side of the divided street shall not be narrower than 14 feet.
- East Link must travel at speed of traffic, which is currently 25 mph. The City would consider raising the limit to 30 mph, but not higher. Sound Transit does not want to operate at speeds less than 35 mph.

Exhibit 4.01

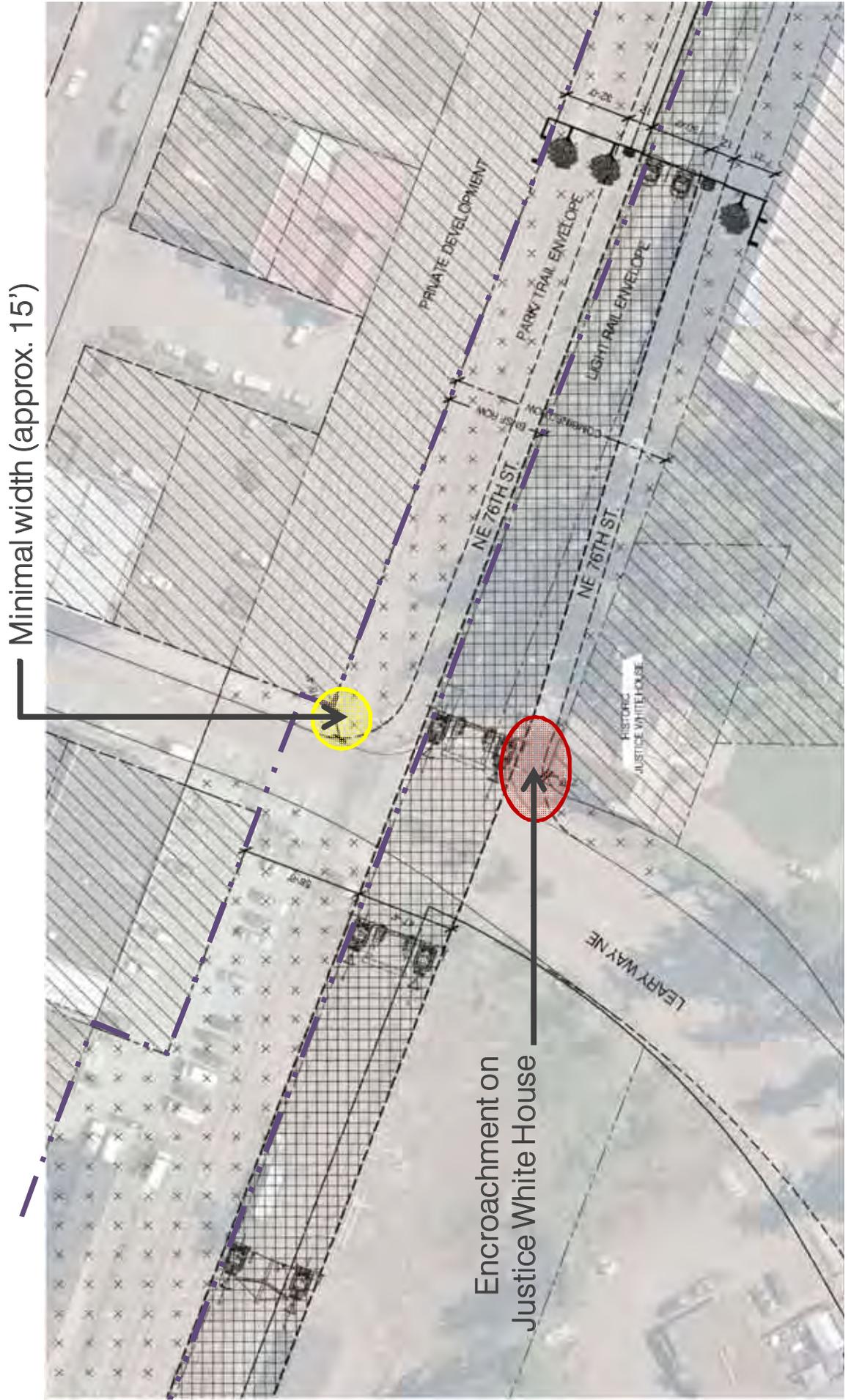
BNSF/ NE 76th St. ROW with typical transit way at (A) intersection, (B) mid-block



<p>The Berger Partnership P.S. Landscape Architecture</p>	PROJECT: REDMOND BNSF TRAIL CORRIDOR	TITLE: DOWNTOWN REDMOND LIGHT RAIL ALIGNMENT OPTIONS STUDIES
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Exhibit 4.02
NE 76th St. Center Running Alignment
Option: Flare Tracks to South



Minimal width (approx. 15')

Encroachment on
Justice White House

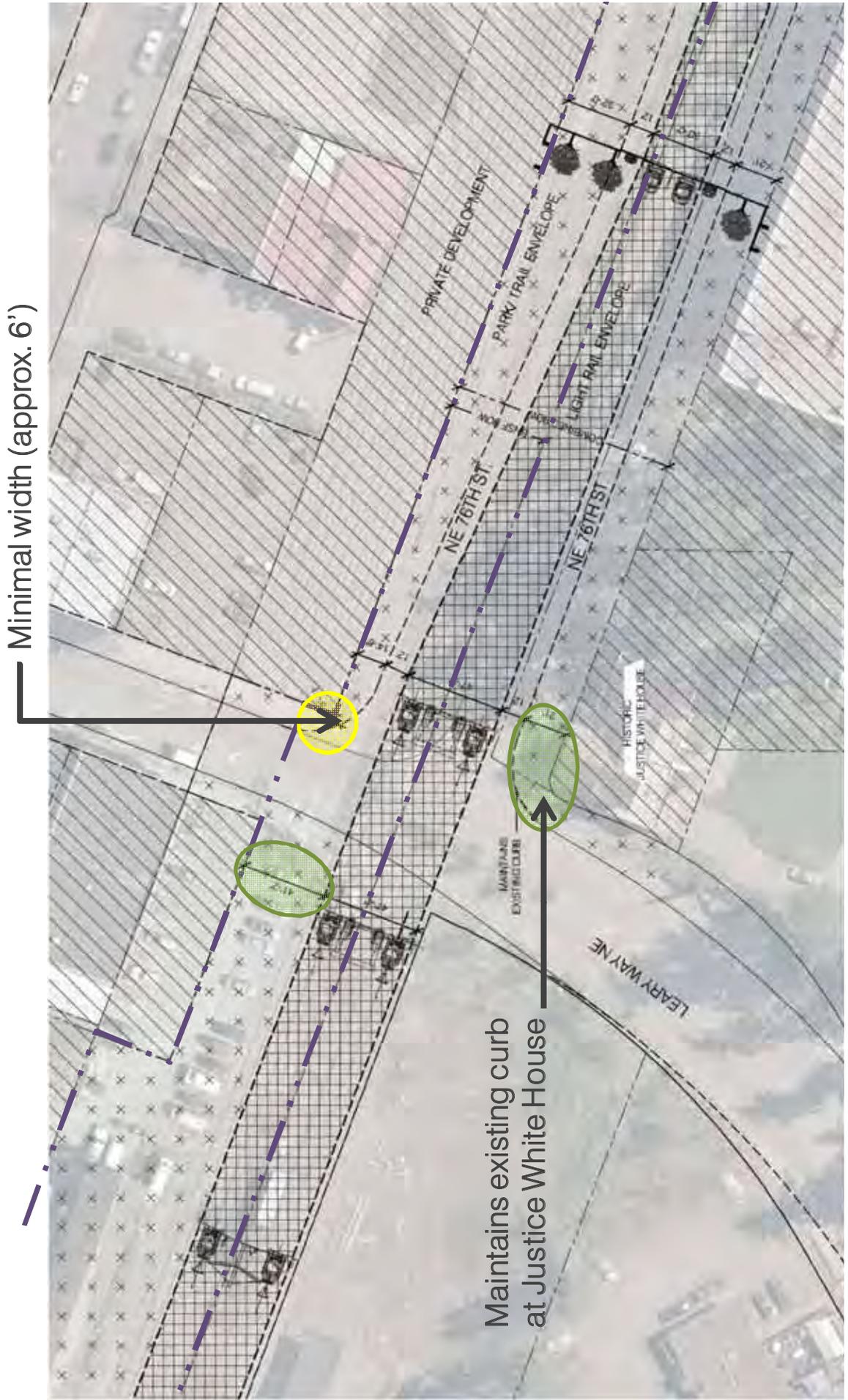
Further Analysis: Leary Way and NE 76th St. Pinch Point Alternatives

- Option: Flare Tracks to North

Additional Opportunities and Challenges:

- Opportunities
 - Maintains existing southeast curb at intersection to preserve Justice White House
 - Maintains significant sidewalk/park trail opportunities on south edge of NE 76th St.
- Challenges
 - Does not provide minimal 25 foot width for park trail at intersection (allows 14'-8")

Exhibit 4.03
NE 76th St. Center Running Alignment
Option: Flare Tracks to North

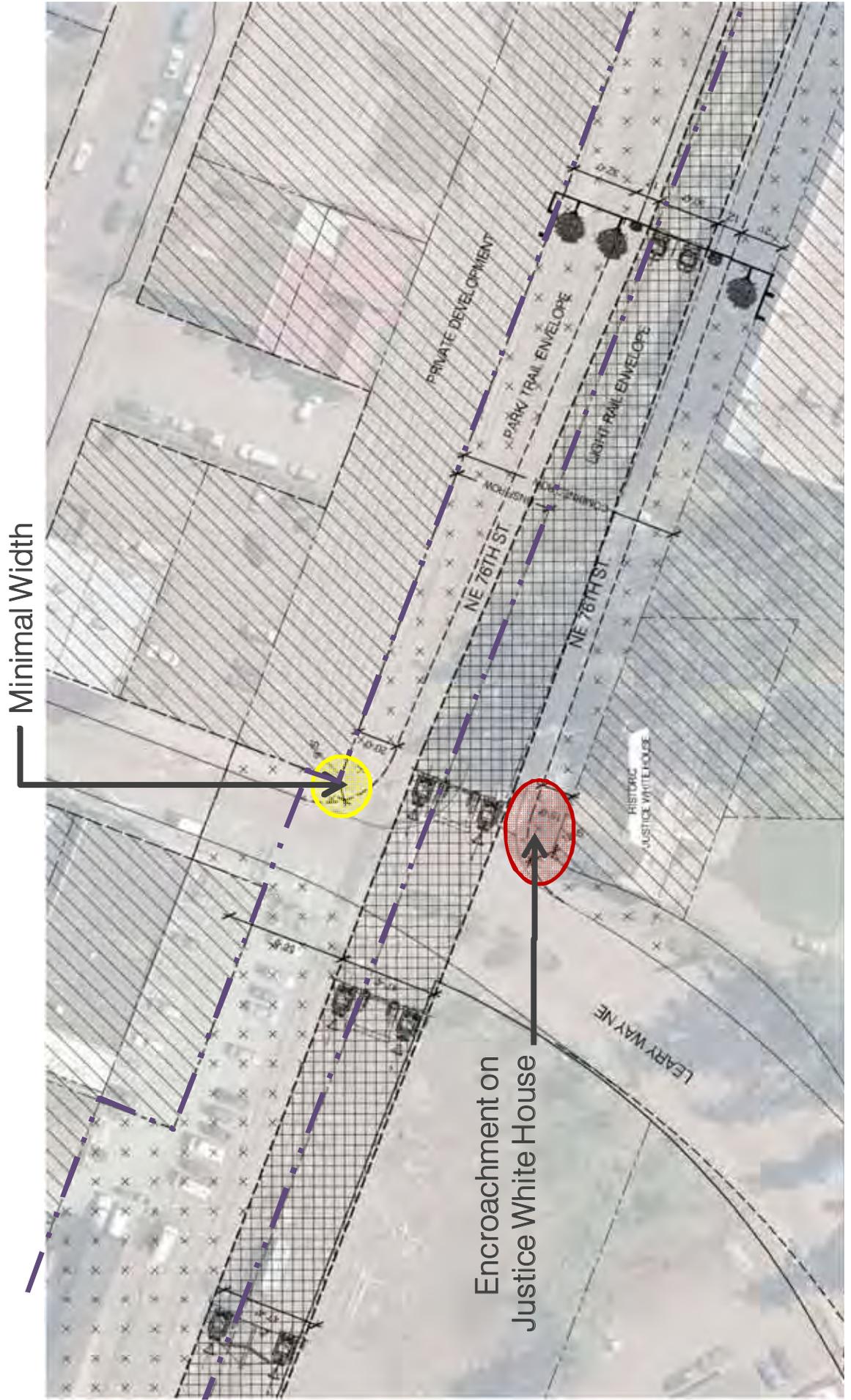


- Option: Flare Tracks to North & South (60/40)

Additional Opportunities and Challenges:

- Opportunities
 - Maintains much of sidewalk opportunities on south edge of NE 76th St.
- Challenges
 - Does not provide minimal 25 foot width for park trail at critical pinch point intersection (provides approx. 20 feet.)
 - Removal of portion of southeast curb at intersection impacts Justice White House (would pinch sidewalk)
 - North/south sidewalk along Leary Way pinched to approximately 9 feet

Exhibit 4.03
NE 76th St. Center Running Alignment
Option: Flare Tracks to North & South (60/40)



Minimal Width

Encroachment on
Justice White House

- Option: Flare Tracks to North & South (50/50)

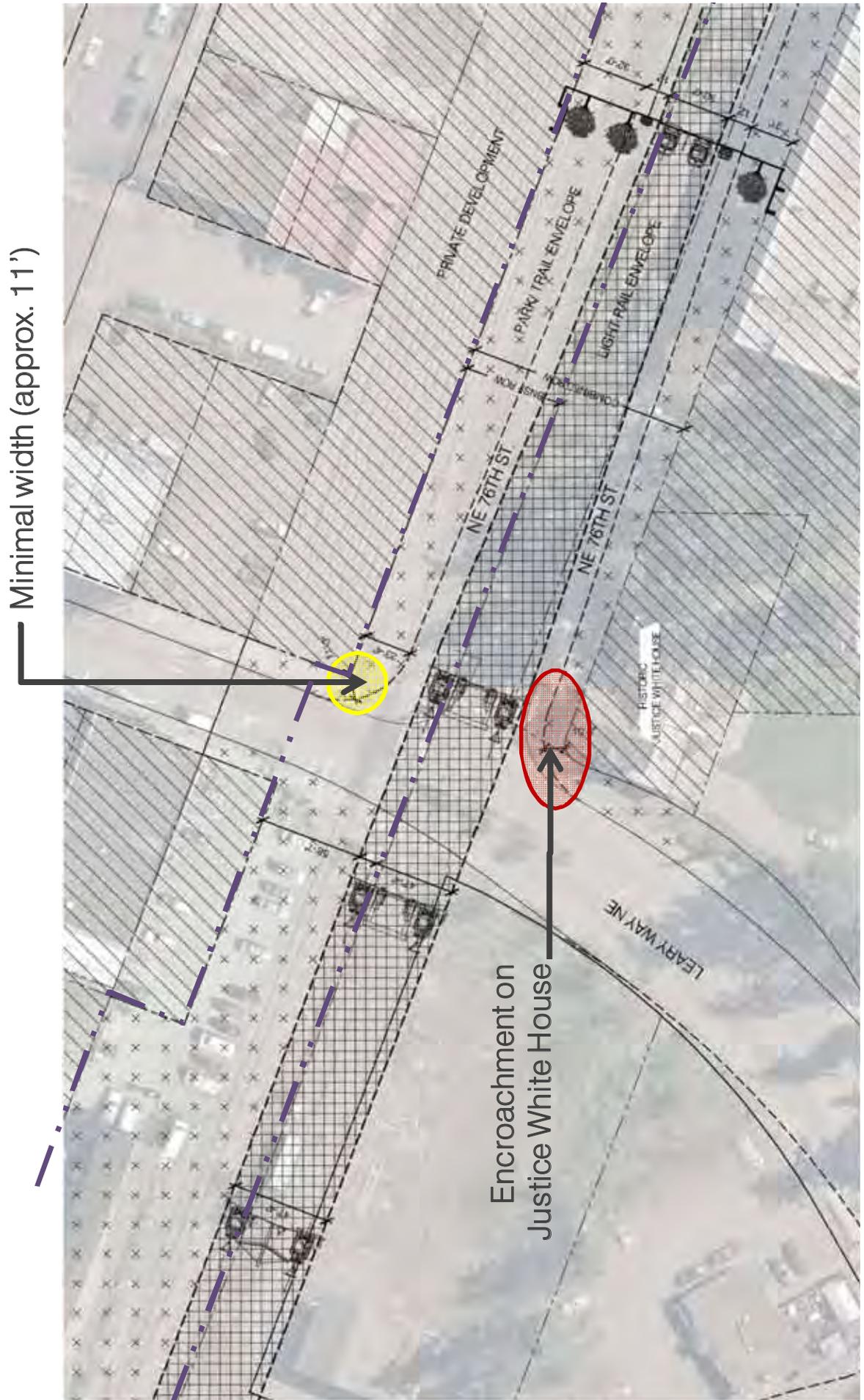
Additional Opportunities and Challenges:

- Opportunities
 - No additional opportunities
- Challenges
 - Does not provide minimal 25 foot width for park trail at critical pinch point intersection (provides approx. 23 feet.)
 - Removal of significant portion of southeast curb at intersection impacts Justice White House (would require elimination of street lane(s))
 - North/south sidewalk pinched to approximately 11 feet

Conclusions:

The center-running rail alignment separates the transit way from the trail and utility corridor and maximizes the available space for park and trail use. Insulating the development of the trail and utility corridor from light rail construction makes for much more predictable development envelopes in the near and long term. Additionally, street edges typically integrate better with active pedestrian ways as there aren't as many requirements for buffers or barriers and they are more flexible for grading and surfacing treatments. Space not used for buffers can instead be utilized for the benefit of the trail corridor to provide more active park areas. Moreover, this is a more predictable condition for both the City and Sound Transit as there are current precedents for the center-running alignment that work well. For these reasons, this alignment allows the vision of the corridor to be fully realized in the short term with less dependence on distant decisions. However, this alignment alternative does not allow ST to operate at preferred speeds, which could affect ridership. Also, this alternative would affect access to the Redmond Town Center parking garage.

Exhibit 4.04
NE 76th St. Center Running Alignment
Option: Flare Tracks to North & South (50/50)



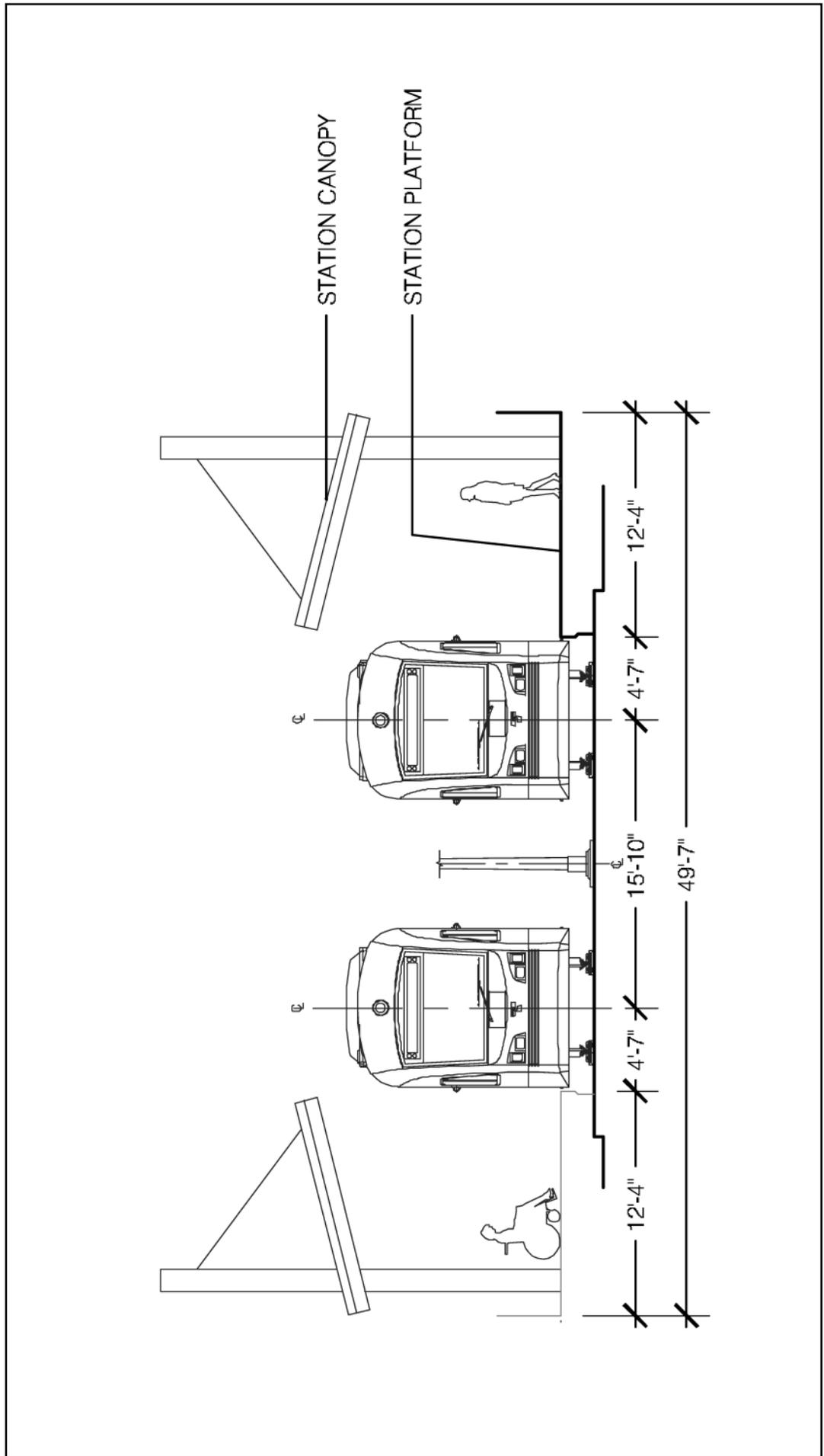
Side Station Platform Studies

In addition to the alternative alignment studies presented in the previous sections, two more alternatives for side station platforms were studied. Each of the alternatives presented thus far include the center platform, per current Sound Transit policy, which is based on operations and cost considerations. The track flare required by the center platform, however, adds approximately 18 feet to the overall light rail envelope at the critical pinch point at Leary Way and NE 76th St. As presented, none of the previous alternatives provide sufficient space for all of the proposed infrastructure projects. Therefore, the City evaluated the side platform station alternatives for both the NE 76th side-running and NE 76th center-running alignments to determine how this may help resolve conflicts at the Leary Way pinch point.

Graphic examples include:

- (Exhibit 5.01) Section: Typical Side Platform

Exhibit 5.01
Light Rail Side Platform



NE 76th St. Side-Running Alignment w/ Side Platforms

Side platforms on the NE 76th St. side-running alignment further maximize useable space at the Leary Way pinch point. This alternative provides approximately 17'-6" between the light rail envelope and northern property line at the narrowest section, meeting the required minimal width for accommodating the trail and utility corridor.

Graphic examples include:

- (Exhibit 5.02) Plans: Leary Way & NE 76th St. Pinch Point Alignment Studies

Additional Opportunities and Challenges:

- Opportunities
 - Maintains existing southeast curb at intersection to preserve Justice White House
- Challenges
 - Does not provide minimum 25 foot width for trail and utility corridor along north edge of BNSF ROW at critical pinch point intersection (provides approx. 11'-6")
 - Side station platform not typically preferred by Sound Transit due to operations and cost considerations.

Conclusions:

The side rail alignment with side platform separates the transit way from the trail and utility corridor and helps maximize the available space for park and trail use. However, not all the elements fit to meet minimal design standards within the current limits of the combined ROW at the critical pinch point at Leary Way and NE 76th St. Therefore, while there are notable benefits that the side platform option presents for the NE 76th side-alignment, this option does not resolve all of the spatial burdens placed on the corridor, and further options for resolving these conflicts would need additional consideration.

Exhibit 5.02
NE 76th St. Side Running Alignment
Option: Side Platforms

Limited width (approx. 17'-6")



Maintains existing curb
at Justice White House

NE 76th St. Center-Running Alignment w/ Side Platforms

The NE 76th St. center-running alignment with side station platforms provides the most available space for a contiguous trail and utility corridor, all of the benefits previously identified with a center platform light rail alignment, separates the transit way from the trail and utility corridor, and maximizes the available space for park and trail use.

Graphic examples include:

- (Exhibit 5.03) Plans: Leary Way & NE 76th St. Pinch Point Alignment Studies

Additional Opportunities and Challenges:

- Opportunities
 - Maintains existing southeast curb at intersection to preserve Justice White House
 - Provides minimum 25 foot width for trail and utility corridor along north edge of BNSF ROW at critical pinch point intersection (provides approx. 32 feet)
- Challenges
 - Limits ST speed to less than 35 mph, their minimum desired speed limit.
 - Side station platform not typically preferred by Sound Transit due to operations and cost considerations.
 - Limits access to Redmond Town Center garage.

Conclusions:

The side rail alignment provides the most space for the City envelope and can provide alignment options that allow ST to operate efficiently. Further analysis may be necessary on the side platform alternatives after evaluating these alternatives with ST.

Tail Tracks

An issue independent of the alignment of the transit way is the end-of-line amenities, both those required and desired.

To maximize the development potential, improve connectivity, and enhance the pedestrian experience within downtown, it is preferred from an urban design standpoint that tail tracks and all operations and maintenance be located outside of the core downtown area, such as at the Southeast Redmond Station. Another alternative is for ST to co-locate station buildings and facilities with a future City development at the property south of the station. The downtown station area is, and will even more so become, the heart of Redmond. As currently proposed, the tail tracks include approximately an additional 660 feet of tracks beyond the station platform. The utilitarian, fenced-off nature of light rail operations and maintenance does not contribute to the vision of urban revitalization that Redmond has envisioned for the land that these additional tracks will occupy.

The master plan will be developed to show a vision of the corridor without the Operations & Maintenance Center and support facilities, and subsequently modified in the future as tail tracks and other support needs are further developed.

Exhibit 5.03
NE 76th St. Center Running Alignment
Option: Side Platforms

Width = 14'-6" (approx.)



Maintains existing curb
at Justice White House

Passenger Rail Service on Existing Rails

Through the process of acquiring the rail corridor, there has been support for maintaining existing rail tracks for a passenger rail service either for commuting or excursions. The current trestles at 154th St., the Sammamish River and Redmond Way would need to be widened and improved to accommodate the minimum required design standards to bring both a trail (25 to 29 foot width) and train (17 foot width off centerline of tracks) into the downtown area. Redmond zoning codes require that any rail station be located within the downtown area. Beyond the constraints at the trestles, the ROW width at the critical pinch point east of Leary Way and NE 76th St. is not wide enough to accommodate a regional trail, ST, and another passenger train utilizing the existing tracks. In addition to the downtown area, there are many concerns over how the train could impact the Sammamish Valley portion of the Redmond Central Connector by bisecting the ROW and thereby complicating trail crossings at street intersections and minimizing opportunities for park and trail open space.

Schedule and Additional Studies

There are many variables in developing September's fast approaching Infrastructure Alignment Plan. ST will continue to be engaged at regularly scheduled meetings about our alternate studies to gauge receptiveness and concerns. ST will provide resources beyond the master plan team to vet different alignment options and impacts. The target outcome is for the City to select a preferred alignment or envelope to allow the Infrastructure Alignment Plan to move forward in August, with support from ST, in order to complete the Infrastructure Alignment Plan and the field design of the stormwater trunk line.

End of Memo

Memo

To: Carolyn Hope
From: Guy Michaelsen
Subject: Preferred Utility and Light Rail Alignment Analysis

Date: 8.5.10
Page: 1 of 10



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Redmond Central Connector four more were developed. Ideally, the City and Sound Transit will agree on a preferred alternative that w. After review of the previous ten alternatives, Sound Transit provided new design information to the City that might lead to improved designs for the side-running and center-running alternatives. ST recommended:

- Removing gates at intersections if speeds are presumed to be 35 mph or less.
- Reviewing geometric design of the alignment from the hairpin turn at SR 520 to the former BNSF corridor to NE 76th St.
- Revising the transit way width to 28'-2".

The City also verified the emergency access requirements for lane widths on NE 76th St. as 14 feet.

The four new alternatives are summarized below.

Sound Transit: Alternative Plan Analysis

Building on coordination to date, Sound Transit drafted two alternate alignment studies, side-running along NE 76th St. and center-running in NE 76th St. Both studies include center platforms and the required flare in the tracks that widens the transit way profile from 28'-2" to approximately 50' at the pinch point. This iteration of the ST plans eliminated the crossing gates, using the assumption that the train would travel at 35 mph or less. Our analysis of the ST alternatives is as follows:

Side-Running Center Platform:

(Exhibit 1.01)

This alignment can work through much of the corridor, but does not provide sufficient right-of-way at the pinch point because of the track flare in preparation required for entering the center platform station. Therefore, the key City infrastructure projects will not fit in the corridor. The existing clearance between the property pinch point and transit way is 11'-5". This is not adequate for the 25' to 29' trail easement required by the County design standards. In addition, there is insufficient room for the 20' foot stormwater trunk line setback. This setback is planned to be maintained from adjacent private properties to the center line of pipe, which requires a 20' to allow trenching and reduce costs during installation, and to allow sufficient room for future maintenance activities when multi-story buildings will line with corridor to the north. To maintain a 20' foot setback in this scheme alternative, the pipe is directly under the transit way and eastbound tracks, which is in conflict with Sound Transit's requirements for a 10'-foot setback for utility structures from the nearest light rail track.

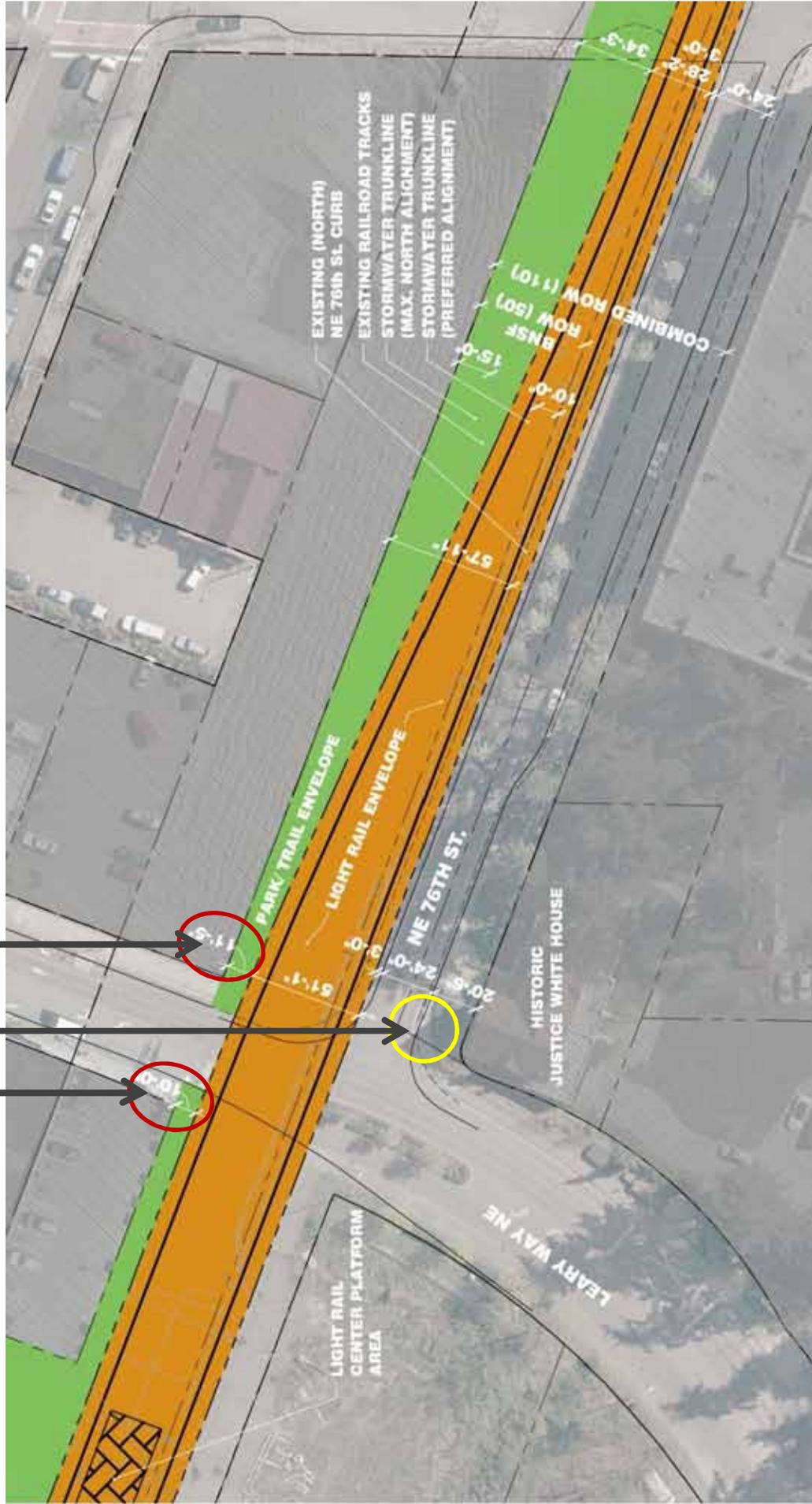
Exhibit 1.01

Sound Transit: NE 76th St. Side Alignment
Center Platform Station

Width = 10'-0"

Minimal impact on curb at Justice White House

Width = 11'-5"



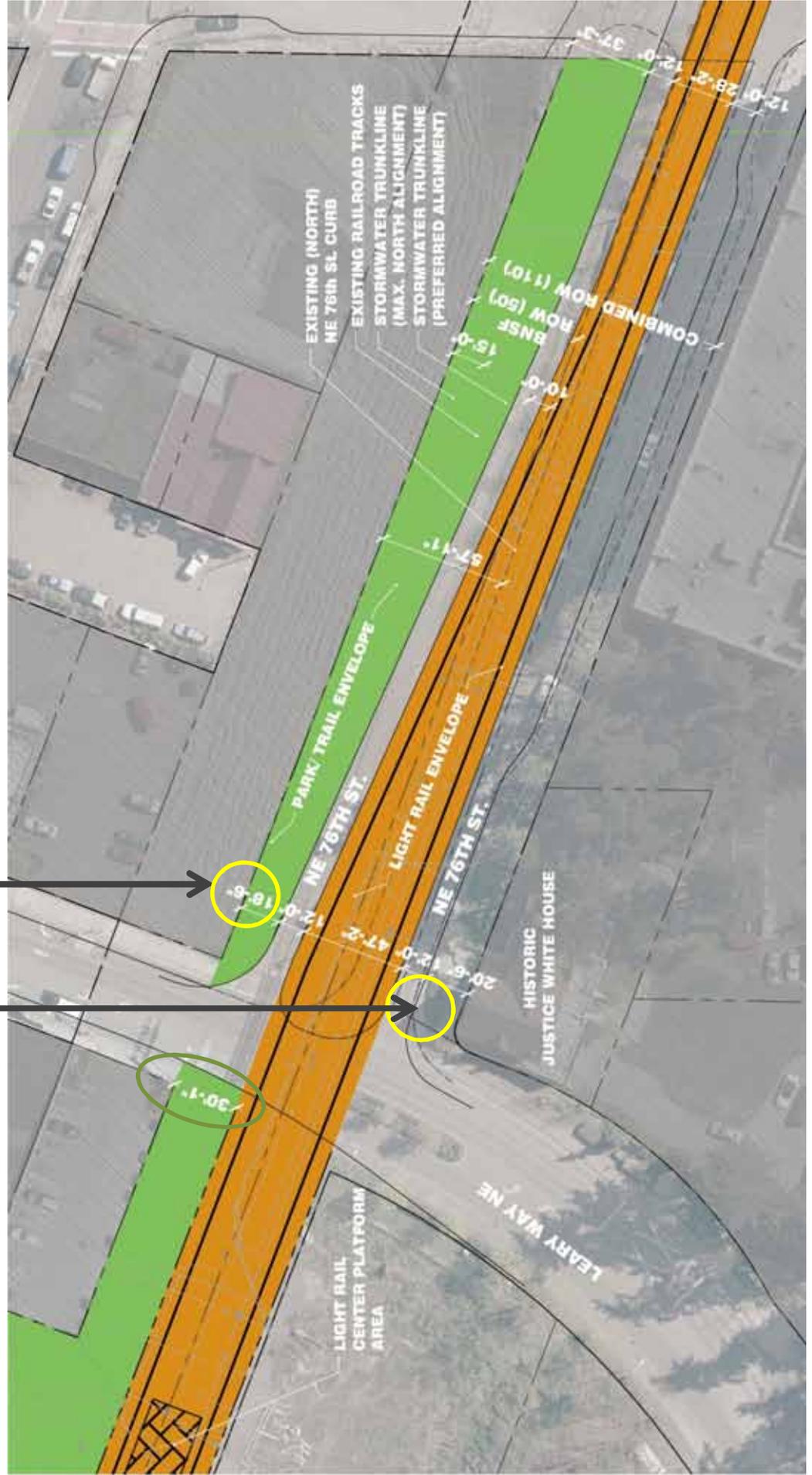
Center-Running Center Platform:

(Exhibit 1.02)

This alignment can work through much of the corridor, but does not provide sufficient right-of-way at the pinch point. Again, the track flare does not allow all required infrastructure to fit in the corridor. Sound Transit calculated that the clearance between the property pinch point and transit way is 18'-6"; however, when applying the City code for emergency access of 14' travel lanes, the clearance is reduced to 14'-6". This is not adequate for the required 25' to 29' foot trail easement (22'.) Furthermore, the ST alignment is located too far to the south (impacting the sidewalk at Justice White House) and requiring a shift to the north, further reducing the 14'-6" to approximately 12'-3"???. The existing clearance does allow room for the stormwater trunk line, which requires a 20' offset from adjacent properties to the center line of the pipe, which would be located under the NE 76th St. westbound travel lane..

Exhibit 1.02
Sound Transit: NE 76th St. Center Alignment
Center Platform

Minimal impact on curb at Justice White House
Width = 18'-6"



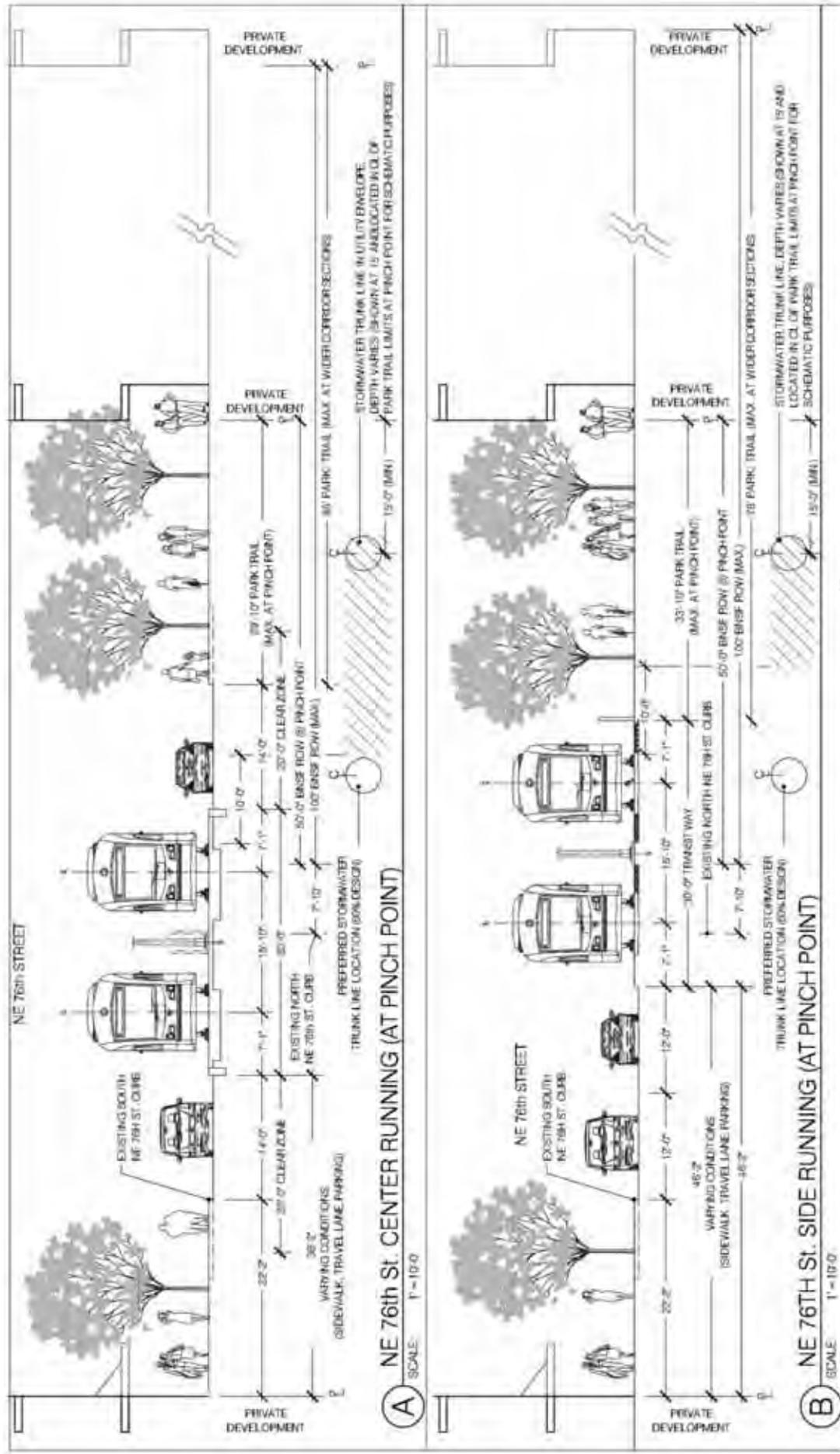
Preferred Utility/Sound Transit Alignment Analysis:

With Sound Transit's studies having the challenges noted above, both ST alternatives were modified to replace the center platform with a side platform layout, thus eliminating the track flare and conflicts at the pinch point. Both alternatives appear to be satisfactory for future utility/trail corridor. However, the side platform terminal alternatives are not currently allowed/preferable under Sound Transit policy. These two alternatives are compared and contrasted below.

Issue	Center Running, Side Platform (Exhibits 2.01(A) & 2.02)	Side Running, Side Platform (Exhibits 2.01(B) & 2.03)
Pinch point clearances for park/trail	29'-10" (26' envelope is adequate)	33'-10" (26' envelope is adequate)
Pinch point clearances for trunk line	43'-10" allowing the pipe to be built where currently designed (and allowing maximum envelope outside of required 15' clearance from adjacent private land.	33'-10" requiring pipe to be moved north of current design, but still outside of required 15' clearance from adjacent private land.
Trail Crossings	Trail crossings (bikes and peds) can be incorporated at the corners/intersections of NE 76 th St., controlled by same signaling as all other intersection rail/vehicle/ped, but remain isolated/buffered from light rail.	Trail crossings (bikes and peds) can be incorporated at the corners/intersections of NE 76 th St., controlled by same signaling as all other intersection rail/vehicle/ped, but remain isolated/buffered from light rail.
Future rail construction impact - NE 76 th St.	Transit way envelope overlays 16 feet of existing NE 76 th St. plus an additional clearance required for construction (assumes 15 feet each side), requiring significant reconstruction of NE 76 th St.	Transit way envelope overlays 6 feet of existing NE 76 th St. plus an additional clearance required for construction (assumes 15 feet each side), requiring some reconstruction of NE 76 th St.
Future rail utility impact - NE 76 th St.	Likely relocation of utilities on the northern side of NE 76 th St. including: gas, power, and water.	Likely relocation of utilities on the northern side of NE 76 th St. including: gas, power, and water.

Issue	Center Running, Side Platform (Exhibits 2.01(A) & 2.02)	Side Running, Side Platform (Exhibits 2.01(B) & 2.03)
Future rail construction impact on constructed park/trail elements. ¹	Transit way envelope plus an additional clearance required for construction (assumes 15 feet each side) would impact 1' into 29'-10" park/trail envelope requiring removal/restoration of elements developed in this area prior to light rail construction.	Transit way envelope plus an additional clearance required for construction (assumes 15 feet each side) would impact 15' into 33'-10" park/trail envelope requiring removal/restoration of elements developed in this area prior to light rail construction.
Operating speeds	With ST's desire for a minimum of 35 mph along NE 76 th St., and speed limited to traffic speed. City is willing to increase speed on NE 76 th to 30 mph.	With ST's desire for a minimum of 35 mph, side running is not limited by the adjacent street speed limit.
Grades	Grades appear to be able to accommodate light rail, stormwater trunk line, and park trail—subject to further analysis upon selection by the City of the preferred alternative.	Grades appear to be able to accommodate light rail, stormwater trunk line, and park trail—subject to further analysis upon selection by the City of the preferred alternative.
Traffic	Reconfigured 76 th St. from 3- to 2-lane profile eliminates left turn lane, requiring reconfiguration of intersection/signals and potential traffic impacts Mid-block left turns are eliminated	Reconfigured 76 th St. from 3- to 2-lane profile eliminates left turn lane, requiring reconfiguration of intersection/signals and potential traffic impacts

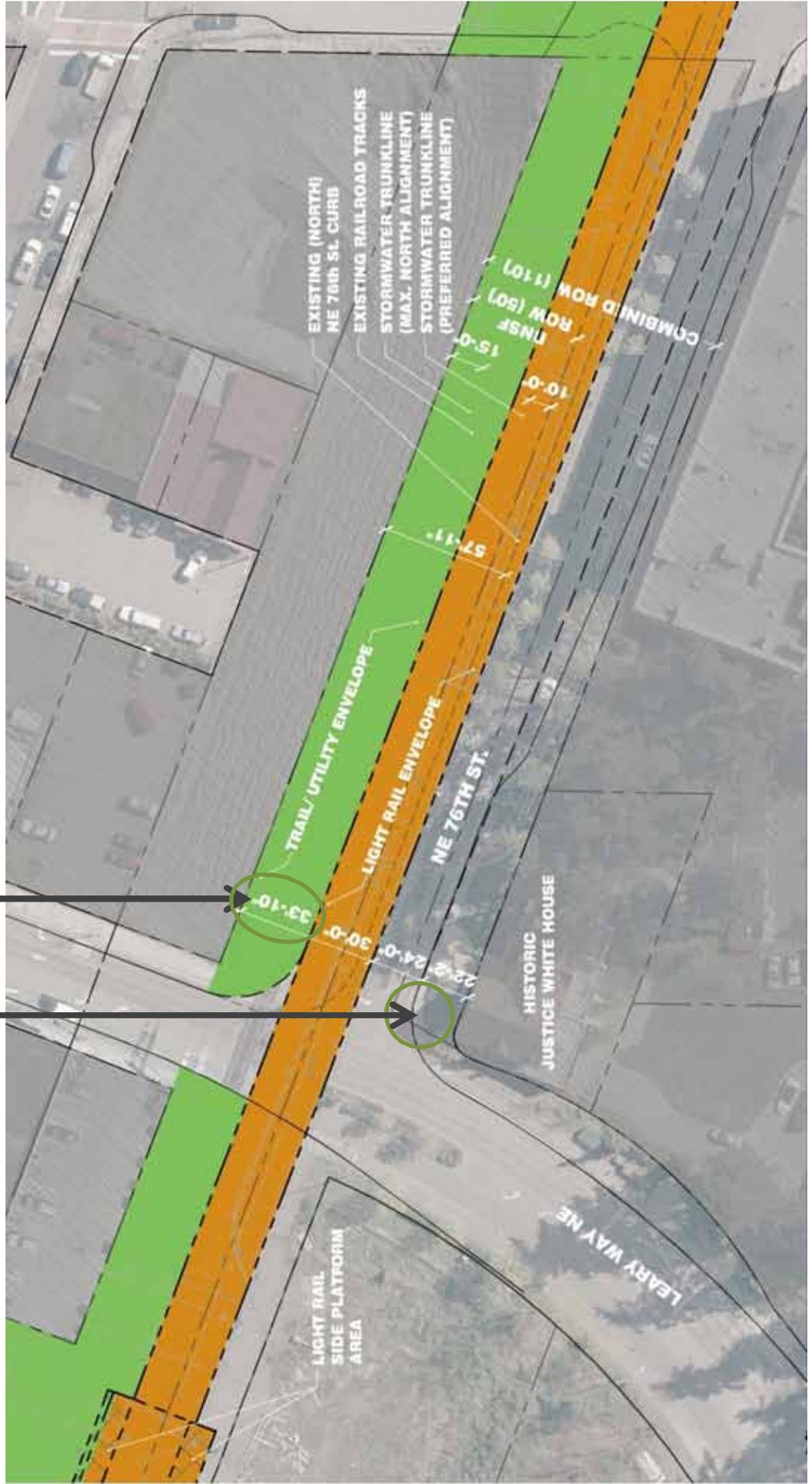
Exhibit 2.01
 NE 76th St. Alignment Typical Sections
 A) Center Running (B) Side Running



PROJECT: REDMOND BUS/STRAIL-CORRIDOR	TITLE: DOWNTOWN REDMOND LIGHT RAIL ALIGNMENT OPTIONS STUDIES
SCALE: 1" = 10'-0"	DATE: 8/04/10
SHEET: 1	

Exhibit 2.02
Redmond: NE 76th St. Side Alignment
Side Platform Station

Maintains existing curb at Justice White House
Width = 33'-10"



City Recommendation

In an effort to reach an agreed upon alignment with Sound Transit prior to beginning the trail master plan process in earnest, the City has determined a recommended alignment. Weighing the many variables between the options for trail/utility and Sound Transit envelopes, the City has identified the NE 76th St. side-running transit way with side station platforms as the preferred alignment at this time. This option is preferred by the City for the following reasons:

- Meets requirements for trail/utility corridor
- AllowsMaintains all access points to Redmond townTown Center garage
- More room for emergency access
- Potentially fewer utilities to relocate and less disruption to 76th St. during ST construction
- Faster train speeds (per current Sound Transit design guidelines)

End of Memo

1 While planning efforts aim to avoid conflicts of constructed park/trail elements to the greatest extent possible, there will inevitably be impacts when light rail is constructed, primarily at pinch points and intersections.