Memorandum

To: Leta Huntsinger, PhD, ITRE, NCSU   September 12, 2022

From: Kyle Ward, Caliper

CC:

Subject: Capacity correction in TRMG2

Caliper has completed the capacity correction to TRMG2. The %RMSE statistic is noticeably improved. This is due not only to the correction of the capacities in downtowns that were too high, but also the new, explicit handling of medians in the capacity lookup table (which required a small modification to the model code).

Caliper replaced the AMBAG capacities (which did not handle medians explicitly). The primary source for the new capacities is the North Carolina Statewide Model (NCSTM) model, which does explicitly consider median treatment. However, NCSTM capacities are averaged over the entire piedmont. This meant the capacities required some calibration and NCHRP 825 was consulted during this process (as well as patterns in observed counts). Nearly all capacities were reduced, but the most noticeable reductions were undivided arterials and collectors in downtown and urban area types.

The new capacity table is provided with this memo for your review. The second attachment is the resulting %RMSE table.

Some highlights:

- %RMSE has fallen to 31%, which is a noticeable improvement and an impressive result.
- Total volume % difference has worsened slightly from -1.5% to -3.5%
    - This is due to a slight decrease in average trip lengths, but this does not concern us enough require recalibration of destination choice. Our volume difference is still well within the +/- 5% range.
- Transit ridership has increased from 119k to 126k (a roughly 6% increase).
    - Given that our largest changes to capacities were to significantly lower urban/downtown arterial capacity (where transit is located), this size shift is reasonable.
    - We were never given a total ridership target for 2020, but the 2016 ridership target was 112k. We assumed some growth between 2016 and 2020, but it is likely that 126k is higher than observed.

 While transit ridership is higher, it is not so high that mode choice requires recalibration. Caliper compared the home-based MC summaries between the runs and the changes are small. The table below is an example of the changes to walk-to-local-bus (the largest transit mode) for home-based trips. The

new trips and mode percentages are in columns 'trips' and 'pct'. The previous values are included next to them. The largest change was OD_Long moving from 1.02% to 1.3%.

BF: "Before fix" (before capacity was corrected)

AF: "After fix" (after capacity was corrected)

trip_type	mode	Trips AF	Trips BF	% BF	% AF
N_HB_K12_All	w_lb	2,741	2,676	0.4	0.39
N_HB_OD_Long	w_lb	13,277	10,339	1.31	1.02
N_HB_OD_Short	w_lb	5,004	5,062	1.07	1.08
N_HB_OMED_All	w_lb	1,974	2,252	1.42	1.62
N_HB_OME_All	w_lb	2,917	3,377	0.24	0.28
W_HB_O_All	w_lb	1,685	1,677	0.46	0.46
W_HB_W_All	w_lb	7,654	7,054	1.1	1.01
Total		**35,253**	**32,438**		
	Diff:	**2,815**			

Given the small absolute size of transit and the small relative size of the changes, we are confident that the TRM is still more than adequate for use in analyzing transit projects.

In summary, we have managed to correct our capacity procedure (and greatly improve assignment results) without sacrificing other components of the model. Furthermore, the new capacity procedure will be much more sensitive to changes in median treatments, which will support more robust project analysis.