



Stantec Consulting Services Inc.  
81 East Water Street Suite 2C  
Toms River NJ 08753-7663  
Tel: (732) 473-9360  
Fax: (732) 473-9361

## Stantec

August 3, 2009  
File: 192510252

Mr. Frank Scarantino, PE, PP  
Ocean County Engineer  
129 Hooper Avenue  
PO Box 2191  
Toms River, NJ 08754-2191

**Reference: REVISED LETTER REPORT  
On-Call Traffic Engineering Services  
Ocean County Contract No. PP2008-144  
Operational Review of Cross-Section Reduction  
Long Beach Boulevard, Harvey Cedars Borough**

Dear Mr. Scarantino:

Stantec has completed a traffic engineering review of the proposed change in cross-section for Long Beach Boulevard in Harvey Cedars Borough. The proposed cross-section would reduce the existing four-lane roadway to a three-lane roadway, with one travel lane in each direction and a two-way left-turn lane (TWLTL) that would transition to dedicated left-turn lanes at intersections. This type of roadway conversion is typically known as a "road diet". In general, road diets tend to reduce vehicular speeds and improve safety for pedestrians (less travel lanes to cross) and bicycles (wider shoulders). This revised letter report reinvestigates the potential operational impacts of the proposed cross-section.

### Traffic Volume Revision

In the previous report performed in April 2009, weekday turning movement counts performed during the Summer of 2008 were increased by 30% as a means of representing the traffic experienced during summer weekend peak hours. In order to determine if the design traffic volumes presented in the previous report accurately represented worst-case summer peak hour conditions, 24-hour Automatic Traffic Recorders (ATRs) were placed at the following locations on Long Beach Boulevard for five days from Thursday, July 9 to Tuesday, July 14, 2009:

#### ATR Locations on Long Beach Boulevard

1. North of 83rd Street – Southbound Direction Only (Entering Harvey Cedars)
2. North of 80th Street – Northbound and Southbound Directions
3. North of 77th Street – Northbound and Southbound Directions
4. South of Buckingham Avenue / 68th Street – Northbound and Southbound Directions
5. South of Cumberland Avenue – Northbound and Southbound Directions

Even though the exact peak hour period was not the same for all counts performed, the highest peak hour volume for each directional ATR count was utilized, to be conservative. For all ATR counts, the peak hour occurred during the midday count period (10:00 AM to 2:00 PM). In **EXHIBIT 1**, these directional ATR peak hour volumes are compared to the hourly approach volumes, which were used in the previous report. Except for the Southbound peak hour volume counted south of Cumberland Avenue, all ATR volumes are lower than design volumes created in the previous report. The surplus of 24 vehicles for the Southbound ATR volume

**Reference: REVISED LETTER REPORT  
Ocean County Contract No. PP2008-144  
Long Beach Boulevard, Harvey Cedars Borough**

south of Cumberland Avenue has been added to the Southbound through movement at the intersection of Long Beach Boulevard and Cumberland Avenue, as highlighted on the 2009 Design Traffic Volume diagram in **EXHIBIT 2**. The hourly volume for this movement has increased from 749 vehicles to 773 vehicles.

### **Traffic Impact Analysis**

Synchro/SimTraffic (version 7) analyses and simulations, using the summer weekday peak hour volumes in **EXHIBIT 2**, were rerun for both the Existing and Proposed Conditions. The Synchro network included all intersections Ocean County provided data for, as well as the signal timings for the three signalized study intersections: 80<sup>th</sup> Street, Camden Avenue, and Salem Avenue. Pedestrian volumes were included in the model to account for the impact of vehicles yielding to pedestrians at intersections. Synchro/SimTraffic analyses and simulation outputs are attached in **APPENDIX A**.

A comparison of the capacity analysis results for the Existing and Proposed Conditions are shown in **EXHIBIT 3**. Despite the addition of 24 vehicles to the Southbound through movement at the intersection of Long Beach Boulevard and Cumberland Avenue, Levels of Service (LOS) presented in this report are the same LOS presented in the previous report. From the LOS table, it is clear that the proposed cross-section reduction would continue to maintain a LOS B or better for the Northbound and Southbound Long Beach Boulevard movements. In fact, many of the side-street LOS would improve due to the cross-section reduction, as there would be fewer lanes to cross when making a left turn from the side-street. This is most evident at the unsignalized intersections of 83<sup>rd</sup> Street, 77<sup>th</sup> Street, and Burlington Avenue, which are the only intersections that experience a LOS E or LOS F for a side-street approach in the Existing Condition. All of these LOS E or LOS F approaches would improve to LOS D or better in the Proposed Condition.

SimTraffic simulation models of the Existing and Proposed Conditions were used to determine cumulative travel time along Northbound and Southbound Long Beach Boulevard. A comparison of the average travel times, based on ten simulation runs, for the Existing and Proposed Conditions are shown in **EXHIBITS 4-6**. The proposed cross-section reduction would result in an increase in overall travel time of 22.3 seconds (9%) along Northbound Long Beach Boulevard and 28 seconds (11%) along Southbound Long Beach Boulevard.

### **Conclusion**

For this revised report, LOS remains the same as the previous April report for both Existing and Proposed Conditions. In addition, the amount of increase in overall Southbound travel time on Long Beach Boulevard has gone up by only one second. From the SimTraffic simulation, it is shown that the construction of the TWLTL will result in an increase of 22.3 and 28 seconds for Northbound and Southbound travel time, respectively, through the Borough of Harvey Cedars. Therefore, our conclusion remains the same from the previous April report.

Overall, the results of the analysis show that the proposed change in cross-section would not detrimentally impact traffic operations along the Long Beach Boulevard corridor, and, in fact, would improve operations for several locations. LOS would slightly deteriorate for the traffic movements on Long Beach Boulevard. However, all side-street approaches would improve to LOS D or better. The implementation of the center turn lane will require the installation of new steel poles and mast arms at all three signalized intersections, at significant expense. Signal heads must be placed over the center left-turn only lanes in compliance with the requirements of the MUTCD. Although not required, it is recommended that pedestrian indications also be added at all three signalized intersections, thus initiating pedestrian clearance timing only when activated and not during every cycle.

It is not likely that removal of the existing pavement markings can be accomplished without some residual material remaining or damage to the existing pavement. Milling and/or resurfacing is recommended.

**Stantec**

August 3, 2009

Page 3 of 3

**Reference: REVISED LETTER REPORT  
Ocean County Contract No. PP2008-144  
Long Beach Boulevard, Harvey Cedars Borough**

Additionally, Ocean County has reviewed the pavement condition, and this eleven year old overlay has been programmed for resurfacing in 2013.

Please feel free to contact us if you have any questions or require any additional information.

Sincerely,  
Louis Luglio, P.E.



Senior Principal  
Tel: (201) 587-9040  
Fax: (201) 587-0444  
louis.luglio@stantec.com

Attachments: **EXHIBITS 1-6**

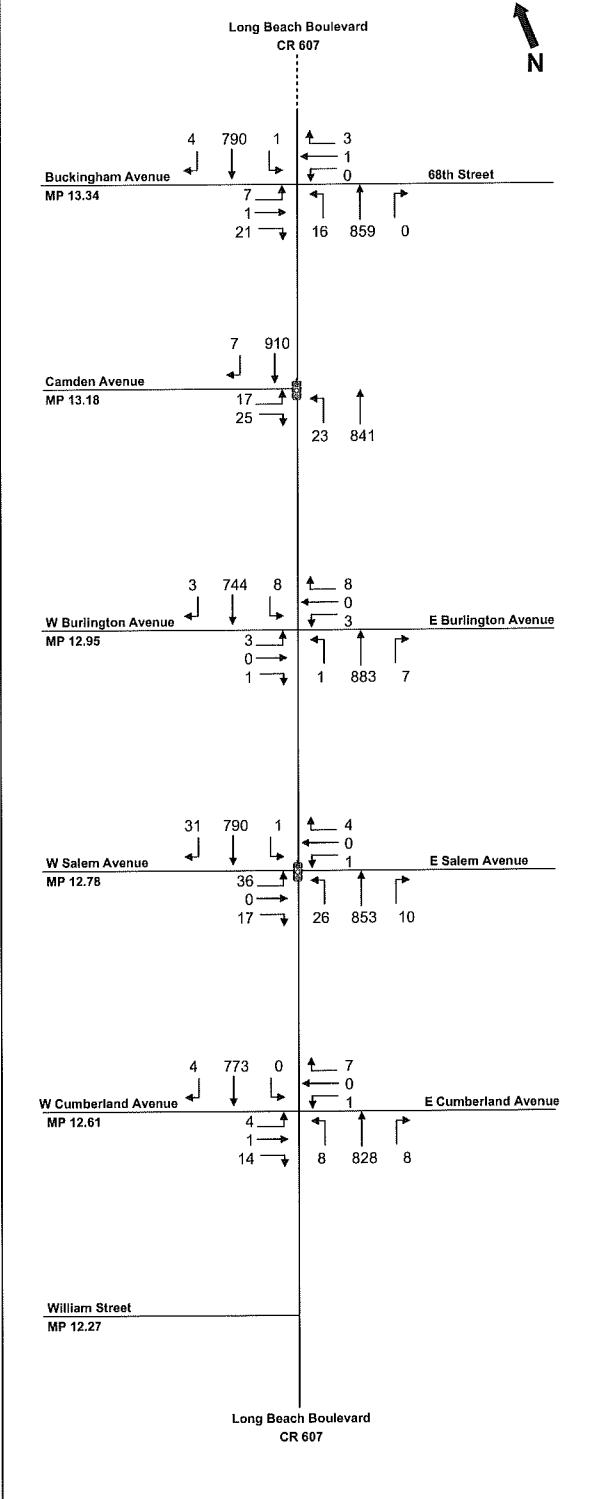
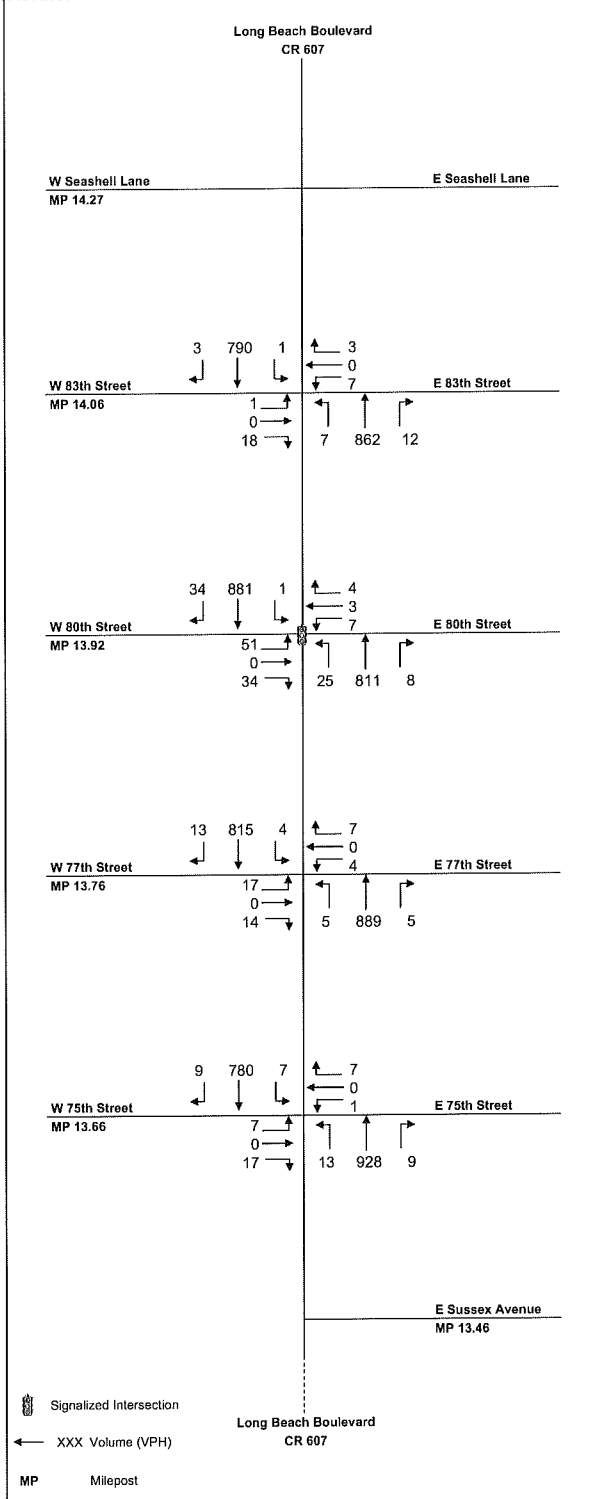
cc: Ron Lotrecchio, Stantec

**EXHIBIT 1**  
**ATR VOLUME VS. DESIGN VOLUME FROM PREVIOUS REPORT**  
**SUMMER WEEKEND PEAK HOUR**

| ATR locations                            | Direction | ATR Volume for Highest Peak Hour Counted | Approach Volumes from April 2009 Report | Surplus (+) / Shortfall (-) |
|--|-----------|--|---|-----------------------------|
| North of 83rd Street                     | SB        | 700                                      | 794                                     | -94                         |
| North of 80th Street                     | NB        | 687                                      | 866                                     | -179                        |
|  | SB        | 706                                      | 917                                     | -211                        |
| North of 77th Street                     | NB        | 702                                      | 913                                     | -211                        |
|  | SB        | 762                                      | 832                                     | -70                         |
| South of Buckingham Avenue / 68th Street | NB        | 714                                      | 875                                     | -161                        |
|  | SB        | 772                                      | 811                                     | -39                         |
| South of Cumberland Avenue               | NB        | 761                                      | 844                                     | -83                         |
|  | SB        | 788                                      | 764                                     | + 24                        |

Northern Corridor

Southern Corridor



305 West Franklin Street  
 Richardson Park, NJ 07067-1017  
 Tel: 908.497.4949  
 Fax: 201.997.0444

**LONG BEACH BLVD RESTIPING  
 TRAFFIC IMPACT STUDY  
 HARVEY CEDARS, NJ**

**EXHIBIT 2  
 2009 Design Traffic Volumes  
 Summer Weekend Peak Hour**

**EXHIBIT 3**  
**EXISTING CONDITION VS. PROPOSED CONDITION**  
**SUMMER WEEKEND PEAK HOUR**  
**CAPACITY ANALYSIS RESULTS**

| Intersection with<br>Long Beach Boulevard<br>(CR 607)         | Existing Condition (4-Lane) |              |       |                     | Proposed Condition (3-Lane) |              |       |                     |
|---|-----------------------------|--------------|-------|---------------------|-----------------------------|--------------|-------|---------------------|
|   | LANE<br>GROUP               | V/C<br>Ratio | Delay | Level of<br>Service | LANE<br>GROUP               | V/C<br>Ratio | Delay | Level of<br>Service |
| <b>83rd Street</b><br><i>Unsignalized</i>                     | EB-LTR                      | 0.07         | 16.1  | C                   | EB-LTR                      | 0.10         | 20.0  | C                   |
|   | WB-LTR                      | 0.14         | 49.5  | E                   | WB-LTR                      | 0.07         | 25.6  | D                   |
|   | NB-LT                       | 0.01         | 0.3   | A                   | NB-L                        | 0.01         | 10.6  | B                   |
|   | SB-LT                       | 0.00         | 0.1   | A                   | SB-L                        | 0.00         | 11.9  | B                   |
| <b>80th Street</b><br><i>Signalized</i>                       | EB-LTR                      | 0.52         | 32.2  | C                   | EB-LTR                      | 0.54         | 33.1  | C                   |
|   | WB-LTR                      | 0.08         | 25.1  | C                   | WB-LTR                      | 0.08         | 25.1  | C                   |
|   |                             |              |       |                     | NB-L                        | 0.11         | 1.9   | A                   |
|   | NB-LTR                      | 0.39         | 2.3   | A                   | NB-TR                       | 0.65         | 4.7   | A                   |
|   | SB-LTR                      | 0.41         | 5.5   | A                   | SB-L                        | 0.00         | 5.0   | A                   |
|   | Intersection                | -            | 5.7   | A                   | Intersection                | -            | 10.4  | B                   |
| <b>77th Street</b><br><i>Unsignalized</i>                     | EB-LTR                      | 0.35         | 51.1  | F                   | EB-LTR                      | 0.21         | 27.7  | D                   |
|   | WB-LTR                      | 0.11         | 34.1  | D                   | WB-LTR                      | 0.07         | 22.9  | C                   |
|   | NB-LT                       | 0.01         | 0.2   | A                   | NB-L                        | 0.01         | 11.8  | B                   |
|   | SB-LT                       | 0.01         | 0.2   | A                   | SB-L                        | 0.01         | 10.8  | B                   |
| <b>75th Street</b><br><i>Unsignalized</i>                     | EB-LTR                      | 0.19         | 31.2  | D                   | EB-LTR                      | 0.13         | 21.6  | C                   |
|   | WB-LTR                      | 0.05         | 21.4  | C                   | WB-LTR                      | 0.05         | 21.6  | C                   |
|   | NB-LT                       | 0.02         | 0.6   | A                   | NB-L                        | 0.02         | 10.4  | B                   |
|   | SB-LT                       | 0.01         | 0.4   | A                   | SB-L                        | 0.01         | 11.2  | B                   |
| <b>Buckingham Avenue / 68th Street</b><br><i>Unsignalized</i> | EB-LTR                      | 0.21         | 30.3  | D                   | EB-LTR                      | 0.16         | 22.3  | C                   |
|   | WB-LTR                      | 0.04         | 30.2  | D                   | WB-LTR                      | 0.03         | 22.8  | C                   |
|   | NB-LT                       | 0.03         | 0.7   | A                   | NB-L                        | 0.03         | 10.4  | B                   |
|   | SB-LT                       | 0.00         | 0.1   | A                   | SB-L                        | 0.00         | 12.2  | B                   |
| <b>Camden Avenue</b><br><i>Signalized</i>                     | EB-LR                       | 0.21         | 19.2  | B                   | EB-LR                       | 0.21         | 19.2  | B                   |
|   | NB-LT                       | 0.38         | 4.6   | A                   | NB-L                        | 0.08         | 5.2   | A                   |
|   | SB-TR                       | 0.36         | 1.8   | A                   | NB-T                        | 0.63         | 9.0   | A                   |
|   | Intersection                | -            | 3.6   | A                   | SB-TR                       | 0.69         | 5.4   | A                   |
| <b>Burlington Avenue</b><br><i>Unsignalized</i>               | EB-LTR                      | 0.05         | 39.6  | E                   | EB-LTR                      | 0.02         | 21.4  | C                   |
|   | WB-LTR                      | 0.07         | 24.2  | C                   | WB-LTR                      | 0.07         | 22.3  | C                   |
|   | NB-LT                       | 0.00         | 0.0   | A                   | NB-L                        | 0.00         | 10.7  | B                   |
|   | SB-LT                       | 0.01         | 0.4   | A                   | SB-L                        | 0.02         | 12.8  | B                   |
| <b>Salem Avenue</b><br><i>Signalized</i>                      | EB-LTR                      | 0.33         | 24.5  | C                   | EB-LTR                      | 0.34         | 24.5  | C                   |
|   | WB-LTR                      | 0.03         | 17.2  | B                   | WB-LTR                      | 0.03         | 17.2  | B                   |
|   |                             |              |       |                     | NB-L                        | 0.09         | 5.9   | A                   |
|   | NB-LTR                      | 0.43         | 5.9   | A                   | NB-TR                       | 0.71         | 12.4  | B                   |
|   | SB-LTR                      | 0.38         | 5.4   | A                   | SB-L                        | 0.00         | 5.0   | A                   |
|   | Intersection                | -            | 6.3   | A                   | SB-TR                       | 0.68         | 11.4  | B                   |
| <b>Cumberland Avenue</b><br><i>Unsignalized</i>               | EB-LTR                      | 0.12         | 23.9  | C                   | EB-LTR                      | 0.10         | 20.0  | C                   |
|   | WB-LTR                      | 0.04         | 18.1  | C                   | WB-LTR                      | 0.04         | 19.1  | C                   |
|   | NB-LT                       | 0.01         | 0.4   | A                   | NB-L                        | 0.01         | 11.1  | B                   |
|   | SB-LT                       | 0.00         | 0.0   | A                   | SB-L                        | 0.00         | 0.0   | A                   |

v/c ratio = volume/capacity ratio

Source: Synchro 7

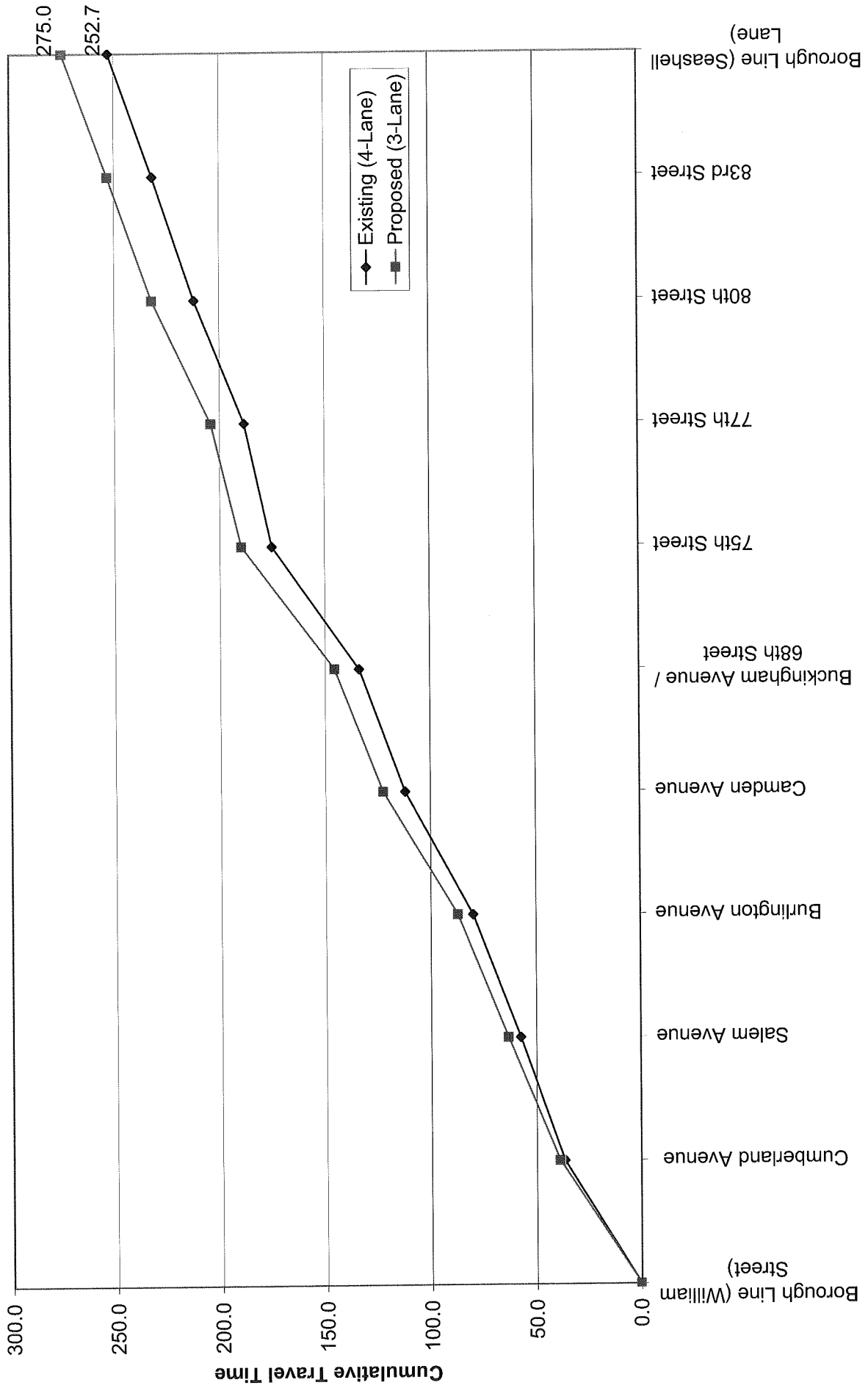
**EXHIBIT 4  
EXISTING CONDITION VS. PROPOSED CONDITION  
SUMMER WEEKEND PEAK HOUR  
LONG BEACH BOULEVARD TRAVEL TIME**

| Intersection with<br>Long Beach Boulevard NB<br>(CR 607) | Distance<br>(miles) | Cumulative Travel Time      |                             |                     |
|--|---------------------|-----------------------------|-----------------------------|---------------------|
|  |                     | Existing<br>4-Lane<br>(sec) | Proposed<br>3-Lane<br>(sec) | Difference<br>(sec) |
| Borough Line (William Street)                            | 0.00                | 0.0                         | 0.0                         | 0.0                 |
| Cumberland Avenue  | 0.34                | 36.5                        | 38.7                        | 2.2                 |
| Salem Avenue   | 0.51                | 57.4                        | 63.2                        | 5.8                 |
| Burlington Avenue  | 0.68                | 79.9                        | 87.2                        | 7.3                 |
| Camden Avenue  | 0.91                | 112.0                       | 122.7                       | 10.7                |
| Buckingham Avenue / 68th Street                          | 1.07                | 133.8                       | 145.7                       | 11.9                |
| 75th Street  | 1.39                | 175.2                       | 190.0                       | 14.8                |
| 77th Street  | 1.49                | 188.3                       | 204.4                       | 16.1                |
| 80th Street  | 1.65                | 212.0                       | 232.2                       | 20.2                |
| 83rd Street  | 1.79                | 231.7                       | 253.3                       | 21.6                |
| Borough Line (Seashell Lane)                             | 2.00                | 252.7                       | 275.0                       | 22.3                |
| <b>TOTAL</b>   | <b>2.00</b>         | <b>252.7</b>                | <b>275.0</b>                | <b>22.3</b>         |

| Intersection with<br>Long Beach Boulevard SB<br>(CR 607) | Distance<br>(miles) | Cumulative Travel Time      |                             |                     |
|--|---------------------|-----------------------------|-----------------------------|---------------------|
|  |                     | Existing<br>4-Lane<br>(sec) | Proposed<br>3-Lane<br>(sec) | Difference<br>(sec) |
| Borough Line (Seashell Lane)                             | 0.00                | 0.0                         | 0.0                         | 0.0                 |
| 83rd Street  | 0.21                | 28.8                        | 30.8                        | 2.0                 |
| 80th Street  | 0.35                | 52.4                        | 62.7                        | 10.3                |
| 77th Street  | 0.51                | 72.0                        | 84.1                        | 12.1                |
| 75th Street  | 0.61                | 84.8                        | 97.6                        | 12.8                |
| Buckingham Avenue / 68th Street                          | 0.93                | 126.4                       | 141.4                       | 15.0                |
| Camden Avenue  | 1.09                | 148.4                       | 168.0                       | 19.6                |
| Burlington Avenue  | 1.32                | 175.5                       | 196.6                       | 21.1                |
| Salem Avenue   | 1.49                | 199.6                       | 224.6                       | 25.0                |
| Cumberland Avenue  | 1.66                | 218.4                       | 244.9                       | 26.5                |
| Borough Line (William Street)                            | 2.00                | 247.6                       | 275.6                       | 28.0                |
| <b>TOTAL</b>   | <b>2.00</b>         | <b>247.6</b>                | <b>275.6</b>                | <b>28.0</b>         |

Source: SimTraffic 7 (average of 10 runs)

# EXHIBIT 5 LONG BEACH BOULEVARD NB TRAVEL TIME COMPARISON





**EXHIBIT 6  
LONG BEACH BOULEVARD SB TRAVEL TIME COMPARISON**

