Redmond Downtown High Capacity Transit Preferred Alignment Technical Report
Credits

City of Redmond

Washington Department of Transportation

Sound Transit

King County Metro

Crandall Arambula, PC - Lead Consultant

URS

Urban Advisors, LTD
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Background
Overview

The following technical report is a supplement to the Preferred Alignment Summary Report. The information provided here identifies detailed information on the project background, meeting process, alternative HCT alignments and station locations, transit oriented development (TOD) design criteria and TOD alternatives. In addition this report recommends a preferred alternative land use and transportation framework for future development in Downtown and Southeast Redmond.

Study Intent

This study is intended to provide decision makers and staff sufficient information to make recommendations for further high capacity transit (HCT) and land-use analysis and refinement for downtown and southeast Redmond. The study does not provide specific recommendations for HCT technology; rather, it is “technologically neutral.” That is, it can accommodate any of a variety of high capacity transit technologies. The study identifies an alignment and station areas that:

- Provide the most cost-effective route to downtown Redmond
- Minimize environmental impacts
- Provide the greatest opportunity for transit-oriented development, thereby, increasing potential HCT ridership
- Support and reinforce the City’s vision for future growth
- Provide adequate analysis and detail for key components that can be used for future HCT studies by Sound Transit, WSDOT, PSRC and others

Why This Plan was Prepared

The City of Redmond, with the cooperation of other agencies, including Sound Transit, WSDOT and King County Metro, has developed this study to identify the potential for high-capacity transit (HCT) in downtown Redmond.

This study helps inform decision makers on a number of issues, including:

- Sound Transit Phase 2 Planning
  - Alignment, stations and park-and-ride facilities
- HCT technology (rail or rail convertible, bus, rapid transit)

WSDOT 520 “Nickel” Project

- Right-of-way impacts
- Road, bridge, environmental and interchange impacts

Redmond Vision for Downtown Growth

- Identify potential Comprehensive Plan updates.
- Provide further analysis and refinement of recommendations included in the Comprehensive Plan and Transportation Master Plan.

Study Area Context

Study Area

Redmond High Capacity Transit Technical Report
Background

Redmond High Capacity Transit Technical Report
Study Area

The consultant team, led by Crandall Arambula, worked with the City of Redmond, WSDOT, Sound Transit and other individuals recommended by the City to establish the study area, review background materials and inventory resources and existing conditions.

Study Area Boundary

The geographic boundaries of the planning areas were identified, refined and mapped. The agreed upon study area included NE 65th St. and Marymoor Park to the south, 180th Ave. NE to the east, NE 90th to the north and West Lake Sammamish Pkwy to the west.

Resources and Existing Conditions

The City's and state's mapping and data information was supplemented with field review as needed to analyze existing economic, market, transportation and infrastructure conditions.
**HCT Technologies**

The type of vehicles that may be used for the corridor include those that are currently being considered by regional planning groups. These include:

1. **Bus Rapid Transit (BRT).** This would be developed as an exclusive busway that could be converted to rail. Typical cross-sections for vehicle envelopes that can be converted to rail were used for development of alternative concepts.

2. **Rail.** Light rail design standards that are currently being employed as part of Sound Transit’s preliminary engineering efforts were used. Typical cross-section, horizontal and vertical geometric constraints for vehicle envelopes were considered.

3. **Monorail.** Consideration for monorail has been included in this study. The concepts can generally accommodate a monorail vehicle envelope with the exception of horizontal and vertical geometry. If used, an alternative alignment at the SR520/ SR202 intersection would be required.
Sound Transit HCT Planning

The 2005 Long-Range Plan

The plan is a blueprint for future development of the regional transit system. A recent report outlined many of the economic benefits of regional transit. The long-range plan identifies:

- Transit Service Options
- Future Projects Subject to Voter Approval
- Updates to the Original 1996 Plan

Sound Transit 2

Sound Transit 2, or ST2, is the regional plan for the next set of investments in a transit system for central Puget Sound. The plan expands on Sound Transit’s system of regional express buses, commuter rail, light rail and transit facilities in Snohomish, King and Pierce counties.

Next Steps

From now to December 2005, Sound Transit will complete preliminary cost and benefit information for each project. This work will be thoroughly reviewed and financial options will be discussed by the Sound Transit Board. As the process moves ahead, Sound Transit will consult with citizens and local governments from across the region.

In early 2006, this additional project information will be available for public review. More work will take place to refine the scope of each project as well as its cost estimate. Packages of projects will be matched against various financing options. This will allow the board to develop a draft ST2 plan for another round of public input.
Redmond HCT Segment - Modeling Analysis

Sound Transit Alignment

11 station locations are generally identified on the HCT segment from the International District Tunnel Station in Downtown Seattle to Downtown Redmond in the conceptual alignment being developed by Sound Transit as part of Phase 2 Planning. Four of the station locations are identified on the HCT segment between Downtown Bellevue, and Downtown and Southeast Redmond. This work is used for planning purposes and is not intended to establish a preferred alignment. This will be done through future project level planning and environmental analysis.

The table above generally summarizes the number of stations and their location. All HCT stations on the Eastside line are King County Metro and/or Sound Transit routes.

Puget Sound Regional Council (PSRC) Ridership Estimates

Because Sound Transit’s transit forecasting model was not readily available, the City of Redmond hired the consulting firm Mirai and Associates to examine ridership forecasts of the High Capacity Transit (HCT) line between downtown Bellevue and Redmond and the assumptions used by the Puget Sound Regional Council (PSRC) in its travel demand model. This investigation used the PSRC travel demand model version “E05” for the year 2030. This model set was released in July 2005.

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Number of Stations and Location - King County Metro and/or Sound Transit Routes
Redmond HCT Segment - Modeling Analysis, cont

**Redmond HCT**

Seven stations are assumed on the HCT segment between the Bellevue CBD and Redmond. The table, shown at right, summarizes the station locations and the assumed access. All of the HCT stations on the Redmond line are served by KC Metro or ST routes. The number of routes serving the station is shown in parentheses.

**Mode Choice Inputs**

Inputs that effect mode choice include auto travel time, auto operating costs, parking costs, transit service (frequency) and transit fares.

Auto travel time is dependent on the network system coded for each year. A review of the PSRC network system shows that it should be updated in the Redmond area to more accurately reflect long range improvement plans, such as the recently adopted Transportation Master Plan.

The costs assumed within the PSRC modeling process are as follows:

1. **Auto Operating**
   - Grows with inflation

2. **Transit Fares**
   - Same as regional year 2000 fare structure (grows with inflation)
   - No Premium Fare for ST bus or HCT

3. **Parking Costs** Developed from the PSRC Parking Survey and Model

Key to any component of the PSRC modeling process is the forecast land use growth used in a specific year. It is especially important that the land use growth assumptions are reflective of the local plans of a jurisdiction and the transportation serviced assumed. Using land use data that is found in the 2030 BKR model, estimates of total households and employment were aggregated to the PSRC TAZ system and in some cases showed inconsistencies.
Redmond HCT Segment - Modeling Analysis, cont

Forecast HCT Boardings and Riders

Forecast HCT boardings and riders were calculated for the PSRC HCT alignment described below and are shown at right. Two-way ridership between the Bellevue Transit Center and the Overlake Transit Center is approximately 12,000 passengers. Two-way ridership between the Overlake Transit Center and the Redmond CBD is about 5,000 passengers. The Overlake Transit Center had the largest amount of people boarding and exiting along the corridor – at approximately 6,000.

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Boardings and Ridership Estimates for Redmond HCT

Redmond High Capacity Transit Technical Report
**WSDOT Nickel Project**

Washington Department of Transportation is currently completing the environmental impact statement and engineering for the SR520 Nickel Project. The project provides highway transportation improvements through Redmond. The project is anticipated to be completed by 2011. The intent of the project is to:

- Improve safety
- Improve congestion
- Increase travel speeds during commuter peak hours
- Facilitate freight movement
- Implement environmental improvements

The intent of the Downtown Redmond HCT Study is to inform the engineering and environmental work and the overall project cost.

This study incorporated the 30 percent engineering, plan and profile drawings provided by WSDOT staff and consultants.

The study also included the review of HCT studies prepared by various consultants for WSDOT.
Existing Redmond Policies, Regulations, Studies and Guidelines

Existing plans, policies, regulations, studies and guidelines that affect land uses and transportation in downtown were gathered and reviewed. The preferred HCT alternative, land-use and transportation frameworks outlined in this study, in general, comply with these existing documents. The following includes a partial list of relevant plans, polices, regulations, studies and guidelines reviewed by the consultants:

- Redmond Comprehensive Plan
- Redmond Community Development Guide (zoning code)
- Redmond Transportation Master Plan
- Downtown Transportation Master Plan
- Downtown Plan Elements 2002
- Bear Creek Parkway Extension Project
- City of Redmond Traffic/Turning Movement Counts
**Existing Conditions**

Existing land-use and transportation assessments were completed. This information was used as a starting point for the planning process.

**Land Use and Transportation**

The City of Redmond provided base mapping, zoning, Comprehensive Plan and additional regulation documents. These were assessed in conjunction with station area alternatives to determine if inconsistencies with or impediments to transit-oriented development existed.

In addition, review of the Redmond Transportation Master Plan, Downtown Transportation Master Plan and ongoing street projects allowed for a better understanding of existing traffic patterns and integration of alternatives into existing, planned and in-process projects.

**Onsite Reconnaissance**

An onsite reconnaissance of the downtown retail environment included consultant review and assessment of current buildings and the pedestrian environment along key downtown streets. The onsite evaluation and assessment of land use and transportation data led to the identification of existing “soft parcels” representing those properties that may be vacant or underutilized, include parking lots, or identified as redevelopment sites. The existing soft parcels map informed the consultant on the location of a HCT alignment, transportation and land-use frameworks and specific alternatives that form the basis of the study.
Opportunities and Constraints

Downtown Redmond’s strengths and weaknesses were analyzed in terms of physical and market potential. Where possible, the preferred alternative builds upon downtown’s strengths and overcomes or minimizes its weaknesses.

**Opportunities**

Some of the physical opportunities that should be built upon follow:

- Good access to downtown to and from the surrounding region
- Traffic volumes along Redmond and Avondale Way supporting local businesses
- BNSF right-of-way provides potential for HCT alignment, improved auto circulation, open space and a ped/bike path
- Pedestrian, bike and auto traffic to and from the Town Center to neighborhoods along 166th and 164th Ave. NE
- Regional attractors and retail anchors
- Open space amenity at Marymoor Park
- Many redevelopment sites
- Transit serving development area to the north

**Constraints**

The physical constraints or obstacles that need to be overcome are:

- SR520 creates a physical barrier to Marymoor Park and SE Redmond and contributes to noise and air pollution
- Auto-oriented development patterns contribute to poor circulation, weaken the pedestrian environment and limit downtown retail potential
- Lack of signalization downgrades pedestrian and auto access north/south across BNSF and NE 70th St.
- Redmond Way and Avondale Way are barriers to north south access within downtown
- Marymoor Park, Bear Creek, Sammamish River and the Town Center Open Space constrain potential for SR520 expansion and location of HCT alignments
The creation of transit-oriented development is based on fundamental characteristics that are critical for success. Crandall Arambula has developed a transit-oriented development diagram that is a basic framework for understanding the link between high-capacity transportation and land use. See image on right.

**The Assumptions:**

The assumptions based on this diagram represent “ideal conditions” for transit-oriented development and act as a measuring stick for development potential within a 1/4-mile radius of a station platform.

These assumptions were applied categorically to three HCT alignment proposals within a variety of station locations to identify actual gross acreage for potential developable areas and identify the number of housing units and employment areas. These numbers were used to estimate the average trips generated per day and a reasonable expectation for transit ridership. The Ideal transit-oriented development assumptions related to the development potential and transit ridership are shown on the right.
Process
**Overview**

The City of Redmond, with the assistance of the consultant team, developed this study over a 1-month period from January 2005 to November 2005. The City's project management team oversaw the process. Local and regional agencies, transit experts and elected officials were involved.

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### Work Tasks and Schedule 2005

<table>
<thead>
<tr>
<th>Task</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Kickoff Meeting</td>
<td>19</td>
</tr>
<tr>
<td>2) Design Summit</td>
<td>26</td>
</tr>
<tr>
<td>3) Brainstorming Work Session #1</td>
<td>5</td>
</tr>
<tr>
<td>4) Land Use Conference Call #1</td>
<td>12</td>
</tr>
<tr>
<td>5) Alternatives Development (3 max.)</td>
<td>5</td>
</tr>
<tr>
<td>6) Land Use Conference Call #2</td>
<td>21</td>
</tr>
<tr>
<td>7) Work Session #2</td>
<td>19</td>
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<tr>
<td>8) Prepare Draft Final Report</td>
<td>1</td>
</tr>
<tr>
<td>9) Submit Draft Final Report</td>
<td></td>
</tr>
<tr>
<td>10) Present Draft Final Report to Council</td>
<td></td>
</tr>
<tr>
<td>11) Prepare for Open House ?</td>
<td></td>
</tr>
<tr>
<td>12) Conduct Open House ?</td>
<td></td>
</tr>
<tr>
<td>13) Prepare Final Report</td>
<td></td>
</tr>
</tbody>
</table>

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*Image: Work Tasks and Schedule*
Alternatives Development

Alternative HCT alignments were developed and evaluated for three different conditions through Downtown and southeast Redmond. They included:

- SR520 alignment
- Bear Creek alignment
- Burlington Northern alignment

Evaluation criteria were developed and are identified on the following page.
Alternatives Evaluation

The Evaluation Criteria represent the fundamental elements required to support successful transit oriented development. Each of the three alignments were evaluated according to this criteria and are identified below.

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>SR 520</th>
<th>Bear Creek</th>
<th>BNSF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Existing Population within 1/4 mile of Station</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2. Potential Land Available within 1/4 mile of Station</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Potential for a Neighborhood Hub adjacent to the Station</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4. Platform Environment</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>5. Pedestrian Access</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Intermodal Connection and Effects of Traffic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Park &amp; Ride Site Potential</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Park &amp; Ride Use Potential</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Environmental Impacts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Community Character</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Cost Factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Ease of Implementation</td>
<td></td>
<td></td>
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</table>

Legend: Good [ ]  Poor [ ]  Fair [x]  N/A [ ]

Redmond High Capacity Transit Technical Report
**Design Summit**

Approximately thirty professionals from the City of Redmond, WSDOT, King County Metro, King County Department of Transportation, Sound Transit, other jurisdictions, regional transit experts and representatives from area businesses attended the Design Summit Meeting on April 26, 2005.

During the first part of the meeting key project issues were reviewed and the three alternative alignments and station area concepts were presented. The second part included a workshop for small groups to discuss project issues.

The feedback received as a part of this event is summarized as follows:

- Important to serve where there is the potential for a large number of pedestrian, bike and bus transit trips accessing HCT (Downtown), as well as, people accessing HCT through a park and ride facility outside of Downtown (Southeast Redmond)
- The best alternative would minimize cost, environmental impacts, and community opposition while maximizing ridership potential
- It is important to minimize disruption to the community
- Design issues need to be worked out with all of the alternatives.

In addition, each individual was asked to complete a response sheet by:
1. Ranking alignments in order of preference
2. Citing three reasons for their preference

The response sheet and results are shown above.

As a result of this Summit, staff presented findings to the Planning Commission on May 18, 2005.
Planning Commission and City Council Briefings

Planning Commission
The Planning Commission briefing took place on May 18, 2005. Staff presented to Planning Commission:

- The three alignment concepts being analyzed
- The results of the Design Summit
- Next steps in the study

City Council
On June 21, 2005 staff provided Council a staff report and presentation that summarized the following items:

- The three alignment concepts being analyzed
- The results of the Design Summit
- SR 520 alignment as the preliminary preferred alignment
- Key issues to be analyzed regarding the SR 520 alignment
- Next steps

Staff recommended the SR 520 alignment for the following reasons in the June 21, 2005 staff report:

1. SR 520 Alignment is generally consistent with what is in the Comprehensive Plan and Transportation Master Plan.

2. The SR 520 Alignment has the following advantages over other HCT alignments that would serve Downtown and Southeast Redmond:
   - Avoids Town Center Open Space
   - Requires only one crossing of Bear Creek
   - Requires only one crossing of SR 520
   - Minimizes the amount of BNSF right of way needed for HCT to serve Downtown

   - Right of way is available for most of the project.

   Based on the review done so far, the SR 520 Alignment best serves both Downtown and Southeast Redmond while minimizing the potential negative impacts that HCT could have on the community.

3. The work of the consultant team and the results of the HCT Design Summit reaffirmed and refined the general direction established in the Comprehensive Plan and Transportation Master Plan.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>SR 520</th>
<th>Bear Creek</th>
<th>BNSF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential to minimize Town Center Open Space</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Potential to minimize BNSF corridor impacts</td>
<td>Medium</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Potential to minimize SR 520/SR 202 interchange impacts</td>
<td>Low</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>Sammamish River Crossings</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Bear Creek Crossings</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>SR 520 Crossings</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Amount of Downtown Served by Downtown Station</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Southeast Redmond Station</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to serve Avondale and Union Hill Rd</td>
<td>Low*</td>
<td>Medium</td>
<td>Low*</td>
</tr>
<tr>
<td>Ability to serve Redmond Way and East Lake Sammamish Pkwy</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>
Brainstorming Session

The brainstorming session summarizes issues, design concepts for further refinement and a schedule of the SR520 HCT alignment that was selected during the April 26th design summit. The session was attended by the consultant team, as well as, staff from various City departments, WSDOT and King County Metro.

The workshop was conducted on August 8, 2005. It included:
- A brief review of the results of the April 26th design summit.
- Identification of remaining issues to be resolved.
- A brainstorming session that identified potential design concepts to be explored by the consultant team as a part of the development of design alternatives for Workshop No. 2.
- Discussion of next steps, including review of a draft schedule.

Key issues included:
- SR520 Nickel Project-related issues
- Park-and-ride
- BNSF right-of-way
- Land uses
Alignment Refinement

Alignment refinements were developed for the following segment areas:
- Marymoor Park HCT alignment area
- SE Redmond HCT alignment area
- Downtown HCT alignment area

Station location refinement and transit-oriented development (TOD) land-use concepts were developed for three stations. These included:
- Terminus Station options
- Downtown Station options
- SE Redmond Park-and-ride Station options

For each station area, three options were identified for specific station platform locations and the potential amount of retail, commercial, and housing captured within a quarter mile radius of each station platform. The images on the right identify the three options for each of the station areas.
Project Team Workshop

The following HCT alignment and land-use concepts, issues and next steps were presented and discussed during a project team workshop on September 21, 2005 attended by the City, King County Metro staff and WSDOT representatives.

Marymoor Park Segment
Prior to presentation of double- and single-track options for HCT along the southern right-of-way of SR 520, WSDOT consultants presented a brief review of the SR 520 Nickel Project status. To accommodate HCT, specific highway design changes would include:
- Lane or other facility width reductions. For either single or double track, acquisition of right-of-way along Marymoor Park will be required

SE Redmond Segment
SR 520/SR 202 interchange HCT facility design options were presented and discussed. Key considerations included:
- Trackway alignment through the interchange
- Location, access and pedestrian environment at the SE Redmond Park-and-Ride Station
- Transit-supportive land uses or future transit-oriented development parcels
- Existing traffic signalization and signalization changes required
- WSDOT access restrictions
- Vehicle access to and visibility of the transit park-and-ride structure

BNSF Segment
Alignment options were presented and discussed. Key considerations for evaluation included:
- “Front door/back door” adjacent land-use conditions created by each option
- Operational and safety issues of the trackway
- Roadway “boulevard” design (not a couplet) advantages
- Sidewalk and on-street parking phasing opportunities
- Emergency access routes

Station Locations
Station locations and land-use implications were presented and discussed. Station issues and considerations included:
- Terminus station options north of Redmond Way
- Station location relationship to existing and proposed open spaces
- Downtown station access to the Redmond Town Center development
- Downtown station location adjacency to potential redevelopment parcels
Agency Meetings

Washington State Department of Transportation (WSDOT)

WSDOT has participated in all major process meetings held as a part of this study. City staff also provided input on the SR 520 Widening Project through its representatives on the project Executive Advisory Committee (EAC) and Technical Advisory Committee (TAC).

Sound Transit

Along with Sound Transit participating in the Design Summit and being provided status reports regarding the Downtown HCT Study, City staff also met with Sound Transit on September 28th and October 4th to discuss the status of the Redmond Downtown HCT Study. These meetings provided both Redmond and Sound Transit staff an opportunity to share their thoughts on how best to serve Downtown and Southeast Redmond with HCT. This was the first of many conversations as Sound Transit continues to work on planning Sound Transit Phase 2.
High Capacity Transit Alignment
Overview

The SR520 HCT alignment offers an opportunity to provide transit service to downtown Redmond in a cost-effective, efficient manner that limits travel time while supporting the community’s vision for future growth. The alignment:

- Minimizes cost. This is achieved by utilizing, in large part, the existing SR520 and BNSF rights-of-way

Construction of at-grade HCT for the majority of the alignment:

- Minimizes environmental impacts. Sensitive areas along waterways are avoided

- Minimizes travel time for park-and-ride patrons. The park-and-ride is located within easy access to major arterials. Further, riders have travel time minimized by avoiding stops through downtown Redmond

- Transit-oriented development is maximized. The alignment route travels through areas rich in potential TOD sites

Support for Future Vision

The alignment route and stations are consistent with the desired character for Downtown and Southeast Redmond.

This alignment also represents some challenges, which based on the work included in this report are manageable and seem to be less than for other possible alignments. They include:

- Potential acquisition of a small amount of Marymoor Park Property
- Ownership of the BNSF right of way
- Funding
Alignment Segments

The transit alignment route proposed has been divided into three segments with unique design considerations. These include:

- Marymoor Park
- SE Redmond
- Downtown HCT
**Marymoor Park Segment**

This segment would extend from the Sammamish River along the southerly right-of-way of SR520 to SE 70th Street. The alignment:

- Could operate as either a single- or a double-track facility
- Requires acquisition of a small amount of Marymoor Park. With further refinement of the SR520 highway design and further study of the HCT alignment during future engineering studies, it is anticipated that impacts to this area could be minimized
- Provides opportunity for a potential station that would be used only during special events
SE Redmond Alignment Segment

This segment extends from Marymoor Park at SE 70th through the SR520/SR202 intersection along the BNSF right-of-way and connects to 17th SE. The alignment:

- Meets all horizontal and vertical engineering standards for HCT rail and rail convertible modes
- Would be grade separated over a realigned and depressed SR520 off-ramp
- Crosses at grade underneath the existing bridge structure
- Crosses at grade across the on-ramp to SR520
- Travels within the existing BNSF right-of-way west of the bridge structure

- Would not impact the planned pedestrian/bicycle recreation pathway within the BNSF right-of-way

The diagram below and on the following page identifies the City's preferred approach for turning the corner back into Downtown Redmond and getting through the SR 520/SR202 interchange. This is the City's preferred approach due to:

- Good access and visibility from Redmond Way (SR 202)
- An at-grade station
- Good pedestrian access to Marymoor Business Park
The alignment meets minimum requirements for HCT rail as established by the Sound Transit Design Criteria. Where the alignment turns northwest at SR 520, a radius of 200 feet was used to avoid impacts to the existing structure. The 200’ radius is still within the parameter established in the design criteria, however, it does not meet the preferred minimum of 300’ for a mainline track. All other horizontal segments are well within the established limits.

The vertical alignment meets the design criteria absolute minimum requirements. At this level of design the structure is assumed to be five feet thick and have a clearance of 18 feet over the ramp and at least 15 feet under SR 520.

The alignment is also designed to clear the future nickel project as it is currently proposed. The assumption is that the nickel project will be in place at the time of construction of the HCT project. The existing on ramp will be at grade and would require crossing gates. Should WSDOT not permit a crossing of the on- and off-ramps or any other constraint that would preclude this alignment, an alternative “fly-over” alignment is suggested.
SE Redmond Alignment Segment, cont.

Alternative Fly-Over Alignment
Provided as an additional option for consideration, this segment extends from Marymoor Park at SE 70th over the SR520 off-ramp, roadway, and Bear Creek touching down in the BNSF right-of-way. The alignment:
- Should be studied further to develop horizontal and vertical engineering standards for HCT rail and rail convertible modes.
- Would be grade separated over the SR 520 off-ramp, SR 520, SR 520 on-ramp and Bear Creek ramp to SR 520
- Travels at grade within the existing BNSF right-of-way west Bear Creek.

- Would not impact the planned pedestrian/bicycle recreation pathway within the BNSF right-of-way

This option would not be preferred due to:
- The station platform not centrally located within the Marymoor Business Park
- Poor visibility and lack of centrally located structured park and ride facilities
- Long distance between overflow parking and station platform
- Potential greater impacts to Marymoor Park right-of-way
- Potential cost of elevated alignment
Downtown Alignment Segment

This segment extends from 170th SE along the BNSF and 76th Street rights-of-way then turns north along a proposed extension of 161st Street across Redmond Way and terminates at 83rd.

BNSF and 76th Street Rights-of-Way

This segment would:
- Be constructed mainly within the 76th Street right-of-way
- Require a two-way “boulevard” reconfiguration of 76th westbound traffic lanes
- Require parking to be constructed along the northerly edge of the BNSF right-of-way

It is imperative for the success and safety of the HCT, Park Block amenity that adjacent buildings are built to the BNSF and 76th ROW and that windows and primary entries are oriented to the street, see section at right.

This building orientation would therefore ensure
- Safety, with “eyes” to the street and greenspace
- Successful retail, office or commercial uses
- Pedestrian oriented development
Downtown Alignment Segment, cont.

161st Ave NE Right-of-Way

This segment would:

- Require 161st Ave NE to be extended between Redmond Way and the Bear Creek Parkway. HCT would be accommodated within this new alignment.
- Require expansion of the right-of-way along 161st north of Redmond Way.

*Note*- The concept represented in the graphic below does not accurately reflect the alignments of the 161st Ave NE/Bear Creek Parkway Extensions, but the HCT alignment could still be implemented generally as shown.
Travel Time

Suggestions for Further Study

The HCT would operate in-street between the park and ride and the terminus station. It would have a top speed of 30 mph. However, in most cases the HCT would operate below that speed reducing the average speed to approximately 19 mph. Dwell time is assumed to be 20 seconds at Redmond Square station. The following table outlines approximate travel times between the park and ride station, Redmond Square station and the terminus station:

Further development of the alignment and the type of technology used for this segment will result in a more accurate travel time.

<table>
<thead>
<tr>
<th>From Station</th>
<th>To station</th>
<th>Distance</th>
<th>Cumulative Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Park and Ride</td>
<td>Redmond SQ</td>
<td>4500 feet</td>
<td>1.83 min</td>
</tr>
<tr>
<td>Redmond SQ</td>
<td>Terminus</td>
<td>2600 feet</td>
<td>4.13 min (dwell)</td>
</tr>
</tbody>
</table>

Approximate Travel Times between the SE Redmond Park and Ride, the Downtown and the Terminus Stations
Station Platforms
Overview

Three HCT stations are proposed for the SR520 Corridor:
- SE Redmond Park and Ride Station
- Downtown Station
- Terminus Station

The stations are located:
- To maximize potential development opportunities that will, in turn, provide additional transit ridership above existing projections modeled by PSRC and Sound Transit
- To meet the needs of a variety of future transit users
- Within close proximity to existing retail, office, housing and employment centers
- At locations that support and contribute to the use of the existing and planned transit infrastructure
SE Redmond Park and Ride Station

This station area would be located along NE 70th Street south of the existing SR520 off-ramp. The station is intended to serve as the HCT primary park-and-ride facility in Redmond. The station would:

- Require acquisition of private property north of NE 70th Street for park-and-ride facilities
- Require acquisition of a portion private property from the NE 70th Street cul de sac to Marymoor Park for the HCT alignment.
- Require acquisition of a portion private property at the realigned intersection of NE 70th and 176th Ave NE.
- Be constructed at grade
- Include an adjacent park-and-ride structure that could accommodate 1,100 cars on four levels
- Include an “overflow surface” parking lot

*This concept represents challenges because it is within the WSDOT limited access right of way. There is potential to work with WSDOT to waive this restriction in order to maximize the amount of commuter parking.*

The park and ride station maximizes:

- Good visibility to SR 520/SR 202
- Ease of access from SR 202 and parking facilities
- Its central located to future R & D development and other land uses in the area
**Downtown Station**

The downtown station is located between 164th Street and 166th Street. The platform would be located partially on the existing 76th Street right-of-way. The station would be:

- Be constructed at grade
- Include pedestrian and bicycle facilities. Connections to bicycle and pedestrian trails within the BNSF right-of-way would provide access to regional and local systems
- Require acquisition of BNSF ROW and dedication of a portion of it to accommodate expansion of the 76th St right of way from 60’ to 62’.

The station location is central to downtown employment, shopping and services and is:

- Adjacent to and within walking distance of major retail and employment uses in the Redmond Town Center development
- Near existing uses and potential redevelopment parcels along Cleveland Street
- Within walking distance of future high density residential, and office uses
- Located at the heart of the proposed public square
Terminus Station

The terminus station is located along 161st Ave NE between Redmond Way and 83rd. The station platform would:

- Be the terminus of the HCT alignment
- Be constructed at grade
- Require expansion of the existing ROW to ‘120-0”
- Adjacent to the King County Metro Bus Transit Station where transfer between transit modes could be easily facilitated

The station location anchors existing public facilities and high density residential to future housing and office development that is:

- Close to future high density housing sites extending west of 161st to the Sammamish River Trail
- Within easy walking distance of existing high-density residential development
- Within easy walking distance of City Hall, the library and other public facilities
- Within walking distance of commercial uses, including a QFC grocery store and similar retail uses
Transit-Oriented Development
Overview

Transit-oriented development (TOD) concepts were created for redevelopment areas within Downtown and Southeast Redmond study area. The concepts:

- Establish development scenarios that respond to existing and future market conditions
- Identified a land use framework for each station area and were used to calculate potential ridership generated by the future development
- Test and evaluate comprehensive plan and transportation management adopted policies and regulations with regard to the TOD concepts

The TOD concepts identified for each station platform area were developed within approximately a 1/4-mile radius. Station area TOD's were provided for:

- SE Redmond Station
- Downtown Station
- Terminus Station

An overall fundamental concept and a “built-out capacity” diagram was prepared knitting together the specific TOD concepts within each station area. Land-use and transportation “framework” diagrams are provided for the overall concept. Finally, a market assessment of each TOD concept is provided as a “real-world” check.
The Fundamental Concept

The fundamental concept knits together the specific TOD station area concepts and reflects reality based market projections. The fundamental concept:

- Is consistent with the Comprehensive Plan
- Maximizes housing development opportunities
- Provides a viable retail “main street” along Cleveland Street
- Establishes a network of open spaces that will serve as a focus for development
- Suggests additional roadway infrastructure to serve new development
- Identifies a range of new employment opportunity sites
- Identifies locations for new parking to serve all new uses

Station Area Districts

The alignment includes three station area districts that support distinct development patterns.

Employment District
- High Density Research and Development Precinct
- Central Public Open Space
- Park and Ride Facilities
- Station Platform

Downtown Retail District
- Retail “Main Street” along Cleveland St
- New Retail Anchors at 164th Ave NE and 166th Ave NE
- Redmond Square, the City’s “Living Room”
- A “neighborhood center”
- Station Platform at Square

Multi-Modal and Housing District
- Transit Center at NE 83rd
- Park & Ride
- Station Platform
- Public Park
- Housing
- Employment

Fundamental Concept Diagram
The TOD Framework

The transit-oriented development framework provides a strategy for development of underutilized parcels locations coupled with improved access to existing transit-supportive uses that will result in increased transit ridership.

The framework also provides a “future snapshot” of development capacity that illustrates what has been described in the City’s Comprehensive and Transportation Management Plans.

New Transit-Oriented Development Capacity Summary At Build-out

- New Retail: 176,300 SF
- Commercial: 381,675 SF
- R&D: 1,204,000 SF
- Office: 408,000 SF
- Housing: 4,683 dwellings
- Parking for HCT P & R: 1,300 spaces
- Parking for Development: 11,573 spaces
- Public Open Space: 39.92 AC

TOD Capacity Diagram

Redmond High Capacity Transit Technical Report
The SE Redmond Employment District Station Area represents the opportunity for creation of a state-of-the-art research and development (R & D) office precinct organized around a public open space that supports regional employment and access to park and ride facilities.

The design of this district provides for:

- A high density employment district with good regional access close to Downtown
- A centrally located station to R & D precinct with good visibility and access to park and ride facilities
- An employment campus served by centrally located parking structures

The transit-oriented development concept, and a three-dimensional representation of the station area are identified below and on the following page.
SE Redmond Employment District - Building Massing

A three-dimensional representation of the preferred HCT alignment, SE Redmond station location and TOD concept along with an aerial view of existing conditions is located below and on the right.
Downtown Retail District

The Downtown Retail District Station area establishes the creation of the “heart” of Downtown Redmond. Central to this concept are:

- “Redmond Square,” the City’s “living room”
- Station platform at the square
- Retail “main street” along Cleveland and anchor retail at 164th Ave NE and 166th Ave NE
- Strategically-located retail parking between anchor sites
- BNSF “park block” amenity

The design of this district provides:

- Good access along 164th and 166th to existing neighborhoods
- An ideal retail configuration along Cleveland St of approximately a quarter mile

The Redmond Square that organizes new retail development to the north and the existing Town Center to the south

The transit-oriented development concept, and a three-dimensional representation of the station area are identified below and on the following page.
Downtown Retail District - Building Massing

A three-dimensional representation of the preferred HCT alignment, Downtown Station location, and TOD concept along with an aerial view of existing conditions is located below and on the right.
Multi-Modal and Housing District

The Terminus Station area would serve as the multi-modal center of Redmond integrating bus and high-capacity transit in close proximity to City Hall, the King County Metro multi-modal TOD development, the existing skate park and the new transit center. Elements of this station area include:

- Terminus station platform at 161st and 83rd
- New public park blocks
- New housing
- New office
- Commercial corridor along Redmond Way

The design of this district provides for:

- High density housing organized around interconnecting park block amenities

- Access to regional trails and open space

The transit-oriented development concept, and a three-dimensional representation of the station area are identified below and on the following page.
Multi-Modal and Housing District - Building Massing

A three-dimensional representation of the preferred HCT alignment, Terminus station location and TOD concept along with an aerial view of existing conditions is located below and on the right.
Market Assessment

Office and Employment Comparison

The market assessment began with a comparison of the commercial and office space in the plan to employment projections from PSRC for the transportation analysis zones in Redmond. The plan shows a potential build-out of approximately 1.99 million square feet in this category. To compare this with projections, we used employment change in Redmond from 2010 to 2030. The change in employment in FIRES (financial insurance, real estate, services) is projected to be roughly 6,650 employees. At 300 gross square feet per employee this would result in a need for 1.99 million square feet of space.

If the purpose of the plan is to illustrate that it is possible for the area to fulfill area employment space needs for the future, it does so. Should market conditions change in the future, it will be possible, for developers to build less than is shown or to phase development over time. The current plan supports future projections and is not proposing an unreasonable goal for the city to achieve given its importance as a regional employment center. If one looks at expected change in the four county region from 2010 to 2030, the employment change in FIRES is approximately 289,000 employees, so the Redmond projected capture is projected to be only 2.4 percent. If Redmond is successful at creating the TOD development proposed in the plan, it will have a unique environment to offer employers, making a modest capture of the space market reasonable.

Housing Comparison

For housing, the market assessment was supplemented by a study performed by Suzanne Britsch of New Home Trends for Redmond’s two centers. The study indicates that from 2005 to 2030 the potential mid range estimate for new housing demand in the city of Redmond could be from 9,000 units to as high as 13,000.

Downtown Redmond could readily accommodate a potential demand for new housing of up to 5000 units, assuming an average of 200 new units per year over the next 25 years. The housing component in the plan fits well with future projections and current trends. As one of the remaining areas available to help meet higher density future housing need in Redmond, the area in the TOD plan is proposed to have 4,683 new units. Given projections this is well within a feasible range for the future.

The Downtown is likely to attract the Empty Nesters and more affluent singles from Generation Y. These people will be attracted to the services, walkability and cultural aspects of Downtown Redmond, and will be interested in a variety of housing types, including condominiums, townhomes, all age rentals and age restricted rentals.

Retail Comparison

The plan proposes 176,300 square feet of new retail shops. To understand the viability of proposed retail we compared the income produced by proposed housing with the amount of retail space proposed. Currently, average income in Redmond is estimated by ESRI Business Information Services at approximately $98,000 per household and is expected to rise to an average of approximately $120,000 by 2010. If one assumes that new households will be at current average incomes, given the proposed 4,683 units, this would result in aggregate income for the area at build-out of $459 million.

The consumer spending that would result at 29 percent of income would be approximately $133 million for the households in the plan. At sales of $350 per square foot, this spending could theoretically support approximately 380,000 square feet of retail space. The retail proposed is thus 46% percent of future demand produced by the TOD plan alone.

Summary

In summary, the plan as proposed seems to be well balanced between capacity, future projections for growth and ability of the uses to be sustained by income and household trends. It will also offer an environment for living and working that is unique to the eastside real estate market that will enhance its market viability.
Transit-Oriented Development-Land-Use Framework
Overview

A Mix of Uses

The land-use framework promotes a mix of uses, both vertically and horizontally. For example, mixed-use buildings with housing or office on upper floors support the retail uses on their ground floors.

When parcels contain a vertical mix of uses, the color shown on the land-use framework typically indicates the predominate use.

Development should be pedestrian-friendly, compatible with existing buildings’ scale, massing and materials and employ sustainable practices for construction and habitation.
Retail and Commercial

Downtown market demand indicates significant retail development potential, within the study area. The demand warrants a three-pronged retail development strategy defining three distinct types of retail uses:

- **Retail Core** – including primary retail uses, new anchors and a retail parking structure along Cleveland.
- **Neighborhood Center** – including a grocery store and neighborhood serving retail.
- **Commercial Corridor** – including service, commercial, and small office uses along Redmond Way.

![Downtown Retail and Commercial Concept](image)

![Downtown Retail and Commercial Diagram](image)
Primary Retail

Primary retail located along Cleveland Street offers the opportunity to link the Old Town retail along Leary Way with the Redmond Town Center forming a “true center” for downtown retail. The primary retail:

- Supports up to 176,300 SF of new retail
- Includes retail anchors sites at 164th Avenue NE and 166th Avenue NE
- Is organized around the New Redmond Square and Station Platform
- Creates a retail loop connecting Old Town retail to the Redmond Town Center
Primary Retail Parking

The success of retail is dependent on a minimum number of parking spaces specifically linked to it. Therefore retail parking has to be strategically located and provide:

- Convenient access to the primary retail street.
- Active uses at the ground floor, including corner entries to shops.
- Safe, well-lighted and well maintained
- “Parking-friendly” auto circulation- a floor plate with minimum 240’ width providing four parking bays allowing easy one-way auto travel.

Primary Retail Parking Framework Diagram
Commercial

Redmond Way, a heavily traveled arterial street, serves as the commercial corridor supporting service, commercial retail and small office uses:
Office/Research and Development

This framework identifies new employment sites throughout the three station areas. It accommodates demand for an additional 1.6 million square feet of office/research and development.
The housing framework meets the current and future demands of downtown Redmond and supports the increase ridership potential to support HCT transit. The housing includes:

- A vertical mix of housing over commercial and/or parking
- Park blocks as housing amenities
- Transit located within walking distance
- Parking on-site
Squares/Open Space

The parks and open spaces framework describes a collection of outdoor areas that:

- Include public and private areas
- Are sited as a focus of activity and development, not leftover space
- Are adaptable for a variety of activities, both active and passive
- Provide off-street pedestrian and bike access to downtown attractors and regional trail routes
- Provide a green linkage to adjacent neighborhoods.
Parking

The parking framework public, private and transit specific parking sites throughout downtown Redmond. This framework “parks out” all uses in each of the TOD station area locations that:

- Are conveniently located to transit, retail and employment uses
- Provide direct access to housing
- Meets minimum requirements for parking each of the land uses in the downtown and SE Redmond.

Parking Framework Diagram

Parking 12,873 Spaces
Transit-Oriented Development - Transportation Framework

Crandall Arambula PC
January, 2006
Much of downtown Redmond is in the public realm – its streets and sidewalks. The high-quality streetscapes, open spaces and trails make downtown a memorable destination creating an environment that attracts investment and supports a diversity of development.

**A Coherent System**

The transportation framework establishes a coherent, pedestrian-friendly environment, supporting a variety of modes of travel. The framework address three modes of transportation:

1) Auto/truck
2) Pedestrian
3) Shared pedestrian/bike

**Auto/Truck**

The framework recognizes that autos and trucks will be the primary modes of access into and through downtown. Proposed improvements, include:

- New Streets- not currently in the City plans
- Planned Streets- included in City plans
- Realigned Streets- not currently in the City plans

**Pedestrian**

Designing for the pedestrian is a fundamental characteristic for creating streets that support thriving downtowns. Proposed improvements include:

- New sidewalks
- New signalized intersections and crosswalks

**Shared Pedestrian and Bike**

A shared pedestrian and bike path provides the opportunity to capitalize on open space improvements and create a recreational amenity in the downtown. Proposed improvements include:

- New shared ped/bike loop system
- New bike lanes

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**LEGEND:**

- New Streets
- Planned Streets
- Realigned Streets
- New Sidewalks
- Signalized Intersections
- Crosswalks
- HCT Stations
- New Open Space along Alignment
- Existing Open Space
- Shared Ped/bike Path
- Bike Lanes
- Existing/Planned Trail
**Auto and Truck**

Proposed components of the auto and truck diagram are described and identified below.

**Key Elements**

These include new, planned and realigned streets.

**New Streets**
- Provide access to new and existing development
- Improve circulation over existing auto dominated infrastructure
- Provides for the delivery of freight and goods to area businesses

**Planned Streets**
- Identified in the City’s Downtown Transportation Master Plan, and Bear Creek Parkway Extension Project

**Realigned Streets**
- Realignment of streets identified in the Downtown Transportation Master Plan to allow for HCT transit, updates to existing City plans and improved access to new and existing development
Pedestrian

Design for the Pedestrian

Streets and sidewalks make up more than 40 percent of the land area within most cities. Well-designed, pedestrian-friendly streets contribute to a successful and vibrant town. The pedestrian diagram focuses specifically on expanding and improving the pedestrian environment.

Key Elements

Retail Supportive Streetscape Improvements

- New sidewalks should be designed to support and improve retail viability on Cleveland Avenue and the intersecting streets of 164th and 166th linking neighborhoods to the Town Center. See fundamental streetscape requirements this page

- Along other streets minimum streetscape elements are indicated on the right

Signalized Intersections

- Are critical at the HCT alignment along NE 76th St. and the BNSF “Park Blocks” providing safety for pedestrians, bikes, autos and transit

- Improve pedestrian and auto connections north and south across Redmond Way and Cleveland Avenue

Crosswalks

- Should be located at all signalized intersections and along high pedestrian trafficked areas

- Should be designed in way that signals the “pedestrian as the priority”
**Shared Pedestrian/Bike Path**

The shared pedestrian and bike path elements create an identifiable pedestrian and bike corridor within the BNSF right-of-way and links to neighborhood loops downtown connecting with the City’s existing and planned bike- and pedestrian-walkway system. It will serve as an amenity for development and provide safe and convenient primary off-street recreational access to downtown and area attractions.

**A New Recreation Corridor**
The BNSF “park block” off-street design concept accommodates the following users:

- Pedestrians with infant strollers
- Low-speed bicyclists, especially families and children
- Rollerbladers and rollerskaters
- Joggers

The new pedestrian loop would:

- Be constructed within existing the BNSF right-of-way and link to the Redmond Square, Sammamish River and regional trail routes

**Neighborhood Loops**

Additional off-street neighborhood loops provide:

- Off-street ped/bike routes
- Bike lanes in specific locations
- Connection to and from neighborhoods to the BNSF off-street path, new open spaces, existing/planned trails, the transit center and downtown attractions

Design of the BNSF off-street path is illustrated below.

![Shared Pedestrian/ Bike Path Diagram](image-url)