INTRODUCTION

The Enhanced Existing Alternative along the W Burnside corridor started with a long list of potential improvements associated with streetscape improvements such as widening sidewalks and providing more landscaping along the road.

The alternative also focuses on providing traffic improvements to help provide connections to neighborhoods and surrounding land uses via left turn opportunities. Implementation of these left turns may have adverse effects on the traffic operations and/or remove existing landscaping/medians.

Evaluation of the Enhanced Existing Alternative was preliminarily done for all modes of travel during the W Burnside/Couch Alternatives Analysis project (completed in December 2006). Based on that preliminary analysis it was determined to further refine and evaluate the Enhanced Existing Alternative to determine if there was merit to a potentially less expensive alternative that still allowed adequate traffic operations and provided connectivity.

The following section outlines the evaluation process implemented for analyzing the Enhanced Existing Alternative Proposed Plan to determine the recommendations for traffic operations along W Burnside.

PROJECT GOALS/OBJECTIVES

The overarching goal and objective of this study is to provide additional detailed analysis and refinement to the W Burnside Enhanced Existing Alternative to compare operations of the corridor to the W Burnside/Couch Couplet Alternative, and inform the public and stakeholders.

To determine the validity of potential enhancements, the Proposed Plan has been analyzed against the regulatory processes of City codes and policies.

In addition to the City policies, the Proposed Plan also was evaluated with the following original goals:

- Improving circulation and access for all modes of travel
- Providing balanced operations for all modes of travel
- Enhancing safety for all modes of travel

METHODOLOGY

The Enhanced Existing Alternative transportation analysis was done similarly to the previous detailed analysis for the W Burnside/Couch Alternatives Analysis. The analysis took into account traffic operations at intersections and compared these results to the operating standards of the City of Portland’s Transportation System Plan.

The regional travel demand model was used to help evaluate the potential traffic impacts associated with the refinements of the alternative. New left turns were implemented in the travel demand model to determine the demand for traffic wanting to utilize those turns. Additionally, a diversion analysis was conducted to evaluate the additional traffic that may “divert” to/from W Burnside with the opportunity for new left turns in place.

Traffic forecasts for the PM peak hour for the planning horizon (2025) were developed at all study area intersections and analyzed for overall intersection operations (including level-of-service and volume-to-capacity ratios). In addition, queuing at intersections was evaluated to determine if the queues at new left turns would adversely affect upstream or downstream intersections.

Based on these traffic findings, recommendations were made to the Enhanced Existing Alternative Proposed Plan to include or reject the potential enhancements.
Findings

The previous Enhanced Existing alternative explored a variety of enhancements along the W Burnside corridor that focused primarily on streetscape improvements, new signalized intersections, and the implementation of left turns to help provide connectivity to the neighborhoods and land uses to the north and south of the corridor.

Due to the constrained and congested nature of W Burnside as a two-way motor vehicle travel way, it is difficult to implement new signals and new left turn opportunities that do not adversely affect the progression and/or opposing travel vehicles. New signals can disrupt the potential progression of vehicles and are difficult to coordinate along a two-way corridor that has balanced traffic flows during peak periods. Left turns typically require a protected phase for operation at a signal which takes “green time” away from the opposing travel direction resulting in more overall delay at the intersection and worse traffic conditions.

However, implementation of new signals do allow for additional crossing locations for pedestrians, helping to connect neighborhoods north and south of W Burnside, and some locations do allow for left turning opportunities without significant impact to the overall intersection operations. Adjustments can be made to the signal timing to allow for the best progression available and implementation of a protected left turn to enhance connectivity.

The following locations are included in the Recommended Plan of the Enhanced Existing Alternative for either a new signalized crossing or to allow for new left turn access:

- NW 22nd Avenue (new signal)
- NW 20th Place (new signal)
- NW 19th Avenue (westbound left turn)
- NW 9th Avenue (new signal)

Based on the revised Enhanced Existing alternative with the revisions previously outlined in this section, Table 2.1 summarizes the future intersection operations for the corridor for the PM peak hour.

Table 2.1

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<tr>
<th>Intersection</th>
<th>Intersection Type</th>
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<th>LOS</th>
<th>WSC</th>
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Table 2.1
**NW 23rd Avenue**

The opportunity to add a westbound left turn with a short pocket to allow access to the Goose Hollow neighborhood from W Burnside at a signalized location was explored (see figure below).

Traffic operations indicated that allowing left turns at this location would not provide for adequate levels of service to meet City standards. Even if a left turn pocket were allowed to be in place and not meet City standards, there is only enough space available for a 50-foot left turn pocket at most, and would require a significant right-of-way take along W Burnside to implement. With such a short left turn pocket, left turning vehicle demand would spill back into the through moving lane and would create a safety hazard to through moving vehicles.

The Proposed Plan included closing the southbound slip lane from NW 23rd Avenue to westbound W Burnside. Further exploration of this option indicated that the slip lane should be retained because it allows for additional capacity in the southbound travel direction and helps the overall intersection operations to better meet the City of Portland traffic operations standard (level-of-service D).

Modifications were also made to the north/south signal timing, which is currently a split phase (first northbound traffic goes, then southbound traffic goes). Concurrent north/south phasing was explored to help traffic operations and it was determined that this type of phasing could be implemented at this intersection. However, even with this type of phasing adding a westbound left turn was still not feasible from a traffic operations and right-of-way/design standpoint. Based on the traffic analysis, the recommended enhancements for the intersection can be found in the Recommended Plan detail ‘B’.

**NW 22nd Avenue**

The Proposed Plan added a new signal at this intersection to help with pedestrian crossing opportunities along W Burnside. The Recommended Plan retains this signal and prohibits eastbound left turns to enhance motor vehicle safety. Based on the traffic analysis, the recommended enhancements for the intersection can be found in the Recommended Plan detail ‘C’.

- Retain new signal at this location and prohibit eastbound left turn for safety.
- Provide curb extensions on northeast and northwest corners to reduce pedestrian crossing on north leg.
Section II: Transportation Analysis

Proposed Plan

Recommended Plan detail

- Retain one-way slip lane from W Burnside.
- Sign W Burnside (eastbound) as “No Turns” to eliminate the potential for left or right turns. Right turns could conflict with slip lane traffic for unsafe maneuver.
- Signalize intersection to facilitate pedestrian crossings to and from the existing bus stop.

NW 20th Avenue

The Proposed Plan included closing the diagonal connection from W Burnside eastbound to SW Morrison St, having all eastbound right turning vehicles turn at NW 20th Pl and access SW Morrison St or SW 20th Pl. This allowed for reclaiming a large parcel of unused area for open space.

Additional counts were conducted during the AM peak period to determine the demand for eastbound movements from W Burnside to SW Morrison St. The count data indicated a large demand for this movement that may conflict with northbound vehicles stored along SW 20th Pl. This could create a safety concern if vehicles were redirected to turn at SW 20th Pl, then make an immediate southbound right to access SW Morrison St. It was determined that the slip lane should be retained from a safety perspective, although a portion of the open area on W Burnside could be reclaimed to help with pedestrian connectivity along W Burnside and also shorten the distance for crossing on the west leg of the intersection.

Based on the traffic analysis, the recommended enhancements for the intersection can be found in the Recommended Plan detail ‘D’.

NW 19th and 18th Avenues

The Proposed Plan proposed a westbound left turn at NW 19th Ave. In addition to the westbound left turn at NW 19th Ave, a complimentary eastbound left turn was proposed at NW 18th Ave to promote additional connectivity to the neighborhood to the north of W Burnside, as well as reduce the need for travel along SW Alder to connect north of W Burnside.

Based on the traffic operations with this configuration, it was determined that allowing left turns from W Burnside at both NW 18th and 19th Avenue would require side-by-side left turn pockets to accommodate the queuing of vehicles. The side-by-side left turns would require additional right-of-way along W Burnside versus traditional back-to-back left turns (see illustration below).

Due to the potential right-of-way necessary to accomplish side-by-side left turns, the turning needs at these intersections were reevaluated, and there was a higher need/demand for the westbound left turn at 19th Avenue. A modified configuration allowed for a five lane cross section at this location with the fifth lane being the westbound left turn pocket that would extend the full length between 19th and 18th Avenues along W Burnside.
The original Enhanced Existing plan also closed SW 18th Ave (between SW Morrison St and W Burnside). This existing movement would be accommodated though a northbound travel lane on SW/NW 19th Ave to NW Couch St, then connection along NW Couch St to NW 18th Ave.

In addition to the closure of SW 18th Ave, the small segment of SW Alder Street was closed from SW 19th Ave to SW 18th Ave. The purpose of these closures was to reclaim space for public use, and to create a less confusing multi-modal environment.

The Recommended Plan retained these closures and explored the opportunity to provide more connectivity to the neighborhoods to the north and south of W Burnside by allowing westbound left turns at 19th Ave.

Traffic operations at NW 19th Ave also became problematic with the addition of northbound through traffic at W Burnside. The redirected northbound traffic from SW 18th Ave needed additional green time to allow for adequate side street operations. This reduced timing for W Burnside and resulted in operations that were over capacity, and a level-of-service (LOS) F at the intersection during the PM peak. For this reason the 18th Avenue connection was retained to allow for adequate traffic operations. Based on the transportation analysis, Recommended Plan detail E shows the recommended improvements.

**NW 16th Avenue Recommendation**
- Retain diagonal connection from W Burnside to SW Alder St.
- Add westbound left turn pocket at NW 19th Ave with protected signal phase.

Realignment of NW 16th Avenue was proposed as a way to make a more direct connection between north and south areas of W Burnside. An eastbound left turn at NW 16th Ave was also part of this realignment. The current intersection is signalized and offset to the north. This realignment would allow for the consolidation of the signalization of the north and south legs as well as allow a new left turn in the eastbound direction.

This realignment would require significant right-of-way to implement and would have little impact to improving the traffic operations along the corridor (especially with a left turn that requires green time from the overall intersection operations). Due to the right-of-way impact and minimal benefits for traffic operations, the realignment was removed from further analysis.
The improvement at this intersection is to remove the eastbound slip lane (south side of Burnside) and create a pedestrian plaza area. In addition to removing the slip lane, the northeast corner would be enhanced with a curb extension on NW 15th Ave.

The recommended enhancements for the intersection can be found in inset drawing ‘G’.

An additional eastbound left turn was evaluated at NW 14th Ave to allow for access to I-405 from W Burnside. Traffic operations and queuing along indicated that this left turn would not allow adequate operations. In addition, the implementation of a left turn would require the reconstruction of the I-405 overpass for an additional lane.

However, the roadway of SW/NW 14th Ave was realigned to the west. This allows for a perpendicular alignment with W Burnside and more open space on the southeast corner of the intersection of SW 14th Ave/W Burnside. Based on the traffic analysis, the recommended enhancements for the intersection can be found in inset drawing of ‘J’.

The original Enhanced Existing Plan retained the westbound “jughandle” (left turn to NW 10th Ave from south side of W Burnside). This maneuver entered SW 10th Ave approximately 30 feet before W Burnside and aligned with SW Oak St.

The Proposed Plan removed this jughandle maneuver and redirected left turns to SW Stark St (approximately SW 13th Ave). This was done to clean up the intersection for circulation and create a larger open space on the southwest intersection of SW 10th Ave/W Burnside. Traffic operations were acceptable with this configuration.

Based on the traffic analysis, the recommended enhancements for the intersection can be found in the inset drawing of ‘L’.

The Proposed Plan had a signal at this location. This allowed for additional connectivity across W Burnside for pedestrians.

Traffic operations were evaluated at this location with the new signal in place and the intersection was found to operate within acceptable standards for the City of Portland with minimal queuing and disruption to progression of traffic along the corridor.

Based on the traffic analysis, the recommended enhancements for the intersection can be found in the inset drawing of ‘M’.

Implement new signal at SW 9th Avenue but prohibit left turns from W Burnside to minimize conflicts with traffic along the corridor.
NW Park Avenue & NW 8th Avenue

The Vision Plan had new signals at both of these intersections to allow for more connectivity north and south across W Burnside, as well as safer pedestrian crossings. These signals would be tied into the coordinated system along W Burnside.

The Recommended Plan retains the signal at NW Park Ave but does not have a signal at SW 8th Ave. The signal at SW 8th Ave was removed because it is not essential for traffic operations, and an unsignalized pedestrian crossing (striped) already exists at this location. A new signal at this location has little benefit (if any) for motor vehicles due to the one-way nature of SW 8th Ave (southbound) and the median on W Burnside that prohibits cross movements of W Burnside.

Based on the traffic analysis, the recommended enhancements for the intersection can be found in the inset drawing of ‘N’.

NW 4th Avenue

The original Enhanced Existing Plan did not have any changes to the existing geometry at this intersection. However, to better penetrate the neighborhood to the north (Old Town/Chinatown), the updated Proposed Plan evaluated implementation of an eastbound left turn at SW 4th Ave.

Traffic analysis indicated that the intersection would operate at acceptable standards during the PM peak hour. This was due primarily to a minimal demand for that movement (approximately 40 vehicles in the peak hour).

While the intersection delay was within acceptable standards, the volume-to-capacity measure indicated that the intersection was nearly at capacity (with a value of 0.98). Implementation of a protected eastbound left turn to access NW 4th Ave did have adverse affects on the westbound through traffic. Queuing in the westbound direction extended beyond NW 3rd Ave and nearly back to NW 2nd Ave. For this reason the eastbound left turn was eliminated.

Based on the traffic analysis, the recommended enhancements for the intersection can be found in the inset drawing of ‘P’.

NW Broadway

The Proposed Plan implemented eastbound and westbound left turns to allow for more connectivity to neighborhoods. Allowing left turns at these locations would not meet the City’s LOS standard of D during the peak hours, and queuing during the PM peak hour could fill the entire storage area from Broadway to SW 6th Ave. Adding protected left turns (that require taking green time from other movements) would only worsen these conditions.

Based on the traffic analysis, the recommended enhancements for the intersection can be found in the inset drawing of ‘O’.

Recommended Plan detail

- Implement new signal at NW Park Ave but prohibit left turns from W Burnside.
- Retain unsignalized crossing at NW 8th Ave with striped pedestrian crossing on east leg of intersection.
- Retain existing geometry, but close/realign the south leg of the intersection to reduce the pedestrian crossing distance.
- Add curb extensions at select locations to enhance the pedestrian environment.
Section II: Transportation Analysis

NW 3rd Avenue

The Proposed Plan explored the opportunity to implement a westbound left turn from W Burnside to allow less out of direction travel and promote direct connectivity to the Downtown neighborhood. Further detailed analysis indicated that while the traffic operations were within standard, queuing for the westbound left turn exceeded the available storage (approximately 200-feet of storage). For this reason the left turn was removed from the Recommended Plan. Left turns would then be rerouted to turn right at NW 2nd Ave and travel around the block to head south on NW 3rd Ave (southbound). This type of travel currently exists today for travelers to access Downtown via W Burnside after crossing over the Burnside Bridge.

Based on the traffic analysis, the recommended enhancements for the intersection can be found in the inset drawing of ‘Q’.

Recommended Plan detail

- Retain existing geometry, add curb extensions at select locations to enhance pedestrian environment.

In addition to removing the left turns at NW 3rd/4th Avenues, a test was conducted at NW Broadway to determine if the intersection could operate at adequate levels if eastbound/westbound left turns were allowed. It was further determined that allowing left turns at NW Broadway would be problematic for traffic operations especially if they were allowed and left turns at NW 3rd/4th Avenues were not allowed. This finding reinforced the removal of left turns at NW Broadway.