City of

Bellevue

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TO: Bellevue Transportation Commission

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SUBJECT: Initial DTP 2030 Forecasting Model Results

INTRODUCTION

The update to the Downtown Transportation Plan will address mobility issues and challenges and support Downtown growth and urban livability looking out to 2030.

On October 25, 2012, staff will compare roadway link level of service for the 2010 Base Year with the 2030 Baseline and a 2030 "Build" scenario.

BKR TRAVEL DEMAND MODELING

At the Commission meeting on September 13, staff provided a summary of the 2030 travel demand forecast and proposed a methodology to reflect the forecast number of Downtown "walk trips" that would be factored into calculating Downtown and level of service.

BKR Daily and PM Peak Travel Demand Summary

Based on the 2030 Downtown land use forecast of 19,000 residents and 70,300 jobs, the BKR travel demand model predicts that there will be about 665,000 daily person trips attracted to, produced in, and internal to Downtown Bellevue, broken down as follows:

- Trips attracted to Downtown: 424,000
- Trips produced Downtown: 104,000
- Trips internal to Downtown: 137,000

The PM Peak Hour (5 PM – 6 PM) trip total is about 55,000, broken down as follows:

- Trips attracted to Downtown: 30,000
- Trips produced Downtown: 15,000
- Trips internal to Downtown: 10,000

Downtown "Walk Trip" Reduction

In the BKR travel demand model, all trips made for any purpose between Transportation Analysis Zones (TAZs) are considered to be vehicle trips, even for the short trips between the small TAZs in Downtown Bellevue. BKR results do not include walk trips, only vehicle trips (Transit, HOV, SOV) therefore a supplemental calculation was performed to derive walk trips, as discussed in the following section.

For the 2030 travel demand modeling, results may exaggerate the number of vehicle trips made within Downtown, because not everyone Downtown arrives with a car, and many people Downtown whether they have a car or not, will walk between destinations that are not far apart.

Based on the forecast daily total of 137,000 vehicle trips, the walk trip reduction methodology yields about 76,000 daily Downtown walk trips with a residual of 50,000 daily private vehicle trips. *Note: about 11,000 of the daily vehicle trips are transit trips. While it is expected that some of the short transit trips would in reality be walk trips, the walk trip calculation was not yet done for the transit trips because while it would yield more pedestrian trips it would not further reduce the number of vehicle trips.*

Downtown "Link" Level of Service for Streets

The BKR model can provide a level of service forecast based on the travel demand and the roadway capacity based on the representation in the link impedance approach. While the typical intersection level of service is determined by the aggregate seconds of delay, the link level of service is based on the projected volume of traffic relative to the roadway capacity (V/C). BKR provides the travel demand (volume) for each roadway segment (link) and the capacity of the link is determined by the type of street and the number of travel lanes between intersections.

Downtown roadway link level of service has been calculated for three different situations. Staff will provide detailed graphics for discussion on October 25.

- 2010 Base Year: This is the "existing conditions" basis for measuring change…BKR modeling is validated based on actual counts.
- 2030 Baseline: The BKR model predicts traffic volume based on assumed land use changes and the assumed transportation system network, including both roads and transit.
- 2030 Baseline "Build" Scenario: This scenario adds several transportation system projects to the 2030 baseline network. These projects were tested to determine their effect on overall Downtown mobility. While only one of these projects is physically located within Downtown, the effect on Downtown traffic is evident – and positive, relative to the 2030 Baseline.

"Build" scenario projects that were added for testing to the 2030 baseline are as follows:

- **SR 520:** Ramps to/from east @ 124th Avenue NE
- **SR 520:** Slip ramp eastbound under 148th Avenue NE to 152nd Avenue NE
- **I-405:** Southbound braid from SR 520 to NE 10th Street
- **I-405:** Add one auxiliary lane each northbound and southbound, between SE 8th Street and SR 520
- **I-405:** HOT lanes between NE 6th Street and I-5
- **NE 2nd Street:** Expand arterial to 5-lanes between Bellevue Way and 112th Avenue NE
- **NE 6th Street:** Extend HOV across I-405 and connect to 120th Ave NE
- **Bellevue Way:** Add one HOV lane southbound from 112th Avenue NE to the South Bellevue Park & Ride

Downtown Intersection Level of Service

Over a number of months staff has built and implemented a traffic operations model "Dynameq" for doing dynamic traffic assignment. This is generally known as DTA. We have attended training at PSRC and have hosted two training sessions here at City Hall. One was for FHWA with attendees from various states and agencies and the other was by the vendor. They are the same one that provides the EMME model software used for the BKR model. Hu Dong of our staff also presented a paper at TRB in 2011 titled "Sensitivity Analysis on Dynameq: A View from Practice".

To put it into reference with the BKR Demand Model and VISSIM Model that have been used and presented in earlier city studies, DTA is the mid-level version of the three scales of models. It is important to note that the specific BKR model, with the same assumptions, is used as the forecast base of the traffic that is modeled in both DTA and VISSIM. It continues to be the foundation of the all of the forecasting we do.

With this background on the approach used to compare 2030 Baseline with 2030 Build Scenario, three sets of side-by-side comparison graphics will be presented. Each series is represented as the traffic modeled in 5 minute increments between 5-6pm. The first series will show the link volume occupancy in more detail than was shown in the EMME link volume and capacity display. Next are the queue length series of displays. These show the node impedance that is calculated in this mid-level model that we can't show from the EMME model. The third set is from the intersection delay that can be used for intersection Level of Service comparison.

What appears to occur is that service levels decrease as traffic increases from the base year to the 2030 baseline, aka the "no-build". By adding the potential set of projects listed in the "build" scenario there would be some improvement in downtown traffic flows.