TERMS OF REFERENCE

NEW MONACO DEVELOPMENT TRAFFIC IMPACT STUDY

Background Synopsis

New Monaco Enterprise (New Monaco) owns the 125 acre property located between Highways 97C and 97 in the District of Peachland. New Monaco is proposing a mixed-use inclusive community on the property that will require primary access to Highway 97 in order to proceed.

On February 3rd 2010, an initial meeting was convened to present the nature of the proposed development, and to discuss the requirements of the proposed access to Highway 97. The meeting was attended by representatives of New Monaco, the District of Peachland (District) and BC Ministry of Transportation and Infrastructure (Ministry).

The project will be undertaking a civic process to achieve an Area Structure Plan with the District. Detailed information regarding internal road networks, specific uses, development densities and parking requirements will be established through that process. Further transportation studies will address the internal site requirements as that information develops through the Area Structure Plan.

As a result of a meeting held on May 6, 2010 between the owner and consultants of New Monaco and representatives from the Ministry, it was agreed that the approval for undertaking a Traffic Impact Study (TIS) and the approval of an access to the New Monaco development would be staged with each stage formally signed off by the Ministry, the District, and the developer. The first stage of the process being the analysis of the Trip Generation Rates, was forwarded to the Ministry on July 14, 2010 for review. A subsequent meeting held on July 15, 2010 between representatives from the Ministry, the District, and the developer agreed to analyze two main intersection configuration options and one early phase transitional intersection configuration to be used in the TIS. They are:

- A protected T for the first phase of the development that would accommodate traffic up to a certain level (some build-out threshold), which would be determined as part of the study;
- For the subsequent phases:
    - Option 1 - a signalized intersection (with two laning options for the right turn into and out of New Monaco); and,
    - Option 2 – a right-in/right-out configuration for the highway (with two laning options for the right turn into and out of New Monaco on the west side of Highway 97) and an underpass under the highway to accommodate left turn movements.

1. EXISTING CONDITIONS, STUDY AREA, AND LOCATION

The development site is located between two Ministry Highways – Highway 97C and Highway 97.

In reviewing the potential designs for internal road network with CTQ Consultants Ltd, the only point of connection to the local Peachland Municipal road system to a public right of way is via an extension of the Walker Road right of way. This right of way has a gradient of 25% and connects to a very steep area on the western edge of the site. FIGURE 1 shows that the majority of the west zone are steep slopes having gradients upwards of over 35% (shown as orange and red).

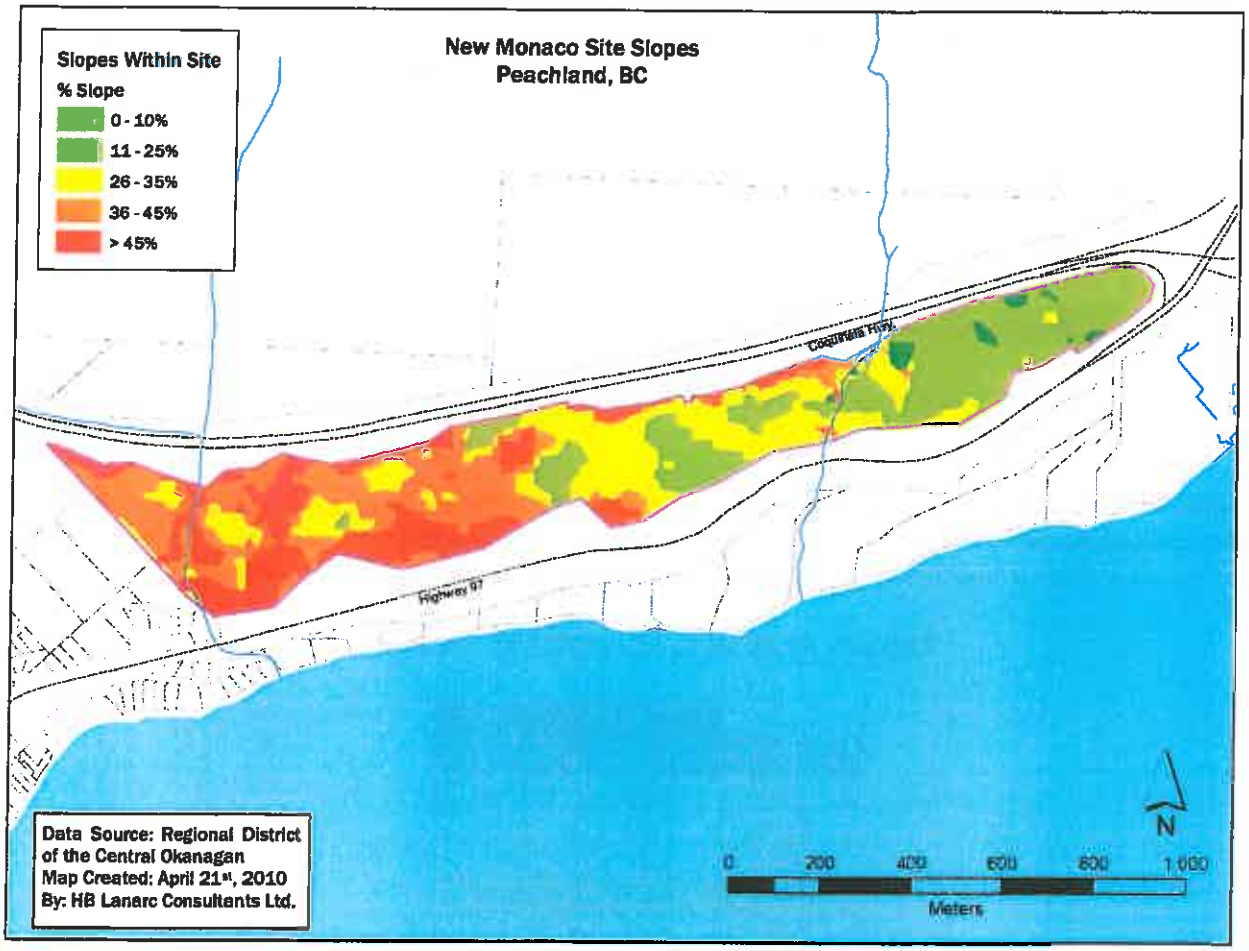

FIGURE 1 NEW MONACO SITE SLOPES

Due to the slope constraints, as well as the long distance between New Monaco village centre and the accesses south of the Highway 97 intersection with Trepanier Bench Road, it is unlikely that this section of the internal road network will be a popular connecting route except for a few local residents. The Colliers report also indicates that most traffic generated by the development is expected to be to and from the north along Highway 97 towards Kelowna. Based on these points, traffic impacts south of the Highway 97 intersection with Trepanier Bench Road is expected to be insignificant.

In discussion with the Ministry and in consideration of the likely extent that New Monaco site traffic will have on the road network discussed above, the following intersections will be examined:

- Proposed site access and Highway 97
- Highway 97 / 97C interchange
- Highway 97 / Drought Road
- Highway 97 / Huston Road / Buchanan Road (North)
- Highway 97 / Buchanan Road (South)
- Highway 97 / Trepanier Bench Road

Corridor analysis, including the required laning to ensure adequate operations, will also be studied between the Highway 97 / 97C interchange and the Trepanier Bench Road intersection. The options considered would also compare future operations to existing operations and consider improvements for the existing Drought Road connection (or at the minimum confirm that the new access will not deteriorate exisitng conditions).

2. ANALYSIS PERIODS

The AM, PM, and Saturday peak hours will be analyzed.

The existing traffic volumes quoted for Highway 97 past the development will be based on the following:

- Turning movement count data obtained by Opus in Spring 2010 for all existing study intersections proposed in the ToR.

Any additional data collected by Opus will note the dates and times of those traffic counts, a requirement by the Ministry of Transportation. Based on a review of available traffic count data for the year 2008, seasonal adjustment factors were determined for the weekday and the weekend and are presented in TABLE 1.

TABLE 1 SEASONAL ADJUSTMENT FACTORS

	SADT FACTOR	
MONTH	MAWDT	MAWET
Jan	1.59	1.84
Feb	1.42	1.65
Mar	1.31	1.47
Apr	1.25	1.34
May	1.20	1.20
Jun	1.13	1.16
Jul	1.02	1.02
Aug	1.00	1.00
Sep	1.17	1.23
Oct	1.39	1.45
Nov	1.71	1.99
Dec	1.63	2.00

As the turning movement counts were conducted in April, it is suggested that seasonal adjustment factors of 1.25 and 1.34 be applied to the weekday and weekend base traffic volumes respectively.

3. TRAFFIC PROJECTION AND BACKGROUND GROWTH

A 3.0 percent background traffic growth rate (simple) will be applied to all study intersection approaches covering traffic on Highway 97. Consistent with the Pincushion development analysis, this background traffic growth rate accounts for anticipated future growth and development in the area. Applying the background growth rate and assessing capacity based on the existing infrastructure will enable the determination of the impact of background growth to the existing road network. The Ministry has informed that at this time, there are no current Ministry planned or funded improvements to this section of Highway 97.

For the Peachland streets, the expected, and therefore suggested growth rates, were provided by the District, and are shown in the TABLE 2.

TABLE 2 GROWTH RATES

STREET	GROWTH RATE
Seclusion Bay Road	0.5% per year
Drought Road	0.5% per year
Buchanan North Road	1.0% per year
Buchanan South Road	1.0% per year
Trepanier Bench Road	1.5% per year

Additionally, the Ministry has requested that the New Monaco development also consider the Phase 1 generated traffic of Pincushion Ridge under background traffic conditions to coincide with the time horizon of the Phase 1 New Monaco development.

4. HORIZON YEARS

Traffic will be generated for the following horizon years to assess the required improvements to accommodate the full build-out of the development:

- Current Year
- Phase 1 (Time Horizon 1) – 2015
- Build-out (Time Horizon 2) – 2025
- 10-Years After Build-Out – 2035

Traffic will be generated for two general horizon years. It is the intention of New Monaco to construct required improvements (for the site access) in conjunction with Phase One. The remainder of the site is intended to be developed in three subsequent continuous phases (as shown in the trip generation letter report dated July 13, 2010). However, as market absorption during different periods of the construction would dictate the amount of development to be built, the Traffic Impact Study intends to address the subsequent continuous phases as one other horizon year (Time Horizon 2). The Ministry has a subsequent requirement for 10 years beyond build-out, and that horizon year will also be analyzed.

5. TRIP GENERATION

Trip generation estimates are based on the maximum potential build-out of the preliminary land use plan and the closest match land use designations identified in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 8th Edition.

The New Monaco development, which is located on a 125-acre property between Highway 97C and 97 in the District of Peachland is envisioned to be a mixed-use community with the following land uses:

- 40 units of single family homes;
- 2,292 units of townhouses/apartments;
- 168 units of vacation homes;
- 100-unit full service hotel;
- 150,000 square feet of office; and,
- 104,000 square feet of retail.

Based on development plans to date, New Monaco will be developed in three zones (East, West, and Central) over four development phases. A summary of the proposed land uses per zone in each phase is summarized in TABLE 3 below. It is noted that there are four documented Phases in the table presented in Opus' New Monaco Trip Generation Analysis submitted to the Ministry for its review on July 13, 2010. However, Phases 2 through 4 as detailed in that document are considered to be portions of a larger phase, and are thus combined into the Build-Out as described in these Terms of Reference. It is noted that the ultimate buildout described here is identical to the July 13, 2010 document table.

TABLE 3 SUMMARY OF PROPOSED LAND USES PER ZONE

		PHASE 1				BUILD-OUT				TOTAL			
	LAND USE	East	Central	West	Total	East	Central	West	Total	East	Central	West	Total
Residential	Single Family Home	0 units	0 units	0 units	**0 units**	0 units	0 units	40 units	**40 units**	0 units	0	40 units	**40 units**
	Townhouses & Apartments	253 units	0 units	0 units	**253 units**	589 units	1,450 units	0 units	**2,039 units**	842 units	1,450 units	0 units	**2,292 units**
	Vacation Homes	32 units	0 units	0 units	**32 units**	76 units	60 units	0 units	**136 units**	108 units	60 units	0 units	**168 units**
Hotel	Full Service Hotel	0 units	0 units	0 units	**0 units**	100 units	0 units	0 units	**100 units**	100 units	0 units	0 units	**100 units**
Commercial	Offices	45,000 sq. ft	0 sq. ft	0 sq. ft	**45,000 sq. ft**	105,000 sq. ft	0 sq. ft	0 sq. ft	**105,000 sq. ft**	150,000 sq. ft	0 sq. ft	0 sq. ft	**150,000 sq. ft**
	Retail	31,200 sq. ft	0 s sq. ft	0 sq. ft	**31,200 sq. ft**	72,800 sq. ft	0 sq. ft	0 sq. ft	**72,800 sq. ft**	104,000 sq. ft	0 sq. ft	0 sq. ft	**104,000 sq. ft**

The proposed trip generation rates are summarized in TABLE 4 below:

TABLE 4 SUMMARY OF PROPOSED TRIP GENERATION RATES

Land Use	ITE Land Use Category	Weekday AM			Weekday PM			Weekend Peak		
		Average Rate	In	Out	Average Rate	In	Out	Average Rate	In	Out
Single Family Home	Single Family Detached Housing (210)	0.77	26%	74%	1.02	64%	36%	0.93	53%	47%
Townhouses / Apartments	Residential Condo / Townhouse (230)	0.44	19%	81%	0.52	64%	36%	0.47	54%	46%
Vacation Homes	Recreation Homes (260)	0.30	49%	51%	0.31	44%	56%	0.36	48%	52%
Full Service Hotel	Hotel (310)	0.52	55%	45%	0.61	58%	42%	0.72	55%	45%
Office	General Office (710)	1.55	88%	12%	1.49	17%	83%	0.41	54%	46%
Retail	Specialty Retail (814)	6.84	48%	52%	5.02	56%	44%	5.50	50%	50%

6. TRIP GENERATION ADJUSTMENTS

Due to the multi-use nature of the development, it is likely that some trips will occur between on-site land uses. As mentioned earlier, the concept of this development is to be inclusive with many residents living, working, and shopping within the site.

It is recognized that the trip generation rates obtained from *Trip Generation* (8th Edition, 2008) are collected from single-use free-standing sites. As New Monaco is proposed to be a mixed-used development, it is expected that some trips will be internal trips that are made from one land use to another land use within the proposed mixed-use development. It is understood that these internal trips would not contribute to traffic to/from the Highway, and will be made in the form of automobile trips to/from individual zones or consist of pedestrian/cycle trips. Therefore, to account for the internal trips, an internal rate, which is defined as a percentage reduction of total trips, was applied to the residential and commercial (offices and retail) land uses.

The proposed trip generation considers the Ministry's comments dated August 30, 2010, a teleconference which took place on September 17, 2010, and the spreadsheet provided to Opus on September 20, 2010. Opus subsequently provided a response letter dated September 30, 2010 on trip generation, which was subsequently approved for use by the Ministry on October 14, 2010. Opus will adhere to the same approved trip generation numbers as quoted in the letter for the TIS. In summary, the following overall internal capture rates are achieved:

Phase One

- • Phase One AM Peak – 13 percent
- • Phase One PM Peak – 25 percent
- • Phase One Saturday – 22 percent

Build-Out

- • Build-Out AM Peak – 12 percent
- • Build-Out PM Peak – 23 percent
- • Build-Out Saturday – 22 percent

The approved letter is attached as an Appendix to this ToR.

7. TRIP DISTRIBUTION & ASSIGNMENT

The trip distribution and trip assignment will be based on the Opus review of the trends in the area. As mentioned previously, it is expected that most of the generated traffic will be to and from the north along Highway 97 (towards Kelowna). The distribution proposed is:

- 70% to/from Kelowna (for both residential and commercial components)
- 25% to/from Peachland (for both residential and commercial components)
- 5% to/from Peachland utilizing the new connection to Drought Road and Seclusion Bay Road.

8. DEVELOPMENT LAYOUT

As a requirement for this study, a preliminary layout including potential maximum densities, breakdown of the types of commercial, retail, and residential usages has been developed by the New Monaco development and planning team in conjunction with the planning team of the District. The number of units and the allocation of area between residential and commercial uses will change as the process evolves through the Area Structure Plan process and different phases of the development. Since the detailed site layouts will not yet be developed, the site-specific requirements will be assessed through further transportation studies (if warranted) as that information develops through the Area Structure Plan process.

9. SAFETY AND CAPACITY ANALYSIS

Safety and capacity analysis would include:

- Conducting a risk assessment to evaluate the safety of laning and, if applicable, signal phasing layouts for a 90 km/hour signalized scenario (i.e. left turn protected/permissive vs. protected only and dual left turns with potential laning options for Highway 97)
- Conducting a review of the existing collision characteristics and identification of current issues
- Addressing current issues with recommended measures consistent with the recommended access scenario
- Addressing the potential differences in capacity and safety based on an at-grade intersection with and without grade changes and at reference speeds for 90 km/hour
- Weaving analysis based on the worksheets from the Highway Capacity Manual
- Sight distance analysis (from proposed site access and for highway traffic sightlines to the intersection and possible queues)

10. ALTERNATIVE MODES

Opus will address alternative modes by considering overall trip management and transportation demand management strategies, propose transit and pedestrian guidelines for the site, and consider trail and bicycle connections.

11. ALTERNATIVE ACCESS AND EMERGENCY ACCESS

Emergency and Secondary Access will be discussed in the TIS, although the consideration and provision of emergency and secondary access is a site planning issue which New Monaco intends to deal with and with the understanding that the District would provide comment on. Since it is a site planning detail, no traffic modelling of emergency and secondary access would be required (as these would not be intended nor primary routes of travel).

12. PERFORMANCE REQUIREMENTS

It is understood that the performance requirements are:

- Maintaining 90 km/hour for through movements on Highway 97
- For the signalized intersection specifically, discharge lengths to ensure full utilization of the lanes through the signal
- Maintaining adequate signal coordination with other signalized intersections along Highway 97, if applicable

13. REPORTING

Upon completion of the study analysis, the methodology, analysis results and findings will be presented in a draft report in electronic (pdf) format for review.

14. SUMMARY

A summary of how the proposed Terms of Reference addresses the Ministry's concerns is provided in the table below.

REQUIREMENTS	
STUDY AREA AND EXISTING CONDITIONS	• Existing Conditions
	• The scope of the study should include the interchange to the north and major intersections to the south, including Trepanier Bench.
TIME	• Include time and date of traffic counts (AM, PM, and Sat)
SYSTEM CHANGE IMPACTS	• There are no current Ministry planned or funded improvements to this section of Highway 97.
HORIZON YEARS	• Horizon Years and background growth.
TRIP GENERATION	• Trip generation – site traffic based on most current ITE Rates and with previously approved internal capture and passby trip rates.

REQUIREMENTS	
TRIP DISTRIBUTION AND ASSIGNMENT	• Based on the traffic consultant's review of trends in the area
DEVELOPMENT LAYOUT	• Layout in accordance with TAC, BC Supplement to TAC and ITE Parking Generation. Parking requirements, magazine storage, internal circulation, accommodation of truck template.
SAFETY	• Accident history • Weaving analysis • Sight distance analysis • Comparison between at-grade intersection and grade separated with reference speeds of 90 km/hr
CAPACITY ANALYSIS	• Signalized and unsignalized intersections (looking at queue analysis, LOS, and individual movements, effects of trucks and grades.
	• Corridor analysis
	• HCS/Synchro printouts and files
OTHER MODES	• Other users such as pedestrians, cyclists, buses need to be addressed.
OPTION GENERATION	• Performance requirements – to maintain 90 km/h for through movements on Hwy 97; • Hwy 97 must operate at LOS C or better • Signalized intersection grade treatment • Discharge lengths

APPENDIX

2. TRIP GENERATION RATES

To forecast the number of trips that will be generated by the proposed development, trip generation rates were obtained from *Trip Generation* (8th Edition, 2008) by the Institute of Transportation Engineers (ITE). The trip generation rates used for the analysis are shown in TABLE 2.1.

TABLE 2.1 TRIP GENERATION RATES

Land Use	ITE Land Use Category	Weekday AM			Weekday PM			Weekend Peak		
		Average Rate	In	Out	Average Rate	In	Out	Average Rate	In	Out
Single Family Home	Single Family Detached Housing (210)	0.77	26%	74%	1.02	64%	36%	0.99	53%	47%
Townhouses / Apartments	Residential Condo / Townhouse (230)	0.44	19%	81%	0.52	64%	36%	0.47	54%	46%
Vacation Homes	Recreation Homes (260)	0.30	49%	51%	0.31	44%	56%	0.26	48%	52%
Full Service Hotel	Hotel (310)	0.52	55%	45%	0.61	58%	42%	0.73	55%	45%
Office	General Office (710)	1.55	88%	12%	1.49	17%	83%	0.41	54%	46%
Retail	Specialty Retail (814)	6.84	48%	52%	5.02	56%	44%	5.5	50%	50%

It is understood that these rates are acceptable to the Ministry based on the comments received from August 30, 2010 and the teleconference on September 10, 2010.

3. DISCUSSION ON INTERNAL CAPTURE

Opus has previously presented the Ministry with literature and sensitivity tests applying an internal capture rate reflective of the ultimate desire and vision of New Monaco. The New Monaco vision is for a likely greater internal capture in the East Zone (40 percent) where there is a critical mass of commercial and higher density residential uses and a relatively lower internal capture rate for the Central and West Zones (15 percent) with the understanding that interactions between the Central, West and East Zones should still be accounted for.

Ultimately, the Ministry is interested in the amount of external traffic likely to enter and exit to Highway 97 at the main proposed point of access. We understand that while the internalization of trips may be somewhat different between zones, the number of resultant net external trips (after accounting for the difference between gross and internal trips) is the main concern for the Ministry. Having said that, the originally presented internal capture rates generally result in an overall internal capture of 30 percent, which is generally consistent and within the range of likely internal capture for similar developments according to the most recent literature.

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While the originally presented trip generation assumed that internal capture would be the same between AM, PM, and the weekend, we acknowledge that in reality it would likely be different between time periods. However, the literature did present arguments that acknowledge the likelihood of achieving a 30 percent reduction across all time periods. For example, while one study suggested that internal capture rates were shown to be approximately 15 and 11 percent for morning peak period entering and exiting trips, respectively, trips to retail uses for the morning peak reached upwards of 25 percent of total trips.[1] The afternoon peak period yielded more impressive results, with 33 and 37 percent of entering and exiting trips.

Since the teleconference, we understand that the Ministry is not willing to accept testing a less conservative assumption. As such, Opus has evaluated several alternative approaches to internal capture. One such approach which is presented here, is based on the Trip Generation Handbook: An ITE Proposed Recommended Practice. The Handbook presents a method to calculate internal capture based on land uses and the amount of development. Building on this methodology, a recent publication in the August 2010 publication of the Institute of Transportation Engineers Journal noted that the rates in the method could be updated following an extensive survey of mixed use sites. Opus was able re-run the analysis based on the data presented from the August 2010 publication.

The resultant achievable internal capture rates based on the ITE method are presented in the following tables. The calculated internal capture for the AM peak period is much less, at 13 percent overall at build-out. However, the PM and Saturday internal capture rates are quite similar, and at the same time not dissimilar to the resultant 30 percent overall internal capture presented to the Ministry in previous analysis. While the AM internal capture based on the method achieves a lesser internal capture than that previously proposed and likely achievable, New Monaco is willing to use the lower rate for analysis to keep consistent with the new approach of utilizing the updated ITE method for the analysis of internal capture (see attached spreadsheet). The following overall rates are proposed:

Phase One

- Phase One AM Peak – 13 percent
- Phase One PM Peak – 25 percent
- Phase One Saturday – 22 percent

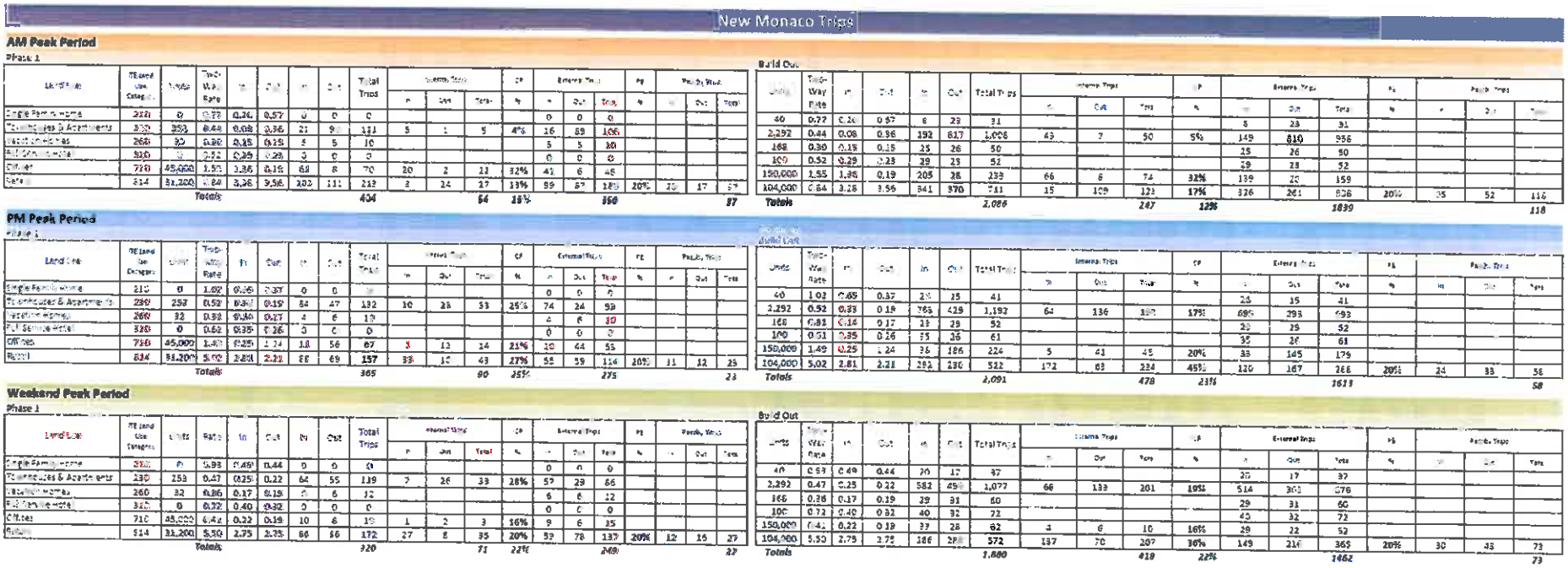
Build-Out

- Build-Out AM Peak – 12 percent
- Build-Out PM Peak – 23 percent
- Build-Out Saturday – 22 percent

While the methodology does not have data for the Saturday peak period, the PM peak period data was applied to achieve Saturday results. The internal capture between a PM peak hour and Saturday should not be dissimilar due to retail developments being busier, but offset by lower internalization to the office uses due to their typical closure on a Saturday. The resultant trip generation utilizing the ITE method are presented in EXHIBIT 3.1.

[1] Bochner, B. S., Sperry, B. R. "Internal Trip Capture Estimator for Mixed-Use Developments", February 2010.

EXHIBIT 3.1 INTERNAL CAPTURE SUMMARY

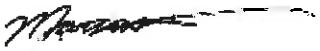


4. DISCUSSION AND RECOMMENDATION

Based on the updated ITE method and the spreadsheet of the likely acceptable rate from the Ministry, the difference in the overall external traffic generated in Phase One and Build-Out ranges between 29 two-way trips to 204 two-way trips. The ITE method actually predicts slightly more trips than what the Ministry is willing to accept for the AM peak hour. Noting the difference in trips, the widely accepted ITE method does not yield significantly less trips than what the Ministry has said it is willing to accept.

Opus suggests that the ITE method for the calculation of internal trips be utilized, taking advantage of new data recently published in August 2010. The rates of internal capture as discussed in this report are achievable, should all the background conditions that the developer has described before for land uses is achieved.

OPUS INTERNATIONAL CONSULTANTS (CANADA) LIMITED



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