APPENDIX N: VISUAL QUALITY TECHNICAL MEMORANDUM

I-405, NE 8th Street to SR 520 Improvement Project

INTERSTATE 405 Corridor Program
Congestion Relief & Bus Rapid Transit Projects

VISUAL QUALITY TECHNICAL MEMORANDUM

April 2008

Washington State Department of Transportation

U.S. Department of Transportation
Federal Highway Administration

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Summary

The Washington State Department of Transportation (WSDOT) is proposing to construct the Interstate 405 (I-405), NE 8th Street to State Route 520 (SR 520) Improvement Project to improve safety and reduce congestion in the vicinity of the I-405 and SR 520 interchange in the city of Bellevue. This report evaluates two alternatives, the Build Alternative and the No Build Alternative.

Purpose of this Technical Memorandum

The purpose of this technical memorandum is to assess the visual effects of the project. Visual perception is an important component of environmental quality that can be affected by transportation projects. Community acceptance of a project is often strongly influenced by the perceived visual effects of that project. For these reasons, WSDOT addresses changes to the visual environment during project development.

A visual effects assessment evaluates both positive and negative visual effects of proposed transportation facilities. Visual effects, including aesthetics, light, and glare, are assessed by evaluating the view that is seen from the freeway as well as the view looking toward the freeway. Visual effects are determined by identifying changes in the visual resources and then evaluating viewer responses to those changes. Visual effects are then considered, in conjunction with a broad range of environmental and socio-economic effects, in developing design concepts, determining avoidance and mitigation measures, and determining how to proceed with a proposed project.

Existing Conditions

The existing conditions surrounding the I-405 corridor in the study area range from moderately forested semi-urban to relatively densely developed, with mixed urban land uses. Terrain along the freeway corridor is generally flat. The general character of the SR 520 corridor is semi-urban development and moderately forested. Existing land use types along SR 520 in the study area east of the I-405 interchange include large-footprint industrial and commercial buildings to the south and mixed single- and multi-family neighborhoods to the north.

In general, topography, vegetation, and structures limit existing views of and from I-405 and SR 520 in the study area. With the exception of downtown Bellevue high-rise buildings, many neighboring residential areas do not have direct views of the project. Portions of the project can be seen primarily from cross streets or interchanges perpendicular to I-405 and SR 520 where screening is limited. The I-405 travel lanes are also visible from overpasses that link the commercial areas on both sides of this freeway corridor.

Project Effects

The proposed project will create temporary visual effects for highway users and neighbors during construction. Construction activities will reduce the visual quality in the study area due to the presence of construction equipment, materials, signs, and staging areas and removal of vegetation and soil disturbance. Temporary lighting may be used for nighttime construction of some project elements.

The project will permanently change visual quality for both freeway users (views from the road) and freeway neighbors (views toward the road). Overall, these changes are minor when compared to existing visual quality. Visual quality declines at six viewpoints, improves at two viewpoints, and stays the same at two viewpoints as a result of this project as discussed in Section 5, Potential Effects. The potential effects on visual quality result primarily from constructing the following project elements:

- Constructing the NE 10th Street on-ramp;
- Replacing the NE 12th Street overpass over I-405;
- Constructing grade-separated ramps along northbound I-405 and eastbound SR 520 within the study area;
- Relocating a noise barrier within the new right-of-way along northbound I-405; and
- Constructing retaining walls.

The proposed project will also create new sources of overhead lighting, shade, and shadowing in various portions of the study area. Continuous illumination will be installed along all new freeway on- and off-ramps throughout the study area. The new lighting will use fixtures that shield sideways glare. Vehicle headlights and glare on the new proposed on- and off-ramps will be additional sources of light and glare associated with the completed project.

The No Build Alternative would not affect visual quality as no structures would be replaced or noticeably modified.

Measures to Avoid or Minimize Effects

Where the local terrain and placement of light poles allow it, light and glare effects associated with nighttime construction activities will be reduced by shielding freeway lighting and using downcast lighting so that lighting sources will not be directly visible from the corridor neighbors. Visual effects will be further reduced by restoring areas as construction is completed (in stages) rather than waiting for the entire project to be completed.

The project is being planned, developed, and designed in accordance with applicable context-sensitive solutions (CSS) guidelines. These guidelines provide an approach that

incorporates community values while meeting local, regional, and national requirements for the safe, efficient, and effective movement of people and goods. CSS considers the elements of mobility, safety, environment, and aesthetics throughout the project. To adhere to these guidelines, the proposed project is being developed to fit its physical surroundings and preserve these elements.

To mitigate for potential adverse light and glare effects at Overlake Hospital Medical Center as a result of vehicle headlights on the new NE 10th Street bridge overcrossing and on-ramp, WSDOT proposes to increase the height of the barrier (protective wall) along the NE 10th Street on-ramp from 32 to 42 inches to further shield the Overlake campus from vehicle headlights.

Unavoidable Adverse Effects

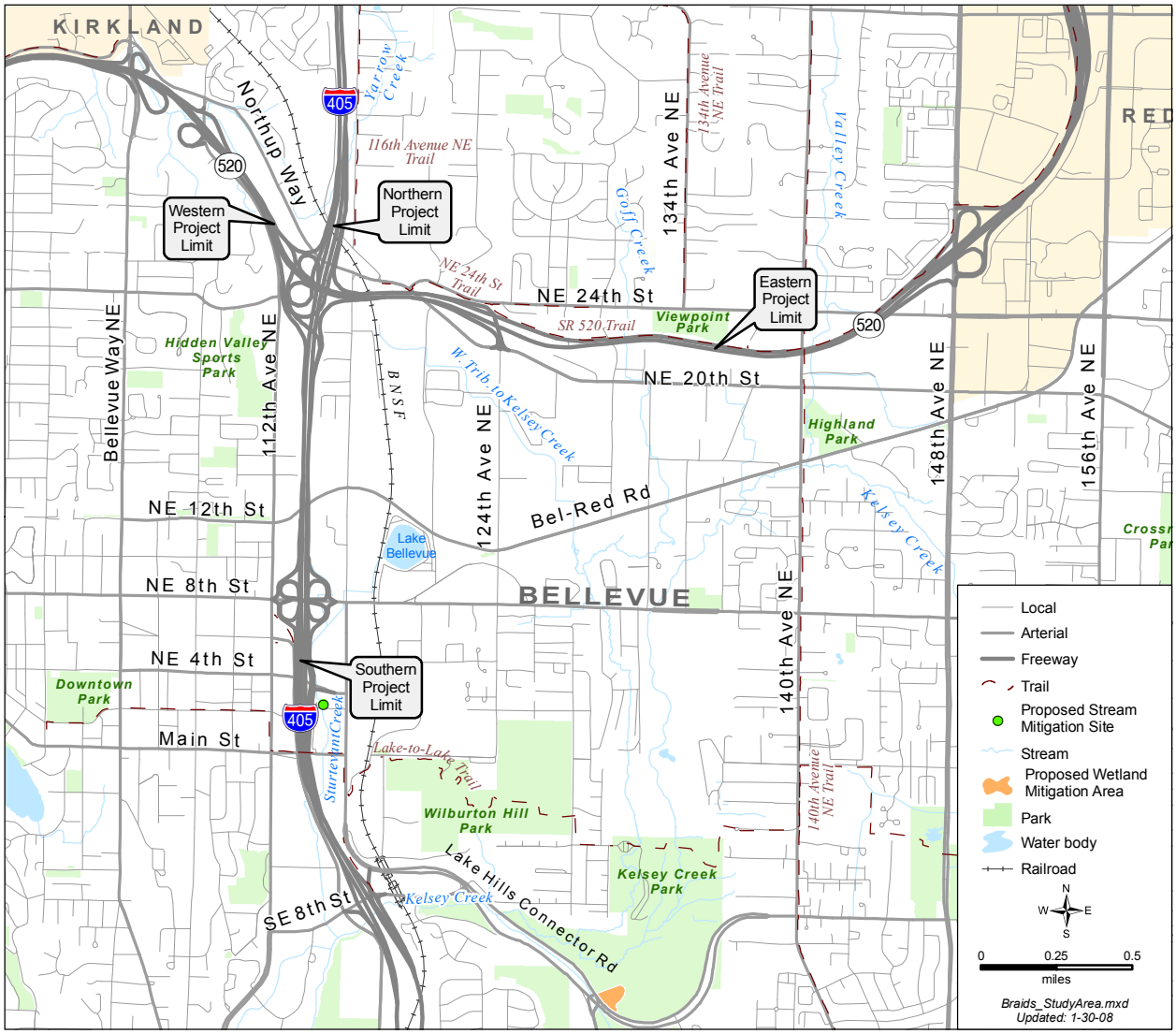
The proposed Build Alternative will add some raised structures in the project's study area, including new ramps, a noise barrier, and retaining walls. Construction activities will clear vegetation within the right-of-way that currently provides a buffer between the freeway and existing properties. All of these activities create changes in the visual resources, primarily within the bounds of the right-of-way. Changes to visual quality for freeway neighbors with views toward the facilities will be minor to negligible. Changes to visual quality for freeway users with views from SR 520 will be negligible. Freeway users with views from I-405 will experience low adverse effects to visual quality due primarily to the construction of elevated ramps` and removal of trees along the roadside.

Project Description

WSDOT is proposing to construct the I-405, NE 8th Street to SR 520 Improvement Project to improve safety and reduce congestion in the vicinity of the I-405 and SR 520 interchange within the city of Bellevue. As shown in Exhibit 1, the project extends approximately 1.5 miles north along I-405, from south of NE 8th Street to the SR 520 interchange, and approximately 1.6 miles east along SR 520, from the I-405 interchange to east of 134th Avenue NE.

The improvements will benefit the public by reducing congestion for the public and freight vehicles, improving safety, improving access and circulation to and from local

Exhibit 1: Project Location and Vicinity



streets, and providing opportunities for environmental improvements.

This technical memorandum analyzes two alternatives, the Build Alternative and the No Build Alternative. The proposed roadway improvements for the Build Alternative, from south to north on I-405, and west to east on SR 520, are described below.

Build Alternative

Northbound I-405 to Eastbound SR 520 Improvements

- Reconfigure the existing northbound NE 4th Street on-ramp to become an auxiliary lane that exits to SR 520 and northbound I-405 as part of a two-lane exit ramp.
- Reconstruct portions of the NE 8th Street on- and off-ramps to northbound I-405. The on-ramp will be reconstructed at a lower grade than the I-405 mainline.
- Rebuild the NE 12th Street bridge crossing over I-405 to accommodate the new ramps.
- Construct a northbound on-ramp to SR 520 from a new NE 10th Street bridge crossing; the bridge crossing will be constructed as part of a separate project prior to constructing the on-ramp.
- Construct grade-separated ramps to divide traffic entering northbound I-405 from NE 8th Street and traffic exiting I-405 to SR 520.
- Construct grade-separated ramps to divide traffic entering eastbound SR 520 from northbound I-405 and traffic exiting eastbound SR 520 to 124th Avenue NE.
- Shift eastbound SR 520 mainline travel lanes toward the median.
- Extend the ramp from northbound I-405 to eastbound SR 520 on a collector-distributor system through the 124th Avenue NE interchange to merge with the existing eastbound SR 520 mainline just east of 134th Avenue NE.
- Reconstruct the 124th Avenue NE interchange off-ramp.
- Relocate an existing noise barrier. The new barrier will be approximately 1,585 feet long and 20 feet high.
- Construct several retaining walls needed to allow for the proposed widening of I-405.

SR 520 to Southbound I-405 Improvements

- Reconfigure the ramps from SR 520 to southbound I-405 to improve traffic flow. The westbound SR 520 to southbound I-405 ramp will become a dedicated auxiliary lane, and on-ramp traffic will no longer be required to immediately merge with

southbound I-405 mainline traffic. The eastbound SR 520 to southbound I-405 ramp will merge with the dedicated auxiliary lane.

Southbound I-405 to SR 520 Improvements

- Realign the southbound I-405 to eastbound SR 520 loop ramp.
- Realign eastbound SR 520 to match the proposed improvements.

Other Improvements

Other improvements proposed along the I-405 and SR 520 corridors within the project limits include retaining walls, relocating an existing noise barrier, stormwater culvert improvements, and stormwater management system improvements. Adverse effects on wetlands and their buffers will be compensated for at a wetland mitigation site located within the boundaries of Kelsey Creek Park southeast of the southern project limits. Mitigation at this site was approved as part of the I-405 Bellevue Nickel Improvement Project. Mitigation for unavoidable effects on an unnamed tributary to Sturtevant Creek will be in-kind and will be located within WSDOT right-of-way on the east side of I-405 and south of NE 4th Street. The location of the wetland and stream mitigation site is shown in Exhibit 1.

Construction Staging

Construction funding is currently available for only some of the proposed improvements in the Build Alternative. Consequently, the project will be constructed in stages. The funded first stage will include the northbound I-405 improvements, including the braided ramps, the NE 12th Street bridge reconstruction, and the northbound NE 10th Street on-ramp. Additionally, one of the three proposed collector-distributor lanes from northbound I-405 to eastbound SR 520 will be constructed. This collector-distributor lane will cross over the existing NE 124th Street on-ramp before merging with SR 520. Construction of these funded improvements is scheduled to begin in 2009 and will be completed in approximately 3 years.

The unfunded project improvements include the remaining two lanes of the three-lane collector-distributor system, improvements from southbound I-405 to the eastbound SR 520 collector-distributor, and the improvements from eastbound and westbound SR 520 to southbound I-405. Construction of these remaining improvements depends on when project funding becomes available.

No Build Alternative

The No Build Alternative assumes the new NE 10th Street bridge across I-405 that is being constructed as part of another project will be in place. The No Build Alternative assumes that only routine activities such as road maintenance, repair, and minor safety

improvements would take place over the next 20 years. The No Build Alternative does not include improvements that would increase roadway capacity, reduce congestion, or improve safety on I-405 or SR 520. For these reasons, it does not satisfy the project's purpose—to reduce congestion created by weaving traffic on I-405 and SR 520.

The No Build Alternative has been evaluated in this technical memorandum to establish a reference point for comparing the effects associated with the Build Alternative.

Existing Conditions

Study Area

For the I-405, NE 8th Street to SR 520 Improvement Project, the project team used the geographic information system (GIS) to define the boundaries of the visual assessment area and to evaluate what parts of the study area are potentially visible from the project and what parts of the project are visible from the surrounding areas. GIS can help define a "topographic viewshed," or the part of the study area that is visible based solely on topography (Exhibit 2). The topographic viewshed is defined as areas within a line-of-sight looking both toward and away from I-405 and SR 520 without regard for the screening effects of vegetation and structures. A viewshed may be larger or smaller than the study area limits (defined for the proposed project as one-quarter mile on either side of the roadway corridor within the project limits) because geography and built and natural features determine what can and cannot be seen. Exhibit 2 illustrates the topographic viewshed for the proposed project.

For this project, the topographic viewshed is larger than the study area because I-405 and SR 520 can be seen from locations beyond the limits of the study area in some places. The viewshed was refined to reflect a range of high-visibility and low-visibility areas as seen in Exhibit 2. The areas determined to be visible to and from I-405 and SR 520, as shown in Exhibit 2, are based solely on topography and do not take into account how vegetation and structures can screen views.

Next, starting with the GIS viewshed analysis, the project team conducted a field reconnaissance to identify where existing vegetation and structures screened or blocked views looking toward and away from the study area. Then the project team selected the key views to be evaluated for visual quality. Representative key views are described below in the Visual Quality of the Study Area section.

Visual Character of the Study Area

The WSDOT *Roadside Classification Plan*[1] (RCP) serves as the basis for roadside planning, design, construction, and maintenance activities. The RCP classifies the portion of I-405 between I-90 and SR 520 as "urban" and "semiurban" (see Glossary for definitions). The urban section includes the southern portion of the study area from NE 4th Street to approximately 1,500 feet south of the I-405/SR 520 interchange, and the semiurban section from this point north through the interchange.

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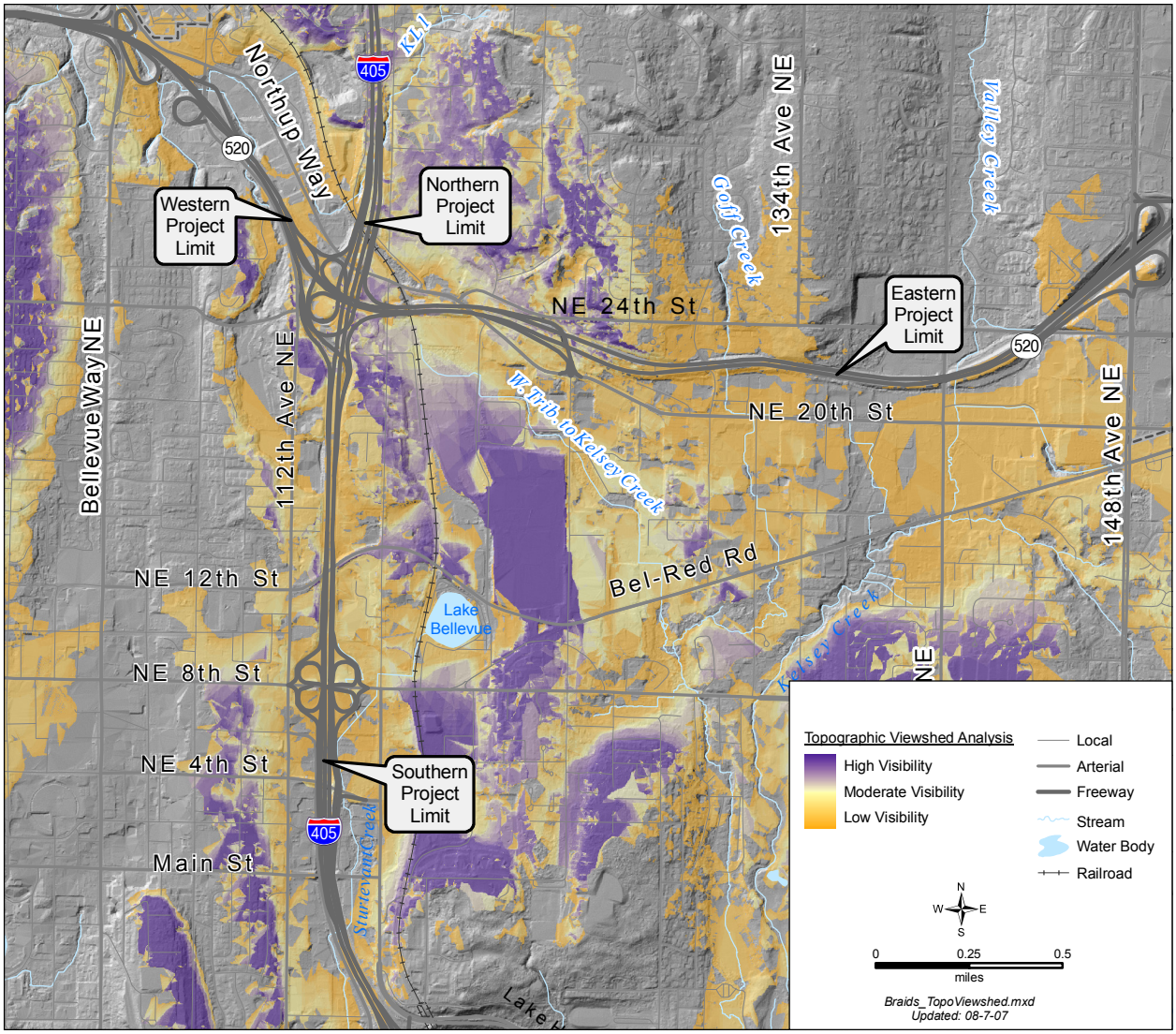
[1] *WSDOT, 1996.*

Exhibit 2: Topographic Viewshed



The general character of the landscape along the SR 520 corridor is semi-urban. However, the RCP classifies SR 520 from the I-405/SR 520 interchange to the eastern project limits as rural.

Under the 1965 Highway Beautification Act of 1965, WSDOT has to replace any properties purchased with federal funds that were designated for beautification and/or landscape preservation along highway corridors if they are converted to highway use. Conversion of any portion of property specifically designated for beautification and/or landscape preservation to a roadway use would require that the converted portion of

property be replaced at a 1:1 ratio. Based on a review of historic right-of-way plans for I-405 and SR 520, there are no such properties designated under the 1965 Highway Beautification Act in the study area.

In general, topography, vegetation, and structures limit existing views of and from I-405 and SR 520 in the study area. With the exception of downtown Bellevue high-rise buildings, many neighboring residential areas do not have direct views of the project. Portions of the project can be seen primarily from cross streets or interchanges perpendicular to I-405 and SR 520 where screening is limited. The I-405 travel lanes are also visible from overpasses that link the commercial areas on both sides of this freeway corridor. These overpasses are NE 4th Street, NE 8th Street, and NE 12th Street, as well as a bus ramp at NE 6th Street.

The *I-405 Visual Resources Expertise Report*[2] prepared for the *I-405 Corridor Program EIS*[3] identified landscape character units along the I-405 Corridor. Landscape character units in the project's study area are the Bellevue and Overlake units, as shown in Exhibit 3. The Bellevue landscape unit is defined as a generally urban, developed area with mid- and high-rise buildings. The Overlake landscape unit is defined by urban and suburban development, including commercial strip development.

The project's eastern limit extends beyond the landscape unit boundaries identified in the *I-405 Visual Resources Expertise Report*. Therefore, for purposes of inventorying existing visual character for this project, the study area was divided into two major geographic sections, one along I-405 between the southern and northern project limits and the other along SR 520 between the western and eastern project limits (see Exhibit 3).

I-405 Project Section

Along the I-405 project section between NE 4th Street and NE 12th Street, the freeway passes through downtown Bellevue. This area is predominantly urban commercial on both sides of the corridor and the freeway is generally level with the surrounding area. Most properties along this section of the I-405 corridor are developed up to the freeway right-of-way. Vegetation within the right-of-way provides some visual screening for the neighboring buildings.

This section of I-405 includes expansive territorial views of the downtown Bellevue skyline west of the I-405 corridor. The tall office and mixed-use commercial and residential buildings are a dominant visual feature; the taller buildings have views of

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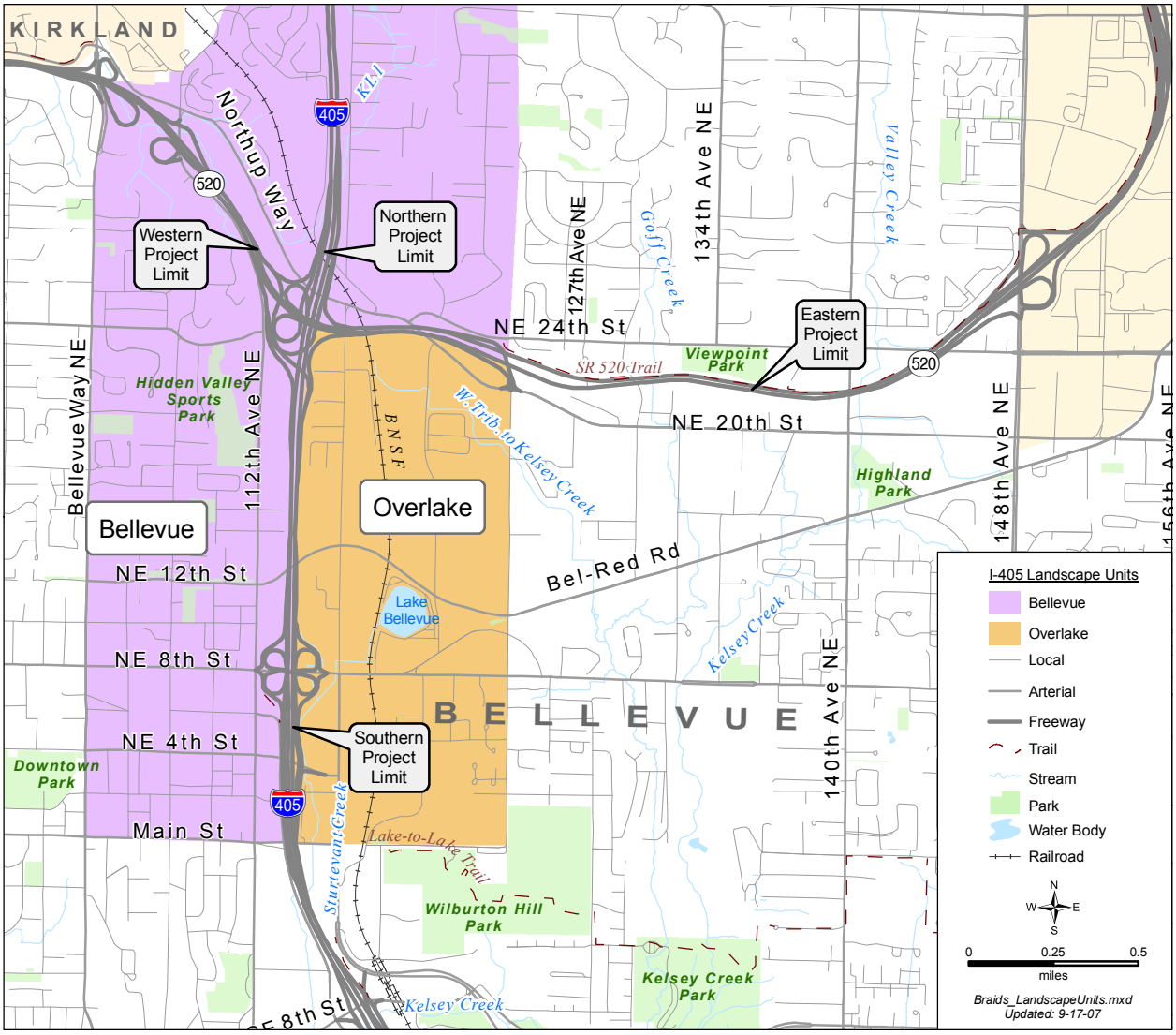
[2] *WSDOT, 2001a.*

[3] *WSDOT, 2001b.*

Exhibit 3: I-405 Landscape Character Units and I-405, NE 8th Street to SR 520 Improvement Project Sections



and are visible from I-405. Pockets of mature evergreen and deciduous trees, both natural and ornamental, soften views of the built environment.

East of the I-405 corridor there are views of local ridgelines and vegetation. In this area, there is a mix of low- to mid-rise commercial, mostly multi-family residential, and public facility uses.

Moving north of the NE 12th Street Overpass along I-405, the area becomes noticeably less urban in character, and is dominated by mature evergreen trees that frame both sides of the I-405 corridor and screen surrounding commercial and residential development.

Further north, the visual character changes in the vicinity of the I-405/SR 520 interchange. Approaching the interchange, the view is dominated by the eastbound SR 520 to northbound I-405 flyover. Views are more open to the west and east as I-405 crosses over the SR 520 corridor, providing a superior viewer position from this portion of the highway.

SR 520 Project Section

Development along SR 520 west of I-405 is dominated by large-footprint, mid-rise commercial buildings surrounded by surface parking lots. The highway passes through a topographic low area and the commercial areas slope toward the highway (viewer position is superior for views toward and inferior for views from SR 520). Although partially screened by large, mature evergreen trees and shrubs, these office buildings have clear views of and are visible from SR 520 and the interchange at I-405. In addition to commercial buildings, small areas of residential use are located south of the freeway. In this area, a noise barrier extends along the south right-of-way boundary of eastbound SR 520 for approximately 2,000 feet immediately west of the I-405 interchange, shielding nearby commercial and residential development from the freeway.

Development along SR 520 east of I-405 is diverse and continuous, including moderate- to large-footprint, low-rise industrial and commercial buildings; dense mixed single- and multi-family neighborhoods; and small- to moderate-sized retail centers along arterial streets. Most of the commercial and retail establishments have their own parking lots. Residential development is almost exclusively located north of SR 520, while south of the corridor is primarily commercial development.

East of I-405, views from SR 520 extend south over the commercial district to the horizon. SR 520 is not generally visible from the commercial district south of the corridor because the district is below the grade of the roadway, and buildings and street trees block views.

North of SR 520, where there are residential areas such as the Bridle Trails neighborhood, trees screen some views to and from SR 520, such as in the area around Viewpoint Park. Several newer residential developments north and south of NE 24th Street have more direct views of the study area. These areas include single-family development on 127th Avenue NE south of NE 24th Street and the Boulders at Pikes Peak townhouse development north of NE 24th Street.

Visual Quality of the Study Area

Ten representative viewpoints were selected for the visual quality evaluation (see Appendix B). These viewpoints represent areas that would have the most visible change as a result of the proposed project and/or would affect a major or sensitive viewer group. Selected viewpoints were from readily accessible vantage points; viewpoints

from individual residences were not specifically addressed. The locations of viewpoints are shown in Exhibit 4. Six of these viewpoints represent views from I-405 and SR 520 (viewpoints F1 through F6) and four represent views toward I-405 and SR 520 and associated project components (e.g., NE 12th Street overpass, viewpoints T1 through T4).

Visual quality is a description of the quality of particular views of the visible environment in terms of vividness, intactness, and unity (see Methodology in Appendix A). Photographs of representative viewpoints looking from and toward I-405 and SR 520 are included in Appendix B. The viewpoints are described below in terms of their existing visual quality. A quantitative visual quality rating on a scale of 1 to 7, with 7 being the highest or most desirable, is given to each viewpoint according to the characteristics of vividness, intactness, and unity (see the Glossary and Appendix A, Methodology, for definitions). Exhibit C-1 (Appendix C) summarizes the visual quality rankings of representative views under existing conditions.

Representative Viewpoints From the Road

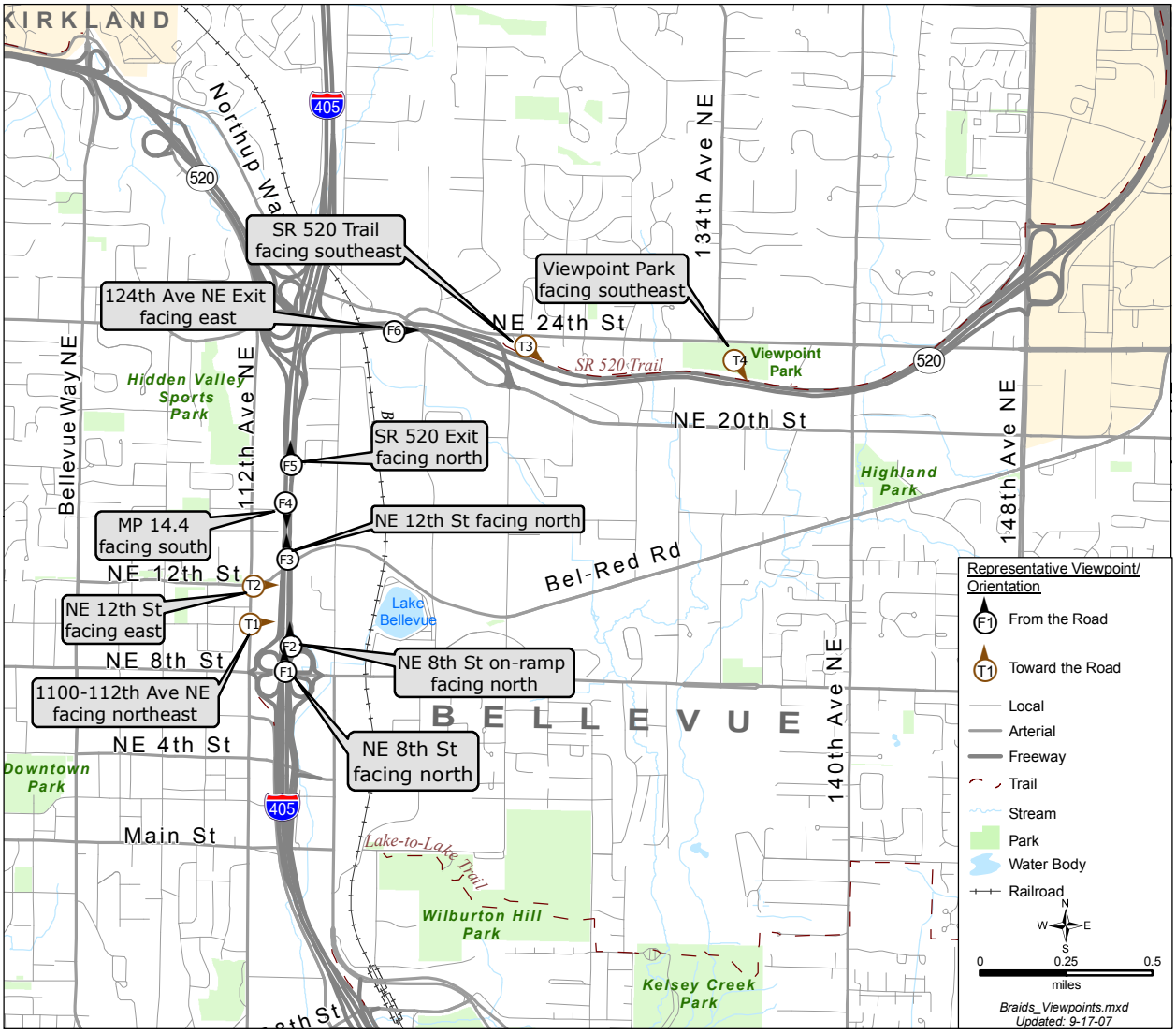
Viewpoint F1: I-405 at NE 8th Street (view to north)

Viewpoint F1 (see Appendix B, Exhibit B-1) looks north along the travel lanes of northbound I-405 near the NE 8th Street on-ramp. From Viewpoint F1, the road is a dominant feature in the foreground and middleground and is bordered by mid-rise commercial and institutional development on both sides of the freeway, partially screened by medium to large trees. The NE 12th Street overpass is visible in the middleground. Freeway signs encroach upon this view. Total visual quality is rated 2.3, low. The primary viewers are drivers and passengers.

Viewpoint F2: NE 8th Street On-ramp (view to north)

Viewpoint F2 (see Appendix B, Exhibit B-3) looks north along the far eastern travel lane of the NE 8th Street on-ramp as it merges onto northbound I-405. From Viewpoint F2, the road is a dominant feature in the foreground and middleground, and is bordered by mid-rise institutional development on the east side of the freeway, partially screened by medium to large trees. The NE 12th Street overpass is a dominant visible element in the middleground. Freeway signs and light poles encroach upon this view. Total visual quality is rated 1.9, low. The primary viewers are drivers and passengers.

Exhibit 4: Viewpoint Locations



Viewpoint F3: I-405 at NE 12th Street (view to north)

Viewpoint F3 (see Appendix B, Exhibit B-5) looks north along the northern travel lanes of I-405 near MP 14.2 past the NE 12th Street overpass. From Viewpoint F3, the road is a dominant feature in the foreground and middleground. The sides of the roadway are well vegetated with trees and shrubs. The roadway itself dominates the view; constructed elements, consisting of lighting fixtures and freeway signs in the

background, lack vividness and unity. Total visual quality is rated 2.5, low. The primary viewers are drivers and passengers.

Viewpoint F4: I-405 at MP 14.4 (view to south)

Viewpoint F4 (see Appendix B, Exhibit B-7) looks south along the southbound travel lanes of I-405 as it approaches the NE 12th Street overpass. From Viewpoint F4, the road is a dominant feature in the foreground and middleground, and is bordered by medium to large trees on both sides of the freeway. The mid-rise Overlake Hospital Medical Center is partially visible in the background along the east side of the freeway. The NE 12th Street overpass, framed by a distant ridgeline, is also visible in the background. Total visual quality is rated 2.5, low. The primary viewers are drivers and passengers.

Viewpoint F5: I-405 at SR 520 Exit (view to north)

Viewpoint F5 (see Appendix B, Exhibit B-9) looks north from the travel lanes of northbound I-405 as it approaches the SR 520 exit. The road is in the foreground and middleground. The sides of the roadway are well vegetated with trees and shrubs. A stepped concrete noise barrier is present on the east side of the exit off-ramp. The roadway itself dominates the view; constructed elements consist of lighting fixtures and freeway signs. The view has average intactness and unity. Total visual quality is rated 2.7, low. The primary viewers from this location are drivers and passengers.

Viewpoint F6: SR 520 at 124th Avenue NE Exit (view to east)

Viewpoint F6 (see Appendix B, Exhibit B-11) looks east from eastbound SR 520 approaching the 124th Avenue NE exit off-ramp. The south side of the roadway and parts of the median are well vegetated with trees that partially screen motorists from views of adjacent commercial development to the south and residential development to the north. Motorists traveling on westbound SR 520 are at a slightly elevated position, and are visible in the middleground of this view. Lighting fixtures, freeway signs, and electrical transmission towers encroach upon this view. Total visual quality is rated 2.7, low. The primary viewers are drivers and passengers.

Representative Viewpoints Toward the Road

Viewpoint T1: 1100 - 112th Avenue NE (view to northeast toward I-405)

Viewpoint T1 (see Appendix B, Exhibit B-13) looks northeast from a commercial building at 1100 - 112th Avenue NE adjacent to the western boundary of the I-405 right-of-way. I-405 and the adjacent Overlake Hospital Medical Center are in the foreground and middleground, with distant views of the Cascade Mountains and adjacent ridgelines in the background on clear days. The dominant land use is the mid-rise Overlake Hospital Medical Center adjacent to the I-405 northbound lanes. A portion of

the NE 12th Street overpass is visible in the middleground in the far left side of this view. Mature trees are visible east of the I-405 corridor. Total visual quality for this viewpoint is rated 3.7, slightly less than average. The primary viewers are employees and patrons of businesses in this office complex, including the Overlake Medical Center offices at 1120 - 112th Avenue NE.

Viewpoint T2: NE 12th Street (view to east)

Viewpoint T2 (see Appendix B, Exhibit B-15) looks east from the sidewalk adjacent to the eastbound travel lanes of NE 12th Street as it approaches the NE 12th Street overpass over I-405. The view is dominated by the road in the foreground. Overlake Hospital's Childbirth Center and Women's Hospital is visible on the east side of I-405 in the middleground of this view. Landscaped vegetation is present along both sides of the roadway and more mature trees are visible in the background. Lighting fixtures moderately encroach upon this view. Total visual quality rates as 3.0, moderately low. Primary viewers are pedestrians walking along NE 12th Street.

Viewpoint T3: SR 520 Trail (view to southeast toward SR 520)

Viewpoint T3 (see Appendix B, Exhibit B-17) looks southeast from the SR 520 bicycle/pedestrian trail near the NE 24th Street trailhead toward SR 520 (foreground). The trail, its surrounding chain-link fence, and SR 520 are the dominant human-made features in the foreground and middleground of this view. There is some tall, dense vegetation located adjacent to the trail and in the SR 520 median. A vegetated ridgeline of foothills is partially visible in the background. Views to Mount Rainier are afforded from this viewpoint on clear days, although they would be viewed from behind the chain-link fence. Total visual quality for this viewpoint is rated 3.2, moderately low. This location is primarily viewed by trail users (i.e., pedestrians and bicyclists).

Viewpoint T4: Viewpoint Park (view to southeast toward SR 520)

Viewpoint T4 (see Appendix B, Exhibit B-19) looks southeast from the log bench in Viewpoint Park. SR 520 is barely visible in the foreground (lower right corner of photograph). Low-rise commercial development in the Bel-Red neighborhood south of SR 520 is visible in the middleground. A vegetated ridgeline of foothills is visible in the background. Views to Mount Rainier are afforded from this viewpoint on clear days. The total visual quality from this viewpoint is rated 4.4, above average, mainly due to the heavy vegetation and background hills and mountain (landform). The primary viewers are park visitors.

Viewer Groups and Viewer Sensitivity

The viewer groups for the project's study area are the same as those in the *I-405 Corridor Program EIS*. The EIS categorized viewers as either "freeway users" (view from road) or "freeway neighbors" (view toward road). The activities of the viewers in each of these categories affect their sensitivity, as described below.

Freeway Users (view from the road)

The I-405 and SR 520 users who will experience changes in visual quality consist primarily of commuter traffic (traffic to and from places of employment), local traffic (non-commuter traffic that has an origin or destination within the study area), tourist traffic, and freight traffic. These users include drivers and passengers. When compared to passengers, drivers have a narrower field of view and reduced perception of views away from the immediate roadway in front of them. Drivers are more sensitive to changes to the view of the roadway (e.g., lighting, signs, barriers, structures, and immediate roadside) and less sensitive to changes away from the roadway. Passengers are more likely to perceive the visual elements of the areas surrounding the freeway.

Commuters are considered to have a low sensitivity to views because they are accustomed to and perhaps indifferent to the view by repetition, except where change occurs. Local traffic has higher sensitivity than commuters because they experience the view less frequently and are moderately sensitive to changes in their usual view. Tourists are more sensitive than commuters and local traffic because they are probably experiencing the view for the first time. Vehicles carrying freight are the least sensitive due to the nature of their activity, which is to ensure the on-time pickup and delivery of goods. All individual views from the roadway typically last a relatively short time due to the movement of the viewer; however, view duration varies with the time of day, season, and weather conditions.

Freeway Neighbors (view toward the road)

I-405 and SR 520 neighbors include local residents and users of the local transportation network and commercial, industrial, institutional (e.g., medical, educational), and recreational areas. Residents may view the study area on a daily basis and for longer periods of time, and generally have a strong sense of identity associated with the area where they live. Consequently they have high viewer sensitivity. Users of local recreational areas experience high viewer sensitivity because they have long and frequent viewer exposure to the study area. Users of the local transportation network may routinely be exposed to views of the areas potentially affected by the project, such as from the local roads that cross I-405 and SR 520. These users may be less sensitive to changes than local residents or users of local recreation areas, who have longer and more frequent exposures to views of the project. Viewer groups likely to experience moderate to low viewer sensitivity include users of commercial, industrial, and

institutional areas because these groups experience intermittent views of the roadways; their activities are focused indoors and not outward to the view.

Project Effects

Temporary Visual Quality Effects

The proposed project will create temporary visual effects for freeway users and neighbors during construction. Construction activities will negatively affect the visual quality in the study area due to the presence of construction equipment, materials, signs, and staging areas, the removal of vegetation, and soil disturbance. Nearby residents and drivers on or near the highway could be exposed to increased light (e.g., illumination, headlights, and solar reflection) during construction, particularly when lighting is used for nighttime construction of some project elements. These effects will be largely contained in the I-405 and SR 520 corridors and will be temporary.

Detours or lane shifts will require greater driver attention and will focus motorists' attention on the roadway and away from views outside the construction areas. Visual distractions will occur primarily during clearing and grading activities and building of structures.

Within the study area, most of the residential areas to the east and west of the I-405 corridor and to the north of the SR 520 corridor are screened from the freeway by a combination of vegetation, topography, and structures located beyond the highway right-of-way. Views of I-405 and SR 520 are limited and occur primarily at cross streets and associated interchanges, or local roads that are near the freeway. In some cases, existing noise barriers will obscure the construction activity from surrounding areas.

The visual effects of construction will not change most views from I-405 or SR 520. Screening by topography, vegetation, and/or existing structures restricts most views to the foreground or middleground. Where distant views are present, they will remain visible. Clearing of vegetation for construction will generally be limited to a narrow area adjacent to the existing facilities.

Project Effects on Structures, Vegetation, and Views

The project will permanently change the visual character for both I-405 or SR 520 users and neighbors and will affect visual quality compared to existing conditions. While most of the project development along SR 520 will remain within the existing right-of-way, most of the proposed grade-separated ramps along the northbound lanes of I-405 will occur outside the existing right-of-way. Project effects will vary depending on factors including the extent of development, the primary viewer group, and the viewer group's sensitivity at a given viewpoint. Exhibit C-2 (Appendix C) summarizes the visual quality rankings of representative views after project construction.

The visual scale, degree of encroachment, and design of individual project elements such as ramps, bridges, retaining walls, and associated elements (e.g., abutments, girders) and removal of vegetated areas will determine the degree of their effects. Project elements that are out of scale with or encroach upon the existing visual character will negatively affect overall visual quality. The proposed grade-separated ramps adjacent to the northbound lanes of I-405 will be completed outside the existing right-of-way and will require additional right-of-way acquisition. The new structures will block views toward and from the highway and replace vegetation with human-built elements; this change will add clutter into the view and reduce intactness. In some cases, existing vegetation located outside the right-of-way will screen the project from potential viewers to the east and the effects on visual quality will be minor. However, where proposed development is not screened, where existing roadside vegetation will be removed, and where the development is extensive (i.e., new ramps, retaining walls), effects on visual quality will be negative. Most of the additional elements that will be added by the project, such as new ramps on SR 520, signage, and other structural elements, will be within the existing right-of-way, and in many cases, within the existing screening of noise barriers and vegetation located outside the right-of-way.

Opening or blocking existing views will also affect visual quality. Where the project opens views of the freeway, the effect will be negative. However, where the project opens views of the horizon line and views of the Cascade Mountain range, such as in the area immediately north of SR 520, the effect will be positive.

Removing vegetation within or beyond the right-of-way to accommodate the project (particularly stands of medium to large trees) will also negatively affect visual quality. For example, vegetation removal within the SR 520 median to accommodate the additional general purpose lanes will have an adverse effect on the visual environment. However, the use of landscaping and aesthetically pleasing designs for I-405, SR 520, and related facilities will enhance the attractiveness of the constructed environment and will alleviate minor effects on visual resources. In addition, removal of this vegetation will open up views of the Cascade Mountain range for viewers located immediately north of SR 520 such as along the SR 520 Trail.

Exhibit 5 presents the visual quality effects determination used to assess the level of effects for the proposed project at the representative viewpoints.

Exhibit 5: Visual Quality Effects Determination

Viewpoint	Existing Visual Quality	Projected Visual Quality	Degree of Visual Change	Principal Viewer Groups	Number of Viewers	Viewer Sensitivity	Type/Duration of Exposure	Visual Effect
F1. I-405 at NE 8th St facing north	2.3	2.1	-0.2	Highway users	High	Low	Short	Low
F2. NE 8th St on-ramp facing north	1.9	1.8	-0.1	Highway users	High	Low	Short	Low
F3. I-405 at NE 12th Street facing north	2.5	2.1	-0.4	Highway users	High	Low	Short	Low
F4. I-405 at MP 14.4 facing south	2.5	2.2	-0.3	Highway users	High	Low	Short	Low
F5. I-405 at SR 520 exit facing north	2.9	2.4	-0.5	Highway users	High	Low	Short	Low
F6. SR 520 at 124th Ave NE exit facing east	2.7	2.4	-0.3	Highway users	High	Low	Short	Low
T1. 1100 - 112th Ave NE facing northeast	3.7	3.6	-0.1	Commercial office users	High	Medium	Long	Low
T2. NE 12th Street facing east	3.1	2.9	-0.2	Local roadway users and pedestrians	Moderate	Medium	Short	Low
T3. SR 520 Trail facing southeast	3.2	3.0	-0.2	Trail users	Low	High	Long	Low
T4. Viewpoint Park facing southeast	4.4	4.4	0	Park users	Low	High	Long	Low

Representative Viewpoints From the Road

See Appendix B for depictions of existing and proposed conditions at viewpoints, and Appendix C for visual quality assessment matrices.

Viewpoint F1: I-405 at NE 8th Street (view to north)

The rendering of Viewpoint F1 (Exhibit B-2) conceptually shows the visual change for northbound I-405 freeway viewers at NE 8th Street. These viewers will see the new grade-separated NE 10th Street on-ramp structure adjacent to the northbound lanes of I-405 in the foreground and the newly reconstructed NE 12th Street overpass in the middleground. Existing mature trees adjacent to the northbound lanes in the background will be removed. The new ramp and overpass will be constructed using the I-405 design standards.

The new grade-separated structure will increase the visual scale of the highway. The reconstructed NE 12th Street overpass will be wider, with a greater visual mass and larger footprint. These new elements will increase the encroachment of human elements on this view and, combined with loss of mature vegetation, will produce a more urban appearance and decrease intactness for this viewpoint. This will have a negative effect on visual quality, decreasing from 2.3 to 2.1.

Viewpoint F2: NE 8th Street On-ramp (view to north)

The Viewpoint F2 rendering (Exhibit B-4) conceptually shows the visual change for freeway viewers traveling on the NE 8th Street on-ramp to northbound I-405. Freeway viewers will see the top of the grade-separated on-ramp structure from NE 10th Street adjacent to the northbound lanes of I-405 as well as the newly reconstructed NE 12th Street overpass in the foreground. The Overlake Hospital facility will remain visible adjacent to the new ramp structure, and existing vegetation in the northbound I-405 right-of-way will be removed.

Similar to Viewpoint F1, the new grade-separated structure, larger reconstructed bridge, and loss of roadside vegetation in the foreground and middleground will increase the visual scale and dominance of the project, resulting in increased encroachment of human elements and decreased intactness for this viewpoint. This will have a negative effect on visual quality, decreasing slightly from 1.9 to 1.7.

Viewpoint F3: I-405 at NE 12th Street (view to north)

The Viewpoint F3 simulation (Exhibit B-6) conceptually shows the visual change for northbound I-405 freeway viewers near NE 12th Street. These freeway viewers will see the tops of vehicle using the new on-ramp to SR 520 adjacent to and separated from the northbound lanes of I-405 by a low dividing wall in the foreground. Existing mature

vegetation in the foreground and middleground in the northbound I-405 right-of-way will be removed and will be partially screened from view by a new retaining wall.

Increased road width and the presence of new elevated structures will increase the encroachment of human elements on this view. Substantial loss of roadside vegetation and mature evergreens will increase the visual scale of the project and will decrease intactness from this viewpoint. This will have a negative effect on visual quality, decreasing from 2.5 to 2.1.

Viewpoint F4: I-405 at MP 14.4 (view to south)

The Viewpoint F4 rendering (Exhibit B-8) conceptually shows the visual change for southbound I-405 freeway viewers near MP 14.4. These viewers will see the tops of cars traveling on the upper level of the new grade-separated ramps and separated from the adjacent I-405 northbound lanes by a low median wall in the foreground and middleground as well as the newly reconstructed NE 12th Street overpass in the middleground.

The proposed grade-separated ramp structure along northbound I-405 will require removal of mature evergreen trees adjacent to the freeway, exposing existing mid-rise office and medical buildings and reducing intactness for this viewpoint. The new ramp structure itself, however, will not substantially increase the visual scale of the project from this viewpoint because of the distance between the viewer and the ramp, which makes it less prominent in the landscape. Loss of vegetation will have a negative effect on visual quality, decreasing from 2.5 to 2.2.

Viewpoint F5: I-405 at SR 520 Exit (view to north)

The Viewpoint F5 simulation (Exhibit B-10) conceptually shows the visual change for northbound I-405 viewers at the approach to the SR 520 exit. Similar to Viewpoint F3, freeway viewers will see the tops of vehicles using the new on-ramp to SR 520 adjacent to and separated from the northbound lanes of I-405 by a low dividing wall in the foreground. The existing on-ramp to SR 520 and associated signage at this viewpoint will be removed. In addition, existing mature vegetation in the foreground and middleground in the northbound I-405 right-of-way will be removed. The existing noise barrier will be reconstructed on top of a new retaining wall to the same height and dimensions but will be located further east adjacent to the new SR 520 on-ramp. The increased concrete surfaces will dominate views.

Increased road width, the presence of new slightly elevated structures, and substantial loss of roadside vegetation and mature evergreens and the retaining wall will increase the visual scale of the project and result in decreased intactness for this viewpoint. This will have a negative effect on visual quality, decreasing from 2.7 to 2.2.

Viewpoint F6: SR 520 at 124th Avenue NE Exit (view to east)

The Viewpoint F6 rendering (Exhibit B-12) conceptually shows the visual change for eastbound SR 520 viewers around MP 7.4 approaching the 124th Avenue NE off-ramp. To the south, existing views of mature vegetation will be replaced by the new proposed retaining wall in the foreground to accommodate ramps carrying traffic entering eastbound SR 520 from I-405. Mature vegetation adjacent to the eastbound lanes of SR 520 will be removed. To the north, freeway viewers will see the elevated westbound lanes of SR 520 and another new retaining wall. Shifting the eastbound SR 520 mainline travel lanes toward the westbound lanes will result in loss of existing mature vegetation present in the median. The retaining walls and associated plantings will be constructed to SR 520 design standards to provide corridor continuity.

The new grade-separated structures along eastbound and westbound SR 520 will increase the encroachment of human elements on this view. Although the new constructed elements will be designed to unify human-made elements of the freeway corridor, these new structures, along with loss of existing mature vegetation, will reduce intactness for this viewpoint. This change will have a negative effect on visual quality, decreasing from 2.7 to 2.4.

Representative Viewpoints Toward the Road

(See Appendix B for depictions of existing and proposed conditions at viewpoints and Appendix C for visual quality assessment matrices.)

Viewpoint T1: 1100 - 112th Avenue NE (view to northeast)

The Viewpoint T1 simulation (Exhibit B-14) conceptually shows the visual change for employees and patrons of businesses located at 1100 - 112th Avenue NE adjacent to the southbound lanes of I-405. These viewers will have an aerial view of the elevated NE 10th Street on-ramp and proposed new on-ramp from northbound I-405 to SR 520 in the foreground and middleground. Existing mature vegetation adjacent to the I-405 northbound lanes will also be removed.

The new grade-separated structures along northbound I-405 will increase the visual scale of the project and will increase encroachment of human elements on this view. These new structures, along with loss of existing mature vegetation, will produce a greater urban appearance and will decrease intactness for this viewpoint. However, distant views of the Cascade Mountains and adjacent ridgelines in the background would not be affected by the proposed improvements; all new structures will be located far below the horizon line, and will not obstruct views of these scenic elements. The project will have a minor effect on visual quality, decreasing from 3.7 to 3.5.

Viewpoint T2: NE 12th Street (view to east)

The Viewpoint T2 rendering (Exhibit B-16) conceptually shows the visual change for viewers traveling eastbound on 12th Street as it approaches the bridge overpass across I-405. Pedestrians, bicyclists, and local traffic will see a newly reconstructed and widened overpass structure in the foreground and middleground that includes separate lanes in both directions for pedestrians and bicyclists. Construction of grade-separated ramps along northbound I-405 will result in loss of some vegetation in the background. The new overpass and associated vegetation will be constructed using the I-405 design standards.

The visual scale and dominance of the reconstructed bridge will be partially offset by the unifying elements of the design treatments. The project will have a negative effect on visual quality, decreasing slightly from 3.0 to 2.9.

Viewpoint T3: SR 520 Trail (view to southeast toward SR 520)

The Viewpoint T3 rendering (Exhibit B-18) conceptually shows the visual change for viewers traveling eastbound on the SR 520 Trail. Trail viewers will see the tops of some remaining vegetation within the SR 520 median, but most of the existing mature vegetation will be removed.

By removing existing vegetation in the SR 520 median, the view's intactness will decrease. However, the project will open views to the south and southeast and to the horizon line, which will make the Cascade Mountains more visible, softening the effect of human elements with natural elements. This will offset the view's decrease in intactness, resulting in a minor effect on visual quality, decreasing from 3.2 to 3.~~9~~0.

Viewpoint T4: Viewpoint Park (view to southeast toward SR 520)

The proposed project will not be visible from the scenic viewpoint in Viewpoint Park. There will be no change to overall visual quality or the existing rating score of 4.4 from this representative viewpoint.

New Sources of Shadow, Light, or Glare

The proposed project will create new sources of overhead lighting, shade, and shadowing in various portions of the study area. The replaced NE 12th Street bridge over I-405 will result in a slight increase in shadow and shade due to the wider and taller structure. New sources of light are also anticipated at this location because the replaced bridge will have luminaries. However the increase in shadow and shade will only affect freeway users traveling below the bridge on I-405. New lighting fixtures will be similar to the existing lighting fixtures that shield sideways glare.

The grade-separated ramps along northbound I-405 and eastbound SR 520 will increase shadow and shade below and in the immediate vicinity of these structures. This will affect primarily local traffic traveling beneath and adjacent to the ramps in these areas, such as on Northup Way and 124th Avenue NE along the SR 520 corridor.

Continuous illumination will be installed along all new freeway on- and off-ramps throughout the study area, but the new lighting levels will likely be similar to existing levels.

Vehicle headlights and glare from the new proposed on- and off-ramps will be additional sources of light and glare associated with the completed project. For example, the proposed on-ramp to SR 520 from the new NE 10th Street bridge will cross over the west edge of the Overlake Hospital campus and will be located near campus buildings. Concern was raised during public scoping that headlights of vehicles driving on the NE 10th Street on-ramp at night could cause light and glare effects in the lower patient rooms of campus buildings.

The roadway elevation of the proposed NE 10th Street bridge overcrossing is designed to crest at the centerline of I-405, so vehicles traveling eastbound on the bridge will be descending as they approach the Overlake Campus. To access the new NE 10th Street on-ramp to SR 520, eastbound motorists will enter a left-turn-only lane before turning and traveling northbound on the proposed on-ramp. Vehicles headlights of motorists traveling on the northbound on-ramp will not shine directly into rooms in the hospital campus, and motorists will descend in elevation with distance from the bridge.

The average top of passenger vehicle headlights is approximately 30 inches or less above the roadway. The average height of the barriers along both the proposed NE 10th Street bridge and northbound on-ramp to SR 520 will be 32 inches. The top of the proposed barrier at the highest elevation along the NE 10th Street bridge and on-ramp will intersect approximately the second floor of adjacent hospital buildings.

Visual Quality Effects of the No Build Alternative

The No Build Alternative assumes that the improvements associated with the project are not constructed and that only routine activities such as road maintenance, repair, and minor safety improvements would take place between 2014 and 2030. This alternative does not include improvements that would increase roadway capacity or reduce congestion beyond baseline conditions.

Routine maintenance may require managing vegetation by pruning or removing trees or shrubs near the roadways, based on the classification of the roads, in accordance with the RCP. With the No Build Alternative, no new sources of light, glare, or shadow would be introduced within the study area. Current conditions would remain largely unchanged.

For these reasons, the No Build Alternative would not affect visual quality as no structures would be replaced or noticeably modified.

Indirect Effects on Visual Quality

Development interest in and around the study area may increase slightly as a result of improved mobility on I-405 and SR 520. Redevelopment of adjacent land use could alter the visual quality of the study area and surroundings, resulting in a more urban character. However, development associated with this indirect growth would occur in compliance with local City of Bellevue comprehensive plans, policies, and development codes, including local urban design policies, and would not be expected to result in adverse effects on visual quality. Over time, the visual quality of the study area will improve as vegetation matures and softens the appearance of the proposed ramps, retaining walls, and other structures, and screens various project features from affected viewers.

Cumulative Effects on Visual Quality

The I-405 team did not evaluate cumulative effects on visual quality. In accordance with Council on Environmental Quality (CEQ) guidelines, an analysis of cumulative effects is not needed for every discipline studied in NEPA documentation. Disciplines selected for cumulative effects analysis should be determined on a case-by-case basis early in the NEPA process, generally as part of early agency coordination and scoping. For the I-405, NE 8th Street to SR 520 Improvement Project, the disciplines evaluated for cumulative effects were air quality, surface water, wetlands, and fish and aquatic habitat. (Refer to the project Cumulative Effects Analysis Technical Memorandum.)

Measures to Avoid or Minimize Effects

Mitigation during Construction

Mitigation measures will be implemented during project construction to help maintain and/or restore the visual character. Where the local terrain and placement of light poles allow it, light and glare effects associated with nighttime construction activities will be reduced by shielding freeway lighting and using downcast lighting so that lighting sources will not be directly visible to the corridor neighbors. Visual effects will be reduced further by restoring (revegetating) areas as construction is completed (in stages) rather than waiting for the entire project to be completed.

Mitigation during Operation

The project is being planned, developed, and designed in accordance with CSS guidelines. These guidelines provide an approach that incorporates community values while meeting local, regional, and national requirements for the safe, efficient, and effective movement of people and goods. CSS considers the elements of mobility, safety, environment, and aesthetics throughout the project. To adhere to these guidelines, the proposed project is being developed to fit its physical surroundings and preserve these elements.

The application of CSS guidelines precludes the need for mitigation of visual effects. The project will consider community input during development to ensure that local concerns are met early in the project planning and design phases.

Measures typical for transportation projects, including retaining existing natural vegetation to the maximum extent practical and planting new vegetation to screen and soften the look and feel of constructed elements such as new retaining walls and a noise barrier, have been incorporated within the I-405 and SR 520 design standards. See Appendix D for a variety of wall types and pattern applications. For example, where space allows, a mix of evergreen and deciduous shrubs will be planted at the base of the new retaining walls along the I-405 and SR 520 corridors. Other areas subject to design standards include structural elements, landscape features, lighting, and signs. For example, cut-off fixtures will be used on new lighting poles to minimize glare and to reduce the amount of light shining into adjacent sensitive areas such as at the Overlake Hospital campus.

WSDOT proposes to increase the height of the NE 10th Street on-ramp barriers (protective wall) from 32 to 42 inches to further shield vehicle headlights on the new NE 10th Street bridge overcrossing and on-ramp from the Overlake campus.

Unavoidable Adverse Effects

The proposed Build Alternative will add some raised structures in the project's study area, including new ramps, a noise barrier, and retaining walls. Construction activities will clear vegetation within the right-of-way that currently provides a buffer between the freeway and adjacent properties. All of these activities create changes in the visual resources, primarily within the bounds of the right-of-way. Changes to visual quality for freeway neighbors with views toward the facilities will be minor to negligible due to removal of natural elements (e.g., vegetative buffer) and increased encroachment of human elements. Changes to visual quality for freeway users with views from SR 520 will be negligible. Freeway users with views from I-405 will experience low adverse effects to visual quality due primarily to the construction of elevated ramps outside the existing right-of-way and removal of trees along the roadside.

Implementation of the CSS public process and application of the resulting community-developed design guidelines will ensure that the final design of the project's elements are developed to fit its physical surroundings and preserve scenic, aesthetic, historic, and environmental resources, while maintaining safety and mobility. Application of design guidelines can ease or lessen the degree of any adverse effects, and provide for a positive viewer response.

Acronyms and Abbreviations

Term	Meaning
CSS	context-sensitive solutions
DOT	U.S. Department of Transportation
EA	environmental assessment
EIS	environmental impact statement
FHWA	Federal Highway Administration
GIS	geographic information system
MP	mile post
NEPA	National Environmental Policy Act
RCP	Roadside Classification Plan
RCW	Revised Code of Washington
SAFETEA	Safe Accountable Flexible and Efficient Transportation Equity Act
SEPA	Washington State Environmental Policy Act
SR	state route
TEA-21	Transportation Equity Act for the 21st Century
USGS	U.S. Geological Survey
WSDOT	Washington State Department of Transportation

Glossary

Term	Meaning
context-sensitive solutions	A collaborative, interdisciplinary approach to develop a transportation facility that fits its physical surroundings and is responsive to the community's scenic, aesthetic, social, economic, historic, and environmental values and resources, while maintaining safety and mobility.
geographic information system (GIS)	A digital computer mapping system that can overlay a wide variety of data such as land use, utilities, and vegetative cover, and provide a spatial analysis.
intactness	The visual integrity of the natural and human-built landscape and its freedom from encroaching elements. High intactness means that the landscape is free of eyesores and is not broken up by features that are out of place.
landscape unit	Places or districts with clear landform or landcover boundaries that form an outdoor area with similar visual character and visual continuity. For example, a landscape unit can be a single neighborhood, or several neighborhoods combined.
rural landscape	Landscape characterized by intermixed built and natural or naturalized elements, with built elements starting to encroach on the natural environment; human manipulations of the land are evident.
semiurban landscape	Landscape characterized by intermixed built and natural or naturalized elements, with built elements prevailing.
simulation	An illustration based on photographs from selected viewpoints that portrays proposed project features and changes to the visual condition.
unity	The visual coherence and compositional harmony of the landscape when considered as a whole. High unity frequently reflects the careful design of individual human components and their relationship in the landscape.
urban landscape	Landscape that is predominantly built environment.
view	That which can be seen either from or toward the transportation facility.
viewer awareness	The degree to which a viewer notices the landscape.
viewer exposure	How many people see something from a particular viewpoint and over what duration they see it. View duration considers how often viewers observe the view, the frequency of views, and whether the viewers or the objects are stationary or moving.

Term	Meaning
viewer groups	Groups of people who are differentiated from others by their viewing characteristics or visual response to a landscape feature. For example, local park users are one class of viewer, and are likely to have a different visual response to a landscape feature than people viewing the same feature from an industrial setting.
viewer location	A description of where the viewer is relative to the resource or landscape feature based on viewer position, distance to resource, and direction. Position is typically categorized as superior (looking down at the resource), normal (looking level at the resource), or inferior (looking up at the resource). Distance to the visual resource is categorized as foreground, middleground, and background. View direction is identified by cardinal direction (north, south, east, or west).
viewer response	A positive or negative measure of how people react to changes in what they see.
viewer sensitivity	The degree to which people respond to what they see. A viewer with high sensitivity to a particular view will respond strongly to any change in the view. Viewer sensitivity does not imply support for or opposition to a proposed change in the view.
visual character	The visual patterns formed by everything that can be seen and how those patterns fit together in the visible landscape. The description of character considers dominance, scale, diversity, and continuity to further define the visible landscape.
visual effect	The degree of change in visual resources and the viewer response to those changes caused by facility development and operations.
visual quality	A subjective measure of the character of the visual resource. The many factors that contribute to a landscape's visual quality are grouped under intactness, unity, and vividness.
visual quality assessment matrix	An evaluation tool that assigns a numeric rating to physical aspects of the viewshed.
vividness	Describes how the landscape elements combine to form a colorful, striking, or otherwise memorable composition.

References

GIS Data Sources

Exhibit 1

WSDOT (Washington State Department of Transportation). 2006 – 2007. I-405 Staff; project limits.

Exhibit 2

Puget Sound LiDAR Consortium, LiDAR, 2002. http://pugetsoundlidar.ess. washington. edu/About_PSLC. htm

Exhibit 3

David Evans & Associates. 2001. *I-405 Corridor Program Visual Resources Expertise Report.* Landscape Units. Revised August 2001.

Exhibit 4

CH2M HILL. 2007. Viewpoint Locations and Orientation.

Base Data

All GIS exhibits contain one or more of the following as base layers:

Bellevue. 2006. Lakes, Parks, Streams.

GDT (Geographic Data Technology, Inc.), April 2005. GDT – Dynamap Transportation.

King County Standard GIS Data Disk, extract June 2006:

> 2005. Trails in King County. Data updated by I-405 staff to match fieldwork, 2002 LiDAR and orthorectified aerial photography.

USGS (United States Geological Survey). June 2002. Color Aerial Photography. http://edc.usgs. gov/products/aerial/hiresortho.html

WSDOT (Washington State Department of Transportation). March 2001. Aerial photography program.

WSDOT (Washington State Department of Transportation), Spatial Data Catalog, 2006, City Limits.

WSDOT (Washington State Department of Transportation), Spatial Data Catalog, 1997, Railroads.

WSDOT (Washington State Department of Transportation). 2006 – 2007. I-405 Staff; Tenth Mile Posts, NE 10th St Bridge, Project Area.

Text References and Verbal Communications

City of Bellevue. 2004. *Overlake Hospital Master Plan/NE 10th Street Extension Draft Environmental Impact Statement*. November 4, 2004.

WSDOT (Washington State Department of Transportation). 2006a. *I-405 Bellevue Nickel Improvement Project, I-90 to Southeast 8th Street, Visual Quality Discipline Report.* January 2006.

WSDOT. 2006b. *Environmental Procedures Manual.* March 2006.

WSDOT. 2006c. *I-405 Context Sensitive Solutions Master Plan*.

WSDOT. 2001a. *I-405 Corridor Program Visual Resources Expertise Report*. Revised August 2001.

WSDOT. 2001b. *I-405 Corridor Program NEPA/SEPA Draft Environmental Impact Statement.* August 2001.

WSDOT. 1996. *The Roadside Classification Plan*.

Appendix A:
Methodology

APPENDIX A. METHODOLOGY

FHWA Visual Quality Assessment Method Overview

The Federal Highway Administration's (FHWA's) *Visual Impact Assessment for Highway Projects* (FHWA-HI-88-054) method was used to evaluate the visual quality impacts for the project. This method was developed to assess the visual impacts from highway projects for environmental assessments (EAs) and environmental impact statements (EISs). The method is both quantitative and qualitative to remove subjectivity and provide a basis for comparison, ensuring that the potential effects on visual quality and aesthetics resulting from the project are adequately and objectively considered. The quantitative analysis assigns numerical values to describe the physical attributes of the landscape character using professionally accepted terminology. The qualitative analysis explains the project and supports these numerical values.

The FHWA visual quality assessment method used for highway projects consists of a six-step evaluation process that has defined and accepted terminology and tools. The visual quality analysis team applied the FHWA method following the sequence listed below.

1. Establish the project's visual limits (views and "landscape units").

2. Determine who has views of and from the project ("viewers").

3. Describe and assess the existing landscape (visual character) and identify key views from and toward the project.

4. Assess the viewers' concerns for a particular view or viewshed ("viewer sensitivity").

5. Determine and evaluate views of and from the project for before and after project views ("viewpoint simulations") and discuss project effects on light, shadow, and glare.

6. Identify mitigation measures to offset visual impacts.

The first three steps establish the baseline conditions for the existing landscape and define how much of the project is visible from outside the study area (see the Existing Conditions section later in this memorandum). Using this baseline, the last three steps assess potential visual changes to the landscape and how the viewer would likely respond to those changes (see the Project Effects section). In addition, the assessment evaluates light, shadow, and glare, and compares the Build and No Build alternatives. Based on the potential effects evaluation, mitigation measures are identified (see Measures to Avoid or Minimize Effects).

Please note that this memorandum uses "landscape" to refer to the complete visible natural and human-built environment. Also, the level of concern different people

experience will be described as a degree of sensitivity to a particular view. Views ***from*** the roadway and views ***toward*** the roadway are both considered.

Tools and Vocabulary

FHWA uses a generally accepted set of tools and well-defined terminology. When the tools and terminology are understood, the FHWA method and its results are explainable and easily followed. The FHWA method and this memorandum use the fundamental terminology described here.

Views are what can be seen "toward" or "from" the road. Sensitive or special views, some of which are listed in municipal codes, are identified for use in simulations.

Viewers are people who have views toward or from the project. Viewers are usually discussed in terms of general categories of activities, such as resident, boater, jogger, or motorist, and are referred to as "viewer groups."

Viewpoint is the position of the viewer.

Viewer sensitivity considers these three factors for a specific view:

- How many people see that view?
- How long can they see the view? Motorists typically see views for a short time, which is referred to as duration, while pedestrians and residents look at views for long durations.
- How does the view affect the activity the viewer is engaged in?
- What is their likely level of concern about the aesthetics and quality of the view? Level of concern is a subjective response; many factors influence this response, such as the visual character of the surrounding landscape, the viewers' activities, and their values, expectations, and interests.

Visual character describes impartially what exists within the landscape. The existing visible natural and built landscape features and their relationships define visual character. These relationships consider dominance, scale, diversity, and continuity to further define character. The resources and features used to define visual character include:

- Landforms: types, gradients, and scale
- Vegetation: types, size, maturity, and continuity
- Land uses: size, scale, and character of associated buildings
- Transportation facilities: types, sizes, scale, and orientation
- Overhead utility structures and lighting: types, sizes, and scale

- Open space: type (e.g., parks, reserves, greenbelts, and undeveloped land), extent, and continuity
- Viewpoints and views toward visual resources
- Water bodies, historic structures, and downtown skylines
- Apparent "grain" or texture, such as the size and distribution of structures and open spaces of the landscape
- Apparent upkeep and maintenance

Visual quality assesses the composition of the character-defining features for selected views. This assessment asks: Is this particular view common or dramatic? Is it a pleasing composition (with a mix of elements that seem to belong together) or not (with a mix of elements that either do not belong together or are eyesores and contrast with the other elements in the surrounding)?

The measures of vividness, intactness, and unity are used to evaluate and discuss visual quality. Each of these three measures receives a rating on a scale of 1 to 7, with 7 being the highest or most desirable. To determine an overall visual quality rating, the analyst takes a numerical average of the three ratings for vividness, intactness, and unity. These measures are defined as follows:

- **Vividness** evaluates the components in the view (landform, vegetation, human-made elements, and water features) and how they fit together to make a dramatic, memorable, or distinctive view. The distinctiveness or quality of a specific element within the landscape defines the element. The values range from 1 to 7, with a value of 7 being a high degree of vividness.
- **Intactness** measures the visual integrity of the natural and human-made landscape and its freedom from encroaching elements. High intactness means that the landscape is free of eyesores and is not broken up by features that are out of place. A rating of 7 indicates a landscape that is highly intact and contains no encroachments.
- **Unity** measures the degree of visual coherence and compositional harmony of the landscape when considered as a whole. High unity frequently reflects the careful design of individual components, how they relate to each other, and their relationship in the landscape. A rating of 7 represents a landscape with a coherent, harmonious visual pattern.

The FHWA method also has three important analytical tools that were used for this project:

- Landscape units are subunits of a study area that make evaluation of the entire study area easier. Visual character and continuity define these landscape units. For this

memorandum, the study area was divided into two geographical sections instead of landscape units.

- Viewsheds are defined as the area visible from the project and the area from which the project can be seen.
- Simulations (for this memorandum) are illustrations based on photographs taken of selected viewpoints. They illustrate the probable changes due to the project and the relative scales of the existing and proposed features apparent from the viewpoints.

Collection of Visual Assessment Information

As a first step, the visual quality analysis team reviewed community planning documents and U.S. Geological Survey (USGS) and geographic information system (GIS) maps to identify existing and proposed conditions. Views or routes were identified that are designated by code or in planning documents as requiring special consideration because of their scenic value. With this information as a base, the team visited the entire study area several times to develop qualitative and quantitative assessments and a description of existing conditions.

The visual quality analysts compared the project's engineering plans and documents to existing conditions and planning documents. They also reviewed and identified relevant information from the *I-405 Visual Resources Expertise Report*,[4] the *I-405 Corridor Program EIS*,[5] and the *I-405 Bellevue Nickel Improvement Project Visual Quality Discipline Report*.[6]

The visual quality analysis team used an assessment matrix to evaluate existing conditions and project effects. This matrix, developed for conducting visual quality assessments, is adapted from the WSDOT 2006 *Environmental Procedures Manual*.[7] The manual lists the numeric ratings assigned to visual quality parameters and components for selected views throughout the study area.

Viewpoint Selection

Viewpoint simulations were used to depict the greatest changes resulting from the project and evaluate potential effects on the identified viewer groups. Five primary criteria were used to select the viewpoints:

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[4] *David Evans, 2001.*

[5] *WSDOT, 2001b.*

[6] *WSDOT, 2006a.*

[7] *WSDOT, 2006b.*

1. The view represents the visual effect for the identified sensitive viewer groups.

2. The view represents moderate to high changes to visual quality or character of scenic views, historic buildings, designated viewpoints, or view corridors, and is a location where there are sensitive viewer groups.

3. The view represents what a person walking, bicycling, or driving would see.

4. The view represents a substantial portion of the roadway study area.

5. The view represents where the greatest change to visual quality from the project would occur.

The visual quality analysis team conducted field reconnaissance of the study area, reviewed existing aerial photographs and proposed design plans, coordinated with WSDOT, and reviewed the local land use plans and policies to determine viewpoint locations. The viewpoints were also evaluated by other I-405 Team members. For this memorandum, the study area was divided into two geographical sections (instead of landscape units) to facilitate viewpoint selection.

Regulations and Guidance

Both FHWA and WSDOT mandate evaluations of visual effects, including aesthetics and light and glare, during project development. Section 459 of the WSDOT 2006 *Environmental Policy Manual* contains policies for conducting visual quality assessments. The WSDOT 1996 *Roadside Classification Plan* provides roadside policies and includes guidelines for treatment of roadsides. Other applicable state regulations include Washington's Highway Beautification Act (RCW 47.040.010) and the Open Space Land Preservation Act (RCW 84.34).

Requirements for visual quality protection in association with freeway systems and other transportation facilities are contained in certain federal programs. These programs include: the Transportation Equity Act for the 21st Century (TEA-21); the Safe, Accountable, Flexible and Efficient Transportation Equity Act of 2003 (SAFETEA); the Highway Beautification Act of 1965; the Historic Preservation Act of 1966; and the U.S. Department of Transportation (DOT) Act, Section 4(f).

In addition, the National Environmental Policy Act (NEPA) requires that due consideration be given to certain environmental issues—including aesthetics and visual quality—in evaluating applicable projects. The Washington State Environmental Policy Act (SEPA) requires a similar process for applicable state and local actions. WSDOT determined that the methodology and criteria for the project's visual quality assessment satisfied these state and federal requirements. The comprehensive plan for the City of Bellevue was also examined to gain an understanding of future land uses and the City's

urban design goals as described in the Land Use Patterns, Plans, and Policies Discipline Report.

Appendix B:
Representative Viewpoints