

Task 04

Transit Modeling Update

Technical Memorandum 9

User Benefit Analysis Guidance

Florida Standard Urban Travel Model System

September 2011

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# 1 Introduction

## 1.1 User Benefits and the Cost Effectiveness Measure

Cost effectiveness is one of several criteria considered by the Federal Transit Administration (FTA) when evaluating candidate New Starts and Small Starts projects. The FTA considers the incremental cost per hour of transportation system user benefit between the baseline alternative and the build alternative when evaluating the cost effectiveness (see Table 1).

Table 1: New Starts and Small Starts Project Justification Criteria

Criterion	Measures/Categories
Mobility Improvements (New Starts only)	<ul style="list-style-type: none"><li>• Number of Transit Trips</li><li>• User Benefits per Passenger Mile</li><li>• Number of Transit Dependents Using the Project</li><li>• Transit Dependent User Benefits per Passenger Mile</li><li>• Transit Dependents Compared to Share of Transit Dependents in the Region</li></ul>
Environmental Benefits (New Starts only)	<ul style="list-style-type: none"><li>• EPA Air Quality Designation</li></ul>
Annual Report on Funding Recommendations 8 FY 2012 Evaluation and Rating Process Operating Efficiencies (New Starts only)	<ul style="list-style-type: none"><li>• Incremental difference in system-wide operating cost per passenger mile between the build and the baseline alternatives</li></ul>
Cost Effectiveness (New Starts and Small Starts)	<ul style="list-style-type: none"><li>• Incremental Cost per Hour of Transportation System User Benefit between the baseline and build alternatives</li></ul>
Transit Supportive Land Use (New Starts and Small Starts)	<ul style="list-style-type: none"><li>• Existing Land Use</li></ul>
Economic Development Effects (New Starts and Small Starts)	<ul style="list-style-type: none"><li>• Transit Supportive Plans and Policies</li><li>• Performance and Impacts of Policies</li></ul>

Source: Federal Transit Administration (FTA), *Capital Investment Program FY 2012 Evaluation and Rating Process*, (2010).

Transportation system user benefits reflect the improvements in regional mobility (as measured by the weighted in-vehicle and out-of-vehicle changes in travel-time and cost to users of the regional

transit system) caused by the implementation of the proposed New Starts or Small Starts project. The cost effectiveness measure is calculated by (a) estimating the incremental “base-year” annualized capital and operating costs of the project compared to the baseline cost and then (b) dividing these costs by the projected user benefits. The result of this calculation is a measure of project cost per hour of projected user benefit expected to be achieved if the project is added to the regional transit system.<sup>1</sup>

The FTA Summit software is the prescribed tool for calculating transportation user benefits using inputs created by a travel forecasting model. User benefits are the change in travel costs (expressed in minutes of in-vehicle time) for all riders (existing and new riders) between origin-destination zone pairs resulting from changes in one or more travel modes, (e.g. changes in: transit fare; out-of-vehicle time; in-vehicle time, etc.).

## 1.2 SUMMIT as a diagnostic tool

Summit is a software tool developed by the FTA for calculating transportation user benefits and for data extraction, comparison, reporting and presentation of data from travel demand models. Summit’s reports are user-customizable and can be produced in various formats for easy consumption. Summit can be used to present district level summaries and changes in trip tables and impedance tables which can be mapped to a GIS layer, making it a very useful tool for graphical presentation and visualization of the travel model outputs.

Summit can also be used as a diagnostic tool. The software can be used to report how change in transit access coverage contributes to change in user benefits. Zones with significant loss or gain of user benefits can be identified for further review to determine if the changes are the result of the planned project or errors in network connectivity. Summit’s trip length frequency distribution reports can also be used to compare the number of trips being affected by changes in level of service. The trip length frequency distribution would not identify locations (zones) of concern but it may provide insights for further investigation and diagnostics, such as identification of how user benefits vary with trip distance, or how the user benefit vary with the change in transit price. Summit’s row and column summary reports may then be used to get detailed data at specific zonal interchanges. Summit can report row and column summaries for selected zones from any of the travel model inputs to Summit. The data from row and column summary reports can also be exported to a GIS file for mapping and easy visual inspection.

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<sup>1</sup> Federal Transit Administration (FTA), *Capital Investment Program FY 2012 Evaluation and Rating Process*, (2010)



## 2 Understanding the User Benefit Measure

### 2.1 Review of principles

#### 2.1.1 Mathematical Underpinnings

The calculation of user benefit is based on the microeconomic theory of consumer surplus.<sup>2</sup> Consumer surplus is used to measure the benefits obtained by consumers who purchase a particular product at a particular price. For the calculation of transportation user benefit, the consumer surplus is derived from the change in the price of travel for all users and for all modes. Consider Figure 1 and the example below.

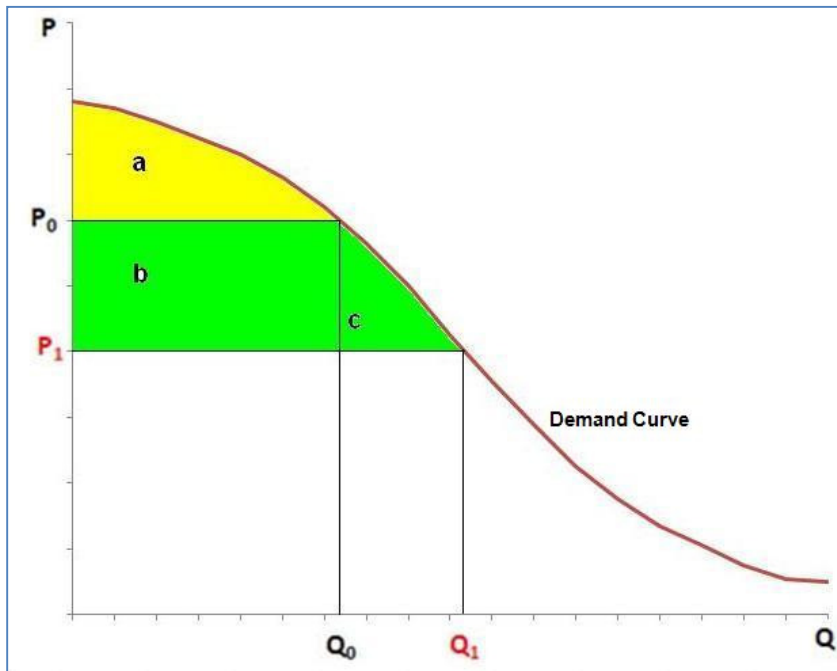
Suppose  $P_0$  is the price (generalized cost) of travel between two zones for a transit service (the Do-Nothing Alternative). At that price, the number of persons willing to ride the transit service between the two zones is  $Q_0$ . The consumer surplus for riders on the existing service is represented by the yellow area in Figure 1, i.e. the area between the horizontal line at  $P_0$  and the demand curve.

Assume that the transit service between the two zones is improved (the Build Alternative) and the new price of travel between the two zones is now  $P_1$ . At this lower price it is estimated that the number of riders between the two zones will increase to  $Q_1$ . The consumer surplus at the new price  $P_1$  is represented by the sum of the yellow and green areas in Figure 1 (i.e. the area between the horizontal line at  $P_1$  and the demand curve).

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<sup>2</sup> Federal Transit Administration. (n.d.). *User's Guide to Summit*. Unpublished

Figure 1: Consumer Surplus



The increase in consumer surplus is the area between the price that existed before ( $P_0$ ), the new price ( $P_1$ ), and the demand curve. The change in consumer surplus affects two groups of transit riders: the riders who previously used the service when the price was at  $P_0$  (the Do-Nothing Alternative); and the new riders who will use the improved service at the lower price ( $P_1$ ). Each rider who previously used the Do-Nothing Alternative service will now receive extra benefits of  $P_1 - P_0$ , resulting in a total benefit of  $((P_1 - P_0) * Q_0)$  for those riders (represented by the green rectangular area "b"). The new riders switched to transit at a price between  $P_0$  and  $P_1$  and therefore the average new rider will benefit from a consumer surplus of approximately  $((Q_1 - Q_0) * (P_1 - P_0)/2)$ , represented by the green triangular area "c".

In Summit, all modes used by the riders are considered so as to account for riders who need to switch modes to get from the origin zone to the destination zone and the price each rider pays is the composite price for all modes used by the rider. This composite price (also called the composite utility or composite impedance) is obtained from the denominator of the logit mode choice model (also referred to as the log sum) and is converted to equivalent minutes of in-vehicle time by dividing by the coefficient on in-vehicle time in the mode choice model.

Summit calculates user benefits by trip purpose and time period. The following equations represent Summit's calculation of user benefits<sup>3</sup>:

$$UB_{ij} = Trips_{ij} \times \Delta P_{ij}$$

Where:

*UB<sub>ij</sub>* = user benefits for travelers from Zone i to Zone j

*Trips<sub>ij</sub>* = person trips from i to j in the base alternative

*ΔP<sub>ij</sub>* = change in the overall price of travel from i to j considering all mode

The change in the overall price is calculated as:

$$\Delta P_{ij} = \frac{\{\ln(\sum_m \exp(U_m^B)) - \ln(\sum_m \exp(U_m^b))\}}{C_{ivt}}$$

Where:

*ΔP<sub>ij</sub>* = change in the overall price of travel from i to j considering all mode

$\sum_m \exp(U_m^b)$  = inclusive price for baseline

$\sum_m \exp(U_m^B)$  = inclusive price for build alternative

*m* = set of available modes

*C<sub>ivt</sub>* = coefficient on in – vehicle time

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<sup>3</sup> Federal Transit Administration. (2009, March). Travel Forecasting for New Starts – Summit Tutorial. Retrieved from [http://www.fta.dot.gov/documents/Day1\\_Summit.ppt](http://www.fta.dot.gov/documents/Day1_Summit.ppt)

## 2.2 Implementation in Model Sets

The inputs required by Summit include files that are outputs from the travel model. These inputs include trip tables, impedance tables, zonal attributes, prices and quantity files, and a zone to district equivalency file (for district level aggregation). To successfully implement Summit, the travel model must create the outputs required by Summit, including the standard FTA output file (the price and quantities file) which must be saved in binary format with no end-of-record character. Table 2 defines the format and contents of the header record and Table 3 defines the format and contents of the data records.<sup>4</sup> Each data record provides information for one socio-economic market segment for one zone-to-zone interchange.

**Table 2: Format and Contents of the Header Record**

<b>Field</b>	<b>Format</b>	<b>Bytes</b>	<b>Contents</b>
1	Integer	4	Number of zones
2	Integer	4	Number of market segments
3	Real	4	Coefficient on transit in-vehicle time
4	Real	4	Coefficient on auto in-vehicle time
5	Alphabetic	6	Travel purpose
6	Alphabetic	6	Time of day
7	Alphabetic	60	Name of this alternative

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<sup>4</sup> Federal Transit Administration. (n.d.). User's Guide to Summit. Unpublished

Table 3: Format and Contents of the Data Records

Field	Format	Bytes	Contents
1	Integer	2	Production zone number
2	Integer	2	Attraction zone number
3	Integer	2	Socio-economic market segment number
4	Real	4	Person trips in this market segment
5	Real	4	Auto and transit person trips in this market segment
6	Real	4	Exponentiated utility for auto
7	Real	4	Fraction of person trips in this segment that have a walk-to-transit path
8	Real	4	Transit share of person trips that have a walk-to-transit path
9	Real	4	Fraction of person trips in this segment that have only a drive-to-transit path
10	Real	4	Transit share of person trips that have only a drive-to-transit path

The FTA standard output file created by mode choice should comply with the following aggregation scheme:<sup>5</sup>

- *Trip Purposes*: One output file must be written for each trip purpose simulated in mode choice.
- *Socio-economic Characteristics*: Each trip-interchange record in the output file for each trip purpose is specific to a socio-economic market segment, within one zone-to-zone interchange. A model with four income classes, for example, must produce four income specific records for each zone-to-zone interchange.
- *Trip-end Geography*: Each record in the output file for each trip purpose must be specific to one zone-to-zone interchange, for one socio-economic market, with separate entries on the record for three different geographic market segments:
  - Trips for which there is walk access to transit, regardless of any other means of access.
  - Trips for which there is only drive access to transit.
  - Trips for which there is no available transit path.

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<sup>5</sup> Federal Transit Administration. (n.d.). User's Guide to Summit. Unpublished

The FTA standard output file must also be able to address anomalies in the availability of trip-interchange-specific information that may result from, for example:

- Dummy zones (zero or missing data) in the trip tables and impedance tables.
- Intrazonal trips (trips from and to the same zone) and trips to external stations.

The FTA requires the use of fixed person trip tables and stipulates that the No-Build person trip-tables must be used for all alternatives.

## 3 SUMMIT Application Basics

### 3.1 Overview

Summit is a console application, written in FORTRAN, that can be run from a DOS or Windows command prompt either directly or using a batch file. The software can read text files and native matrix files from travel modeling platforms including Tranplan, MinUTP and EMME/2.

The zone to zone interchange level “prices and quantities” information required by Summit for user benefit calculations are output as binary files by mode choice when the travel demand model is run. A Summit user benefit analysis required user benefit files from a baseline alternative and a build alternative.

When analyzing user benefits, Summit creates internal tables which are segmented by transit access markets. Summit defines three categories of transit access markets: can walk to transit (CW), where walk access is possible; must drive to transit (MD), where only drive access is possible; and no transit (NT), where no transit is available. This produces nine transit access market designations that are used for tabulating the trips, user benefits and interchanges for which transit access remain the same between the baseline and the build alternative and those for which some change in transit access occurs:

- Can Walk – Can Walk (CW-CW) - Trips, user benefits or interchanges for which there is no change in “can walk” access coverage between the baseline and build alternative.
- Can Walk – Must Drive (CW-MD) - Trips, user benefits or interchanges for which access coverage has changed from “can walk” to “must drive”.
- Can Walk – No Transit (CW-NT) - Trips, user benefits or interchanges for which access coverage has changed from “can walk” to “no transit”.
- Must Drive – Can Walk (MD-CW) - Trips, user benefits or interchanges for which access coverage has changed from “must drive” to “can walk”.
- Must Drive – Must Drive (MD-MD) - Trips, user benefits or interchanges for which there is no change in “must drive” access coverage.
- Must Drive – No Transit (MD-NT) - Trips, user benefits or interchanges for which access coverage has changed from “must drive” to “no transit”.
- No Transit - Can Walk (NT-CW) - Trips, user benefits or interchanges for which access coverage has changed from “no transit” to “can walk”.
- No Transit – Must Drive (NT-MD) - Trips, user benefits or interchanges for which access coverage has changed from “no transit” to “must drive”.
- No Transit – No Transit (NT-NT) - Trips, user benefits or interchanges for which there is no change in “no transit” access coverage.

Summit creates internal tables for each socioeconomic market segment that is tabulated in the “prices and quantities” file (see Table 4),

These internal tables include:

- All trips in the Baseline (BASE) segmented by each of the access markets and one table for all access markets. (Internal tables 1 to 10).
- All trips in the Build alternative (ALT) segmented by each of the access markets and one table for all access markets. (Internal tables 11 to 20).
- Transit trips in the Baseline segmented by each of the access markets and one table for all access markets. (Internal tables 21 to 30).
- Transit trips in the Build segmented by each of the access markets and one table for all access markets. (Internal tables 31 to 40).
- User benefits for auto and transit modes segmented by each of the access markets and one table for all access markets. (Internal tables 41 to 50).
- User benefits for auto modes segmented by each of the access markets and one table for all access markets. (Internal tables 51 to 60).
- User benefits for transit modes segmented by each of the access markets and one table for all access markets. (Internal tables 61 to 70).
- User benefits for asymmetric trips segmented by each of the access markets and one table for all access markets. (Internal tables 71 to 80).

It should be noted however that Summit can only reference ninety-nine working tables, numbered t1 to t99. These working tables, in addition to the inputs, outputs and table manipulations are specified and referenced using a text based control file for each trip purpose. Summit is implemented from the command line using this control file. Batch files may be used to automate the process of running Summit for more than one trip purpose. A sample Summit control file is included at Appendix A.



Table 4: Summit Internal Table References for User Benefit Calculations

Table	Contents	Conditions	Markets
01	trips all	BASE	CW-CW
02	trips all	BASE	CW-MD
03	trips all	BASE	CW-NT
04	trips all	BASE	MD-CW
05	trips all	BASE	MD-MD
06	trips all	BASE	MD-NT
07	trips all	BASE	NT-CW
08	trips all	BASE	NT-MD
09	trips all	BASE	NT-NT
10	trips all	BASE	TOTAL
11	trips all	ALT	CW-CW
12	trips all	ALT	CW-MD
13	trips all	ALT	CW-NT
14	trips all	ALT	MD-CW
15	trips all	ALT	MD-MD
16	trips all	ALT	MD-NT
17	trips all	ALT	NT-CW
18	trips all	ALT	NT-MD
19	trips all	ALT	NT-NT
20	trips all	ALT	TOTAL
21	trips trn	BASE	CW-CW
22	trips trn	BASE	CW-MD
23	trips trn	BASE	CW-NT
24	trips trn	BASE	MD-CW
25	trips trn	BASE	MD-MD
26	trips trn	BASE	MD-NT
27	trips trn	BASE	NT-CW
28	trips trn	BASE	NT-MD
29	trips trn	BASE	NT-NT
30	trips trn	BASE	TOTAL
31	trips trn	ALT	CW-CW
32	trips trn	ALT	CW-MD
33	trips trn	ALT	CW-NT
34	trips trn	ALT	MD-CW
35	trips trn	ALT	MD-MD
36	trips trn	ALT	MD-NT
37	trips trn	ALT	NT-CW
38	trips trn	ALT	NT-MD
39	trips trn	ALT	NT-NT
40	trips trn	ALT	TOTAL

Table	Contents	Conditions	Markets
41	userbens	Total	CW-CW
42	userbens	Total	CW-MD
43	userbens	Total	CW-NT
44	userbens	total	MD-CW
45	userbens	total	MD-MD
46	userbens	total	MD-NT
47	userbens	total	NT-CW
48	userbens	total	NT-MD
49	userbens	total	NT-NT
50	userbens	total	TOTAL
51	userbens	auto	CW-CW
52	userbens	auto	CW-MD
53	userbens	auto	CW-NT
54	userbens	auto	MD-CW
55	userbens	auto	MD-MD
56	userbens	auto	MD-NT
57	userbens	auto	NT-CW
58	userbens	auto	NT-MD
59	userbens	auto	NT-NT
60	userbens	auto	TOTAL
61	userbens	transit	CW-CW
62	userbens	transit	CW-MD
63	userbens	transit	CW-NT
64	userbens	transit	MD-CW
65	userbens	transit	MD-MD
66	userbens	transit	MD-NT
67	userbens	transit	NT-CW
68	userbens	transit	NT-MD
69	userbens	transit	NT-NT
70	userbens	transit	TOTAL
71	userbens	trip asym	CW-CW
72	userbens	trip asym	CW-MD
73	userbens	trip asym	CW-NT
74	userbens	trip asym	MD-CW
75	userbens	trip asym	MD-MD
76	userbens	trip asym	MD-NT
77	userbens	trip asym	NT-CW
78	userbens	trip asym	NT-MD
79	userbens	trip asym	NT-NT
80	userbens	trip asym	TOTAL

## 3.2 Control File Parameters

### 3.2.1 Important Keywords

The Summit control file is a text file with specifications and parameters contained in blocks of text. Each block begins with a keyword followed by lines containing specifications and controls for the block, and each block ends with the keyword **&END**. Some important keywords used in a typical Summit control file are described below.

#### 3.2.1.1 &FNAMES

The **&FNAMES** block is the first specification block in the Summit control file. It is used to specify the paths and file names for Summit's inputs and outputs. The following specifications are used for Summit input files:

- **fequiv** - Specification for the TAZ to District equivalency file used to aggregate Summit interchange outputs to the district level.
- **f<sub>table 1</sub>** - Specification for the Prices and Quantities file from the Baseline's mode choice for the particular trip purpose.
- **f<sub>table 2</sub>** - Specification for the Prices and Quantities file from the Build alternative's mode choice for the particular trip purpose.
- **pqfiles** - Specification to identify which input tables (**f<sub>tables</sub>**) are the prices and quantities tables.

Summit writes out a standard ASCII report file. The report contains quantities, prices and user benefits aggregated at the district level and by market segment. Additionally, the user may specify output files including: trip length frequency report; zone level user benefit report; district to district summary report; and stratified trip tables.

The following specifications are used for Summit output reports and files:

- **freport** - Specification for the standard ASCII report file created by Summit (\*.rpt).
- **ftlfd** - Specification for trip length frequency distribution report (\*.tlf).
- **fddub** - Specification for the output table that contains district to district summary for 80 user benefit internal tables.
- **frcub** - Specification for output file containing zone level standard user benefit tables.
- **frcsums** - Specification for zone level output file containing select user benefits tables for row and column sums (\*.rcs). The rows and columns are specified in the **&PARAMS** block.
- **frcvals** - Specification for zone level output file containing selected row and column values (\*.rcv). The rows and columns are specified in the **&PARAMS** block.
- **fstrats** - Specification for an output file with zone level stratified trip tables (\*.str). The table is stratified using user specified impedance breakpoints. The breakpoints are specified in the **&ANALYSIS** block.

Exhibit 1 shows an example of a typical **&FNAMES** block in a Summit control file for the peak period home-based work trip purpose.

Exhibit 1: Example of **&FNAMES** Block with File References

<b>&amp;FNAMES</b>	
freport='hbwpk.rpt'	! Standard Summit output report, HBWPK
fequiv='distr_eqv.txt'	! Zone to district equivalency file
ftable1='..\ub_NB\ NB_PK_HBW.UserBen'	! P&Q file, NB mode choice, HBWPK
ftable2='..\ub_Alt3\ Alt3_PK_HBW.UserBen'	! P&Q file, Alt3 mode choice, HBWPK
ftable3='..\NB\NB_PK.Skim'	! Peak period skim file, NB
ftable4='..\Alt3\Alt3_PK.Skim'	! Peak period skim file, Alt3
ftlfd='hbwpk.tlf'	! Trip length frequency distribution, HBWPK
frcsums='hbwpk.rcs'	! Selected user benefit tables, HBWPK
frcvals='hbwpk.rcv'	! Selected row and column values, HBWPK
fstrats='hbwpk.str'	! Stratified trip tables, HBWPK
fdub='hbwpk.d2d'	! District to district summaries, HBWPK
frcub='hbwpk.rcu'	! Zone level user benefit tables, HBWPK
pqfiles=1,2	! Indicates ftable1 and ftable2 are P&Q files
<b>&amp;END</b>	

### 3.2.1.2 **&PARAMS**

The **&PARAMS** block in the control file is where the user specifies the number of zones, number of districts, format of the travel model input and output tables being called or created by Summit, and the GIS output format .

The following specifications can be found in the **&PARAMS** block of a typical Summit control file:

- **ndistr** - References the number of districts specified in the zone to district equivalency file that was specified in the **&FNAMES** block.
- **nzones** - References the number of traffic analysis zones in the travel model.
- **maxdp** - Specification for the cap used to limit unreasonable levels of change in zone-to-zone transit price. The caps are specified in equivalent minutes of in-vehicle time and the FTA currently recommends a lower bound of -45 minutes and an upper bound of +45 minutes of equivalent in-vehicle time.
- **softtabi** - Specifies the format of the input tables from the travel mode.
- **softtabo** - Specifies the format to be used for writing output tables that could be read by the travel model.
- **prteqv** - Specifies whether or not the zone to district equivalency should be written to the standard Summit report file.

Exhibit 2 shows an example of a typical **&PARAMS** block in a Summit control file.

**Exhibit 2: Example of &PARAMS Block in a Summit Control File**

```
&PARAMS
ndists=20                ! Number of districts
nzones=3731             ! Number of TAZs
maxdp=45,9999,9999,9999,45,9999,9999,9999,45    ! Cap on change in transit price
softtabi='tranplan'     ! Format of input tables from travel model
softtabo='tranplan'     ! Format of output tables
prteqv=F
&END
```

### 3.2.1.3 **&PAGES**

The specifications for page width and page height for the Summit output report and tables are placed in the **&PAGES** block. Typical specifications in the **&PAGES** block of the Summit control file include:

1. **pageh** - Specifies page height of output reports (in lines).
2. **pagew** - Specifies the page width of output reports (in character spaces).

Exhibit 3 shows an example of a typical **&PAGES** block in a Summit control file with the page height for output set as 60 lines and the page width set as 130 spaces.

**Exhibit 3: Example of &PAGES Block in a Summit Control File**

```
&PAGES
pagew=130               ! Page width for output reports.
pageh=60                ! Page height for output reports.
&END
```

### 3.2.1.4 **&TABLES**

Summit can reference a maximum of 99 working tables (t1 to t99). These working tables include internal tables tabulated by Summit, trip tables, impedance tables, zonal data and user benefit tables.

Additional working tables are required for each additional socioeconomic market being analyzed. Therefore it is sometimes necessary to aggregate some tables so as to keep within the limit of 99 working tables. When this is the case, the user may choose to maintain the lowest income or lowest vehicle ownership market (usually considered the most important socioeconomic market) and aggregate

two or more of the other socioeconomic markets so as to satisfy the 99 working tables limit. Alternatively, the analyst may choose to aggregate access market segments for a particular trip purpose.

When Summit is not being used for user-benefit analysis (i.e. quality of service calculations based on trip tables and impedance tables from the travel model), the nine access markets are not considered, user benefits are not calculated and the user benefit internal tables are not tabulated. In such analyses the Summit control file is used to reference trip tables and impedance tables as working tables.

Whatever the purpose of the Summit application, the working tables (t1 up to t99) are specified in the **&TABLES** block of the Summit control file, thereby making them available for calculations and reporting.

Table specification and referencing are discussed at Section 3.2.2.

### 3.2.1.5 **&ANALYSIS**

Summit also provides the user with the capability to analyze the data contained in any working table, including trip tables and “prices and quantities” files. The user can specify trip length frequency distributions, trip tables stratified by change in price of travel, and the reporting of specific row and column sums and row and column values from selected working tables. Selected zone level interchanges may also be specified for analysis. The specifications for analysis of data using Summit, including trip length frequency distribution reports, row and column sums reports, row and column value reports, and stratified trip tables are all specified in the **&ANALYSIS** block of the control file. The working tables referenced in the **&ANALYSIS** block are specified in the **&TABLES** block.

The following specifications are used for in the **&ANALYSIS** block:

3. ***tlfN=a,b*** - References the working tables to be used for the N<sup>th</sup> trip length frequency distribution, where N is a sequential number 1 to x, ***a*** is the working table number for a quantities (trips) table, and ***b*** is the working table number for a price of service (impedance) table . A specification of ***tlf1=21,31*** instructs Summit to create a frequency distribution of values in working table 21 by working table 31.
4. ***intvltlf*** - Specifies the interval to be used for the frequency distribution.
5. ***trcsums*** - References the working tables to be used for the row and column sums report. A specification of ***trcsums=1,5*** instructs Summit to report the row and column sums from working table 1 and working table 5.
6. ***trcvals*** - References the working tables to be used for the row and column values report. A specification of ***trcvals=1,5*** instructs Summit to report the row and column values, for selected zone interchanges, from working table 1 and working table 5.
7. ***izvals*** - Specifies the i-zones to be used for the row and column values report.
8. ***jzvals*** - Specifies the j-zones to be used for the row and column values report.

9. **tstrat=a,b** - References the tables to be used for creating a stratified trip table report (district –to-district), where **a** is the working table number for a quantities (trips) table, and **b** is the working table number for a price of service (impedance) table. A specification of **tstrat=21,31** instructs Summit to create a stratified table of values in working table 21 by working table 31.
10. **bpstrats** - Specifies the breakpoints to be used to create the stratified trip table specified by **tstrat**. A specification of **bpstrats=-45.0,-10.0,-0.0001,0.0001,10.0,45.0** instructs Summit to create stratified trip tables with breakpoints at **-45.0, -10.0, -0.0001, 0.0001, 10.0,** and **45.0**. For this particular case, seven tabular district-to-district stratified tables would be created, one for each of the six break points specified at **bpstrats** and one for a break point at 0.
11. **tlineN** - Specifies the text to be used for the  $N^{th}$  title line of the stratified trip table report. A **"#"** could be used in a title line to instruct Summit to number each stratified table sequentially. A specification of **tline1='Report 2-#'** instructs Summit to write "Report 2-#" as the first title line of each stratified table report, where # is the number of the stratified table. For specifications of **bpstrats=-45.0,-10.0,-0.0001,0.0001,10.0,45.0** and **tline1='Report 2-#'**, the stratified table at breakpoint -45.0 would have **"Report 2-1"** as its first title line and the stratified table at breakpoint +10.0 would have **"Report 2-6"** as its first title line.

Exhibit 4 shows an example of a shortened **&ANALYSIS** block in a Summit control file.

**Exhibit 4: Example of &ANALYSIS Block in a Summit Control File**

```
&ANALYSIS
tlf1=21,31          ! Trip length freq distrib 1, working table 21 by working table 31
tlf2=22,32          ! Trip length freq distrib 2, working table 22 by working table 32
tlf3=23,33          ! Trip length freq distrib 3, working table 23 by working table 33
tlf4=24,34          ! Trip length freq distrib 4, working table 24 by working table 34
tlf5=25,35          ! Trip length freq distrib 5, working table 25 by working table 35
intvltlf=5.0        ! Interval for the trip length freq distrib LOS term
trcsums=1,5         ! Row and column sums report, working tables 1 and 5
trcvals=1,5         ! Row and column values report, working tables 1 and 5
izvals=1710         ! i-zones for row and column values
jzvals=1288,1568    ! j-zones for row and column values
tstrat=21,31        ! Stratified trip table, working table 21 by working table 31
bpstrats=-45.0,-10.0,-0.0001,0.0001,10.0,45.0 ! Break points for Stratified trip table
tline1='Report 2-#' ! Title line 1 for district level stratified trip table
tline2='HBW Person Trips Stratified by Change in Transit Price'
tline3='(Price in Minutes)'
tline4='Trips by Low Income Households'
&END
```

### 3.2.1.6 &TRPT

The district level summaries in the standard Summit reports are specified in several trip report (**&TRPT**) blocks in the control file. Any working table specified in the **&TABLES** block of the control file can be aggregated to the district level. A separate **&TRPT** block is used for specifying each district level summary report. Exhibit 5 shows an example of a typical **&TRPT** block.

The following specifications are used in the **&TRPT** block:

- 12. **t** - References the working table that would be used to create the district level summary report. A specification of **t=5** instructs Summit to create a district level summary report from working table 5.
- 13. **pafmt** - Specifies the format of the district level summary report as Production/Attraction (P/A) or Origin/Destination (O/D). Acceptable specifications are **pafmt=T** (true) or **pafmt=F** (false).
- 14. **places** - Specifies the maximum number of digits to the left of the decimal when formatting numeric data in the summary table.
- 15. **dplaces** - Specifies the maximum number of digits to the right of the decimal when formatting numeric data in the summary table.
- 16. **scale** - Specifies the scaling factor for numeric data in the summary table. A specification of **scale=0.01667** for a user benefit summary would cause the user benefits to be tabulated in hours and not minutes, (i.e. 1 /60 = 0.01667).
- 17. **tlineN** - Specifies the text to be used for the  $N^{th}$  title line of the specified district level summary report, where  $N$  is a numeric value.
- 18. **source** - Specifies the source of the data used for the district level summary report. This information will be written below the summary table in the standard Summit report. Example: **source='Mode Choice Model'**.

Exhibit 5: Example of a **&TRPT** Block in a Summit Control File

&TRPT	
t=5	! Working table that will provide data
pafmt=T	! District level summary will be in P/A format
places=7	! Format of data in summary, 7 digit integer
scale=0.01666667	! Convert minutes of UB to hours of UB
tline1='Report 1-5'	! Title line 1 of district level summary
tline2='User Benefits (hours) for the TSM vs.ALT'	! Title line 2 of district level summary
tline3='Total'	! Title line 3 of district level summary
tline4='All Transit-Access Markets'	! Title line 4 of district level summary
tline5='Non-Home Based'	! Title line 5 of district level summary
source='Mode-choice application'	! Source of Summit data file
&END	

### 3.2.2 Table Specifications and Referencing

#### *Table Specification and Referencing for User Benefit Analysis*

Summit's inputs, outputs and working tables are specified using strict syntax. For user benefit analysis, the internal tables are referenced using the syntax **umnn**,

where,

- u** - indicates that the table is an internal table for user benefit analysis
- m** - is an integer value that indicates the socioeconomic market segment
- nn** - is an integer value that indicates the number of the user benefit internal table (see

When aggregation of all socioeconomic market is desired the value of **m** is set to one more than the number of socioeconomic markets. Therefore, for a trip purpose with four market segments the reference:

**t1 = 'u501'**

specifies working table **t1** as the sum of all trips in the Base scenario for the "Can Walk – Can Walk" access market (see Table 4).

The user can also aggregate trips or user benefits for all nine access markets by using Summit's internal table 10, 20, 30, 40, 50, 60, 70 or 80 which specifies the total trips or total user benefits for all access markets. Therefore for a particular trip purpose the reference:

**t1 = 'u110'**

specifies working table **t1** as the total number of trips for the particular trip purpose in socioeconomic market segment 1 in the Base scenario for all access markets (see Table 4)

Similarly;

**t2 = 'u170'**

specifies working table **t2** as the total user benefits for transit riders for the particular trip purpose in socioeconomic market segment 1 in the build alternative compared to the baseline Base for all access markets (see Table 4).



### Table Specification and Referencing for Non-User Benefit Analysis

When Summit is used for non-user benefit applications, no internal tables are tabulated. For such applications the inputs, which may include trip tables and impedance tables from the travel model, are referenced by Summit as working tables using the syntax *tfnn*,

where,

- t** - indicates that the table is a trip table or impedance table from the travel model
- f** - indicates the sequential **f**table number of the referenced file (see the **&FNAMES** block)
- nn** - indicates the sequential order of the desired table in file **m**

For example, assume that in the **&FNAMES** block of a Summit control file, **f**table4 specifies a skim matrix file that includes four skim tables for a particular alternative. The first skim table is for the AM peak period, the second skim table is for the midday period, the third skim table is for the PM peak period, and the fourth skim table is for the night period. Therefore;

**t6 = 't403'**

specifies working table **t6** as the PM peak skim table for the particular alternative

#### 3.2.3 Table Computation Syntax

A table specification may include arithmetic operators for addition (+), subtraction (-), multiplication (\*), and division (/) but cannot include the use of parenthesis to specify the order in which the calculation is carried out. To get around this restriction, each specification is defined as a set of one to twenty terms, where the terms are linked additively (by addition or subtraction) and each term consists of one to three elements that are combined multiplicatively (by multiplication or division).

A specification that is additive in its references may have up to twenty terms but a specification that is multiplicative in its reference can have only one term. The following are examples of specifications that include arithmetic operations:

- t1 = 't101 + t102 + t103 + t104'** - Working table specification with additive reference of four terms. Working table 1 is the sum of four input tables.
- t2 = 't201 + t202 + t203 + t204'** - Working table specification with additive reference of four terms. Working table 2 is the sum of four input tables.
- t3 = 't2 - t1'** - Working table specification with additive reference of two terms. Working table 3 is the difference between working table 2 and working table 1.
- t4 = '100 \* t3/t1'** - Working table specification with multiplicative reference. Only one term is permitted in a multiplicative reference. Working table 4 is the product of 100 and the ratio of working table 3 to working table 1.

Exhibit 6 shows a part of a typical **&TABLES** block in a Summit control file. The specifications shown are referencing Summit internal tables and previously specified working tables that referenced internal tables.

Exhibit 6: Example of &TABLES Block (part) in a Summit Control File

```
&TABLES  
  t 1 = 'u410'  
  t 2 = 'u420-t1'  
  t 3 = 'u430'  
  t 4 = 'u440-t3'  
  t 5 = 'u450'  
  t 6 = 'u460'  
  t 7 = 'u470'  
  t 8 = 'u480'  
  t11 = 'u150'  
  t12 = 'u250'  
  t13 = 'u350'  
  t14 = 't11/t5'  
  t21 = 'u101'  
  t22 = 'u102'  
  t23 = 'u103'  
  t24 = 'u104'  
  t25 = 'u105'  
  t26 = 'u106'  
  t27 = 'u107'
```

### 3.3 Inputs

#### 3.3.1 Standard User-Benefit Files

Summit's standard input user benefit (or "prices and quantities") files are produced by the travel model's mode choice in a binary format specified for Summit compatibility. Each file contains the zone-to-zone data records for one trip purpose for an alternative. Each data record is specific to one socio-economic market for each zonal interchange and contains information for each of three access market segments, namely: "can walk", "must drive" and "no transit" (see Section 2.2). The format and contents of the header record and the data records of the standard user benefit file are shown at Table 2 and Table 3.

### 3.3.2 Matrix Files

Summit can read trip tables and impedance tables from native matrix files created by Tranplan, MinUTP and EMME/2. The matrix files are referenced in the **&FNAMES** block and the format of the matrix file is specified in the **&PARAMS** block.

### 3.3.3 Input Vectors (“Flat”) Files

Input vectors (or flat files) are zonal or district attributes files in which each record contain attribute data for a single zone or district. Input vectors used by Summit are limited to 101 fields that are each 10 spaces wide for labels and data records. Each record in the vector file refers to a single zone or district. Summit can read “flat” files that are in dBase (.DBF), comma-separated value (.CSV), or ASCII format.

### 3.3.4 Zone/District Equivalency File

The zone-to-district equivalency file provides information that Summit uses to aggregate zone level data to the district level. The file is in ASCII format and contains records of the zone-to-district specifications. Each record specifies a district number, the zones (listed individually or using ranges) to be associated with that district number and the name of the district. A single district may be specified in one or more records using the same district number but there should be no duplication of zone numbers in the file. Each zone must be associated with only one district. Each record in the file begins with the keyword ***DIST.***

The district names specified in the zone-to-district files should be no longer than 10 characters. Longer names would be truncated by Summit. Also, the number of districts in the zone-to-district equivalency file must be no more than the number of districts specified in the control file. To facilitate printing of the standard Summit report on a letter size page the user should consider keeping the number of districts to about 20. The standard Summit report contains several district-to-district tables and for a 20-district x 20-district trip table to be printed onto a letter-size page, the orientation would have to be set to “Landscape” and the font size would have to be reduced to 7.

Exhibit 7 shows an example of zone-to-district equivalency specification for twenty districts. Some districts are specified on more than one record.

**Exhibit 7: Example of Zone-to-District Equivalency Specification**

DIST 1 = 2548-2699	Riverside
DIST 1 = 2996-3731	Riverside
DIST 2 = 2067-2084, 2087-2088	SGV East
DIST 2 = 2090-2268	SGV East
DIST 3 = 1093-1096, 1159-1285	Gateway
DIST 3 = 1356-1369, 1382-1385	Gateway
DIST 3 = 1398-1405, 1446-1511	Gateway
DIST 3 = 1523-1708	Gateway
DIST 4 = 881-1092, 1097-1158	South Bay
DIST 4 = 1406-1445, 1512-1522	South Bay
DIST 5 = 575-613, 742-744, 746-747	Westside
DIST 5 = 749, 751-753, 798-810	Westside
DIST 6 = 1-12, 521-526	Malibu
DIST 7 = 2700-2881	SBD
DIST 8 = 2269-2547	OC
DIST 9 = 405-428, 1764-1805	Arroyo
DIST 9 = 1885-1888, 1890	Arroyo
DIST 10 = 1296, 1725-1736	LA CBD
DIST 10 = 1855-1856	LA CBD
DIST 11 = 620-621, 628-634, 639-646	LA Central
DIST 11 = 689-712, 716-719, 721-733	LA Central
DIST 11 = 754-797, 811-850, 852-855	LA Central
DIST 11 = 857-861, 863-865, 867-880	LA Central
DIST 11 = 1709-1724, 1740-1746	LA Central
DIST 11 = 1748-1750, 1752-1757, 1849	LA Central
DIST 12 = 13-184, 186-187, 1884	LA North
DIST 13 = 2882-2995	Ventura
DIST 14 = 851, 856, 862, 866	East LA
DIST 14 = 1286-1295, 1297-1338	East LA
DIST 14 = 1340-1355, 1370-1381	East LA
DIST 14 = 1386-1397, 1737-1739	East LA
DIST 14 = 1747, 1751, 1758-1763	East LA
DIST 14 = 1859-1883	East LA
DIST 15 = 185, 188-404, 429-520	SFV
DIST 16 = 1339, 1889, 1891-2066	SGV West
DIST 16 = 2085-2086, 2089	SGV West
DIST 17 = 539-574	SantaMonica
DIST 18 = 654-688, 734-741	CenturyBev
DIST 18 = 745, 748, 750	CenturyBev
DIST 19 = 527-538, 614-618	Brentwood
DIST 20 = 619, 622-627, 635-638	Glendale
DIST 20 = 647-653, 713-715, 720	Glendale
DIST 20 = 1806-1848, 1850-1854	Glendale
DIST 20 = 1857-1858	Glendale

**3.3.4.1 General guideline for defining district geography**

Districts should be defined so that they demarcate significant travel markets that are likely to be impacted by the project being analyzed. The district definition should aid in the analysis of travel flows between areas of interest to the study. The number of districts should be kept to about 20 or less for

the reasons states earlier. The district boundary should be based on the TAZ system so that each district consists of one or more TAZs. Where possible, contiguous areas with high residential population should be placed in districts separate from contiguous areas with high employment. The central business district (CBD) should have its own district or be assigned to several districts, depending on the nature and alignment of the project. For example, it may be satisfactory to have the CBD in a single district for a new commuter rail project or BRT project whose alignment is from the suburbs to the downtown area. However, for a downtown circulator project, it may be more useful to sub-divide the CBD into more than one district.

Significant outlying business districts that are likely to be impacted by the project may also be assigned to separate districts. Significant activity centers (e.g. college campus, stadium, etc.) that may be impacted by the project may also be placed in separate districts.

## 3.4 Outputs

Summit writes out a standard ASCII report file and other user specified outputs. The standard report contains quantities, prices and user benefits aggregated at the district level and by market segment. Additionally, the user may specify output files including: trip length frequency report; zone level user benefit report; district to district summary report; or stratified trip tables. The standard Summit report is described in Section 3.4.1 and the other user specified output files are described in Section 4.

### 3.4.1 Standard Report File

The standard report file provides an overview of the Summit run and contains district level tabular reports as specified by the user (see a sample Summit report at Appendix B). The standard report file contains the following:

- The version number and date of the summit software.
- The date and time the Summit run was initiated and the data and time the program ended.
- A playback of the contents of the control file that was used to run Summit, including all keyword blocks and associated specifications along with default values for specifications that were not included in the control file.
- Declaration of the header record of the prices and quantities files specified at ***f*table1** and ***f*table2** in the ***&FNAMES*** block of the control file.
- Warning/error messages, if applicable. Summit's checks the input files and the specifications in the control file prior to performing any calculations. If the checks result in a warning an error message is added to the report and the Summit run proceeds. However, if the check results in an error or fatal error, an error message is added to the report and the Summit run is terminated. Each warning or error generates a separate error message which is added to the report.
- If user benefit calculations were specified in the control file, the standard report file contains a summary of 80 internal tables used for user benefit calculations. The user benefits shown in the summary of user benefits calculations are the capped user benefits, based on the maximum change in price (***maxdp***) specification in the ***&PARAMS*** block of the control file.

- The difference between the capped and uncapped user benefits summarized at the access market level for each socioeconomic market (see Exhibit 8).
- A report of each table specified in the **&TRPT** block of the control file. These tables are aggregated at the district level. The user benefit tables report the capped user benefits, based on the **maxdp** specification in the **&PARAMS** block of the control file.
- If stratified trip tables are specified, the standard report file will include a report of each stratified trip table using the break points specified in the **&ANALYSIS** block of the control file. The stratified trip tables are aggregated at the district level.

**Exhibit 8 Change in User Benefits from capped price changes (minutes)**

Segment :	Total	1	2	3
CW-CW	-16937	-1627	-4119	-11190
CW-MD	0	0	0	0
CW-NT	0	0	0	0
MD-CW	0	0	0	0
MD-MD	-3676	-94	-471	-3111
MD-NT	0	0	0	0
NT-CW	0	0	0	0
NT-MD	0	0	0	0
NT-NT	0	0	0	0
Totals	-20613	-1722	-4590	-14301

The summary of user benefit calculations in the standard report shows the number of trips and the user benefits for each of the nine access markets detailed by Summit. This allows the user to easily review the impacts of the transportation network and service changes with respect to the transit access markets. Table 5 shows the summary of all person trips by access market for the baseline and build alternative. Table 5 and Table 6 shows data extracted from the sample Summit report file (see Appendix B).

Table 5: Summary of All Trips from Internal Tables 1 to 20

Table	Contents	Conditions	Markets		Total	
1	trips	all	BASE	CW-CW	5953450	trips
2	trips	all	BASE	CW-MD	0	trips
3	trips	all	BASE	CW-NT	0	trips
4	trips	all	BASE	MD-CW	0	trips
5	trips	all	BASE	MD-MD	1308501	trips
6	trips	all	BASE	MD-NT	0	trips
7	trips	all	BASE	NT-CW	0	trips
8	trips	all	BASE	NT-MD	0	trips
9	trips	all	BASE	NT-NT	2094831	trips
10	trips	all	BASE	TOTAL	9356787	trips
11	trips	all	ALT	CW-CW	5953450	trips
12	trips	all	ALT	CW-MD	0	trips
13	trips	all	ALT	CW-NT	0	trips
14	trips	all	ALT	MD-CW	0	trips
15	trips	all	ALT	MD-MD	1308501	trips
16	trips	all	ALT	MD-NT	0	trips
17	trips	all	ALT	NT-CW	0	trips
18	trips	all	ALT	NT-MD	0	trips
19	trips	all	ALT	NT-NT	2094831	trips
20	trips	all	ALT	TOTAL	9356787	trips

Table 6: Summary of Transit Trips from Internal Tables 21 to 40

Table	Contents	Conditions	Markets		Total	
21	trips	trn	BASE	CW-CW	638975	trips
22	trips	trn	BASE	CW-MD	0	trips
23	trips	trn	BASE	CW-NT	0	trips
24	trips	trn	BASE	MD-CW	0	trips
25	trips	trn	BASE	MD-MD	22355	trips
26	trips	trn	BASE	MD-NT	0	trips
27	trips	trn	BASE	NT-CW	0	trips
28	trips	trn	BASE	NT-MD	0	trips
29	trips	trn	BASE	NT-NT	0	trips
30	trips	trn	BASE	TOTAL	661330	trips
31	trips	trn	ALT	CW-CW	645846	trips
32	trips	trn	ALT	CW-MD	0	trips
33	trips	trn	ALT	CW-NT	0	trips
34	trips	trn	ALT	MD-CW	0	trips
35	trips	trn	ALT	MD-MD	22801	trips
36	trips	trn	ALT	MD-NT	0	trips
37	trips	trn	ALT	NT-CW	0	trips
38	trips	trn	ALT	NT-MD	0	trips
39	trips	trn	ALT	NT-NT	0	trips
40	trips	trn	ALT	TOTAL	668647	trips

Table 7 shows user benefits for transit riders summarized from Internal Tables 61 to 70 and stratified by the nine access markets. A positive number of user benefit (expressed in equivalent minutes of in-vehicle time) imply that the access market experienced net improvement in travel. Riders in these access markets may be considered as “Winners” while those riders in access markets that experienced dis-benefits (negative user benefit) are considered as “Losers” with respect to the changes in the transit system. This information is useful for identifying how the benefits (and dis-benefits) of the transit project are distributed across the access markets.

The summary of user benefits calculations also provides information that could be used to examine how the change in transit access contributes to the total user benefits.



Table 7: Summary of User Benefit Calculations from Internal Tables 61 to 70

Table	Contents	Conditions	Markets	Total	
61	userbens	transit	CW-CW	547952	minutes
62	userbens	transit	CW-MD	0	minutes
63	userbens	transit	CW-NT	0	minutes
64	userbens	transit	MD-CW	0	minutes
65	userbens	transit	MD-MD	21436	minutes
66	userbens	transit	MD-NT	0	minutes
67	userbens	transit	NT-CW	0	minutes
68	userbens	transit	NT-MD	0	minutes
69	userbens	transit	NT-NT	0	minutes
70	userbens	transit	TOTAL	569388	minutes

The standard report also include several district-to-district summaries of user benefit and trip tables specified in the **&TRPT** block of the control file or summaries of stratified trip tables specified in the **&ANALYSIS** block (see Appendix B for a sample Summit report).

In addition to the standard report, Summit may also create several other output files depending on the specifications in the **&FNAMES** block of the Summit control file. The additional user specified outputs can include trip length frequency report; zone level user benefit report; district to district summary report; or stratified trip tables.

### 3.4.1.1 User Benefit Table Numbers & Interpretation

An access category is applied at the interchange level for each trip purpose in both the baseline and build alternative. Summit tabulates internal user benefit tables when analyzing user benefit. A complete list of the internal tables is available at Table 4. The internal tables contain trips and user benefits segmented by into nine access markets as follows:

- CW-CW - Trips, user benefits or interchanges for which there is no change in “can walk” access coverage between the baseline and build alternative.
- CW-MD - Trips, user benefits or interchanges for which access coverage has changed from “can walk” to “must drive”.
- CW-NT - Trips, user benefits or interchanges for which access coverage has changed from “can walk” to “no transit”.
- MD-CW - Trips, user benefits or interchanges for which access coverage has changed from “must drive” to “can walk”.
- MD-MD - Trips, user benefits or interchanges for which there is no change in “must drive” access coverage.

- MD-NT - Trips, user benefits or interchanges for which access coverage has changed from “must drive” to “no transit”.
- NT-CW - Trips, user benefits or interchanges for which access coverage has changed from “no transit” to “can walk”.
- NT-MD - Trips, user benefits or interchanges for which access coverage has changed from “no transit” to “must drive”.
- NT-NT - Trips, user benefits or interchanges for which there is no change in “no transit” access coverage.

Table 8 (extracted from the Summit standard report at Appendix B) shows the summary tabulation for Summit internal tables 1 to 10. The summary for internal table 1 states that there are 5,953,450 trips for which there is no change in “can walk” transit access. Table 8 also shows that there was no shift in access for any access market, i.e. there are no trips in the CW-MD, CW-NT, MD-CW, MD-NT, NT-CW, or NT-MD access markets. .

**Table 8: Summary of All Trips from Internal Tables 1 to 10**

<b>Table</b>	<b>Contents</b>	<b>Conditions</b>	<b>Markets</b>		<b>Total</b>	
1	trips	all	BASE	CW-CW	5953450	trips
2	trips	all	BASE	CW-MD	0	trips
3	trips	all	BASE	CW-NT	0	trips
4	trips	all	BASE	MD-CW	0	trips
5	trips	all	BASE	MD-MD	1308501	trips
6	trips	all	BASE	MD-NT	0	trips
7	trips	all	BASE	NT-CW	0	trips
8	trips	all	BASE	NT-MD	0	trips
9	trips	all	BASE	NT-NT	2094831	trips
10	trips	all	BASE	TOTAL	9356787	trips

Similarly, Table 9 (extracted from the Summit standard report at Appendix B) shows the total user benefits for each of the nine access markets. The summary of internal table 41 indicates that there are 547,952 minutes of user benefit associated with the 5.95 million trips shown in the summary of internal table 1 (see Table 8).

Table 9: Summary of Total User Benefits All Trips from Internal Tables 1 to 10

Table	Contents	Conditions	Markets	Total	
41	userbens	total	CW-CW	547952	minutes
42	userbens	total	CW-MD	0	minutes
43	userbens	total	CW-NT	0	minutes
44	userbens	total	MD-CW	0	minutes
45	userbens	total	MD-MD	21436	minutes
46	userbens	total	MD-NT	0	minutes
47	userbens	total	NT-CW	0	minutes
48	userbens	total	NT-MD	0	minutes
49	userbens	total	NT-NT	0	minutes
50	userbens	total	TOTAL	569388	minutes

While the summaries of user benefit shown in Table 9 are all positive (or zero) it is not unusual for some summaries of user benefit to be negative (i.e. dis-benefits). User dis-benefits are associated with interchanges where there is a reduction or removal of transit service. Negative user benefit should however be reviewed to ensure that they are the result of intended changes in transit service or transportation policy and are not the result of network coding errors.

### 3.4.2 District Level Summary Tables

Summit’s internal calculations of user benefit are done at the zone-to-zone level. However, the user benefit tables that are included in the standard report are tabulated at the district level. The zone level trips and user benefits are aggregated to the district level based on the specification continued in the zone-to-district equivalency file (referenced at *fequiv* in the **&FNAMES** block of the Summit control file).

District level summaries are specified in **&TRPT** blocks in the control file. Exhibit 9 shows the **&TRPT** block for a district to district report of user benefits for all transit markets for the non-home based trip purpose. The district-to-district summary specified in Exhibit 9 will use total user benefit data from Summit working table 5 (specified in the **&TABLES** block) and will be report user benefits in hours (i.e. *scale = 0.01666667*) in the production/attraction format (i.e. *pafmt=T*).

Exhibit 9: Example of a &TRPR Block in a Summit Control File

```
&TRPT
t=5                ! Working table that will provide data
pafmt=T           ! District level summary will be in P/A format
places=7          ! Format of data in summary, 7 digit integer
scale=0.01666667 ! Convert minutes of UB to hours of UB
tline1='Report 1-5' ! Title line 1 of district level summary
tline2='User Benefits (hours) for the TSM vs.ALT' ! Title line 2 of district level summary
tline3='Total'     ! Title line 3 of district level summary
tline4='All Transit-Access Markets' ! Title line 4 of district level summary
tline5='Non-Home Based' ! Title line 5 of district level summary
source='Mode-choice application' ! Source of Summit data file
&END
```

Any Summit working table (specified in the **&TABLES** block of the control file) can be aggregated to the district level (see Appendix B). These could include:

- Trip tables,
- Impedance tables,
- User benefit tables,
- Tables showing change in person trips (for various conditions),
- Tables showing change in user benefits caused by change in auto price,
- Tables showing change in user benefit caused by change in price of transit travel, or
- Tables showing change in user benefit caused by trip or record asymmetry.

Exhibit 10 shows an example of a district level summary report of total user benefits for all transit access markets for HBW trip purpose. The report shows negative user benefits for some district level interchanges. For example, there are -299 hours of user benefit associated with transit trips in the LA North – Gateway district level interchange. Negative user benefits indicate interchanges in which there are user benefit “Losers” while positive user benefits indicate interchanges in which there are user benefit “Winners”. As mentioned earlier, negative user benefits should be reviewed to ensure that they are accurate reflections of the changes between the baseline and the build alternative and are not the result of errors in network coding.

Exhibit 10: Example of a District Level Report of Total User Benefit

Report 1-5																						
User Benefits (hours) for the No Build vs. Alt1																						
Total																						
All Transit-Access Markets																						
Home-Based-Work																						
Production District	Attraction District																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Total
1 SantaMonic	5	120	105	36	34	11	-3	1	-1	3	1	5	6	2	16	3	10	7	0	0	2	364
2 Westwood	26	339	205	57	100	52	-1	13	1	25	5	8	10	5	38	5	25	8	1	4	10	936
3 MidWilshir	281	1,082	667	74	158	65	51	51	2	29	25	-5	15	9	25	8	-23	4	-5	-2	3	2,516
4 KoreaTown	135	837	446	18	17	15	40	28	4	4	22	1	2	2	7	1	-4	2	0	0	1	1,578
5 LA CBD	11	25	8	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48
6 LA Central	5	20	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32
7 BeachCity	3	36	21	6	8	3	-1	-1	-4	-1	0	1	2	0	4	1	3	1	0	0	1	82
8 Crenshaw	-6	220	144	29	16	5	-21	-9	-3	-1	3	1	4	0	5	1	6	2	0	0	0	396
9 South Bay	4	25	6	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	38
10 Gateway	12	241	155	4	7	0	0	-1	0	-1	7	0	1	0	-1	0	0	8	0	0	-1	430
11 Malibu	-1	7	4	0	2	0	-2	0	-1	-1	0	0	0	0	0	0	0	0	0	0	0	8
12 HlyHillW	10	116	55	-1	9	0	-2	-2	-2	-5	0	0	0	0	0	0	0	0	0	0	0	179
13 LA Rest	51	281	133	3	10	3	6	4	0	-1	9	1	1	1	1	0	0	0	0	0	0	503
14 East LA	3	58	49	2	4	0	0	0	0	-1	1	0	0	0	0	0	0	0	0	0	0	117
15 Foothill	59	571	235	9	62	7	7	-16	-19	-45	6	0	1	1	0	0	0	3	0	0	0	882
16 SanGabValy	29	192	87	4	28	3	5	-8	-9	-14	2	0	1	0	0	0	0	1	0	0	0	322
17 SanFernado	54	274	115	1	16	1	-29	-5	-47	-26	0	0	0	0	-5	0	-2	0	0	0	0	348
18 North LA	86	311	260	14	48	-2	-3	-36	-119	-299	7	1	-2	-6	-51	-20	0	-1	0	-4	0	183
19 Ventura Co	11	21	25	2	8	1	0	-4	-7	-29	0	0	0	0	0	0	0	0	0	0	0	29
20 Orange Co	24	160	84	3	15	2	2	-2	-1	-2	2	0	0	0	0	0	0	4	0	0	0	291
21 InlandEmp	38	161	48	4	19	3	12	-16	-16	-49	4	0	1	1	0	0	0	1	0	0	0	210
Total	838	5,100	2,858	267	564	169	65	-6	-221	-413	94	15	44	16	38	-1	15	41	-4	-2	16	9,490

Source: Mode-choice application

## 4 Use & Interpretation of Summit Outputs

### 4.1 Trip Length Frequency Distributions → Spreadsheet

Summit can create an output report with trip length frequency distributions based on the ***tlfN*** specification in the **&ANALYSIS** block of the control file. The trip length frequency distributions are specified using references to a table containing quantity of travel data and a level of service table. The syntax for the ***tlfN*** specification is ***a,b***,

where,

***N*** - is a sequential number 1 to x for the frequency distribution report

***a*** - is the working table number for the quantity of travel table

***b*** - is the working table number of the level of service table that would be used to create the trip length frequency distribution.

The interval range of the level of service term is also specified in the **&ANALYSIS** block using the syntax, ***intvtlf = n***,

where,

***n*** - is a numeric interval range for the level of service term.

Table 10 shows an example of part of a trip length frequency report. The first two columns show trip length frequency distribution 1 (i.e. ***tlf1***) which is based on the quantity of travel table specified as working table ***t21*** (which references the internal table ***U101***) and the level of service table specified as working table ***t31*** (which in this case referenced internal table ***U181***, i.e. *the change in travel price between the baseline and the build alternative*). ***U101*** refers to the internal table of all trips in the “can walk” access market in both the baseline and the build alternative, while ***U181*** refers to the internal table of change in travel price (in minutes) for trips in the “can walk” access market. The trip length frequency distribution provides information on how the transit alternative performs, compared to the baseline, at various level of service differences. The level of service variable in this case is the change in price of travel. The data in this report may be copied to a spreadsheet and plotted as charts for easy review.

Table 10: Example of Trip Length Frequency Distribution Report

tlf1<=V	t21:31	tlf2<=V	t22:32	tlf3<=V	t23:33	tlf4<=V	t24:34	tlf5<=V	t25:35
-50	0							-50	0
-45	2291							-45	609
-40	880							-40	169
-35	1246							-35	264
-30	1894							-30	270
-25	4685							-25	374
-20	6575							-20	772
-15	8391							-15	641
-10	11506							-10	1058
-5	21606							-5	1465
0	548819							0	17114
0	4883582							0	808903
5	837380							5	28846
10	71935							10	5053
15	45595							15	3285
20	23626							20	2443
25	13994							25	1820
30	8267							30	1398
35	6301							35	1329
40	5406							40	1693
45	9359							45	2400
50	0							50	0

## 4.2 Selected row & column sums → GIS Mapping

A report of row and column sums at the zone level for selected working tables can be produced by Summit. The report is created based on the **trcsums** specification in the **&ANALYSIS** block. The syntax for the specification is **trcsums = x<sub>1</sub>,x<sub>2</sub>,...x<sub>n</sub>**

where,

**x<sub>1</sub> to x<sub>n</sub>** - are the number of the working tables for which row and column sums are required.

Table 11 shows a few records from a typical row and column sum report which was specified as **trcsums = 1,5**. In the header record, “rs” implies row sum and “cs” implies column sum. The integer after “rs”

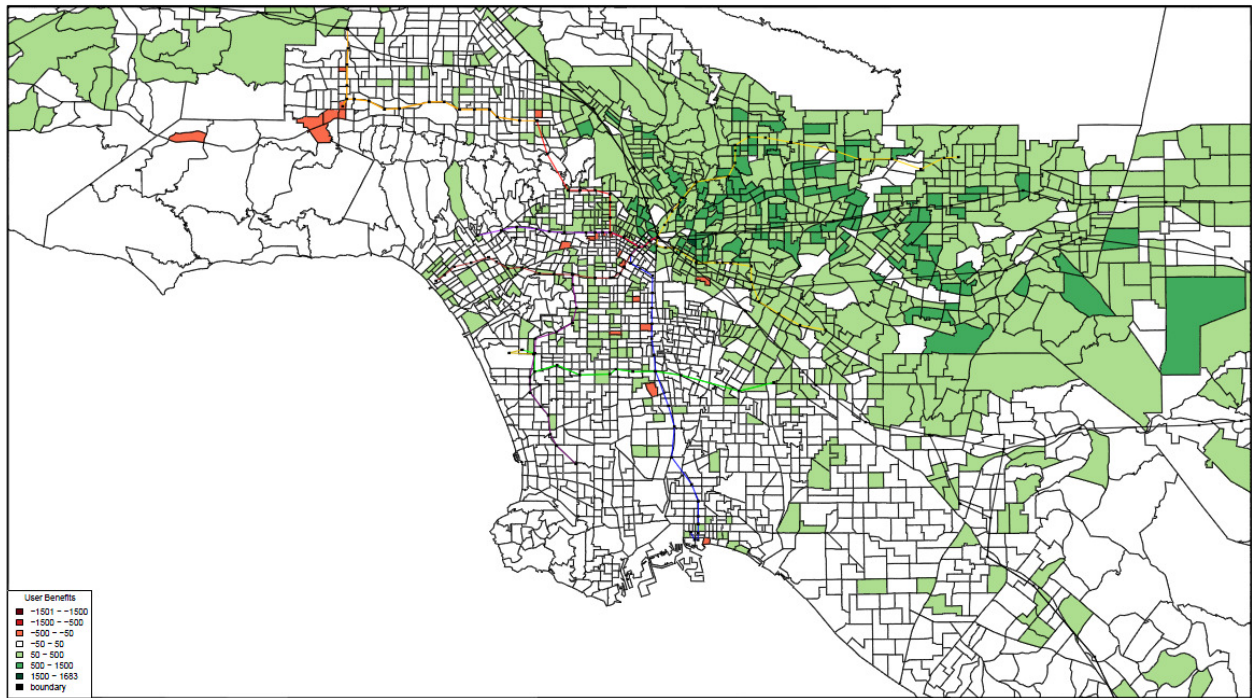
and “cs” refers to the working table number from which the row and column sums were obtained. Each data record contains the zone number and the row and column sums for the working tables implied in the header record. The row sums are the respective zone totals for the production end of the interchange while the column sums are the zone totals for the attraction end of the interchange. The data in the report can be exported to a zone level GIS file and can be used for mapping the production and attraction end of data. This method is used for creating thematic maps of user benefit at the production and attraction end of zonal interchanges. Figure 2 shows an example of the type of thematic maps that could be created using data from Summit row and column values.

**Table 11: Example of Row and Column Sum Report**

zone	rs1	rs5	cs1	cs5
1	4392	-9	5861	164
2	4187	-14	2588	14
3	5351	-1	5490	8
4	3117	-98	1522	5
5	1913	-11	987	30
6	1367	-5	37	0
7	1686	-7	7348	64
8	5127	-9	8844	4
9	2497	-57	8898	44
10	3023	-1	1861	0
11	3439	-17	1932	0



Figure 2: Thematic Map: User Benefit by Production Zone



### 4.3 Selected Row & Column Values → GIS Mapping

A report of row and column values from selected working tables for selected zonal interchanges can also be produced by Summit. The row and column values report is created based on the *trcvals*, *izvals* and *jzvals* specification in the *&ANALYSIS* block. The *trcvals* specification references the working tables of interest and the *izvals* and *jzvals* specifications identifies the selected *i* and *j* zones. The syntax for the specifications is:

$$trcvals = x_1, x_2, \dots, x_n$$

where,

$x_1$  to  $x_n$  - are the number of the selected working tables from which the row and column values are required.

$$izvals = i_1, i_2, \dots, i_n$$

where,

$i_1$  to  $i_n$  - are the number of the *i* zones for which row values are required.

$$jzvals = j_1, j_2, \dots, j_n$$

where,

$j_1$  to  $j_n$  - are the number of the *j* zones for which column values are required.

Table 12 shows a few records from a typical row and column values report. The report was specified as:

***trcvals =1,5***  
***izvals = 1710***  
***jzvals =1288,1568***

In the header record of the report, “r” implies row value and “c” implies column value. The first four integers in the field name is the number of a specified zone and the last two integers is the number of a specified working table. Therefore the field name “r171001” implies row values for i-zone 1710 from working table 1. Similarly, field name c128805 implies column values for j-zone 1288 from working table 5. The data in the row and column value report can also be exported to GIS file for mapping.

**Table 12: Example of Row and Column Values Report**

<b>zone</b>	<b>r171001</b>	<b>r171005</b>	<b>c128801</b>	<b>c128805</b>	<b>c156801</b>	<b>c156805</b>
1	0	0	2.43	0	0	0
2	0	0	0	0	0	0
3	0	0	2.26	0	0	0
4	0	0	1.33	0	0	0
5	0	0	0	0	0	0
6	0.05	0	0	0	0	0
7	9.24	-0.86	0	0	0	0
8	0	0	1.91	0	0	0
9	0	0	1.11	0	0	0
10	0	0	0	0	0	0

#### **4.4 District to District Report of Internal User Benefit Tables**

Summit can also output a separate text based file that contains the data from the 80 internal tables in tabular form. This file is referenced as ***fddub*** in the ***&FNAMES*** block and is typically given a ***.d2d*** file extension. Table 13 shows an example of part of a district-to-district report of Summit’s internal tables. The first column contains the production district, the second column contains the attraction district, and the third to eighty-second column contains the summary data from each of Summit’s 80 internal user benefit tables (table 1 to table 80) in sequential order. The report does not contain a header record. The header record shown in Table 10 is intended for demonstration only.

Table 13: District-to-District Report of Summit Internal Tables (part of file)

Production District	Attraction District	Internal UB Table 1	Internal UB Table 2	Internal UB Table 3	Internal UB Table 4	Internal UB Table 5	Internal UB Table ...	Internal UB Table 80
1	1	182287	0	0	0	208605	...	0
1	2	3016	0	0	0	2898	...	0
1	3	2687	0	0	0	3600	...	0
1	4	1193	0	0	0	1923	...	0
1	5	69	0	0	0	58	...	0
1	6	15	0	0	0	30	...	0
1	7	39712	0	0	0	43471	...	0
1	8	19999	0	0	0	23864	...	0
1	9	180	0	0	0	262	...	0
1	10	322	0	0	0	556	...	0
1	11	268	0	0	0	600	...	0
1	12	33	0	0	0	27	...	0
1	13	47	0	0	0	55	...	0
1	14	403	0	0	0	567	...	0

#### 4.5 Zone-to-zone stratified trip tables

The user can also specify a zone-to-zone stratified trip tables in the Summit control file. The name of the output stratified trip table is referenced by the *fstrats* in the *&FNAMES* block.

## 5 Preparation of Thematic Maps

User benefits can be tabulated in row and column sum reports and the production and attraction end data can be exported to GIS files and mapped using a color-coded thematic map (as shown in Figure 2) for easy review and visualization of the user benefit “winners” and “losers”. It is also useful to include the transit station locations and the project alignment for ease in referencing winning and losing zones with respect to the project alignment and station locations.

FTA has established certain guidelines for the preparation of these thematic maps.

### 5.1 FTA Guidelines for User Benefit Thematic Maps

For a New Starts submittal, the FTA requires that thematic maps be prepared for the Locally Preferred Alternative (LPA) versus the Baseline. Thematic map should be prepared for each trip purpose, the peak period total, the off-peak period total and the daily total. Two maps are required for each purpose and period, one showing user benefits for productions in the zone and one showing the user benefits for attraction in the zones.

FTA also suggests that shades of green be used for coloring the zones with positive benefits and shades of red for zones with negative benefits (dis-benefits). The FTA’s guidance provides the following methodology for calculating the breakpoints in the shades of green and red:

1. Sum all of the benefits in zones with positive benefits.
2. Sort the zones in descending order of benefits.
3. Calculate the percentage of benefits (in each zone with positive benefits) as the benefits in a zone divided by the sum from step 1.
4. Calculate the accumulated percentage.

The breakpoints are the minutes of user benefits associated with the zone where the accumulation reaches 40 percent, 70 percent, and 90 percent of the total benefits. The breakpoints for shades of green only consider zones with positive benefits and each map has three shades of green according to the following:

- Dark Green - the set of zones with the highest user benefits whose accumulative user benefits reaches 40 percent of the total positive user benefits for the project.
- Medium Green - the next set of zones (by descending order of user benefits) whose accumulative user benefits reaches the next 30 percent of the total positive user benefits for the project
- Light Green - the next set of zones (by descending order of user benefits) whose accumulative user benefits reaches the next 20 percent of the total positive user benefits of the project.

All remaining zones with positive user benefits are shown in white.

Zones with negative user benefits are shown as one of three shades of red and the breakpoints for the negative user benefit categories are established using a methodology similar to that used for the positive user benefits.

## 5.2 Software Tool for Preparation of Thematic Maps

PB Americas has developed a software tool that prepares the thematic maps to FTA specifications. The tool which is coded in the R programming language uses data from Summit row and column sums reports and a TAZ level GIS shape file to create each thematic map in accordance with the FTA requirements. The software tool can also use existing shape files of the project alignment and station locations to add those details to the thematic maps. The tool outputs the maps as PDF documents. The thematic map shown at Figure 2 was created using the PB Americas software tool.

## 6 Example Applications

### 6.1 Example 1: User Benefit Calculation & Thematic Map Inputs

This example describes the process of using Summit to calculate user benefits. The calculation of user benefits requires standard user benefit input files (also called “prices and quantities” or P&Q files) from a Baseline and Build Alternative for a transit project. Additionally, Summit requires a zone to district equivalency file for reporting the results of the user benefit calculations at the district to district aggregation level. All specifications for running Summit would be prepared in a text-based control file. This example considers only the home-based work trip purpose however a typical user benefit analysis would include a Summit run for each trip purpose simulated by mode choice of the travel model. A complete control file for this exercise is at Appendix C.

#### 6.1.1 Step 1: Specify Input Data

It is assumed that the travel model was previously run for a Baseline and a Build Alternative for a transit project and that the standard user benefits input files were created by mode choice when the travel model was run.

- Specify the path and file name for the standard user benefit files using specifications ***f*table1** and ***f*table2** in the file names (***&FNAMES***) block of the control file. ***f*table1** would specify the input file for the Baseline and ***f*table2** would specify the input file for the ***Build Alternative***.
- Use the specification ***pqfiles*** to indicate that the files referenced by the specifications ***f*table1** and ***f*table2** are standard user benefit file.
- Specify the path and file name for the zone to district equivalency file using the specification ***f*equiv** in the file names (***&FNAMES***) block of the control file. Summit computes user benefits at the zone to zone interchange level but uses the zone to district equivalency file to report the results of the user benefit calculations at the aggregated district to district level.

Exhibit 11 shows (in bold text) the specifications for the input files for a typical user benefit analysis.

Exhibit 11: &FNAMES block with input files highlighted

```
&FNAMES
freport='hbwpk.rpt'
fequiv='Dist_Westside_3731.prn'           ! Zone to district equivalency file
ftable1='..\ub_NB\West_NB_PK_HBW.UserBen'  ! Standard UB file, NB mode choice, HBW Peak
ftable2='..\ub_Alt1\West_Alt1_PK_HBW.UserBen' ! Standard UB file, Alt1 mode choice, HBW Peak
frcsums='hbwpk.rcs'
fddub='hbwpk.d2d'
frcub='hbwpk.rcu'
pqfiles=1,2                               ! Indicates ftable1 and ftable2 are UB files
&END
```

### 6.1.2 Step 2: Specify Output Files

The following output files are required for this example application of Summit:

- The standard Summit report file.
- Zone level report of the standard user benefits tables.
- District to district values from the standard user benefit working tables. This output is required for the summary district to district tables included in the standard Summit report.
- Zone level row and column sums from selected standard user benefit tables. Data from this file is used as input for the thematic maps.

These output files are specified in the file names (**&FNAMES**) block as described below:

- Specify the name for the standard Summit report file using the specification **freport**.
- Specify the name for the output zone level report of the standard user benefit tables using the specification **frcub**.
- Specify the name for the output district to district user benefit tables using the specification **fddub**.
- Specify the name for the output zone level row and column sums from selected user benefit tables using the specification **frcsums**. The selected user benefit tables would be specified later in the **&ANALYSIS** block.

Exhibit 12 shows (in bold text) the specifications for the output files for this example.

Exhibit 12: &FNAMES block with output files highlighted

```
&FNAMES
freport='hbwpk_eg1.rpt'                ! Standard Summit report file
fequiv='Dist_Westside_3731.prn'
ftable1='..\ub_NB\West_NB_PK_HBW.UserBen'
ftable2='..\ub_Alt1\West_Alt1_PK_HBW.UserBen'
frcsums='hbwpk.rcs'                    ! Zone level row and column sums from UB tables
fddub='hbwpk.d2d'                      ! District to district summary of standard UB tables
frcub='hbwpk.rcu'                      ! Zone level values from standard UB tables
pqfiles=1,2
&END
```

### 6.1.3 Step 3: Specify Working Tables

Specify working tables that would contain the trips and user benefits data for the district to district summaries in the standard Summit report. A typically user may be interested in the following district to district summaries:

- Number of person trips for all transit access markets in the Baseline
- Change in the number of person trips for all transit access markets when the Baseline is compared to the Build Alternative
- Number of transit trips for all transit access markets in the Baseline Alternative
- Change in the number of transit trips for all transit access markets when the Baseline is compared to the Build Alternative
- Total User Benefits for all transit access markets for the Baseline versus the Build
- User Benefits for all transit access markets caused by change in the price of auto travel for the Baseline versus the Build Alternative
- User Benefits for all transit access markets caused by change in the price of transit travel for the Baseline versus the Build Alternative
- User Benefits for all transit access markets caused by trip asymmetry for the Baseline versus the Build Alternative. This summary is usually included to report on trip asymmetric anomalies where may exist for an interchange in one Alternative and not for the other Alternative.
- User Benefits for each socioeconomic segment for all transit access markets for the Baseline versus the Build Alternative
- Share of total user benefits accruing to low income households for all transit access markets

Exhibit 13 shows the specification and referencing of the working tables.



Exhibit 13: **&TABLES** block showing table referencing

```
&TABLES
t1='u410'      ! All person trips – All transit access markets - in Baseline
t2='u420-t1'   ! Change in all person trips – All transit access markets – Build minus Baseline
t3='u430'      ! Transit trips – All transit access markets – Baseline
t4='u440-t3'   ! Change in transit trips – All transit access markets – Build minus Baseline
t5='u450'      ! User benefits – Total
t6='u460'      ! User benefits – Auto
t7='u470'      ! User benefits – Transit
t8='u480'      ! User benefits – Trip Asymmetry
t11='u150'     ! User benefits – Socioeconomic Market 1 (Low income households)
t12='u250'     ! User benefits – Socioeconomic Market 2 (Medium income households)
t13='u350'     ! User benefits – Socioeconomic Market 3 (High income households)
t14='t11/t5'   ! Share of total user benefits accrued to low income households
&END
```

6.1.4 Step 4: Specify the User Benefit Tables for the Row and Column Sum Report

The standard user benefit tables to be used for the row and column sums report is specified in the **&ANALYSIS** block of the control file. For this particular example, we are interested in using the data from the row and column sums report for mapping all trips and total user benefits for all transit access markets and all socioeconomic segments by production and attraction zone. The standard user benefit tables of interest are therefore **u410** and **u450** which were previously referenced by **t1** and **t5** in the **&TABLES** block. Exhibit 14 shows the specification of the user benefit tables that would be used for the row and column sums report.

Exhibit 14: **&ANALYSIS** block showing specification of user benefit tables for row and column sums

```
&ANALYSIS
trcsums=1,5    ! Standard UB tables used for row and column sums report
&END
```

6.1.5 Step 5: Specify the District to District Summary Tables

The district to district summaries in the standard Summit report are specified in several trip report (**&TRPT**) blocks of the control file. The following specifications are used:

- Specify the working table number, using the specification **t**.
- Specify whether the data is in P/A or O/D format, using the specification **pafmt**.
- Specify how the data is to be scaled, using the specification **scale**.
- Specify the number of digits to the left and right of the decimal, using the specifications **places** and **dplaces**, respectively.

- Specify text for each summary table title, using the specification ***tline#***, where # is an integer value that represents the line number in the summary table title.
- Specify the source of the data (or other useful information), using the specification ***source***. This information will be written at the bottom of the summary table.

Exhibit 15 shows the specifications for the summary tables that would be included in the standard Summit report file.

**Exhibit 15: &TRPT Block showing specification of summary tables**

```

&TRPT
t=1
pafmt=T
places=7
tline1='Report 1-1'
tline2='Person-Trips in the No Build Alternative'
tline3='All Transit-Access Markets'
tline4='Home-Based-Work Trips'
source='Mode-choice application'
&END

&TRPT
t=2
pafmt=T
places=7
tline1='Report 1-2'
tline2='Change in Person-Trips: Alt1 minus No Build'
tline3='All Transit-Access Markets'
tline4='Home-Based-Work Trips'
source='Mode-choice application'
&END

&TRPT
t=3
pafmt=T
places=7
tline1='Report 1-3'
tline2='Transit Person-Trips in the No Build Alternative'
tline3='All Transit-Access Markets'
tline4='Home-Based-Work Trips'
source='Mode-choice application'
&END

&TRPT
t=4
pafmt=T
places=7
tline1='Report 1-4'
tline2='Change in Transit Person-Trips: Alt1 minus No Build'
tline3='All Transit-Access Markets'
tline4='Home-Based-Work Trips'
source='Mode-choice application'

```

&END

&TRPT

t=5

pafmt=T

places=7

scale=0.01666667

tline1='Report 1-5'

tline2='User Benefits (hours) for the No Build vs. Alt1 '

tline3='Total'

tline4='All Transit-Access Markets'

tline5='Home-Based-Work'

source='Mode-choice application'

&END

&TRPT

t=6

pafmt=T

places=7

scale=0.01666667

tline1='Report 1-6'

tline2='User Benefits (hours) for the No Build vs. Alt1'

tline3='Caused by Changes in the Price of Auto Travel'

tline4='All Transit-Access Markets'

tline5='Home-Based-Work'

source='Mode-choice application'

&END

&TRPT

t=7

pafmt=T

places=7

scale=0.01666667

tline1='Report 1-7'

tline2='User Benefits (hours) for the No Build vs. Alt1'

tline3='Caused by Changes in the Price of Transit Travel'

tline4='All Transit-Access Markets'

tline5='Home-Based-Work'

source='Mode-choice application'

&END

&TRPT

t=8

pafmt=T

places=7

scale=0.01666667

tline1='Report 1-8'

tline2='User Benefits (hours) for the No Build versus Alt1 '

tline3='Caused by Trip Asymmetry'

tline4='All Transit-Access Markets'

tline5='Home-Based-Work'

source='Mode-choice application'

&END

```

&TRPT
t=11
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-9'
tline2='User Benefits (hours) for the No Build versus Alt1'
tline3='Total for Low Income Households'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application'
&END

&TRPT
t=12
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-10'
tline2='User Benefits (hours) for the No Build versus Alt1'
tline3='Total for Medium Income Households'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application'
&END

&TRPT
t=13
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-11'
tline2='User Benefits (hours) for the No Build versus Alt1'
tline3='Total for High Income Households'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application (MTA Travel Simulation Model)'
&END

&TRPT
t=14
pafmt=T
scale=100.0
places=7
dplaces=1
tline1='Report 1-12'
tline2='Share of Total User Benefits Accruing to Low Income Households'
tline3='Percent to Low Income Households'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application'
&END

```

### 6.1.6 Step 6: Run Summit and Review the Output Reports

Running Summit using the control file described for this example would produce the output files specified in the **&FNAMES** block of the control file. Exhibit 16 shows a part of the row and column sums report that was created by this example. The zone number is listed in the first column and each row contains the row sum (Production value) and column sum (Attraction value) for that zone. The second and third columns contain the total trip and total user benefit for the respective production zone. Similarly, the fourth and fifth columns list the total trip and total user benefits for the respective attraction zone. This data could be used in a GIS mapping application to plot the total trips and user benefits by production zones and attractions. The thematic map in Figure 2 was prepared using data obtained from a similar process.

Exhibit 16: Row and Column Sums Report (part)

zone	rs1	rs5	cs1	cs5
1	4392	9	5861	5
2	4187	17	2588	-4
3	5351	14	5490	-4
4	3117	25	1522	-1
5	1913	11	987	3
6	1367	9	37	0
7	1686	12	7348	3
8	5127	9	8844	-1
9	2497	-14	8898	-6
10	3023	-19	1861	0
11	3439	-26	1932	0
12	5754	-30	2987	0
13	2275	30	295	0
14	5272	4	6455	16
15	645	0	403	0
16	0	0	189	0
17	3729	-11	4529	30
18	9050	24	2278	31
19	0	0	55	0
20	0	0	18310	410
21	0	0	304	4
22	12811	1041	4643	8
23	8441	126	2591	1

Exhibit 17 shows a district to district summary table (Report 1-5) from the standard Summit report that was created by this example. Report 1-5 presents information on the total user benefits for the Baseline (No Build) versus the Build Alternative (Alt1) for all transit access markets.

Exhibit 17: Summary Report 1-5 showing total user benefits for all access markets

Report 1-5																						
User Benefits (hours) for the No Build vs. Alt1																						
Total																						
All Transit-Access Markets																						
Home-Based-Work																						
Production District	Attraction District																				Total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		21
1 SantaMonic	5	120	105	36	34	11	-3	1	-1	3	1	5	6	2	16	3	10	7	0	0	2	364
2 Westwood	26	339	205	57	100	52	-1	13	1	25	5	8	10	5	38	5	25	8	1	4	10	936
3 MidWilshir	281	1082	667	74	158	65	51	51	2	29	25	-5	15	9	25	8	-23	4	-5	-2	3	2516
4 KoreaTown	135	837	446	18	17	15	40	28	4	4	22	1	2	2	7	1	-4	2	0	0	1	1578
5 LA CBD	11	25	8	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48
6 LA Central	5	20	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32
7 BeachCity	3	36	21	6	8	3	-1	-1	-4	-1	0	1	2	0	4	1	3	1	0	0	1	82
8 Crenshaw	-6	220	144	29	16	5	-21	-9	-3	-1	3	1	4	0	5	1	6	2	0	0	0	396
9 South Bay	4	25	6	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	38
10 Gateway	12	241	155	4	7	0	0	-1	0	-1	7	0	1	0	-1	0	0	8	0	0	-1	430
11 Malibu	-1	7	4	0	2	0	-2	0	-1	-1	0	0	0	0	0	0	0	0	0	0	0	8
12 HlyHillW	10	116	55	-1	9	0	-2	-2	-2	-5	0	0	0	0	0	0	0	0	0	0	0	179
13 LA Rest	51	281	133	3	10	3	6	4	0	-1	9	1	1	1	1	0	0	0	0	0	0	503
14 East LA	3	58	49	2	4	0	0	0	0	-1	1	0	0	0	0	0	0	0	0	0	0	117
15 Foothill	59	571	235	9	62	7	7	-16	-19	-45	6	0	1	1	0	0	0	3	0	0	0	882
16 SanGabValy	29	192	87	4	28	3	5	-8	-9	-14	2	0	1	0	0	0	1	0	0	0	0	322
17 SanFernado	54	274	115	1	16	1	-29	-5	-47	-26	0	0	0	0	-5	0	-2	0	0	0	0	348
18 North LA	86	311	260	14	48	-2	-3	-36	-119	-299	7	1	-2	-6	-51	-20	0	-1	0	-4	0	183
19 Ventura Co	11	21	25	2	8	1	0	-4	-7	-29	0	0	0	0	0	0	0	0	0	0	0	29
20 Orange Co	24	160	84	3	15	2	2	-2	-1	-2	2	0	0	0	0	0	0	4	0	0	0	291
21 InlandEmp	38	161	48	4	19	3	12	-16	-16	-49	4	0	1	1	0	0	0	1	0	0	0	210
Total	838	5100	2858	267	564	169	65	-6	-221	-413	94	15	44	16	38	-1	15	41	-4	-2	16	9490

Source: Mode-choice application

## 6.2 Example 2: Distribution of transit trips by change in transit price

This example describes the process of using Summit to report the transit trip frequency distribution by change in transit price. Like Example 1, this example will also consider only the home-based work trip purpose. However as stated previously, a typical user benefit analysis would include a Summit run for each trip purpose simulated by mode choice of the travel model.

The control file used for this example is based on the control file from the Example 1 with changes made to specify the frequency distribution output file required for this example. A complete control file for this example is at Appendix D.

### 6.2.1 Step 1: Specify Input Data

The inputs used for this example are the same as the inputs used for the Example 1.

### 6.2.2 Step 2: Specify Output Files

A frequency distribution report is the desired output from this example application of Summit. The file name of the report is specified in the file names (**&FNAMES**) block using the specification **ftlfd**. Exhibit 18 shows (in bold text) the specifications for the standard Summit report and the trip frequency distribution output files for this example. The trip tables and delta price (change in price) tables that are the data sources for the trip frequency distribution report will be specified in the **&ANALYSIS** block.

The file name specification for the standard Summit report (**freport**) was also revised for this example to update the example number in the file name.

Exhibit 18: **&FNAMES** block with updated specifications highlighted

```
&FNAMES
freport='hbwpk_eg2.rpt'                ! Standard Summit report file
fequiv='Dist_Westside_3731.prn'
ftable1='..\ub_NB\West_NB_PK_HBW.UserBen'
ftable2='..\ub_Alt1\West_Alt1_PK_HBW.UserBen'
ftlfd='hbwpk_eg2.tlf'                  ! trip frequency distribution report
frcsums='hbwpk.rcs'
fddub='hbwpk.d2d'
frcub='hbwpk.rcu'
pqfiles=1,2
&END
```

### 6.2.3 Step 3: Specify Working Tables

Specify working tables that would contain the transit trips and delta price for the trip frequency distribution report. For this example, specify the standard user benefit tables that contain transit trips for each transit access market and each socioeconomic segment in the Build Alternative (i.e. standard user benefit tables **u131** to **u139**, **u231** to **u239**, and **u331** to **u339**) and specify the standard user benefit tables that contain the delta travel price for each transit access market and each socioeconomic segment for the Baseline versus the Build Alternative (i.e. standard user benefit tables **u181** to **u189**, **u281** to **u289**, and **u381** to **u389**). The working tables are referenced as **t21** to **t29**, **t31** to **t39**, **t41** to **t49**, **t51** to **t59**, **t61** to **t69**, and **t71** to **t79** and can be reviewed in the control file for this example shown at Appendix D.

### 6.2.4 Step 4: Specify Working Tables for each Frequency Distribution

The trips tables and associated delta price tables for the trip frequency distribution for each socioeconomic market and transit access market are specified in the **&ANALYSIS** block of the control file. Each trip frequency distribution is specified using the specification **tlf#** where # is an integer value that represents the number of the frequency distribution. The frequency interval is also specified in the **&ANALYSIS** block using the specification **intvltlf**. For this example a frequency interval of 5 minutes of change in price is specified.

Exhibit 19 shows the specifications of the working tables and frequency interval that are used for the transit trip frequency distribution by change in transit price.



Exhibit 19: &ANALYSIS block with specification for the trip frequency distributions highlighted

```

&ANALYSIS
tlf1=21,31      ! tlf1 - Transit trips from working table 21 by delta price from working table 31
tlf2=22,32      ! tlf2 - Transit trips from working table 22 by delta price from working table 32
tlf3=23,33      ! tlf3 - Transit trips from working table 23 by delta price from working table 33
tlf4=24,34      ! tlf4 - Transit trips from working table 24 by delta price from working table 34
tlf5=25,35      ! tlf5 - Transit trips from working table 25 by delta price from working table 35
tlf6=26,36      ! tlf6 - Transit trips from working table 26 by delta price from working table 36
tlf7=27,37      ! tlf7 - Transit trips from working table 27 by delta price from working table 37
tlf8=28,38      ! tlf8 - Transit trips from working table 28 by delta price from working table 38
tlf9=29,39      ! tlf9 - Transit trips from working table 29 by delta price from working table 39
tlf11=41,51     ! tlf11 - Transit trips from working table 41 by delta price from working table 51
tlf12=42,52     ! tlf12 - Transit trips from working table 42 by delta price from working table 52
tlf13=43,53     ! tlf13 - Transit trips from working table 43 by delta price from working table 53
tlf14=44,54     ! tlf14 - Transit trips from working table 44 by delta price from working table 54
tlf15=45,55     ! tlf15 - Transit trips from working table 45 by delta price from working table 55
tlf16=46,56     ! tlf16 - Transit trips from working table 46 by delta price from working table 56
tlf17=47,57     ! tlf17 - Transit trips from working table 47 by delta price from working table 57
tlf18=48,58     ! tlf18 - Transit trips from working table 48 by delta price from working table 58
tlf19=49,59     ! tlf19 - Transit trips from working table 49 by delta price from working table 59
tlf21=61,71     ! tlf21 - Transit trips from working table 61 by delta price from working table 71
tlf22=62,72     ! tlf22 - Transit trips from working table 62 by delta price from working table 72
tlf23=63,73     ! tlf23 - Transit trips from working table 63 by delta price from working table 73
tlf24=64,74     ! tlf24 - Transit trips from working table 64 by delta price from working table 74
tlf25=65,75     ! tlf25 - Transit trips from working table 65 by delta price from working table 75
tlf26=66,76     ! tlf26 - Transit trips from working table 66 by delta price from working table 76
tlf27=67,77     ! tlf27 - Transit trips from working table 67 by delta price from working table 77
tlf28=68,78     ! tlf28 - Transit trips from working table 68 by delta price from working table 78
tlf29=69,79     ! tlf29 - Transit trips from working table 69 by delta price from working table 79
intvltlf=5.0    ! frequency interval = 5 minutes delta price
trcsums=1,5     ! Standard UB tables used for row and column sums report
&END

```

### 6.2.5 Step 5: Run Summit and Review the Frequency Distribution Report

Running Summit using the control file described for this example would produce the output files specified in the **&FNAMES** block of the control file, including the trip frequency distribution report.

Exhibit 20 shows a part of the frequency distribution report that was produced when Summit was run using the control file described for this Exercise. Each pair of column data in the report represents one frequency distribution. The left column lists the interval range for transit delta price and the right column lists the number of transit trips for the associated change in transit price (Baseline minus Build Alternative). The number of the trip frequency distribution and the tables used for the frequency distribution are stated above the delta price and trip data. The blank columns in Exhibit 20 occur where there are no trips in the particular transit access market.

The transit trip frequency distribution report created by this example application of Summit is useful for examining the performance of the Build Alternative with respect to the changes made to the transit service. Exhibit 20 shows that for low income transit riders in the CW-CW transit access market 38 percent of those riders enjoy an improved service, 62 percent enjoy little or no change in transit service while for 0.3 percent of the riders the service is worse.

**Exhibit 20: Trip Frequency Report (part) – Transit Trips by Change in Transit Price**

t1f1<=V	t21:31	t1f2<=V	t22:32	t1f3<=V	t23:33	t1f4<=V	t24:34	t1f5<=V	t25:35
-50.0	0							-50.0	0
-45.0	18							-45.0	1
-40.0	7							-40.0	0
-35.0	5							-35.0	1
-30.0	98							-30.0	0
-25.0	136							-25.0	0
-20.0	62							-20.0	0
-15.0	89							-15.0	0
-10.0	197							-10.0	19
-5.0	529							-5.0	26
-.0	62103							-.0	199
0.0	157374							0.0	2639
5.0	115368							5.0	769
10.0	7240							10.0	35
15.0	3396							15.0	23
20.0	2595							20.0	23
25.0	1875							25.0	10
30.0	1147							30.0	15
35.0	790							35.0	6
40.0	395							40.0	5
45.0	249							45.0	17
50.0	0							50.0	0

### 6.3 Example 3: Frequency distribution of benefits by change in transit price

This example describes the process of using Summit to report the frequency distribution of user benefits by change in transit price. This example will consider only the home-based work trip purpose for low income households because of the limitation in the number of working tables (t1 to t99) that can be referenced by Summit. A complete analysis would include a Summit run for each socioeconomic segment and trip purpose simulated by model choice.

The control file used for this example would be based on the control file from Example 2 with changes made to specify the required frequency distribution output file. A complete control file for this example is at Appendix E.

### 6.3.1 Step 1: Specify Input Data

The inputs used for this example are the same as the inputs used for Example 2.

### 6.3.2 Step 2: Specify Output Files

Similar to Example 2, a frequency distribution report is the key desired output from this example application of Summit. The file name specification for the standard Summit report, the frequency distribution report and the row and column sums report were revised for this example to update the example number in the file name. The updated file name specifications are highlighted in Exhibit 21.

The user benefit tables and delta price (change in price) tables that are the data sources for the frequency distribution report will be specified in the **&ANALYSIS** block.

Exhibit 21: **&FNAMES** block with updated specifications highlighted

<b>&amp;FNAMES</b>	
<b>freport='hbwpk_eg3a.rpt'</b>	<b>! Standard Summit report file</b>
fequiv='Dist_Westside_3731.prn'	
ftable1='..\ub_NB\West_NB_PK_HBW.UserBen'	
ftable2='..\ub_Alt1\West_Alt1_PK_HBW.UserBen'	
<b>ftlfd='hbwpk_eg3a.tlf'</b>	<b>! frequency distribution report</b>
<b>frcsums='hbwpk_eg3a.rcs'</b>	<b>! Zone level row and column sums from UB tables</b>
fdub='hbwpk.d2d'	
frub='hbwpk.rcu'	
pqfiles=1,2	
<b>&amp;END</b>	

### 6.3.3 Step 3: Specify Working Tables

Specify working tables that would contain the user benefits and delta price for the frequency distribution report. Summit would not perform frequency distributions for negative user benefit values so it was necessary to develop separate zone to zone tables for positive and negative user benefits then use the absolute values of the negative user benefits for the frequency distribution. Exhibit 22 shows how the separate zone to zone tables for negative and positive user benefits were developed and how the tables of negative user benefits were converted to absolute values before being operated on by Summit's frequency distribution process. The complete **&TABLES** block can be examined at Appendix E.

Exhibit 22: Part of **&TABLES** block showing specification of working tables

```
&TABLES
...
t20='u141>0'      ! Table of Boolean values for positive UB in CW-CW for socioeconomic segment 1 (all trips)
t21='u141*t20'    ! Table of positive UB in CW-CW for socioeconomic segment 1 (all trips)
t22='u141<0'      ! Table of Boolean values for negative UB in CW-CW for socioeconomic segment 1 (all trips)
t23='u141*t22'    ! Table of negative UB in CW-CW for socioeconomic segment 1 (all trips)
t24='-1*t23'      ! Convert negative UB to absolute value in CW-CW for socioeconomic segment 1 (all trips)
...
&END
```

#### 6.3.4 Step 4: Specify the pairs of Working Tables used for each Frequency Distribution

The user benefit tables that were developed in the **&TABLES** block and the associated delta price tables for the trip frequency distribution are specified in the **&ANALYSIS** block of the control file. Each trip frequency distribution is specified using the specification ***tlf#*** where # is an integer value that represents the number of the frequency distribution. The frequency interval is also specified in the **&ANALYSIS** block using the specification ***intvltlf***. Similar to Example 2, a frequency interval of 5 minutes of change in price is specified. Additionally, the tables to be used for the row and column sums report for this example were specified. Exhibit 23 shows the specifications of the working tables and frequency interval that are used for the user benefit frequency distribution by change in transit price.

Exhibit 23: &ANALYSIS block showing specification of User Benefits frequency distributions

```

&ANALYSIS
tlf1=21,81      ! tlf1 - +’ve User Benefits from working table 21 by delta price from working table 81
tlf2=26,82      ! tlf2 - +’ve User Benefits from working table 26 by delta price from working table 82
tlf3=31,83      ! tlf3 - +’ve User Benefits from working table 31 by delta price from working table 83
tlf4=36,84      ! tlf4 - +’ve User Benefits from working table 36 by delta price from working table 84
tlf5=41,85      ! tlf5 - +’ve User Benefits from working table 41 by delta price from working table 85
tlf6=46,86      ! tlf6 - +’ve User Benefits from working table 46 by delta price from working table 86
tlf7=51,87      ! tlf7 - +’ve User Benefits from working table 51 by delta price from working table 87
tlf8=56,88      ! tlf8 - +’ve User Benefits from working table 56 by delta price from working table 88
tlf9=61,89      ! tlf9 - +’ve User Benefits from working table 61 by delta price from working table 89
tlf11=24,81     ! tlf11 - Abs of -’ve User Benefits from working table 24 by delta price from working table 81
tlf12=29,82     ! tlf12 - Abs of -’ve User Benefits from working table 29 by delta price from working table 82
tlf13=34,83     ! tlf13 - Abs of -’ve User Benefits from working table 34 by delta price from working table 83
tlf14=39,84     ! tlf14 - Abs of -’ve User Benefits from working table 39 by delta price from working table 84
tlf15=44,85     ! tlf15 - Abs of -’ve User Benefits from working table 44 by delta price from working table 85
tlf16=49,86     ! tlf16 - Abs of -’ve User Benefits from working table 49 by delta price from working table 86
tlf17=54,87     ! tlf17 - Abs of -’ve User Benefits from working table 54 by delta price from working table 87
tlf18=59,88     ! tlf18 - Abs of -’ve User Benefits from working table 59 by delta price from working table 88
tlf19=64,89     ! tlf19 - Abs of -’ve User Benefits from working table 64 by delta price from working table 89
intvltlf=5.0    ! frequency interval = 5 minutes delta price
trcsums= 71,72,73,74,75,76,77,78,79    ! Standard UB tables used for row and column sums report
&END

```

### 6.3.5 Step 5: Run Summit and Review the Frequency Distribution Report

Running Summit using the control file described for this example would produce the output files specified in the **&FNAMES** block of the control file, including the frequency distribution report.

Exhibit 24 shows a part of the frequency distribution report that was produced when Summit was run using the control file described for this exercise. Each pair of column data in the report represents one frequency distribution. The left column lists the interval range for transit delta price and the right column lists the number of user benefits for the associated change in transit price (Baseline minus Build Alternative). The frequency distributions shown in the upper section of the report are for positive user benefits while the distributions in the lower section of the report are for negative user benefits.

The number of the frequency distribution and the tables used for the frequency distribution are stated above the delta price and user benefits data. The blank columns in the report occur where there are no trips in particular transit access market. The user benefit frequency distribution report aids the analyst in the review of performance of the Build Alternative with respect to the changes made to transit in the Build Alternative.

**Exhibit 24: Frequency Report (part) – Positive and Negative User Benefits by Change in Transit Price**

t1f1<=V	t21:81	t1f2<=V	t26:82	t1f3<=V	t31:83	t1f4<=V	t36:84	t1f5<=V	t41:85
-.0	0							-.0	0
0.0	0							0.0	0
5.0	53416							5.0	484
10.0	49876							10.0	243
15.0	40319							15.0	242
20.0	42776							20.0	336
25.0	39311							25.0	176
30.0	28883							30.0	334
35.0	23464							35.0	150
40.0	13267							40.0	141
45.0	8647							45.0	491
50.0	0							50.0	0
t1f11<=V	t24:81	t1f12<=V	t29:82	t1f13<=V	t34:83	t1f14<=V	t39:84	t1f15<=V	t44:85
-50.0	0							-50.0	0
-45.0	1767							-45.0	96
-40.0	385							-40.0	15
-35.0	274							-35.0	36
-30.0	3857							-30.0	9
-25.0	4730							-25.0	17
-20.0	1724							-20.0	12
-15.0	1727							-15.0	10
-10.0	2559							-10.0	225
-5.0	3874							-5.0	226
-.0	11919							-.0	159
0.0	0							0.0	0
5.0	0							5.0	0

## 7 Negative User Benefits

### 7.1 General Sources of negative user benefits

While a key aim of a transit project would be the improvement of the transit service on a regional basis with a net positive number of user benefits expressed in equivalent minutes (or hours) of in-vehicle time, it is not unusual for some interchanges to have negative user benefits (i.e. user dis-benefits). User dis-benefits are associated with interchanges where there is a reduction or removal of transit service. For example a bus service may be re-routed to serve a previously under-served market but the re-routing may result in a longer travel time for some existing riders or may cause some existing riders to have to transfer to another bus to complete their trip.

While negative user benefits may be an unintended or unavoidable consequence of the changes in the transit service between the Baseline and the Build Alternatives for some interchanges, those interchanges should be carefully reviewed in the model to ensure that the negative user benefits are not the result of network coding errors.

### 7.2 Use of UserbenC

PB Americas has developed a software tool to aid in diagnosing issues observed in the user benefits analysis. This software tool codenamed UserbenC was originally developed in FORTRAN and has several features for aiding the analyst in identifying the source of anomalies in the user benefit analysis. The tool has been redeveloped in Java for this project and renamed Benji. It is particularly useful in identifying zonal interchanges with negative user benefits and once identified by Benji, those interchanges can be further examined for coding errors or other anomalies. Benji will be made available to the Florida DOT as a product of this project.

## 8 References

- Federal Transit Administration. (2010, July). *Capital Investment Program FY 2012 Evaluation and Rating Process*, (2010). Retrieved from [http://www.fta.dot.gov/documents/FY12\\_Evaluation\\_Process\(1\).pdf](http://www.fta.dot.gov/documents/FY12_Evaluation_Process(1).pdf)
- Federal Transit Administration. (2009, March). *Travel Forecasting for New Starts – Summit Tutorial*. Retrieved from [http://www.fta.dot.gov/documents/Day1\\_Summit.ppt](http://www.fta.dot.gov/documents/Day1_Summit.ppt)
- Federal Transit Administration. (n.d.). *User’s Guide to Summit*. Unpublished



# 9 Appendices

## Appendix A: Summit Control File (sample)

FOR DEMONSTRATION PURPOSE ONLY

hbwpk.ctl  
summit configuration for Section 5309 New Starts evaluation  
2035 Westside No Build vs. Alt1 hbw-peak

NOTE: Files used are not exactly the Westside Project files

=====

&FNAMES

freport='hbwpk.rpt'  
fequiv='Dist\_Westside\_3731.prn'  
ftable1='..\..\ub\_NB\West\_NB\_PK\_HBW.UserBen'  
ftable2='..\..\ub\_Alt1\West\_Alt1\_PK\_HBW.UserBen'  
ftlfd='hbwpk.tlf'  
frcsums='hbwpk.rcs'  
frcvals='hbwpk.rcv'  
fstrats='hbwpk.str'  
fddub='hbwpk.d2d'  
frcub='hbwpk.rcu'  
pqfiles=1,2  
&END

&PARAMS

ndists=21  
nzones=3731  
maxdp=45,9999,9999,9999,45,9999,9999,9999,45  
softtabi='tranplan'  
softtabo='tranplan'  
prteqv=F  
usetotal=f  
&END

&PAGES

pageh=50  
&END

&TABLES

t1='u410'  
t2='u420-t1'  
t3='u430'  
t4='u440-t3'  
t5='u450'  
t6='u460'  
t7='u470'  
t8='u480'  
t9='u490'  
t11='u150'  
t12='u250'  
t13='u350'  
t14='t11/t5'  
t21='u101'  
t22='u102'  
t23='u103'  
t24='u104'  
t25='u105'

```
t26='u106'  
t27='u107'  
t28='u108'  
t29='u109'  
t31='u181'  
t32='u182'  
t33='u183'  
t34='u184'  
t35='u185'  
t36='u186'  
t37='u187'  
t38='u188'  
t39='u189'  
t41='u201'  
t42='u202'  
t43='u203'  
t44='u204'  
t45='u205'  
t46='u206'  
t47='u207'  
t48='u208'  
t49='u209'  
t51='u281'  
t52='u282'  
t53='u283'  
t54='u284'  
t55='u285'  
t56='u286'  
t57='u287'  
t58='u288'  
t59='u289'  
t61='u301'  
t62='u302'  
t63='u303'  
t64='u304'  
t65='u305'  
t66='u306'  
t67='u307'  
t68='u308'  
t69='u309'  
t71='u381'  
t72='u382'  
t73='u383'  
t74='u384'  
t75='u385'  
t76='u386'  
t77='u387'  
t78='u388'  
t79='u389'  
&END  
  
&analysis  
tlf1=21,31  
tlf2=22,32  
tlf3=23,33  
tlf4=24,34  
tlf5=25,35  
tlf6=26,36
```

```

tlf7=27,37
tlf8=28,38
tlf9=29,39
tlf11=41,51
tlf12=42,52
tlf13=43,53
tlf14=44,54
tlf15=45,55
tlf16=46,56
tlf17=47,57
tlf18=48,58
tlf19=49,59
tlf21=61,71
tlf22=62,72
tlf23=63,73
tlf24=64,74
tlf25=65,75
tlf26=66,76
tlf27=67,77
tlf28=68,78
tlf29=69,79
intvltlf=5.0
trcsums=1,5
trcvals=1,5
izvals=2041,2259
jzvals=415,416
tstrat=21,31
bpstrats=-45.0,-10.0,-0.0001,0.0001,10.0,45.0
tline1='Report 2-#'
tline2='HBW Person Trips Stratified by Change in Transit Price'
tline3='(Price in Minutes)'
tline4='Trips by Low Income Households'
&end

&TRPT
t=1
pafmt=T
places=7
tline1='Report 1-1'
tline2='Person-Trips in the No Build Alternative'
tline3='All Transit-Access Markets'
tline4='Home-Based-Work Trips'
source='Mode-choice application (MTA Travel Simulation Model)'
&END

&TRPT
t=2
pafmt=T
places=7
tline1='Report 1-2'
tline2='Change in Person-Trips: Alt1 minus NO Build'
tline3='All Transit-Access Markets'
tline4='Home-Based-Work Trips'
source='Mode-choice application (MTA Travel Simulation Model)'
&END

&TRPT
t=3

```

```

pafmt=T
places=7
tline1='Report 1-3'
tline2='Transit Person-Trips in the No Build Alternative'
tline3='All Transit-Access Markets'
tline4='Home-Based-Work Trips'
source='Mode-choice application (MTA Travel Simulation Model)'
&END

&TRPT
t=4
pafmt=T
places=7
tline1='Report 1-4'
tline2='Change in Transit Person-Trips: Alt1 minus No Build'
tline3='All Transit-Access Markets'
tline4='Home-Based-Work Trips'
source='Mode-choice application (MTA Travel Simulation Model)'
&END

&TRPT
t=5
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-5'
tline2='User Benefits (hours) for the No Build vs. Alt1 '
tline3='Total'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application (MTA Travel Simulation Model)'
&END

&TRPT
t=6
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-6'
tline2='User Benefits (hours) for the No Build vs. Alt1'
tline3='Caused by Changes in the Price of Auto Travel'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application (MTA Travel Simulation Model)'
&END

&TRPT
t=7
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-7'
tline2='User Benefits (hours) for the No Build vs. Alt1'
tline3='Caused by Changes in the Price of Transit Travel'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application (MTA Travel Simulation Model)'
&END

```

```
&TRPT
t=8
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-8'
tline2='User Benefits (hours) for the No Build versus Alt1 '
tline3='Caused by Trip Asymmetry'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application (MTA Travel Simulation Model)'
&END
```

```
&TRPT
t=9
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-9'
tline2='User Benefits (hours) for the No Build versus Alt1 '
tline3='Caused by Record Asymmetry'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application (MTA Travel Simulation Model)'
&END
```

```
&TRPT
t=11
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-10'
tline2='User Benefits (hours) for the No Build versus Alt1'
tline3='Total for Low Income Households'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application (MTA Travel Simulation Model)'
&END
```

```
&TRPT
t=12
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-11'
tline2='User Benefits (hours) for the No Build versus Alt1'
tline3='Total for Medium Income Households'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application (MTA Travel Simulation Model)'
&END
```

```
&TRPT
t=13
pafmt=T
places=7
scale=0.01666667
```

```
tline1='Report 1-13'  
tline2='User Benefits (hours) for the No Build versus Alt1'  
tline3='Total for High Income Households'  
tline4='All Transit-Access Markets'  
tline5='Home-Based-Work'  
source='Mode-choice application (MTA Travel Simulation Model)'  
&END  
  
&TRPT  
t=14  
pafmt=T  
scale=100.0  
places=7  
dplaces=1  
tline1='Report 1-14'  
tline2='Share of Total User Benefits Accruing to Low Income Households'  
tline3='Percent to Low Income Households'  
tline4='All Transit-Access Markets'  
tline5='Home-Based-Work'  
source='Mode-choice application (MTA Travel Simulation Model)'  
&END
```

## Appendix B: Standard Summit Report (sample)

---

```
program summit (Version 0.993; 08/04/04; FTA)

07/22/11 15:44:27 program initiated

wrtctl 601 (i) settings from the control file
&fnames
  freport = hbwpk.rpt
  fequiv  = Dist_Westside_3731.prn
  ftable1 = ../../ub_NB\West_NB_PK_HBW.UserBen
  ftable2 = ../../ub_Alt1\West_Alt1_PK_HBW.UserBen
  ftabtxt =
  ftables =
  ftlfd   = hbwpk.tlf
  frcsums = hbwpk.rcs
  frcvals = hbwpk.rcv
  fstrats = hbwpk.str
  fddub   = hbwpk.d2d
  frcub   = hbwpk.rcu
  pqfiles = 1 2
&params
  nzones = 3731
  ndists = 21
  ubrun  = T
  skipii = F
  cwidtext = 8
  cwidvect = 8
  cwidtabo = 8
  prteqv = F
  softtabi = tranplan
  softtabo = tranplan
  softmap  = generic
  maxdp    = 45 9999 9999
           9999 45 9999
           9999 9999 45
&tables
  t 1 = u410
  t 2 = u420-t1
  t 3 = u430
  t 4 = u440-t3
  t 5 = u450
  t 6 = u460
  t 7 = u470
  t 8 = u480
  t 9 = u490
  t11 = u150
  t12 = u250
  t13 = u350
  t14 = t11/t5
  t21 = u101
  t22 = u102
  t23 = u103
  t24 = u104
  t25 = u105
```



t26 = u106  
t27 = u107  
t28 = u108  
t29 = u109  
t31 = u181  
t32 = u182  
t33 = u183  
t34 = u184  
t35 = u185  
t36 = u186  
t37 = u187  
t38 = u188  
t39 = u189  
t41 = u201  
t42 = u202  
t43 = u203  
t44 = u204  
t45 = u205  
t46 = u206  
t47 = u207  
t48 = u208  
t49 = u209  
t51 = u281  
t52 = u282  
t53 = u283  
t54 = u284  
t55 = u285  
t56 = u286  
t57 = u287  
t58 = u288  
t59 = u289  
t61 = u301  
t62 = u302  
t63 = u303  
t64 = u304  
t65 = u305  
t66 = u306  
t67 = u307  
t68 = u308  
t69 = u309  
t71 = u381  
t72 = u382  
t73 = u383  
t74 = u384  
t75 = u385  
t76 = u386  
t77 = u387  
t78 = u388  
t79 = u389

&analysis

tlf 1 = 21 vs 31  
tlf 2 = 22 vs 32  
tlf 3 = 23 vs 33  
tlf 4 = 24 vs 34  
tlf 5 = 25 vs 35  
tlf 6 = 26 vs 36  
tlf 7 = 27 vs 37  
tlf 8 = 28 vs 38

```

tlf 9      = 29 vs 39
tlf11     = 41 vs 51
tlf12     = 42 vs 52
tlf13     = 43 vs 53
tlf14     = 44 vs 54
tlf15     = 45 vs 55
tlf16     = 46 vs 56
tlf17     = 47 vs 57
tlf18     = 48 vs 58
tlf19     = 49 vs 59
tlf21     = 61 vs 71
tlf22     = 62 vs 72
tlf23     = 63 vs 73
tlf24     = 64 vs 74
tlf25     = 65 vs 75
tlf26     = 66 vs 76
tlf27     = 67 vs 77
tlf28     = 68 vs 78
tlf29     = 69 vs 79
intvltlf  = 5.00
pagetlfs  = 1 1 1 1 1 1 1 1 1 1
           2 2 2 2 2 2 2 2 2 2
           3 3 3 3 3 3 3 3 3 3
trcsums   = 1 5
trcvals   = 1 5
izvals    = 20412259
jzvals    = 415 416
tstratT   = 21
tstratI   = 31
bpstrats  = 1 -45.000
           2 -10.000
           3 0.000
           4 0.000
           5 10.000
           6 45.000
places    = 6
dplaces   = 0
pafmt     = F
&pages
pagew     = 132
pageh     = 50
tpages    = 1 2 3 4 5 6 7 8 9 10
           11 12 13
&trpt
# table pl dpl scale maskub masklb pct notots
-----
1 1 7 0 1.000 -999999.00 999999.00 0 F
2 2 7 0 1.000 -999999.00 999999.00 0 F
3 3 7 0 1.000 -999999.00 999999.00 0 F
4 4 7 0 1.000 -999999.00 999999.00 0 F
5 5 7 0 0.017 -999999.00 999999.00 0 F
6 6 7 0 0.017 -999999.00 999999.00 0 F
7 7 7 0 0.017 -999999.00 999999.00 0 F
8 8 7 0 0.017 -999999.00 999999.00 0 F
9 9 7 0 0.017 -999999.00 999999.00 0 F
10 11 7 0 0.017 -999999.00 999999.00 0 F
11 12 7 0 0.017 -999999.00 999999.00 0 F
12 13 7 0 0.017 -999999.00 999999.00 0 F

```

13 14 7 1 100.000 -999999.00 999999.00 0 F

prpqhead 6601 (i) pq header record for file1

number of zones : 3057  
number of segments : 3  
Civt for transit : -0.0250  
Civt for auto : -0.0250  
travel purpose : HBW  
time period : PEAK

name of alternative: 2035 Westside DEIS NB

prpqhead 6601 (i) pq header record for file2

number of zones : 3057  
number of segments : 3  
Civt for transit : -0.0250  
Civt for auto : -0.0250  
travel purpose : HBW  
time period : PEAK

name of alternative: 2035 Westside DEIS Alt1

Summary of User Benefit Calculations

Table	Contents	Conditions	Markets		Total
1	trips	all	BASE	CW-CW	5953450 trips
2	trips	all	BASE	CW-MD	0 trips
3	trips	all	BASE	CW-NT	0 trips
4	trips	all	BASE	MD-CW	0 trips
5	trips	all	BASE	MD-MD	1308501 trips
6	trips	all	BASE	MD-NT	0 trips
7	trips	all	BASE	NT-CW	0 trips
8	trips	all	BASE	NT-MD	0 trips
9	trips	all	BASE	NT-NT	2094831 trips
10	trips	all	BASE	TOTAL	9356787 trips
11	trips	all	ALT	CW-CW	5953450 trips
12	trips	all	ALT	CW-MD	0 trips
13	trips	all	ALT	CW-NT	0 trips
14	trips	all	ALT	MD-CW	0 trips
15	trips	all	ALT	MD-MD	1308501 trips
16	trips	all	ALT	MD-NT	0 trips
17	trips	all	ALT	NT-CW	0 trips
18	trips	all	ALT	NT-MD	0 trips
19	trips	all	ALT	NT-NT	2094831 trips
20	trips	all	ALT	TOTAL	9356787 trips
21	trips	trn	BASE	CW-CW	638975 trips
22	trips	trn	BASE	CW-MD	0 trips
23	trips	trn	BASE	CW-NT	0 trips
24	trips	trn	BASE	MD-CW	0 trips
25	trips	trn	BASE	MD-MD	22355 trips
26	trips	trn	BASE	MD-NT	0 trips
27	trips	trn	BASE	NT-CW	0 trips
28	trips	trn	BASE	NT-MD	0 trips
29	trips	trn	BASE	NT-NT	0 trips
30	trips	trn	BASE	TOTAL	661330 trips
31	trips	trn	ALT	CW-CW	645846 trips
32	trips	trn	ALT	CW-MD	0 trips
33	trips	trn	ALT	CW-NT	0 trips
34	trips	trn	ALT	MD-CW	0 trips
35	trips	trn	ALT	MD-MD	22801 trips
36	trips	trn	ALT	MD-NT	0 trips
37	trips	trn	ALT	NT-CW	0 trips
38	trips	trn	ALT	NT-MD	0 trips
39	trips	trn	ALT	NT-NT	0 trips
40	trips	trn	ALT	TOTAL	668647 trips
41	userbens	total		CW-CW	547952 minutes
42	userbens	total		CW-MD	0 minutes
43	userbens	total		CW-NT	0 minutes
44	userbens	total		MD-CW	0 minutes
45	userbens	total		MD-MD	21436 minutes
46	userbens	total		MD-NT	0 minutes
47	userbens	total		NT-CW	0 minutes
48	userbens	total		NT-MD	0 minutes
49	userbens	total		NT-NT	0 minutes
50	userbens	total		TOTAL	569388 minutes

51	userbens	auto		CW-CW	0 minutes
52	userbens	auto		CW-MD	0 minutes
53	userbens	auto		CW-NT	0 minutes
54	userbens	auto		MD-CW	0 minutes
55	userbens	auto		MD-MD	0 minutes
56	userbens	auto		MD-NT	0 minutes
57	userbens	auto		NT-CW	0 minutes
58	userbens	auto		NT-MD	0 minutes
59	userbens	auto		NT-NT	0 minutes
60	userbens	auto		TOTAL	0 minutes
61	userbens	transit		CW-CW	547952 minutes
62	userbens	transit		CW-MD	0 minutes
63	userbens	transit		CW-NT	0 minutes
64	userbens	transit		MD-CW	0 minutes
65	userbens	transit		MD-MD	21436 minutes
66	userbens	transit		MD-NT	0 minutes
67	userbens	transit		NT-CW	0 minutes
68	userbens	transit		NT-MD	0 minutes
69	userbens	transit		NT-NT	0 minutes
70	userbens	transit		TOTAL	569388 minutes
71	userbens	trip	asym	CW-CW	0 minutes
72	userbens	trip	asym	CW-MD	0 minutes
73	userbens	trip	asym	CW-NT	0 minutes
74	userbens	trip	asym	MD-CW	0 minutes
75	userbens	trip	asym	MD-MD	0 minutes
76	userbens	trip	asym	MD-NT	0 minutes
77	userbens	trip	asym	NT-CW	0 minutes
78	userbens	trip	asym	NT-MD	0 minutes
79	userbens	trip	asym	NT-NT	0 minutes
80	userbens	trip	asym	TOTAL	0 minutes

person trips total	BASE	recrds	9356799	trips
person trips total	ALT	recrds	9356799	trips
person trips motorized	BASE	recrds	9356799	trips
person trips motorized	ALT	recrds	9356799	trips
transit trips CW	BASE	recrds	638975	trips
transit trips CW	ALT	recrds	645846	trips
transit trips MD	BASE	recrds	22355	trips
transit trips MD	ALT	recrds	22801	trips
transit trips total	BASE	recrds	661330	trips
transit trips total	ALT	recrds	668647	trips

total expenditure	BASE	414193695	minutes
total expenditure	ALT	413603693	minutes
user benefits (d expnd)	BASE - ALT	590001	minutes

trips from data field 2 (1=total; 2=motorized)

Change in UBs from capped price changes (minutes)

Segment:	Total	1	2	3
CW-CW	-16937	-1627	-4119	-11190
CW-MD	0	0	0	0
CW-NT	0	0	0	0
MD-CW	0	0	0	0
MD-MD	-3676	-94	-471	-3111
MD-NT	0	0	0	0
NT-CW	0	0	0	0
NT-MD	0	0	0	0
NT-NT	0	0	0	0
Totals	-20613	-1722	-4590	-14301

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Report 1-1

Person-Trips in the No Build Alternative  
All Transit-Access Markets  
Home-Based-Work Trips

Production District	Attraction District																				Total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		21
1 SantaMonic	16913	11604	4010	1885	2030	1196	7936	2004	2568	2470	2727	1668	422	577	1738	870	4327	792	397	1123	515	67771
2 Westwood	6080	21949	6284	1878	2026	2334	5546	2184	2382	2502	1380	1368	510	612	1965	780	4304	712	368	1112	657	66931
3 MidWilshir	8726	18728	33795	9799	5974	5519	9913	8264	5151	7194	3748	5403	1982	2103	4461	2418	11076	2679	794	2764	1535	152027
4 KoreaTown	3812	6351	13009	15871	7334	10977	5377	8957	5161	9008	2595	3270	4179	3686	5206	2430	8429	2915	714	1923	712	121913
5 LA CBD	94	198	173	356	1163	487	158	330	153	319	26	77	333	158	255	228	175	112	0	268	104	5167
6 LA Central	157	152	162	184	494	859	142	547	99	449	0	48	160	237	100	112	230	74	10	98	8	4321
7 BeachCity	25068	23913	10974	4563	5431	3625	47782	10557	14414	8544	5423	3406	1312	1565	5075	2348	9378	2248	839	3946	1841	192253
8 Crenshaw	10481	12438	14347	11960	11722	15398	32595	74931	35392	44890	4098	4511	5155	9753	13072	7729	14478	5239	935	8621	4926	342672
9 South Bay	8474	9812	6877	5734	8247	6100	31247	23138	218579	52143	2788	3495	2343	3189	10729	6946	10713	4768	676	25536	4004	445537
10 Gateway	5557	6587	7765	8942	10966	11784	16739	29329	69344	348373	2801	4926	5631	15879	29006	27980	15936	7931	938	149802	22783	799000
11 Malibu	8953	10385	5081	2128	2434	1487	5670	1749	2451	2519	15712	2131	558	569	2084	853	15073	1602	7993	596	510	90537
12 HlyHillW	2645	5735	11121	6401	4487	2897	3767	2388	2278	4214	1597	23585	2589	1470	6254	1731	17574	8701	1238	2021	1312	114002
13 LA Rest	2762	4433	7423	8489	8765	7153	4219	6466	4778	11294	1626	6084	19838	6470	14875	5531	9500	8351	750	3862	2608	145276
14 East LA	890	838	1567	1956	2594	3631	1286	4121	2838	17134	477	848	2683	15031	5489	5256	3083	1159	258	3169	2329	76636
15 Foothill	3915	6279	7095	9235	15807	10368	7194	9930	12977	41371	2605	8164	9861	11272	280147	72119	17186	15672	1573	35518	109085	687373
16 SanGabValy	1946	2469	3343	4111	7177	5877	3646	6487	7839	33380	1044	2076	3763	6567	52583	99959	5925	3137	402	30030	27338	309100
17 SanFernado	17250	28566	25258	15559	12883	10041	18329	11799	17034	26290	21677	35344	7037	5605	27060	9928	331403	34503	30229	7459	5388	698641
18 North LA	8152	12022	12532	11835	13685	9373	11680	8682	14708	23957	7216	25703	7833	4345	32257	10676	96633	260934	14936	6937	19004	613099
19 Ventura Co	2134	2405	1465	1470	1545	909	2387	1060	2543	3361	14535	2980	512	407	2785	1004	27206	3785	357125	1511	2156	433284
20 Orange Co	1695	2123	2610	2465	4098	3074	6006	5029	22882	80550	937	1724	1388	1967	15393	15210	4325	2632	7571449820	64382	1689067	1689067
21 InlandEmp	744	1041	983	1563	2875	2025	2226	2754	5287	17204	462	1008	1332	1838	68789	17613	3219	2408	689	797872088331	2302178	2302178
Total	136446	188027	175875	126384	131736	115115	223845	220706	448857	737163	93472	137821	79421	93298	579324	291721	610173	370352	421619	1815902	2359529	9356787

Source: Mode-choice application (MTA Travel Simulation Model)

Report 1-2  
Change in Person-Trips: Alt1 minus NO Build  
All Transit-Access Markets  
Home-Based-Work Trips

Production District	Attraction District																					Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
1 SantaMonic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2 Westwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3 MidWilshir	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 KoreaTown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 LA CBD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6 LA Central	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7 BeachCity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 Crenshaw	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9 South Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 Gateway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 Malibu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 HlyHillW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 LA Rest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14 East LA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 Foothill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 SanGabValy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 SanFernado	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 North LA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 Ventura Co	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 Orange Co	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 InlandEmp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: Mode-choice application (MTA Travel Simulation Model)



Report 1-3  
 Transit Person-Trips in the No Build Alternative  
 All Transit-Access Markets  
 Home-Based-Work Trips

Production District	Attraction District																				Total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		21
1 SantaMonic	3718	1875	835	450	834	356	1657	388	300	470	245	222	88	79	436	179	541	142	37	222	86	13159
2 Westwood	1858	2613	995	391	767	462	1006	338	292	475	120	189	95	54	426	114	581	123	44	241	70	11253
3 MidWilshir	3079	3835	6352	2701	2665	1886	1935	2026	988	1708	476	1179	506	425	1207	518	2857	557	157	568	193	35820
4 KoreaTown	2368	2566	5292	4828	4778	4856	1871	3539	1746	3223	451	1132	1589	1427	1916	801	3162	896	171	542	231	47384
5 LA CBD	72	62	80	98	357	161	67	148	60	109	2	31	122	61	85	101	89	34	0	82	91	1909
6 LA Central	107	74	83	84	282	193	71	223	40	199	0	21	60	108	45	38	88	12	1	33	6	1768
7 BeachCity	5562	2482	1458	635	1455	635	4841	1279	1068	949	300	322	140	133	728	253	760	204	64	417	257	23943
8 Crenshaw	3508	2323	3315	2995	4784	4123	5632	12020	5397	7706	420	781	1016	1796	2430	1122	2744	719	183	1115	628	64755
9 South Bay	1276	746	845	797	2107	888	2686	2412	13027	3954	199	383	245	260	1311	599	1309	419	89	1335	204	35093
10 Gateway	1783	980	1358	1718	3364	2272	2226	3880	6463	29487	396	674	629	1616	2424	1584	3598	730	198	6977	856	73212
11 Malibu	230	99	77	61	208	63	79	25	31	51	46	30	9	10	50	20	150	19	39	7	1	1306
12 HlyHillW	630	628	1710	983	1557	631	433	317	265	580	147	1782	281	133	832	217	1962	896	113	173	112	14380
13 LA Rest	989	628	1157	1285	2608	1538	631	941	577	1352	188	760	1813	748	2038	700	1338	890	171	319	229	20900
14 East LA	414	196	397	494	1252	961	307	824	467	3035	77	162	481	1766	993	869	754	172	72	255	221	14167
15 Foothill	1524	936	1124	1523	5649	2219	1151	1165	1481	2502	275	817	1009	910	17418	4293	2275	1133	294	544	4393	52634
16 SanGabValy	669	295	464	555	2793	1116	436	504	513	1176	169	248	321	410	2853	4615	1212	293	81	215	1042	19979
17 SanFernado	2173	2464	3340	2634	5080	2292	1800	1424	2008	4475	721	3648	820	556	2889	1445	29257	1695	761	636	248	70365
18 North LA	1915	1585	1903	1742	6776	2409	1420	1037	1163	2773	174	2304	939	497	2275	767	4489	5924	113	386	215	40807
19 Ventura Co	109	41	62	174	919	281	83	86	112	313	50	188	62	51	279	97	576	120	3793	52	56	7503
20 Orange Co	388	201	351	391	1713	558	518	379	847	2497	54	180	123	108	383	182	695	149	53	66868	823	77462
21 InlandEmp	203	185	192	341	1607	647	275	378	323	734	16	99	172	253	1825	390	303	88	10	5158	20332	33529
Total	32576	24812	31390	24878	51557	28545	29125	33330	37166	67768	4525	15151	10521	11401	42842	18905	58740	15215	6444	86146	30293	661330

Source: Mode-choice application (MTA Travel Simulation Model)

Report 1-4  
Change in Transit Person-Trips: Alt1 minus No Build  
All Transit-Access Markets  
Home-Based-Work Trips

Production District	Attraction District																				Total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		21
1 SantaMonic	4	91	84	29	22	8	-2	1	-1	3	1	5	5	2	13	3	9	6	0	0	1	282
2 Westwood	24	292	168	45	68	41	1	11	1	22	4	7	8	5	29	5	22	6	1	4	10	773
3 MidWilshir	175	764	522	63	106	50	40	42	0	25	22	-3	12	8	22	8	-15	5	-3	-3	3	1843
4 KoreaTown	65	366	223	14	7	9	27	19	3	3	17	1	2	2	4	1	-3	2	0	0	1	761
5 LA CBD	1	15	4	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22
6 LA Central	2	9	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
7 BeachCity	3	33	17	5	6	2	-1	-1	-5	-1	0	1	2	0	4	1	3	1	0	0	1	69
8 Crenshaw	1	142	91	21	9	3	-14	-7	-3	-1	3	1	3	0	4	1	5	2	0	0	0	263
9 South Bay	4	23	4	0	1	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	34
10 Gateway	15	210	129	4	5	0	0	-1	0	-1	7	0	1	0	-1	0	0	7	0	0	-1	373
11 Malibu	-2	9	5	0	2	0	-3	0	-1	-1	0	0	0	0	0	0	0	0	0	0	0	9
12 HlyHillW	9	98	38	-1	7	0	-2	-2	-2	-5	0	0	0	0	0	0	0	0	0	0	0	140
13 LA Rest	36	189	100	3	8	2	5	3	-1	-1	8	1	1	1	1	0	0	0	0	0	0	357
14 East LA	2	35	30	1	2	0	0	-1	0	-1	1	0	0	0	0	0	0	0	0	0	0	71
15 Foothill	49	594	220	9	31	6	8	-20	-23	-58	6	1	1	1	0	0	0	3	0	0	0	830
16 SanGabValy	28	252	93	5	20	3	7	-11	-12	-19	2	0	1	1	0	0	0	1	0	0	0	370
17 SanFernado	58	226	89	2	13	1	-31	-7	-51	-30	0	0	0	0	-6	0	-2	0	0	0	0	262
18 North LA	106	407	264	14	22	0	1	-41	-136	-311	18	1	-7	-5	-67	-23	0	-1	0	-5	-1	238
19 Ventura Co	14	49	33	2	4	1	1	-5	-9	-34	0	0	0	1	0	0	0	0	0	0	0	55
20 Orange Co	27	224	91	3	9	2	3	-2	-1	-3	3	0	0	0	0	0	0	5	0	0	0	362
21 InlandEmp	32	172	42	4	7	2	14	-17	-19	-59	5	0	1	1	0	0	0	3	0	0	0	187
Total	653	4198	2250	224	349	132	54	-39	-258	-472	98	15	30	18	2	-4	19	40	-3	-5	14	7317

Source: Mode-choice application (MTA Travel Simulation Model)

Report 1-5  
 User Benefits (hours) for the No Build vs. Alt1  
 Total  
 All Transit-Access Markets  
 Home-Based-Work

Production District	Attraction District																				Total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		21
1 SantaMonic	5	120	105	36	34	11	-3	1	-1	3	1	5	6	2	16	3	10	7	0	0	2	364
2 Westwood	26	339	205	57	100	52	-1	13	1	25	5	8	10	5	38	5	25	8	1	4	10	936
3 MidWilshir	281	1082	667	74	158	65	51	51	2	29	25	-5	15	9	25	8	-23	4	-5	-2	3	2516
4 KoreaTown	135	837	446	18	17	15	40	28	4	4	22	1	2	2	7	1	-4	2	0	0	1	1578
5 LA CBD	11	25	8	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48
6 LA Central	5	20	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32
7 BeachCity	3	36	21	6	8	3	-1	-4	-1	0	1	2	0	4	1	3	1	0	0	0	1	82
8 Crenshaw	-6	220	144	29	16	5	-21	-9	-3	-1	3	1	4	0	5	1	6	2	0	0	0	396
9 South Bay	4	25	6	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	38
10 Gateway	12	241	155	4	7	0	0	-1	0	-1	7	0	1	0	-1	0	0	8	0	0	-1	430
11 Malibu	-1	7	4	0	2	0	-2	0	-1	-1	0	0	0	0	0	0	0	0	0	0	0	8
12 HlyHillW	10	116	55	-1	9	0	-2	-2	-2	-5	0	0	0	0	0	0	0	0	0	0	0	179
13 LA Rest	51	281	133	3	10	3	6	4	0	-1	9	1	1	1	1	0	0	0	0	0	0	503
14 East LA	3	58	49	2	4	0	0	0	0	-1	1	0	0	0	0	0	0	0	0	0	0	117
15 Foothill	59	571	235	9	62	7	7	-16	-19	-45	6	0	1	1	0	0	0	3	0	0	0	882
16 SanGabValy	29	192	87	4	28	3	5	-8	-9	-14	2	0	1	0	0	0	0	1	0	0	0	322
17 SanFernado	54	274	115	1	16	1	-29	-5	-47	-26	0	0	0	0	-5	0	-2	0	0	0	0	348
18 North LA	86	311	260	14	48	-2	-3	-36	-119	-299	7	1	-2	-6	-51	-20	0	-1	0	-4	0	183
19 Ventura Co	11	21	25	2	8	1	0	-4	-7	-29	0	0	0	0	0	0	0	0	0	0	0	29
20 Orange Co	24	160	84	3	15	2	2	-2	-1	-2	2	0	0	0	0	0	0	4	0	0	0	291
21 InlandEmp	38	161	48	4	19	3	12	-16	-16	-49	4	0	1	1	0	0	0	1	0	0	0	210
Total	838	5100	2858	267	564	169	65	-6	-221	-413	94	15	44	16	38	-1	15	41	-4	-2	16	9490

Source: Mode-choice application (MTA Travel Simulation Model)

Report 1-6  
 User Benefits (hours) for the No Build vs. Alt1  
 Caused by Changes in the Price of Auto Travel  
 All Transit-Access Markets  
 Home-Based-Work

Production District	Attraction District																					Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
1 SantaMonic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2 Westwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3 MidWilshir	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 KoreaTown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 LA CBD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6 LA Central	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7 BeachCity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 Crenshaw	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9 South Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 Gateway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 Malibu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 HlyHillW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 LA Rest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14 East LA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 Foothill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 SanGabValy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 SanFernado	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 North LA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 Ventura Co	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 Orange Co	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 InlandEmp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: Mode-choice application (MTA Travel Simulation Model)

Report 1-7  
 User Benefits (hours) for the No Build vs. Alt1  
 Caused by Changes in the Price of Transit Travel  
 All Transit-Access Markets  
 Home-Based-Work

Production District	Attraction District																				Total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		21
1 SantaMonic	5	120	105	36	34	11	-3	1	-1	3	1	5	6	2	16	3	10	7	0	0	2	364
2 Westwood	26	339	205	57	100	52	-1	13	1	25	5	8	10	5	38	5	25	8	1	4	10	936
3 MidWilshir	281	1082	667	74	158	65	51	51	2	29	25	-5	15	9	25	8	-23	4	-5	-2	3	2516
4 KoreaTown	135	837	446	18	17	15	40	28	4	4	22	1	2	2	7	1	-4	2	0	0	1	1578
5 LA CBD	11	25	8	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48
6 LA Central	5	20	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32
7 BeachCity	3	36	21	6	8	3	-1	-1	-4	-1	0	1	2	0	4	1	3	1	0	0	1	82
8 Crenshaw	-6	220	144	29	16	5	-21	-9	-3	-1	3	1	4	0	5	1	6	2	0	0	0	396
9 South Bay	4	25	6	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	38
10 Gateway	12	241	155	4	7	0	0	-1	0	-1	7	0	1	0	-1	0	0	8	0	0	-1	430
11 Malibu	-1	7	4	0	2	0	-2	0	-1	-1	0	0	0	0	0	0	0	0	0	0	0	8
12 HlyHillW	10	116	55	-1	9	0	-2	-2	-2	-5	0	0	0	0	0	0	0	0	0	0	0	179
13 LA Rest	51	281	133	3	10	3	6	4	0	-1	9	1	1	1	1	0	0	0	0	0	0	503
14 East LA	3	58	49	2	4	0	0	0	0	-1	1	0	0	0	0	0	0	0	0	0	0	117
15 Foothill	59	571	235	9	62	7	7	-16	-19	-45	6	0	1	1	0	0	0	3	0	0	0	882
16 SanGabValy	29	192	87	4	28	3	5	-8	-9	-14	2	0	1	0	0	0	1	0	0	0	0	322
17 SanFernado	54	274	115	1	16	1	-29	-5	-47	-26	0	0	0	0	-5	0	-2	0	0	0	0	348
18 North LA	86	311	260	14	48	-2	-3	-36	-119	-299	7	1	-2	-6	-51	-20	0	-1	0	-4	0	183
19 Ventura Co	11	21	25	2	8	1	0	-4	-7	-29	0	0	0	0	0	0	0	0	0	0	0	29
20 Orange Co	24	160	84	3	15	2	2	-2	-1	-2	2	0	0	0	0	0	0	4	0	0	0	291
21 InlandEmp	38	161	48	4	19	3	12	-16	-16	-49	4	0	1	1	0	0	0	1	0	0	0	210
Total	838	5100	2858	267	564	169	65	-6	-221	-413	94	15	44	16	38	-1	15	41	-4	-2	16	9490

Source: Mode-choice application (MTA Travel Simulation Model)

Report 1-8  
 User Benefits (hours) for the No Build versus Alt1  
 Caused by Trip Asymmetry  
 All Transit-Access Markets  
 Home-Based-Work

Production District	Attraction District																					Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
1 SantaMonic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2 Westwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3 MidWilshir	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 KoreaTown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 LA CBD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6 LA Central	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7 BeachCity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 Crenshaw	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9 South Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 Gateway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 Malibu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 HlyHillW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 LA Rest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14 East LA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 Foothill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 SanGabValy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 SanFernado	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 North LA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 Ventura Co	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 Orange Co	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 InlandEmp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: Mode-choice application (MTA Travel Simulation Model)

Report 1-9  
 User Benefits (hours) for the No Build versus Alt1  
 Caused by Record Asymmetry  
 All Transit-Access Markets  
 Home-Based-Work

Production District	Attraction District																					Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
1 SantaMonic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2 Westwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3 MidWilshir	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 KoreaTown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 LA CBD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6 LA Central	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7 BeachCity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 Crenshaw	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9 South Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 Gateway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 Malibu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 HlyHillW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 LA Rest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14 East LA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 Foothill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 SanGabValy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 SanFernado	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 North LA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 Ventura Co	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 Orange Co	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 InlandEmp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: Mode-choice application (MTA Travel Simulation Model)

Report 1-10  
 User Benefits (hours) for the No Build versus Alt1  
 Total for Low Income Households  
 All Transit-Access Markets  
 Home-Based-Work

Production District	Attraction District																					Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
1 SantaMonic	3	58	33	12	7	5	-1	0	-1	1	0	1	2	1	6	2	5	2	0	0	1	136
2 Westwood	3	203	86	23	24	20	-2	7	1	12	2	4	5	2	18	2	12	4	0	1	4	432
3 MidWilshir	108	638	351	33	44	25	29	29	3	16	14	-3	8	5	12	3	-12	3	-2	0	1	1304
4 KoreaTown	55	614	283	12	8	9	26	17	3	2	12	1	2	1	4	0	-2	0	0	0	1	1047
5 LA CBD	6	12	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
6 LA Central	2	11	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17
7 BeachCity	1	23	12	3	3	1	0	-1	-1	0	0	0	1	0	2	0	2	0	0	0	0	48
8 Crenshaw	-6	162	101	18	7	3	-17	-7	-2	-1	1	1	3	0	3	1	3	1	0	0	1	271
9 South Bay	1	16	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22
10 Gateway	-2	128	72	1	2	0	0	-1	0	0	2	1	0	0	0	0	0	3	0	0	0	206
11 Malibu	-1	3	2	0	1	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
12 HlyHillW	2	70	37	-1	2	0	0	-1	0	-1	0	0	0	0	0	0	0	0	0	0	0	108
13 LA Rest	19	203	86	2	4	2	4	2	0	0	6	1	1	1	0	0	0	0	0	0	0	332
14 East LA	1	42	34	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80
15 Foothill	4	145	58	2	3	1	1	-1	-1	-4	1	0	0	0	0	0	0	1	0	0	0	209
16 SanGabValy	3	37	22	1	1	0	0	-1	0	-1	0	0	0	0	0	0	0	0	0	0	0	63
17 SanFernado	15	190	70	0	2	0	-7	-1	-8	-2	0	0	0	0	-2	0	0	0	0	0	0	256
18 North LA	6	35	34	1	-1	-4	-11	-6	-47	-85	2	-1	2	-4	-39	-16	0	-1	0	-3	0	-139
19 Ventura Co	0	3	2	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	4
20 Orange Co	2	21	11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	37
21 InlandEmp	3	17	5	0	1	0	1	-1	-1	-3	0	0	0	0	0	0	0	0	0	0	0	23
<b>Total</b>	<b>224</b>	<b>2630</b>	<b>1309</b>	<b>109</b>	<b>111</b>	<b>64</b>	<b>22</b>	<b>36</b>	<b>-56</b>	<b>-67</b>	<b>43</b>	<b>5</b>	<b>26</b>	<b>5</b>	<b>5</b>	<b>-8</b>	<b>7</b>	<b>16</b>	<b>-2</b>	<b>-2</b>	<b>6</b>	<b>4482</b>

Source: Mode-choice application (MTA Travel Simulation Model)



Report 1-11  
 User Benefits (hours) for the No Build versus Alt1  
 Total for Medium Income Households  
 All Transit-Access Markets  
 Home-Based-Work

Production District	Attraction District																				Total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		21
1 SantaMonic	1	38	44	13	9	3	-1	0	0	1	0	2	2	1	5	1	3	2	0	0	0	125
2 Westwood	11	70	50	15	23	14	0	3	0	6	1	2	2	1	9	1	7	2	0	1	3	221
3 MidWilshir	113	300	211	22	57	25	17	14	1	8	8	-1	4	2	7	3	-8	1	-1	0	1	784
4 KoreaTown	61	185	131	5	6	4	12	9	1	1	6	0	0	1	2	0	-1	1	0	0	1	427
5 LA CBD	4	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
6 LA Central	2	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
7 BeachCity	1	8	5	2	3	1	0	0	-1	0	0	0	0	0	1	0	1	0	0	0	0	20
8 Crenshaw	0	47	31	8	7	1	-3	-2	-1	0	1	0	1	0	1	0	2	1	0	0	0	93
9 South Bay	2	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
10 Gateway	5	61	43	1	2	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	115
11 Malibu	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12 HlyHillW	3	28	12	0	2	0	0	-1	-1	-1	0	0	0	0	0	0	0	0	0	0	0	43
13 LA Rest	23	56	34	1	4	1	2	1	0	0	2	0	0	0	0	0	0	0	0	0	0	124
14 East LA	2	12	11	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27
15 Foothill	15	128	59	2	17	2	1	-4	-3	-11	1	0	0	0	0	0	0	1	0	0	0	209
16 SanGabValy	6	42	18	1	6	1	1	-2	-1	-3	0	0	0	0	0	0	0	0	0	0	0	69
17 SanFernado	19	58	26	0	5	0	-7	-2	-10	-7	0	0	0	0	-1	0	0	0	0	0	0	82
18 North LA	22	75	58	2	9	-1	0	-8	-21	-61	1	0	-3	-2	-6	-2	0	0	0	-1	0	63
19 Ventura Co	1	3	4	0	1	0	0	-1	-1	-5	0	0	0	0	0	0	0	0	0	0	0	4
20 Orange Co	4	26	12	0	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	46
21 InlandEmp	7	37	10	1	3	1	3	-3	-3	-12	1	0	0	0	0	0	0	0	0	0	0	45
Total	305	1194	767	75	160	53	25	5	-42	-85	25	4	9	4	18	3	3	11	-1	1	4	2534

Source: Mode-choice application (MTA Travel Simulation Model)

Report 1-13  
 User Benefits (hours) for the No Build versus Alt1  
 Total for High Income Households  
 All Transit-Access Markets  
 Home-Based-Work

Production District	Attraction District																				Total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		21
1 SantaMonic	1	25	28	12	17	3	-1	0	0	1	0	2	2	1	5	1	2	3	0	0	1	103
2 Westwood	12	66	69	19	53	17	1	3	0	8	1	3	3	2	11	2	6	2	0	2	3	283
3 MidWilshir	60	144	106	19	56	15	5	7	-1	5	4	-1	3	2	6	2	-3	1	-1	-2	2	428
4 KoreaTown	19	38	32	1	3	1	3	2	0	0	3	0	0	0	1	0	0	0	0	0	0	104
5 LA CBD	0	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
6 LA Central	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
7 BeachCity	1	5	3	1	3	0	0	0	-1	0	0	0	0	0	1	0	1	0	0	0	0	14
8 Crenshaw	1	12	13	3	3	1	-1	-1	0	0	0	0	0	0	1	0	1	0	0	0	0	32
9 South Bay	1	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	7
10 Gateway	9	52	40	1	3	0	0	0	0	0	3	0	0	0	0	0	0	3	0	0	0	109
11 Malibu	0	4	2	0	1	0	-1	0	-1	-1	0	0	0	0	0	0	0	0	0	0	0	3
12 HlyHillW	4	18	6	0	5	0	-1	0	-1	-3	0	0	0	0	0	0	-1	0	0	0	0	28
13 LA Rest	9	22	12	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	47
14 East LA	1	4	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
15 Foothill	40	298	118	5	42	4	5	-10	-14	-31	4	0	1	1	0	0	0	1	0	0	0	464
16 SanGabValy	20	113	47	3	20	2	4	-5	-7	-10	1	0	0	0	0	0	0	0	0	0	0	189
17 SanFernado	20	26	19	1	10	0	-15	-2	-29	-17	0	0	0	0	-2	0	-1	0	0	0	0	10
18 North LA	58	201	168	10	41	3	8	-22	-50	-153	4	1	-1	0	-5	-1	0	0	0	-1	0	259
19 Ventura Co	9	15	19	1	8	1	0	-3	-6	-23	0	0	0	0	0	0	0	0	0	0	0	21
20 Orange Co	19	113	60	2	11	1	2	-1	0	-2	1	0	0	0	0	0	0	2	0	0	0	208
21 InlandEmp	28	108	33	3	15	2	9	-12	-12	-34	3	0	1	1	0	0	0	0	0	0	0	143
Total	310	1276	782	83	294	52	17	-47	-123	-261	26	6	9	7	16	3	5	14	-1	-1	6	2473

Source: Mode-choice application (MTA Travel Simulation Model)

Report 1-14  
 Share of Total User Benefits Accruing to Low Income Households  
 Percent to Low Income Households  
 All Transit-Access Markets  
 Home-Based-Work

Production District	Attraction District																					Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
1 SantaMonic	59.7	48.1	31.3	31.9	20.7	41.9	54.2	40.7	54.3	40.1	32.2	24.0	37.6	34.2	41.2	58.4	46.0	24.4	54.2	1.9	37.0	37.5
2 Westwood	10.5	59.8	42.1	40.8	24.3	39.1	190.3	52.8	50.1	47.1	48.8	45.4	50.1	39.1	47.4	42.2	48.7	47.9	64.6	33.3	38.6	46.1
3 MidWilshir	38.3	59.0	52.6	44.1	28.1	38.8	57.2	57.2	141.3	55.0	53.1	62.1	55.8	55.3	46.8	41.4	50.7	63.5	48.1	20.1	18.3	51.8
4 KoreaTown	40.4	73.3	63.5	65.0	46.6	63.9	63.5	59.8	67.9	62.3	55.6	96.8	75.4	50.7	59.3	53.8	58.5	28.9	99.8	-19.8	41.3	66.4
5 LA CBD	61.5	47.6	46.2	39.7	53.3	54.1	52.0	52.8	38.4	53.8	0.0	22.4	44.5	43.0	45.9	44.8	7.3	31.9	0.0	29.7	41.2	50.5
6 LA Central	40.5	55.8	56.7	73.1	83.9	78.1	51.5	62.4	49.1	128.3	0.0	194.4	69.3	55.5	62.4	77.4	26.5	45.9	26.1	24.7	48.9	54.5
7 BeachCity	27.3	63.6	59.2	52.8	35.4	53.2	-17.4	45.5	37.1	20.0	45.1	58.8	66.3	62.8	52.1	64.9	55.9	51.7	40.7	34.7	34.7	58.4
8 Crenshaw	107.5	73.6	69.8	61.1	43.3	62.2	81.6	72.9	69.2	66.5	54.1	69.7	67.6	-5.9	64.1	70.8	54.5	53.3	240.8	47.6	136.0	68.4
9 South Bay	16.6	61.8	71.1	58.5	15.3	-43.1	50.1	39.7	39.1	-3.8	40.1	63.5	87.1	6.9	-9.3	-1.5	60.4	27.0	33.4	18.0	17.5	56.6
10 Gateway	-16.1	53.0	46.4	39.3	25.1	-48.9	9.7	39.3	14.7	26.4	36.0	-21.3	51.2	79.1	21.2	30.3	18.5	39.3	24.0	29.3	21.6	47.9
11 Malibu	56.7	43.7	40.2	53.0	39.2	51.9	32.5	28.9	14.7	5.2	61.9	7.0	56.8	35.1	-73.2	-22.5	15.5	30.9	14.3	39.6	4.1	52.0
12 HlyHillW	25.4	60.6	66.3	119.3	19.1	33.1	13.8	46.3	21.2	16.7	78.2	-4.6	29.5	40.4	29.1	28.4	27.9	37.7	19.8	-8.7	22.7	60.2
13 LA Rest	38.2	72.2	65.0	57.8	40.2	67.7	64.1	65.9	24.2	-28.4	66.3	78.5	64.8	70.3	61.5	65.4	-6.5	38.0	48.8	38.2	47.5	65.9
14 East LA	32.2	72.3	68.8	62.4	36.5	47.8	46.7	42.3	41.8	42.0	44.9	35.4	62.4	41.0	35.2	46.9	15.9	44.3	16.1	30.7	44.9	68.3
15 Foothill	6.6	25.5	24.5	16.9	4.8	7.9	7.6	7.6	5.4	8.4	12.7	28.8	26.4	10.7	41.4	48.8	0.0	26.5	33.4	3.3	56.6	23.7
16 SanGabValy	9.4	19.3	24.9	16.9	5.3	9.6	8.7	8.4	3.9	6.8	18.6	0.0	17.2	13.0	52.0	53.0	0.0	37.2	27.0	1.7	50.3	19.6
17 SanFernado	27.8	69.3	61.0	13.1	9.9	17.9	23.8	25.1	17.7	8.3	100.0	23.4	14.6	11.3	32.7	-31.4	21.8	68.8	61.6	5.7	0.0	73.7
18 North LA	6.5	11.2	13.2	10.2	-3.0	232.8	349.3	15.5	39.7	28.5	30.2	-68.2	-75.3	65.8	77.8	81.9	327.0	68.3	93.8	70.3	89.5	-76.1
19 Ventura Co	3.6	13.1	7.2	3.7	2.9	2.8	-17.8	4.0	2.6	3.3	69.0	0.0	2.5	4.6	70.6	75.1	34.8	412.4	194.5	3.0	80.5	13.8
20 Orange Co	6.9	13.4	13.7	8.1	4.4	7.1	3.2	6.2	5.1	6.1	11.8	0.0	9.8	9.1	29.3	35.0	0.0	30.5	0.0	113.5	32.2	12.6
21 InlandEmp	6.7	10.4	9.7	9.4	5.2	6.6	8.2	7.2	4.2	5.9	9.9	9.3	9.1	7.1	0.0	0.0	0.0	18.3	0.0	3.5	0.0	10.7
Total	26.7	51.6	45.8	40.8	19.6	37.8	34.6	-615.8	25.4	16.2	45.6	36.2	58.5	34.6	12.0	566.5	47.7	38.9	45.0	92.5	36.2	47.2

Source: Mode-choice application (MTA Travel Simulation Model)

Report 2-1  
 HBW Person Trips Stratified by Change in Transit Price  
 (Price in Minutes)  
 Trips by Low Income Households  
 For Impedance Values Less Than -45.00

Origin District	Destination District																				Total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		21
1 SantaMonic	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2 Westwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3 MidWilshir	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 KoreaTown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 LA CBD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6 LA Central	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7 BeachCity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 Crenshaw	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9 South Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 Gateway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 Malibu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 HlyHillW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 LA Rest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14 East LA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 Foothill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 SanGabValy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 SanFernado	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 North LA	0	1	0	0	0	0	0	0	3	0	0	0	15	0	191	0	0	11	0	0	0	221
19 Ventura Co	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 Orange Co	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 InlandEmp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Totals	0	1	0	0	0	0	1	0	3	0	0	0	15	0	191	0	0	11	0	0	0	223

Report 2-2  
 HBW Person Trips Stratified by Change in Transit Price  
 (Price in Minutes)  
 Trips by Low Income Households  
 For Impedance Values Between -45.00 And -10.00

Origin District	Destination District																					Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
1 SantaMonic	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3
2 Westwood	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
3 MidWilshir	0	0	0	5	0	0	32	0	0	0	0	0	0	0	5	0	0	0	6	0	0	48
4 KoreaTown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 LA CBD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6 LA Central	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7 BeachCity	0	2	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
8 Crenshaw	33	3	0	7	0	0	64	10	4	0	0	0	0	0	0	0	0	0	0	0	0	122
9 South Bay	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
10 Gateway	32	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	46
11 Malibu	0	0	0	0	0	0	5	0	1	0	0	0	0	0	1	0	0	0	0	1	0	10
12 HlyHillW	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
13 LA Rest	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
14 East LA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 Foothill	18	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21
16 SanGabValy	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
17 SanFernado	1	47	0	0	0	0	9	2	0	0	4	0	0	0	15	0	0	0	0	0	0	78
18 North LA	0	2	0	12	8	19	63	89	339	566	1	17	56	46	290	214	24	41	0	87	103	1976
19 Ventura Co	0	0	0	0	0	0	0	1	2	10	0	0	0	0	0	0	0	0	0	0	0	15
20 Orange Co	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3
21 InlandEmp	0	0	3	0	0	1	0	6	1	15	0	0	0	0	0	0	0	0	0	0	0	26
Totals	89	61	6	24	9	20	197	110	348	592	6	17	56	46	310	214	24	53	6	88	103	2378

Report 2-3  
 HBW Person Trips Stratified by Change in Transit Price  
 (Price in Minutes)  
 Trips by Low Income Households  
 For Impedance Values Between -10.00 And 0.00

Origin District	Destination District																				Total		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		21	
1 SantaMonic	289	65	4	4	23	24	254	109	148	92	27	3	5	4	20	10	28	2	1	28	0	1138	
2 Westwood	503	151	1	0	15	0	400	35	120	13	28	3	0	2	2	2	13	1	0	26	0	1316	
3 MidWilshir	192	44	482	422	98	185	468	379	308	345	50	379	64	84	195	69	1078	162	53	176	48	5283	
4 KoreaTown	270	68	502	990	721	685	308	789	369	1017	84	173	232	259	256	167	635	220	24	74	15	7859	
5 LA CBD	1	0	0	1	24	10	5	12	5	17	0	0	0	1	0	0	0	0	0	1	0	77	
6 LA Central	2	0	4	0	11	69	4	85	10	93	0	0	0	3	2	4	3	2	0	7	0	299	
7 BeachCity	194	407	258	51	58	60	662	418	417	506	42	45	18	38	59	70	157	18	6	81	0	3564	
8 Crenshaw	383	448	574	121	536	659	736	6117	1432	6369	61	246	149	452	783	764	946	352	37	818	306	22290	
9 South Bay	72	99	155	42	127	77	17	415	151	927	1	69	43	75	282	285	242	141	17	216	102	3553	
10 Gateway	77	40	94	12	248	275	111	2331	2176	15895	2	213	136	212	799	983	736	315	21	1642	721	27040	
11 Malibu	31	11	6	15	4	5	31	9	23	20	8	10	1	2	2	1	37	8	0	5	0	229	
12 HlyHillW	80	46	161	115	34	23	101	144	107	369	10	22	12	16	55	14	41	3	0	21	7	1381	
13 LA Rest	52	11	88	85	32	69	67	433	281	1016	4	10	43	20	4	5	37	5	0	26	0	2289	
14 East LA	56	35	60	14	39	74	12	543	260	1807	0	0	0	19	2	0	0	0	0	22	0	2943	
15 Foothill	51	5	31	6	35	47	37	474	458	1970	0	0	0	0	7	0	0	4	0	78	0	3202	
16 SanGabValy	20	15	18	1	11	23	17	279	219	1046	3	0	0	1	12	0	0	1	0	107	0	1773	
17 SanFernado	396	307	64	4	47	51	515	516	788	2041	27	0	2	0	23	7	81	0	0	34	0	4904	
18 North LA	115	19	18	74	219	127	353	232	198	699	22	103	19	72	21	12	607	70	34	25	42	3081	
19 Ventura Co	11	0	0	1	1	0	7	11	22	37	1	0	1	0	0	0	0	0	4	4	0	100	
20 Orange Co	9	0	9	7	7	9	14	125	324	1154	0	0	0	0	0	0	0	1	0	1	0	1659	
21 InlandEmp	4	0	0	0	2	3	5	41	50	211	0	0	0	0	0	0	0	1	0	8	0	324	
Totals	2806		2529		2291		4122		7867		370		725		2523		4641		196		1242		94302
		1773		1965		2478		13498		35644		1274		1260		2394		1304		3397			

Report 2-4  
 HBW Person Trips Stratified by Change in Transit Price  
 (Price in Minutes)  
 Trips by Low Income Households  
 For Impedance Values Between 0.00 And 0.00

Origin District	Destination District																				Total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		21
1 SantaMonic	948	33	1	0	1	0	453	15	36	2	68	4	2	0	1	0	14	4	1	1	0	1588
2 Westwood	64	2	0	0	0	0	77	3	2	0	10	0	0	0	0	0	0	0	0	0	0	159
3 MidWilshir	0	0	473	251	17	14	3	0	0	58	12	296	40	34	116	74	521	107	13	31	11	2071
4 KoreaTown	0	0	455	1127	26	46	20	26	23	74	23	542	325	70	382	163	1438	349	66	44	19	5220
5 LA CBD	0	0	10	22	0	0	0	0	0	0	1	19	5	0	2	0	45	22	0	0	0	126
6 LA Central	0	0	12	37	0	8	7	2	5	32	0	7	4	14	11	0	57	3	0	4	0	204
7 BeachCity	2256	266	184	176	6	128	4835	821	842	310	292	94	32	56	215	68	576	59	33	196	1	11447
8 Crenshaw	630	42	260	1181	30	427	4178	10827	6054	2986	171	283	589	889	1173	407	1422	144	47	567	38	32348
9 South Bay	340	11	98	418	22	343	2505	2516	21699	4513	80	156	165	243	766	426	831	133	15	1782	88	37151
10 Gateway	4	0	95	642	117	108	859	1098	6367	33033	108	365	570	1024	2814	2189	1520	315	55	14112	989	66383
11 Malibu	58	7	6	6	2	3	38	8	4	3	113	8	3	2	17	6	127	11	81	6	3	514
12 HlyHillW	0	0	410	585	41	51	0	0	0	110	27	2482	246	105	706	194	1972	863	96	168	66	8122
13 LA Rest	0	0	258	681	292	99	0	0	0	409	26	1028	2978	398	1921	691	1722	1134	75	282	184	12177
14 East LA	0	0	61	167	67	70	0	0	1	1375	21	187	568	1444	1012	893	751	184	12	362	178	7352
15 Foothill	0	0	102	502	292	163	0	0	1	1352	52	692	938	784	29585	8000	1803	1050	85	2517	8560	56480
16 SanGabValy	0	0	53	182	157	36	0	0	0	928	18	185	296	306	4702	9356	599	207	24	1208	1186	19441
17 SanFernado	2	0	640	1051	181	175	21	1	7	687	681	3766	821	366	3165	1285	40628	2904	2024	636	375	59417
18 North LA	0	0	121	498	59	55	0	0	0	245	73	1442	581	146	1653	458	3322	14398	256	223	451	23981
19 Ventura Co	0	0	20	18	6	6	0	0	0	15	142	58	10	7	179	24	523	72	12380	40	32	13533
20 Orange Co	0	0	23	81	50	29	50	25	468	3631	13	99	83	65	940	876	290	111	28	89662	2496	99021
21 InlandEmp	0	0	7	34	23	24	9	5	37	322	3	34	39	51	3821	602	138	54	17	2657	74011	81887
Totals	4302	363	3290	7659	1389	1785	13054	15347	35547	50087	1933	11748	8295	6003	53183	25714	58299	22126	15308	114498	88690	538621

Report 2-5  
 HBW Person Trips Stratified by Change in Transit Price  
 (Price in Minutes)  
 Trips by Low Income Households  
 For Impedance Values Between 0.00 And 10.00

Origin District	Destination District																				Total	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		21
1 SantaMonic	972	1096	354	160	157	152	349	167	94	194	116	102	43	46	190	113	495	76	28	105	39	5048
2 Westwood	345	3549	492	176	122	233	269	209	164	270	51	128	65	37	207	51	493	93	35	162	35	7185
3 MidWilshir	1284	1377	5253	1510	923	1039	1319	1657	696	1123	345	256	334	337	619	333	619	240	22	270	55	19609
4 KoreaTown	1054	711	3260	3436	2570	4167	1534	2825	1367	2072	255	437	1125	1228	1121	510	924	312	63	439	139	29552
5 LA CBD	12	9	31	24	288	129	35	72	30	69	0	1	109	40	51	73	4	3	0	61	38	1078
6 LA Central	44	15	44	37	272	280	37	152	25	78	0	5	61	107	24	38	6	9	0	16	3	1253
7 BeachCity	668	2057	926	309	452	228	611	223	82	184	71	208	103	83	362	141	424	149	15	114	148	7557
8 Crenshaw	1282	1667	2562	1633	2248	3148	1692	2942	245	1097	183	454	665	1369	1080	581	999	453	46	369	492	25210
9 South Bay	267	661	442	119	512	96	275	93	105	118	54	100	69	50	145	62	65	105	5	46	59	3447
10 Gateway	627	335	718	585	984	1454	1016	1434	863	987	58	8	135	1365	30	8	9	86	0	26	11	10739
11 Malibu	46	77	76	24	32	19	31	17	14	16	6	7	5	7	14	10	26	6	2	2	1	437
12 HlyHillW	252	376	1220	247	476	285	344	211	167	77	121	39	59	90	4	0	78	6	1	29	0	4083
13 LA Rest	485	204	802	818	1387	1467	762	1034	616	869	128	74	1024	1002	694	482	64	96	39	393	127	12570
14 East LA	153	45	216	261	600	815	278	570	371	1046	23	5	173	2005	346	355	5	27	1	289	109	7692
15 Foothill	311	125	401	375	737	705	623	703	852	822	52	6	160	329	457	334	0	67	0	378	46	7484
16 SanGabValy	142	40	202	167	282	410	276	405	452	747	36	0	80	325	572	915	0	21	1	533	132	5739
17 SanFernado	1391	1778	2345	705	1128	932	1629	1171	1226	677	381	24	131	341	8	5	3305	27	195	115	0	17514
18 North LA	291	518	785	400	649	501	419	394	374	304	62	149	115	106	128	60	1360	665	252	80	88	7702
19 Ventura Co	32	28	15	13	20	12	47	24	38	26	22	0	4	10	4	2	40	0	36	3	6	383
20 Orange Co	75	25	85	71	150	141	219	214	375	86	16	0	26	66	1	1	0	1	0	0	20	1574
21 InlandEmp	17	3	20	35	55	48	56	73	98	79	2	0	18	20	0	0	0	1	0	14	0	538
Totals	9751	14698	20248	11106	14044	16261	11823	14591	8252	10941	1982	2002	4501	8962	6060	4076	8917	2444	740	3444	1550	176393



Report 2-6  
 HBW Person Trips Stratified by Change in Transit Price  
 (Price in Minutes)  
 Trips by Low Income Households  
 For Impedance Values Between 10.00 And 45.00

Origin District	Destination District																				Total			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		21		
1 SantaMonic	0	215	71	26	12	0	0	0	0	0	0	0	4	0	6	0	2	1	0	0	0	0	337	
2 Westwood	0	869	254	58	60	30	3	6	1	34	9	0	7	6	35	8	12	2	0	0	41	1436		
3 MidWilshir	144	2171	1068	63	68	28	58	9	2	17	35	2	23	5	11	9	0	6	0	0	0	3719		
4 KoreaTown	104	1657	611	0	0	0	24	0	0	0	39	0	0	0	5	0	0	0	0	0	0	2441		
5 LA CBD	27	27	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60		
6 LA Central	5	31	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42		
7 BeachCity	0	89	30	1	4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	125		
8 Crenshaw	5	559	237	35	7	0	0	0	0	0	7	0	2	0	0	0	2	4	0	0	0	855		
9 South Bay	0	34	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	48		
10 Gateway	15	557	215	0	0	0	0	0	0	0	21	0	0	0	0	0	0	16	0	0	0	824		
11 Malibu	3	19	2	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	27		
12 HlyHillW	6	301	69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	375		
13 LA Rest	48	586	251	0	0	0	7	0	0	0	27	0	0	0	0	0	0	2	0	0	0	921		
14 East LA	5	133	111	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	252		
15 Foothill	18	465	196	0	0	0	0	0	0	0	6	0	0	0	0	0	0	16	0	0	0	701		
16 SanGabValy	9	159	74	0	0	0	3	0	0	0	1	0	0	0	0	0	0	9	0	0	0	255		
17 SanFernado	11	898	150	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1061		
18 North LA	42	152	134	16	0	3	22	81	16	45	20	4	81	10	8	3	1	1	1	1	4	644		
19 Ventura Co	8	36	10	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56		
20 Orange Co	8	101	55	0	0	0	0	0	0	0	2	0	0	0	0	0	0	15	0	0	0	181		
21 InlandEmp	6	40	17	0	0	0	4	3	0	0	2	0	0	0	0	0	0	5	0	0	0	78		
Totals	462		3578		151		124		20		173		118		66		17		80		1	0	44	14437
		9098		198		60		100		97		6		22		20		80		0				

Report 2-7  
 HBW Person Trips Stratified by Change in Transit Price  
 (Price in Minutes)  
 Trips by Low Income Households  
 For Impedance Values Greater Than 45.00

Origin District	Destination District																					Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
1 SantaMonic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2 Westwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3 MidWilshir	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 KoreaTown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 LA CBD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6 LA Central	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7 BeachCity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 Crenshaw	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9 South Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 Gateway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 Malibu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 HlyHillW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 LA Rest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14 East LA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 Foothill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 SanGabValy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 SanFernado	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 North LA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 Ventura Co	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 Orange Co	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 InlandEmp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

## Appendix C: Summit Control File for Example 1

FOR DEMONSTRATION PURPOSE ONLY

hbwpk.ct1  
summit configuration for Section 5309 New Starts evaluation  
2035 Westside No Build vs. Alt1 hbw-peak

Run Description: Basic User Benefit Analysis and Output Data for Thematic Map

Files used are not exact replicas from the Westside Project

```
=====
&FNAMES
freport='hbwpk_eg1.rpt'
fequiv='Dist_Westside_3731.prn'
ftable1='..\..\ub_NB\West_NB_PK_HBW.UserBen'
ftable2='..\..\ub_Alt1\West_Alt1_PK_HBW.UserBen'
frcsums='hbwpk.rcs'
fddub='hbwpk.d2d'
frcub='hbwpk.rcu'
pqfiles=1,2
&END
```

```
&PARAMS
ndists=21
nzones=3731
maxdp=45,9999,9999,9999,45,9999,9999,9999,45
softtabi='tranplan'
softtabo='tranplan'
prteqv=F
&END
```

```
&PAGES
pageh=50
&END
```

```
&TABLES
t1='u410'
t2='u420-t1'
t3='u430'
t4='u440-t3'
t5='u450'
t6='u460'
t7='u470'
t8='u480'
t11='u150'
t12='u250'
t13='u350'
t14='t11/t5'
&END
```

```
&analysis
trcsums=1,5
&end
```

```
&TRPT
```

```

t=1
pafmt=T
places=7
tline1='Report 1-1'
tline2='Person-Trips in the No Build Alternative'
tline3='All Transit-Access Markets'
tline4='Home-Based-Work Trips'
source='Mode-choice application'
&END

&TRPT
t=2
pafmt=T
places=7
tline1='Report 1-2'
tline2='Change in Person-Trips: Alt1 minus No Build'
tline3='All Transit-Access Markets'
tline4='Home-Based-Work Trips'
source='Mode-choice application'
&END

&TRPT
t=3
pafmt=T
places=7
tline1='Report 1-3'
tline2='Transit Person-Trips in the No Build Alternative'
tline3='All Transit-Access Markets'
tline4='Home-Based-Work Trips'
source='Mode-choice application'
&END

&TRPT
t=4
pafmt=T
places=7
tline1='Report 1-4'
tline2='Change in Transit Person-Trips: Alt1 minus No Build'
tline3='All Transit-Access Markets'
tline4='Home-Based-Work Trips'
source='Mode-choice application'
&END

&TRPT
t=5
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-5'
tline2='User Benefits (hours) for the No Build vs. Alt1 '
tline3='Total'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application'
&END

&TRPT
t=6

```

```

pafmt=T
places=7
scale=0.01666667
tline1='Report 1-6'
tline2='User Benefits (hours) for the No Build vs. Alt1'
tline3='Caused by Changes in the Price of Auto Travel'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application'
&END

&TRPT
t=7
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-7'
tline2='User Benefits (hours) for the No Build vs. Alt1'
tline3='Caused by Changes in the Price of Transit Travel'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application'
&END

&TRPT
t=8
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-8'
tline2='User Benefits (hours) for the No Build versus Alt1 '
tline3='Caused by Trip Asymmetry'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application'
&END

&TRPT
t=11
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-9'
tline2='User Benefits (hours) for the No Build versus Alt1'
tline3='Total for Low Income Households'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application'
&END

&TRPT
t=12
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-10'
tline2='User Benefits (hours) for the No Build versus Alt1'
tline3='Total for Medium Income Households'

```

```
tline4='All Transit-Access Markets'  
tline5='Home-Based-Work'  
source='Mode-choice application'  
&END  
  
&TRPT  
t=13  
pafmt=T  
places=7  
scale=0.01666667  
tline1='Report 1-11'  
tline2='User Benefits (hours) for the No Build versus Alt1'  
tline3='Total for High Income Households'  
tline4='All Transit-Access Markets'  
tline5='Home-Based-Work'  
source='Mode-choice application (MTA Travel Simulation Model)'  
&END  
  
&TRPT  
t=14  
pafmt=T  
scale=100.0  
places=7  
dplaces=1  
tline1='Report 1-12'  
tline2='Share of Total User Benefits Accruing to Low Income Households'  
tline3='Percent to Low Income Households'  
tline4='All Transit-Access Markets'  
tline5='Home-Based-Work'  
source='Mode-choice application'  
&END
```

## Appendix D: Summit Control File for Example 2

FOR DEMONSTRATION PURPOSE ONLY

hbwpk.ctl  
summit configuration for Section 5309 New Starts evaluation  
2035 Westside No Build vs. Alt1 hbw-peak

Run Description: Basic User Benefit Analysis and Transit Trip Frequency Distribution

Files used are not exact replicas from the Westside Project  
=====

&FNAMES

freport='hbwpk\_eg2.rpt'  
fequiv='Dist\_Westside\_3731.prn'  
ftable1='..\..\ub\_NB\West\_NB\_PK\_HBW.UserBen'  
ftable2='..\..\ub\_Alt1\West\_Alt1\_PK\_HBW.UserBen'  
ftlfd='hbwpk\_eg2.tlf'  
frcsums='hbwpk.rcs'  
fddub='hbwpk.d2d'  
frcub='hbwpk.rcu'  
pqfiles=1,2  
&END

&PARAMS

ndists=21  
nzones=3731  
maxdp=45,9999,9999,9999,45,9999,9999,9999,45  
softtabi='tranplan'  
softtabo='tranplan'  
prteqv=F  
&END

&PAGES

pageh=50  
&END

&TABLES

t1='u410'  
t2='u420-t1'  
t3='u430'  
t4='u440-t3'  
t5='u450'  
t6='u460'  
t7='u470'  
t8='u480'  
t11='u150'  
t12='u250'  
t13='u350'  
t14='t11/t5'  
t21='u131'  
t22='u132'  
t23='u133'  
t24='u134'  
t25='u135'  
t26='u136'

```
t27='u137'  
t28='u138'  
t29='u139'  
t31='u181'  
t32='u182'  
t33='u183'  
t34='u184'  
t35='u185'  
t36='u186'  
t37='u187'  
t38='u188'  
t39='u189'  
t41='u231'  
t42='u232'  
t43='u233'  
t44='u234'  
t45='u235'  
t46='u236'  
t47='u237'  
t48='u238'  
t49='u239'  
t51='u281'  
t52='u282'  
t53='u283'  
t54='u284'  
t55='u285'  
t56='u286'  
t57='u287'  
t58='u288'  
t59='u289'  
t61='u331'  
t62='u332'  
t63='u333'  
t64='u334'  
t65='u335'  
t66='u336'  
t67='u337'  
t68='u338'  
t69='u339'  
t71='u381'  
t72='u382'  
t73='u383'  
t74='u384'  
t75='u385'  
t76='u386'  
t77='u387'  
t78='u388'  
t79='u389'  
&END  
  
&analysis  
tlf1=21,31  
tlf2=22,32  
tlf3=23,33  
tlf4=24,34  
tlf5=25,35  
tlf6=26,36  
tlf7=27,37
```



```

tlf8=28,38
tlf9=29,39
tlf11=41,51
tlf12=42,52
tlf13=43,53
tlf14=44,54
tlf15=45,55
tlf16=46,56
tlf17=47,57
tlf18=48,58
tlf19=49,59
tlf21=61,71
tlf22=62,72
tlf23=63,73
tlf24=64,74
tlf25=65,75
tlf26=66,76
tlf27=67,77
tlf28=68,78
tlf29=69,79
intvltlf=5.0
trcsums=1,5
&end

&TRPT
t=1
pafmt=T
places=7
tline1='Report 1-1'
tline2='Person-Trips in the No Build Alternative'
tline3='All Transit-Access Markets'
tline4='Home-Based-Work Trips'
source='Mode-choice application'
&END

&TRPT
t=2
pafmt=T
places=7
tline1='Report 1-2'
tline2='Change in Person-Trips: Alt1 minus No Build'
tline3='All Transit-Access Markets'
tline4='Home-Based-Work Trips'
source='Mode-choice application'
&END

&TRPT
t=3
pafmt=T
places=7
tline1='Report 1-3'
tline2='Transit Person-Trips in the No Build Alternative'
tline3='All Transit-Access Markets'
tline4='Home-Based-Work Trips'
source='Mode-choice application'
&END

&TRPT

```

```

t=4
pafmt=T
places=7
tline1='Report 1-4'
tline2='Change in Transit Person-Trips: Alt1 minus No Build'
tline3='All Transit-Access Markets'
tline4='Home-Based-Work Trips'
source='Mode-choice application'
&END

&TRPT
t=5
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-5'
tline2='User Benefits (hours) for the No Build vs. Alt1 '
tline3='Total'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application'
&END

&TRPT
t=6
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-6'
tline2='User Benefits (hours) for the No Build vs. Alt1'
tline3='Caused by Changes in the Price of Auto Travel'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application'
&END

&TRPT
t=7
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-7'
tline2='User Benefits (hours) for the No Build vs. Alt1'
tline3='Caused by Changes in the Price of Transit Travel'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application'
&END

&TRPT
t=8
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-8'
tline2='User Benefits (hours) for the No Build versus Alt1 '
tline3='Caused by Trip Asymmetry'
tline4='All Transit-Access Markets'

```

```

tline5='Home-Based-Work'
source='Mode-choice application'
&END

&TRPT
t=11
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-9'
tline2='User Benefits (hours) for the No Build versus Alt1'
tline3='Total for Low Income Households'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application'
&END

&TRPT
t=12
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-10'
tline2='User Benefits (hours) for the No Build versus Alt1'
tline3='Total for Medium Income Households'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application'
&END

&TRPT
t=13
pafmt=T
places=7
scale=0.01666667
tline1='Report 1-11'
tline2='User Benefits (hours) for the No Build versus Alt1'
tline3='Total for High Income Households'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application (MTA Travel Simulation Model)'
&END

&TRPT
t=14
pafmt=T
scale=100.0
places=7
dplaces=1
tline1='Report 1-12'
tline2='Share of Total User Benefits Accruing to Low Income Households'
tline3='Percent to Low Income Households'
tline4='All Transit-Access Markets'
tline5='Home-Based-Work'
source='Mode-choice application'
&END

```

## Appendix E: Summit Control File for Example 3

FOR DEMONSTRATION PURPOSE ONLY

hbwpk.ct1  
summit configuration for Section 5309 New Starts evaluation  
2035 Westside No Build vs. Alt1 hbw-peak

Run Description: User Benefit Frequency Distribution (Low Income Households)

Files used are not exact replicas from the Westside Project  
=====

&FNAMES

freport='hbwpk\_eg3a.rpt'  
fequiv='Dist\_Westside\_3731.prn'  
ftable1='..\..\ub\_NB\West\_NB\_PK\_HBW.UserBen'  
ftable2='..\..\ub\_Alt1\West\_Alt1\_PK\_HBW.UserBen'  
ftlfd='hbwpk\_eg3a.tlf'  
frcsums='hbwpk\_eg3a.rcs'  
fddub='hbwpk.d2d'  
frcub='hbwpk.rcu'  
pqfiles=1,2  
&END

&PARAMS

ndists=21  
nzones=3731  
maxdp=45,9999,9999,9999,45,9999,9999,9999,45  
softtabi='tranplan'  
softtabo='tranplan'  
prteqv=F  
&END

&PAGES

pageh=50  
&END

&TABLES

t1='u410'  
t2='u420-t1'  
t3='u430'  
t4='u440-t3'  
t5='u450'  
t6='u460'  
t7='u470'  
t8='u480'  
t9='u490'  
t11='u150'  
t12='u250'  
t13='u350'  
t14='t11/t5'  
  
t20='u141>0'  
t21='u141\*t20'  
t22='u141<0'  
t23='u141\*t22'

t24='-1\*t23'  
  
t25='u142>0'  
t26='u142\*t25'  
t27='u142<0'  
t28='u142\*t27'  
t29='-1\*t28'  
  
t30='u143>0'  
t31='u143\*t30'  
t32='u143<0'  
t33='u143\*t32'  
t34='-1\*t33'  
  
t35='u144>0'  
t36='u144\*t35'  
t37='u144<0'  
t38='u144\*t37'  
t39='-1\*t38'  
  
t40='u145>0'  
t41='u145\*t40'  
t42='u145<0'  
t43='u145\*t42'  
t44='-1\*t43'  
  
t45='u146>0'  
t46='u146\*t45'  
t47='u146<0'  
t48='u146\*t47'  
t49='-1\*t48'  
  
t50='u147>0'  
t51='u147\*t50'  
t52='u147<0'  
t53='u147\*t52'  
t54='-1\*t53'  
  
t55='u148>0'  
t56='u148\*t55'  
t57='u148<0'  
t58='u148\*t57'  
t59='-1\*t58'  
  
t60='u149>0'  
t61='u149\*t60'  
t62='u149<0'  
t63='u149\*t62'  
t64='-1\*t63'  
  
t71='u141'  
t72='u142'  
t73='u143'  
t74='u144'  
t75='u145'  
t76='u146'  
t77='u147'  
t78='u148'

```
t79='u149'  
  
t80='u150'  
  
t81='u181'  
t82='u182'  
t83='u183'  
t84='u184'  
t85='u185'  
t86='u186'  
t87='u187'  
t88='u188'  
t89='u189'  
  
&END  
  
&analysis  
tlf1=21,81  
tlf2=26,82  
tlf3=31,83  
tlf4=36,84  
tlf5=41,85  
tlf6=46,86  
tlf7=51,87  
tlf8=56,88  
tlf9=61,89  
  
tlf11=24,81  
tlf12=29,82  
tlf13=34,83  
tlf14=39,84  
tlf15=44,85  
tlf16=49,86  
tlf17=54,87  
tlf18=59,88  
tlf19=64,89  
  
intvltlf=5.0  
trcsums=71,72,73,74,75,76,77,78,79  
&end  
  
t=21  
pafmt=T  
scale=0.01666667  
places=7  
tline1='Report 1-1'  
tline2='Positive UB (Total)'  
tline3='CW-CW Transit-Access Markets'  
tline4='Low Income Households'  
tline5='Home-Based-Work'  
source='Mode-choice application'  
&END  
  
&TRPT  
t=23  
pafmt=T  
scale=0.01666667
```

```
places=7
tline1='Report 1-2'
tline2='Negative UB (Total)'
tline3='CW-CW Transit-Access Markets'
tline4='Low Income Households'
tline5='Home-Based-Work'
source='Mode-choice application'
&END
```

```
&TRPT
t=26
pafmt=T
scale=0.01666667
places=7
tline1='Report 1-3'
tline2='Positive UB (Total)'
tline3='CW-MD Transit-Access Markets'
tline4='Low Income Households'
tline5='Home-Based-Work'
source='Mode-choice application'
&END
```

```
&TRPT
t=28
pafmt=T
scale=0.01666667
places=7
tline1='Report 1-4'
tline2='Negative UB (Total)'
tline3='CW-MD Transit-Access Markets'
tline4='Low Income Households'
tline5='Home-Based-Work'
source='Mode-choice application'
&END
```

```
&TRPT
t=31
pafmt=T
scale=0.01666667
places=7
tline1='Report 1-5'
tline2='Positive UB (Total)'
tline3='CW-NT Transit-Access Markets'
tline4='Low Income Households'
tline5='Home-Based-Work'
source='Mode-choice application'
&END
```

```
&TRPT
t=33
pafmt=T
scale=0.01666667
places=7
tline1='Report 1-6'
```

```
tline2='Negative UB (Total)'  
tline3='CW-NT Transit-Access Markets'  
tline4='Low Income Households'  
tline5='Home-Based-Work'  
source='Mode-choice application'  
&END
```

```
&TRPT  
t=36  
pafmt=T  
scale=0.01666667  
places=7  
tline1='Report 1-7'  
tline2='Positive UB (Total)'  
tline3='MD-CW Transit-Access Markets'  
tline4='Low Income Households'  
tline5='Home-Based-Work'  
source='Mode-choice application'  
&END
```

```
&TRPT  
t=38  
pafmt=T  
scale=0.01666667  
places=7  
tline1='Report 1-8'  
tline2='Negative UB (Total)'  
tline3='MD-CW Transit-Access Markets'  
tline4='Low Income Households'  
tline5='Home-Based-Work'  
source='Mode-choice application'  
&END
```

```
&TRPT  
t=41  
pafmt=T  
scale=0.01666667  
places=7  
tline1='Report 1-9'  
tline2='Positive UB (Total)'  
tline3='MD-MD Transit-Access Markets'  
tline4='Low Income Households'  
tline5='Home-Based-Work'  
source='Mode-choice application'  
&END
```

```
&TRPT  
t=43  
pafmt=T  
scale=0.01666667  
places=7  
tline1='Report 1-10'  
tline2='Negative UB (Total)'  
tline3='MD-MD Transit-Access Markets'
```



```
tline4='Low Income Households'  
tline5='Home-Based-Work'  
source='Mode-choice application'  
&END
```

```
&TRPT  
t=46  
pafmt=T  
scale=0.01666667  
places=7  
tline1='Report 1-11'  
tline2='Positive UB (Total)'  
tline3='MD-NT Transit-Access Markets'  
tline4='Low Income Households'  
tline5='Home-Based-Work'  
source='Mode-choice application'  
&END
```

```
&TRPT  
t=48  
pafmt=T  
scale=0.01666667  
places=7  
tline1='Report 1-12'  
tline2='Negative UB (Total)'  
tline3='MD-NT Transit-Access Markets'  
tline4='Low Income Households'  
tline5='Home-Based-Work'  
source='Mode-choice application'  
&END
```

```
&TRPT  
t=51  
pafmt=T  
scale=0.01666667  
places=7  
tline1='Report 1-13'  
tline2='Positive UB (Total)'  
tline3='NT-CW Transit-Access Markets'  
tline4='Low Income Households'  
tline5='Home-Based-Work'  
source='Mode-choice application'  
&END
```

```
&TRPT  
t=53  
pafmt=T  
scale=0.01666667  
places=7  
tline1='Report 1-14'  
tline2='Negative UB (Total)'  
tline3='NT-CW Transit-Access Markets'  
tline4='Low Income Households'  
tline5='Home-Based-Work'
```

```
source='Mode-choice application'  
&END  
  
&TRPT  
t=56  
pafmt=T  
scale=0.01666667  
places=7  
tline1='Report 1-15'  
tline2='Positive UB (Total)'  
tline3='NT-MD Transit-Access Markets'  
tline4='Low Income Households'  
tline5='Home-Based-Work'  
source='Mode-choice application'  
&END
```

```
&TRPT  
t=58  
pafmt=T  
scale=0.01666667  
places=7  
tline1='Report 1-16'  
tline2='Negative UB (Total)'  
tline3='NTMD Transit-Access Markets'  
tline4='Low Income Households'  
tline5='Home-Based-Work'  
source='Mode-choice application'  
&END
```

```
&TRPT  
t=61  
pafmt=T  
scale=0.01666667  
places=7  
tline1='Report 1-17'  
tline2='Positive UB (Total)'  
tline3='NT-NT Transit-Access Markets'  
tline4='Low Income Households'  
tline5='Home-Based-Work'  
source='Mode-choice application'  
&END
```

```
&TRPT  
t=63  
pafmt=T  
scale=0.01666667  
places=7  
tline1='Report 1-18'  
tline2='Negative UB (Total)'  
tline3='NT-NT Transit-Access Markets'  
tline4='Low Income Households'  
tline5='Home-Based-Work'  
source='Mode-choice application'  
&END
```

```
&TRPT  
t=80  
pafmt=T  
scale=0.01666667  
places=7  
tline1='Report 1-19'  
tline2='UB (Total)'  
tline3='All Transit-Access Markets'  
tline4='Low Income Households'  
tline5='Home-Based-Work'  
source='Mode-choice application'  
&END
```