

APPENDIX B

**VISUAL IMPACT ANALYSIS
METHODOLOGY**

Point Ruston Visual Impact Analysis

1.0 Introduction

This report analyzes the potential visual impacts of the Point Ruston development proposal. Past view analyses acceptable to the City were used as models to complete a visual impact study for this proposal. The location, natural topography and existing development in the vicinity provide various opportunities for expansive views of Puget Sound, Commencement Bay, Vashon Island, Maury Island and beyond. The analysis considers views from the project site and surrounding locations that may be affected by the redevelopment of the former ASARCO Tacoma Smelter site.

The area proposed for Point Ruston development is the former Asarco Smelter site located in Tacoma and Ruston. A photograph of the former smelter site is included in Figure 1. As shown, the site was covered with many large industrial buildings and structures. Final demolition of the last large building, the Fine Ore Bins building, was completed in 2004. The Fine Ore Bins building measured approximately 800 feet long, 400 feet wide and 100 feet tall at its highest point. The smelter and its 572 foot tall smoke stack were well-known by the local community and served as a visual point of reference to residents and visitors. Remediation of the site has been ongoing under EPA's authority for more than ten years to prepare the site for development. The City of Tacoma, Town of Ruston, and MetroParks have been actively involved in planning and preparing for redevelopment of the site since the mid 1990s.

Point Ruston's project design will meet applicable City of Tacoma and Town of Ruston building requirements. In Tacoma, the shoreline codes for the "S-6" Ruston Way Shoreline District provide regulations relating to the height, set-back, view corridors, public access, parking and landscaping. The "S-6" zone limits building height to 80 feet. The Ruston Way Design Manual discusses the intended character of the public walkways, public plazas and amenities along the shoreline edge for the length of the project site which will provide new opportunities for views and recreation along this stretch of shoreline not previously accessible during the property's active industrial life or remediation. The Ruston Master Development Plan (MDP) zone limits building height to 60 feet.



Looking north across operating Asarco site at “fine ore bins”.



Looking east across operating Asarco site toward Mount Rainier.

FIGURE 1

2.0 Visual Impact Criteria

The assessment of views and aesthetic impacts of any development within a community are subjective. Criteria for view impact evaluation are needed to determine what potential impacts proposed development will have upon existing views and view opportunities. In examining the Point Ruston project's visual impacts, considerations were taken of:

- 1) Views from residential neighborhoods overlooking the project;
- 2) Views from Ruston Way;
- 3) Views from the Tacoma Yacht Club;
- 4) Views from the undeveloped area east of Stack Hill; and
- 5) Views from the project area.

Approximate locations from where visual impacts of the "Point Ruston" project are evaluated are shown on Figure 2 and were chosen based upon public comment and staff recommendation as "worst-case" locations. This analysis uses several criteria to describe and evaluate the visual impact from the proposed buildings including "dominance," and "overall blockage."

"Dominance" describes the vertical prominence of the proposal by measuring the number of visual "planes" or backgrounds that are broken by the proposal. There are three backgrounds along Ruston Way that appear "dominant": water, land and sky. The relative importance of these backgrounds depends upon the viewing location and direction. A project that "breaks" all backgrounds is most dominant. A project that would traverse only one of the backgrounds would be least dominant.

"Overall blockage" represents the amount of horizontal and vertical view blocked by the project at certain points. Again, the amount of overall blockage is dependent upon the point at which it is measured taking into account both dominance and the width of blockage. Blockage at points close to buildings can be much more significant than blockage at points on hillsides above the project or at points located at a distance from the project.

"Overall Blockage" and "dominance" from the proposed development will have some visual impact upon a broad area since the former ASARCO site is relatively large, and not from just one building. Visual impact analysis at other sites is often conducted considering only one building's impact upon existing views. Such impact can be evaluated from one point looking at the point of the building to be constructed and determine what "percentage" of the area is going to be blocked by that building.

With the "Point Ruston" project, the overall visual impact is difficult to measure when looking at individual buildings since there are a relatively high number of different buildings to the proposal. Because there are a large number of buildings proposed and they will be built over a large area, the proposed development's visual impact is evaluated in relation to its overall blockage or dominance over this broad view of the site. The various sites where visual impacts were measured as shown on Figure 2 are at different elevations and have views of "near shoreline," "far shoreline" and/or "far skyline."



Figure 2: View study locations in relation to proposed "POINT RUSTON"

The “near shoreline” from the points where the potential development of “Point Ruston” is evaluated is the shore along Ruston Way and where there is an existing view of the water at that shoreline. The “far shoreline” encompasses all of the water views up to lands in the distance including Brown’s Point, Vashon Island, and Maury Island shorelines. If water is estimated to be seen from the evaluation points, then the development will have no impact upon the “far shoreline.” The “far skyline” includes skylines at distant land areas. Such skylines include Tacoma skylines, skylines of Brown’s Point Vashon Island, Maury Island and background mountain ranges. If lands are estimated to be seen above the projected building heights, then the development will have no impact upon the “far skyline.” It is the “far shoreline” and “far skyline” views that are considered more important by members of the community than those of the “near shoreline.”

3.0 Method of View Analysis

Visual impact analysis should be measured along coordinated pathways and not just at one point when appropriate. Urban designer Kevin Lynch has indicated that the "visual sequence" is as significant to the visual impact of a project as any particular point. As explained in his book, Site Planning Lynch states, "...the landscape is usually experienced by a moving observer...the single view is not as important as the cumulative effect of a sequence of views" (Page 162). Roads and paths lead the eye more often than does an object at one particular site. Therefore, it is necessary to examine the project in terms of the paths and corridors which exist or will be developed in order to determine the overall significance of a project's visual impact on the existing environment.

An initial assessment of potential view impacts was made by walking through the neighborhoods and taking pictures of the site from different points and directions. This visual assessment provided an indication of existing views. A view analysis to measure "dominance" and "overall blockage" was completed using these photographs. In making the analysis models of the project are superimposed upon the photographs from the points to measure "Point Ruston" project's visual impacts. From these photographs and simulations of buildings, the impact upon views of the "near shoreline," "far shoreline," and "far skyline" are determined. If any of the original views are blocked by the modeled project, those areas are noted on site photographs, and the amount of the view that is blocked is measured and noted on each photograph.

It should be noted that these models in many cases represent maximum building potentials (largest allowable building envelopes and tallest allowable building heights) providing a "worst-case" scenario appropriate for SEPA analysis. Final site configuration and building massing will significantly reduce visual impacts with varying building sizes, heights, upper story setbacks and modulated roof lines. The models were intended specifically to represent mass, not actual building aesthetics such as colors or architectural details.

The angle of view noted on each figure is related to the location of the picture taken within the figure and how much of the "Point Ruston" site is within the figure. Therefore, the angle of view varies significantly within each of the pictures provided. The amount of dominance or overall blockage is determined only within that angle of view evaluated. As the location of evaluation moves toward either end of the project site, the angle of view reduces considerably. For example the picture of the site from the bottom of Stack Hill shows an angle of view of 129 degrees to the far shoreline because the location is near the center of the "Point Ruston" site. The angle of view at Ruston Way southeast of the site is only 47 degrees. Therefore, blockage at the Ruston Way point of observation appears larger than that at Stack Hill even though the view of the Sound and Commencement Bay is not obstructed at all by the project at Ruston Way south of the project site.

Criteria similar to previous view impact analysis studies conducted in Tacoma are used in this analysis. If overall blockage and dominance is 0% to 24%, the visual impact is considered "low." If the overall blockage is between 25% and 50%, the visual impact is considered "moderate," and if the overall blockage and dominance is over 50%, the visual impact is considered "high."

4.0 View Analysis

Dominance and overall blockage are addressed separately for each of the views analyzed. Currently, from all of the points evaluated, there is view of the “near shoreline.” RCW 90.58.320 stipulates that no permit shall be given to any structure more than 35 feet in height above average grade that “obstructs” the view of a substantial number of adjoining residents except when “overriding considerations of the public interest will be served.” Visual impact will occur upon view of “near shoreline” from just about any development and certainly from development upon the “Point Ruston” property 35 feet in height. Except from two different spots evaluated, the visual impact from any development upon the site will impact “near shoreline” views to a great extent. But again, because all development on this site at any height will have impact upon views of “near shoreline,” the visual impact upon “near shoreline” from “Point Ruston” will be not any more significant than any other development permitted upon the site. It will definitely not be more significant than the building activity approved by the Mater Development Plan adopted by the Town of Ruston for the former ASARCO site.

Visual impacts upon “far shoreline” are also easily determined by looking at the photographs with the building simulations inserted. Where water is still visible, the project is not expected to have impact upon the “far shoreline” and the angle where the “far shoreline” is impacted can be measured. Except at several locations near the project and near Ruston Way, the proposed buildings from the “Point Ruston” project do not block or dominate a large amount of the “far shoreline” views.

Visual impacts upon the “far skyline” are easily determined when looking at the photograph views with inserted building simulation. Once buildings impede views of the background land areas, the simulated building is surrounded with sky and represents a “blockage” of the “far skyline.” The amount of “far skyline” that is blocked is measured in relation to the overall angle of view that is analyzed from the photograph, not the entire angle that can be seen by someone from the point evaluated.

4.1 Dominance and Overall Blockage

Topography and relative grades are important factors when analyzing dominance and overall blockage of the project from specific viewpoints. The project is bordered by hillsides ranging in elevations from 100 to almost 200 feet above sea level and it is at these elevations where existing residences view the site.

4.1.1 From Hillside Residences Overlooking the Project

Residences located northwest of the project are characterized by primary views to the north across the OCF towards Commencement Bay, Vashon Island, and Seattle. Figures 3 through 6 show the blockage anticipated by development by “Point Ruston” from residential places west and southwest of the site. Figure 3 and 4 show potential view impacts from residences along Bennett Street. Buildings proposed at the northwest end of “Point Ruston” will be located at the foot of the On-site Containment Facility (OCF) hill with a maximum allowable height of 60 feet, although most of the buildings planned will not be of this height. The grade difference between the project site elevation and the top of the landscaped OCF is more than 80 feet. From above and behind the OCF on Bennett Street where residences are located, the project buildings are not dominant as only portions of the highest roof structures are visible over the edge of the OCF “horizon”.

Wide secondary views to the east are available from much of this area. Browns Point, the Tacoma Port Industrial Area, Mt. Rainier and distant views of the City of Tacoma skyline are visible from most locations evaluated. Fanning north to east, these views progress across more of the length of the project and increase its potential dominance and overall blockage. The grade separation still minimizes dominance with the tallest buildings on the southeast side of the project obscuring only portions of one background, the near water of Commencement Bay. View corridors provided through the site are generally at angles perpendicular to these views but the 100 foot wide promenade and building setback from the shoreline as well as the central internal road will be discernable. The backgrounds of land, including Browns Point, the Port of Tacoma, and the backdrops of the Cascades and Mt Rainier remain visible over the project.

Figure 3 shows a photograph taken from the north end of Bennett Street and illustrates that the buildings created by the project will block up to 81% of the “near shoreline” views. Near shorelines southeast of the site and through a corridor of the project will still be visible after construction upon the site. Some of the taller buildings created on the southeast of the site will block approximately 5% of the “far shoreline” of Tacoma that is now visible. Analysis indicates that the project will impact none of the far skyline views, and therefore, the project will have a “low” impact upon the current vision. Figure 4 provides a photograph taken near 51st Street on Bennett and indicates that all of the “near shoreline” adjacent the site will be blocked by the proposed project. However, none of the “far shoreline” or “far skyline” that is now visible will be blocked by the proposed project. Therefore, proposed “Point Ruston” impact upon views is considered “low” by criteria.

The views and impacts described from Bennett are also generally representative of views from the top of the OCF, an open space area of approximately 6 acres in size which may be developed in the future as a park. Nearer to the edge of the open space area more of the buildings will be visible in the foreground looking down the side slopes to the project. Buildings may also increase in dominance from the nearer vantage point and slightly reduced elevation (the 2% drainage grade of the top represents a 10 foot drop from high to low). Views to the north and northwest will be more expansive nearer to the edge of the OCF than from Bennett Street where trees on the hillside above the yacht basin currently limit views in these directions.

Figures 5 and 6 are taken from residential locations southwest of the proposed “Point Ruston” project site. Figure 5 is a photograph representing the view impact to residents near Baltimore on Commercial Street. While 93% of the “near shoreline” that can now be seen will be blocked by the proposed development, some of the “near shoreline” will be visible as a result of corridors that are planned in the project. None of the “far shoreline” or “far skyline” views to these residents will be blocked by the project, so it also has a “low” impact upon views.

Figure 6 shows view impact from the bottom of the developing “Stack Hill.” Because this location is near the center of the proposed project its overall evaluated angle of view is a wide 129 degrees. The “near shoreline” will have 95% of its current view blocked by the proposed project. A small percentage of the “near shoreline” will be visible through one of the corridors planned for the project. From this point 19% of the “far shoreline” of Brown’s Point will be blocked by the taller buildings on the south east corner of the project. None of the “far skyline” views from this location will be blocked by the project. The overall view impact from “Stack Hill” is also “low.”

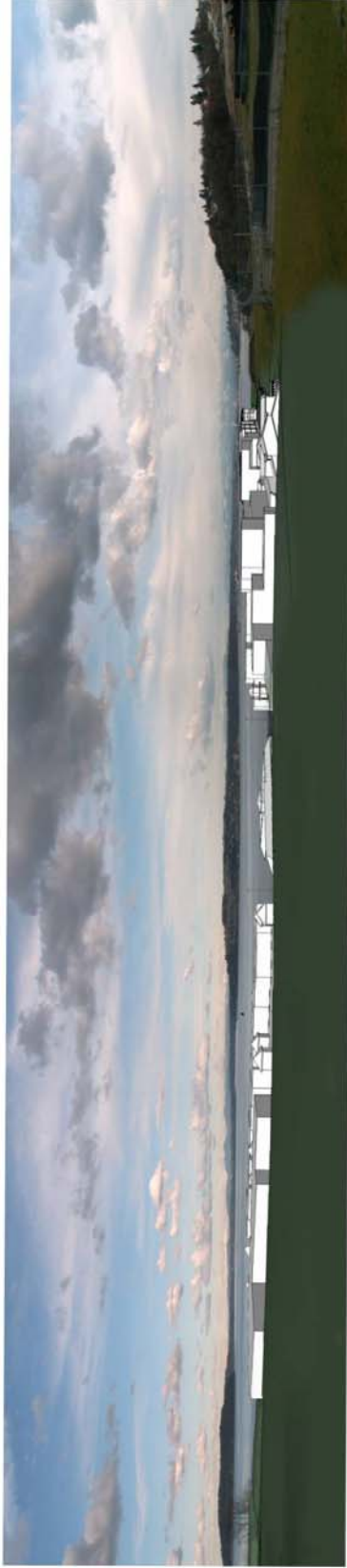


Figure 3

- Location 2: Bennett Street above the OCF
- Elevation: Approximately 108'
- Facing: Southeast
- Near Shoreline View Blockage: 81%
- Far Shoreline View Blockage: 5%
- Far Skyline View Blockage: 0%



Location #2 View Blockage Analysis



Figure 4

- Location 3: Residence around 51st and Bennett Street
- Elevation: Approximately 110'
- Facing: Northeast
- Near Shoreline View Blockage: 100%
- Far Shoreline View Blockage: 5%
- Far Skyline View Blockage: 0%

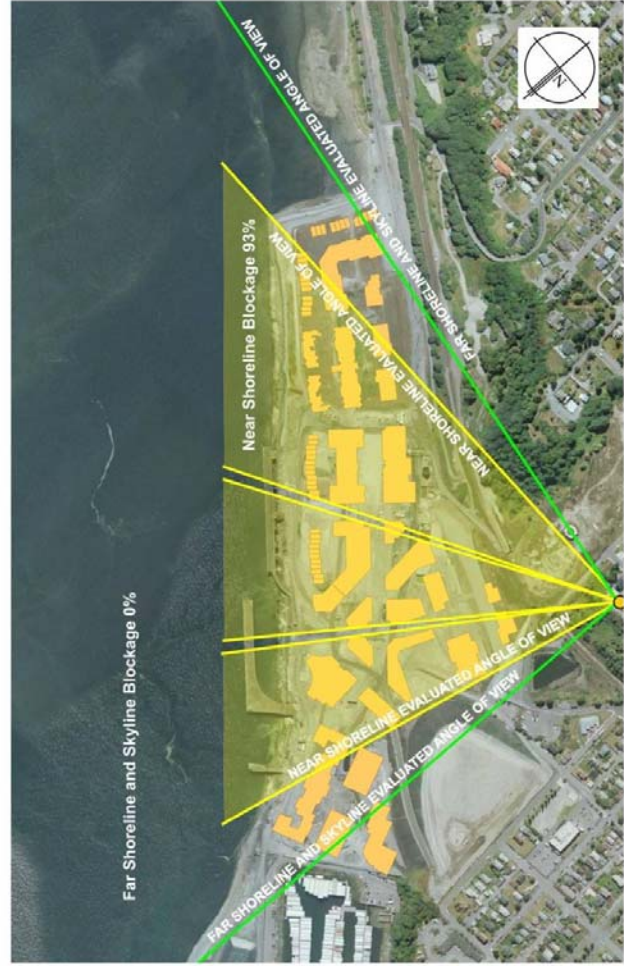


Location #3 View Blockage Analysis



Figure 5

- Location 4: Residence on Commercial Street near Baltimore
- Elevation: Approximately 135'
- Facing: Northeast
- Near Shoreline View Blockage: 93%
- Far Shoreline View Blockage: 0%
- Far Skyline View Blockage: 0%



Location #4 View Blockage Analysis

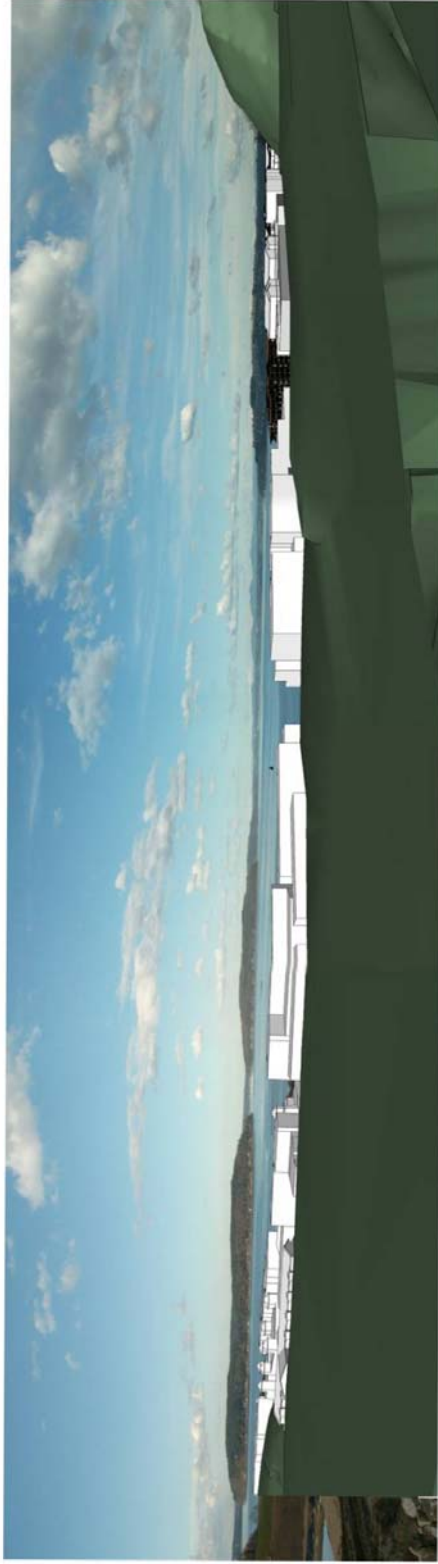


Figure 6

- Location 5: Stack Hill
- Elevation: 118'
- Facing: Northeast
- Near Shoreline View Blockage: 95%
- Far Shoreline View Blockage: 19%
- Far Skyline View Blockage: 0%



Location #5 View Blockage Analysis

4.1.2 Area East of Stack Hill

Views from south of the project include areas on the north end of Orchard Street, areas where residences are planned and areas where existing residences near Ferdinand along the railroad. These views are from elevations higher than the project site, and are characterized by northern views of Commencement Bay, Vashon Island and the Puget Sound toward Seattle. Hillsides of equal or higher elevations border this area to the northwest and southeast confining the width of available northward views. Browns Point is visible to the northeast and from a few locations evaluated the Olympics can be seen looking west.

Dominance varies to future residences located at the various locations evaluated. At the higher elevations of this particular area, the buildings from the project would have minimal dominance obscuring primarily the project shoreline or “near shoreline” water.

The existing residences east of Stack Hill are generally above the hillside at elevations approximately 200 feet above sea level. View impacts to these residences will be none to minimal because of their relatively far distance from the project. There is also some undeveloped area at the top of the hillside at the end of Orchard Street. The view orientations in this area are varied. Some properties on Orchard are oriented east toward the Port Industrial Area and City of Tacoma. These views are generally focused to the southeast of the site and will be only minimally impacted. Views in this area that are oriented north and northeast over the project are most impacted by the project. Existing vegetation on the hillside obscures some territorial views and views down to the project. Figure 7 illustrates the view blockage that the project will create from the north end of Orchard Street. As seen from the photograph and evaluation angle, only 48% of the “near shoreline” will be blocked by the project. This results from the high elevation of the location in relation to the project and from the lower buildings of the northwest end of the project. From this perspective it is estimated that the existing piers can still be seen. No “far shoreline” or “far skyline” will be blocked by the project from this perspective resulting in a “low” overall visual impact at this location.

On the hillside below the existing residences in this area, there is an undeveloped “bench” beginning southeast of the property where access is available from Ferdinand Street and running parallel with the project property to approximately its mid point. This area is across and above Ruston Way and the BNSF railroad lines. The developable areas of the bench include grades ranging from approximately 50 feet to approximately 90 feet in elevation. The comprehensive plan designation for this property was amended in 2005 to allow medium intensity development and the ability to seek approvals for buildings of up to 60 feet in height. It was noted that this property could provide a transition between the high intensity designation of the project property and the low intensity of the residential areas above. The staff report for the amendment also noted that development of the bench with buildings up to 60 feet in height, even from the highest elevations, would fall below the grade of the hilltop residences with no significant impact to existing views. The hillside above the bench and existing vegetation which partially obscures views from the top is to be protected as a condition of the amendment. Figures 8, 9, 10 and 11 are a projection of the model on photographs taken at approximate elevations between 80 and 50 feet.

From the southeast end on the undeveloped bench, views oriented north would be across the width of the project property. The tallest project structures, up to 80 feet in height in this area, would be dominant in this direction obscuring portions of the Bay, Browns Point, and Vashon Island. Horizontal separation of approximately 200 feet across the railroad, Ruston Way, and landscaped parking areas of the project provides room for view perspective during winter and spring months when deciduous trees foliage is not obstructing views.



Figure 7

- Location 6: Undeveloped Area at North end of Orchard Street
- Elevation: Approximately 160'
- Facing: Northeast
- Near Shoreline View Blockage: 48%
- Far Shoreline View Blockage: 0%
- Far Skyline View Blockage: 0%



Location #6 View Blockage Analysis

Figures 8 and 9 measure visual impacts from southeast of the project should residences be created on undeveloped property at elevations of 80 feet and 65 feet respectively. Figure 8 where property elevation is approximately 80 feet, shows that 83% “near shoreline” would be obstructed by the project. Seventeen percent (17%) of the “near shoreline” view to the southeast of the project is unobstructed by the project. Only 26% of the “far shoreline” is blocked by the project and none of the “far skyline” is blocked by the project from this perspective permitting conclusion that the project will have only a “low” impact.

Figure 9 shows a greater visual impact if a residence were built at this elevation (60 feet) and at this point. “Near shoreline” blockage is only 77 %, but “far shoreline” blockage increases to 64% and “far skyline” blockage is 49% making the visual impact from the project “medium to high” by the criteria established at this location. This impact would be reduced if a residence were constructed approximately 200 feet to the west since a 100 feet corridor is planned to the water through the project at this location.

Figures 10 and 11 show views from existing residences further east of the other two sites and just west of Ferdinand and at elevations approximately 50 and 55 feet. Figure 10 was taken from a residence approximately 200 feet west of Ferdinand and at 50 feet elevation. The “near shoreline” angle of view that was evaluated was 97 degrees taking into account the view of Tacoma Yacht Club. It is estimated from models placed upon the photograph taken from this location that 80 % of the “near shoreline” would be blocked by the project with corridors permitting the view of some of the existing “near shoreline.” The “far shoreline” and “far skyline” angle of view is 123 degrees taking in Brown’s Point. “Far shoreline” blockage is estimated to be 55% and “far skyline” blockage is estimated to be 47% by the project, providing a moderate to high impact from this location.

Figure 11 shows the view impact to an existing residence approximately 150 feet east of the residence shown in Figure 10 and approximately 55 feet in elevation. Because this site of evaluation is further east from the residence examined in Figure 10, the angle of the view of the project is narrower. “Near shoreline” blockage is estimated at only 59% and “far shoreline” and “far skyline” blockage is estimated at 49% which makes the impact of the project to views at this residence “moderate” by criteria used.

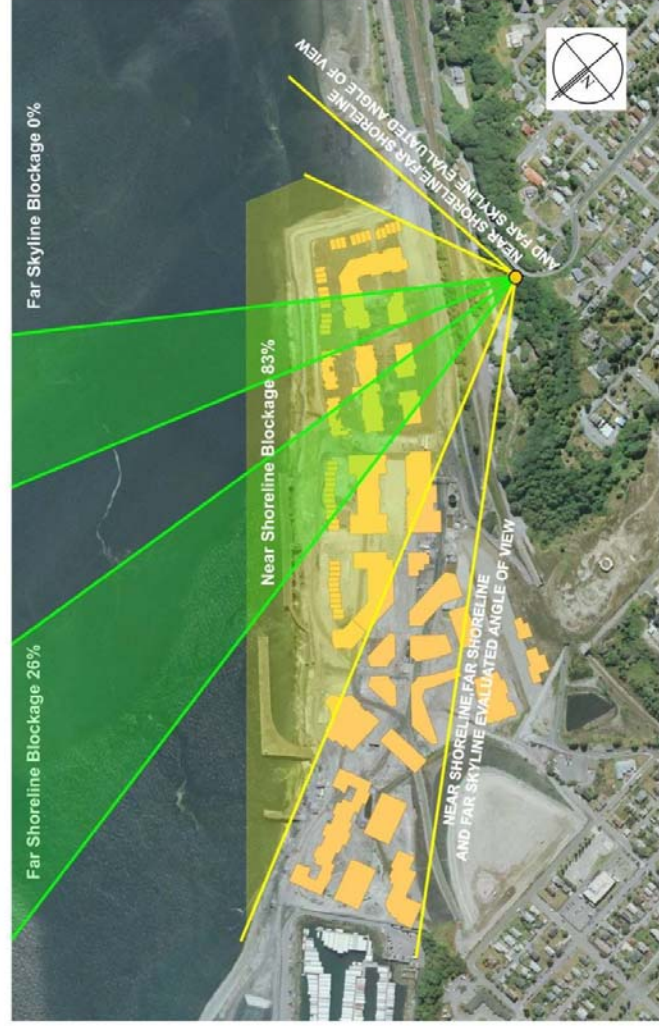
4.1.3 From Ruston Way

Pedestrians and vehicles approaching the project from Tacoma will first view the project's narrower southeastern end across Tract A and the preceding parks along Ruston Way. From a distance, the project structures will be moderately dominant obscuring portions of the background (one side of OCF, hillside above Tacoma Yacht Club basin, and Vashon Island). Overall blockage is minimal at a distance of approximately 1500 feet from the site. The dominance and overall blockage increases moving closer to the project as shown in Figure 12, taken approximately 500 feet from the site. When passing the project on Ruston Way, the buildings will be dominant and overall blockage will be high. Photographs were taken at points along the new Ruston Way road alignment from lower than final elevations to provide a model of expected views. The model shows the view corridors will provide intermittent views through the project to the shoreline and Commencement Bay and beyond (see Figures 13 and 14). Current views of the water along Ruston Way are very limited as the existing grade of Ruston Way is lower than the current site elevation and then dips into the tunnel. The current Ruston Way alignment averages 6 feet or more below the planned site grade. The proposed realignment of Ruston Way will provide improved views of the water through the view corridors and at higher road elevations traveling northwest and connecting with the current 51st Street.



Figure 8

- Location 7: Undeveloped Area above Railroad near Ferdinand Street
- Elevation: 80'
- Facing: Northeast
- Near Shoreline View Blockage: 83%
- Far Shoreline View Blockage: 26%
- Far Skyline View Blockage: 0%

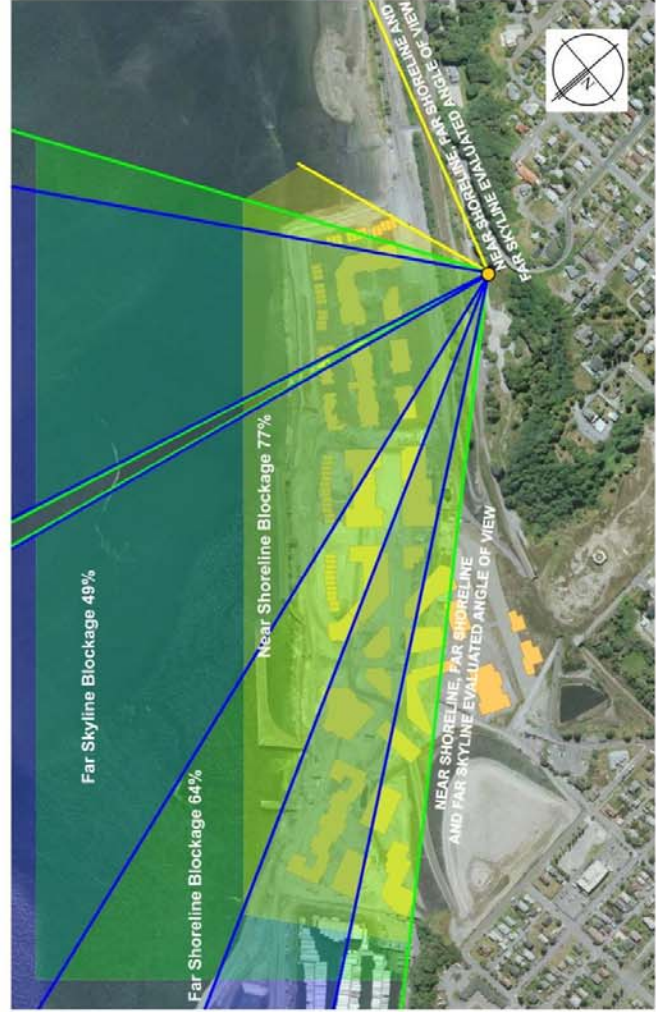


Location #7 View Blockage Analysis



Figure 9

- Location 8: Undeveloped Area above Railroad near Ferdinand Street
- Elevation: 65'
- Facing: Northeast
- Near Shoreline View Blockage: 77%
- Far Shoreline View Blockage: 64%
- Far Skyline View Blockage: 49%

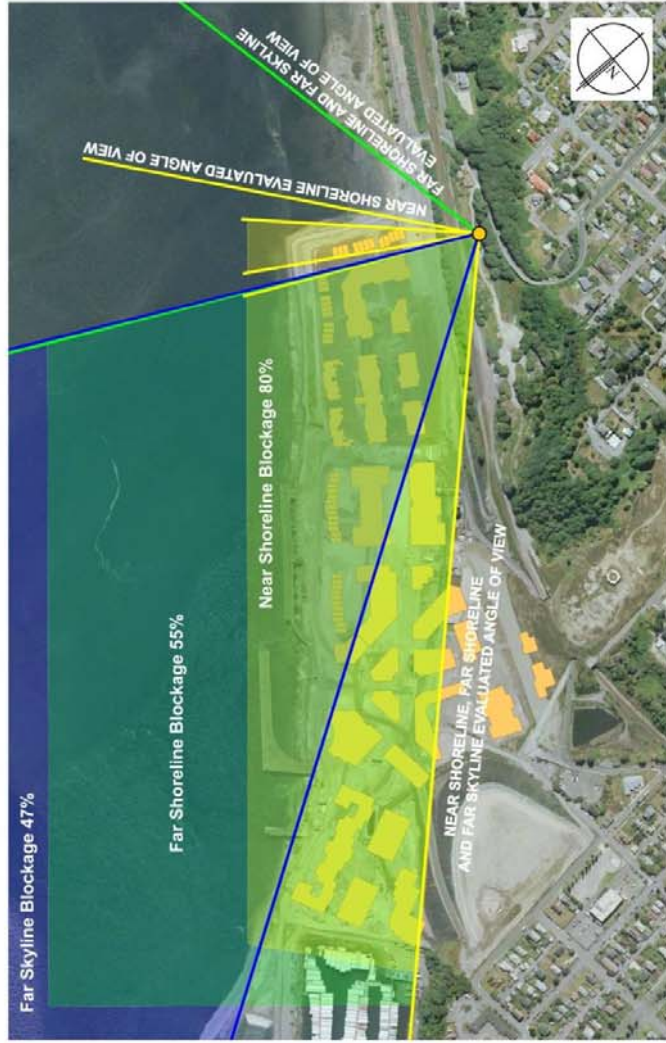


Location #8 View Blockage Analysis



Figure 10

- Location 9: First Existing House near Ferdinand Street and Ruston Way
- Elevation: Approximately 50'
- Facing: North
- Near Shoreline View Blockage: 80%
- Far Shoreline View Blockage: 55%
- Far Skyline View Blockage: 47%



Location #9 View Blockage Analysis



Figure 11

- Location 10: Second Existing House near Ferdinand Street and Ruston Way
- Elevation: Approximately 55'
- Facing: North
- Near Shoreline View Blockage: 59%
- Far Shoreline View Blockage: 49%
- Far Skyline View Blockage: 49%



Location #10 View Blockage Analysis

Figure 12 has a narrow angle of view that is evaluated related to the other Figures since the project is being viewed from the south end. Total angle of view evaluated for the “near shoreline” impact at this location is only 38 degrees and none of it will be impacted by the project. The “far shoreline” and “far skyline” overall angle of view analyzed is 47 degrees. Of that 46% of the “far shoreline” and 57% of the “far skyline” will be impacted. Again, this considers only the relatively small angle evaluated and does not consider the impact upon the overall views available from this location. Most water views and “far shoreline” and “far skyline” views that are available to pedestrians and drivers along Ruston Way will not be impacted by the development from this location and, thus, were not evaluated.

Figures 13 and 14 show view impacts from Ruston Way at two corridors planned on the site. The “near shoreline,” “far shoreline,” and “far skyline” blockage will be the same at each of these sites because locations are so close to the project. Figure 13, at the middle corridor planned on the Tacoma side of the project, evaluates an angle view of 50 degrees. It is estimated that 80% of the “near shoreline,” “far shoreline,” and “far skyline” will be blocked at this location by the project. Figure 14 is derived from a photograph taken at the corridor existing approximately where the Town of Ruston and City of Tacoma boundaries meet at Ruston Way. An angle of view evaluated here is 84 degrees and it is estimated that the project would block 85% of the “near shoreline,” “far shoreline,” and “far skyline” views. Based upon the criteria established for impact determination upon views, it is concluded that the project will have a “high” impact upon existing views. Again, it is important to emphasize that because these locations are close to the proposed project site, any building at heights of 35 feet would have the same “high” impact upon these Ruston Way points of evaluation.

Special Note: Following the publishing of the Draft Supplemental EIS the site plan was revised to flip buildings 2 A and B with buildings 3 A and B. Both buildings are visible in Location 12 Figure 13 without this change. This site plan revision has no impact on the width of the view corridor or percentage of blockage, but has shifted the corridor five degrees to the east. Further analysis has concluded that this is not a significant adverse impact and therefore no revision is necessary to the summary of impacts.

4.1.4 From Tacoma Yacht Club located on Peninsula Park

The Tacoma Yacht Club was built on the Metro Park's Breakwater Peninsula which was formed from ASARCO slag pours to serve as a breakwater for the yacht basin marina. The peninsula is at approximately the same elevation as the northwestern end of the proposed project. Views toward the project vary depending on the point of observation. Driving around the yacht basin to the Tacoma Yacht Club views to the project are blocked by a large wall, storage structure and fence at the property line. Photos for analyses were taken in the Tacoma Yacht Club parking lot about 1800 feet from the northwestern edge of the project (see Figure 15). It should be noted that significant views from the club house itself located at the end of the peninsula would be unaffected by the project. The windows and decks of the club house are oriented away from the project and toward the panoramic views of Commencement Bay, Vashon Island, Browns Point, Mt. Rainier and background mountain ranges. As there are no impacts from the project from these vantage points, they were not photographed.

Photographs were taken from the end of the parking lot near the yacht basin looking east and southeast toward the project. Dominance of the proposed structures from this location will be minor against the backdrop of the North Tacoma hillsides. Views of Mount Rainier and the Tacoma skyline will not be impacted. The overall blockage of the project is minimal since the angle of coverage is relatively small considering the overall view looking east/southeast. The angle of building dominance is very narrow compared to the overall angle of sight and is not in the direction of primary views.

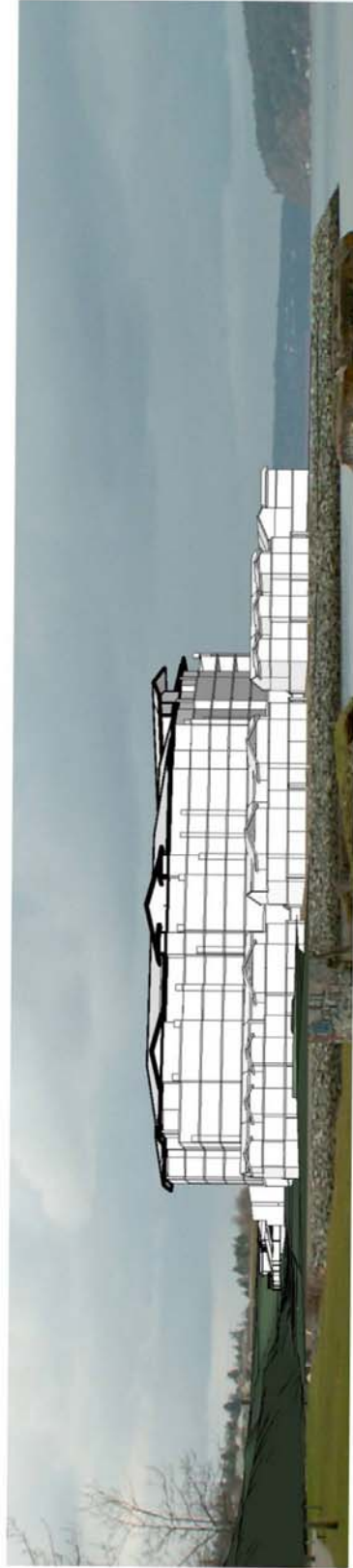
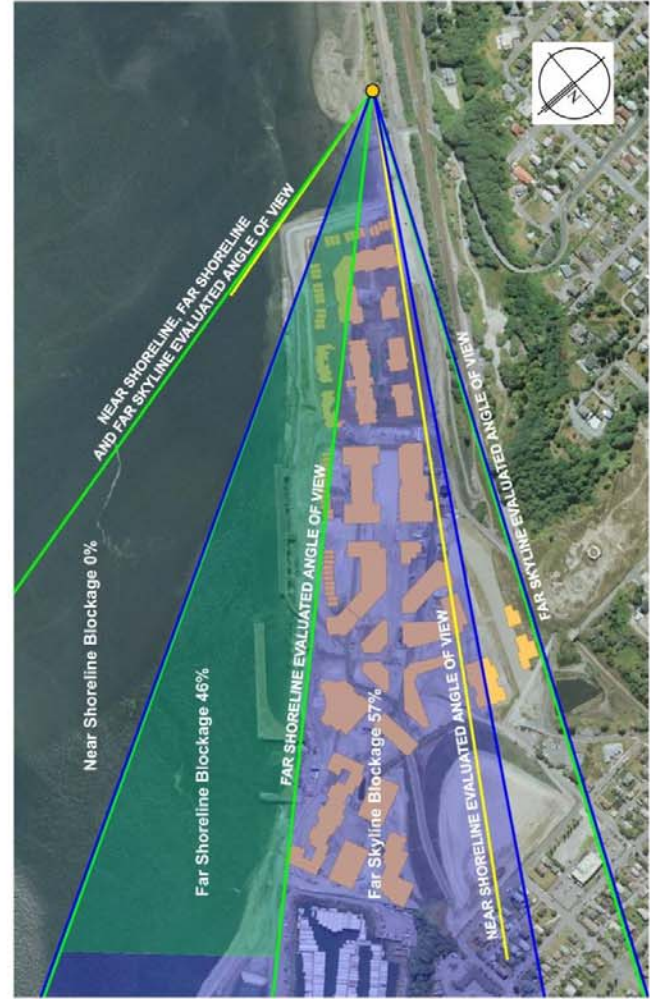


Figure 12

- Location 11: Ruston Way South of Site
- Looking North
- Elevation: 17'
- Facing: Northwest
- Near Shoreline View Blockage: 0%
- Far Shoreline View Blockage: 46%
- Far Skyline View Blockage: 57%

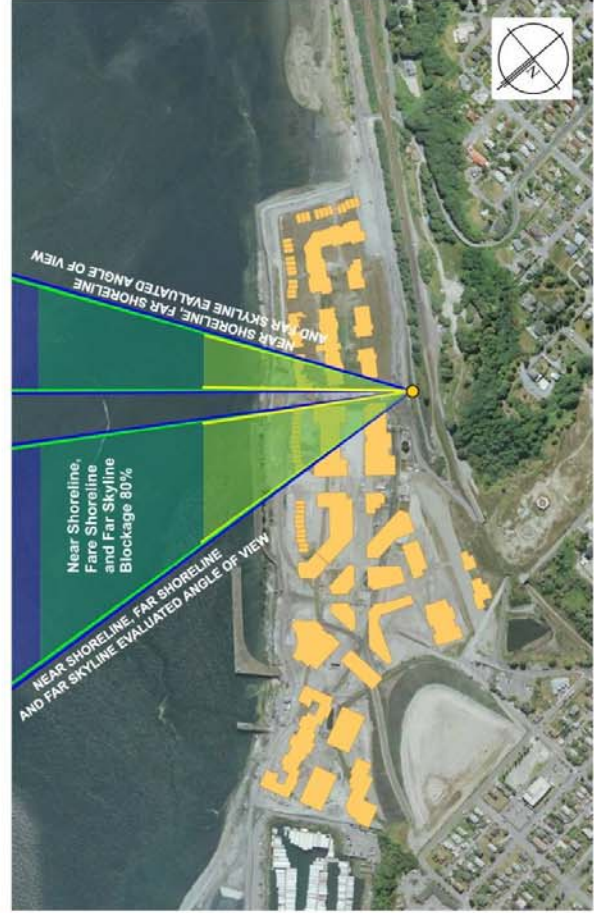


Location #11 View Blockage Analysis



Figure 13

- Location 12: Ruston Way Along Site
Looking North
- Elevation: 37'
- Facing: North
- Near Shoreline View Blockage: 80%
- Far Shoreline View Blockage: 80%
- Far Skyline View Blockage: 80%



Location #12 View Blockage Analysis



Figure 14

- Location 13: Ruston Way Along Site
Looking North
- Elevation: 39'
- Facing: North
- Near Shoreline View Blockage: 85%
- Far Shoreline View Blockage: 85%
- Far Skyline View Blockage: 85%



Location #13 View Blockage Analysis



Figure 15

- Location 1: Tacoma Yacht Club Parking Lot
- Elevation: 15'
- Facing: Southeast
- Near Shoreline View Blockage: N/A
- Far Shoreline View Blockage: N/A
- Far Skyline View Blockage: 22%



Location #1 View Blockage Analysis

Figure 15 shows that an angle of view of only 45 degrees is evaluated. From this point there is no “near shoreline” or “far shoreline” seen presently so the project will have no impact upon these unless the existing view obstructions are removed. In that case the views of the “near shoreline” and “far shoreline” will be improved. Figure 15 estimates that approximately 22% of the angle of view evaluated will be impacted by the project, which is a “low” impact by criteria established.

4.3.5 From the Project Area

From the project area, views available to the public from the promenade and shoreline parks will be created where none previously existed in the industrial life of the property. Within the interior of the project, the view corridors maintain visual connection with the water. Tiered building heights will provide some views from buildings behind those on the waterfront. Dominance will vary by location within the project as will overall blockage. Both will be mitigated by the expansive promenade area and view corridors through the property.

5.0 Conclusions and Mitigation Measures

When looking at the proposed buildings from different angles and points surrounding the site, it is concluded that the development overall has little to moderate visual impact even considering development to the maximum footprints and heights permitted as the models portrayed. It should be noted that the build-out depicts the "worst-case" model to estimate view blockage and is conservative as it would actually be less significant than shown.

As discussed in the introduction, demolition and site remediation has eliminated the many large buildings and structures used in the smelting operation and prepared the property for redevelopment and beneficial reuse. The resulting project will be pleasant in visual contrast compared to former smelting operations and recent remediation activities.

One significant factor in considering the visual impacts of the proposed "Point Ruston" development is the existence of Master Development Plan for the ASARCO site approved by the Town of Ruston and reviewed by the City of Tacoma. The plan proposed creation of buildings approximately 60 feet in height as close to the water as is being proposed in the "Point Ruston" proposal. All of the buildings now proposed within the Town of Ruston are 60 feet in height or less and all of the buildings proposed within Tacoma are 80 feet in height or less.

Contrasts from new buildings and the project are not expected to be significant since the materials on the proposed structures will generally draw from earth-tone palettes and utilize natural materials. The overall coordination of the project with surrounding environment is high as it is designed to emphasize the water and outdoor recreational opportunities in a similar fashion to existing uses and development in the vicinity. The campus-like design and layout will provide coordination throughout the entire project and to other paths and pedestrian areas along Ruston Way. The planned waterfront promenade combined with the proposed open view corridors will be evident from the residential hillsides displaying the project's internal relationships between buildings on the site and highlighting the interface between the proposed project and its surroundings.

"Overall blockage" (horizontal and vertical coverage) and "dominance" (vertical height) across the site varies from "low" to "high", again depending upon the specific location of the viewer. The terracing of buildings (lower structures at the water and higher structures away from the water) will complement the steep slopes of the hills south of the site when viewed from the water and will also be discernable when viewing the project at wider angles from the south or northwest. Overall blockage to existing residents is measured as "low" since project buildings and grades will be significantly lower than existing elevations of residences to the northwest and south of the site. Blockage will be relatively narrow when viewing the project from the southeast or northwest at the levels of the proposed project. Blockage at potential residential areas on the bench in the undeveloped area to the east of Stack Hill will be "moderate" to "high" since the potential buildings on the site will cover the water view and background land views at lowest elevations. At the higher elevations, the blockage is "low." Views at lower elevations will be "moderate to high" mitigated by wide corridors through the project site that will provide views of the shoreline and Commencement Bay. Additionally, the 1500 foot long Tract A corridor at the southeastern end of the site will provide uninterrupted views of the Bay and Browns Point in an east/southeasterly direction.

The visual impact will be least significant from the existing residences above the surrounding hillsides. These areas comprise the vast majority of existing developed views. The waters of Commencement Bay and Puget Sound will remain visible. The proposed buildings will not

interfere with views of background mountain ranges even from the lowest elevations of the Stack Hill development. Current views of Mount Rainier will not be blocked by any new structures when viewed from existing residences or the top of the OCF. Mount Rainier also remains unobstructed from the yacht club parking lot which is at approximately the same elevation as the northwestern end of the project.

Overall blockage and dominance will be greatest for travelers moving westward along Ruston Way past the project where buildings are located in near proximity between potential drivers and the water. View corridors will provide water views as travelers move along Ruston Way. Pedestrians and cyclists will have opportunity to use planned view corridors, commercial areas, park areas, public plazas, and the expansive waterfront promenade. Dominance will be slight to travelers coming from Ruston moving eastward toward Ruston Way where water and background land sights will remain dominant from this perspective. Overall blockage will be “low” when viewing the project from the southeast across Tract A where open views of the Commencement Bay and Browns Point will be unobstructed. When compared with the approved Master Development Plan (MDP) overall blockage and dominance of buildings meeting the MDP for the ASARCO site would be as significant as buildings for the proposed “Point Ruston” project. While view corridors may be different at various points between buildings in the MDP and buildings in the proposed project, such differences between the two would be insignificant. Extension of the promenade from its current end point just southeast of the site will provide a consistent, publicly accessible waterfront area along the extent of Ruston Way and the project waterfront which has not been available to the site before. This public waterfront access and new waterfront parks are improvements that serve the public good referenced in RCW 90.58.320 and therefore permits building heights to be over 35 feet in the shorelines of the state.

APPENDIX E

EPA COMMENT LETTER – HUMAN
HEALTH

APPENDIX C

**ASARCO LETTER ALLOWING
CONDITIONAL RESIDENTIAL USES
PER THE MDP**



December 13, 2006

Town of Ruston
5117 N. Winifred Street
Tacoma, WA 98407-3544
Attn: Mayor Transue

RE: Residential Development at Former Asarco Tacoma Smelter Site

Dear Mayor Transue:

Huitt-Zollars, as the Town of Ruston's representative, has requested a letter indicating Asarco's approval of residential development on the Stack Hill property as Ruston Zoning code allows for residential development on Stack Hill with Asarco's approval. As you know, Asarco has been in support of residential/mixed use development at the property since 2001. Prior to the sale of the property to Point Ruston, Asarco and the Development Strategy Team including representatives from the City of Tacoma, Metro Parks of Tacoma and the Town of Ruston, were proceeding with revisions to the Master Development Plan to allow residential use on the entire former Tacoma Smelter site including Stack Hill and the lower site.

The Town's Resolution No. 333, July 2001, provided for the addition of residential uses to the range of uses appropriate for post-remediation development of the site. The resolution was a result of Asarco, Metro Parks, Tacoma and Ruston proposing residential use as an appropriate additional element of post-remediation site development.

I would also note that the property was marketed and sold by Asarco as appropriate for residential/mixed use development and as such the bankruptcy court approved the sale in January 2006. This letter serves as Asarco's final support for residential use of the site.

Asarco has enjoyed working with the Town of Ruston on site development issues over the years and very much appreciated the Town's support. Point Ruston, as the new owner of the site, should be the point of contact for development issues from this point forward including appropriate use. Please call me with any questions at 602-977-6556.

Sincerely,

Thomas L. Aldrich
V.P. Environmental Affairs

Cc: Sue O'Neal
Karen Pickett

APPENDIX D

TRANSPORTATION APPENDICES

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Appendix 3.7-D: Trip Generation

Appendix 3.7-E: Trip Distribution and Assignment

Appendix 3.7-F: Intersection Level of Service Reports

Appendix 3.7-G: Arterial Level of Service Reports

No Action Appendices

Appendix 3.7-H: Trip Distribution and Assignment

Appendix 3.7-I: Intersection Level of Service Reports

Appendix 3.7-J: Arterial Level of Service Reports

Appendix 3.7-A: Traffic Volumes on Selected Road

Summary of MPR Tube Count Data

LOCATION	Weekday				Weekend			
	Average	Peak	App.	PK HR	Average	Peak	App.	PK HR
LOC# 01 RUSTON WAY N/O MC CARVER ST	6,868 5,714	958 579	NB SB	5:00 PM	7,483 5,928	697 498	NB SB	4:00 PM
Total	12,582	1,537			13,411	1,195		
LOC# 02 RUSTON WAY (SCHUSTER PKWY) S/O N 30TH ST	14,171 17,147	1,686 1,642	NB SB	5:00 PM	12,323 15,143	1,042 1,183	NB SB	5:00 PM
Total	31,318	3,328			27,466	2,225		
LOC# 03 RUSTON WAY E/O ORCHARD ST	2,053 2,369	184 279	EB WB	5:00 PM	2,423 3,171	247 279	EB WB	4:00 PM
Total	4,421	463			5,595	526		
LOC# 04 N 51ST ST E/O PEARL ST	2,578 3,509	195 401	EB WB	5:00 PM	3,247 4,055	337 362	EB WB	4:00 PM
Total	6,086	596			7,301	698		
LOC# 05 PEARL ST S/O N 51ST ST	2,621 2,714	254 281	NB SB	4:00 PM	4,297 5,063	434 667	NB SB	4:00 PM
Total	5,335	535			9,360	1,101		
LOC# 06 PEARL ST N/O N 37TH ST	5,275 5,472	449 474	NB SB	5:00 PM	6,065 6,434	553 596	NB SB	1:00 PM
Total	10,746	923			12,499	1,149		
LOC# 07 N 46TH ST E/O PEARL ST	2,236 2,456	172 253	EB WB	5:00 PM	2,010 2,311	157 177	EB WB	12:00 PM
Total	4,692	425			4,321	334		
LOC# 08 N 46TH ST W/O ORCHARD ST	2,358 2,578	230 287	EB WB	5:00 PM	2,041 2,251	160 178	EB WB	4:00 PM
Total	4,936	517			4,291	338		
LOC# 09 N 51ST ST E/O WINIFRED ST	1,564 1,735	145 213	- -	5:00 PM	1,110 1,230	97 110	- -	4:00 PM
Total	3,299	358			2,340	207		

TACOMA, WASHINGTON
 RUSTON WAY N/O MC CARVER ST
 LOC# 01

Peak **1,256** Average Weekday
 Hour **1,157** Peak Weekend

Begin	Saturday 16-Sep		Sunday 17-Sep		Monday 18-Sep		Tuesday 19-Sep		Wednesday 20-Sep		Thursday 21-Sep		Friday 22-Sep		Saturday 23-Sep		Sunday 24-Sep	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12 PM	101	123	119	125	47	48	40	50	39	39	54	27	45	56	129	109	137	126
1 AM	64	64	58	55	31	30	28	21	26	23	25	26	41	28	60	52	75	72
2 AM	44	50	46	37	18	24	27	21	15	20	19	31	17	14	58	37	48	52
3 AM	24	28	20	24	12	18	15	20	17	21	16	17	18	24	30	36	28	23
4 AM	23	26	29	34	21	73	20	73	25	86	28	91	26	70	21	35	22	18
5 AM	34	43	36	25	36	206	42	208	41	219	46	219	41	199	40	48	38	39
6 AM	86	86	71	67	100	398	126	404	123	399	124	403	116	387	90	108	60	65
7 AM	149	143	91	82	186	537	207	621	215	589	209	584	196	563	123	132	85	89
8 AM	160	238	138	161	261	374	242	376	297	392	226	365	239	361	230	231	153	164
9 AM	253	318	214	249	187	230	217	242	191	243	201	236	236	229	253	280	259	236
10 AM	340	312	309	300	234	245	233	220	205	206	202	204	252	244	373	321	416	301
11 AM	436	340	411	329	327	244	421	236	427	233	463	235	465	278	475	301	600	311
12 PM	545	379	469	347	406	280	393	321	357	306	371	324	464	372	618	374	709	381
1 PM	591	427	502	390	323	369	315	378	292	343	314	369	438	436	633	446	685	431
2 PM	601	444	508	395	388	324	364	365	351	320	351	337	576	379	750	452	633	452
3 PM	647	465	456	392	606	318	549	296	546	337	560	344	644	369	829	488	646	474
4 PM	647	524	517	340	746	272	867	284	790	285	810	330	882	346	776	577	694	551
5 PM	660	459	590	353	823	307	1010	265	914	250	899	297	1143	374	720	506	819	462
6 PM	635	401	465	348	534	239	633	259	625	280	698	253	863	364	745	431	720	490
7 PM	494	402	297	344	332	224	350	279	342	229	410	268	632	337	544	467	410	394
8 PM	340	331	233	232	184	202	216	267	222	214	270	240	308	381	372	338	221	277
9 PM	309	342	161	173	162	178	176	210	204	196	191	201	309	337	291	361	129	176
10 PM	263	259	145	114	124	89	98	143	116	101	151	135	219	279	222	268	128	106
11 PM	183	159	72	85	82	78	76	76	65	63	86	96	164	177	172	194	77	65
TOTALS	7629	6363	5957	5001	6170	5307	6665	5635	6445	5394	6724	5632	8334	6604	8554	6592	7792	5755
Combined		13992		10958		11477		12300		11839		12356		14938		15146		13547

Avg. Wkday M-F				Avg. Peak Wkend Sat-Su		
NB	SB	Total		NB	SB	Total
45	44	89	FALSE	122	121	242
30	26	56	FALSE	64	61	125
19	22	41	FALSE	49	44	93
16	20	36	FALSE	26	28	53
24	79	103	FALSE	24	28	52
41	210	251	FALSE	37	39	76
118	398	516	FALSE	77	82	158
203	579	781	FALSE	112	112	224
253	374	627	FALSE	170	199	369
206	236	442	FALSE	245	271	516
225	224	449	FALSE	360	309	668
421	245	666	FALSE	481	320	801
398	321	719	FALSE	585	370	956
336	379	715	FALSE	603	424	1026
406	345	751	FALSE	623	436	1059
581	333	914	FALSE	645	455	1099
819	303	1122	FALSE	659	498	1157
958	299	1256	5:00 PM	697	445	1142
671	279	950	FALSE	641	418	1059
413	267	681	FALSE	436	402	838
240	261	501	FALSE	292	295	586
208	224	433	FALSE	223	263	486
142	149	291	FALSE	190	187	376
95	98	193	FALSE	126	126	252
6868	5714			7483	5928	
	12582	ADT			13411	ADT

TACOMA, WASHINGTON

RUSTON WAY (SCHUSTER PKWY) S/O N 30TH ST

LOC# 02

Peak
Hour

2,973

Average Weekday

2,178

Peak Weekend

Begin	Saturday 16-Sep		Sunday 17-Sep		Monday 18-Sep		Tuesday 19-Sep		Wednesday 20-Sep		Thursday 21-Sep		Friday 22-Sep		Saturday 23-Sep		Sunday 24-Sep	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12 PM	242	250	241	255	124	107	106	101	110	86	140	74	146	113	291	248	302	282
1 AM	156	172	144	126	57	58	56	48	63	55	53	57	82	83	151	141	162	153
2 AM	113	115	115	110	35	52	54	54	45	53	51	61	50	58	130	127	117	115
3 AM	55	65	50	63	35	65	40	64	37	63	34	62	55	74	64	80	65	81
4 AM	60	88	63	83	54	191	64	189	68	202	67	206	79	194	47	94	43	60
5 AM	90	176	69	99	133	584	141	577	141	585	145	576	157	532	76	171	73	115
6 AM	154	307	120	216	310	1190	337	1252	373	1270	351	1266	380	1180	162	330	107	186
7 AM	323	523	167	262	572	1546	679	1717	675	1691	615	1640	697	1615	281	456	169	289
8 AM	438	713	289	463	655	1192	664	1196	722	1291	629	1246	719	1194	429	740	274	465
9 AM	643	983	450	689	482	798	500	826	487	884	501	881	573	882	490	829	433	748
10 AM	725	1040	569	903	511	718	485	667	452	662	465	703	541	798	606	902	489	864
11 AM	760	1093	692	941	576	784	605	807	670	791	670	794	727	898	723	1008	663	1005
12 PM	783	1212	752	1002	637	879	671	870	665	893	708	885	838	1046	864	1089	802	957
1 PM	842	1119	793	1036	639	877	644	860	673	871	656	881	784	1005	816	1104	869	1028
2 PM	938	1163	750	966	845	916	846	886	811	864	833	898	1054	1087	1001	1200	876	1032
3 PM	1002	1195	781	960	1160	1067	1123	1069	1177	1084	1190	1068	1313	1256	1148	1256	864	1057
4 PM	1031	1253	861	986	1446	1168	1597	1202	1558	1200	1472	1146	1611	1346	1034	1306	996	1188
5 PM	1051	1169	956	963	1576	1171	1736	1296	1681	1252	1692	1315	1744	1402	1063	1302	1096	1113
6 PM	1068	1050	795	793	1085	817	1221	963	1274	959	1286	1023	1405	1264	1005	1074	1093	1039
7 PM	853	851	660	745	673	629	693	654	778	612	856	740	922	880	785	898	771	849
8 PM	684	736	482	521	449	437	572	542	530	447	599	581	631	743	669	710	540	595
9 PM	635	665	357	358	390	415	429	433	466	446	503	463	592	671	628	670	340	375
10 PM	562	576	315	278	319	241	307	274	310	264	393	330	510	521	535	572	295	266
11 PM	368	351	203	169	175	156	216	160	176	144	248	196	420	368	422	381	182	170
TOTALS	13576	16865	10674	12987	12938	16058	13786	16707	13942	16669	14157	17092	16030	19210	13420	16688	11621	14032
Combined		30441		23661		28996		30493		30611		31249		35240		30108		25653

Avg. Wkday M-F				Avg. Peak Wkend Sat-Su		
NB	SB	Total		NB	SB	Total
125	96	221	FALSE	269	259	528
62	60	122	FALSE	153	148	301
47	56	103	FALSE	119	117	236
40	66	106	FALSE	59	72	131
66	196	263	FALSE	53	81	135
143	571	714	FALSE	77	140	217
350	1232	1582	FALSE	136	260	396
648	1642	2289	FALSE	235	383	618
678	1224	1902	FALSE	358	595	953
509	854	1363	FALSE	504	812	1316
491	710	1200	FALSE	597	927	1525
650	815	1464	FALSE	710	1012	1721
704	915	1618	FALSE	800	1065	1865
679	899	1578	FALSE	830	1072	1902
878	930	1808	FALSE	891	1090	1982
1193	1109	2301	FALSE	949	1117	2066
1537	1212	2749	FALSE	981	1183	2164
1686	1287	2973	5:00 PM	1042	1137	2178
1254	1005	2259	FALSE	990	989	1979
784	703	1487	FALSE	767	836	1603
556	550	1106	FALSE	594	641	1234
476	486	962	FALSE	490	517	1007
368	326	694	FALSE	427	423	850
247	205	452	FALSE	294	268	562
14171	17147			12323	15143	
	31318	ADT			27466	ADT

TACOMA, WASHINGTON
RUSTON WAY E/O ORCHARD ST
LOC# 03

Peak **420** Average Weekday
Hour **522** Peak Weekend

Begin	Saturday 16-Sep		Sunday 17-Sep		Monday 18-Sep		Tuesday 19-Sep		Wednesday 20-Sep		Thursday 21-Sep		Friday 22-Sep		Saturday 23-Sep		Sunday 24-Sep	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12 PM	16	45	31	47	6	22	13	19	10	13	5	14	7	14	31	31	25	58
1 AM	15	19	21	33	4	18	8	9	8	9	8	5	7	14	8	22	19	35
2 AM	18	27	3	18	8	11	8	10	5	8	11	7	2	4	13	22	17	26
3 AM	9	9	8	7	7	5	10	5	9	4	9	4	12	8	8	8	13	15
4 AM	10	10	5	14	16	11	23	8	26	13	20	11	22	9	7	6	5	10
5 AM	16	24	12	20	88	38	85	19	78	23	90	18	73	22	18	21	13	22
6 AM	32	56	23	47	142	63	138	48	146	64	150	61	118	82	43	51	31	35
7 AM	51	81	24	32	177	87	193	77	193	84	187	62	170	60	51	69	27	27
8 AM	103	104	56	63	132	94	122	69	143	108	140	77	137	73	99	132	73	71
9 AM	138	141	107	113	89	68	91	97	91	79	73	68	103	104	117	125	99	126
10 AM	121	195	152	141	99	100	101	105	100	80	114	83	98	91	137	178	129	163
11 AM	185	192	158	174	97	101	103	113	104	102	99	136	114	128	161	196	156	218
12 PM	196	230	138	235	116	122	126	111	92	114	112	126	137	122	172	232	185	271
1 PM	188	232	166	214	106	131	101	126	97	124	129	120	128	195	228	248	223	281
2 PM	163	273	163	231	107	147	136	141	89	126	120	157	148	191	188	310	189	285
3 PM	216	254	170	223	149	219	109	201	131	220	122	221	145	229	265	324	246	314
4 PM	234	300	152	212	134	235	131	260	137	233	165	230	180	298	320	276	283	311
5 PM	219	247	176	230	149	254	134	264	104	274	155	294	164	307	256	288	242	332
6 PM	174	235	145	207	76	179	118	204	102	203	107	202	135	265	192	238	198	301
7 PM	129	164	110	141	69	124	80	124	70	134	72	155	113	198	161	182	139	224
8 PM	109	154	59	99	54	85	41	95	70	82	73	102	128	115	94	141	83	122
9 PM	77	129	29	60	41	52	77	105	42	72	57	67	122	131	86	123	52	69
10 PM	51	91	31	54	30	46	42	44	29	34	29	56	60	79	57	87	23	45
11 PM	31	63	15	27	22	32	22	20	21	22	26	33	40	53	40	61	16	36
TOTALS	2501	3275	1954	2642	1918	2244	2012	2274	1897	2225	2073	2309	2363	2792	2752	3371	2486	3397
Combined		5776		4596		4162		4286		4122		4382		5155		6123		5883

Avg. Wkday M-F				Avg. Peak Wkend Sat-Su		
EB	WB	Total		EB	WB	Total
8	16	25	FALSE	26	45	71
7	11	18	FALSE	16	27	43
7	8	15	FALSE	13	23	36
9	5	15	FALSE	10	10	19
21	10	32	FALSE	7	10	17
83	24	107	FALSE	15	22	37
139	64	202	FALSE	32	47	80
184	74	258	FALSE	38	52	91
135	84	219	FALSE	83	93	175
89	83	173	FALSE	115	126	242
102	92	194	FALSE	135	169	304
103	116	219	FALSE	165	195	360
117	119	236	FALSE	173	242	415
112	139	251	FALSE	201	244	445
120	152	272	FALSE	176	275	451
131	218	349	FALSE	224	279	503
149	251	401	FALSE	247	275	522
141	279	420	5:00 PM	223	274	498
108	211	318	FALSE	177	245	423
81	147	228	FALSE	135	178	313
73	96	169	FALSE	86	129	215
68	85	153	FALSE	61	95	156
38	52	90	FALSE	41	69	110
26	32	58	FALSE	26	47	72
2053	2369			2423	3171	
	4421	ADT			5595	ADT

TACOMA, WASHINGTON
N 51ST ST E/O PEARL ST
LOC# 04

Peak Hour **590** Average Weekday
673 Peak Weekend

Begin	Saturday 16-Sep		Sunday 17-Sep		Monday 18-Sep		Tuesday 19-Sep		Wednesday 20-Sep		Thursday 21-Sep		Friday 22-Sep		Saturday 23-Sep		Sunday 24-Sep	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12 PM	26	39	41	68	6	23	22	33	18	26	9	23	12	13	45	59	31	83
1 AM	22	32	32	28	4	21	8	15	8	13	11	16	10	24	13	37	22	49
2 AM	17	30	5	28	9	15	7	12	6	5	14	13	4	5	18	31	19	31
3 AM	10	13	12	6	7	3	8	7	9	11	9	8	13	18	12	13	11	23
4 AM	13	12	3	17	15	12	21	17	24	14	14	14	19	12	8	8	5	12
5 AM	16	45	16	20	98	32	87	29	82	31	97	31	74	34	20	28	14	27
6 AM	39	80	32	78	152	62	173	78	174	78	166	87	162	87	50	79	34	55
7 AM	48	131	30	58	204	119	182	117	204	127	190	115	182	114	54	97	31	39
8 AM	113	161	72	75	131	135	132	104	148	146	153	124	146	124	124	170	76	111
9 AM	180	188	131	134	90	97	108	144	116	144	97	104	135	154	142	201	116	183
10 AM	181	298	163	179	120	137	124	159	121	129	146	125	129	159	186	245	184	218
11 AM	245	249	208	220	142	185	147	166	129	162	143	208	150	191	203	286	203	272
12 PM	267	295	194	317	161	179	170	159	117	169	129	203	186	194	270	353	259	356
1 PM	254	320	247	257	137	177	138	181	145	200	189	193	176	244	327	351	324	358
2 PM	247	381	225	293	161	202	185	202	103	201	145	217	202	282	272	419	263	353
3 PM	308	354	241	270	184	328	147	302	176	351	156	326	212	327	379	396	334	334
4 PM	313	341	209	263	158	341	181	345	163	333	220	314	253	414	425	373	399	370
5 PM	278	309	222	252	185	393	204	378	132	415	190	386	232	435	362	298	359	324
6 PM	236	257	196	258	106	259	161	327	136	307	141	279	219	444	248	319	239	341
7 PM	159	230	141	167	104	206	107	187	104	205	110	218	144	278	224	260	192	245
8 PM	137	187	85	137	72	124	73	154	84	124	91	141	170	191	111	206	110	121
9 PM	98	140	46	82	61	72	75	168	51	101	55	115	156	154	105	148	73	76
10 PM	65	112	39	66	37	60	54	71	31	67	38	83	78	145	64	97	36	59
11 PM	39	77	19	34	22	57	32	41	32	37	36	50	50	77	51	79	20	37
TOTALS Combined	3311	4281	2609	3307	2366	3239	2546	3396	2313	3396	2549	3393	3114	4120	3713	4553	3354	4077
		7592		5916		5605		5942		5709		5942		7234		8266		7431

Avg. Wkday M-F				Avg. Peak Wkend Sat-Su		
EB	WB	Total		EB	WB	Total
13	24	37	FALSE	36	62	98
8	18	26	FALSE	22	37	59
8	10	18	FALSE	15	30	45
9	9	19	FALSE	11	14	25
19	14	32	FALSE	7	12	20
88	31	119	FALSE	17	30	47
165	78	244	FALSE	39	73	112
192	118	311	FALSE	41	81	122
142	127	269	FALSE	96	129	226
109	129	238	FALSE	142	177	319
128	142	270	FALSE	179	235	414
142	182	325	FALSE	215	257	472
153	181	333	FALSE	248	330	578
157	199	356	FALSE	288	322	610
159	221	380	FALSE	252	362	613
175	327	502	FALSE	316	339	654
195	349	544	FALSE	337	337	673
189	401	590	5:00 PM	305	296	601
153	323	476	FALSE	230	294	524
114	219	333	FALSE	179	226	405
98	147	245	FALSE	111	163	274
80	122	202	FALSE	81	112	192
48	85	133	FALSE	51	84	135
34	52	87	FALSE	32	57	89
2578	3509			3247	4055	
	6086	ADT			7301	ADT

TACOMA, WASHINGTON
PEARL ST S/O N 51ST ST
LOC# 05

Peak **530** Average Weekday
Hour **1,032** Peak Weekend

Begin	Saturday 16-Sep		Sunday 17-Sep		Monday 18-Sep		Tuesday 19-Sep		Wednesday 20-Sep		Thursday 21-Sep		Friday 22-Sep		Saturday 23-Sep		Sunday 24-Sep	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12 PM	23	22	20	27	9	6	9	15	10	6	11	15	8	6	25	26	29	30
1 AM	29	18	17	29	7	5	10	12	8	1	7	12	2	1	21	28	29	31
2 AM	13	21	11	17	5	7	5	1	1	5	0	1	5	5	11	13	8	18
3 AM	7	9	8	7	1	3	1	5	2	3	1	5	3	3	5	9	10	7
4 AM	12	2	11	6	8	5	8	12	9	10	11	12	13	10	9	6	2	6
5 AM	58	16	43	15	46	69	41	78	40	35	37	77	37	37	59	20	36	16
6 AM	104	44	76	44	80	120	72	123	83	82	69	120	91	87	114	74	76	47
7 AM	233	57	70	52	114	130	98	121	110	102	81	118	108	109	153	88	91	57
8 AM	250	86	120	114	99	154	110	114	134	105	111	110	115	112	286	264	110	124
9 AM	216	82	206	173	144	170	152	110	133	133	112	106	145	142	271	268	211	188
10 AM	295	105	238	248	138	142	144	72	123	188	123	70	198	200	298	348	301	269
11 AM	329	166	270	283	176	141	168	117	136	208	220	113	233	222	300	296	347	307
12 PM	354	250	350	356	162	161	181	87	143	156	152	84	222	166	372	403	495	386
1 PM	344	298	436	416	162	135	170	123	167	182	178	119	189	194	431	452	495	453
2 PM	388	386	411	359	210	190	185	149	160	136	172	145	234	256	469	472	467	389
3 PM	358	497	364	507	211	183	219	201	204	210	202	195	282	303	485	584	413	551
4 PM	334	611	318	642	214	186	263	339	199	191	260	329	311	360	447	718	361	697
5 PM	289	598	298	545	225	199	246	231	236	156	212	224	351	356	340	703	339	592
6 PM	200	385	224	375	151	167	190	164	200	225	171	159	306	296	296	453	255	408
7 PM	155	312	138	311	143	150	109	117	128	186	123	113	180	263	169	367	157	339
8 PM	105	159	69	124	69	138	87	74	67	153	70	72	85	231	100	187	79	135
9 PM	83	125	42	63	58	83	62	46	50	68	47	46	91	207	77	147	47	67
10 PM	36	46	16	19	19	61	23	25	22	44	24	25	38	75	19	55	18	20
11 PM	26	33	13	17	24	46	17	16	15	30	14	16	25	25	33	37	13	18
TOTALS	4241	4328	3769	4749	2475	2651	2570	2352	2380	2615	2408	2286	3272	3666	4790	6018	4389	5155
Combined		8569		8518		5126		4922		4995		4694		6938		10808		9544

Avg. Wkday M-F				Avg. Peak Wkend Sat-Su		
NB	SB	Total		NB	SB	Total
9	10	19	FALSE	24	26	51
7	6	13	FALSE	24	27	51
3	4	7	FALSE	11	17	28
2	4	5	FALSE	8	8	16
10	10	20	FALSE	9	5	14
40	59	99	FALSE	49	17	66
79	106	185	FALSE	93	52	145
102	116	218	FALSE	137	64	200
114	119	233	FALSE	192	147	339
137	132	269	FALSE	226	178	404
145	134	280	FALSE	283	243	526
187	160	347	FALSE	312	263	575
172	131	303	FALSE	393	349	742
173	151	324	FALSE	427	405	831
192	175	367	FALSE	434	402	835
224	218	442	FALSE	405	535	940
249	281	530	4:00 PM	365	667	1032
254	233	487	FALSE	317	610	926
204	202	406	FALSE	244	405	649
137	166	302	FALSE	155	332	487
76	134	209	FALSE	88	151	240
62	90	152	FALSE	62	101	163
25	46	71	FALSE	22	35	57
19	27	46	FALSE	21	26	48
2621	2714			4297	5063	
	5335	ADT			9360	ADT

TACOMA, WASHINGTON
PEARL ST N/O N 37TH ST
LOC# 06

Peak **904** Average Weekday
Hour **1,038** Peak Weekend

Begin	Saturday 16-Sep		Sunday 17-Sep		Monday 18-Sep		Tuesday 19-Sep		Wednesday 20-Sep		Thursday 21-Sep		Friday 22-Sep		Saturday 23-Sep		Sunday 24-Sep	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12 PM	91	91	70	93	34	40	45	38	50	33	33	34	27	33	96	65	72	85
1 AM	58	52	51	65	15	23	41	27	25	23	21	26	26	29	50	76	68	80
2 AM	40	56	36	30	13	16	19	15	11	15	19	18	22	15	44	48	41	55
3 AM	19	24	28	19	11	9	11	12	16	13	8	12	12	22	25	41	21	28
4 AM	37	20	16	26	23	24	23	31	24	25	25	24	27	24	16	20	12	22
5 AM	51	35	46	19	69	96	58	89	60	92	65	84	68	93	61	31	42	21
6 AM	89	65	58	53	130	169	128	161	141	167	131	158	148	156	106	67	65	48
7 AM	207	145	70	79	207	273	202	269	209	292	204	289	213	278	138	133	76	73
8 AM	283	312	181	158	253	282	239	271	245	268	241	254	280	269	285	295	149	195
9 AM	303	345	249	294	231	292	272	311	228	275	228	283	265	330	353	349	287	304
10 AM	428	454	339	318	255	308	277	307	229	279	247	282	287	289	422	424	389	339
11 AM	491	521	353	347	298	316	319	319	285	310	361	305	369	365	483	479	448	387
12 PM	490	545	455	447	328	344	312	403	317	349	316	370	374	383	526	537	619	528
1 PM	476	469	484	414	344	314	350	344	307	335	353	363	335	369	617	521	636	534
2 PM	519	433	408	388	422	342	384	331	387	344	382	378	411	429	558	558	504	489
3 PM	461	503	382	458	371	470	335	473	386	454	340	455	466	518	577	624	481	565
4 PM	415	566	318	481	383	426	445	418	379	415	424	386	442	473	521	676	399	660
5 PM	438	550	371	490	425	400	482	478	405	428	419	478	516	489	509	654	461	598
6 PM	361	417	353	346	350	332	399	376	357	341	377	339	472	437	400	507	389	510
7 PM	313	343	288	331	316	281	324	290	332	275	338	285	410	405	390	441	328	423
8 PM	253	266	224	208	218	193	273	212	226	202	259	175	282	286	254	288	232	246
9 PM	226	210	139	131	168	108	198	153	182	140	191	130	228	256	209	193	169	113
10 PM	123	147	90	78	91	66	103	109	115	93	97	105	149	139	144	149	84	85
11 PM	133	116	31	40	67	60	45	44	62	50	62	65	119	91	112	112	47	63
TOTALS	6305	6685	5040	5313	5022	5184	5284	5481	4978	5218	5141	5298	5948	6178	6896	7288	6019	6451
Combined	12990		10353		10206		10765		10196		10439		12126		14184		12470	

Avg. Wkday M-F				Avg. Peak Wkend Sat-Su		
NB	SB	Total		NB	SB	Total
38	36	73	FALSE	82	84	166
26	26	51	FALSE	57	68	125
17	16	33	FALSE	40	47	88
12	14	25	FALSE	23	28	51
24	26	50	FALSE	20	22	42
64	91	155	FALSE	50	27	77
136	162	298	FALSE	80	58	138
207	280	487	FALSE	123	108	230
252	269	520	FALSE	225	240	465
245	298	543	FALSE	298	323	621
259	293	552	FALSE	395	384	778
326	323	649	FALSE	444	434	877
329	370	699	FALSE	523	514	1037
338	345	683	FALSE	553	485	1038
397	365	762	FALSE	497	467	964
380	474	854	FALSE	475	538	1013
415	424	838	FALSE	413	596	1009
449	455	904	5:00 PM	445	573	1018
391	365	756	FALSE	376	445	821
344	307	651	FALSE	330	385	714
252	214	465	FALSE	241	252	493
193	157	351	FALSE	186	162	348
111	102	213	FALSE	110	115	225
71	62	133	FALSE	81	83	164
5275	5472	ADT		6065	6434	ADT
10746				12499		

TACOMA, WASHINGTON
N 46TH ST E/O PEARL ST
LOC# 07

Peak **417** Average Weekday
Hour **328** Peak Weekend

Begin	Saturday 16-Sep		Sunday 17-Sep		Monday 18-Sep		Tuesday 19-Sep		Wednesday 20-Sep		Thursday 21-Sep		Friday 22-Sep		Saturday 23-Sep		Sunday 24-Sep	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12 PM	30	43	28	56	11	18	18	20	12	14	23	19	4	14	26	48	28	50
1 AM	29	40	20	29	10	10	11	15	15	12	6	15	6	15	19	34	43	48
2 AM	14	22	9	17	3	10	6	4	1	9	2	4	9	7	18	24	13	29
3 AM	7	7	6	7	6	7	9	3	7	12	4	6	9	5	9	14	7	16
4 AM	7	6	4	5	24	13	24	11	21	16	18	13	15	8	5	7	8	3
5 AM	15	19	7	16	51	26	67	33	45	29	51	24	45	26	10	16	14	14
6 AM	25	26	26	18	108	57	103	58	106	60	125	61	103	61	32	26	18	18
7 AM	57	53	55	41	164	102	185	117	170	109	169	101	170	103	57	66	40	42
8 AM	97	98	72	61	162	118	151	112	145	134	152	112	146	121	98	116	70	80
9 AM	132	118	123	130	130	106	101	104	121	104	97	106	131	127	136	127	120	117
10 AM	149	128	142	128	111	114	113	118	113	124	106	111	116	123	155	165	130	157
11 AM	134	152	127	122	124	146	161	159	114	140	131	117	116	144	173	179	142	172
12 PM	169	176	130	166	126	121	132	138	98	113	129	132	122	127	168	170	162	172
1 PM	132	186	122	144	113	133	122	148	111	125	114	162	139	136	172	191	155	169
2 PM	147	183	120	140	135	177	139	185	154	151	141	162	184	185	153	189	129	192
3 PM	152	175	110	123	157	204	147	214	166	208	175	188	179	245	177	212	132	168
4 PM	148	148	142	165	139	221	175	221	131	219	160	227	179	277	146	208	157	176
5 PM	125	163	141	168	178	256	161	248	129	241	179	259	173	261	161	168	166	207
6 PM	134	149	117	144	139	156	150	207	145	206	152	191	151	236	147	176	137	208
7 PM	121	121	85	114	80	136	104	120	108	130	138	130	133	138	142	131	111	148
8 PM	73	95	84	93	59	74	75	95	82	84	75	104	82	99	69	72	79	90
9 PM	58	70	58	51	45	73	51	64	56	92	49	65	77	102	91	87	27	44
10 PM	48	77	37	36	36	37	37	38	31	36	37	46	73	66	62	75	34	47
11 PM	37	50	24	25	23	24	30	26	33	32	28	38	39	62	41	56	21	17
TOTALS	2040	2305	1789	1999	2134	2339	2272	2458	2114	2400	2261	2393	2401	2688	2267	2557	1943	2384
Combined		4345		3788		4473		4730		4514		4654		5089		4824		4327

Avg. Wkday M-F				Avg. Peak Wkend Sat-Su		
EB	WB	Total		EB	WB	Total
14	17	31	FALSE	28	49	77
10	13	23	FALSE	28	38	66
4	7	11	FALSE	14	23	37
7	7	14	FALSE	7	11	18
20	12	33	FALSE	6	5	11
52	28	79	FALSE	12	16	28
109	59	168	FALSE	25	22	47
172	106	278	FALSE	52	51	103
151	119	271	FALSE	84	89	173
116	109	225	FALSE	128	123	251
112	118	230	FALSE	144	145	289
129	141	270	FALSE	144	156	300
121	126	248	FALSE	157	171	328
120	141	261	FALSE	145	173	318
151	172	323	FALSE	137	176	313
165	212	377	FALSE	143	170	312
157	233	390	FALSE	148	174	323
164	253	417	5:00 PM	148	177	325
147	199	347	FALSE	134	169	303
113	131	243	FALSE	115	129	243
75	91	166	FALSE	76	88	164
56	79	135	FALSE	59	63	122
43	45	87	FALSE	45	59	104
31	36	67	FALSE	31	37	68
2236	2456			2010	2311	
	4692	ADT			4321	ADT

TACOMA, WASHINGTON
N 46TH ST W/O ORCHARD ST
LOC# 08

Peak **448** Average Weekday
Hour **329** Peak Weekend

Begin	Saturday 16-Sep		Sunday 17-Sep		Monday 18-Sep		Tuesday 19-Sep		Wednesday 20-Sep		Thursday 21-Sep		Friday 22-Sep		Saturday 23-Sep		Sunday 24-Sep	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12 PM	43	56	32	63	10	19	14	24	13	20	19	24	13	20	42	66	36	69
1 AM	29	28	29	24	11	11	12	13	13	12	7	13	13	12	17	30	30	34
2 AM	9	25	12	17	2	9	6	11	8	7	2	11	8	7	22	26	17	26
3 AM	6	11	2	9	5	10	10	5	6	12	5	5	6	12	9	13	8	21
4 AM	10	5	4	5	29	12	28	13	26	16	23	13	26	16	5	7	6	4
5 AM	16	17	6	16	59	18	72	20	53	19	56	20	57	19	13	16	12	14
6 AM	34	20	25	16	134	39	135	39	135	38	148	43	141	40	28	23	18	15
7 AM	63	57	49	39	213	79	247	112	225	99	231	130	236	104	56	50	39	39
8 AM	100	74	73	66	184	106	160	94	174	124	171	169	183	131	115	86	69	69
9 AM	139	102	135	102	140	115	127	117	137	101	118	123	144	106	152	99	121	93
10 AM	167	123	150	110	108	112	133	116	112	96	101	106	117	100	167	138	143	149
11 AM	155	166	139	112	118	140	150	144	130	125	125	130	137	130	177	151	151	143
12 PM	154	179	123	157	117	127	125	118	109	111	109	121	114	116	170	154	155	160
1 PM	142	188	128	140	134	119	116	126	119	129	138	145	136	147	185	166	149	169
2 PM	145	186	114	150	150	178	153	181	187	180	159	176	178	171	157	192	120	183
3 PM	166	175	113	133	141	235	142	238	175	382	169	195	167	266	163	210	149	159
4 PM	156	161	144	143	142	261	147	248	127	376	159	155	154	273	160	197	180	176
5 PM	130	156	131	172	148	292	163	291	158	254	171	306	167	291	170	169	157	203
6 PM	145	161	111	124	139	176	155	232	142	181	162	243	145	232	145	156	133	192
7 PM	113	139	88	122	79	138	109	130	90	142	114	137	130	154	125	128	104	151
8 PM	63	93	71	88	58	80	66	107	68	83	70	112	79	123	57	80	76	92
9 PM	62	90	49	56	40	71	47	81	50	74	50	85	66	98	75	93	32	48
10 PM	44	92	37	42	35	43	36	40	30	43	37	42	59	86	54	99	25	51
11 PM	27	70	20	30	22	30	21	36	31	30	21	36	40	85	44	61	22	22
TOTALS	2118	2374	1785	1936	2218	2420	2374	2536	2318	2654	2365	2540	2516	2739	2308	2410	1952	2282
Combined		4492		3721		4638		4910		4972		4905		5255		4718		4234

Avg. Wkday M-F				Avg. Peak Wkend Sat-Su		
EB	WB	Total		EB	WB	Total
14	21	35	FALSE	38	64	102
11	12	23	FALSE	26	29	55
5	9	14	FALSE	15	24	39
6	9	15	FALSE	6	14	20
26	14	40	FALSE	6	5	12
59	19	79	FALSE	12	16	28
139	40	178	FALSE	26	19	45
230	105	335	FALSE	52	46	98
174	125	299	FALSE	89	74	163
133	112	246	FALSE	137	99	236
114	106	220	FALSE	157	130	287
132	134	266	FALSE	156	143	299
115	119	233	FALSE	151	163	313
129	133	262	FALSE	151	166	317
165	177	343	FALSE	134	178	312
159	263	422	FALSE	148	169	317
146	263	408	FALSE	160	169	329
161	287	448	5:00 PM	147	175	322
149	213	361	FALSE	134	158	292
104	140	245	FALSE	108	135	243
68	101	169	FALSE	67	88	155
51	82	132	FALSE	55	72	126
39	51	90	FALSE	40	71	111
27	43	70	FALSE	28	46	74
2358	2578			2041	2251	
	4936	ADT			4291	ADT

TACOMA, WASHINGTON
N 51ST ST E/O WINIFRED ST
LOC# 09

Peak **321** Average Weekday
Hour **198** Peak Weekend

Begin	Saturday 16-Sep		Sunday 17-Sep		Monday 18-Sep		Tuesday 19-Sep		Wednesday 20-Sep		Thursday 21-Sep		Friday 22-Sep		Saturday 23-Sep		Sunday 24-Sep	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	0	0	0	0	0	0
12 PM	19	34	32	41	7	20	16	22	13	13	8	17	0	0	0	0	0	0
1 AM	15	21	21	23	4	16	8	7	7	8	9	5	0	0	0	0	0	0
2 AM	16	18	4	15	7	8	8	9	5	6	10	7	0	0	0	0	0	0
3 AM	10	9	8	4	7	2	9	6	9	4	9	4	0	0	0	0	0	0
4 AM	11	8	5	13	15	7	20	7	22	9	17	11	0	0	0	0	0	0
5 AM	14	23	12	16	83	18	78	17	77	18	84	16	0	0	0	0	0	0
6 AM	37	49	26	44	144	44	148	40	148	39	154	47	0	0	0	0	0	0
7 AM	47	72	26	32	175	84	179	76	181	78	188	63	0	0	0	0	0	0
8 AM	96	81	57	50	131	82	117	66	139	90	138	80	0	0	0	0	0	0
9 AM	134	106	107	86	78	67	84	96	95	83	77	63	0	0	0	0	0	0
10 AM	124	177	141	110	93	86	97	98	97	70	103	77	0	0	0	0	0	0
11 AM	187	167	158	143	99	106	114	106	108	102	107	132	0	0	0	0	0	0
12 PM	191	208	142	209	120	117	121	111	93	101	102	118	0	0	0	0	0	0
1 PM	188	208	174	171	98	116	101	124	112	118	134	117	0	0	0	0	0	0
2 PM	164	243	167	198	109	137	142	133	80	121	110	152	0	0	0	0	0	0
3 PM	209	232	168	174	141	213	103	206	130	209	128	210	0	0	0	0	0	0
4 PM	228	237	149	178	131	220	131	247	140	230	154	222	0	0	0	0	0	0
5 PM	211	207	175	177	148	258	142	261	101	258	146	289	0	0	0	0	0	0
6 PM	173	183	144	164	77	169	116	203	99	209	107	204	0	0	0	0	0	0
7 PM	124	132	111	110	71	128	85	135	70	131	74	156	0	0	0	0	0	0
8 PM	113	121	60	85	56	87	44	96	77	85	70	85	0	0	0	0	0	0
9 PM	78	104	30	54	43	48	69	90	42	64	49	76	0	0	0	0	0	0
10 PM	55	71	34	40	32	43	41	43	29	42	35	49	0	0	0	0	0	0
11 PM	33	52	12	19	21	36	23	20	24	22	24	32	0	0	0	0	0	0
TOTALS	2477	2763	1963	2156	1890	2112	1996	2219	1898	2110	2037	2232	0	0	0	0	0	0
Combined		5240		4119		4002		4215		4008		4269	0	0	0	0	0	0

Avg. Wkday M-F				Avg. Peak Wkend Sat-Su		
0	0	Total		0	0	Total
9	14	23	FALSE	13	19	32
6	7	13	FALSE	9	11	20
6	6	12	FALSE	5	8	13
7	3	10	FALSE	5	3	8
15	7	22	FALSE	4	5	9
64	14	78	FALSE	7	10	16
119	34	153	FALSE	16	23	39
145	60	205	FALSE	18	26	44
105	64	169	FALSE	38	33	71
67	62	129	FALSE	60	48	108
78	66	144	FALSE	66	72	138
86	89	175	FALSE	86	78	164
87	89	177	FALSE	83	104	188
89	95	184	FALSE	91	95	185
88	109	197	FALSE	83	110	193
100	168	268	FALSE	94	102	196
111	184	295	FALSE	94	104	198
107	213	321	5:00 PM	97	96	193
80	157	237	FALSE	79	87	166
60	110	170	FALSE	59	61	119
49	71	120	FALSE	43	52	95
41	56	96	FALSE	27	40	67
27	35	63	FALSE	22	28	50
18	22	40	FALSE	11	18	29
1564	1735			1110	1230	
3299		ADT		2340		ADT

TACOMA, WASHINGTON
N 51ST ST E/O PEARL ST
LOC# 04

Peak
Hour

526

675

Average Weekday
Peak Weekend

Begin	Monday 2-Jul		Tuesday 3-Jul		Wednesday 4-Jul		Thursday 5-Jul		Friday 6-Jul		Saturday 7-Jul		Sunday 8-Jul		Monday 9-Jul		Tuesday 10-Jul	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12 PM	14	23	9	29	24	42	35	35	17	23	31	45	19	54	9	14	31	83
1 AM	12	10	7	17	19	27	11	13	15	18	24	39	18	31	10	18	22	49
2 AM	12	8	10	18	10	14	5	10	6	8	14	13	12	20	13	9	19	31
3 AM	11	5	11	8	6	9	8	7	9	6	10	16	11	12	10	9	11	23
4 AM	26	17	13	22	15	23	12	17	21	19	13	26	13	19	28	17	5	12
5 AM	65	30	70	26	12	25	51	30	66	28	22	19	19	12	78	20	14	27
6 AM	138	42	133	58	35	25	108	42	126	62	29	44	28	27	137	48	34	55
7 AM	167	79	146	87	34	26	132	76	142	75	49	71	33	52	154	87	31	39
8 AM	115	113	139	115	43	23	148	94	124	106	73	75	50	50	132	94	76	111
9 AM	129	113	124	138	77	47	115	126	122	127	100	137	108	135	98	111	116	183
10 AM	131	122	125	135	98	29	132	140	140	153	145	200	121	178	105	132	184	218
11 AM	129	191	154	210	87	37	150	194	147	236	145	204	135	236	163	185	203	272
12 PM	183	214	176	190	146	55	182	234	183	234	217	309	186	299	186	212	259	356
1 PM	196	242	170	260	171	74	214	266	220	284	264	317	202	286	173	215	324	358
2 PM	192	248	223	274	178	55	214	252	248	292	232	338	242	314	218	282	263	353
3 PM	214	277	244	310	154	68	226	296	259	335	329	357	287	376	201	264	334	334
4 PM	238	307	218	273	170	60	249	303	241	337	321	336	304	273	246	269	399	370
5 PM	197	337	211	338	161	48	249	317	220	328	299	311	303	279	211	326	359	324
6 PM	197	287	171	268	149	75	213	291	219	243	258	266	310	259	167	240	239	341
7 PM	178	210	187	268	192	72	200	234	143	294	209	232	247	240	164	200	192	245
8 PM	173	176	169	217	203	77	175	184	176	233	198	234	203	218	142	162	110	121
9 PM	140	127	142	176	38	203	123	141	180	156	157	163	135	130	119	138	73	76
10 PM	56	68	76	87	146	141	74	58	70	82	87	91	59	58	50	61	36	59
11 PM	24	45	27	82	51	109	22	51	31	53	64	66	19	33	23	45	20	37
TOTALS	2937	3291	2955	3606	2219	1364	3048	3411	3125	3732	3290	3909	3064	3591	2837	3158	3354	4077
Combined	6228		6561		3583		6459		6857		7199		6655		5995		7431	

Avg. Wkday M-F				Avg. Peak Wkend Sat-Su		
EB	WB	Total		EB	WB	Total
20	36	55	FALSE	25	50	75
14	22	35	FALSE	21	35	56
11	14	25	FALSE	13	17	30
9	10	19	FALSE	11	14	25
17	18	35	FALSE	13	23	36
51	27	77	FALSE	21	16	36
102	47	149	FALSE	29	36	64
115	67	182	FALSE	41	62	103
111	94	205	FALSE	62	63	124
112	121	232	FALSE	104	136	240
131	133	263	FALSE	133	189	322
148	189	337	FALSE	140	220	360
188	214	401	FALSE	202	304	506
210	243	452	FALSE	233	302	535
219	251	470	FALSE	237	326	563
233	269	502	FALSE	308	367	675
252	274	526	4:00 PM	313	305	617
230	288	518	FALSE	301	295	596
194	249	443	FALSE	284	263	547
179	218	397	FALSE	228	236	464
164	167	331	FALSE	201	226	427
116	145	262	FALSE	146	147	293
73	79	152	FALSE	73	75	148
28	60	89	FALSE	42	50	91
2949	3201		ADT	3021	3533	
6151				6554		ADT

RUSTON, WASHINGTON
N PEARL ST (SR-163) S/ON 51ST ST
LOC# 05

Peak
Hour

213

Average Weekday

139

Peak Weekend

Begin	Monday 2-Jul		Tuesday 3-Jul		Wednesday 4-Jul		Thursday 5-Jul		Friday 6-Jul		Saturday 7-Jul		Sunday 8-Jul		Monday 9-Jul		Tuesday 10-Jul	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12 PM	21	33	23	32	38	51	61	72	31	51	44	57	47	78	33	14	18	38
1 AM	19	26	18	30	36	45	56	60	26	42	35	52	47	58	30	6	14	29
2 AM	14	19	17	26	35	41	42	41	25	29	30	48	41	47	28	5	15	24
3 AM	12	20	16	19	35	27	36	27	21	24	30	44	33	35	22	7	17	22
4 AM	10	25	13	21	33	31	27	18	15	21	35	45	38	33	17	8	17	23
5 AM	15	28	14	21	28	34	17	16	12	18	36	40	27	30	17	9	16	20
6 AM	15	27	12	21	23	28	20	11	9	19	31	36	20	40	13	13	15	17
7 AM	13	22	11	23	20	28	15	10	10	20	22	34	14	32	15	13	11	15
8 AM	12	17	14	20	15	17	15	6	12	18	15	25	6	32	13	12	8	10
9 AM	7	11	11	18	13	16	17	4	11	20	13	23	4	26	15	11	8	9
10 AM	8	10	14	16	14	14	11	4	9	18	15	18	7	13	12	7	7	7
11 AM	7	9	14	15	12	17	9	4	8	11	18	11	11	17	13	4	6	5
12 PM	18	8	11	12	18	20	12	3	9	11	21	14	17	10	19	3	9	4
1 PM	19	7	14	10	25	14	15	4	19	10	33	8	40	9	20	3	14	4
2 PM	26	8	20	8	36	16	23	4	34	8	43	9	60	8	38	1	23	2
3 PM	39	8	30	8	56	12	34	3	44	11	58	13	90	0	47	0	40	2
4 PM	45	12	42	8	75	9	46	3	57	12	73	12	109	0	55	2	50	5
5 PM	52	14	48	14	89	11	50	2	61	13	73	16	104	0	69	2	56	8
6 PM	50	22	46	18	94	10	56	6	63	19	80	15	104	1	64	2	64	12
7 PM	64	34	70	25	99	12	76	13	76	22	76	14	98	2	96	2	74	18
8 PM	74	52	85	43	103	16	92	34	91	38	74	16	107	2	121	11	95	36
9 PM	88	56	98	43	117	22	110	34	95	46	76	18	110	6	136	15	105	41
10 PM	110	60	125	49	134	29	126	40	110	50	74	20	117	5	166	26	121	53
11 PM	126	84	127	74	137	44	148	61	145	83	99	43	117	18	188	41	146	85
TOTALS	864	612	893	574	1285	564	1114	480	993	614	1104	631	1368	502	1247	217	949	489
Combined		1476		1467		1849		1594		1607		1735		1870		1464		1438

Avg. Wkday M-F				Avg. Peak Wkend Sat-Su		
EB	WB	Total		EB	WB	Total
32	42	74		46	68	113
28	34	62	FALSE	41	55	96
25	26	52	FALSE	36	48	83
23	21	44	FALSE	32	40	71
19	21	40	FALSE	37	39	76
17	21	38	FALSE	32	35	67
15	19	35	FALSE	26	38	64
14	19	32	FALSE	18	33	51
13	14	27	FALSE	11	29	39
12	13	24	FALSE	9	25	33
11	11	22	FALSE	11	16	27
10	9	19	FALSE	15	14	29
14	9	22	FALSE	19	12	31
18	7	25	FALSE	37	9	45
29	7	35	FALSE	52	9	60
41	6	48	FALSE	74	7	81
53	7	60	FALSE	91	6	97
61	9	70	FALSE	89	8	97
62	13	75	FALSE	92	8	100
79	18	97	FALSE	87	8	95
94	33	127	FALSE	91	9	100
107	37	144	FALSE	93	12	105
127	44	171	FALSE	96	13	108
145	67	213	11:00 PM	108	31	139
1173	558			988	473	
	1731		ADT		1461	
						ADT

RUSTON, WASHINGTON
N 51ST ST E/O WINNIFRED ST
LOC# 09

Peak
Hour

209

Average Weekday

75

Peak Weekend

	Monday 2-Jul		Tuesday 3-Jul		Wednesday 4-Jul		Thursday 5-Jul		Friday 6-Jul		Saturday 7-Jul		Sunday 8-Jul		Monday 9-Jul		Tuesday 10-Jul	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
Begin																		
12 PM	15	21	11	24	25	44	35	25	15	24	22	37	20	50	8	15	12	20
1 AM	12	10	7	17	19	24	8	12	14	16	18	39	15	30	9	14	8	11
2 AM	15	10	5	17	14	17	9	10	13	14	16	29	12	31	12	8	9	6
3 AM	11	8	6	11	13	15	7	8	10	10	17	20	16	32	10	10	10	10
4 AM	10	8	6	11	9	17	5	7	6	11	15	20	16	26	10	7	11	13
5 AM	11	7	7	12	8	12	5	7	5	9	15	12	14	20	10	8	8	11
6 AM	7	6	8	10	9	13	4	7	5	8	14	15	9	11	6	8	6	13
7 AM	11	6	10	6	6	13	4	7	4	7	12	16	7	9	6	3	4	10
8 AM	11	4	11	8	5	9	6	9	5	3	11	14	8	10	11	4	3	6
9 AM	12	4	8	7	8	8	7	6	6	5	8	15	8	11	11	5	3	11
10 AM	13	5	9	5	8	7	10	6	7	9	8	15	11	13	12	3	8	15
11 AM	9	8	6	11	8	10	11	8	10	12	8	18	11	21	17	9	12	15
12 PM	13	9	6	12	8	16	13	10	13	16	8	23	10	22	18	12	16	20
1 PM	25	15	17	20	9	20	18	13	21	17	10	24	12	20	30	16	25	19
2 PM	33	17	23	22	9	19	21	18	26	17	10	20	13	18	43	19	30	14
3 PM	37	13	34	19	17	19	26	19	36	18	17	18	18	13	48	16	46	17
4 PM	45	20	46	23	19	22	31	22	41	19	25	19	22	11	55	17	51	19
5 PM	70	22	68	19	14	23	51	25	65	20	28	17	21	10	80	17	81	21
6 PM	81	22	82	23	16	27	63	21	79	26	31	23	24	13	81	19	97	24
7 PM	95	32	91	32	13	23	80	22	94	33	27	28	25	16	91	27	100	26
8 PM	139	34	138	38	18	20	117	28	133	39	30	28	29	17	143	39	156	35
9 PM	140	34	142	47	20	19	118	30	132	57	29	40	32	25	143	47	153	42
10 PM	153	48	156	59	23	20	139	39	151	62	29	46	27	32	160	57	162	53
11 PM	180	53	178	68	21	31	150	55	155	64	37	52	25	36	182	71	183	69
TOTALS	1148	416	1075	521	319	448	938	414	1046	516	445	588	405	497	1196	451	1194	500
Combined		1564		1596		767		1352		1562		1033		902		1647		1694

Avg. Wkday				Avg. Peak Wkend		
M-F				Sat-Su		
EB	WB	Total		EB	WB	Total
17	25	42	FALSE	21	44	65
11	15	26	FALSE	17	35	51
11	12	23	FALSE	14	30	44
10	10	20	FALSE	17	26	43
8	11	19	FALSE	16	23	39
8	9	17	FALSE	15	16	31
6	9	16	FALSE	12	13	25
6	7	14	FALSE	10	13	22
7	6	14	FALSE	10	12	22
8	7	14	FALSE	8	13	21
10	7	17	FALSE	10	14	24
10	10	21	FALSE	10	20	29
12	14	26	FALSE	9	23	32
21	17	38	FALSE	11	22	33
26	18	44	FALSE	12	19	31
35	17	52	FALSE	18	16	33
41	20	61	FALSE	24	15	39
61	21	82	FALSE	25	14	38
71	23	94	FALSE	28	18	46
81	28	108	FALSE	26	22	48
121	33	154	FALSE	30	23	52
121	39	161	FALSE	31	33	63
135	48	183	FALSE	28	39	67
150	59	209	11:00 PM	31	44	75
631	493			1153	472	
	1123	ADT			1625	ADT

Appendix 3.7-B: Existing Arterial Level of Service Reports

Arterial Level of Service: NB N Ruston Way

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
N McCarver Street	16	7.6	26.9	0.2	23
Commercial 10	15	2.0	16.5	0.1	26
	82	1.1	14.8	0.1	27
Commercial 09	14	1.5	16.8	0.1	27
Commercial 08	13	0.7	6.5	0.0	27
Commercial 07	12	0.7	6.6	0.0	27
Adler Street	11	1.6	10.6	0.1	26
Commercial 06	10	0.7	9.2	0.1	28
Commercial 05	9	0.3	5.3	0.0	28
Commercial 04	8	0.6	7.9	0.1	28
Park 02	7	1.6	22.1	0.2	27
N 40th Street	6	1.2	15.9	0.1	27
Commercial 03	5	1.7	18.4	0.1	27
Commercial 02	4	0.8	7.6	0.1	27
Commercial 01	3	1.2	13.7	0.1	27
Park Access 01	2	1.2	12.3	0.1	27
N 49th Street	1	3.4	33.6	0.3	30
	34	0.9	21.7	0.2	28
	35	0.3	6.3	0.1	29
	33	0.3	6.0	0.0	28
	31	0.4	7.1	0.1	28
Total		29.7	285.7	2.1	27

Arterial Level of Service: SB N Ruston Way

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	31	0.2	7.4	0.1	32
	33	0.0	6.8	0.1	29
	35	0.0	5.8	0.0	29
	34	0.0	6.1	0.1	29
N 49th Street	1	0.4	21.2	0.2	29
Park Access 01	2	0.7	32.3	0.3	31
Commercial 01	3	0.3	11.6	0.1	28
Commercial 02	4	0.3	13.0	0.1	29
Commercial 03	5	0.2	7.1	0.1	29
N 40th Street	6	0.4	17.2	0.1	29
Park 02	7	0.6	15.2	0.1	28
Commercial 04	8	0.9	21.7	0.2	28
Commercial 05	9	0.4	7.9	0.1	28
Commercial 06	10	0.6	5.5	0.0	27
Adler Street	11	0.6	9.2	0.1	28
Commercial 07	12	0.5	9.1	0.1	30
Commercial 08	13	0.2	6.2	0.0	28
Commercial 09	14	0.3	6.1	0.0	28
	82	0.4	15.9	0.1	29
Commercial 10	15	0.5	14.1	0.1	29
N McCarver Street	16	3.6	17.8	0.1	24
Total		11.3	257.0	2.0	29

Arterial Level of Service: NB N Ruston Way

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
N McCarver Street	16	11.5	30.8	0.2	20
Commercial 10	15	2.4	16.9	0.1	26
	82	1.3	15.0	0.1	27
Commercial 09	14	1.9	17.3	0.1	27
Commercial 08	13	0.9	6.6	0.0	26
Commercial 07	12	0.9	6.8	0.0	26
Adler Street	11	2.2	11.3	0.1	24
Commercial 06	10	0.9	9.3	0.1	28
Commercial 05	9	0.4	5.3	0.0	28
Commercial 04	8	0.6	7.9	0.1	28
Park 02	7	1.7	22.0	0.2	28
N 40th Street	6	1.3	15.9	0.1	27
Commercial 03	5	2.0	18.7	0.1	27
Commercial 02	4	0.8	7.6	0.1	26
Commercial 01	3	1.4	13.9	0.1	27
Park Access 01	2	1.2	12.4	0.1	27
N 49th Street	1	3.4	33.1	0.3	30
	34	1.0	22.0	0.2	28
	35	0.4	6.4	0.1	28
	33	0.4	6.1	0.0	28
	31	0.5	7.2	0.1	28
Total		37.1	292.4	2.1	27

Arterial Level of Service: SB N Ruston Way

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	31	0.2	7.4	0.1	32
	33	0.1	6.8	0.1	29
	35	0.1	5.8	0.0	29
	34	0.1	6.2	0.1	29
N 49th Street	1	0.7	21.4	0.2	29
Park Access 01	2	1.3	33.5	0.3	30
Commercial 01	3	0.6	11.8	0.1	28
Commercial 02	4	0.7	13.3	0.1	28
Commercial 03	5	0.5	7.3	0.1	28
N 40th Street	6	0.8	17.3	0.1	29
Park 02	7	0.9	15.2	0.1	28
Commercial 04	8	1.5	21.9	0.2	28
Commercial 05	9	0.6	7.9	0.1	28
Commercial 06	10	0.6	5.4	0.0	28
Adler Street	11	0.9	9.4	0.1	27
Commercial 07	12	0.7	9.3	0.1	30
Commercial 08	13	0.3	6.3	0.0	28
Commercial 09	14	0.4	6.2	0.0	28
	82	0.6	16.2	0.1	28
Commercial 10	15	0.8	14.5	0.1	28
N McCarver Street	16	5.0	19.4	0.1	22
Total		17.1	262.4	2.0	28

Appendix 3.7-C: Existing Intersection Level of Service Reports

HCM Signalized Intersection Capacity Analysis

1: 6th Avenue & SR-16 WB Off Ramp

2006 Existing
12/17/2007

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑↑	
Volume (vph)	538	0	0	793	242	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	0.95			0.95	0.97	
Frt	1.00			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3505			3539	3394	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	3505			3539	3394	
Peak-hour factor, PHF	0.89	0.89	0.96	0.96	0.85	0.85
Adj. Flow (vph)	604	0	0	826	285	44
RTOR Reduction (vph)	0	0	0	0	20	0
Lane Group Flow (vph)	604	0	0	826	309	0
Heavy Vehicles (%)	3%	3%	2%	2%	2%	2%
Turn Type						
Protected Phases	4			8	6	
Permitted Phases						
Actuated Green, G (s)	66.7			66.7	13.3	
Effective Green, g (s)	67.7			67.7	14.3	
Actuated g/C Ratio	0.75			0.75	0.16	
Clearance Time (s)	5.0			5.0	5.0	
Vehicle Extension (s)	2.5			2.5	2.5	
Lane Grp Cap (vph)	2637			2662	539	
v/s Ratio Prot	0.17			0.23	0.09	
v/s Ratio Perm						
v/c Ratio	0.23			0.31	0.57	
Uniform Delay, d1	3.3			3.6	35.0	
Progression Factor	0.23			1.00	1.00	
Incremental Delay, d2	0.2			0.3	1.2	
Delay (s)	1.0			3.9	36.2	
Level of Service	A			A	D	
Approach Delay (s)	1.0			3.9	36.2	
Approach LOS	A			A	D	
Intersection Summary						
HCM Average Control Delay			8.9		HCM Level of Service	A
HCM Volume to Capacity ratio			0.36			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			36.9%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: 10th Street & N Jackson Avenue

2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	12	23	39	1	15	43	610	356	168	580	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			0%			0%			0%	
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt		0.92			1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected		0.99			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1726			1811	1615	1805	3410		1805	3602	
Flt Permitted		0.99			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1726			1811	1615	1805	3410		1805	3602	
Peak-hour factor, PHF	0.85	0.85	0.85	0.76	0.76	0.76	0.94	0.94	0.94	0.94	0.95	0.95
Adj. Flow (vph)	7	14	27	51	1	20	46	649	379	179	611	9
RTOR Reduction (vph)	0	26	0	0	0	17	0	59	0	0	0	0
Lane Group Flow (vph)	0	22	0	0	52	3	46	969	0	179	620	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Split			Split		custom	Prot			Prot		
Protected Phases	7	7		8	8	8	5	2		1	6	
Permitted Phases						5						
Actuated Green, G (s)		2.5			6.1	10.4	4.3	30.0		16.8	42.5	
Effective Green, g (s)		3.5			7.1	12.4	5.3	31.0		17.8	43.5	
Actuated g/C Ratio		0.05			0.09	0.16	0.07	0.41		0.24	0.58	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		2.5			2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		80			171	351	127	1402		426	2078	
v/s Ratio Prot		c0.01			c0.03	0.00	0.03	c0.28		c0.10	0.17	
v/s Ratio Perm						0.00						
v/c Ratio		0.28			0.30	0.01	0.36	0.69		0.42	0.30	
Uniform Delay, d1		34.7			31.8	26.4	33.4	18.3		24.4	8.2	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.4			0.7	0.0	1.3	1.4		0.5	0.1	
Delay (s)		36.1			32.6	26.4	34.7	19.6		24.9	8.2	
Level of Service		D			C	C	C	B		C	A	
Approach Delay (s)		36.1			30.9			20.3			12.0	
Approach LOS		D			C			C			B	
Intersection Summary												
HCM Average Control Delay			17.7				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			75.4				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			56.5%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: SR-16 EB Ramp & N Jackson Avenue

2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	266	0	507	0	0	0	0	756	133	118	494	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			0%			-5%			0%	
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	
Frt	1.00	0.85						0.98		1.00	1.00	
Flt Protected	0.95	1.00						1.00		0.95	1.00	
Satd. Flow (prot)	1769	1583						3617		1805	3610	
Flt Permitted	0.95	1.00						1.00		0.95	1.00	
Satd. Flow (perm)	1769	1583						3617		1805	3610	
Peak-hour factor, PHF	0.87	0.87	0.87	0.25	0.25	0.25	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	306	0	583	0	0	0	0	840	148	130	543	0
RTOR Reduction (vph)	0	208	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	306	375	0	0	0	0	0	978	0	130	543	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm						Prot					
Protected Phases	4						6					
Permitted Phases	4						5					
Actuated Green, G (s)	28.4	28.4						29.5		11.4	45.9	
Effective Green, g (s)	29.4	29.4						30.5		12.4	46.9	
Actuated g/C Ratio	0.35	0.35						0.36		0.15	0.56	
Clearance Time (s)	5.0	5.0						5.0		5.0	5.0	
Vehicle Extension (s)	1.5	1.5						1.5		1.5	1.5	
Lane Grp Cap (vph)	617	552						1309		266	2008	
v/s Ratio Prot	c0.24						c0.27					
v/s Ratio Perm	0.17											
v/c Ratio	0.50	0.68						0.75		0.49	0.27	
Uniform Delay, d1	21.6	23.4						23.5		33.0	9.8	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	0.2	2.6						2.1		0.5	0.0	
Delay (s)	21.8	26.1						25.6		33.6	9.8	
Level of Service	C	C						C		C	A	
Approach Delay (s)	24.6						25.6					
Approach LOS	C						A					
Intersection Summary												
HCM Average Control Delay			22.3		HCM Level of Service			C				
HCM Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			84.3		Sum of lost time (s)			12.0				
Intersection Capacity Utilization			73.1%		ICU Level of Service			D				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: N Ruston Way & N McCarver Street

2006 Existing
12/17/2007

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Volume (vph)	193	24	60	651	121	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	0%			0%	-3%	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	1.00	1.00	0.95	1.00	0.97	
Satd. Flow (prot)	1900	1615	1805	1900	1770	
Flt Permitted	1.00	1.00	0.63	1.00	0.97	
Satd. Flow (perm)	1900	1615	1190	1900	1770	
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.90	0.90
Adj. Flow (vph)	210	26	63	685	134	58
RTOR Reduction (vph)	0	12	0	0	17	0
Lane Group Flow (vph)	210	14	63	685	175	0
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%
Turn Type		Perm	Perm			
Protected Phases	2			6	4	
Permitted Phases		2	6			
Actuated Green, G (s)	22.6	22.6	22.6	22.6	12.2	
Effective Green, g (s)	23.6	23.6	23.6	23.6	13.2	
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.29	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	1001	851	627	1001	522	
v/s Ratio Prot	0.11			0.36	0.10	
v/s Ratio Perm		0.01	0.05			
v/c Ratio	0.21	0.02	0.10	0.68	0.34	
Uniform Delay, d1	5.6	5.1	5.3	7.8	12.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.0	0.1	1.8	0.3	
Delay (s)	5.7	5.1	5.3	9.6	12.6	
Level of Service	A	A	A	A	B	
Approach Delay (s)	5.6			9.3	12.6	
Approach LOS	A			A	B	
Intersection Summary						
HCM Average Control Delay			9.1	HCM Level of Service		A
HCM Volume to Capacity ratio			0.56			
Actuated Cycle Length (s)			44.8	Sum of lost time (s)		8.0
Intersection Capacity Utilization			50.8%	ICU Level of Service		A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

5: N 30th Street & N McCarver Street

2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	42	419	36	12	832	10	93	71	35	23	40	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			-2%	
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.98			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1770	1840		1787	1878			1751			1807	
Flt Permitted	0.20	1.00		0.43	1.00			0.71			0.89	
Satd. Flow (perm)	371	1840		810	1878			1275			1620	
Peak-hour factor, PHF	0.91	0.91	0.91	0.93	0.93	0.93	0.96	0.96	0.96	0.59	0.59	0.92
Adj. Flow (vph)	46	460	40	13	895	11	97	74	36	39	68	57
RTOR Reduction (vph)	0	2	0	0	0	0	0	9	0	0	24	0
Lane Group Flow (vph)	46	498	0	13	906	0	0	198	0	0	140	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	0%	0%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			4			6			2	
Permitted Phases	4			4			6			2		
Actuated Green, G (s)	52.9	52.9		52.9	52.9			15.9			15.9	
Effective Green, g (s)	53.9	53.9		53.9	53.9			16.9			16.9	
Actuated g/C Ratio	0.68	0.68		0.68	0.68			0.21			0.21	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5			2.5			2.5	
Lane Grp Cap (vph)	254	1259		554	1285			273			347	
v/s Ratio Prot		0.27			c0.48							
v/s Ratio Perm	0.12			0.02				c0.15			0.09	
v/c Ratio	0.18	0.40		0.02	0.70			0.72			0.40	
Uniform Delay, d1	4.5	5.4		4.0	7.6			28.8			26.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.3	0.1		0.0	1.7			8.6			0.6	
Delay (s)	4.7	5.5		4.0	9.2			37.4			27.2	
Level of Service	A	A		A	A			D			C	
Approach Delay (s)		5.5			9.2			37.4			27.2	
Approach LOS		A			A			D			C	
Intersection Summary												
HCM Average Control Delay			12.9			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			78.8			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			68.7%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: N Westgate Boulevard & N Pearl Street

2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	240	61	225	441	180	79	546	64	125	547	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.96		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3501		1805	3453		1805	3553		1805	3559	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	3501		1805	3453		1805	3553		1805	3559	
Peak-hour factor, PHF	0.95	0.95	0.95	0.94	0.94	0.94	0.95	0.95	0.95	0.89	0.89	0.89
Adj. Flow (vph)	121	253	64	239	469	191	83	575	67	140	615	64
RTOR Reduction (vph)	0	26	0	0	53	0	0	9	0	0	8	0
Lane Group Flow (vph)	121	291	0	239	607	0	83	633	0	140	671	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	10.0	15.6		15.0	20.6		6.7	29.1		10.3	32.7	
Effective Green, g (s)	11.0	16.6		16.0	21.6		7.7	30.1		11.3	33.7	
Actuated g/C Ratio	0.12	0.18		0.18	0.24		0.09	0.33		0.13	0.37	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	221	646		321	829		154	1188		227	1333	
v/s Ratio Prot	0.07	c0.08		0.13	c0.18		0.05	0.18		c0.08	c0.19	
v/s Ratio Perm												
v/c Ratio	0.55	0.45		0.74	0.73		0.54	0.53		0.62	0.50	
Uniform Delay, d1	37.2	32.6		35.1	31.5		39.4	24.3		37.3	21.7	
Progression Factor	1.00	1.00		1.00	1.00		0.92	0.98		0.99	1.27	
Incremental Delay, d2	2.2	0.4		8.6	3.2		2.2	1.4		4.0	1.3	
Delay (s)	39.3	33.0		43.6	34.7		38.7	25.2		41.0	28.8	
Level of Service	D	C		D	C		D	C		D	C	
Approach Delay (s)		34.8			37.1			26.7			30.8	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM Average Control Delay			32.4			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			61.7%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

7: N 26th Street & N Pearl Street

2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	121	186	55	126	242	81	135	705	73	73	529	157
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.96		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3487		1805	3475		1805	3559		1805	3486	
Flt Permitted	0.44	1.00		0.52	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	840	3487		984	3475		1805	3559		1805	3486	
Peak-hour factor, PHF	0.88	0.88	0.88	0.96	0.96	0.96	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	138	211	62	131	252	84	141	734	76	79	575	171
RTOR Reduction (vph)	0	34	0	0	41	0	0	6	0	0	24	0
Lane Group Flow (vph)	138	239	0	131	295	0	141	804	0	79	722	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm		Perm			Prot			Prot			
Protected Phases	4		8			5		2		1		6
Permitted Phases	4		8									
Actuated Green, G (s)	18.1	18.1		18.1	18.1		11.7	48.0		8.9	45.2	
Effective Green, g (s)	19.1	19.1		19.1	19.1		12.7	49.0		9.9	46.2	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.14	0.54		0.11	0.51	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	178	740		209	737		255	1938		199	1789	
v/s Ratio Prot		0.07			0.08		c0.08	c0.23		0.04	0.21	
v/s Ratio Perm	c0.16			0.13								
v/c Ratio	0.78	0.32		0.63	0.40		0.55	0.41		0.40	0.40	
Uniform Delay, d1	33.4	30.0		32.2	30.5		36.0	12.1		37.3	13.4	
Progression Factor	1.00	1.00		1.00	1.00		0.94	1.38		1.18	0.64	
Incremental Delay, d2	18.1	0.2		5.0	0.3		1.8	0.6		0.9	0.7	
Delay (s)	51.5	30.2		37.2	30.8		35.5	17.2		44.8	9.3	
Level of Service	D	C		D	C		D	B		D	A	
Approach Delay (s)		37.3			32.6			19.9			12.7	
Approach LOS		D			C			B			B	
Intersection Summary												
HCM Average Control Delay	22.6			HCM Level of Service			C					
HCM Volume to Capacity ratio	0.53											
Actuated Cycle Length (s)	90.0			Sum of lost time (s)			12.0					
Intersection Capacity Utilization	58.1%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

8: N 30th Street & N Pearl Street

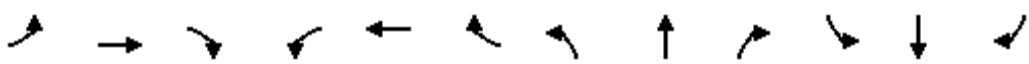
2006 Existing
12/17/2007

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			
Volume (vph)	269	124	611	159	94	570
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	4%		0%			0%
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1734	1552	3464		1770	3539
Flt Permitted	0.95	1.00	1.00		0.32	1.00
Satd. Flow (perm)	1734	1552	3464		593	3539
Peak-hour factor, PHF	0.96	0.96	0.95	0.95	0.93	0.93
Adj. Flow (vph)	280	129	643	167	101	613
RTOR Reduction (vph)	0	99	17	0	0	0
Lane Group Flow (vph)	280	30	793	0	101	613
Heavy Vehicles (%)	2%	2%	1%	1%	2%	2%
Turn Type	Perm				Perm	
Protected Phases	4		2			2
Permitted Phases		4			2	
Actuated Green, G (s)	19.6	19.6	60.4		60.4	60.4
Effective Green, g (s)	20.6	20.6	61.4		61.4	61.4
Actuated g/C Ratio	0.23	0.23	0.68		0.68	0.68
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.5	2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	397	355	2363		405	2414
v/s Ratio Prot	c0.16		c0.23			0.17
v/s Ratio Perm		0.02			0.17	
v/c Ratio	0.71	0.08	0.34		0.25	0.25
Uniform Delay, d1	31.9	27.3	5.9		5.5	5.5
Progression Factor	1.00	1.00	1.10		0.89	0.93
Incremental Delay, d2	5.2	0.1	0.4		1.5	0.3
Delay (s)	37.1	27.4	6.9		6.4	5.4
Level of Service	D	C	A		A	A
Approach Delay (s)	34.0		6.9			5.5
Approach LOS	C		A			A
Intersection Summary						
HCM Average Control Delay			12.1		HCM Level of Service	B
HCM Volume to Capacity ratio			0.43			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			55.2%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

9: N 46th Street & N Pearl Street

2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	56	19	75	91	71	47	276	64	43	284	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	10	12	12	10	12	12	10	12	12
Grade (%)		2%			0%			0%			1%	
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.93		1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1635	3257		1652	3306		1636	3406		1643	3506	
Flt Permitted	0.63	1.00		0.69	1.00		0.56	1.00		0.54	1.00	
Satd. Flow (perm)	1091	3257		1205	3306		966	3406		927	3506	
Peak-hour factor, PHF	0.80	0.80	0.80	0.87	0.87	0.87	0.94	0.94	0.94	0.93	0.93	0.93
Adj. Flow (vph)	10	70	24	86	105	82	50	294	68	46	305	9
RTOR Reduction (vph)	0	16	0	0	53	0	0	36	0	0	4	0
Lane Group Flow (vph)	10	78	0	86	134	0	50	326	0	46	310	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			4			6			2		
Permitted Phases	4			4			6			2		
Actuated Green, G (s)	10.1	10.1		10.1	10.1		11.5	11.5		11.5	11.5	
Effective Green, g (s)	11.1	11.1		11.1	11.1		12.5	12.5		12.5	12.5	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.40	0.40		0.40	0.40	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	383	1144		423	1161		382	1347		367	1387	
v/s Ratio Prot		0.02			0.04			0.10			0.09	
v/s Ratio Perm	0.01			0.07			0.05			0.05		
v/c Ratio	0.03	0.07		0.20	0.12		0.13	0.24		0.13	0.22	
Uniform Delay, d1	6.7	6.8		7.2	6.9		6.1	6.4		6.1	6.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.0		0.2	0.0		0.1	0.1		0.1	0.1	
Delay (s)	6.7	6.8		7.3	7.0		6.2	6.5		6.2	6.4	
Level of Service	A	A		A	A		A	A		A	A	
Approach Delay (s)		6.8			7.1			6.4			6.4	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	31.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

10: N 51st Street & N Pearl Street

2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	32	33	81	67	67	28	129	47	54	136	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Grade (%)		-2%			3%			-2%			2%	
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.94			1.00	0.85	1.00	0.96		1.00	1.00	
Flt Protected		0.99			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1794			1822	1591	1668	1686		1635	1721	
Flt Permitted		0.95			0.75	1.00	0.60	1.00		0.60	1.00	
Satd. Flow (perm)		1710			1401	1591	1049	1686		1040	1721	
Peak-hour factor, PHF	0.76	0.76	0.76	0.96	0.96	0.96	0.88	0.88	0.88	0.52	0.52	0.52
Adj. Flow (vph)	14	42	43	84	70	70	32	147	53	104	262	0
RTOR Reduction (vph)	0	36	0	0	0	58	0	11	0	0	0	0
Lane Group Flow (vph)	0	63	0	0	154	12	32	189	0	104	262	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			4			6		5	2	
Permitted Phases	4			4		4	6			2		
Actuated Green, G (s)		14.3			14.3	14.3	40.7	40.7		65.7	65.7	
Effective Green, g (s)		15.3			15.3	15.3	41.7	41.7		66.7	66.7	
Actuated g/C Ratio		0.17			0.17	0.17	0.46	0.46		0.74	0.74	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		2.5			2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		291			238	270	486	781		910	1275	
v/s Ratio Prot								c0.11		0.03	c0.15	
v/s Ratio Perm		0.04			c0.11	0.01	0.03			0.06		
v/c Ratio		0.22			0.65	0.04	0.07	0.24		0.11	0.21	
Uniform Delay, d1		32.2			34.8	31.2	13.4	14.6		3.9	3.6	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			5.3	0.0	0.3	0.7		0.0	0.4	
Delay (s)		32.5			40.1	31.3	13.6	15.3		4.0	3.9	
Level of Service		C			D	C	B	B		A	A	
Approach Delay (s)		32.5			37.3			15.1			3.9	
Approach LOS		C			D			B			A	
Intersection Summary												
HCM Average Control Delay		17.9										
HCM Volume to Capacity ratio		0.30										
Actuated Cycle Length (s)		90.0										
Intersection Capacity Utilization		41.3%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: N 17th Street & N Narrows Drive

2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	344	0	14	0	439	208	15	442	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00			1.00		1.00	1.00	
Frt				1.00	0.85			0.96		1.00	1.00	
Flt Protected				0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)				1787	1599			1818		1805	1900	
Flt Permitted				0.95	1.00			1.00		0.19	1.00	
Satd. Flow (perm)				1787	1599			1818		365	1900	
Peak-hour factor, PHF	0.25	0.25	0.25	0.87	0.87	0.87	0.95	0.95	0.95	0.89	0.89	0.89
Adj. Flow (vph)	0	0	0	395	0	16	0	462	219	17	497	0
RTOR Reduction (vph)	0	0	0	0	10	0	0	17	0	0	0	0
Lane Group Flow (vph)	0	0	0	395	6	0	0	664	0	17	497	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Perm			Perm						Perm		
Protected Phases	7			8			6			2		
Permitted Phases	7			8						2		
Actuated Green, G (s)				23.6	23.6		29.1			29.1	29.1	
Effective Green, g (s)				24.6	24.6		30.1			30.1	30.1	
Actuated g/C Ratio				0.39	0.39		0.48			0.48	0.48	
Clearance Time (s)				5.0	5.0		5.0			5.0	5.0	
Vehicle Extension (s)				2.5	2.5		2.5			2.5	2.5	
Lane Grp Cap (vph)				701	627		873			175	912	
v/s Ratio Prot					0.00		c0.37				0.26	
v/s Ratio Perm				c0.22						0.05		
v/c Ratio				0.56	0.01		0.76			0.10	0.54	
Uniform Delay, d1				14.9	11.6		13.3			8.9	11.5	
Progression Factor				1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2				0.8	0.0		3.8			0.2	0.5	
Delay (s)				15.7	11.6		17.1			9.1	12.0	
Level of Service				B	B		B			A	B	
Approach Delay (s)	0.0			15.5			17.1			11.9		
Approach LOS	A			B			B			B		
Intersection Summary												
HCM Average Control Delay	15.0			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.67											
Actuated Cycle Length (s)	62.7			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	61.5%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: I-705 Off-Ramp & Stadium Way

2006 Existing
12/17/2007



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	68	922	221	49	781	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	2%		2%			-4%
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1752	1567	1764		1841	1938
Flt Permitted	0.95	1.00	1.00		0.57	1.00
Satd. Flow (perm)	1752	1567	1764		1100	1938
Peak-hour factor, PHF	0.95	0.95	0.85	0.85	0.91	0.91
Adj. Flow (vph)	72	971	260	58	858	122
RTOR Reduction (vph)	0	399	9	0	0	0
Lane Group Flow (vph)	72	572	309	0	858	122
Heavy Vehicles (%)	2%	2%	4%	4%	0%	0%
Turn Type	pm+ov			custom		
Protected Phases	3	5	6		5	2
Permitted Phases		3			4	
Actuated Green, G (s)	4.6	28.9	16.9		34.4	46.2
Effective Green, g (s)	5.6	30.9	17.9		36.4	47.2
Actuated g/C Ratio	0.07	0.41	0.24		0.48	0.62
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.5	2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	129	638	416		775	1205
v/s Ratio Prot	0.04	c0.30	c0.18		c0.37	0.06
v/s Ratio Perm		0.07			c0.16	
v/c Ratio	0.56	0.90	0.74		1.11	0.10
Uniform Delay, d1	34.0	21.0	26.9		18.0	5.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.1	15.2	6.7		65.8	0.0
Delay (s)	38.1	36.2	33.5		83.8	5.8
Level of Service	D	D	C		F	A
Approach Delay (s)	36.3		33.5			74.1
Approach LOS	D		C			E

Intersection Summary

HCM Average Control Delay	51.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	75.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis 14: N 30th Street & N Orchard Street

2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	88	250	29	53	402	45	38	203	27	35	190	62
Peak Hour Factor	0.93	0.93	0.93	0.97	0.97	0.97	0.87	0.87	0.87	0.94	0.94	0.94
Hourly flow rate (vph)	95	269	31	55	414	46	44	233	31	37	202	66
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	395	515	308	305								
Volume Left (vph)	95	55	44	37								
Volume Right (vph)	31	46	31	66								
Hadj (s)	0.02	-0.02	-0.02	-0.09								
Departure Headway (s)	8.2	8.2	8.6	8.6								
Degree Utilization, x	0.90	1.17	0.74	0.73								
Capacity (veh/h)	395	436	390	397								
Control Delay (s)	51.5	125.4	32.4	31.4								
Approach Delay (s)	51.5	125.4	32.4	31.4								
Approach LOS	F	F	D	D								
Intersection Summary												
Delay				68.6								
HCM Level of Service				F								
Intersection Capacity Utilization				63.6%	ICU Level of Service	B						
Analysis Period (min)				15								

HCM Signalized Intersection Capacity Analysis

15: 6th Avenue & N Pearl Street

2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	197	425	172	160	604	286	107	308	57	68	345	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			0%			0%			0%	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1796	3592	1607	1770	3539	1583		3494	1583	1752	3505	1568
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1796	3592	1607	1770	3539	1583		3494	1583	1752	3505	1568
Peak-hour factor, PHF	0.98	0.98	0.98	0.88	0.88	0.88	0.89	0.89	0.89	0.80	0.80	0.80
Adj. Flow (vph)	201	434	176	182	686	325	120	346	64	85	431	182
RTOR Reduction (vph)	0	0	125	0	0	222	0	0	52	0	0	147
Lane Group Flow (vph)	201	434	51	182	686	103	0	466	12	85	431	35
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		1	1		2	2	
Permitted Phases			4			8			1			2
Actuated Green, G (s)	10.0	24.9	24.9	12.5	27.4	27.4		16.5	16.5	16.1	16.1	16.1
Effective Green, g (s)	11.0	25.9	25.9	13.5	28.4	28.4		17.5	17.5	17.1	17.1	17.1
Actuated g/C Ratio	0.12	0.29	0.29	0.15	0.32	0.32		0.19	0.19	0.19	0.19	0.19
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5	2.5	2.5
Lane Grp Cap (vph)	220	1034	462	266	1117	500		679	308	333	666	298
v/s Ratio Prot	c0.11	0.12		c0.10	c0.19			c0.13		0.05	c0.12	
v/s Ratio Perm			0.03			0.06			0.01			0.02
v/c Ratio	0.91	0.42	0.11	0.68	0.61	0.21		0.69	0.04	0.26	0.65	0.12
Uniform Delay, d1	39.0	26.0	23.6	36.2	26.1	22.5		33.7	29.4	31.0	33.7	30.2
Progression Factor	1.00	1.00	1.00	1.12	1.09	2.02		1.00	1.00	0.66	0.71	1.29
Incremental Delay, d2	37.6	1.3	0.5	6.4	2.5	0.9		2.6	0.0	0.3	1.7	0.1
Delay (s)	76.7	27.2	24.0	46.8	31.0	46.4		36.3	29.5	20.7	25.6	38.9
Level of Service	E	C	C	D	C	D		D	C	C	C	D
Approach Delay (s)		38.8			37.6			35.5			28.5	
Approach LOS		D			D			D			C	

Intersection Summary

HCM Average Control Delay	35.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

16: N Narrows Drive & N 26th Street

2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	175	276	2	33	325	107	0	1	23	70	3	195
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.89	0.89	0.89	0.75	0.75	0.75	0.89	0.89	0.89
Hourly flow rate (vph)	186	294	2	37	365	120	0	1	31	79	3	219
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												12
Median type		None			TWLTL							
Median storage (veh)					2							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	485			296			1218	1227	295	1197	1168	425
vC1, stage 1 conf vol							667	667		499	499	
vC2, stage 2 conf vol							551	560		697	668	
vCu, unblocked vol	485			296			1218	1227	295	1197	1168	425
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	83			97			100	100	96	72	99	65
cM capacity (veh/h)	1088			1277			137	268	749	278	307	629
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	186	296	37	485	32	301						
Volume Left	186	0	37	0	0	79						
Volume Right	0	2	0	120	31	219						
cSH	1088	1700	1277	1700	697	864						
Volume to Capacity	0.17	0.17	0.03	0.29	0.05	0.35						
Queue Length 95th (ft)	15	0	2	0	4	39						
Control Delay (s)	9.0	0.0	7.9	0.0	10.4	16.3						
Lane LOS	A		A		B	C						
Approach Delay (s)	3.5		0.6		10.4	16.3						
Approach LOS					B	C						
Intersection Summary												
Average Delay			5.4									
Intersection Capacity Utilization			54.0%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

17: N 37th Street & N Narrows Drive

2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	16	10	37	21	77	12	147	34	59	164	7
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.91	0.91	0.91	0.84	0.84	0.84	0.88	0.88	0.88	0.85	0.85	0.85
Hourly flow rate (vph)	3	18	11	44	25	92	14	167	39	69	193	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)	1111											
pX, platoon unblocked												
vC, conflicting volume	117			29			247	234	23	305	194	71
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	117			29			247	234	23	305	194	71
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			97	74	96	86	72	99
cM capacity (veh/h)	1484			1598			537	648	1057	490	682	994
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	3	29	44	117	14	206	69	201				
Volume Left	3	0	44	0	14	0	69	0				
Volume Right	0	11	0	92	0	39	0	8				
cSH	1484	1700	1598	1700	537	699	490	691				
Volume to Capacity	0.00	0.02	0.03	0.07	0.03	0.29	0.14	0.29				
Queue Length 95th (ft)	0	0	2	0	2	31	12	30				
Control Delay (s)	7.4	0.0	7.3	0.0	11.9	12.3	13.6	12.3				
Lane LOS	A		A		B	B	B	B				
Approach Delay (s)	0.8		2.0		12.3		12.6					
Approach LOS					B		B					
Intersection Summary												
Average Delay	9.5											
Intersection Capacity Utilization	31.9%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis

18: N 37th Street & N Pearl Street

2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	17	102	52	29	5	214	450	74	23	417	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.87		1.00	0.98		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1639		1787	1839		1787	3498		1787	3526	
Flt Permitted	0.72	1.00		0.53	1.00		0.43	1.00		0.46	1.00	
Satd. Flow (perm)	1359	1639		1002	1839		813	3498		856	3526	
Peak-hour factor, PHF	0.89	0.89	0.89	0.65	0.65	0.65	0.99	0.99	0.99	0.93	0.93	0.93
Adj. Flow (vph)	26	19	115	80	45	8	216	455	75	25	448	44
RTOR Reduction (vph)	0	101	0	0	7	0	0	8	0	0	4	0
Lane Group Flow (vph)	26	33	0	80	46	0	216	522	0	25	488	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	11.3	11.3		11.3	11.3		70.7	70.7		58.3	58.3	
Effective Green, g (s)	11.3	11.3		11.3	11.3		70.7	70.7		58.3	58.3	
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.79	0.79		0.65	0.65	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	171	206		126	231		730	2748		554	2284	
v/s Ratio Prot		0.02			0.03		c0.03	0.15			0.14	
v/s Ratio Perm	0.02			c0.08			c0.21			0.03		
v/c Ratio	0.15	0.16		0.63	0.20		0.30	0.19		0.05	0.21	
Uniform Delay, d1	35.1	35.1		37.4	35.3		2.6	2.4		5.8	6.5	
Progression Factor	1.00	1.00		1.00	1.00		1.51	1.42		1.00	1.00	
Incremental Delay, d2	0.4	0.4		10.0	0.4		0.2	0.1		0.2	0.2	
Delay (s)	35.5	35.5		47.4	35.7		4.1	3.6		5.9	6.7	
Level of Service	D	D		D	D		A	A		A	A	
Approach Delay (s)		35.5			42.8			3.7			6.7	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM Average Control Delay			11.3			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.34									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			44.2%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

19: N 46th Street & N Vassault Street

2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	15	6	43	17	39	15	117	30	18	138	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.72	0.72	0.72	0.73	0.73	0.73	0.86	0.86	0.86	0.85	0.85	0.85
Hourly flow rate (vph)	3	21	8	59	23	53	17	136	35	21	162	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	459	411	163	412	394	153	164			171		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	459	411	163	412	394	153	164			171		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	96	99	89	96	94	99			98		
cM capacity (veh/h)	459	519	887	516	526	890	1427			1400		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	32	136	188	185								
Volume Left	3	59	17	21								
Volume Right	8	53	35	1								
cSH	575	621	1427	1400								
Volume to Capacity	0.06	0.22	0.01	0.02								
Queue Length 95th (ft)	4	21	1	1								
Control Delay (s)	11.6	12.4	0.8	1.0								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.6	12.4	0.8	1.0								
Approach LOS	B	B										
Intersection Summary												
Average Delay			4.4									
Intersection Capacity Utilization			30.7%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 20: N 51st Street & N Park Way

2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	2	16	41	35	31	10	35	42	21	15	44	4
Peak Hour Factor	0.87	0.87	0.87	0.91	0.91	0.91	0.82	0.82	0.82	0.69	0.69	0.69
Hourly flow rate (vph)	2	18	47	38	34	11	43	51	26	22	64	6
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total (vph)	68	84	43	77	22	70						
Volume Left (vph)	2	38	43	0	22	0						
Volume Right (vph)	47	11	0	26	0	6						
Hadj (s)	-0.41	0.01	0.53	-0.20	0.64	0.08						
Departure Headway (s)	4.1	4.5	5.5	4.7	5.6	5.0						
Degree Utilization, x	0.08	0.10	0.06	0.10	0.03	0.10						
Capacity (veh/h)	831	754	634	730	615	686						
Control Delay (s)	7.4	8.0	7.7	7.1	7.6	7.4						
Approach Delay (s)	7.4	8.0	7.3		7.4							
Approach LOS	A	A	A		A							
Intersection Summary												
Delay			7.5									
HCM Level of Service			A									
Intersection Capacity Utilization			26.1%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

21: N Pearl Street & N Park Way

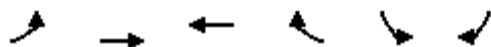
2006 Existing
12/17/2007

						
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	10	197	91	21	26	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.50	0.50	0.88	0.88	0.71	0.71
Hourly flow rate (vph)	20	394	103	24	37	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		854				
pX, platoon unblocked						
vC, conflicting volume	127				352	64
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	127				352	64
tC, single (s)	4.1				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	99				94	99
cM capacity (veh/h)	1457				600	975
Direction, Lane #	NB 1	NB 2	SB 1	SB 2	NE 1	
Volume Total	151	263	69	58	48	
Volume Left	20	0	0	0	37	
Volume Right	0	0	0	24	11	
cSH	1457	1700	1700	1700	660	
Volume to Capacity	0.01	0.15	0.04	0.03	0.07	
Queue Length 95th (ft)	1	0	0	0	6	
Control Delay (s)	1.1	0.0	0.0	0.0	10.9	
Lane LOS	A				B	
Approach Delay (s)	0.4		0.0		10.9	
Approach LOS					B	
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			19.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

22: N 51st Street & N Bennett Street

2006 Existing
12/17/2007



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	1	117	246	3	1	1
Sign Control		Free	Free		Stop	
Grade		0%	6%		0%	
Peak Hour Factor	0.59	0.59	0.76	0.76	0.50	0.50
Hourly flow rate (vph)	2	198	324	4	2	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	328				527	326
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	328				527	326
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1243				514	720
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	200	328	4			
Volume Left	2	0	2			
Volume Right	0	4	2			
cSH	1243	1700	600			
Volume to Capacity	0.00	0.19	0.01			
Queue Length 95th (ft)	0	0	1			
Control Delay (s)	0.1	0.0	11.0			
Lane LOS	A		B			
Approach Delay (s)	0.1	0.0	11.0			
Approach LOS			B			
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			23.1%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

23: N 49th Street & N Ruston Way

2006 Existing
12/17/2007



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	3	73	223	271	110	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.93	0.93	0.57	0.57
Hourly flow rate (vph)	3	85	240	291	193	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	965	194	195			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	965	194	195			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	90	83			
cM capacity (veh/h)	236	853	1390			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	88	240	291	195		
Volume Left	3	240	0	0		
Volume Right	85	0	0	2		
cSH	773	1390	1700	1700		
Volume to Capacity	0.11	0.17	0.17	0.11		
Queue Length 95th (ft)	10	16	0	0		
Control Delay (s)	10.3	8.1	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	10.3	3.7		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			30.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

24: N 46th Street & N Baltimore Street

2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	17	163	1	10	286	31	1	5	0	19	5	10
Sign Control		Free			Free			Stop			Stop	
Grade		-1%			1%			-3%			1%	
Peak Hour Factor	0.92	0.92	0.92	0.81	0.81	0.81	0.50	0.50	0.50	0.71	0.71	0.71
Hourly flow rate (vph)	18	177	1	12	353	38	2	10	0	27	7	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	391			178			629	631	178	617	612	372
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	391			178			629	631	178	617	612	372
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			99	97	100	93	98	98
cM capacity (veh/h)	1173			1404			377	391	871	384	395	669
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	197	404	12	48								
Volume Left	18	12	2	27								
Volume Right	1	38	0	14								
cSH	1173	1404	389	441								
Volume to Capacity	0.02	0.01	0.03	0.11								
Queue Length 95th (ft)	1	1	2	9								
Control Delay (s)	0.9	0.3	14.5	14.1								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.9	0.3	14.5	14.1								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.7									
Intersection Capacity Utilization			30.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

25: N 46th Street & N Orchard Street

2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	151	13	40	281	14	17	23	15	5	14	9
Sign Control		Free			Free			Stop			Stop	
Grade		-1%			1%			-3%			1%	
Peak Hour Factor	0.83	0.83	0.83	0.94	0.94	0.94	0.86	0.86	0.86	0.70	0.70	0.70
Hourly flow rate (vph)	7	182	16	43	299	15	20	27	17	7	20	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	314			198			619	603	190	627	604	306
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	314			198			619	603	190	627	604	306
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			95	93	98	98	95	98
cM capacity (veh/h)	1258			1387			369	398	852	361	400	738
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	205	356	64	40								
Volume Left	7	43	20	7								
Volume Right	16	15	17	13								
cSH	1258	1387	453	459								
Volume to Capacity	0.01	0.03	0.14	0.09								
Queue Length 95th (ft)	0	2	12	7								
Control Delay (s)	0.3	1.2	14.2	13.6								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.3	1.2	14.2	13.6								
Approach LOS			B	B								
Intersection Summary												
Average Delay			2.9									
Intersection Capacity Utilization			42.1%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

26: N 46th Street & N Ferdinand Street

2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	101	4	4	158	11	2	8	3	20	37	174
Sign Control		Free			Free			Stop			Stop	
Grade		-1%			1%			-3%			1%	
Peak Hour Factor	0.92	0.92	0.92	0.83	0.83	0.83	0.65	0.65	0.65	0.88	0.88	0.88
Hourly flow rate (vph)	65	110	4	5	190	13	3	12	5	23	42	198
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	204			114			668	456	112	460	451	197
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	204			114			668	456	112	460	451	197
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			99	97	100	95	91	77
cM capacity (veh/h)	1380			1488			258	479	947	483	481	849
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	179	208	20	262								
Volume Left	65	5	3	23								
Volume Right	4	13	5	198								
cSH	1380	1488	471	715								
Volume to Capacity	0.05	0.00	0.04	0.37								
Queue Length 95th (ft)	4	0	3	42								
Control Delay (s)	3.1	0.2	13.0	12.9								
Lane LOS	A	A	B	B								
Approach Delay (s)	3.1	0.2	13.0	12.9								
Approach LOS			B	B								
Intersection Summary												
Average Delay			6.3									
Intersection Capacity Utilization			44.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

27: N 40th Street & N Ruston Way

2006 Existing
12/17/2007



Movement	EBL	EBR	NBL2	NBL	SER	SER2
Lane Configurations						
Volume (veh/h)	0	6	10	549	193	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.94	0.94	0.74	0.74
Hourly flow rate (vph)	0	8	11	584	261	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				Raised	None	
Median storage veh)				1		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	867	261	262			
vC1, stage 1 conf vol	261					
vC2, stage 2 conf vol	605					
vCu, unblocked vol	867	261	262			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	99			
cM capacity (veh/h)	432	782	1314			
Direction, Lane #	EB 1	NB 1	NB 2	SE 1		
Volume Total	8	11	584	262		
Volume Left	0	11	0	0		
Volume Right	8	0	0	1		
cSH	782	1314	1700	1700		
Volume to Capacity	0.01	0.01	0.34	0.15		
Queue Length 95th (ft)	1	1	0	0		
Control Delay (s)	9.7	7.8	0.0	0.0		
Lane LOS	A	A				
Approach Delay (s)	9.7	0.1		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			40.4%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

28: N Ruston Way & N Adler Street

2006 Existing
12/17/2007



Movement	WBL	WBR	SEL	SER	NEL	NER
Lane Configurations						
Volume (veh/h)	177	582	190	17	11	68
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.86	0.86	0.90	0.90	0.66	0.66
Hourly flow rate (vph)	206	677	211	19	17	103
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT		Raised			
Median storage veh)	2		1			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	230				1309	221
vC1, stage 1 conf vol					221	
vC2, stage 2 conf vol					1088	
vCu, unblocked vol	230				1309	221
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	85				94	87
cM capacity (veh/h)	1350				265	822
Direction, Lane #	WB 1	WB 2	SE 1	NE 1		
Volume Total	206	677	230	120		
Volume Left	206	0	0	17		
Volume Right	0	0	19	103		
cSH	1350	1700	1700	636		
Volume to Capacity	0.15	0.40	0.14	0.19		
Queue Length 95th (ft)	13	0	0	17		
Control Delay (s)	8.1	0.0	0.0	12.0		
Lane LOS	A			B		
Approach Delay (s)	1.9		0.0	12.0		
Approach LOS				B		
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			39.4%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

29: N 49th Street & N Pearl Street

2006 Existing
12/17/2007



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	12	5	236	9	2	253
Sign Control	Stop		Free			Free
Grade	0%		-2%			1%
Peak Hour Factor	0.71	0.71	0.84	0.84	0.73	0.73
Hourly flow rate (vph)	17	7	281	11	3	347
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			1174			951
pX, platoon unblocked						
vC, conflicting volume	638	286			292	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	638	286			292	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	99			100	
cM capacity (veh/h)	443	758			1270	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	24	292	349			
Volume Left	17	0	3			
Volume Right	7	11	0			
cSH	504	1700	1270			
Volume to Capacity	0.05	0.17	0.00			
Queue Length 95th (ft)	4	0	0			
Control Delay (s)	12.5	0.0	0.1			
Lane LOS	B		A			
Approach Delay (s)	12.5	0.0	0.1			
Approach LOS	B					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			24.9%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 30: N 51st Street & N Winnifred Street

2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	6	123	5	16	206	9	7	5	6	5	7	10
Peak Hour Factor	0.86	0.86	0.86	0.83	0.83	0.83	0.56	0.56	0.56	0.92	0.92	0.92
Hourly flow rate (vph)	7	143	6	19	248	11	12	9	11	5	8	11
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	156	278	32	24								
Volume Left (vph)	7	19	13	5								
Volume Right (vph)	6	11	11	11								
Hadj (s)	-0.01	-0.01	-0.12	-0.23								
Departure Headway (s)	4.3	4.2	4.8	4.7								
Degree Utilization, x	0.19	0.32	0.04	0.03								
Capacity (veh/h)	813	834	687	693								
Control Delay (s)	8.3	9.2	8.0	7.8								
Approach Delay (s)	8.3	9.2	8.0	7.8								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.8									
HCM Level of Service			A									
Intersection Capacity Utilization			27.3%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
13: N Park St. & N Narrows Dr.

2006 Existing
12/17/2007

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	SBL	SBT
Lane Configurations												
Volume (vph)	1	0	1	2	2	1	2	5	43	149	2	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	25		0	0		25			25		0	
Storage Lanes	1		0	0		1			1		0	
Taper Length (ft)	25		25	25		25			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850						
Flt Protected	0.950				0.976				0.950			0.986
Satd. Flow (prot)	1770	1583	0	0	1818	1583	0	0	1770	1863	0	1837
Flt Permitted	0.950				0.976				0.950			0.986
Satd. Flow (perm)	1770	1583	0	0	1818	1583	0	0	1770	1863	0	1837
Link Speed (mph)		30			30					30		30
Link Distance (ft)		1212			1636					910		821
Travel Time (s)		27.5			37.2					20.7		18.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	0	1	2	2	1	2	5	47	162	2	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	1	0	0	4	3	0	0	52	162	0	7
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Right	Left	Left	Left	Left	Left
Median Width(ft)		12			12					12		12
Link Offset(ft)		0			0					0		0
Crosswalk Width(ft)		16			16					16		16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15	15		15	
Sign Control		Stop			Stop					Stop		Stop

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 33.5% ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings
13: N Park St. & N Narrows Dr.

2006 Existing
12/17/2007



Lane Group	SBR	SBR2	SEL	SER
Lane Configurations				
Volume (vph)	90	1	108	1
Ideal Flow (vphpl)	1900	1900	1900	1900
Storage Length (ft)	25		25	0
Storage Lanes	1		1	0
Taper Length (ft)	25		25	25
Lane Util. Factor	1.00	1.00	1.00	1.00
Frt	0.850			0.850
Flt Protected			0.950	
Satd. Flow (prot)	1583	0	1770	1583
Flt Permitted			0.950	
Satd. Flow (perm)	1583	0	1770	1583
Link Speed (mph)			30	
Link Distance (ft)			825	
Travel Time (s)			18.8	
Peak Hour Factor	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	1	117	1
Shared Lane Traffic (%)				
Lane Group Flow (vph)	99	0	117	1
Enter Blocked Intersection	No	No	No	No
Lane Alignment	Right	Right	Left	Right
Median Width(ft)			12	
Link Offset(ft)			0	
Crosswalk Width(ft)			16	
Two way Left Turn Lane				
Headway Factor	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	9	15	9
Sign Control			Stop	
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

1: N 51st Street & N Pearl Street

2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	36	52	62	123	102	102	65	301	76	88	257	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Grade (%)		-2%			3%			-2%			2%	
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.94			1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected		0.99			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1790			1822	1591	1668	1703		1635	1721	
Flt Permitted		0.79			0.64	1.00	0.41	1.00		0.43	1.00	
Satd. Flow (perm)		1433			1191	1591	720	1703		732	1721	
Peak-hour factor, PHF	0.76	0.76	0.76	0.96	0.96	0.96	0.88	0.88	0.88	0.52	0.52	0.52
Adj. Flow (vph)	47	68	82	128	106	106	74	342	86	169	494	0
RTOR Reduction (vph)	0	33	0	0	0	63	0	8	0	0	0	0
Lane Group Flow (vph)	0	164	0	0	234	43	74	420	0	169	494	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm			pm+pt		
Protected Phases		4			4			6		5	2	
Permitted Phases	4			4		4	6			2		
Actuated Green, G (s)		20.8			20.8	20.8	47.4	47.4		59.2	59.2	
Effective Green, g (s)		21.8			21.8	21.8	48.4	48.4		60.2	60.2	
Actuated g/C Ratio		0.24			0.24	0.24	0.54	0.54		0.67	0.67	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		2.5			2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		347			288	385	387	916		568	1151	
v/s Ratio Prot								c0.25		0.03	c0.29	
v/s Ratio Perm		0.11			c0.20	0.03	0.10			0.17		
v/c Ratio		0.47			0.81	0.11	0.19	0.46		0.30	0.43	
Uniform Delay, d1		29.2			32.2	26.6	10.7	12.8		10.3	6.9	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.7			15.5	0.1	1.1	1.7		0.2	1.2	
Delay (s)		29.9			47.7	26.7	11.8	14.4		10.5	8.1	
Level of Service		C			D	C	B	B		B	A	
Approach Delay (s)		29.9			41.1			14.0			8.7	
Approach LOS		C			D			B			A	
Intersection Summary												
HCM Average Control Delay		19.2										
HCM Volume to Capacity ratio		0.54										
Actuated Cycle Length (s)		90.0										
Intersection Capacity Utilization		54.3%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: N 51st Street & N Winnifred Street

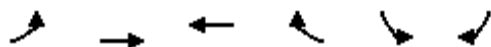
2006 Existing
12/17/2007

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	198	8	11	302	60	10	8	9	8	11	15
Peak Hour Factor	0.86	0.86	0.86	0.83	0.83	0.83	0.56	0.56	0.56	0.92	0.92	0.92
Hourly flow rate (vph)	12	230	9	13	364	72	18	14	16	9	12	16
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	251	449	48	37								
Volume Left (vph)	12	13	18	9								
Volume Right (vph)	9	72	16	16								
Hadj (s)	-0.01	-0.09	-0.13	-0.22								
Departure Headway (s)	4.6	4.3	5.4	5.3								
Degree Utilization, x	0.32	0.54	0.07	0.05								
Capacity (veh/h)	756	809	575	583								
Control Delay (s)	9.8	12.3	8.8	8.6								
Approach Delay (s)	9.8	12.3	8.8	8.6								
Approach LOS	A	B	A	A								
Intersection Summary												
Delay			11.1									
HCM Level of Service			B									
Intersection Capacity Utilization			33.4%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

3: N 51st Street & N Bennett Street

2006 Existing
12/17/2007



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	2	151	318	4	2	1
Sign Control		Free	Free		Stop	
Grade		0%	6%		0%	
Peak Hour Factor	0.59	0.59	0.76	0.76	0.50	0.50
Hourly flow rate (vph)	3	256	418	5	4	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	424				684	421
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	424				684	421
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1146				416	637
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	259	424	6			
Volume Left	3	0	4			
Volume Right	0	5	2			
cSH	1146	1700	471			
Volume to Capacity	0.00	0.25	0.01			
Queue Length 95th (ft)	0	0	1			
Control Delay (s)	0.1	0.0	12.7			
Lane LOS	A		B			
Approach Delay (s)	0.1	0.0	12.7			
Approach LOS			B			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			27.0%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

5: N Ruston Way & Park Access

2006 Existing
12/17/2007



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	150	343	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	163	373	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	373				536	373
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	373				536	373
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1186				506	673
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	163	373	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1186	1700	1700			
Volume to Capacity	0.00	0.22	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			21.4%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: N 49th Street & N Ruston Way

2006 Existing
12/17/2007



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	8	102	252	350	142	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.93	0.93	0.57	0.57
Hourly flow rate (vph)	9	119	271	376	249	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1170	252	254			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1170	252	254			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	85	80			
cM capacity (veh/h)	171	792	1322			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	128	271	376	254		
Volume Left	9	271	0	0		
Volume Right	119	0	0	5		
cSH	626	1322	1700	1700		
Volume to Capacity	0.20	0.20	0.22	0.15		
Queue Length 95th (ft)	19	19	0	0		
Control Delay (s)	12.2	8.4	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	12.2	3.5		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			3.7			
Intersection Capacity Utilization			38.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

13: N 49th Street & N Pearl Street

2006 Existing
12/17/2007

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	12	9	434	9	3	439
Sign Control	Stop		Free			Free
Grade	0%		-2%			1%
Peak Hour Factor	0.71	0.71	0.84	0.84	0.73	0.73
Hourly flow rate (vph)	17	13	517	11	4	601
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						951
pX, platoon unblocked	0.95					
vC, conflicting volume	1132	522			527	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1112	522			527	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	98			100	
cM capacity (veh/h)	220	559			1040	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	30	527	605			
Volume Left	17	0	4			
Volume Right	13	11	0			
cSH	298	1700	1040			
Volume to Capacity	0.10	0.31	0.00			
Queue Length 95th (ft)	8	0	0			
Control Delay (s)	18.4	0.0	0.1			
Lane LOS	C		A			
Approach Delay (s)	18.4	0.0	0.1			
Approach LOS	C					
Intersection Summary						
Average Delay		0.5				
Intersection Capacity Utilization		35.5%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

14: N 49th Street & N Winnifred Street

2006 Existing
12/17/2007



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	5	214	12	17	71	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.63	0.75	0.75	0.61	0.83	0.63
Hourly flow rate (vph)	8	285	16	28	86	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	44				331	30
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	44				331	30
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				87	99
cM capacity (veh/h)	1578				664	1050
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	293	44	93			
Volume Left	8	0	86			
Volume Right	0	28	8			
cSH	1578	1700	686			
Volume to Capacity	0.01	0.03	0.14			
Queue Length 95th (ft)	0	0	12			
Control Delay (s)	0.2	0.0	11.1			
Lane LOS	A		B			
Approach Delay (s)	0.2	0.0	11.1			
Approach LOS			B			
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization			26.2%	ICU Level of Service		A
Analysis Period (min)			15			

Appendix 3.7-D: Proposed Action Trip Generation

Trip Gen-Internal 071129

12/17/2007 1:30 PM

Multi-use Development PM Peak Internal Trip Calculation

Retail

ITE Land Use =	Retail & Supermarket
Size =	
% Enter =	47%
% Exit =	53%
Enter	323
Exit	364
Total	688
%	100%

Retail

ITE Land Use =	Other Commercial
Size =	
% Enter =	56%
% Exit =	44%
Enter	241
Exit	192
Total	433
%	100%

Residential

ITE Land Use =	General Residential
Size =	1020
% Enter =	64%
% Exit =	36%
Enter	316
Exit	178
Total	494
%	100%

Office

ITE Land Use =	Office LU710
Size =	
% Enter =	17%
% Exit =	83%
Enter	25
Exit	121
Total	146
%	100%

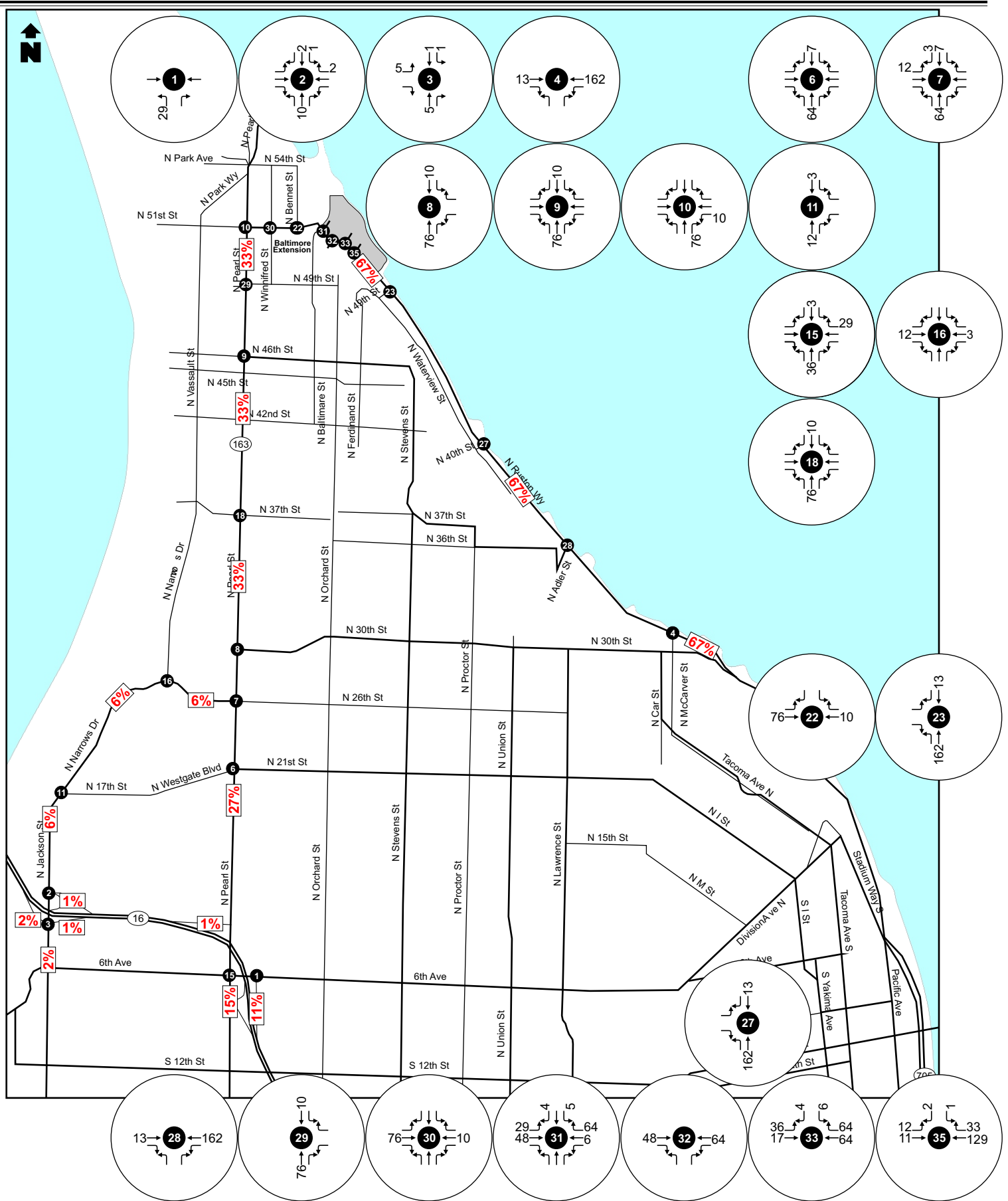
External Trips

	Retail & Supermark	General Residential	Other Commer	Office	Sub-Total
External Enter	286	281	202	17	786
External Exit	315	152	158	112	736
Total External Trips	601	434	359	129	1523
Internal Trips	87	60	74	17	238
Gross Trips	688	494	433	146	1761
Overall Average Internal Capture Rate					13%

	35%	64%
super		health
enter	100	129
exit	110	101
total	210	230
	65%	36%
retail		rest
enter	186	73
exit	205	57
total	391	129

Source: 2001 ITE Trip Generation Handbook Methodology
Data Source: 7th Edition Trip Generation Report

Appendix 3.7- E: Proposed Action Trip Distribution and Assignment



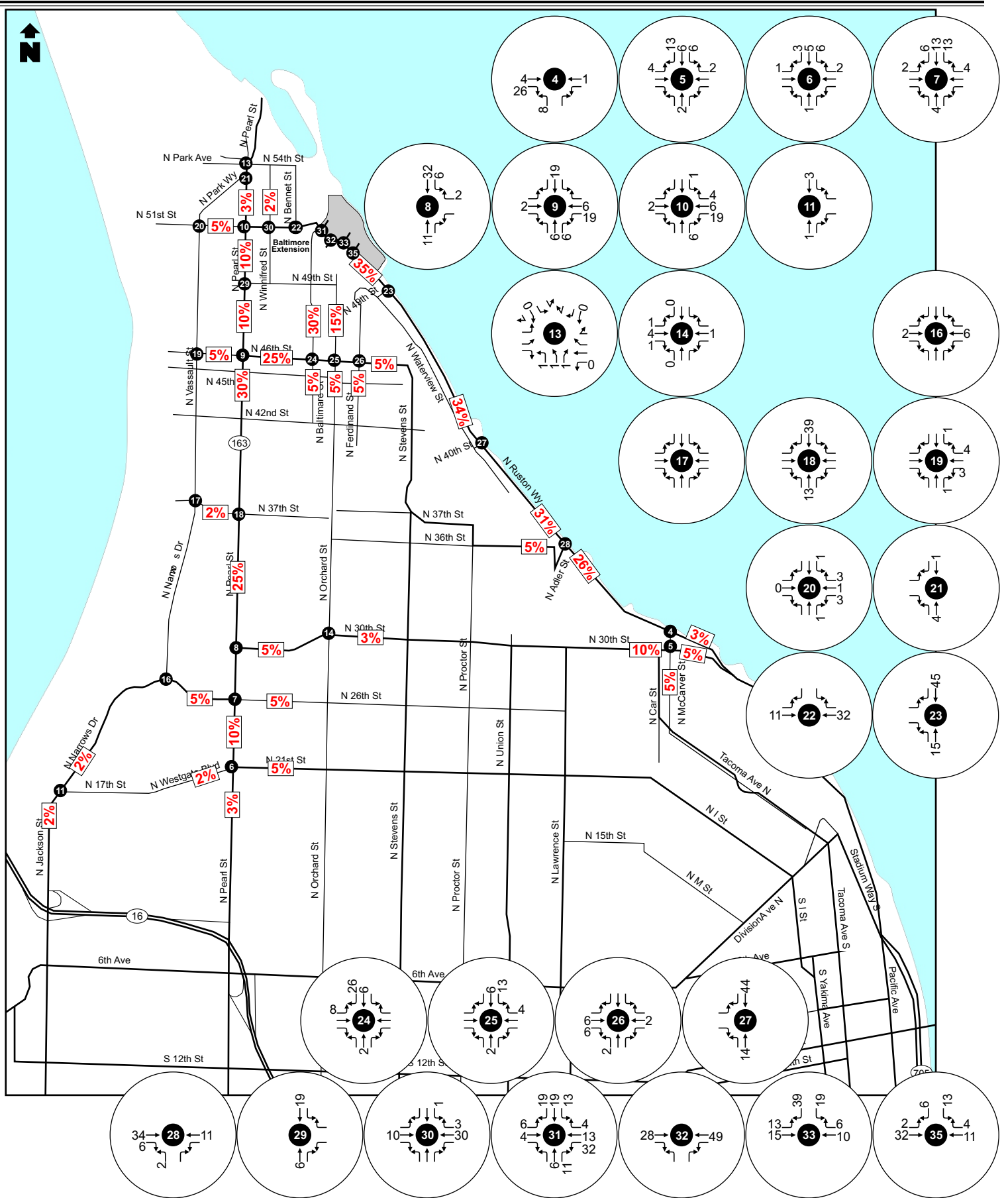


FIGURE 3.7-E2:
WEEKDAY PM PEAK HOUR LOCAL MULTI-FAMILY
TRIP DISTRIBUTION AND TRAVEL ASSIGNMENT

Point Ruston
Traffic Impact Analysis
E.I.S. Supplement

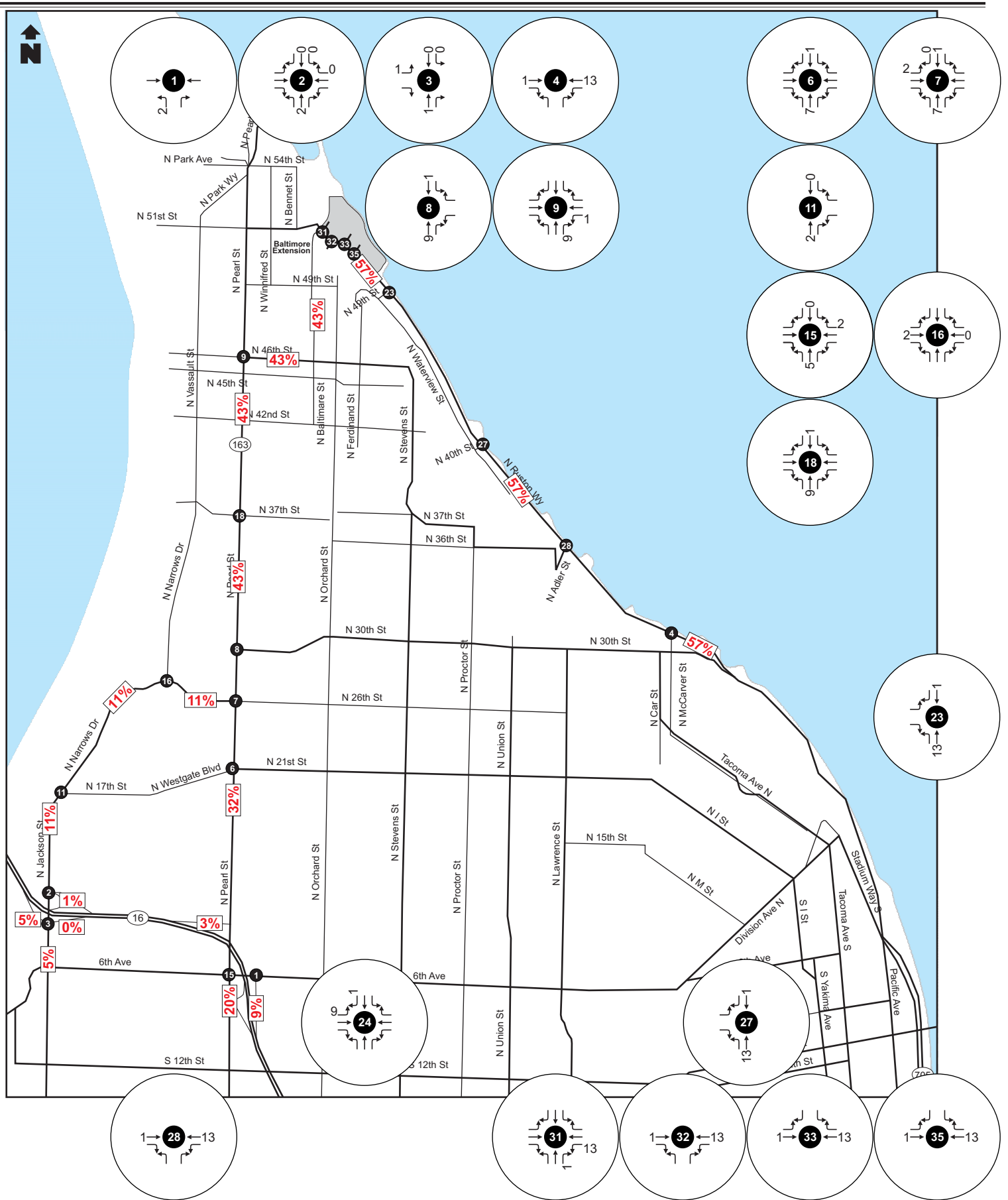
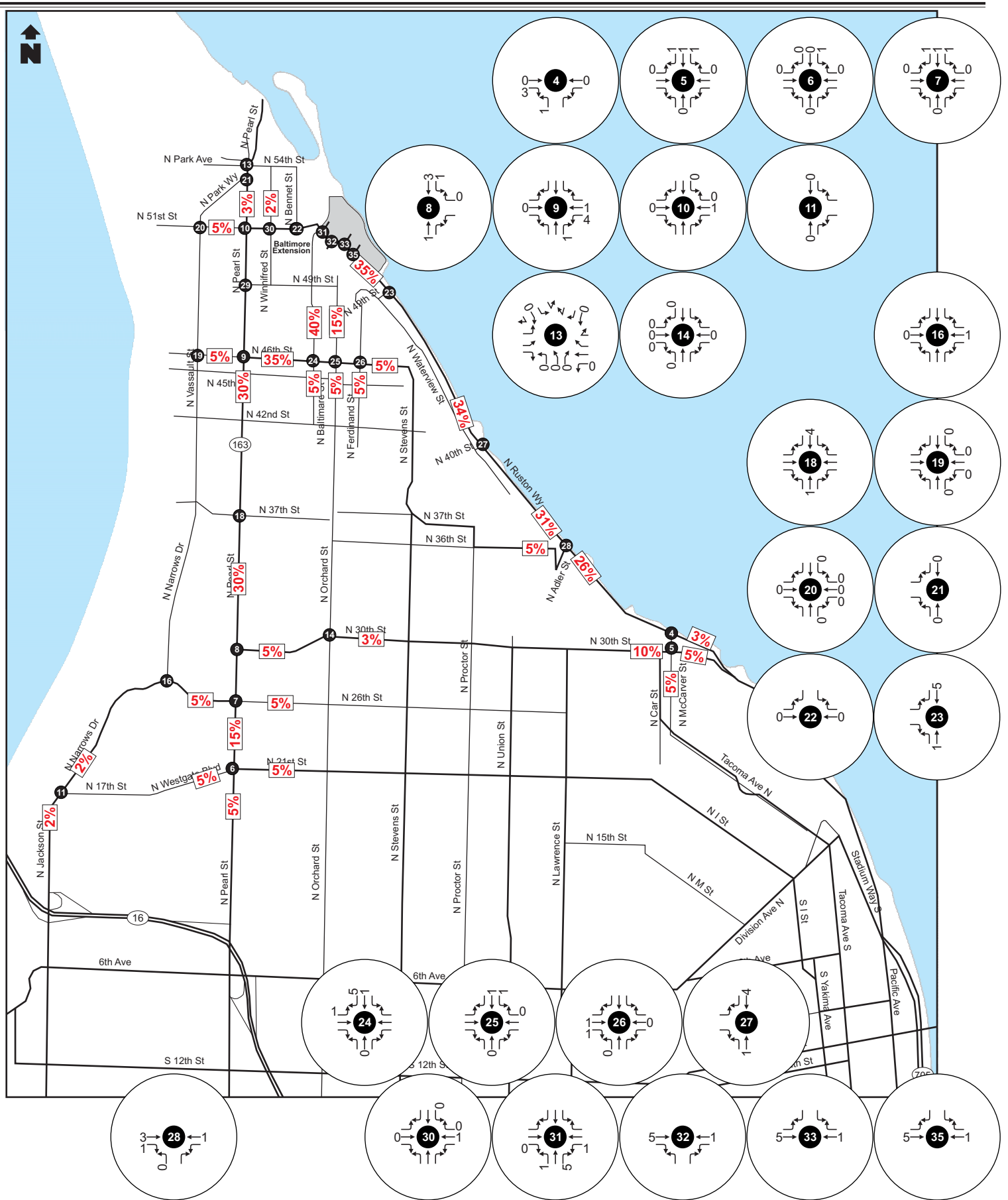
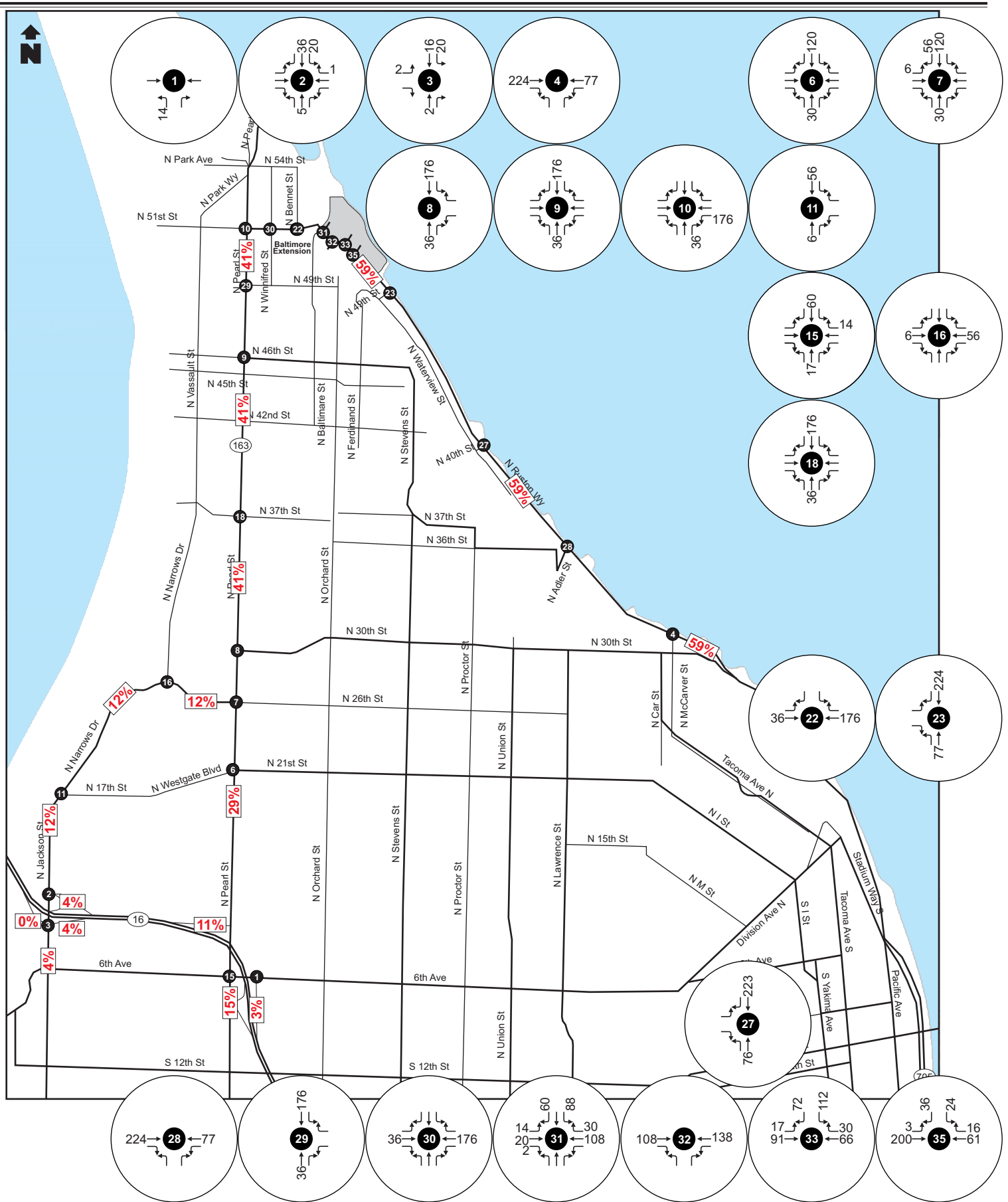
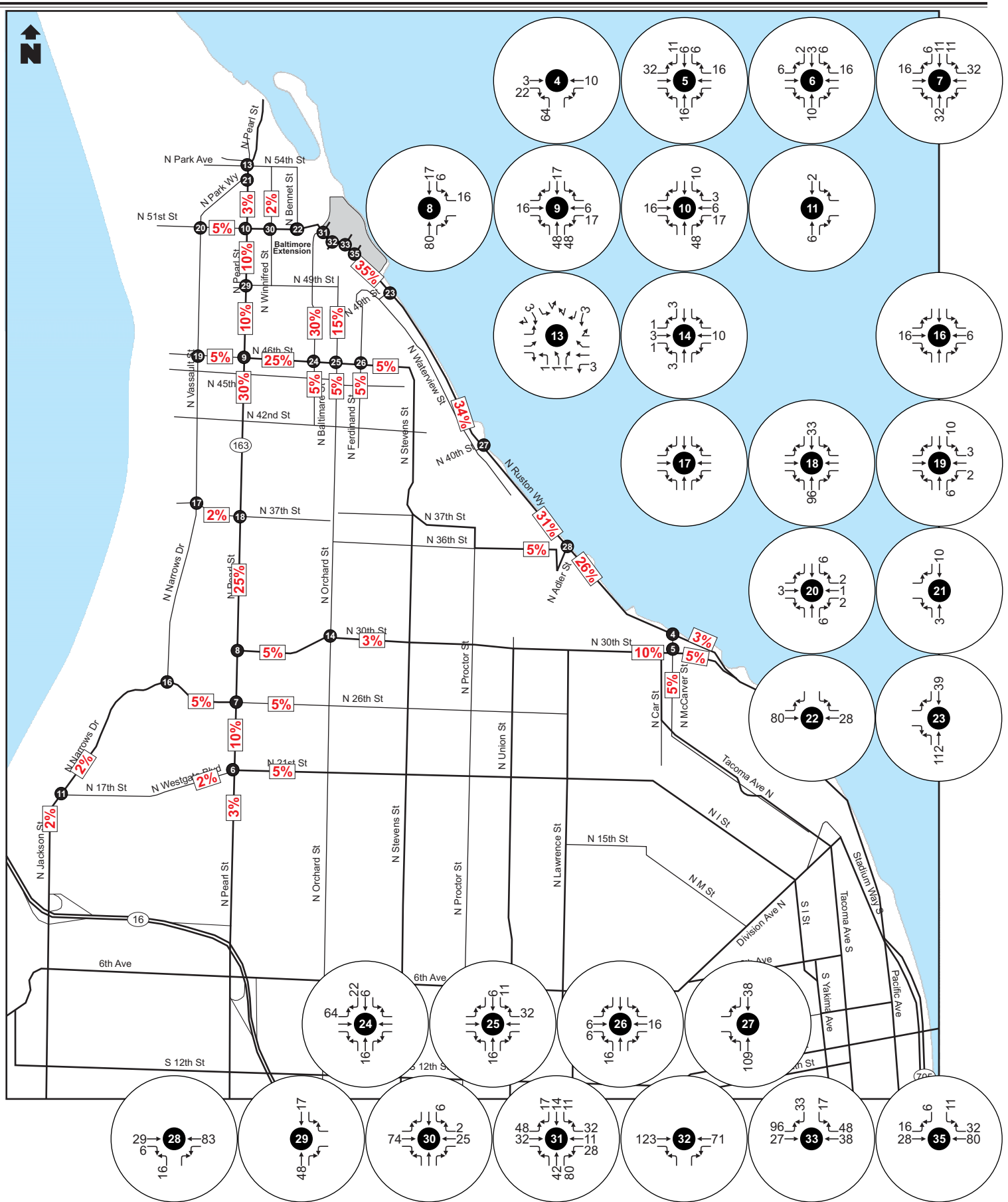


FIGURE 3.7-E3:
WEEKDAY PM PEAK HOUR REGIONAL SINGLE-FAMILY
TRIP DISTRIBUTION AND TRAVEL ASSIGNMENT

Point Ruston
Traffic Impact Analysis
E.I.S. Supplement







Appendix 3.7-F: Proposed Action Intersection Level of Service Reports

HCM Signalized Intersection Capacity Analysis
1: 6th Avenue & SR-16 WB Off Ramp

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Volume (vph)	630	0	0	929	328	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	0.95			0.95	0.97	
Flt	1.00			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3505			3539	3400	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	3505			3539	3400	
Peak-hour factor, PHF	0.89	0.89	0.96	0.96	0.85	0.85
Adj. Flow (vph)	708	0	0	968	386	51
RTOR Reduction (vph)	0	0	0	0	16	0
Lane Group Flow (vph)	708	0	0	968	421	0
Heavy Vehicles (%)	3%	3%	2%	2%	2%	2%
Turn Type						
Protected Phases	4			8	6	
Permitted Phases						
Actuated Green, G (s)	63.8			63.8	16.2	
Effective Green, g (s)	64.8			64.8	17.2	
Actuated g/C Ratio	0.72			0.72	0.19	
Clearance Time (s)	5.0			5.0	5.0	
Vehicle Extension (s)	2.5			2.5	2.5	
Lane Grp Cap (vph)	2524			2548	650	
v/s Ratio Prot	0.20			c0.27	c0.12	
v/s Ratio Perm						
v/c Ratio	0.28			0.38	0.65	
Uniform Delay, d1	4.4			4.9	33.6	
Progression Factor	0.23			1.00	1.00	
Incremental Delay, d2	0.2			0.4	2.0	
Delay (s)	1.3			5.3	35.6	
Level of Service	A			A	D	
Approach Delay (s)	1.3			5.3	35.6	
Approach LOS	A			A	D	
Intersection Summary						
HCM Average Control Delay			10.2		HCM Level of Service	B
HCM Volume to Capacity ratio			0.44			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			43.1%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
2: 10th Street & N Jackson Avenue

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑	↑↑	↑↑	↑↑		↑↑	↑↑	
Volume (vph)	7	14	27	46	1	21	50	731	417	218	718	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			0%			0%				0%
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Flt		0.92			1.00	0.85	1.00	0.95		1.00	1.00	
Flt Protected		0.99			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1724			1811	1615	1805	3413		1805	3602	
Flt Permitted		0.99			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1724			1811	1615	1805	3413		1805	3602	
Peak-hour factor, PHF	0.85	0.85	0.85	0.76	0.76	0.76	0.94	0.94	0.94	0.94	0.95	0.95
Adj. Flow (vph)	8	16	32	61	1	28	53	778	444	232	756	12
RTOR Reduction (vph)	0	30	0	0	0	23	0	54	0	0	0	0
Lane Group Flow (vph)	0	26	0	0	62	5	53	1168	0	232	768	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Split			Split	custom		Prot			Prot		
Protected Phases	7		7		8	8	5	2		1	6	
Permitted Phases						5						
Actuated Green, G (s)		3.6			6.6	12.8	6.2	37.4		20.4	51.6	
Effective Green, g (s)		4.6			7.6	14.8	7.2	38.4		21.4	52.6	
Actuated g/C Ratio		0.05			0.09	0.17	0.08	0.44		0.24	0.60	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		2.5			2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		90			156	345	148	1489		439	2153	
v/s Ratio Prot		c0.01			c0.03	0.00	0.03	c0.34		c0.13	0.21	
v/s Ratio Perm						0.00						
v/c Ratio		0.29			0.40	0.01	0.36	0.78		0.53	0.36	
Uniform Delay, d1		40.1			38.0	30.5	38.2	21.3		28.9	9.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.3			1.2	0.0	1.1	2.7		0.9	0.1	
Delay (s)		41.4			39.2	30.5	39.3	23.9		29.8	9.1	
Level of Service		D			D	C	D	C		C	A	
Approach Delay (s)		41.4			36.5			24.6			13.9	
Approach LOS		D			D			C			B	
Intersection Summary												
HCM Average Control Delay					21.0			HCM Level of Service		C		
HCM Volume to Capacity ratio					0.64							
Actuated Cycle Length (s)					88.0			Sum of lost time (s)		16.0		
Intersection Capacity Utilization					64.9%			ICU Level of Service		C		
Analysis Period (min)					15							
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: SR-16 EB Ramp & N Jackson Avenue

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱						↰	↱	↰	↱	
Volume (vph)	320	0	594	0	0	0	0	894	156	159	596	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%				0%		-5%			0%	
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	
Flt	1.00	0.85						0.98		1.00	1.00	
Flt Protected	0.95	1.00						1.00		0.95	1.00	
Satd. Flow (prot)	1769	1583						3618		1805	3610	
Flt Permitted	0.95	1.00						1.00		0.95	1.00	
Satd. Flow (perm)	1769	1583						3618		1805	3610	
Peak-hour factor, PHF	0.87	0.87	0.87	0.25	0.25	0.25	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	368	0	683	0	0	0	0	993	173	175	655	0
RTOR Reduction (vph)	0	152	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	368	531	0	0	0	0	0	1157	0	175	655	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm						Prot					
Protected Phases	4						6					
Permitted Phases	4						5					
Actuated Green, G (s)	45.3	45.3						44.2		16.6	65.8	
Effective Green, g (s)	46.3	46.3						45.2		17.6	66.8	
Actuated g/C Ratio	0.38	0.38						0.37		0.15	0.55	
Clearance Time (s)	5.0	5.0						5.0		5.0	5.0	
Vehicle Extension (s)	1.5	1.5						1.5		1.5	1.5	
Lane Grp Cap (vph)	676	605						1350		262	1991	
v/s Ratio Prot		c0.34						c0.32		c0.10	0.18	
v/s Ratio Perm	0.21											
v/c Ratio	0.54	0.88						0.86		0.67	0.33	
Uniform Delay, d1	29.2	34.8						35.0		49.0	14.9	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	0.5	13.2						5.4		4.9	0.0	
Delay (s)	29.7	48.0						40.3		53.9	14.9	
Level of Service	C	D						D		D	B	
Approach Delay (s)		41.6			0.0			40.3			23.1	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM Average Control Delay	36.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	121.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: N Ruston Way & N McCarver Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Volume (vph)	472	86	70	1026	219	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	0%			0%	-3%	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Flt	1.00	0.85	1.00	1.00	0.97	
Flt Protected	1.00	1.00	0.95	1.00	0.96	
Satd. Flow (prot)	1900	1615	1805	1900	1783	
Flt Permitted	1.00	1.00	0.42	1.00	0.96	
Satd. Flow (perm)	1900	1615	789	1900	1783	
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.90	0.90
Adj. Flow (vph)	513	93	74	1080	243	68
RTOR Reduction (vph)	0	23	0	0	12	0
Lane Group Flow (vph)	513	70	74	1080	299	0
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%
Turn Type	Perm		Perm		6	
Protected Phases	2		6		4	
Permitted Phases	2		6		4	
Actuated Green, G (s)	55.2	55.2	55.2	55.2	18.6	
Effective Green, g (s)	56.2	56.2	56.2	56.2	19.6	
Actuated g/C Ratio	0.67	0.67	0.67	0.67	0.23	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	1274	1083	529	1274	417	
v/s Ratio Prot	0.27			c0.57	c0.17	
v/s Ratio Perm		0.04	0.09			
v/c Ratio	0.40	0.06	0.14	0.85	0.72	
Uniform Delay, d1	6.2	4.7	5.0	10.5	29.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.0	0.1	5.3	5.4	
Delay (s)	6.4	4.8	5.1	15.9	34.9	
Level of Service	A	A	A	B	C	
Approach Delay (s)	6.1			15.2	34.9	
Approach LOS	A			B	C	

Intersection Summary			
HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	83.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: N 30th Street & N McCarver Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱	↰	↱	↰	↱
Volume (vph)	88	491	42	14	975	31	109	103	41	41	61	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			-2%	
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Flt	1.00	0.99		1.00	1.00			0.98			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1770	1841		1787	1873			1757			1802	
Flt Permitted	0.08	1.00		0.36	1.00			0.63			0.83	
Satd. Flow (perm)	140	1841		679	1873			1136			1514	
Peak-hour factor, PHF	0.91	0.91	0.91	0.93	0.93	0.93	0.96	0.96	0.59	0.59	0.92	
Adj. Flow (vph)	97	540	46	15	1048	33	114	107	43	69	103	98
RTOR Reduction (vph)	0	2	0	0	1	0	0	8	0	0	24	0
Lane Group Flow (vph)	97	584	0	15	1080	0	0	256	0	0	246	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	0%	0%	0%
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			4			6			2	
Permitted Phases	4			4			6			2		
Actuated Green, G (s)	55.3	55.3		55.3	55.3			21.0			21.0	
Effective Green, g (s)	56.3	56.3		56.3	56.3			22.0			22.0	
Actuated g/C Ratio	0.65	0.65		0.65	0.65			0.25			0.25	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5			2.5			2.5	
Lane Grp Cap (vph)	91	1201		443	1222			290			386	
v/s Ratio Prot		0.32			0.58							
v/s Ratio Perm	c0.69			0.02			c0.23				0.16	
v/c Ratio	1.07	0.49		0.03	0.88			0.88			0.64	
Uniform Delay, d1	15.0	7.6		5.3	12.3			30.9			28.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	113.4	0.2		0.0	7.8			25.3			3.0	
Delay (s)	128.4	7.9		5.4	20.2			56.2			31.6	
Level of Service	F	A		A	C			E			C	
Approach Delay (s)		25.0			20.0			56.2			31.6	
Approach LOS		C			B			E			C	
Intersection Summary												
HCM Average Control Delay		26.9			HCM Level of Service			C				
HCM Volume to Capacity ratio		1.01										
Actuated Cycle Length (s)		86.3			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		97.6%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: N Westgate Boulevard & N Pearl Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱	↰	↱	↰	↱
Volume (vph)	143	281	71	264	517	230	93	753	75	161	777	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95		1.00	0.95
Flt	1.00	0.97		1.00	0.95			1.00	0.99		1.00	0.99
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1805	3501		1805	3443			1805	3561		1805	3564
Flt Permitted	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (perm)	1805	3501		1805	3443			1805	3561		1805	3564
Peak-hour factor, PHF	0.95	0.95	0.95	0.94	0.94	0.94	0.95	0.95	0.95	0.89	0.89	0.89
Adj. Flow (vph)	151	296	75	281	550	245	98	793	79	181	873	82
RTOR Reduction (vph)	0	26	0	0	59	0	0	8	0	0	7	0
Lane Group Flow (vph)	151	345	0	281	736	0	98	864	0	181	948	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	10.5	17.7		16.1	23.3		6.5	25.3		10.9	29.7	
Effective Green, g (s)	11.5	18.7		17.1	24.3		7.5	26.3		11.9	30.7	
Actuated g/C Ratio	0.13	0.21		0.19	0.27		0.08	0.29		0.13	0.34	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	231	727		343	930		150	1041		239	1216	
v/s Ratio Prot	c0.08	0.10		0.16	c0.21		0.05	0.24		c0.10	c0.27	
v/s Ratio Perm												
v/c Ratio	0.65	0.47		0.82	0.79		0.65	0.83		0.76	0.78	
Uniform Delay, d1	37.4	31.3		35.0	30.5		40.0	29.8		37.7	26.6	
Progression Factor	1.00	1.00		1.00	1.00		0.90	1.15		0.96	1.53	
Incremental Delay, d2	5.8	0.4		13.8	4.5		5.7	5.0		9.6	3.8	
Delay (s)	43.2	31.7		48.8	35.0		41.6	39.3		45.5	44.4	
Level of Service	D	C		D	D		D	D		D	D	
Approach Delay (s)		35.0			38.6			39.5			44.6	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM Average Control Delay		40.2			HCM Level of Service			D				
HCM Volume to Capacity ratio		0.75										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		75.0%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: N 26th Street & N Pearl Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Volume (vph)	181	218	64	148	284	134	158	967	86	114	776	258
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Flt	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3487		1805	3436		1805	3566		1805	3475	
Flt Permitted	0.40	1.00		0.50	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	751	3487		951	3436		1805	3566		1805	3475	
Peak-hour factor, PHF	0.88	0.88	0.88	0.96	0.96	0.96	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	206	248	73	154	296	140	165	1007	90	124	843	280
RTOR Reduction (vph)	0	31	0	0	64	0	0	6	0	0	33	0
Lane Group Flow (vph)	206	290	0	154	372	0	165	1091	0	124	1090	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases	4			8			5		2	1		6
Permitted Phases	4			8			5		2	1		6
Actuated Green, G (s)	24.9	24.9		24.9	24.9		12.6	39.1		11.0	37.5	
Effective Green, g (s)	25.9	25.9		25.9	25.9		13.6	40.1		12.0	38.5	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.15	0.45		0.13	0.43	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	216	1003		274	989		273	1589		241	1487	
v/s Ratio Prot		0.08			0.11		0.09	0.31		0.07	0.31	
v/s Ratio Perm	0.27			0.16								
v/c Ratio	0.95	0.29		0.56	0.38		0.60	0.69		0.51	0.73	
Uniform Delay, d1	31.5	24.9		27.2	25.6		35.7	19.9		36.3	21.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.40		1.13	0.65	
Incremental Delay, d2	47.9	0.1		2.1	0.2		2.1	1.6		1.3	2.9	
Delay (s)	79.3	25.0		29.4	25.8		37.9	29.5		42.4	16.8	
Level of Service	E	C		C	C		D	C		D	B	
Approach Delay (s)		46.3			26.7			30.6			19.4	
Approach LOS		D			C			C			B	
Intersection Summary												
HCM Average Control Delay		28.4			HCM Level of Service			C				
HCM Volume to Capacity ratio		0.78										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		73.9%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
8: N 30th Street & N Pearl Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↱		↰	↱
Volume (vph)	315	165	935	186	124	927
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	4%		0%			0%
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Flt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1734	1552	3485		1770	3539
Flt Permitted	0.95	1.00	1.00		0.19	1.00
Satd. Flow (perm)	1734	1552	3485		352	3539
Peak-hour factor, PHF	0.96	0.96	0.95	0.95	0.93	0.93
Adj. Flow (vph)	328	172	984	196	133	997
RTOR Reduction (vph)	0	70	14	0	0	0
Lane Group Flow (vph)	328	102	1166	0	133	997
Heavy Vehicles (%)	2%	2%	1%	1%	2%	2%
Turn Type	Perm				Perm	
Protected Phases	4		2			2
Permitted Phases	4		2			2
Actuated Green, G (s)	22.1	22.1	57.9		57.9	57.9
Effective Green, g (s)	23.1	23.1	58.9		58.9	58.9
Actuated g/C Ratio	0.26	0.26	0.65		0.65	0.65
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.5	2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	445	398	2281		230	2316
v/s Ratio Prot	0.19		0.33			0.28
v/s Ratio Perm		0.07			0.38	
v/c Ratio	0.74	0.26	0.51		0.58	0.43
Uniform Delay, d1	30.7	26.6	8.1		8.6	7.5
Progression Factor	1.00	1.00	0.95		0.87	0.81
Incremental Delay, d2	5.9	0.2	0.6		9.7	0.6
Delay (s)	36.6	26.9	8.2		17.2	6.6
Level of Service	D	C	A		B	A
Approach Delay (s)	33.2		8.2			7.9
Approach LOS	C		A			A
Intersection Summary						
HCM Average Control Delay		12.5			HCM Level of Service	B
HCM Volume to Capacity ratio		0.62				
Actuated Cycle Length (s)		90.0			Sum of lost time (s)	8.0
Intersection Capacity Utilization		67.6%			ICU Level of Service	C
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
9: N 46th Street & N Pearl Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Volume (vph)	9	85	22	145	121	83	55	487	150	50	548	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	10	12	12	10	12	12	10	12	12
Grade (%)		2%			0%			0%			1%	
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.94		1.00	0.96		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1635	3281		1652	3324		1636	3381		1643	3513	
Flt Permitted	0.61	1.00		0.67	1.00		0.42	1.00		0.36	1.00	
Satd. Flow (perm)	1043	3281		1160	3324		716	3381		631	3513	
Peak-hour factor, PHF	0.80	0.80	0.80	0.87	0.87	0.87	0.94	0.94	0.94	0.93	0.93	0.93
Adj. Flow (vph)	11	106	28	167	139	95	59	518	160	54	589	10
RTOR Reduction (vph)	0	18	0	0	61	0	0	51	0	0	2	0
Lane Group Flow (vph)	11	116	0	167	173	0	59	627	0	54	597	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			4			6			2	
Permitted Phases	4			4			6			2		
Actuated Green, G (s)	11.3	11.3		11.3	11.3		12.9	12.9		12.9	12.9	
Effective Green, g (s)	12.3	12.3		12.3	12.3		13.9	13.9		13.9	13.9	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.41	0.41		0.41	0.41	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	375	1180		417	1195		291	1374		256	1428	
v/s Ratio Prot		0.04			0.05			0.19			0.17	
v/s Ratio Perm	0.01			0.14			0.08			0.09		
v/c Ratio	0.03	0.10		0.40	0.14		0.20	0.46		0.21	0.42	
Uniform Delay, d1	7.1	7.3		8.2	7.4		6.6	7.4		6.6	7.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.0		0.5	0.0		0.3	0.2		0.3	0.1	
Delay (s)	7.1	7.3		8.7	7.4		6.8	7.6		6.9	7.4	
Level of Service	A	A		A	A		A	A		A	A	
Approach Delay (s)		7.3			7.9			7.5			7.4	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay		7.5			HCM Level of Service			A				
HCM Volume to Capacity ratio		0.43										
Actuated Cycle Length (s)		34.2			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		51.3%			ICU Level of Service			A				
Analysis Period (min)		15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: N 51st Street & N Pearl Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Volume (vph)	13	57	39	311	93	87	33	151	219	75	159	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Grade (%)		-2%			3%			-2%			2%	
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.95			1.00	0.85	1.00	0.91		1.00	1.00	
Flt Protected		0.99			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1816			1802	1591	1668	1600		1635	1721	
Flt Permitted		0.94			0.68	1.00	0.50	1.00		0.36	1.00	
Satd. Flow (perm)		1713			1266	1591	879	1600		620	1721	
Peak-hour factor, PHF	0.76	0.76	0.76	0.96	0.96	0.96	0.88	0.88	0.88	0.52	0.52	0.52
Adj. Flow (vph)	17	75	51	324	97	91	38	172	249	144	306	0
RTOR Reduction (vph)	0	25	0	0	0	29	0	52	0	0	0	0
Lane Group Flow (vph)	0	118	0	0	421	62	38	369	0	144	306	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm	pm+pt				
Protected Phases		4			4		6			5	2	
Permitted Phases	4			4		4	6			2		
Actuated Green, G (s)		33.4			33.4	33.4	35.6	35.6		46.6	46.6	
Effective Green, g (s)		34.4			34.4	34.4	36.6	36.6		47.6	47.6	
Actuated g/C Ratio		0.38			0.38	0.38	0.41	0.41		0.53	0.53	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		2.5			2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		655			484	608	357	651		407	910	
v/s Ratio Prot								0.23		0.03	0.18	
v/s Ratio Perm		0.07			0.33	0.04	0.04			0.16		
v/c Ratio		0.18			0.87	0.10	0.11	0.57		0.35	0.34	
Uniform Delay, d1		18.4			25.7	17.9	16.6	20.6		19.8	12.1	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			15.2	0.1	0.6	3.5		0.4	1.0	
Delay (s)		18.5			40.9	17.9	17.2	24.1		20.2	13.1	
Level of Service		B			D	B	B	C		C	B	
Approach Delay (s)		18.5			36.8			23.6			15.4	
Approach LOS		B			D			C			B	
Intersection Summary												
HCM Average Control Delay		25.1				HCM Level of Service		C				
HCM Volume to Capacity ratio		0.66										
Actuated Cycle Length (s)		90.0				Sum of lost time (s)		8.0				
Intersection Capacity Utilization		65.2%				ICU Level of Service		C				
Analysis Period (min)		15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: N 17th Street & N Narrows Drive

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	403	0	16	0	542	244	18	583	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00			1.00		1.00	1.00	
Flt				1.00	0.85			0.96		1.00	1.00	
Flt Protected				0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)				1787	1599			1820		1805	1900	
Flt Permitted				0.95	1.00			1.00		0.11	1.00	
Satd. Flow (perm)				1787	1599			1820		200	1900	
Peak-hour factor, PHF	0.25	0.25	0.25	0.87	0.87	0.87	0.95	0.95	0.95	0.89	0.89	0.89
Adj. Flow (vph)	0	0	0	463	0	18	0	571	257	20	655	0
RTOR Reduction (vph)	0	0	0	0	11	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	0	0	463	7	0	0	813	0	20	655	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Perm			Perm						Perm		
Protected Phases	7			8			6			2		
Permitted Phases	7			8						2		
Actuated Green, G (s)				28.0	28.0	37.0			37.0			
Effective Green, g (s)				29.0	29.0	38.0			38.0			
Actuated g/C Ratio				0.39	0.39	0.51			0.51			
Clearance Time (s)				5.0	5.0	5.0			5.0			
Vehicle Extension (s)				2.5	2.5	2.5			2.5			
Lane Grp Cap (vph)				691	618	922			101			
v/s Ratio Prot					0.00	c0.45			0.34			
v/s Ratio Perm				c0.26				0.10				
v/c Ratio				0.67	0.01	0.88			0.20			
Uniform Delay, d1				19.0	14.2	16.5			10.1			
Progression Factor				1.00	1.00	1.00			1.00			
Incremental Delay, d2				2.3	0.0	9.9			0.7			
Delay (s)				21.4	14.2	26.3			10.8			
Level of Service				C	B	C			B			
Approach Delay (s)	0.0			21.1			26.3			15.6		
Approach LOS	A			C			C			B		
Intersection Summary												
HCM Average Control Delay	21.4			HCM Level of Service			C					
HCM Volume to Capacity ratio	0.79											
Actuated Cycle Length (s)	75.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	72.4%			ICU Level of Service			C					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
12: I-705 Off-Ramp & Stadium Way

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	80	1080	259	57	915	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	2%		2%			-4%
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1752	1567	1765		1841	1938
Flt Permitted	0.95	1.00	1.00		0.54	1.00
Satd. Flow (perm)	1752	1567	1765		1047	1938
Peak-hour factor, PHF	0.95	0.95	0.85	0.85	0.91	0.91
Adj. Flow (vph)	84	1137	305	67	1005	143
RTOR Reduction (vph)	0	389	8	0	0	0
Lane Group Flow (vph)	84	748	364	0	1005	143
Heavy Vehicles (%)	2%	2%	4%	4%	0%	0%
Turn Type	pm+ov			custom		
Protected Phases	3	5	6		5	2
Permitted Phases		3			4	
Actuated Green, G (s)	4.6	28.8	18.8		34.3	48.0
Effective Green, g (s)	5.6	30.8	19.8		36.3	49.0
Actuated g/C Ratio	0.07	0.40	0.25		0.47	0.63
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.5	2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	126	621	450		747	1222
v/s Ratio Prot	0.05	c0.39	c0.21		c0.44	0.07
v/s Ratio Perm		0.09			c0.19	
v/c Ratio	0.67	1.20	0.81		1.35	0.12
Uniform Delay, d1	35.1	23.5	27.2		18.8	5.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	11.4	106.9	10.0		164.3	0.0
Delay (s)	46.5	130.4	37.2		183.1	5.8
Level of Service	D	F	D		F	A
Approach Delay (s)	124.6		37.2			161.0
Approach LOS	F		D			F
Intersection Summary						
HCM Average Control Delay			128.0	HCM Level of Service		F
HCM Volume to Capacity ratio			1.16			
Actuated Cycle Length (s)			77.7	Sum of lost time (s)		16.0
Intersection Capacity Utilization			90.6%	ICU Level of Service		E
Analysis Period (min)	15					
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
14: N 30th Street & N Orchard Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	106	302	37	62	483	53	48	238	32	41	223	77
Peak Hour Factor	0.93	0.93	0.93	0.97	0.97	0.97	0.87	0.87	0.87	0.94	0.94	0.94
Hourly flow rate (vph)	114	325	40	64	498	55	55	274	37	44	237	82
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	478	616	366	363								
Volume Left (vph)	114	64	55	44								
Volume Right (vph)	40	55	37	82								
Hadj (s)	0.01	-0.02	-0.01	-0.09								
Departure Headway (s)	9.4	9.3	9.4	9.4								
Degree Utilization, x	1.24	1.60	0.95	0.94								
Capacity (veh/h)	390	390	379	377								
Control Delay (s)	157.8	303.8	66.5	63.7								
Approach Delay (s)	157.8	303.8	66.5	63.7								
Approach LOS	F	F	F	F								
Intersection Summary												
Delay	170.1											
HCM Level of Service	F											
Intersection Capacity Utilization	76.1%			ICU Level of Service			D					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis
15: 6th Avenue & N Pearl Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	231	498	202	187	708	379	125	418	67	80	468	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			0%			0%			0%	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1796	3592	1607	1770	3539	1583		3499	1583	1752	3505	1568
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1796	3592	1607	1770	3539	1583		3499	1583	1752	3505	1568
Peak-hour factor, PHF	0.98	0.98	0.98	0.88	0.88	0.88	0.89	0.89	0.89	0.80	0.80	0.80
Adj. Flow (vph)	236	508	206	212	805	431	140	470	75	100	585	214
RTOR Reduction (vph)	0	0	155	0	0	318	0	0	59	0	0	167
Lane Group Flow (vph)	236	508	51	212	805	113	0	610	16	100	585	47
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Turn Type	Prot	Perm		Prot	Perm		Split	Perm		Split	Perm	
Protected Phases	7	4		3	8		1	1		2	2	
Permitted Phases		4			8			1			2	
Actuated Green, G (s)	10.0	21.1	21.1	11.6	22.7	22.7		18.7	18.7	18.6	18.6	18.6
Effective Green, g (s)	11.0	22.1	22.1	12.6	23.7	23.7		19.7	19.7	19.6	19.6	19.6
Actuated g/C Ratio	0.12	0.25	0.25	0.14	0.26	0.26		0.22	0.22	0.22	0.22	0.22
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5	2.5	2.5
Lane Grp Cap (vph)	220	882	395	248	932	417		766	347	382	763	341
v/s Ratio Prot	c0.13	0.14		0.12	c0.23			c0.17		0.06	c0.17	
v/s Ratio Perm			0.03			0.07			0.01			0.03
v/c Ratio	1.07	0.58	0.13	0.85	0.86	0.27		0.80	0.05	0.26	0.77	0.14
Uniform Delay, d1	39.5	29.8	26.4	37.8	31.6	26.3		33.3	27.7	29.2	33.1	28.4
Progression Factor	1.00	1.00	1.00	1.12	1.11	2.21		1.00	1.00	0.56	0.62	1.24
Incremental Delay, d2	81.3	2.7	0.7	22.8	10.1	1.5		5.6	0.0	0.2	2.9	0.1
Delay (s)	120.8	32.6	27.1	65.2	45.3	59.7		38.8	27.8	16.4	23.3	35.2
Level of Service	F	C	C	E	D	E		D	C	B	C	D
Approach Delay (s)	53.3			52.5			37.6			25.3		
Approach LOS	D			D			D			C		
Intersection Summary												
HCM Average Control Delay	44.0			HCM Level of Service			D					
HCM Volume to Capacity ratio	0.85											
Actuated Cycle Length (s)	90.0			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	73.8%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
16: N Narrows Drive & N 26th Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	205	363	2	39	455	125	0	1	27	82	4	228
Sign Control	Free				Free			Stop			Stop	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.89	0.89	0.89	0.75	0.75	0.75	0.89	0.89	0.89
Hourly flow rate (vph)	218	386	2	44	511	140	0	1	36	92	4	256
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												12
Median type	None			TWLTL								
Median storage (veh)	2											
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	652			388			1553	1563	387	1528	1494	581
vC1, stage 1 conf vol							823	823			669	669
vC2, stage 2 conf vol							729	739			859	824
vCu, unblocked vol	652			388			1553	1563	387	1528	1494	581
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5			6.1	5.5
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	77			96			100	99	95	52	98	50
cM capacity (veh/h)	944			1181			37	173	665	192	227	513
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	218	388	44	652	37	353						
Volume Left	218	0	44	0	0	92						
Volume Right	0	2	0	140	36	256						
cSH	944	1700	1181	1700	604	707						
Volume to Capacity	0.23	0.23	0.04	0.38	0.06	0.50						
Queue Length 95th (ft)	22	0	3	0	5	70						
Control Delay (s)	10.0	0.0	8.2	0.0	11.4	24.8						
Lane LOS	A		A		B	C						
Approach Delay (s)	3.6		0.5		11.4	24.8						
Approach LOS					B	C						
Intersection Summary												
Average Delay			6.9									
Intersection Capacity Utilization			64.3%		ICU Level of Service				C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
17: N 37th Street & N Narrows Drive

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	4	19	12	43	25	90	14	172	40	69	192	8
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.91	0.91	0.91	0.84	0.84	0.84	0.88	0.88	0.88	0.85	0.85	0.85
Hourly flow rate (vph)	4	21	13	51	30	107	16	195	45	81	226	9
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)	1111											
pX, platoon unblocked												
vC, conflicting volume	137			34			291	276	27	359	229	83
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	137			34			291	276	27	359	229	83
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			97	68	96	81	65	99
cM capacity (veh/h)	1460			1591			468	611	1051	420	649	979
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	4	34	51	137	16	241	81	235				
Volume Left	4	0	51	0	16	0	81	0				
Volume Right	0	13	0	107	0	45	0	9				
cSH	1460	1700	1591	1700	468	664	420	658				
Volume to Capacity	0.00	0.02	0.03	0.08	0.03	0.36	0.19	0.36				
Queue Length 95th (ft)	0	0	2	0	3	41	18	41				
Control Delay (s)	7.5	0.0	7.3	0.0	13.0	13.5	15.6	13.5				
Lane LOS	A		A		B	B	C	B				
Approach Delay (s)	0.9		2.0		13.5		14.0					
Approach LOS					B		B					
Intersection Summary												
Average Delay				10.4								
Intersection Capacity Utilization				34.4%	ICU Level of Service			A				
Analysis Period (min)				15								

HCM Signalized Intersection Capacity Analysis
18: N 37th Street & N Pearl Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Volume (vph)	27	20	120	61	34	6	251	766	87	27	762	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.87		1.00	0.98		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1639		1787	1840		1787	3520		1787	3542	
Flt Permitted	0.72	1.00		0.48	1.00		0.26	1.00		0.33	1.00	
Satd. Flow (perm)	1349	1639		910	1840		485	3520		618	3542	
Peak-hour factor, PHF	0.89	0.89	0.89	0.65	0.65	0.65	0.99	0.99	0.99	0.93	0.93	0.93
Adj. Flow (vph)	30	22	135	94	52	9	254	774	88	29	819	52
RTOR Reduction (vph)	0	116	0	0	8	0	0	6	0	0	3	0
Lane Group Flow (vph)	30	41	0	94	53	0	254	856	0	29	868	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.8	12.8		12.8	12.8		69.2	69.2		54.4	54.4	
Effective Green, g (s)	12.8	12.8		12.8	12.8		69.2	69.2		54.4	54.4	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.77	0.77		0.60	0.60	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	192	233		129	262		529	2706		374	2141	
v/s Ratio Prot		0.03			0.03		c0.06	0.24			0.25	
v/s Ratio Perm	0.02			c0.10			c0.31			0.05		
v/c Ratio	0.16	0.18		0.73	0.20		0.48	0.32		0.08	0.41	
Uniform Delay, d1	33.9	34.0		36.9	34.1		4.2	3.2		7.4	9.3	
Progression Factor	1.00	1.00		1.00	1.00		2.33	1.97		1.00	1.00	
Incremental Delay, d2	0.4	0.4		18.5	0.4		0.6	0.3		0.4	0.6	
Delay (s)	34.2	34.3		55.4	34.5		10.4	6.5		7.8	9.9	
Level of Service	C	C		E	C		B	A		A	A	
Approach Delay (s)		34.3			47.2			7.4			9.8	
Approach LOS		C			D			A			A	
Intersection Summary												
HCM Average Control Delay			13.1			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)		8.0				
Intersection Capacity Utilization			61.7%			ICU Level of Service		B				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
19: N 46th Street & N Vassault Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↰			↰			↰	
Volume (veh/h)	2	18	7	56	20	54	18	137	43	33	162	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.72	0.72	0.72	0.73	0.73	0.73	0.86	0.86	0.86	0.85	0.85	0.85
Hourly flow rate (vph)	3	25	10	77	27	74	21	159	50	39	191	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None				None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	583	520	191	517	496	184	192			209		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	583	520	191	517	496	184	192			209		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	94	99	82	94	91	98			97		
cM capacity (veh/h)	360	443	856	427	453	855	1394			1356		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	38	178	230	231								
Volume Left	3	77	21	39								
Volume Right	10	74	50	1								
cSH	497	546	1394	1356								
Volume to Capacity	0.08	0.33	0.02	0.03								
Queue Length 95th (ft)	6	35	1	2								
Control Delay (s)	12.8	14.8	0.8	1.5								
Lane LOS	B	B	A	A								
Approach Delay (s)	12.8	14.8	0.8	1.5								
Approach LOS	B	B										
Intersection Summary												
Average Delay				5.4								
Intersection Capacity Utilization			37.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
20: N 51st Street & N Park Way

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

																				
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR								
Lane Configurations																				
Sign Control		Stop			Stop			Stop			Stop									
Volume (vph)	2	20	42	41	34	16	36	43	29	23	45	4								
Peak Hour Factor	0.87	0.87	0.87	0.91	0.91	0.91	0.82	0.82	0.82	0.69	0.69	0.69								
Hourly flow rate (vph)	2	23	48	45	37	18	44	52	35	33	65	6								
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2														
Volume Total (vph)	74	100	44	88	33	71														
Volume Left (vph)	2	45	44	0	33	0														
Volume Right (vph)	48	18	0	35	0	6														
Hadj (s)	-0.39	-0.02	0.53	-0.25	0.64	0.08														
Departure Headway (s)	4.2	4.5	5.5	4.8	5.7	5.1														
Degree Utilization, x	0.09	0.13	0.07	0.12	0.05	0.10														
Capacity (veh/h)	806	745	623	723	606	673														
Control Delay (s)	7.6	8.2	7.8	7.2	7.8	7.5														
Approach Delay (s)	7.6	8.2	7.4	7.6																
Approach LOS	A	A	A	A																
Intersection Summary																				
Delay			7.7																	
HCM Level of Service			A																	
Intersection Capacity Utilization			27.0%	ICU Level of Service		A														
Analysis Period (min)			15																	

HCM Unsignalized Intersection Capacity Analysis
21: N Pearl Street & N Park Way

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

						
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	12	239	118	25	30	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.50	0.50	0.88	0.88	0.71	0.71
Hourly flow rate (vph)	24	478	134	28	42	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)	854					
pX, platoon unblocked						
vC, conflicting volume	162			435	81	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	162			435	81	
tC, single (s)	4.1			6.9	7.0	
tC, 2 stage (s)						
tF (s)	2.2			3.6	3.4	
p0 queue free %	98			92	99	
cM capacity (veh/h)	1414			530	950	
Direction, Lane #	NB 1	NB 2	SB 1	SB 2	NE 1	
Volume Total	183	319	89	73	55	
Volume Left	24	0	0	0	42	
Volume Right	0	0	0	28	13	
cSH	1414	1700	1700	1700	590	
Volume to Capacity	0.02	0.19	0.05	0.04	0.09	
Queue Length 95th (ft)	1	0	0	0	8	
Control Delay (s)	1.1	0.0	0.0	0.0	11.7	
Lane LOS	A			B		
Approach Delay (s)	0.4			0.0	11.7	
Approach LOS			B			
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			24.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
22: N 51st Street & N Bennett Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	1	339	533	4	1	1
Sign Control		Free	Free		Stop	
Grade		0%	6%		0%	
Peak Hour Factor	0.59	0.59	0.76	0.76	0.50	0.50
Hourly flow rate (vph)	2	575	701	5	2	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	707				1282	704
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	707				1282	704
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	901				184	440
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	576	707	4			
Volume Left	2	0	2			
Volume Right	0	5	2			
cSH	901	1700	259			
Volume to Capacity	0.00	0.42	0.02			
Queue Length 95th (ft)	0	0	1			
Control Delay (s)	0.1	0.0	19.1			
Lane LOS	A		C			
Approach Delay (s)	0.1	0.0	19.1			
Approach LOS			C			
Intersection Summary						
Average Delay		0.1				
Intersection Capacity Utilization		38.3%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
23: N 49th Street & N Ruston Way

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	86	261	705	467	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	5	100	281	758	508	1
Pedestrians	100					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	8					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1928	608	609			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1928	608	609			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	78	69			
cM capacity (veh/h)	47	458	898			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	105	281	758	509		
Volume Left	5	281	0	0		
Volume Right	100	0	0	1		
cSH	329	898	1700	1700		
Volume to Capacity	0.32	0.31	0.45	0.30		
Queue Length 95th (ft)	33	34	0	0		
Control Delay (s)	21.0	10.8	0.0	0.0		
Lane LOS	C	B				
Approach Delay (s)	21.0	2.9		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay		3.2				
Intersection Capacity Utilization		54.6%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
24: N 46th Street & N Baltimore Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Volume (veh/h)	114	191	1	12	335	36	1	25	0	22	20	84		
Sign Control		Free			Free			Stop			Stop			
Grade		-1%			1%			-3%			1%			
Peak Hour Factor	0.92	0.92	0.92	0.81	0.81	0.81	0.50	0.50	0.50	0.71	0.71	0.71		
Hourly flow rate (vph)	124	208	1	15	414	44	2	50	0	31	28	118		
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)														
Median type	None			None										
Median storage (veh)														
Upstream signal (ft)														
pX, platoon unblocked														
vC, conflicting volume	458				209				1054	944	208	946	922	436
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	458				209				1054	944	208	946	922	436
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89				99				99	79	100	83	88	81
cM capacity (veh/h)	1108				1368				137	233	837	182	235	616
Direction, Lane #	EB 1	WB 1	NB 1	SB 1										
Volume Total	333	473	52	177										
Volume Left	124	15	2	31										
Volume Right	1	44	0	118										
cSH	1108	1368	227	368										
Volume to Capacity	0.11	0.01	0.23	0.48										
Queue Length 95th (ft)	9	1	21	63										
Control Delay (s)	3.9	0.3	25.6	23.6										
Lane LOS	A	A	D	C										
Approach Delay (s)	3.9	0.3	25.6	23.6										
Approach LOS			D	C										
Intersection Summary														
Average Delay				6.7										
Intersection Capacity Utilization				61.0%	ICU Level of Service			B						
Analysis Period (min)				15										

HCM Unsignalized Intersection Capacity Analysis
25: N 46th Street & N Orchard Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	7	177	15	47	329	55	20	46	18	35	31	11
Sign Control		Free			Free			Stop			Stop	
Grade		-1%			1%			-3%			1%	
Peak Hour Factor	0.83	0.83	0.83	0.94	0.94	0.94	0.86	0.86	0.86	0.70	0.70	0.70
Hourly flow rate (vph)	8	213	18	50	350	59	23	53	21	50	44	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	409			231			756	748	222	766	727	379
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	409			231			756	748	222	766	727	379
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			92	84	97	81	87	98
cM capacity (veh/h)	1161			1348			276	326	817	265	337	672
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	240	459	98	110								
Volume Left	8	50	23	50								
Volume Right	18	59	21	16								
cSH	1161	1348	357	320								
Volume to Capacity	0.01	0.04	0.27	0.34								
Queue Length 95th (ft)	1	3	27	37								
Control Delay (s)	0.4	1.2	18.8	22.0								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.4	1.2	18.8	22.0								
Approach LOS			C	C								
Intersection Summary												
Average Delay				5.4								
Intersection Capacity Utilization				51.6%	ICU Level of Service			A				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis
26: N 46th Street & N Ferdinand Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	70	133	19	5	205	13	22	9	4	23	43	204
Sign Control		Free			Free			Stop			Stop	
Grade		-1%			1%			-3%			1%	
Peak Hour Factor	0.92	0.92	0.92	0.83	0.83	0.83	0.65	0.65	0.65	0.88	0.88	0.88
Hourly flow rate (vph)	76	145	21	6	247	16	34	14	6	26	49	232
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	263			165			830	582	155	587	584	255
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	263			165			830	582	155	587	584	255
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			81	97	99	93	88	71
cM capacity (veh/h)	1313			1425			178	401	896	391	400	789
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	241	269	54	307								
Volume Left	76	6	34	26								
Volume Right	21	16	6	232								
cSH	1313	1425	233	635								
Volume to Capacity	0.06	0.00	0.23	0.48								
Queue Length 95th (ft)	5	0	22	66								
Control Delay (s)	2.8	0.2	25.1	15.9								
Lane LOS	A	A	D	C								
Approach Delay (s)	2.8	0.2	25.1	15.9								
Approach LOS			D	C								
Intersection Summary												
Average Delay		8.0										
Intersection Capacity Utilization		49.8%		ICU Level of Service					A			
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis
27: N Ruston Way & N 40th Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	561	1	12	1027	0	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.74	0.74	0.94	0.94	0.75	0.75
Hourly flow rate (vph)	758	1	13	1093	0	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			TWTL		
Median storage (veh)				2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			759		1877	759
vC1, stage 1 conf vol					759	
vC2, stage 2 conf vol					1118	
vCu, unblocked vol			759		1877	759
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	98
cM capacity (veh/h)			861		262	410
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	759	13	1093	9		
Volume Left	0	13	0	0		
Volume Right	1	0	0	9		
cSH	1700	861	1700	410		
Volume to Capacity	0.45	0.01	0.64	0.02		
Queue Length 95th (ft)	0	1	0	2		
Control Delay (s)	0.0	9.2	0.0	14.0		
Lane LOS		A		B		
Approach Delay (s)	0.0	0.1		14.0		
Approach LOS				B		
Intersection Summary						
Average Delay		0.1				
Intersection Capacity Utilization		64.1%		ICU Level of Service		C
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
28: N Ruston Way & N Adler Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

						
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (veh/h)	535	34	207	1035	32	80
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.86	0.86	0.66	0.66
Hourly flow rate (vph)	594	38	241	1203	48	121
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT			TWLT		
Median storage (veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			632		2298	613
vC1, stage 1 conf vol					613	
vC2, stage 2 conf vol					1685	
vCu, unblocked vol			632		2298	613
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			75		59	75
cM capacity (veh/h)			960		119	494
Direction, Lane #	SE 1	NW 1	NW 2	NE 1		
Volume Total	632	241	1203	170		
Volume Left	0	241	0	48		
Volume Right	38	0	0	121		
cSH	1700	960	1700	260		
Volume to Capacity	0.37	0.25	0.71	0.65		
Queue Length 95th (ft)	0	25	0	103		
Control Delay (s)	0.0	10.0	0.0	41.5		
Lane LOS		A		E		
Approach Delay (s)	0.0	1.7		41.5		
Approach LOS				E		
Intersection Summary						
Average Delay			4.2			
Intersection Capacity Utilization			67.8%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
29: N 49th Street & N Pearl Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	14	6	440	11	2	512
Sign Control	Stop		Free			Free
Grade	0%		-2%			1%
Peak Hour Factor	0.71	0.71	0.84	0.84	0.73	0.73
Hourly flow rate (vph)	20	8	524	13	3	701
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			1174			951
pX, platoon unblocked	0.96					
vC, conflicting volume	1237	530			537	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1226	530			537	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	98			100	
cM capacity (veh/h)	190	553			1031	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	28	537	704			
Volume Left	20	0	3			
Volume Right	8	13	0			
cSH	237	1700	1031			
Volume to Capacity	0.12	0.32	0.00			
Queue Length 95th (ft)	10	0	0			
Control Delay (s)	22.2	0.0	0.1			
Lane LOS	C		A			
Approach Delay (s)	22.2	0.0	0.1			
Approach LOS	C					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			38.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
30: N 51st Street & N Winnifred Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	7	339	6	19	480	16	8	6	7	14	8	12
Peak Hour Factor	0.86	0.86	0.86	0.83	0.83	0.83	0.56	0.56	0.56	0.92	0.92	0.92
Hourly flow rate (vph)	8	394	7	23	578	19	14	11	12	15	9	13
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	409	620	38	37								
Volume Left (vph)	8	23	14	15								
Volume Right (vph)	7	19	13	13								
Hadj (s)	-0.01	-0.01	-0.12	-0.13								
Departure Headway (s)	4.8	4.6	6.2	6.2								
Degree Utilization, x	0.55	0.80	0.06	0.06								
Capacity (veh/h)	717	769	522	517								
Control Delay (s)	13.6	23.1	9.6	9.6								
Approach Delay (s)	13.6	23.1	9.6	9.6								
Approach LOS	B	C	A	A								
Intersection Summary												
Delay				18.7								
HCM Level of Service				C								
Intersection Capacity Utilization				46.1%	ICU Level of Service			A				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis
31: N Ruston Way & Park Access

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	130	205	3	84	394	182	1	58	102	159	49	151
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	141	223	3	91	428	198	1	63	111	173	53	164
Approach Volume (veh/h)	367			717			175			390		
Crossing Volume (veh/h)	317			205			537			521		
High Capacity (veh/h)	1079			1179			906			918		
High v/c (veh/h)	0.34			0.61			0.19			0.43		
Low Capacity (veh/h)	885			975			730			741		
Low v/c (veh/h)	0.42			0.74			0.24			0.53		
Intersection Summary												
Maximum v/c High	0.61											
Maximum v/c Low	0.74											
Intersection Capacity Utilization	81.9%			ICU Level of Service			D					

HCM Unsignalized Intersection Capacity Analysis
33: N Ruston Way & Site Access

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Right Turn Channelized						
Volume (veh/h)	161	303	511	149	154	148
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	175	329	555	162	167	161
Approach Volume (veh/h)	504	717		328		
Crossing Volume (veh/h)	167	175		555		
High Capacity (veh/h)	1215	1208		893		
High v/c (veh/h)	0.42	0.59		0.37		
Low Capacity (veh/h)	1007	1000		719		
Low v/c (veh/h)	0.50	0.72		0.46		
Intersection Summary						
Maximum v/c High		0.59				
Maximum v/c Low		0.72				
Intersection Capacity Utilization		88.4%		ICU Level of Service	E	

HCM Unsignalized Intersection Capacity Analysis
34: Commercial Access & N Baltimore Street

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↕	↔	↔
Volume (veh/h)	2	8	160	6	2	133
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	9	174	7	2	145
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None			None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	326	177			180	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	326	177			180	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	667	866			1395	
Direction, Lane #						
	WB 1	NB 1	SB 1	SB 2		
Volume Total	11	180	2	145		
Volume Left	2	0	2	0		
Volume Right	9	7	0	0		
cSH	817	1700	1395	1700		
Volume to Capacity	0.01	0.11	0.00	0.09		
Queue Length 95th (ft)	1	0	0	0		
Control Delay (s)	9.5	0.0	7.6	0.0		
Lane LOS	A		A			
Approach Delay (s)	9.5	0.0	0.1			
Approach LOS	A					
Intersection Summary						
Average Delay		0.4				
Intersection Capacity Utilization		18.8%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
35: N Ruston Way & East Access

2014 Proposed Action - Scenario 1
12/4/2007 - Average Weekday

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	33	423	611	85	49	50
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	36	460	664	92	53	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)					1	
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	757				1242	710
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	757				1242	710
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				71	87
cM capacity (veh/h)	854				185	433
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	496	757	108			
Volume Left	36	0	53			
Volume Right	0	92	54			
cSH	854	1700	373			
Volume to Capacity	0.04	0.45	0.29			
Queue Length 95th (ft)	3	0	29			
Control Delay (s)	1.2	0.0	23.2			
Lane LOS	A		C			
Approach Delay (s)	1.2	0.0	23.2			
Approach LOS			C			
Intersection Summary						
Average Delay		2.3				
Intersection Capacity Utilization		59.5%	ICU Level of Service	B		
Analysis Period (min)		15				

1: N Park Street & N Narrows Drive Performance by movement

Movement	EBL	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	SBL	SBT	SBR
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.0	0.0	0.2
Delay / Veh (s)	5.3	2.7	6.3	7.7	8.3	5.2	10.4	10.9	8.2	7.3	7.4	8.2
Total Stops	1	1	6	1	1	2	8	52	176	2	5	107
Travel Dist (mi)	0.2	0.3	1.9	0.3	0.4	0.8	1.3	8.7	29.1	0.2	0.8	15.7
Travel Time (hr)	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.5	1.4	0.0	0.0	0.9
Avg Speed (mph)	24	23	24	26	24	26	22	21	21	20	22	21
Fuel Used (gal)	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3	0.8	0.0	0.0	0.5
HC Emissions (g)	0	0	0	0	0	0	0	2	11	0	0	4
CO Emissions (g)	0	0	4	0	1	1	9	69	272	1	4	105
NOx Emissions (g)	0	0	1	0	0	0	1	6	30	0	0	12
Vehicles Entered	1	1	6	1	1	3	7	52	175	2	5	107
Vehicles Exited	1	1	6	1	1	2	8	52	176	2	5	107
Hourly Exit Rate	1	1	6	1	1	2	8	52	176	2	5	107
Input Volume	1	1	6	2	1	2	9	53	177	2	6	109
% of Volume	100	100	100	50	100	100	89	98	99	100	83	98
Denied Entry Before	0	0	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0	0	0

1: N Park Street & N Narrows Drive Performance by movement

Movement	SBR2	SEL	SER	All
Total Delay (hr)	0.0	0.4	0.0	1.2
Delay / Veh (s)	7.8	10.5	5.5	9.0
Total Stops	1	132	2	497
Travel Dist (mi)	0.2	18.9	0.3	78.8
Travel Time (hr)	0.0	1.1	0.0	4.1
Avg Speed (mph)	25	21	21	21
Fuel Used (gal)	0.0	0.6	0.0	2.3
HC Emissions (g)	0	5	0	22
CO Emissions (g)	0	139	1	607
NOx Emissions (g)	0	13	0	64
Vehicles Entered	1	131	2	495
Vehicles Exited	1	132	2	497
Hourly Exit Rate	1	132	2	497
Input Volume	1	130	1	501
% of Volume	100	102	200	99
Denied Entry Before	0	0	0	0
Denied Entry After	0	0	0	0

Total Network Performance

Total Delay (hr)	1.4
Delay / Veh (s)	10.4
Total Stops	497
Travel Dist (mi)	188.8
Travel Time (hr)	8.4
Avg Speed (mph)	24
Fuel Used (gal)	6.9
HC Emissions (g)	78
CO Emissions (g)	2427
NOx Emissions (g)	244
Vehicles Entered	495
Vehicles Exited	497
Hourly Exit Rate	497
Input Volume	1002
% of Volume	50
Denied Entry Before	0
Denied Entry After	0



Movement Summary

Ruston Point EIS Supplement

Average Weekday Park Access Scenario 1 (31)

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
N Baltimore Street (northbound)										
3L	L	1	50.0	0.286	15.0	LOS B	51	0.70	0.91	25.5
8T	T	63	1.6	0.274	57.7	LOS E	51	0.70	0.93	17.3
8R	R	111	1.8	0.274	10.6	LOS B	51	0.70	0.73	27.3
Approach		176	2.3	0.274	27.5	LOS C	51	0.70	0.80	22.8
N Ruston Way (westbound)										
1L	L	91	2.2	0.734	14.0	LOS B	244	0.72	0.78	26.0
6T	T	428	2.1	0.732	7.2	LOS A	244	0.72	0.69	28.6
6R	R	198	2.0	0.731	8.3	LOS A	244	0.72	0.67	28.2
Approach		718	2.1	0.732	8.3	LOS A	244	0.72	0.69	28.2
Park Access (southbound)										
7L	L	173	1.7	0.604	17.3	LOS B	154	0.82	1.02	24.5
4T	T	53	1.9	0.602	10.5	LOS B	154	0.82	0.96	27.4
4R	R	164	1.8	0.605	11.5	LOS B	154	0.82	0.89	26.8
Approach		389	1.8	0.605	13.9	LOS B	154	0.82	0.96	25.7
N Ruston Way (eastbound)										
5L	L	141	2.1	0.461	13.0	LOS B	89	0.61	0.79	26.3
2T	T	223	1.8	0.461	55.7	LOS E	89	0.61	0.90	17.8
2R	R	3	25.0	0.444	7.2	LOS A	89	0.61	0.68	28.6
Approach		367	2.2	0.461	38.8	LOS D	89	0.61	0.85	20.7
All Vehicles		1650	2.1	0.734	18.5	LOS B	244	0.72	0.80	25.1

Symbols which may appear in this table:

Following Degree of Saturation

x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

Following LOS

- Based on density for continuous movements

Following Queue



Movement Summary

Ruston Point EIS Supplement

Average Weekday Site Access (33)

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
N Ruston Way (westbound)										
6T	T	555	2.0	0.704	6.0	LOS A	215	0.66	0.61	28.9
6R	R	162	1.9	0.704	7.1	LOS A	215	0.66	0.64	28.5
Approach		717	2.0	0.705	6.3	LOS A	215	0.66	0.61	28.8
Site Access (southbound)										
7L	L	167	1.8	0.524	16.5	LOS B	118	0.78	0.98	24.9
4R	R	161	1.9	0.524	10.7	LOS B	118	0.78	0.93	27.2
Approach		328	1.8	0.524	13.7	LOS B	118	0.78	0.95	25.9
N Ruston Way (eastbound)										
5L	L	175	1.7	0.512	11.8	LOS B	116	0.52	0.68	26.6
2T	T	329	2.1	0.512	54.4	LOS D	116	0.52	0.83	16.8
Approach		505	2.0	0.512	39.7	LOS D	116	0.52	0.78	19.6
All Vehicles		1550	1.9	0.704	18.7	LOS B	215	0.64	0.74	24.5

Symbols which may appear in this table:

Following Degree of Saturation

x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

Following LOS

- Based on density for continuous movements

Following Queue

- Density for continuous movement



Site: Proposed Site Access

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HCM Signalized Intersection Capacity Analysis

9: N 46th Street & N Pearl Street

2014 Proposed Action - Scenario 2

2/26/2008 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	85	22	155	121	83	55	481	155	50	539	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	10	12	12	10	12	12	10	12	12
Grade (%)		2%			0%			0%			1%	
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.94		1.00	0.96		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1635	3281		1652	3324		1636	3377		1643	3513	
Flt Permitted	0.61	1.00		0.67	1.00		0.42	1.00		0.36	1.00	
Satd. Flow (perm)	1043	3281		1160	3324		723	3377		628	3513	
Peak-hour factor, PHF	0.80	0.80	0.80	0.87	0.87	0.87	0.94	0.94	0.94	0.93	0.93	0.93
Adj. Flow (vph)	11	106	28	178	139	95	59	512	165	54	580	10
RTOR Reduction (vph)	0	18	0	0	60	0	0	54	0	0	2	0
Lane Group Flow (vph)	11	116	0	178	174	0	59	623	0	54	588	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			4			6			2		
Permitted Phases	4			4			6			2		
Actuated Green, G (s)	11.7	11.7		11.7	11.7		13.1	13.1		13.1	13.1	
Effective Green, g (s)	12.7	12.7		12.7	12.7		14.1	14.1		14.1	14.1	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.41	0.41		0.41	0.41	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	381	1197		423	1213		293	1368		254	1423	
v/s Ratio Prot		0.04			0.05			c0.18			0.17	
v/s Ratio Perm	0.01			c0.15			0.08			0.09		
v/c Ratio	0.03	0.10		0.42	0.14		0.20	0.46		0.21	0.41	
Uniform Delay, d1	7.1	7.3		8.3	7.4		6.7	7.5		6.7	7.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.0		0.5	0.0		0.2	0.2		0.3	0.1	
Delay (s)	7.1	7.3		8.8	7.4		7.0	7.7		7.0	7.5	
Level of Service	A	A		A	A		A	A		A	A	
Approach Delay (s)		7.3			8.0			7.7			7.5	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay	7.7			HCM Level of Service			A					
HCM Volume to Capacity ratio	0.44											
Actuated Cycle Length (s)	34.8			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	51.8%			ICU Level of Service			A					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: N 51st Street & N Pearl Street

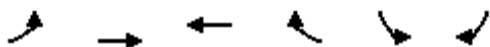
2014 Proposed Action - Scenario 2

2/26/2008 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	57	39	301	93	87	33	151	213	75	159	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Grade (%)		-2%			3%			-2%			2%	
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.95			1.00	0.85	1.00	0.91		1.00	1.00	
Flt Protected		0.99			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1816			1803	1591	1668	1602		1635	1721	
Flt Permitted		0.94			0.68	1.00	0.50	1.00		0.37	1.00	
Satd. Flow (perm)		1714			1266	1591	884	1602		639	1721	
Peak-hour factor, PHF	0.76	0.76	0.76	0.96	0.96	0.96	0.88	0.88	0.88	0.52	0.52	0.52
Adj. Flow (vph)	17	75	51	314	97	91	38	172	242	144	306	0
RTOR Reduction (vph)	0	25	0	0	0	30	0	50	0	0	0	0
Lane Group Flow (vph)	0	118	0	0	411	61	38	364	0	144	306	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm			pm+pt		
Protected Phases		4			4			6		5	2	
Permitted Phases	4			4		4	6			2		
Actuated Green, G (s)		32.8			32.8	32.8	36.2	36.2		47.2	47.2	
Effective Green, g (s)		33.8			33.8	33.8	37.2	37.2		48.2	48.2	
Actuated g/C Ratio		0.38			0.38	0.38	0.41	0.41		0.54	0.54	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		2.5			2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		644			475	598	365	662		420	922	
v/s Ratio Prot								c0.23		0.03	c0.18	
v/s Ratio Perm		0.07			c0.32	0.04	0.04			0.16		
v/c Ratio		0.18			0.87	0.10	0.10	0.55		0.34	0.33	
Uniform Delay, d1		18.8			26.0	18.2	16.2	20.0		19.0	11.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			15.0	0.1	0.6	3.3		0.4	1.0	
Delay (s)		18.9			41.0	18.3	16.8	23.3		19.4	12.8	
Level of Service		B			D	B	B	C		B	B	
Approach Delay (s)		18.9			36.9			22.7			14.9	
Approach LOS		B			D			C			B	
Intersection Summary												
HCM Average Control Delay		24.7			HCM Level of Service			C				
HCM Volume to Capacity ratio		0.64										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		64.2%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 22: N 51st Street & N Bennett Street

2014 Proposed Action - Scenario 2
2/26/2008 - Average Weekday



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	1	334	523	4	1	1
Sign Control		Free	Free		Stop	
Grade		0%	6%		0%	
Peak Hour Factor	0.59	0.59	0.76	0.76	0.50	0.50
Hourly flow rate (vph)	2	566	688	5	2	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	693				1260	691
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	693				1260	691
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	911				190	448
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	568	693	4			
Volume Left	2	0	2			
Volume Right	0	5	2			
cSH	911	1700	266			
Volume to Capacity	0.00	0.41	0.02			
Queue Length 95th (ft)	0	0	1			
Control Delay (s)	0.1	0.0	18.7			
Lane LOS	A		C			
Approach Delay (s)	0.1	0.0	18.7			
Approach LOS			C			
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			37.8%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

24: N 46th Street & N Baltimore Street

2014 Proposed Action - Scenario 2

2/26/2008 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	120	191	1	12	335	36	1	25	0	22	20	93
Sign Control		Free			Free			Stop			Stop	
Grade		-1%			1%			-3%			1%	
Peak Hour Factor	0.92	0.92	0.92	0.81	0.81	0.81	0.50	0.50	0.50	0.71	0.71	0.71
Hourly flow rate (vph)	130	208	1	15	414	44	2	50	0	31	28	131
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	458			209			1080	957	208	959	935	436
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	458			209			1080	957	208	959	935	436
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	88			99			98	78	100	82	88	79
cM capacity (veh/h)	1108			1368			128	227	837	176	230	616
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	339	473	52	190								
Volume Left	130	15	2	31								
Volume Right	1	44	0	131								
cSH	1108	1368	220	372								
Volume to Capacity	0.12	0.01	0.24	0.51								
Queue Length 95th (ft)	10	1	22	70								
Control Delay (s)	4.1	0.3	26.3	24.4								
Lane LOS	A	A	D	C								
Approach Delay (s)	4.1	0.3	26.3	24.4								
Approach LOS			D	C								
Intersection Summary												
Average Delay			7.2									
Intersection Capacity Utilization			61.9%		ICU Level of Service				B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
29: N 49th Street & N Pearl Street

2014 Proposed Action - Scenario 2
2/26/2008 - Average Weekday

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	14	6	435	11	2	503
Sign Control	Stop		Free			Free
Grade	0%		-2%			1%
Peak Hour Factor	0.71	0.71	0.84	0.84	0.73	0.73
Hourly flow rate (vph)	20	8	518	13	3	689
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			1174			951
pX, platoon unblocked	0.96					
vC, conflicting volume	1219	524			531	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1207	524			531	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	98			100	
cM capacity (veh/h)	196	557			1036	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	28	531	692			
Volume Left	20	0	3			
Volume Right	8	13	0			
cSH	243	1700	1036			
Volume to Capacity	0.12	0.31	0.00			
Queue Length 95th (ft)	10	0	0			
Control Delay (s)	21.7	0.0	0.1			
Lane LOS	C		A			
Approach Delay (s)	21.7	0.0	0.1			
Approach LOS	C					
Intersection Summary						
Average Delay		0.5				
Intersection Capacity Utilization		38.1%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
30: N 51st Street & N Winnifred Street

2014 Proposed Action - Scenario 2
2/26/2008 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	7	333	6	19	470	16	8	6	7	14	8	12
Peak Hour Factor	0.86	0.86	0.86	0.83	0.83	0.83	0.56	0.56	0.56	0.92	0.92	0.92
Hourly flow rate (vph)	8	387	7	23	566	19	14	11	12	15	9	13
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	402	608	38	37								
Volume Left (vph)	8	23	14	15								
Volume Right (vph)	7	19	13	13								
Hadj (s)	-0.01	-0.01	-0.12	-0.13								
Departure Headway (s)	4.8	4.6	6.2	6.2								
Degree Utilization, x	0.54	0.78	0.06	0.06								
Capacity (veh/h)	719	771	524	518								
Control Delay (s)	13.3	21.8	9.6	9.6								
Approach Delay (s)	13.3	21.8	9.6	9.6								
Approach LOS	B	C	A	A								
Intersection Summary												
Delay			17.8									
HCM Level of Service			C									
Intersection Capacity Utilization			45.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

34: Commercial Access & N Baltimore Street

2014 Proposed Action - Scenario 2

2/26/2008 - Average Weekday

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	2	8	165	6	2	142
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	9	179	7	2	154
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	341	183			186	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	341	183			186	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	654	860			1389	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	11	186	2	154		
Volume Left	2	0	2	0		
Volume Right	9	7	0	0		
cSH	809	1700	1389	1700		
Volume to Capacity	0.01	0.11	0.00	0.09		
Queue Length 95th (ft)	1	0	0	0		
Control Delay (s)	9.5	0.0	7.6	0.0		
Lane LOS	A		A			
Approach Delay (s)	9.5	0.0	0.1			
Approach LOS	A					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			19.0%		ICU Level of Service	A
Analysis Period (min)			15			

SIDRA INTERSECTION

Movement Summary

Ruston Point EIS Supplement

Average Weekday Park Access Scenario 2 (31)

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
N Baltimore Street (northbound)										
3L	L	1	50.0	0.286	14.9	LOS B	52	0.70	0.91	25.5
8T	T	63	1.6	0.280	57.6	LOS E	52	0.70	0.93	17.3
8R	R	116	1.7	0.280	10.5	LOS B	52	0.70	0.73	27.3
Approach		181	2.2	0.280	27.0	LOS C	52	0.70	0.80	22.9
N Ruston Way (westbound)										
1L	L	101	2.0	0.732	14.0	LOS B	242	0.72	0.78	26.1
6T	T	417	1.9	0.730	7.1	LOS A	242	0.72	0.68	28.7
6R	R	198	2.0	0.731	8.2	LOS A	242	0.72	0.67	28.3
Approach		716	2.0	0.730	8.4	LOS A	242	0.72	0.69	28.1
Park Access (southbound)										
7L	L	173	1.7	0.604	17.3	LOS B	154	0.82	1.02	24.5
4T	T	53	1.9	0.602	10.4	LOS B	154	0.82	0.96	27.4
4R	R	164	1.8	0.603	11.5	LOS B	154	0.82	0.89	26.8
Approach		389	1.8	0.604	13.9	LOS B	154	0.82	0.95	25.7
N Ruston Way (eastbound)										
5L	L	141	2.1	0.458	13.1	LOS B	88	0.62	0.79	26.3
2T	T	216	1.9	0.458	55.8	LOS E	88	0.62	0.90	17.8
2R	R	3	25.0	0.444	7.3	LOS A	88	0.62	0.68	28.6
Approach		361	2.2	0.458	38.6	LOS D	88	0.62	0.86	20.8
All Vehicles		1647	2.0	0.732	18.4	LOS B	242	0.72	0.80	25.1

Symbols which may appear in this table:

Following Degree of Saturation

x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

Following LOS

- Based on density for continuous movements

Following Queue

HCM Signalized Intersection Capacity Analysis
9: N 46th Street & N Pearl Street

2014 Proposed Action - Scenario 1
12/4/2007 - Summer Weekday

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Volume (vph)	9	83	22	145	118	82	54	465	150	49	532	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	10	12	12	10	12	12	10	12	12
Grade (%)		2%			0%			0%			1%	
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.94		1.00	0.96		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1635	3279		1652	3322		1636	3376		1643	3512	
Flt Permitted	0.61	1.00		0.67	1.00		0.43	1.00		0.38	1.00	
Satd. Flow (perm)	1047	3279		1162	3322		736	3376		656	3512	
Peak-hour factor, PHF	0.80	0.80	0.80	0.87	0.87	0.87	0.94	0.94	0.94	0.93	0.93	0.93
Adj. Flow (vph)	11	104	28	167	136	94	57	495	160	53	572	10
RTOR Reduction (vph)	0	18	0	0	60	0	0	55	0	0	2	0
Lane Group Flow (vph)	11	114	0	167	170	0	57	600	0	53	580	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			4			6			2	
Permitted Phases	4			4			6			2		
Actuated Green, G (s)	11.3	11.3		11.3	11.3		12.7	12.7		12.7	12.7	
Effective Green, g (s)	12.3	12.3		12.3	12.3		13.7	13.7		13.7	13.7	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.40	0.40		0.40	0.40	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	379	1186		420	1202		297	1360		264	1415	
v/s Ratio Prot		0.03			0.05			0.18			0.17	
v/s Ratio Perm	0.01			0.14			0.08			0.08		
v/c Ratio	0.03	0.10		0.40	0.14		0.19	0.44		0.20	0.41	
Uniform Delay, d1	7.0	7.2		8.1	7.3		6.6	7.4		6.6	7.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.0		0.5	0.0		0.2	0.2		0.3	0.1	
Delay (s)	7.0	7.2		8.5	7.3		6.8	7.5		6.9	7.4	
Level of Service	A	A		A	A		A	A		A	A	
Approach Delay (s)		7.2			7.8			7.5			7.4	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay		7.5			HCM Level of Service			A				
HCM Volume to Capacity ratio		0.42										
Actuated Cycle Length (s)		34.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		50.7%			ICU Level of Service			A				
Analysis Period (min)		15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: N 51st Street & N Pearl Street

2014 Proposed Action - Scenario 1
12/4/2007 - Summer Weekday

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Volume (vph)	41	79	72	347	130	125	75	346	236	112	295	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Grade (%)		-2%			3%			-2%			2%	
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.95			1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected		0.99			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1802			1806	1591	1668	1649		1635	1721	
Flt Permitted		0.70			0.60	1.00	0.38	1.00		0.11	1.00	
Satd. Flow (perm)		1271			1118	1591	665	1649		191	1721	
Peak-hour factor, PHF	0.76	0.76	0.76	0.96	0.96	0.96	0.88	0.88	0.88	0.52	0.52	0.52
Adj. Flow (vph)	54	104	95	361	135	130	85	393	268	215	567	0
RTOR Reduction (vph)	0	24	0	0	0	31	0	27	0	0	0	0
Lane Group Flow (vph)	0	229	0	0	496	99	85	634	0	215	567	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm		pm+pt			
Protected Phases		4			4		6			5	2	
Permitted Phases	4			4		4	6			2		
Actuated Green, G (s)		37.0			37.0	37.0	31.0	31.0		43.0	43.0	
Effective Green, g (s)		38.0			38.0	38.0	32.0	32.0		44.0	44.0	
Actuated g/C Ratio		0.42			0.42	0.42	0.36	0.36		0.49	0.49	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		2.5			2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		537			472	672	236	586		222	841	
v/s Ratio Prot							c0.38			c0.09	0.33	
v/s Ratio Perm		0.18			c0.44	0.06	0.13			0.39		
v/c Ratio		0.43			1.05	0.15	0.36	1.08		0.97	0.67	
Uniform Delay, d1		18.3			26.0	16.0	21.4	29.0		22.4	17.5	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			55.4	0.1	4.2	61.2		50.9	4.3	
Delay (s)		18.7			81.4	16.1	25.7	90.2		73.2	21.8	
Level of Service		B			F	B	C	F		E	C	
Approach Delay (s)		18.7			67.9			82.9			36.0	
Approach LOS		B			E			F			D	
Intersection Summary												
HCM Average Control Delay		57.0				HCM Level of Service		E				
HCM Volume to Capacity ratio		1.06										
Actuated Cycle Length (s)		90.0				Sum of lost time (s)		12.0				
Intersection Capacity Utilization		89.0%				ICU Level of Service		E				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
22: N 51st Street & N Bennett Street

2014 Proposed Action - Scenario 1
12/4/2007 - Summer Weekday

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	1	360	598	4	2	1
Sign Control		Free	Free		Stop	
Grade		0%	6%		0%	
Peak Hour Factor	0.59	0.59	0.76	0.76	0.50	0.50
Hourly flow rate (vph)	2	610	787	5	4	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	792				1403	789
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	792				1403	789
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				97	99
cM capacity (veh/h)	837				155	394
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	612	792	6			
Volume Left	2	0	4			
Volume Right	0	5	2			
cSH	837	1700	195			
Volume to Capacity	0.00	0.47	0.03			
Queue Length 95th (ft)	0	0	2			
Control Delay (s)	0.1	0.0	24.1			
Lane LOS	A		C			
Approach Delay (s)	0.1	0.0	24.1			
Approach LOS			C			
Intersection Summary						
Average Delay		0.1				
Intersection Capacity Utilization		41.7%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
23: N 49th Street & N Ruston Way

2014 Proposed Action - Scenario 1
12/4/2007 - Summer Weekday

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	9	118	290	758	483	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	10	137	312	815	525	3
Pedestrians	100					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	8					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2065	627	628			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2065	627	628			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	71	69	65			
cM capacity (veh/h)	36	447	883			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	148	312	815	528		
Volume Left	10	312	0	0		
Volume Right	137	0	0	3		
cSH	247	883	1700	1700		
Volume to Capacity	0.60	0.35	0.48	0.31		
Queue Length 95th (ft)	87	40	0	0		
Control Delay (s)	39.1	11.3	0.0	0.0		
Lane LOS	E	B				
Approach Delay (s)	39.1	3.1		0.0		
Approach LOS	E					
Intersection Summary						
Average Delay			5.2			
Intersection Capacity Utilization			59.5%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
24: N 46th Street & N Baltimore Street

2014 Proposed Action - Scenario 1
12/4/2007 - Summer Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	115	187	1	11	329	36	1	25	0	22	19	83
Sign Control		Free			Free			Stop			Stop	
Grade		-1%			1%			-3%			1%	
Peak Hour Factor	0.92	0.92	0.92	0.81	0.81	0.81	0.50	0.50	0.50	0.71	0.71	0.71
Hourly flow rate (vph)	125	203	1	14	406	44	2	50	0	31	27	117
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	451			204			1040	932	204	934	910	428
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	451			204			1040	932	204	934	910	428
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			99			99	79	100	83	89	81
cM capacity (veh/h)	1115			1373			142	237	842	186	239	622
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	329	464	52	175								
Volume Left	125	14	2	31								
Volume Right	1	44	0	117								
cSH	1115	1373	231	374								
Volume to Capacity	0.11	0.01	0.23	0.47								
Queue Length 95th (ft)	9	1	21	60								
Control Delay (s)	4.0	0.3	25.1	22.7								
Lane LOS	A	A	D	C								
Approach Delay (s)	4.0	0.3	25.1	22.7								
Approach LOS			D	C								
Intersection Summary												
Average Delay		6.6										
Intersection Capacity Utilization		60.4%		ICU Level of Service		B						
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis
25: N 46th Street & N Orchard Street

2014 Proposed Action - Scenario 1
12/4/2007 - Summer Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	7	173	15	46	323	54	20	45	17	32	29	10
Sign Control		Free			Free			Stop			Stop	
Grade		-1%			1%			-3%			1%	
Peak Hour Factor	0.83	0.83	0.83	0.94	0.94	0.94	0.86	0.86	0.86	0.70	0.70	0.70
Hourly flow rate (vph)	8	208	18	49	344	57	23	52	20	46	41	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	401			227			740	733	217	750	714	372
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	401			227			740	733	217	750	714	372
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			92	84	98	83	88	98
cM capacity (veh/h)	1169			1354			287	333	822	274	344	678
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	235	450	95	101								
Volume Left	8	49	23	46								
Volume Right	18	57	20	14								
cSH	1169	1354	364	329								
Volume to Capacity	0.01	0.04	0.26	0.31								
Queue Length 95th (ft)	1	3	26	32								
Control Delay (s)	0.4	1.2	18.4	20.8								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.4	1.2	18.4	20.8								
Approach LOS			C	C								
Intersection Summary												
Average Delay		5.1										
Intersection Capacity Utilization		50.2%			ICU Level of Service			A				
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis
26: N 46th Street & N Ferdinand Street

2014 Proposed Action - Scenario 1
12/4/2007 - Summer Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	69	129	18	5	201	13	21	9	3	23	43	200
Sign Control		Free			Free			Stop			Stop	
Grade		-1%			1%			-3%			1%	
Peak Hour Factor	0.92	0.92	0.92	0.83	0.83	0.83	0.65	0.65	0.65	0.88	0.88	0.88
Hourly flow rate (vph)	75	140	20	6	242	16	32	14	5	26	49	227
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	258			160			814	570	150	574	572	250
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	258			160			814	570	150	574	572	250
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			83	97	99	93	88	71
cM capacity (veh/h)	1319			1432			185	408	902	400	407	794
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	235	264	51	302								
Volume Left	75	6	32	26								
Volume Right	20	16	5	227								
cSH	1319	1432	238	641								
Volume to Capacity	0.06	0.00	0.21	0.47								
Queue Length 95th (ft)	5	0	20	63								
Control Delay (s)	2.9	0.2	24.2	15.5								
Lane LOS	A	A	C	C								
Approach Delay (s)	2.9	0.2	24.2	15.5								
Approach LOS			C	C								
Intersection Summary												
Average Delay		7.8										
Intersection Capacity Utilization		49.0%			ICU Level of Service			A				
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis
29: N 49th Street & N Pearl Street

2014 Proposed Action - Scenario 1
12/4/2007 - Summer Weekday

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	11	647	10	4	710
Sign Control	Stop		Free			Free
Grade	0%		-2%			1%
Peak Hour Factor	0.71	0.71	0.84	0.84	0.73	0.73
Hourly flow rate (vph)	7	15	770	12	5	973
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			1174			951
pX, platoon unblocked	0.76					
vC, conflicting volume	1760	776			782	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1841	776			782	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	96			99	
cM capacity (veh/h)	64	401			836	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	23	782	978			
Volume Left	7	0	5			
Volume Right	15	12	0			
cSH	151	1700	836			
Volume to Capacity	0.15	0.46	0.01			
Queue Length 95th (ft)	13	0	0			
Control Delay (s)	33.0	0.0	0.2			
Lane LOS	D		A			
Approach Delay (s)	33.0	0.0	0.2			
Approach LOS	D					
Intersection Summary						
Average Delay		0.5				
Intersection Capacity Utilization		50.5%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis 30: N 51st Street & N Winnifred Street

2014 Proposed Action - Scenario 1
12/4/2007 - Summer Weekday

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	11	407	9	12	574	12	12	9	10	16	12	7
Peak Hour Factor	0.86	0.86	0.86	0.83	0.83	0.83	0.56	0.56	0.56	0.92	0.92	0.92
Hourly flow rate (vph)	13	473	10	14	692	14	21	16	18	17	13	8
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	497	720	55	38								
Volume Left (vph)	13	14	21	17								
Volume Right (vph)	10	14	18	8								
Hadj (s)	-0.01	-0.01	-0.12	-0.03								
Departure Headway (s)	5.1	4.9	6.7	6.9								
Degree Utilization, x	0.70	0.97	0.10	0.07								
Capacity (veh/h)	497	730	503	484								
Control Delay (s)	19.3	48.4	10.5	10.4								
Approach Delay (s)	19.3	48.4	10.5	10.4								
Approach LOS	C	E	B	B								
Intersection Summary												
Delay				34.7								
HCM Level of Service				D								
Intersection Capacity Utilization				46.4%	ICU Level of Service			A				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis 31: N Ruston Way & Park Access

2014 Proposed Action - Scenario 1
12/4/2007 - Summer Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	129	226	3	83	464	179	1	57	103	159	46	153
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	140	246	3	90	504	195	1	62	112	173	50	166
Approach Volume (veh/h)	389			789			175			389		
Crossing Volume (veh/h)	313			203			559			596		
High Capacity (veh/h)	1083			1181			891			865		
High v/c (veh/h)	0.36			0.67			0.20			0.45		
Low Capacity (veh/h)	888			976			716			693		
Low v/c (veh/h)	0.44			0.81			0.24			0.56		
Intersection Summary												
Maximum v/c High	0.67											
Maximum v/c Low	0.81											
Intersection Capacity Utilization	84.7%			ICU Level of Service					E			

HCM Unsignalized Intersection Capacity Analysis
33: N Ruston Way & Site Access

2014 Proposed Action - Scenario 1
12/4/2007 - Summer Weekday

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Right Turn Channelized						
Volume (veh/h)	154	334	585	139	150	141
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	167	363	636	151	163	153
Approach Volume (veh/h)	530	787		316		
Crossing Volume (veh/h)	163	167		636		
High Capacity (veh/h)	1219	1215		837		
High v/c (veh/h)	0.44	0.65		0.38		
Low Capacity (veh/h)	1011	1007		669		
Low v/c (veh/h)	0.52	0.78		0.47		
Intersection Summary						
Maximum v/c High	0.65					
Maximum v/c Low	0.78					
Intersection Capacity Utilization	92.3%					
ICU Level of Service	F					

HCM Unsignalized Intersection Capacity Analysis
34: Commercial Access & N Baltimore Street

2014 Proposed Action - Scenario 1
12/4/2007 - Summer Weekday

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↕	↔	↔
Volume (veh/h)	2	8	159	6	2	129
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	9	173	7	2	140
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None			None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	321	176			179	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	321	176			179	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	672	867			1396	
Direction, Lane #						
	WB 1	NB 1	SB 1	SB 2		
Volume Total	11	179	2	140		
Volume Left	2	0	2	0		
Volume Right	9	7	0	0		
cSH	819	1700	1396	1700		
Volume to Capacity	0.01	0.11	0.00	0.08		
Queue Length 95th (ft)	1	0	0	0		
Control Delay (s)	9.5	0.0	7.6	0.0		
Lane LOS	A		A			
Approach Delay (s)	9.5	0.0	0.1			
Approach LOS	A					
Intersection Summary						
Average Delay	0.4					
Intersection Capacity Utilization	18.7%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
35: N Ruston Way & East Access

2014 Proposed Action - Scenario 1
12/4/2007 - Summer Weekday

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	31	452	675	80	47	49
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	34	491	734	87	51	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)					1	
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	821				1336	777
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	821				1336	777
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				68	87
cM capacity (veh/h)	808				162	397
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	525	821	104			
Volume Left	34	0	51			
Volume Right	0	87	53			
cSH	808	1700	282			
Volume to Capacity	0.04	0.48	0.37			
Queue Length 95th (ft)	3	0	41			
Control Delay (s)	1.1	0.0	25.1			
Lane LOS	A		D			
Approach Delay (s)	1.1	0.0	25.1			
Approach LOS			D			
Intersection Summary						
Average Delay		2.2				
Intersection Capacity Utilization		59.2%	ICU Level of Service	B		
Analysis Period (min)		15				



Movement Summary

Ruston Point EIS Supplement

Summer Weekday Park Access Scenario 1 (31)

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
N Baltimore Street (northbound)										
3L	L	1	50.0	0.286	15.2	LOS B	52	0.71	0.91	25.4
8T	T	62	1.6	0.281	57.9	LOS E	52	0.71	0.94	17.2
8R	R	112	1.8	0.281	10.8	LOS B	52	0.71	0.74	27.1
Approach		176	2.3	0.281	27.5	LOS C	52	0.71	0.81	22.8
N Ruston Way (westbound)										
1L	L	90	2.2	0.796	15.2	LOS B	319	0.81	0.81	25.5
6T	T	504	2.0	0.796	8.3	LOS A	319	0.81	0.75	28.3
6R	R	195	2.1	0.796	9.4	LOS A	319	0.81	0.73	27.9
Approach		789	2.0	0.796	9.4	LOS A	319	0.81	0.75	27.8
Park Access (southbound)										
7L	L	173	1.7	0.667	19.7	LOS B	186	0.89	1.09	23.5
4T	T	50	2.0	0.667	12.9	LOS B	186	0.89	1.05	26.1
4R	R	166	1.8	0.667	14.0	LOS B	186	0.89	0.99	25.5
Approach		388	1.8	0.666	16.4	LOS B	186	0.89	1.04	24.6
N Ruston Way (eastbound)										
5L	L	140	2.1	0.488	13.2	LOS B	100	0.63	0.80	26.3
2T	T	246	2.0	0.488	55.9	LOS E	100	0.63	0.90	17.7
2R	R	3	25.0	0.500	7.4	LOS A	100	0.63	0.69	28.6
Approach		390	2.3	0.488	40.0	LOS D	100	0.63	0.86	20.5
All Vehicles		1743	2.1	0.796	19.6	LOS B	319	0.78	0.85	24.6

Symbols which may appear in this table:

Following Degree of Saturation

x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

Following LOS

- Based on density for continuous movements

Following Queue



Movement Summary

Ruston Point EIS Supplement

Summer Weekday Site Access (33)

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
N Ruston Way (westbound)										
6T	T	636	2.0	0.759	6.5	LOS A	271	0.73	0.64	28.6
6R	R	151	2.0	0.759	7.6	LOS A	271	0.73	0.66	28.2
Approach		787	2.0	0.759	6.8	LOS A	271	0.73	0.64	28.5
Site Access (southbound)										
7L	L	163	1.8	0.558	18.1	LOS B	133	0.84	1.03	24.2
4R	R	153	2.0	0.558	12.4	LOS B	133	0.84	0.99	26.3
Approach		316	1.9	0.559	15.4	LOS B	133	0.84	1.01	25.1
N Ruston Way (eastbound)										
5L	L	167	1.8	0.534	11.8	LOS B	125	0.53	0.68	26.5
2T	T	363	1.9	0.533	54.4	LOS D	125	0.53	0.82	16.8
Approach		530	1.9	0.533	41.0	LOS D	125	0.53	0.78	19.3
All Vehicles		1633	2.0	0.759	19.5	LOS B	271	0.68	0.76	24.2

Symbols which may appear in this table:

Following Degree of Saturation

x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

Following LOS

- Based on density for continuous movements

Following Queue

- Density for continuous movement



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Site: Summer Proposed Site Access

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HCM Signalized Intersection Capacity Analysis

9: N 46th Street & N Pearl Street

2014 Proposed Action - Scenario 2

2/26/2008 - Summer Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	83	22	159	118	82	54	457	159	49	518	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	10	12	12	10	12	12	10	12	12
Grade (%)		2%			0%			0%			1%	
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.94		1.00	0.96		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1635	3279		1652	3322		1636	3369		1643	3512	
Flt Permitted	0.61	1.00		0.67	1.00		0.44	1.00		0.38	1.00	
Satd. Flow (perm)	1047	3279		1162	3322		750	3369		651	3512	
Peak-hour factor, PHF	0.80	0.80	0.80	0.87	0.87	0.87	0.94	0.94	0.94	0.93	0.93	0.93
Adj. Flow (vph)	11	104	28	183	136	94	57	486	169	53	557	10
RTOR Reduction (vph)	0	18	0	0	59	0	0	61	0	0	2	0
Lane Group Flow (vph)	11	114	0	183	171	0	57	594	0	53	565	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			4			6			2		
Permitted Phases	4			4			6			2		
Actuated Green, G (s)	11.7	11.7		11.7	11.7		12.8	12.8		12.8	12.8	
Effective Green, g (s)	12.7	12.7		12.7	12.7		13.8	13.8		13.8	13.8	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.40	0.40		0.40	0.40	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	385	1207		428	1223		300	1348		260	1405	
v/s Ratio Prot		0.03			0.05			c0.18			0.16	
v/s Ratio Perm	0.01			c0.16			0.08			0.08		
v/c Ratio	0.03	0.09		0.43	0.14		0.19	0.44		0.20	0.40	
Uniform Delay, d1	7.0	7.1		8.2	7.3		6.7	7.5		6.8	7.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.0		0.5	0.0		0.2	0.2		0.3	0.1	
Delay (s)	7.0	7.2		8.7	7.3		6.9	7.7		7.0	7.5	
Level of Service	A	A		A	A		A	A		A	A	
Approach Delay (s)		7.1			7.9			7.6			7.5	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			7.6	HCM Level of Service			A					
HCM Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			34.5	Sum of lost time (s)			8.0					
Intersection Capacity Utilization			51.5%	ICU Level of Service			A					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: N 51st Street & N Pearl Street

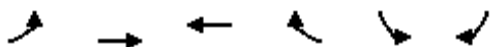
2014 Proposed Action - Scenario 2

2/26/2008 - Summer Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	79	72	333	130	125	75	346	227	112	295	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Grade (%)		-2%			3%			-2%			2%	
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.95			1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected		0.99			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1802			1806	1591	1668	1652		1635	1721	
Flt Permitted		0.70			0.60	1.00	0.22	1.00		0.11	1.00	
Satd. Flow (perm)		1269			1116	1591	392	1652		186	1721	
Peak-hour factor, PHF	0.76	0.76	0.76	0.96	0.96	0.96	0.88	0.88	0.88	0.52	0.52	0.52
Adj. Flow (vph)	54	104	95	347	135	130	85	393	258	215	567	0
RTOR Reduction (vph)	0	24	0	0	0	32	0	26	0	0	0	0
Lane Group Flow (vph)	0	229	0	0	482	98	85	625	0	215	567	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm			pm+pt		
Protected Phases		4			4			6		5	2	
Permitted Phases	4			4		4	6			2		
Actuated Green, G (s)		36.0			36.0	36.0	32.0	32.0		44.0	44.0	
Effective Green, g (s)		37.0			37.0	37.0	33.0	33.0		45.0	45.0	
Actuated g/C Ratio		0.41			0.41	0.41	0.37	0.37		0.50	0.50	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		2.5			2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		522			459	654	144	606		222	861	
v/s Ratio Prot								c0.38		c0.09	0.33	
v/s Ratio Perm		0.18			c0.43	0.06	0.22			0.40		
v/c Ratio		0.44			1.05	0.15	0.59	1.03		0.97	0.66	
Uniform Delay, d1		19.0			26.5	16.6	23.0	28.5		35.5	16.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			55.8	0.1	16.5	44.9		50.9	3.9	
Delay (s)		19.5			82.3	16.7	39.6	73.4		86.4	20.7	
Level of Service		B			F	B	D	E		F	C	
Approach Delay (s)		19.5			68.3			69.5			38.8	
Approach LOS		B			E			E			D	
Intersection Summary												
HCM Average Control Delay			53.8				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			87.7%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 22: N 51st Street & N Bennett Street

2014 Proposed Action - Scenario 2
2/26/2008 - Summer Weekday



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	1	351	583	4	2	1
Sign Control		Free	Free		Stop	
Grade		0%	6%		0%	
Peak Hour Factor	0.59	0.59	0.76	0.76	0.50	0.50
Hourly flow rate (vph)	2	595	767	5	4	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	772				1368	770
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	772				1368	770
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	852				163	404
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	597	772	6			
Volume Left	2	0	4			
Volume Right	0	5	2			
cSH	852	1700	204			
Volume to Capacity	0.00	0.45	0.03			
Queue Length 95th (ft)	0	0	2			
Control Delay (s)	0.1	0.0	23.2			
Lane LOS	A		C			
Approach Delay (s)	0.1	0.0	23.2			
Approach LOS			C			
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			40.9%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
24: N 46th Street & N Baltimore Street

2014 Proposed Action - Scenario 2

2/26/2008 - Summer Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	124	187	1	11	329	36	1	25	0	22	19	98
Sign Control		Free			Free			Stop			Stop	
Grade		-1%			1%			-3%			1%	
Peak Hour Factor	0.92	0.92	0.92	0.81	0.81	0.81	0.50	0.50	0.50	0.71	0.71	0.71
Hourly flow rate (vph)	135	203	1	14	406	44	2	50	0	31	27	138
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	451			204			1080	951	204	954	929	428
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	451			204			1080	951	204	954	929	428
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	88			99			98	78	100	83	88	78
cM capacity (veh/h)	1115			1373			127	228	842	178	231	622
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	339	464	52	196								
Volume Left	135	14	2	31								
Volume Right	1	44	0	138								
cSH	1115	1373	221	382								
Volume to Capacity	0.12	0.01	0.23	0.51								
Queue Length 95th (ft)	10	1	22	70								
Control Delay (s)	4.2	0.3	26.2	23.9								
Lane LOS	A	A	D	C								
Approach Delay (s)	4.2	0.3	26.2	23.9								
Approach LOS			D	C								
Intersection Summary												
Average Delay			7.2									
Intersection Capacity Utilization			61.8%		ICU Level of Service				B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 29: N 49th Street & N Pearl Street

2014 Proposed Action - Scenario 2
2/26/2008 - Summer Weekday

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	11	638	10	4	696
Sign Control	Stop		Free			Free
Grade	0%		-2%			1%
Peak Hour Factor	0.71	0.71	0.84	0.84	0.73	0.73
Hourly flow rate (vph)	7	15	760	12	5	953
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			1174			951
pX, platoon unblocked	0.77					
vC, conflicting volume	1730	765			771	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1798	765			771	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	96			99	
cM capacity (veh/h)	68	406			843	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	23	771	959			
Volume Left	7	0	5			
Volume Right	15	12	0			
cSH	159	1700	843			
Volume to Capacity	0.14	0.45	0.01			
Queue Length 95th (ft)	12	0	0			
Control Delay (s)	31.3	0.0	0.2			
Lane LOS	D		A			
Approach Delay (s)	31.3	0.0	0.2			
Approach LOS	D					
Intersection Summary						
Average Delay		0.5				
Intersection Capacity Utilization		49.8%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
30: N 51st Street & N Winnifred Street

2014 Proposed Action - Scenario 2
2/26/2008 - Summer Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	11	398	9	12	560	12	12	9	10	16	12	7
Peak Hour Factor	0.86	0.86	0.86	0.83	0.83	0.83	0.56	0.56	0.56	0.92	0.92	0.92
Hourly flow rate (vph)	13	463	10	14	675	14	21	16	18	17	13	8
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	486	704	55	38								
Volume Left (vph)	13	14	21	17								
Volume Right (vph)	10	14	18	8								
Hadj (s)	-0.01	-0.01	-0.12	-0.03								
Departure Headway (s)	5.1	4.8	6.7	6.8								
Degree Utilization, x	0.69	0.95	0.10	0.07								
Capacity (veh/h)	486	732	505	486								
Control Delay (s)	18.4	42.8	10.4	10.3								
Approach Delay (s)	18.4	42.8	10.4	10.3								
Approach LOS	C	E	B	B								
Intersection Summary												
Delay			31.2									
HCM Level of Service			D									
Intersection Capacity Utilization			45.7%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

34: Commercial Access & N Baltimore Street

2014 Proposed Action - Scenario 2

2/26/2008 - Summer Weekday

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	2	8	168	6	2	143
Sign Control	Stop		Free		Free	Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	9	183	7	2	155
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	346	186			189	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	346	186			189	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	650	856			1385	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	11	189	2	155		
Volume Left	2	0	2	0		
Volume Right	9	7	0	0		
cSH	805	1700	1385	1700		
Volume to Capacity	0.01	0.11	0.00	0.09		
Queue Length 95th (ft)	1	0	0	0		
Control Delay (s)	9.5	0.0	7.6	0.0		
Lane LOS	A		A			
Approach Delay (s)	9.5	0.0	0.1			
Approach LOS	A					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			19.2%		ICU Level of Service	A
Analysis Period (min)			15			

SIDRA INTERSECTION

Movement Summary

Ruston Point EIS Supplement

Summer Weekday Park Access Scenario 2 (31)

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
N Baltimore Street (northbound)										
3L	L	1	50.0	0.286	15.1	LOS B	54	0.71	0.91	25.4
8T	T	62	1.6	0.291	57.9	LOS E	54	0.71	0.94	17.2
8R	R	121	1.7	0.291	10.8	LOS B	54	0.71	0.74	27.2
Approach		184	2.2	0.291	26.7	LOS C	54	0.71	0.81	23.0
N Ruston Way (westbound)										
1L	L	105	1.9	0.795	15.2	LOS B	320	0.81	0.81	25.5
6T	T	489	2.0	0.796	8.3	LOS A	320	0.81	0.75	28.3
6R	R	195	2.1	0.796	9.4	LOS A	320	0.81	0.73	27.9
Approach		789	2.0	0.796	9.5	LOS A	320	0.81	0.75	27.8
Park Access (southbound)										
7L	L	173	1.7	0.667	19.7	LOS B	186	0.89	1.09	23.5
4T	T	50	2.0	0.667	12.9	LOS B	186	0.89	1.05	26.1
4R	R	166	1.8	0.667	14.0	LOS B	186	0.89	0.99	25.5
Approach		388	1.8	0.667	16.4	LOS B	186	0.89	1.04	24.6
N Ruston Way (eastbound)										
5L	L	140	2.1	0.484	13.4	LOS B	98	0.63	0.81	26.3
2T	T	237	2.1	0.484	56.0	LOS E	98	0.63	0.91	17.7
2R	R	3	25.0	0.500	7.6	LOS A	98	0.63	0.70	28.6
Approach		381	2.4	0.484	39.8	LOS D	98	0.63	0.87	20.5
All Vehicles		1742	2.1	0.796	19.5	LOS B	320	0.78	0.85	24.7

Symbols which may appear in this table:

Following Degree of Saturation

x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

Following LOS

- Based on density for continuous movements

Following Queue

Appendix 3.7-G: Proposed Action Arterial Level of Service Reports

Arterial Level of Service: NB N Ruston Way

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
N McCarver Street	16	20.9	40.3	0.2	16
Commercial 10	15	3.3	17.7	0.1	25
	82	1.5	15.2	0.1	27
Commercial 09	14	2.3	17.7	0.1	26
Commercial 08	13	1.1	6.9	0.0	25
Commercial 07	12	1.1	7.0	0.0	25
Adler Street	11	2.7	11.7	0.1	24
Commercial 06	10	1.4	9.9	0.1	26
Commercial 05	9	0.5	5.5	0.0	27
Commercial 04	8	0.7	8.1	0.1	27
Park 02	7	2.1	22.4	0.2	27
N 40th Street	6	1.5	16.1	0.1	27
Commercial 03	5	2.3	18.9	0.1	26
Commercial 02	4	0.9	7.7	0.1	26
Commercial 01	3	1.6	14.1	0.1	26
Park Access 01	2	1.5	12.6	0.1	26
N 49th Street	1	4.5	36.7	0.3	27
	34	1.9	22.7	0.2	27
East Access	35	2.4	8.3	0.1	22
Site Access	33	6.5	11.7	0.0	15
Park Access	31	7.4	16.6	0.1	12
Total		68.2	327.9	2.1	24

Arterial Level of Service: SB N Ruston Way

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Baltimore Ext.	31	4.3	11.8	0.1	20
Site Access	33	3.9	13.5	0.1	15
East Access	35	0.4	8.7	0.0	20
	34	0.1	6.7	0.1	27
N 49th Street	1	0.8	21.2	0.2	29
Park Access 01	2	2.0	35.3	0.3	28
Commercial 01	3	0.9	12.1	0.1	27
Commercial 02	4	1.4	13.9	0.1	27
Commercial 03	5	0.7	7.5	0.1	27
N 40th Street	6	1.4	18.0	0.1	28
Park 02	7	1.7	16.2	0.1	27
Commercial 04	8	2.2	22.5	0.2	27
Commercial 05	9	1.2	8.5	0.1	26
Commercial 06	10	1.0	5.8	0.0	26
Adler Street	11	1.4	10.0	0.1	26
Commercial 07	12	1.3	10.4	0.1	26
Commercial 08	13	0.7	6.6	0.0	26
Commercial 09	14	0.9	6.7	0.0	26
	82	1.3	16.8	0.1	27
Commercial 10	15	1.8	15.5	0.1	26
N McCarver Street	16	8.2	21.9	0.1	20
Total		37.4	289.6	2.0	25

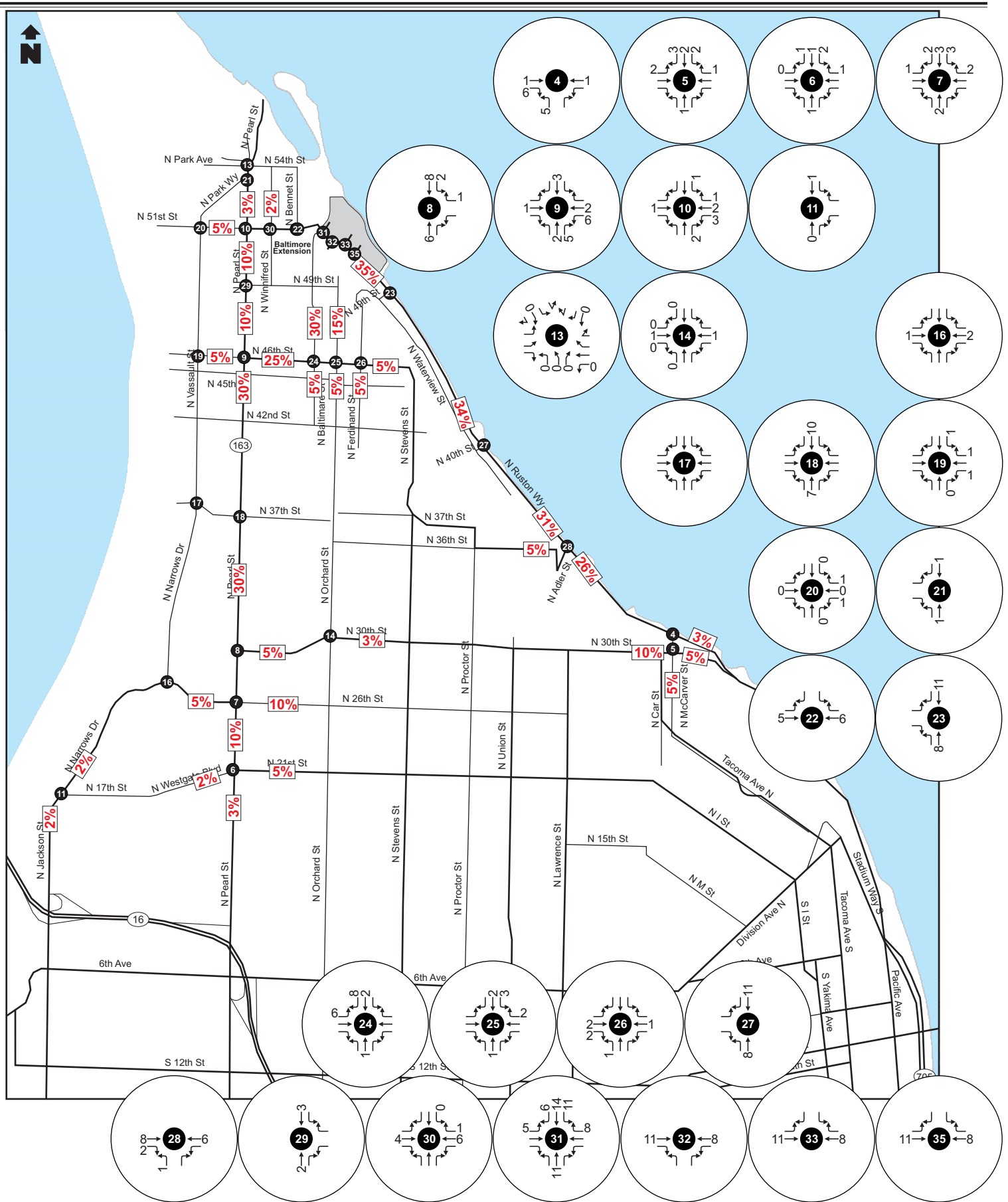
Arterial Level of Service: NB N Ruston Way

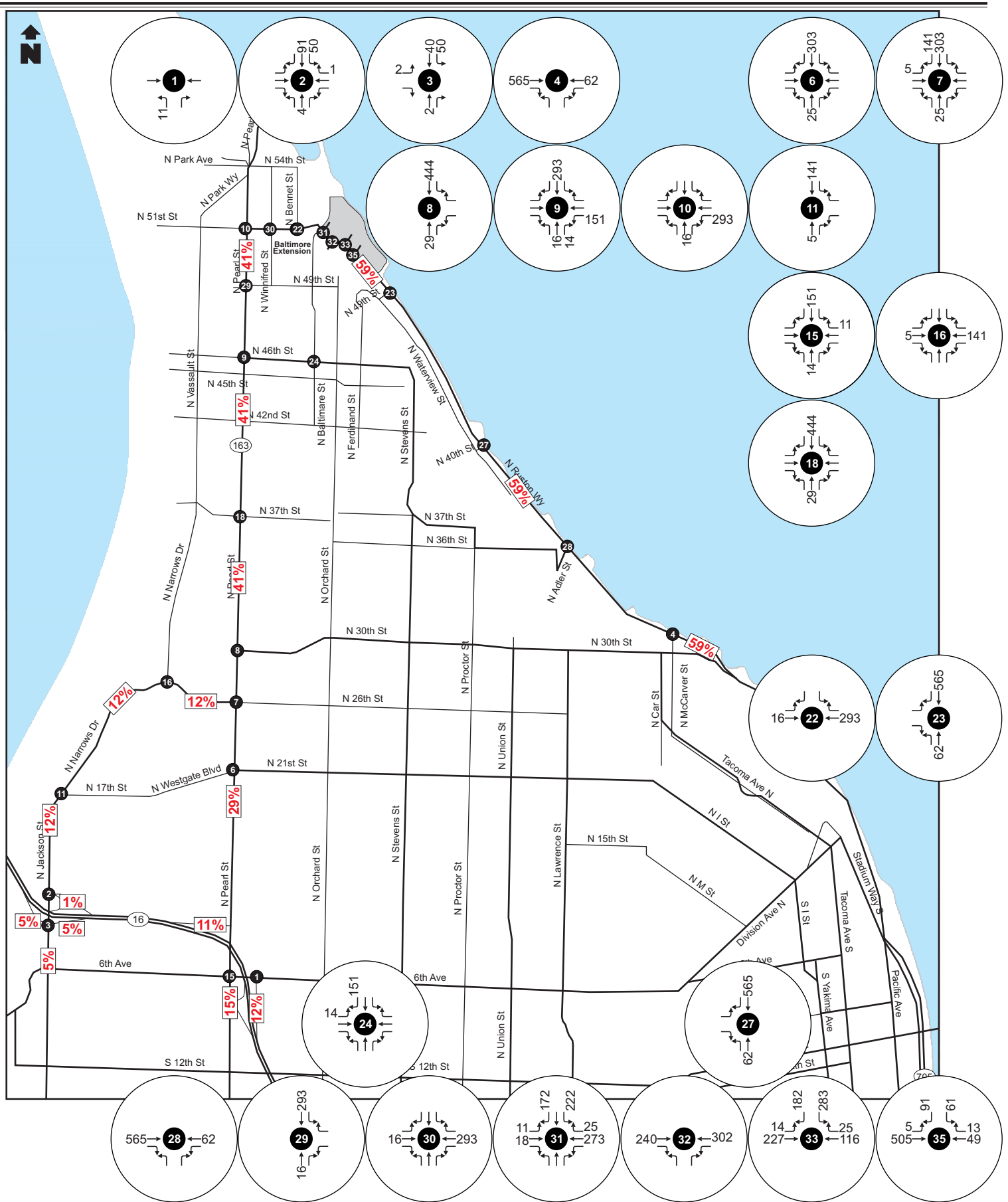
Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
N McCarver Street	16	59.7	79.1	0.2	11
Commercial 10	15	3.3	17.7	0.1	25
	82	1.5	15.3	0.1	26
Commercial 09	14	2.7	18.0	0.1	26
Commercial 08	13	1.2	7.0	0.0	25
Commercial 07	12	1.2	7.1	0.0	25
Adler Street	11	3.0	12.1	0.1	23
Commercial 06	10	1.4	9.8	0.1	26
Commercial 05	9	0.6	5.5	0.0	27
Commercial 04	8	0.7	8.1	0.1	27
Park 02	7	2.2	22.6	0.2	27
N 40th Street	6	1.6	16.2	0.1	27
Commercial 03	5	2.4	19.0	0.1	26
Commercial 02	4	0.9	7.7	0.1	26
Commercial 01	3	1.7	14.1	0.1	26
Park Access 01	2	1.6	12.7	0.1	26
N 49th Street	1	4.5	36.5	0.3	28
	34	1.9	22.7	0.2	27
East Access	35	2.6	8.6	0.1	21
Site Access	33	7.1	12.2	0.0	14
Park Access	31	8.6	17.8	0.1	11
Total		110.4	369.6	2.1	22

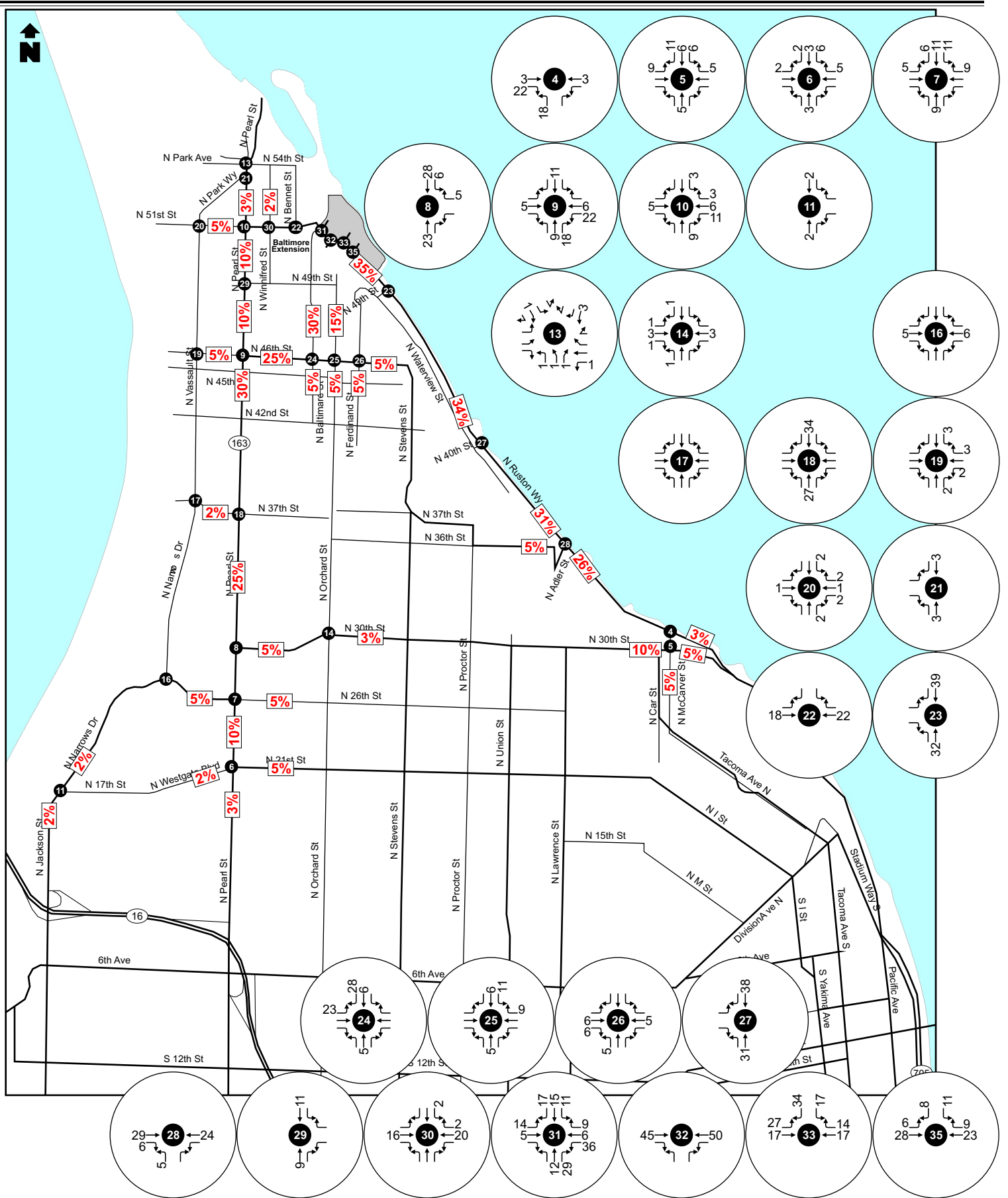
Arterial Level of Service: SB N Ruston Way

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Baltimore Ext.	31	4.7	12.2	0.1	19
Site Access	33	4.4	14.0	0.1	14
East Access	35	0.4	8.7	0.0	20
	34	0.1	6.7	0.1	27
N 49th Street	1	1.0	21.3	0.2	29
Park Access 01	2	2.7	35.9	0.3	28
Commercial 01	3	1.1	12.3	0.1	27
Commercial 02	4	1.3	13.8	0.1	27
Commercial 03	5	0.9	7.7	0.1	26
N 40th Street	6	1.5	18.1	0.1	27
Park 02	7	1.8	16.2	0.1	27
Commercial 04	8	2.4	22.8	0.2	27
Commercial 05	9	1.3	8.6	0.1	25
Commercial 06	10	0.8	5.6	0.0	27
Adler Street	11	1.5	10.0	0.1	26
Commercial 07	12	1.5	10.5	0.1	26
Commercial 08	13	0.7	6.6	0.0	26
Commercial 09	14	0.8	6.6	0.0	26
	82	1.5	16.9	0.1	27
Commercial 10	15	3.7	17.3	0.1	23
N McCarver Street	16	9.8	23.5	0.1	18
Total		43.6	295.4	2.0	25

Appendix 3.7-H: No Action Trip Distribution and Assignment







Appendix 3.7-I: No Action Intersection Level of Service Reports

HCM Signalized Intersection Capacity Analysis

1: 6th Avenue & SR-16 WB Off Ramp

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑↑	
Volume (vph)	630	0	0	929	297	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	0.95			0.95	0.97	
Frt	1.00			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3505			3539	3396	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	3505			3539	3396	
Peak-hour factor, PHF	0.89	0.89	0.96	0.96	0.85	0.85
Adj. Flow (vph)	708	0	0	968	349	51
RTOR Reduction (vph)	0	0	0	0	19	0
Lane Group Flow (vph)	708	0	0	968	381	0
Heavy Vehicles (%)	3%	3%	2%	2%	2%	2%
Turn Type						
Protected Phases	4			8	6	
Permitted Phases						
Actuated Green, G (s)	64.9			64.9	15.1	
Effective Green, g (s)	65.9			65.9	16.1	
Actuated g/C Ratio	0.73			0.73	0.18	
Clearance Time (s)	5.0			5.0	5.0	
Vehicle Extension (s)	2.5			2.5	2.5	
Lane Grp Cap (vph)	2566			2591	608	
v/s Ratio Prot	0.20			c0.27	c0.11	
v/s Ratio Perm						
v/c Ratio	0.28			0.37	0.63	
Uniform Delay, d1	4.0			4.4	34.2	
Progression Factor	0.19			1.00	1.00	
Incremental Delay, d2	0.2			0.4	1.8	
Delay (s)	1.0			4.9	35.9	
Level of Service	A			A	D	
Approach Delay (s)	1.0			4.9	35.9	
Approach LOS	A			A	D	
Intersection Summary						
HCM Average Control Delay			9.5		HCM Level of Service	A
HCM Volume to Capacity ratio			0.42			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			42.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: 10th Street & N Jackson Avenue

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	14	27	46	1	19	50	720	417	247	771	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			0%			0%			0%	
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt		0.92			1.00	0.85	1.00	0.94		1.00	1.00	
Flt Protected		0.99			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1724			1811	1615	1805	3411		1805	3602	
Flt Permitted		0.99			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1724			1811	1615	1805	3411		1805	3602	
Peak-hour factor, PHF	0.85	0.85	0.85	0.76	0.76	0.76	0.94	0.94	0.94	0.94	0.95	0.95
Adj. Flow (vph)	8	16	32	61	1	25	53	766	444	263	812	12
RTOR Reduction (vph)	0	30	0	0	0	21	0	57	0	0	0	0
Lane Group Flow (vph)	0	26	0	0	62	4	53	1153	0	263	824	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Split			Split		custom	Prot			Prot		
Protected Phases	7	7		8	8	8	5	2		1	6	
Permitted Phases						5						
Actuated Green, G (s)		3.6			6.6	12.8	6.2	37.3		22.3	53.4	
Effective Green, g (s)		4.6			7.6	14.8	7.2	38.3		23.3	54.4	
Actuated g/C Ratio		0.05			0.08	0.16	0.08	0.43		0.26	0.61	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		2.5			2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		88			153	338	145	1455		468	2182	
v/s Ratio Prot		c0.01			c0.03	0.00	0.03	c0.34		c0.15	0.23	
v/s Ratio Perm						0.00						
v/c Ratio		0.29			0.41	0.01	0.37	0.79		0.56	0.38	
Uniform Delay, d1		41.0			39.0	31.4	39.1	22.3		28.8	9.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.3			1.3	0.0	1.1	3.0		1.3	0.1	
Delay (s)		42.4			40.2	31.4	40.3	25.3		30.1	9.1	
Level of Service		D			D	C	D	C		C	A	
Approach Delay (s)		42.4			37.7			25.9			14.2	
Approach LOS		D			D			C			B	
Intersection Summary												
HCM Average Control Delay			21.6				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			89.8				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			66.2%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: SR-16 EB Ramp & N Jackson Avenue

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	315	0	594	0	0	0	0	889	156	189	619	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		4%			0%			-5%			0%	
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	
Frt	1.00	0.85						0.98		1.00	1.00	
Flt Protected	0.95	1.00						1.00		0.95	1.00	
Satd. Flow (prot)	1769	1583						3618		1805	3610	
Flt Permitted	0.95	1.00						1.00		0.95	1.00	
Satd. Flow (perm)	1769	1583						3618		1805	3610	
Peak-hour factor, PHF	0.87	0.87	0.87	0.25	0.25	0.25	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	362	0	683	0	0	0	0	988	173	208	680	0
RTOR Reduction (vph)	0	144	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	362	539	0	0	0	0	0	1152	0	208	680	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm									Prot		
Protected Phases		4						6		5	2	
Permitted Phases	4											
Actuated Green, G (s)	46.9	46.9						45.2		18.6	68.8	
Effective Green, g (s)	47.9	47.9						46.2		19.6	69.8	
Actuated g/C Ratio	0.38	0.38						0.37		0.16	0.56	
Clearance Time (s)	5.0	5.0						5.0		5.0	5.0	
Vehicle Extension (s)	1.5	1.5						1.5		1.5	1.5	
Lane Grp Cap (vph)	674	603						1330		281	2005	
v/s Ratio Prot		c0.34						c0.32		c0.12	0.19	
v/s Ratio Perm	0.20											
v/c Ratio	0.54	0.89						0.87		0.74	0.34	
Uniform Delay, d1	30.3	36.5						36.9		50.6	15.3	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	0.4	15.3						5.9		8.8	0.0	
Delay (s)	30.7	51.9						42.8		59.4	15.4	
Level of Service	C	D						D		E	B	
Approach Delay (s)		44.5			0.0			42.8			25.7	
Approach LOS		D			A			D			C	
Intersection Summary												
HCM Average Control Delay			38.5				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			125.7				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			86.8%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: N Ruston Way & N McCarver Street

2014 No Action - Scenario 1

12/18/2007 - Average Weekday

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	797	59	70	841	166	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	0%			0%	-3%	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	1.00	1.00	0.95	1.00	0.96	
Satd. Flow (prot)	1900	1615	1805	1900	1775	
Flt Permitted	1.00	1.00	0.23	1.00	0.96	
Satd. Flow (perm)	1900	1615	436	1900	1775	
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.90	0.90
Adj. Flow (vph)	866	64	74	885	184	68
RTOR Reduction (vph)	0	9	0	0	17	0
Lane Group Flow (vph)	866	55	74	885	235	0
Heavy Vehicles (%)	0%	0%	0%	0%	1%	1%
Turn Type		Perm	Perm			
Protected Phases	2			6	4	
Permitted Phases		2	6			
Actuated Green, G (s)	55.4	55.4	55.4	55.4	15.3	
Effective Green, g (s)	56.4	56.4	56.4	56.4	16.3	
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.20	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	1328	1129	305	1328	359	
v/s Ratio Prot	0.46			c0.47	c0.13	
v/s Ratio Perm		0.03	0.17			
v/c Ratio	0.65	0.05	0.24	0.67	0.66	
Uniform Delay, d1	6.7	3.8	4.4	6.8	29.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	0.0	0.3	1.2	3.8	
Delay (s)	7.8	3.8	4.7	8.0	33.4	
Level of Service	A	A	A	A	C	
Approach Delay (s)	7.5			7.7	33.4	
Approach LOS	A			A	C	
Intersection Summary						
HCM Average Control Delay			10.7		HCM Level of Service	B
HCM Volume to Capacity ratio			0.66			
Actuated Cycle Length (s)			80.7		Sum of lost time (s)	8.0
Intersection Capacity Utilization			73.2%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

5: N 30th Street & N McCarver Street

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	491	42	14	975	18	109	89	41	35	55	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			3%			-2%	
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.98			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1770	1841		1787	1876			1752			1805	
Flt Permitted	0.09	1.00		0.37	1.00			0.64			0.85	
Satd. Flow (perm)	174	1841		689	1876			1150			1547	
Peak-hour factor, PHF	0.91	0.91	0.91	0.93	0.93	0.93	0.96	0.96	0.96	0.59	0.59	0.92
Adj. Flow (vph)	67	540	46	15	1048	19	114	93	43	59	93	83
RTOR Reduction (vph)	0	2	0	0	0	0	0	9	0	0	23	0
Lane Group Flow (vph)	67	584	0	15	1067	0	0	241	0	0	212	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	0%	0%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			4			6			2	
Permitted Phases	4			4			6			2		
Actuated Green, G (s)	55.2	55.2		55.2	55.2			19.6			19.6	
Effective Green, g (s)	56.2	56.2		56.2	56.2			20.6			20.6	
Actuated g/C Ratio	0.66	0.66		0.66	0.66			0.24			0.24	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5			2.5			2.5	
Lane Grp Cap (vph)	115	1220		457	1243			279			376	
v/s Ratio Prot		0.32			c0.57							
v/s Ratio Perm	0.39			0.02				c0.21			0.14	
v/c Ratio	0.58	0.48		0.03	0.86			0.86			0.56	
Uniform Delay, d1	7.9	7.1		4.9	11.2			30.8			28.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	6.1	0.2		0.0	6.0			22.8			1.6	
Delay (s)	14.0	7.3		5.0	17.2			53.6			29.7	
Level of Service	B	A		A	B			D			C	
Approach Delay (s)		8.0			17.0			53.6			29.7	
Approach LOS		A			B			D			C	
Intersection Summary												
HCM Average Control Delay			19.8			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			84.8			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			84.9%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

6: N Westgate Boulevard & N Pearl Street

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	137	281	71	264	517	217	93	675	75	154	951	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.96		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3501		1805	3450		1805	3556		1805	3573	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	3501		1805	3450		1805	3556		1805	3573	
Peak-hour factor, PHF	0.95	0.95	0.95	0.94	0.94	0.94	0.95	0.95	0.95	0.89	0.89	0.89
Adj. Flow (vph)	144	296	75	281	550	231	98	711	79	173	1069	79
RTOR Reduction (vph)	0	26	0	0	54	0	0	9	0	0	5	0
Lane Group Flow (vph)	144	345	0	281	727	0	98	781	0	173	1143	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	10.3	17.2		16.1	23.0		6.6	25.9		10.8	30.1	
Effective Green, g (s)	11.3	18.2		17.1	24.0		7.6	26.9		11.8	31.1	
Actuated g/C Ratio	0.13	0.20		0.19	0.27		0.08	0.30		0.13	0.35	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	227	708		343	920		152	1063		237	1235	
v/s Ratio Prot	c0.08	0.10		0.16	c0.21		0.05	0.22		c0.10	c0.32	
v/s Ratio Perm												
v/c Ratio	0.63	0.49		0.82	0.79		0.64	0.73		0.73	0.93	
Uniform Delay, d1	37.4	31.8		35.0	30.7		39.9	28.3		37.6	28.3	
Progression Factor	1.00	1.00		1.00	1.00		0.89	1.20		0.95	1.47	
Incremental Delay, d2	5.0	0.4		13.8	4.5		5.4	3.0		6.7	9.2	
Delay (s)	42.4	32.2		48.8	35.2		41.1	36.9		42.3	50.8	
Level of Service	D	C		D	D		D	D		D	D	
Approach Delay (s)	35.0			38.8			37.4			49.7		
Approach LOS	D			D			D			D		
Intersection Summary												
HCM Average Control Delay			41.8	HCM Level of Service			D					
HCM Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)			12.0					
Intersection Capacity Utilization			75.8%	ICU Level of Service			D					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

7: N 26th Street & N Pearl Street

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	218	64	148	284	107	158	869	86	101	940	333
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.96		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3487		1805	3462		1805	3561		1805	3468	
Flt Permitted	0.40	1.00		0.49	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	765	3487		927	3462		1805	3561		1805	3468	
Peak-hour factor, PHF	0.88	0.88	0.88	0.96	0.96	0.96	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	176	248	73	154	296	111	165	905	90	110	1022	362
RTOR Reduction (vph)	0	32	0	0	46	0	0	7	0	0	35	0
Lane Group Flow (vph)	176	289	0	154	361	0	165	988	0	110	1349	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases	4			8			5			2		
Permitted Phases	4			8						1		
Actuated Green, G (s)	22.3	22.3		22.3	22.3		12.6	42.4		10.3	40.1	
Effective Green, g (s)	23.3	23.3		23.3	23.3		13.6	43.4		11.3	41.1	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.15	0.48		0.13	0.46	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	198	903		240	896		273	1717		227	1584	
v/s Ratio Prot		0.08			0.10		c0.09	0.28		0.06	c0.39	
v/s Ratio Perm	c0.23			0.17								
v/c Ratio	0.89	0.32		0.64	0.40		0.60	0.58		0.48	0.85	
Uniform Delay, d1	32.1	27.0		29.6	27.6		35.7	16.7		36.6	21.7	
Progression Factor	1.00	1.00		1.00	1.00		0.99	1.38		1.12	0.68	
Incremental Delay, d2	34.6	0.2		5.1	0.2		2.3	1.0		1.0	5.2	
Delay (s)	66.7	27.1		34.7	27.8		37.6	24.2		41.9	20.1	
Level of Service	E	C		C	C		D	C		D	C	
Approach Delay (s)		41.1			29.7			26.1			21.7	
Approach LOS		D			C			C			C	
Intersection Summary												
HCM Average Control Delay	26.9			HCM Level of Service			C					
HCM Volume to Capacity ratio	0.81											
Actuated Cycle Length (s)	90.0			Sum of lost time (s)			12.0					
Intersection Capacity Utilization	78.6%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

8: N 30th Street & N Pearl Street

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			
Volume (vph)	315	151	784	186	118	1152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	4%		0%			0%
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1734	1552	3471		1770	3539
Flt Permitted	0.95	1.00	1.00		0.24	1.00
Satd. Flow (perm)	1734	1552	3471		441	3539
Peak-hour factor, PHF	0.96	0.96	0.95	0.95	0.93	0.93
Adj. Flow (vph)	328	157	825	196	127	1239
RTOR Reduction (vph)	0	106	17	0	0	0
Lane Group Flow (vph)	328	51	1004	0	127	1239
Heavy Vehicles (%)	2%	2%	1%	1%	2%	2%
Turn Type	Perm				Perm	
Protected Phases	4		2			2
Permitted Phases		4			2	
Actuated Green, G (s)	22.1	22.1	57.9		57.9	57.9
Effective Green, g (s)	23.1	23.1	58.9		58.9	58.9
Actuated g/C Ratio	0.26	0.26	0.65		0.65	0.65
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.5	2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	445	398	2272		289	2316
v/s Ratio Prot	c0.19		0.29			c0.35
v/s Ratio Perm		0.03			0.29	
v/c Ratio	0.74	0.13	0.44		0.44	0.53
Uniform Delay, d1	30.7	25.7	7.6		7.5	8.3
Progression Factor	1.00	1.00	0.98		0.73	0.82
Incremental Delay, d2	5.9	0.1	0.5		4.4	0.8
Delay (s)	36.6	25.8	7.9		9.9	7.6
Level of Service	D	C	A		A	A
Approach Delay (s)	33.1		7.9			7.8
Approach LOS	C		A			A
Intersection Summary						
HCM Average Control Delay			12.1		HCM Level of Service	B
HCM Volume to Capacity ratio			0.59			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			63.4%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

9: N 46th Street & N Pearl Street

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	72	22	282	114	83	55	345	127	50	630	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	10	12	12	10	12	12	10	12	12
Grade (%)		2%			0%			0%			1%	
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.94		1.00	0.96		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1635	3266		1652	3316		1636	3363		1643	3514	
Flt Permitted	0.61	1.00		0.68	1.00		0.30	1.00		0.43	1.00	
Satd. Flow (perm)	1051	3266		1178	3316		518	3363		747	3514	
Peak-hour factor, PHF	0.80	0.80	0.80	0.87	0.87	0.87	0.94	0.94	0.94	0.93	0.93	0.93
Adj. Flow (vph)	11	90	28	324	131	95	59	367	135	54	677	10
RTOR Reduction (vph)	0	14	0	0	49	0	0	73	0	0	2	0
Lane Group Flow (vph)	11	104	0	324	177	0	59	429	0	54	685	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			4			6			2		
Permitted Phases	4			4			6			2		
Actuated Green, G (s)	21.3	21.3		21.3	21.3		14.8	14.8		14.8	14.8	
Effective Green, g (s)	22.3	22.3		22.3	22.3		15.8	15.8		15.8	15.8	
Actuated g/C Ratio	0.48	0.48		0.48	0.48		0.34	0.34		0.34	0.34	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	508	1580		570	1604		178	1153		256	1204	
v/s Ratio Prot		0.03			0.05			0.13			c0.19	
v/s Ratio Perm	0.01			c0.28			0.11			0.07		
v/c Ratio	0.02	0.07		0.57	0.11		0.33	0.37		0.21	0.57	
Uniform Delay, d1	6.2	6.3		8.5	6.5		11.2	11.4		10.7	12.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.0		1.1	0.0		0.8	0.1		0.3	0.5	
Delay (s)	6.2	6.4		9.5	6.5		12.0	11.6		11.0	12.9	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		6.3			8.3			11.6			12.7	
Approach LOS		A			A			B			B	

Intersection Summary

HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	46.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

10: N 51st Street & N Pearl Street

2014 No Action - Scenario 1

12/18/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	43	39	393	86	83	33	151	77	67	159	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Grade (%)		-2%			3%			-2%			2%	
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.94			1.00	0.85	1.00	0.95		1.00	1.00	
Flt Protected		0.99			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1801			1798	1591	1668	1667		1635	1721	
Flt Permitted		0.92			0.69	1.00	0.46	1.00		0.49	1.00	
Satd. Flow (perm)		1675			1300	1591	806	1667		845	1721	
Peak-hour factor, PHF	0.76	0.76	0.76	0.96	0.96	0.96	0.88	0.88	0.88	0.52	0.52	0.52
Adj. Flow (vph)	17	57	51	409	90	86	38	172	88	129	306	0
RTOR Reduction (vph)	0	28	0	0	0	24	0	18	0	0	0	0
Lane Group Flow (vph)	0	97	0	0	499	62	38	242	0	129	306	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm			pm+pt		
Protected Phases		4			4			6		5	2	
Permitted Phases	4			4		4	6			2		
Actuated Green, G (s)		39.9			39.9	39.9	29.1	29.1		40.1	40.1	
Effective Green, g (s)		40.9			40.9	40.9	30.1	30.1		41.1	41.1	
Actuated g/C Ratio		0.45			0.45	0.45	0.33	0.33		0.46	0.46	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		2.5			2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		761			591	723	270	558		447	786	
v/s Ratio Prot								c0.15		0.02	c0.18	
v/s Ratio Perm		0.06			c0.38	0.04	0.05			0.11		
v/c Ratio		0.13			0.84	0.09	0.14	0.43		0.29	0.39	
Uniform Delay, d1		14.2			21.7	13.9	20.9	23.3		19.2	16.2	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			10.5	0.0	1.1	2.4		0.3	1.5	
Delay (s)		14.3			32.2	14.0	22.0	25.8		19.5	17.6	
Level of Service		B			C	B	C	C		B	B	
Approach Delay (s)		14.3			29.6			25.3			18.2	
Approach LOS		B			C			C			B	
Intersection Summary												
HCM Average Control Delay		23.9			HCM Level of Service			C				
HCM Volume to Capacity ratio		0.63										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		60.6%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: N 17th Street & N Narrows Drive

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	403	0	16	0	524	244	18	663	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00			1.00		1.00	1.00	
Frt				1.00	0.85			0.96		1.00	1.00	
Flt Protected				0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)				1787	1599			1819		1805	1900	
Flt Permitted				0.95	1.00			1.00		0.11	1.00	
Satd. Flow (perm)				1787	1599			1819		213	1900	
Peak-hour factor, PHF	0.25	0.25	0.25	0.87	0.87	0.87	0.95	0.95	0.95	0.89	0.89	0.89
Adj. Flow (vph)	0	0	0	463	0	18	0	552	257	20	745	0
RTOR Reduction (vph)	0	0	0	0	11	0	0	16	0	0	0	0
Lane Group Flow (vph)	0	0	0	463	7	0	0	793	0	20	745	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Perm			Perm						Perm		
Protected Phases	7			8			6			2		
Permitted Phases	7			8						2		
Actuated Green, G (s)				28.0	28.0		37.0			37.0	37.0	
Effective Green, g (s)				29.0	29.0		38.0			38.0	38.0	
Actuated g/C Ratio				0.39	0.39		0.51			0.51	0.51	
Clearance Time (s)				5.0	5.0		5.0			5.0	5.0	
Vehicle Extension (s)				2.5	2.5		2.5			2.5	2.5	
Lane Grp Cap (vph)				691	618		922			108	963	
v/s Ratio Prot					0.00		c0.44				0.39	
v/s Ratio Perm				c0.26						0.09		
v/c Ratio				0.67	0.01		0.86			0.19	0.77	
Uniform Delay, d1				19.0	14.2		16.2			10.1	15.0	
Progression Factor				1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2				2.3	0.0		8.2			0.6	3.8	
Delay (s)				21.4	14.2		24.4			10.7	18.8	
Level of Service				C	B		C			B	B	
Approach Delay (s)	0.0				21.1		24.4				18.6	
Approach LOS	A				C		C				B	
Intersection Summary												
HCM Average Control Delay	21.4			HCM Level of Service			C					
HCM Volume to Capacity ratio	0.78											
Actuated Cycle Length (s)	75.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	71.4%			ICU Level of Service			C					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: I-705 Off-Ramp & Stadium Way

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	80	1080	259	57	915	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	2%		2%			-4%
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1752	1567	1765		1841	1938
Flt Permitted	0.95	1.00	1.00		0.54	1.00
Satd. Flow (perm)	1752	1567	1765		1047	1938
Peak-hour factor, PHF	0.95	0.95	0.85	0.85	0.91	0.91
Adj. Flow (vph)	84	1137	305	67	1005	143
RTOR Reduction (vph)	0	389	8	0	0	0
Lane Group Flow (vph)	84	748	364	0	1005	143
Heavy Vehicles (%)	2%	2%	4%	4%	0%	0%
Turn Type	pm+ov			custom		
Protected Phases	3	5	6		5	2
Permitted Phases		3			4	
Actuated Green, G (s)	4.6	28.8	18.8		34.3	48.0
Effective Green, g (s)	5.6	30.8	19.8		36.3	49.0
Actuated g/C Ratio	0.07	0.40	0.25		0.47	0.63
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	2.5	2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	126	621	450		747	1222
v/s Ratio Prot	0.05	c0.39	c0.21		c0.44	0.07
v/s Ratio Perm		0.09			c0.19	
v/c Ratio	0.67	1.20	0.81		1.35	0.12
Uniform Delay, d1	35.1	23.5	27.2		18.8	5.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	11.4	106.9	10.0		164.3	0.0
Delay (s)	46.5	130.4	37.2		183.1	5.8
Level of Service	D	F	D		F	A
Approach Delay (s)	124.6		37.2			161.0
Approach LOS	F		D			F
Intersection Summary						
HCM Average Control Delay			128.0		HCM Level of Service	F
HCM Volume to Capacity ratio			1.16			
Actuated Cycle Length (s)			77.7		Sum of lost time (s)	16.0
Intersection Capacity Utilization			90.6%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis 14: N 30th Street & N Orchard Street

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	105	298	36	62	475	53	46	238	32	41	223	74
Peak Hour Factor	0.93	0.93	0.93	0.97	0.97	0.97	0.87	0.87	0.87	0.94	0.94	0.94
Hourly flow rate (vph)	113	320	39	64	490	55	53	274	37	44	237	79
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	472	608	363	360								
Volume Left (vph)	113	64	53	44								
Volume Right (vph)	39	55	37	79								
Hadj (s)	0.02	-0.02	-0.01	-0.09								
Departure Headway (s)	9.3	9.3	9.4	9.3								
Degree Utilization, x	1.22	1.57	0.95	0.93								
Capacity (veh/h)	391	392	379	376								
Control Delay (s)	148.8	290.8	64.5	61.5								
Approach Delay (s)	148.8	290.8	64.5	61.5								
Approach LOS	F	F	F	F								
Intersection Summary												
Delay			162.3									
HCM Level of Service			F									
Intersection Capacity Utilization			74.8%	ICU Level of Service					D			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

15: 6th Avenue & N Pearl Street

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Volume (vph)	231	498	202	187	708	348	125	379	67	80	556	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			0%			0%			0%	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1796	3592	1607	1770	3539	1583		3496	1583	1752	3505	1568
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1796	3592	1607	1770	3539	1583		3496	1583	1752	3505	1568
Peak-hour factor, PHF	0.98	0.98	0.98	0.88	0.88	0.88	0.89	0.89	0.89	0.80	0.80	0.80
Adj. Flow (vph)	236	508	206	212	805	395	140	426	75	100	695	214
RTOR Reduction (vph)	0	0	155	0	0	292	0	0	59	0	0	165
Lane Group Flow (vph)	236	508	51	212	805	103	0	566	16	100	695	49
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%	3%	3%
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		1	1		2	2	
Permitted Phases			4			8			1			2
Actuated Green, G (s)	10.0	21.1	21.1	11.3	22.4	22.4		18.1	18.1	19.5	19.5	19.5
Effective Green, g (s)	11.0	22.1	22.1	12.3	23.4	23.4		19.1	19.1	20.5	20.5	20.5
Actuated g/C Ratio	0.12	0.25	0.25	0.14	0.26	0.26		0.21	0.21	0.23	0.23	0.23
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5	2.5	2.5
Lane Grp Cap (vph)	220	882	395	242	920	412		742	336	399	798	357
v/s Ratio Prot	c0.13	0.14		0.12	c0.23			c0.16		0.06	c0.20	
v/s Ratio Perm			0.03			0.06			0.01			0.03
v/c Ratio	1.07	0.58	0.13	0.88	0.88	0.25		0.76	0.05	0.25	0.87	0.14
Uniform Delay, d1	39.5	29.8	26.4	38.1	31.9	26.3		33.3	28.2	28.5	33.5	27.7
Progression Factor	1.00	1.00	1.00	1.11	1.09	2.15		1.00	1.00	0.54	0.63	1.30
Incremental Delay, d2	81.3	2.7	0.7	26.8	11.0	1.4		4.5	0.0	0.1	5.5	0.1
Delay (s)	120.8	32.6	27.1	69.2	45.9	58.0		37.8	28.3	15.4	26.4	36.2
Level of Service	F	C	C	E	D	E		D	C	B	C	D
Approach Delay (s)		53.3			52.8			36.7			27.4	
Approach LOS		D			D			D			C	

Intersection Summary

HCM Average Control Delay	43.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

16: N Narrows Drive & N 26th Street

2014 No Action - Scenario 1

12/18/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	205	336	2	39	530	125	0	1	27	82	4	228
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.94	0.94	0.94	0.89	0.89	0.89	0.75	0.75	0.75	0.89	0.89	0.89
Hourly flow rate (vph)	218	357	2	44	596	140	0	1	36	92	4	256
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												12
Median type	None			TWLTL								
Median storage (veh)	2											
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	736			360			1608	1618	359	1584	1549	666
vC1, stage 1 conf vol							795	795			753	753
vC2, stage 2 conf vol							813	824			830	796
vCu, unblocked vol	736			360			1608	1618	359	1584	1549	666
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5			6.1	5.5
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	75			96			100	99	95	52	98	44
cM capacity (veh/h)	879			1210			29	147	690	191	223	460
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	218	360	44	736	37	353						
Volume Left	218	0	44	0	0	92						
Volume Right	0	2	0	140	36	256						
cSH	879	1700	1210	1700	610	633						
Volume to Capacity	0.25	0.21	0.04	0.43	0.06	0.56						
Queue Length 95th (ft)	24	0	3	0	5	86						
Control Delay (s)	10.4	0.0	8.1	0.0	11.3	27.5						
Lane LOS	B			A			B			D		
Approach Delay (s)	3.9			0.5			11.3			27.5		
Approach LOS					B	D						
Intersection Summary												
Average Delay	7.3											
Intersection Capacity Utilization	68.3%			ICU Level of Service					C			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

17: N 37th Street & N Narrows Drive

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	4	19	12	43	25	90	14	172	40	69	192	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.84	0.84	0.84	0.88	0.88	0.88	0.85	0.85	0.85
Hourly flow rate (vph)	4	21	13	51	30	107	16	195	45	81	226	9
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					1111							
pX, platoon unblocked												
vC, conflicting volume	137			34			291	276	27	359	229	83
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	137			34			291	276	27	359	229	83
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			97	68	96	81	65	99
cM capacity (veh/h)	1460			1591			468	611	1051	420	649	979
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	4	34	51	137	16	241	81	235				
Volume Left	4	0	51	0	16	0	81	0				
Volume Right	0	13	0	107	0	45	0	9				
cSH	1460	1700	1591	1700	468	664	420	658				
Volume to Capacity	0.00	0.02	0.03	0.08	0.03	0.36	0.19	0.36				
Queue Length 95th (ft)	0	0	2	0	3	41	18	41				
Control Delay (s)	7.5	0.0	7.3	0.0	13.0	13.5	15.6	13.5				
Lane LOS	A		A		B	B	C	B				
Approach Delay (s)	0.9		2.0		13.5		14.0					
Approach LOS					B		B					
Intersection Summary												
Average Delay			10.4									
Intersection Capacity Utilization			34.4%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

18: N 37th Street & N Pearl Street

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	20	120	61	34	6	251	601	87	27	980	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.87		1.00	0.98		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1639		1787	1840		1787	3506		1787	3549	
Flt Permitted	0.72	1.00		0.48	1.00		0.18	1.00		0.39	1.00	
Satd. Flow (perm)	1349	1639		910	1840		344	3506		729	3549	
Peak-hour factor, PHF	0.89	0.89	0.89	0.65	0.65	0.65	0.99	0.99	0.99	0.93	0.93	0.93
Adj. Flow (vph)	30	22	135	94	52	9	254	607	88	29	1054	52
RTOR Reduction (vph)	0	116	0	0	8	0	0	8	0	0	2	0
Lane Group Flow (vph)	30	41	0	94	53	0	254	687	0	29	1104	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases	4			8			5		2	6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.8	12.8		12.8	12.8		69.2	69.2		54.4	54.4	
Effective Green, g (s)	12.8	12.8		12.8	12.8		69.2	69.2		54.4	54.4	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.77	0.77		0.60	0.60	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	192	233		129	262		438	2696		441	2145	
v/s Ratio Prot		0.03			0.03		c0.07	0.20			0.31	
v/s Ratio Perm	0.02			c0.10			c0.38			0.04		
v/c Ratio	0.16	0.18		0.73	0.20		0.58	0.25		0.07	0.51	
Uniform Delay, d1	33.9	34.0		36.9	34.1		6.2	3.0		7.3	10.2	
Progression Factor	1.00	1.00		1.00	1.00		2.67	1.88		1.00	1.00	
Incremental Delay, d2	0.4	0.4		18.5	0.4		1.7	0.2		0.3	0.9	
Delay (s)	34.2	34.3		55.4	34.5		18.2	5.8		7.6	11.1	
Level of Service	C	C		E	C		B	A		A	B	
Approach Delay (s)		34.3			47.2			9.2			11.0	
Approach LOS		C			D			A			B	
Intersection Summary												
HCM Average Control Delay	14.4			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.59											
Actuated Cycle Length (s)	90.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	67.7%			ICU Level of Service			C					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

19: N 46th Street & N Vassault Street

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	18	7	53	20	50	18	137	38	25	162	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.72	0.72	0.72	0.73	0.73	0.73	0.86	0.86	0.86	0.85	0.85	0.85
Hourly flow rate (vph)	3	25	10	73	27	68	21	159	44	29	191	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	555	495	191	495	474	181	192			203		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	555	495	191	495	474	181	192			203		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	95	99	84	94	92	98			98		
cM capacity (veh/h)	381	461	856	445	470	859	1394			1362		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	38	168	224	221								
Volume Left	3	73	21	29								
Volume Right	10	68	44	1								
cSH	515	559	1394	1362								
Volume to Capacity	0.07	0.30	0.02	0.02								
Queue Length 95th (ft)	6	32	1	2								
Control Delay (s)	12.5	14.2	0.8	1.2								
Lane LOS	B	B	A	A								
Approach Delay (s)	12.5	14.2	0.8	1.2								
Approach LOS	B	B										
Intersection Summary												
Average Delay			5.1									
Intersection Capacity Utilization			35.1%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 20: N 51st Street & N Park Way

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	2	20	48	44	38	15	41	49	27	20	52	5
Peak Hour Factor	0.87	0.87	0.87	0.91	0.91	0.91	0.82	0.82	0.82	0.69	0.69	0.69
Hourly flow rate (vph)	2	23	55	48	42	16	50	60	33	29	75	7
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total (vph)	80	107	50	93	29	83						
Volume Left (vph)	2	48	50	0	29	0						
Volume Right (vph)	55	16	0	33	0	7						
Hadj (s)	-0.41	0.00	0.53	-0.21	0.64	0.07						
Departure Headway (s)	4.3	4.6	5.6	4.8	5.7	5.2						
Degree Utilization, x	0.09	0.14	0.08	0.12	0.05	0.12						
Capacity (veh/h)	796	732	617	710	599	666						
Control Delay (s)	7.7	8.3	7.9	7.3	7.8	7.7						
Approach Delay (s)	7.7	8.3	7.5		7.7							
Approach LOS	A	A	A		A							
Intersection Summary												
Delay			7.8									
HCM Level of Service			A									
Intersection Capacity Utilization			27.6%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

21: N Pearl Street & N Park Way

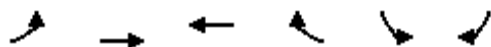
2014 No Action - Scenario 1
12/18/2007 - Average Weekday

						
Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Volume (veh/h)	12	235	110	25	30	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.50	0.50	0.88	0.88	0.71	0.71
Hourly flow rate (vph)	24	470	125	28	42	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		854				
pX, platoon unblocked						
vC, conflicting volume	153				422	77
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	153				422	77
tC, single (s)	4.1				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	98				92	99
cM capacity (veh/h)	1425				540	956
Direction, Lane #	NB 1	NB 2	SB 1	SB 2	NE 1	
Volume Total	181	313	83	70	55	
Volume Left	24	0	0	0	42	
Volume Right	0	0	0	28	13	
cSH	1425	1700	1700	1700	600	
Volume to Capacity	0.02	0.18	0.05	0.04	0.09	
Queue Length 95th (ft)	1	0	0	0	8	
Control Delay (s)	1.1	0.0	0.0	0.0	11.6	
Lane LOS	A				B	
Approach Delay (s)	0.4		0.0		11.6	
Approach LOS					B	
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			24.0%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

22: N 51st Street & N Bennett Street

2014 No Action - Scenario 1
12/18/2007 - Average Weekday



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	1	171	601	4	1	1
Sign Control		Free	Free		Stop	
Grade		0%	6%		0%	
Peak Hour Factor	0.59	0.59	0.76	0.76	0.50	0.50
Hourly flow rate (vph)	2	290	791	5	2	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	796				1087	793
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	796				1087	793
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	99
cM capacity (veh/h)	835				241	392
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	292	796	4			
Volume Left	2	0	2			
Volume Right	0	5	2			
cSH	835	1700	298			
Volume to Capacity	0.00	0.47	0.01			
Queue Length 95th (ft)	0	0	1			
Control Delay (s)	0.1	0.0	17.2			
Lane LOS	A		C			
Approach Delay (s)	0.1	0.0	17.2			
Approach LOS			C			
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			41.9%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

23: N 49th Street & N Ruston Way

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	86	261	433	749	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	5	100	281	466	814	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1842	815	815			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1842	815	815			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	74	66			
cM capacity (veh/h)	55	381	821			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	105	281	466	815		
Volume Left	5	281	0	0		
Volume Right	100	0	0	1		
cSH	301	821	1700	1700		
Volume to Capacity	0.35	0.34	0.27	0.48		
Queue Length 95th (ft)	38	38	0	0		
Control Delay (s)	23.2	11.6	0.0	0.0		
Lane LOS	C	B				
Approach Delay (s)	23.2	4.4		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			3.4			
Intersection Capacity Utilization		69.5%		ICU Level of Service		C
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

24: N 46th Street & N Baltimore Street

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	78	191	1	12	335	36	1	11	0	22	12	214
Sign Control		Free			Free			Stop			Stop	
Grade		-1%			1%			-3%			1%	
Peak Hour Factor	0.92	0.92	0.92	0.81	0.81	0.81	0.50	0.50	0.50	0.71	0.71	0.71
Hourly flow rate (vph)	85	208	1	15	414	44	2	22	0	31	17	301
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	458			209			1153	865	208	854	844	436
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	458			209			1153	865	208	854	844	436
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			99			98	92	100	87	94	51
cM capacity (veh/h)	1108			1368			80	269	837	242	272	616
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	293	473	24	349								
Volume Left	85	15	2	31								
Volume Right	1	44	0	301								
cSH	1108	1368	225	514								
Volume to Capacity	0.08	0.01	0.11	0.68								
Queue Length 95th (ft)	6	1	9	127								
Control Delay (s)	3.0	0.3	22.9	25.6								
Lane LOS	A	A	C	D								
Approach Delay (s)	3.0	0.3	22.9	25.6								
Approach LOS			C	D								
Intersection Summary												
Average Delay			9.2									
Intersection Capacity Utilization			65.0%		ICU Level of Service				C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

25: N 46th Street & N Orchard Street

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	7	177	15	47	329	28	20	33	18	21	24	11
Sign Control		Free			Free			Stop			Stop	
Grade		-1%			1%			-3%			1%	
Peak Hour Factor	0.83	0.83	0.83	0.94	0.94	0.94	0.86	0.86	0.86	0.70	0.70	0.70
Hourly flow rate (vph)	8	213	18	50	350	30	23	38	21	30	34	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	380			231			737	719	222	744	713	365
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	380			231			737	719	222	744	713	365
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			92	89	97	90	90	98
cM capacity (veh/h)	1190			1348			292	339	817	287	344	685
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	240	430	83	80								
Volume Left	8	50	23	30								
Volume Right	18	30	21	16								
cSH	1190	1348	378	352								
Volume to Capacity	0.01	0.04	0.22	0.23								
Queue Length 95th (ft)	1	3	20	22								
Control Delay (s)	0.3	1.2	17.2	18.2								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.3	1.2	17.2	18.2								
Approach LOS			C	C								
Intersection Summary												
Average Delay			4.2									
Intersection Capacity Utilization			46.9%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

26: N 46th Street & N Ferdinand Street

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	70	126	12	5	191	13	8	9	4	23	43	204
Sign Control		Free			Free			Stop			Stop	
Grade		-1%			1%			-3%			1%	
Peak Hour Factor	0.92	0.92	0.92	0.83	0.83	0.83	0.65	0.65	0.65	0.88	0.88	0.88
Hourly flow rate (vph)	76	137	13	6	230	16	12	14	6	26	49	232
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	246			150			802	553	143	559	552	238
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	246			150			802	553	143	559	552	238
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			93	97	99	94	88	71
cM capacity (veh/h)	1332			1444			189	417	909	409	417	806
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	226	252	32	307								
Volume Left	76	6	12	26								
Volume Right	13	16	6	232								
cSH	1332	1444	307	655								
Volume to Capacity	0.06	0.00	0.11	0.47								
Queue Length 95th (ft)	5	0	9	63								
Control Delay (s)	3.0	0.2	18.1	15.3								
Lane LOS	A	A	C	C								
Approach Delay (s)	3.0	0.2	18.1	15.3								
Approach LOS			C	C								
Intersection Summary												
Average Delay			7.3									
Intersection Capacity Utilization			48.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

27: N Ruston Way & N 40th Street

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

						
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (veh/h)	845	1	12	758	0	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.74	0.74	0.94	0.94	0.75	0.75
Hourly flow rate (vph)	1142	1	13	806	0	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			TWLT		
Median storage veh				2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1143		1974	1143
vC1, stage 1 conf vol					1143	
vC2, stage 2 conf vol					832	
vCu, unblocked vol			1143		1974	1143
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	96
cM capacity (veh/h)			618		250	246
Direction, Lane #	EB 1	WB 1	WB 2	NE 1		
Volume Total	1143	13	806	9		
Volume Left	0	13	0	0		
Volume Right	1	0	0	9		
cSH	1700	618	1700	246		
Volume to Capacity	0.67	0.02	0.47	0.04		
Queue Length 95th (ft)	0	2	0	3		
Control Delay (s)	0.0	10.9	0.0	20.2		
Lane LOS		B		C		
Approach Delay (s)	0.0	0.2		20.2		
Approach LOS				C		
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			54.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

28: N Ruston Way & N Adler Street

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

						
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (veh/h)	829	28	207	787	19	80
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.86	0.86	0.66	0.66
Hourly flow rate (vph)	921	31	241	915	29	121
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT			TWLT		
Median storage veh	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			952		2333	937
vC1, stage 1 conf vol					937	
vC2, stage 2 conf vol					1397	
vCu, unblocked vol			952		2333	937
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			67		79	62
cM capacity (veh/h)			730		140	322
Direction, Lane #	SE 1	NW 1	NW 2	NE 1		
Volume Total	952	241	915	150		
Volume Left	0	241	0	29		
Volume Right	31	0	0	121		
cSH	1700	730	1700	258		
Volume to Capacity	0.56	0.33	0.54	0.58		
Queue Length 95th (ft)	0	36	0	84		
Control Delay (s)	0.0	12.3	0.0	36.7		
Lane LOS		B		E		
Approach Delay (s)	0.0	2.6		36.7		
Approach LOS				E		
Intersection Summary						
Average Delay			3.8			
Intersection Capacity Utilization			72.8%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

29: N 49th Street & N Pearl Street

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	14	6	298	11	2	594
Sign Control	Stop		Free			Free
Grade	0%		-2%			1%
Peak Hour Factor	0.71	0.71	0.84	0.84	0.73	0.73
Hourly flow rate (vph)	20	8	355	13	3	814
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			1174			951
pX, platoon unblocked	0.93					
vC, conflicting volume	1180	361			368	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1158	361			368	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	99			100	
cM capacity (veh/h)	204	688			1191	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	28	368	816			
Volume Left	20	0	3			
Volume Right	8	13	0			
cSH	258	1700	1191			
Volume to Capacity	0.11	0.22	0.00			
Queue Length 95th (ft)	9	0	0			
Control Delay (s)	20.6	0.0	0.1			
Lane LOS	C		A			
Approach Delay (s)	20.6	0.0	0.1			
Approach LOS	C					
Intersection Summary						
Average Delay		0.5				
Intersection Capacity Utilization		42.9%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
30: N 51st Street & N Winnifred Street

2014 No Action - Scenario 1
12/18/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	7	175	6	19	551	14	8	6	7	8	8	12
Peak Hour Factor	0.86	0.86	0.86	0.83	0.83	0.83	0.56	0.56	0.56	0.92	0.92	0.92
Hourly flow rate (vph)	8	203	7	23	664	17	14	11	12	9	9	13
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	219	704	38	30								
Volume Left (vph)	8	23	14	9								
Volume Right (vph)	7	17	13	13								
Hadj (s)	-0.01	-0.01	-0.12	-0.20								
Departure Headway (s)	4.8	4.4	5.9	5.8								
Degree Utilization, x	0.29	0.85	0.06	0.05								
Capacity (veh/h)	716	704	567	565								
Control Delay (s)	9.8	26.7	9.3	9.1								
Approach Delay (s)	9.8	26.7	9.3	9.1								
Approach LOS	A	D	A	A								
Intersection Summary												
Delay				21.8								
HCM Level of Service				C								
Intersection Capacity Utilization				47.3%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis
31: N Ruston Way & Park Access

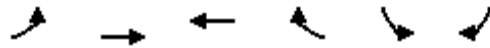
2014 No Action - Scenario 1

12/18/2007 - Average Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	29	152	0	59	577	42	1	23	40	244	29	195
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	32	165	0	64	627	46	1	25	43	265	32	212
Approach Volume (veh/h)	197			737			70			509		
Crossing Volume (veh/h)	361			58			462			692		
High Capacity (veh/h)	1043			1324			962			800		
High v/c (veh/h)	0.19			0.56			0.07			0.64		
Low Capacity (veh/h)	852			1106			780			636		
Low v/c (veh/h)	0.23			0.67			0.09			0.80		
Intersection Summary												
Maximum v/c High	0.64											
Maximum v/c Low	0.80											
Intersection Capacity Utilization	82.4%			ICU Level of Service			E					

HCM Unsignalized Intersection Capacity Analysis
 33: N Ruston Way & Site Access

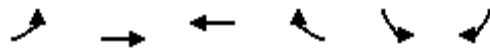
2014 No Action - Scenario 1
 12/18/2007 - Average Weekday



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Right Turn Channelized						
Volume (veh/h)	41	395	462	38	299	215
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	45	429	502	41	325	234
Approach Volume (veh/h)		474	543		559	
Crossing Volume (veh/h)		325	45		502	
High Capacity (veh/h)		1073	1337		932	
High v/c (veh/h)		0.44	0.41		0.60	
Low Capacity (veh/h)		879	1118		753	
Low v/c (veh/h)		0.54	0.49		0.74	
Intersection Summary						
Maximum v/c High			0.60			
Maximum v/c Low			0.74			
Intersection Capacity Utilization			89.4%		ICU Level of Service	E

HCM Unsignalized Intersection Capacity Analysis 35: N Ruston Way & East Access

2014 No Action - Scenario 1
12/18/2007 - Average Weekday



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	11	684	402	22	72	99
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	743	437	24	78	108
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						1
Median type		None	None			
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	461				1216	449
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	461				1216	449
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				60	82
cM capacity (veh/h)	1100				198	610
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	755	461	186			
Volume Left	12	0	78			
Volume Right	0	24	108			
cSH	1100	1700	397			
Volume to Capacity	0.01	0.27	0.47			
Queue Length 95th (ft)	1	0	60			
Control Delay (s)	0.3	0.0	21.8			
Lane LOS	A		C			
Approach Delay (s)	0.3	0.0	21.8			
Approach LOS			C			
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			55.5%	ICU Level of Service		B
Analysis Period (min)			15			

1: N Park Street & N Narrows Drive Performance by approach

Approach	EB	WB	NB	SB	SE	All
Total Delay (hr)	0.0	0.0	0.6	0.3	0.4	1.2
Delay / Veh (s)	3.4	5.2	8.7	8.0	10.5	8.9
Stop Delay (hr)	0.0	0.0	0.3	0.3	0.3	0.9
St Del/Veh (s)	3.7	4.5	5.1	8.1	8.4	6.7
Total Stops	2	10	227	113	133	485
Stop/Veh	1.00	1.00	1.00	1.00	1.00	1.00
Travel Dist (mi)	0.4	2.7	37.7	16.3	19.2	76.3
Travel Time (hr)	0.0	0.1	1.9	0.9	1.1	4.0
Vehicles Entered	2	10	227	112	133	484
Vehicles Exited	2	10	227	113	133	485
Hourly Exit Rate	2	10	227	113	133	485
Input Volume	2	9	235	116	129	491
% of Volume	100	111	97	97	103	99

Total Network Performance

Total Delay (hr)	1.4
Delay / Veh (s)	10.4
Stop Delay (hr)	1.0
St Del/Veh (s)	7.1
Total Stops	485
Stop/Veh	1.01
Travel Dist (mi)	183.0
Travel Time (hr)	8.1
Vehicles Entered	484
Vehicles Exited	481
Hourly Exit Rate	481
Input Volume	982
% of Volume	49



Movement Summary

Ruston Point EIS Supplement

Average Weekday No Action Park Access Scenario 1 (31)

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
N Baltimore Street (northbound)										
3L	L	1	50.0	0.105	13.8	LOS B	19	0.62	0.82	26.0
8T	T	25	3.8	0.107	56.5	LOS E	19	0.62	0.87	17.6
8R	R	43	2.3	0.107	9.4	LOS A	19	0.62	0.65	27.9
Approach		72	4.2	0.107	26.6	LOS C	19	0.62	0.73	23.3
N Ruston Way (westbound)										
1L	L	64	1.6	0.587	10.9	LOS B	149	0.31	0.61	27.1
6T	T	627	2.1	0.587	4.1	LOS A	149	0.31	0.38	30.5
6R	R	46	2.2	0.590	5.1	LOS A	149	0.31	0.43	29.9
Approach		738	2.0	0.587	4.7	LOS A	149	0.31	0.40	30.1
Park Access (southbound)										
7L	L	265	1.9	0.869	32.0	LOS C	367	1.00	1.39	19.5
4T	T	32	3.1	0.865	25.1	LOS C	367	1.00	1.39	21.0
4R	R	212	1.9	0.869	26.2	LOS C	367	1.00	1.36	20.6
Approach		509	2.0	0.869	29.1	LOS C	367	1.00	1.38	20.0
N Ruston Way (eastbound)										
5L	L	32	3.1	0.267	12.8	LOS B	46	0.57	0.77	26.4
2T	T	165	1.8	0.268	55.5	LOS E	46	0.57	0.90	17.8
2R	R	1	50.0	0.286	7.1	LOS A	46	0.57	0.67	28.8
Approach		199	2.5	0.268	48.2	LOS D	46	0.57	0.87	19.1
All Vehicles		1518	2.2	0.869	19.6	LOS B	367	0.59	0.81	23.9

Symbols which may appear in this table:

Following Degree of Saturation

x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

Following LOS

- Based on density for continuous movements

Following Queue



Movement Summary

Ruston Point EIS Supplement

Average Weekday No Action Site Access (33)

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
N Ruston Way (westbound)										
6T	T	502	2.0	0.431	3.8	LOS A	97	0.23	0.36	30.8
6R	R	41	2.4	0.432	4.9	LOS A	97	0.23	0.43	30.2
Approach		543	2.0	0.431	3.9	LOS A	97	0.23	0.36	30.8
Site Access (southbound)										
7L	L	325	1.8	0.795	22.2	LOS C	288	0.91	1.19	22.6
4R	R	234	2.1	0.793	16.5	LOS B	288	0.91	1.16	24.3
Approach		559	2.0	0.794	19.8	LOS B	288	0.91	1.18	23.3
N Ruston Way (eastbound)										
5L	L	45	2.2	0.608	14.5	LOS B	159	0.74	0.87	25.8
2T	T	429	2.1	0.605	57.2	LOS E	159	0.74	0.94	16.2
Approach		475	2.1	0.605	53.1	LOS D	159	0.74	0.94	16.9
All Vehicles		1577	2.0	0.795	24.4	LOS C	288	0.63	0.82	22.8

Symbols which may appear in this table:

Following Degree of Saturation

x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

Following LOS

- Based on density for continuous movements

Following Queue

- Density for continuous movement



Site: Office Site Access

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HCM Signalized Intersection Capacity Analysis
9: N 46th Street & N Pearl Street

2014 No Action - Scenario 1
12/4/2007 - Summer Weekday

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Volume (vph)	9	70	22	285	112	82	54	335	129	49	619	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	10	12	12	10	12	12	10	12	12
Grade (%)		2%			0%			0%			1%	
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.94		1.00	0.96		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1635	3264		1652	3315		1636	3359		1643	3514	
Flt Permitted	0.61	1.00		0.68	1.00		0.30	1.00		0.44	1.00	
Satd. Flow (perm)	1054	3264		1180	3315		523	3359		754	3514	
Peak-hour factor, PHF	0.80	0.80	0.80	0.87	0.87	0.87	0.94	0.94	0.94	0.93	0.93	0.93
Adj. Flow (vph)	11	88	28	328	129	94	57	356	137	53	666	10
RTOR Reduction (vph)	0	14	0	0	48	0	0	79	0	0	2	0
Lane Group Flow (vph)	11	102	0	328	175	0	57	414	0	53	674	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	2%	2%	2%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			4			6			2	
Permitted Phases	4			4			6			2		
Actuated Green, G (s)	21.8	21.8		21.8	21.8		14.6	14.6		14.6	14.6	
Effective Green, g (s)	22.8	22.8		22.8	22.8		15.6	15.6		15.6	15.6	
Actuated g/C Ratio	0.49	0.49		0.49	0.49		0.34	0.34		0.34	0.34	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	518	1604		580	1629		176	1129		254	1181	
v/s Ratio Prot		0.03			0.05			0.12			0.19	
v/s Ratio Perm	0.01			0.28			0.11			0.07		
v/c Ratio	0.02	0.06		0.57	0.11		0.32	0.37		0.21	0.57	
Uniform Delay, d1	6.1	6.2		8.3	6.3		11.5	11.7		11.0	12.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.0		1.0	0.0		0.8	0.1		0.3	0.5	
Delay (s)	6.1	6.2		9.3	6.4		12.3	11.8		11.3	13.2	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		6.2			8.1			11.9			13.1	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM Average Control Delay		10.9			HCM Level of Service			B				
HCM Volume to Capacity ratio		0.57										
Actuated Cycle Length (s)		46.4			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		58.2%			ICU Level of Service			B				
Analysis Period (min)		15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: N 51st Street & N Pearl Street

2014 No Action - Scenario 1
12/4/2007 - Summer Weekday

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↰			↰			↰	
Volume (vph)	41	66	72	435	125	122	75	346	106	104	295	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Grade (%)		-2%			3%			-2%			2%	
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.95			1.00	0.85	1.00	0.96		1.00	1.00	
Flt Protected		0.99			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1794			1802	1591	1668	1694		1635	1721	
Flt Permitted		0.66			0.61	1.00	0.16	1.00		0.18	1.00	
Satd. Flow (perm)		1195			1141	1591	273	1694		314	1721	
Peak-hour factor, PHF	0.76	0.76	0.76	0.96	0.96	0.96	0.88	0.88	0.88	0.52	0.52	0.52
Adj. Flow (vph)	54	87	95	453	130	127	85	393	120	200	567	0
RTOR Reduction (vph)	0	27	0	0	0	26	0	12	0	0	0	0
Lane Group Flow (vph)	0	209	0	0	583	101	85	501	0	200	567	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm		pm+pt			
Protected Phases		4			4		6			5	2	
Permitted Phases	4			4		4	6			2		
Actuated Green, G (s)		41.0			41.0	41.0	28.0	28.0		39.0	39.0	
Effective Green, g (s)		42.0			42.0	42.0	29.0	29.0		40.0	40.0	
Actuated g/C Ratio		0.47			0.47	0.47	0.32	0.32		0.44	0.44	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		2.5			2.5	2.5	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		558			532	742	88	546		242	765	
v/s Ratio Prot							0.30			0.06	0.33	
v/s Ratio Perm		0.17			0.51	0.06	0.31			0.30		
v/c Ratio		0.37			1.10	0.14	0.97	0.92		0.83	0.74	
Uniform Delay, d1		15.5			24.0	13.7	30.0	29.3		33.2	20.7	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			67.8	0.1	86.9	22.7		19.7	6.4	
Delay (s)		15.8			91.8	13.7	116.9	52.0		52.9	27.1	
Level of Service		B			F	B	F	D		D	C	
Approach Delay (s)		15.8			77.8			61.3			33.8	
Approach LOS		B			E			E			C	
Intersection Summary												
HCM Average Control Delay		52.6				HCM Level of Service		D				
HCM Volume to Capacity ratio		0.99										
Actuated Cycle Length (s)		90.0				Sum of lost time (s)		8.0				
Intersection Capacity Utilization		84.6%				ICU Level of Service		E				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
22: N 51st Street & N Bennett Street

2014 No Action - Scenario 1
12/4/2007 - Summer Weekday

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	2	203	674	4	2	1
Sign Control		Free	Free		Stop	
Grade		0%	6%		0%	
Peak Hour Factor	0.59	0.59	0.76	0.76	0.50	0.50
Hourly flow rate (vph)	3	344	887	5	4	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	892				1240	889
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	892				1240	889
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	99
cM capacity (veh/h)	769				194	345
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	347	892	6			
Volume Left	3	0	4			
Volume Right	0	5	2			
cSH	769	1700	227			
Volume to Capacity	0.00	0.52	0.03			
Queue Length 95th (ft)	0	0	2			
Control Delay (s)	0.1	0.0	21.3			
Lane LOS	A		C			
Approach Delay (s)	0.1	0.0	21.3			
Approach LOS			C			
Intersection Summary						
Average Delay		0.1				
Intersection Capacity Utilization		45.7%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
23: N 49th Street & N Ruston Way

2014 No Action - Scenario 1
12/4/2007 - Summer Weekday

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	9	118	290	511	776	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	10	137	312	549	843	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2018	845	847			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2018	845	847			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	74	62	61			
cM capacity (veh/h)	40	366	799			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	148	312	549	847		
Volume Left	10	312	0	0		
Volume Right	137	0	0	3		
cSH	231	799	1700	1700		
Volume to Capacity	0.64	0.39	0.32	0.50		
Queue Length 95th (ft)	97	47	0	0		
Control Delay (s)	44.7	12.4	0.0	0.0		
Lane LOS	E	B				
Approach Delay (s)	44.7	4.5		0.0		
Approach LOS	E					
Intersection Summary						
Average Delay			5.6			
Intersection Capacity Utilization			74.9%	ICU Level of Service	D	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
24: N 46th Street & N Baltimore Street

2014 No Action - Scenario 1
12/4/2007 - Summer Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	80	187	1	11	329	36	1	12	0	22	14	219
Sign Control		Free			Free			Stop			Stop	
Grade		-1%			1%			-3%			1%	
Peak Hour Factor	0.92	0.92	0.92	0.81	0.81	0.81	0.50	0.50	0.50	0.71	0.71	0.71
Hourly flow rate (vph)	87	203	1	14	406	44	2	24	0	31	20	308
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	451			204			1152	855	204	845	834	428
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	451			204			1152	855	204	845	834	428
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			99			97	91	100	87	93	50
cM capacity (veh/h)	1115			1373			79	272	842	244	275	622
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	291	464	26	359								
Volume Left	87	14	2	31								
Volume Right	1	44	0	308								
cSH	1115	1373	229	517								
Volume to Capacity	0.08	0.01	0.11	0.69								
Queue Length 95th (ft)	6	1	9	134								
Control Delay (s)	3.1	0.3	22.7	26.3								
Lane LOS	A	A	C	D								
Approach Delay (s)	3.1	0.3	22.7	26.3								
Approach LOS			C	D								
Intersection Summary												
Average Delay		9.7										
Intersection Capacity Utilization		65.3%		ICU Level of Service		C						
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis
25: N 46th Street & N Orchard Street

2014 No Action - Scenario 1
12/4/2007 - Summer Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	7	173	15	46	323	28	20	32	17	21	24	10
Sign Control		Free			Free			Stop			Stop	
Grade		-1%			1%			-3%			1%	
Peak Hour Factor	0.83	0.83	0.83	0.94	0.94	0.94	0.86	0.86	0.86	0.70	0.70	0.70
Hourly flow rate (vph)	8	208	18	49	344	30	23	37	20	30	34	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	373			227			722	706	217	729	700	359
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	373			227			722	706	217	729	700	359
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			92	89	98	90	90	98
cM capacity (veh/h)	1196			1354			300	346	822	295	350	690
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	235	422	80	79								
Volume Left	8	49	23	30								
Volume Right	18	30	20	14								
cSH	1196	1354	384	357								
Volume to Capacity	0.01	0.04	0.21	0.22								
Queue Length 95th (ft)	1	3	19	21								
Control Delay (s)	0.4	1.2	16.9	17.9								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.4	1.2	16.9	17.9								
Approach LOS			C	C								
Intersection Summary												
Average Delay		4.1										
Intersection Capacity Utilization		46.2%		ICU Level of Service		A						
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis
26: N 46th Street & N Ferdinand Street

2014 No Action - Scenario 1
12/4/2007 - Summer Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	69	124	12	5	187	13	8	9	3	23	43	200
Sign Control		Free			Free			Stop			Stop	
Grade		-1%			1%			-3%			1%	
Peak Hour Factor	0.92	0.92	0.92	0.83	0.83	0.83	0.65	0.65	0.65	0.88	0.88	0.88
Hourly flow rate (vph)	75	135	13	6	225	16	12	14	5	26	49	227
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	241			148			788	544	141	548	543	233
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	241			148			788	544	141	548	543	233
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			94	97	99	94	88	72
cM capacity (veh/h)	1337			1446			195	422	912	417	423	811
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	223	247	31	302								
Volume Left	75	6	12	26								
Volume Right	13	16	5	227								
cSH	1337	1446	305	659								
Volume to Capacity	0.06	0.00	0.10	0.46								
Queue Length 95th (ft)	4	0	8	60								
Control Delay (s)	3.0	0.2	18.1	15.0								
Lane LOS	A	A	C	C								
Approach Delay (s)	3.0	0.2	18.1	15.0								
Approach LOS			C	C								
Intersection Summary												
Average Delay		7.2										
Intersection Capacity Utilization		48.2%		ICU Level of Service		A						
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis
29: N 49th Street & N Pearl Street

2014 No Action - Scenario 1
12/4/2007 - Summer Weekday

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	11	516	10	4	797
Sign Control	Stop		Free			Free
Grade	0%		-2%			1%
Peak Hour Factor	0.71	0.71	0.84	0.84	0.73	0.73
Hourly flow rate (vph)	7	15	614	12	5	1092
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			1174			951
pX, platoon unblocked	0.73	1.00			1.00	
vC, conflicting volume	1723	620			626	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1805	620			626	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	97			99	
cM capacity (veh/h)	64	491			955	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	23	626	1097			
Volume Left	7	0	5			
Volume Right	15	12	0			
cSH	159	1700	955			
Volume to Capacity	0.14	0.37	0.01			
Queue Length 95th (ft)	12	0	0			
Control Delay (s)	31.3	0.0	0.2			
Lane LOS	D		A			
Approach Delay (s)	31.3	0.0	0.2			
Approach LOS	D					
Intersection Summary						
Average Delay		0.5				
Intersection Capacity Utilization		55.1%		ICU Level of Service		B
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis 30: N 51st Street & N Winnifred Street

2014 No Action - Scenario 1
12/4/2007 - Summer Weekday

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	11	255	9	12	653	10	12	9	10	11	12	17
Peak Hour Factor	0.86	0.86	0.86	0.83	0.83	0.83	0.56	0.56	0.56	0.92	0.92	0.92
Hourly flow rate (vph)	13	297	10	14	787	12	21	16	18	12	13	18
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	320	813	55	43								
Volume Left (vph)	13	14	21	12								
Volume Right (vph)	10	12	18	18								
Hadj (s)	-0.01	-0.01	-0.12	-0.20								
Departure Headway (s)	5.1	4.6	6.3	6.3								
Degree Utilization, x	0.45	1.05	0.10	0.08								
Capacity (veh/h)	699	764	537	534								
Control Delay (s)	12.2	66.1	10.0	9.8								
Approach Delay (s)	12.2	66.1	10.0	9.8								
Approach LOS	B	F	B	A								
Intersection Summary												
Delay				47.6								
HCM Level of Service				E								
Intersection Capacity Utilization				49.4%	ICU Level of Service			A				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis 31: N Ruston Way & Park Access

2014 No Action - Scenario 1
12/4/2007 - Summer Weekday

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	29	186	0	63	658	41	1	22	43	245	30	195
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	32	202	0	68	715	45	1	24	47	266	33	212
Approach Volume (veh/h)	234			828			72			511		
Crossing Volume (veh/h)	367			57			500			785		
High Capacity (veh/h)	1037			1325			933			742		
High v/c (veh/h)	0.23			0.63			0.08			0.69		
Low Capacity (veh/h)	847			1107			754			586		
Low v/c (veh/h)	0.28			0.75			0.10			0.87		
Intersection Summary												
Maximum v/c High	0.69											
Maximum v/c Low	0.87											
Intersection Capacity Utilization	88.7%			ICU Level of Service						E		

HCM Unsignalized Intersection Capacity Analysis
33: N Ruston Way & Site Access

2014 No Action - Scenario 1
12/4/2007 - Summer Weekday

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Right Turn Channelized						
Volume (veh/h)	41	433	547	38	299	215
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	45	471	595	41	325	234
Approach Volume (veh/h)	515	636	559			
Crossing Volume (veh/h)	325	45	595			
High Capacity (veh/h)	1073	1337	865			
High v/c (veh/h)	0.48	0.48	0.65			
Low Capacity (veh/h)	879	1118	694			
Low v/c (veh/h)	0.59	0.57	0.80			
Intersection Summary						
Maximum v/c High			0.65			
Maximum v/c Low			0.80			
Intersection Capacity Utilization			93.2%		ICU Level of Service	F

HCM Unsignalized Intersection Capacity Analysis
35: N Ruston Way & East Access

2014 No Action - Scenario 1
12/4/2007 - Summer Weekday

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Volume (veh/h)	11	721	487	22	72	99
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	784	529	24	78	108
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						1
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	553				1349	541
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	553				1349	541
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				52	80
cM capacity (veh/h)	1017				164	541
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	796	553	186			
Volume Left	12	0	78			
Volume Right	0	24	108			
cSH	1017	1700	333			
Volume to Capacity	0.01	0.33	0.56			
Queue Length 95th (ft)	1	0	81			
Control Delay (s)	0.3	0.0	28.7			
Lane LOS	A		D			
Approach Delay (s)	0.3	0.0	28.7			
Approach LOS			D			
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			57.4%		ICU Level of Service	B
Analysis Period (min)			15			



Movement Summary

Ruston Point EIS Supplement

Summer Weekday No Action Park Access Scenario 1 (31)

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
N Baltimore Street (northbound)										
3L	L	1	50.0	0.111	14.2	LOS B	20	0.64	0.84	25.9
8T	T	24	4.2	0.113	56.9	LOS E	20	0.64	0.88	17.5
8R	R	47	2.1	0.113	9.8	LOS A	20	0.64	0.66	27.7
Approach		73	4.1	0.113	25.4	LOS C	20	0.64	0.74	23.5
N Ruston Way (westbound)										
1L	L	68	1.5	0.648	10.9	LOS B	187	0.34	0.60	27.0
6T	T	715	2.0	0.650	4.1	LOS A	187	0.34	0.38	30.3
6R	R	45	2.2	0.652	5.2	LOS A	187	0.34	0.43	29.7
Approach		828	1.9	0.650	4.7	LOS A	187	0.34	0.40	29.9
Park Access (southbound)										
7L	L	266	1.9	0.964	49.6	LOS D	536	1.00	1.70	15.6
4T	T	33	3.0	0.971	42.8	LOS D	536	1.00	1.70	16.3
4R	R	212	1.9	0.964	43.9	LOS D	536	1.00	1.69	16.1
Approach		511	2.0	0.965	46.8	LOS D	536	1.00	1.69	15.9
N Ruston Way (eastbound)										
5L	L	32	3.1	0.320	13.0	LOS B	57	0.60	0.79	26.3
2T	T	202	2.0	0.319	55.7	LOS E	57	0.60	0.90	17.8
2R	R	1	50.0	0.333	7.2	LOS A	57	0.60	0.68	28.7
Approach		236	2.5	0.319	49.5	LOS D	57	0.60	0.89	18.8
All Vehicles		1648	2.1	0.971	25.1	LOS C	536	0.60	0.89	21.8

Symbols which may appear in this table:

Following Degree of Saturation

x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

Following LOS

- Based on density for continuous movements

Following Queue



Movement Summary

Ruston Point EIS Supplement

Summer Weekday No Action Site Access (33)

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (ft)	Prop. Queued	Eff. Stop Rate	Aver Speed (mph)
N Ruston Way (westbound)										
6T	T	595	2.0	0.498	3.9	LOS A	125	0.26	0.36	30.7
6R	R	41	2.4	0.500	5.0	LOS A	125	0.26	0.43	30.0
Approach		636	2.0	0.498	3.9	LOS A	125	0.26	0.37	30.7
Site Access (southbound)										
7L	L	325	1.8	0.864	28.5	LOS C	369	0.99	1.35	20.6
4R	R	234	2.1	0.863	22.8	LOS C	369	0.99	1.34	21.7
Approach		559	2.0	0.864	26.1	LOS C	369	0.99	1.35	21.0
N Ruston Way (eastbound)										
5L	L	45	2.2	0.652	15.2	LOS B	190	0.79	0.90	25.5
2T	T	471	1.9	0.656	57.8	LOS E	190	0.79	0.96	16.0
Approach		515	1.9	0.655	54.1	LOS D	190	0.79	0.95	16.7
All Vehicles		1710	2.0	0.864	26.3	LOS C	369	0.66	0.86	22.0

Symbols which may appear in this table:

Following Degree of Saturation

x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

Following LOS

- Based on density for continuous movements

Following Queue

- Density for continuous movement



SIDRA SOLUTIONS

Site: Summer Office Site Access

\\Tsiserver\company\Project\2006\206055 Point Ruston\SEIS\Technical\Average Weekday.aap

Processed Dec 17, 2007 02:40:43PM

A1053, TSI, Medium Office

Produced by SIDRA Intersection 3.1.061208.34

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www.sidrasolutions.com

Appendix 3.7-J: No Action Arterial Level of Service Reports

Arterial Level of Service: NB N Ruston Way

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
N McCarver Street	16	11.1	30.4	0.2	21
Commercial 10	15	2.4	16.7	0.1	26
	82	1.2	14.9	0.1	27
Commercial 09	14	2.2	17.6	0.1	26
Commercial 08	13	0.9	6.7	0.0	26
Commercial 07	12	1.1	6.9	0.0	25
Adler Street	11	3.0	12.0	0.1	23
Commercial 06	10	1.2	9.6	0.1	27
Commercial 05	9	0.5	5.4	0.0	28
Commercial 04	8	0.6	7.9	0.1	28
Park 02	7	1.8	22.1	0.2	27
N 40th Street	6	1.3	15.9	0.1	27
Commercial 03	5	1.9	18.6	0.1	27
Commercial 02	4	0.8	7.6	0.1	27
Commercial 01	3	1.4	13.8	0.1	27
Park Access 01	2	1.3	12.4	0.1	26
N 49th Street	1	4.0	35.4	0.3	28
	34	1.3	22.2	0.2	28
East Access	35	1.1	7.0	0.1	26
Site Access	33	4.3	9.4	0.0	18
Park Access	31	4.3	13.5	0.1	15
Total		47.9	306.0	2.1	25

Arterial Level of Service: SB N Ruston Way

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Baltimore Ext.	31	3.4	10.9	0.1	21
Site Access	33	4.5	13.7	0.1	15
East Access	35	0.6	8.9	0.0	19
	34	0.2	6.7	0.1	27
N 49th Street	1	1.3	21.6	0.2	28
Park Access 01	2	3.1	36.6	0.3	27
Commercial 01	3	1.2	12.4	0.1	26
Commercial 02	4	1.4	13.9	0.1	27
Commercial 03	5	0.8	7.6	0.1	27
N 40th Street	6	1.8	18.4	0.1	27
Park 02	7	2.0	16.4	0.1	26
Commercial 04	8	2.5	22.9	0.2	26
Commercial 05	9	1.2	8.6	0.1	25
Commercial 06	10	0.9	5.7	0.0	26
Adler Street	11	1.8	10.2	0.1	25
Commercial 07	12	2.1	11.0	0.1	25
Commercial 08	13	1.0	7.0	0.0	25
Commercial 09	14	1.2	6.9	0.0	25
	82	1.7	17.2	0.1	27
Commercial 10	15	2.0	15.6	0.1	26
N McCarver Street	16	9.2	23.1	0.1	19
Total		44.1	295.4	2.0	25

Arterial Level of Service: NB N Ruston Way

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
N McCarver Street	16	13.9	33.2	0.2	19
Commercial 10	15	2.5	16.9	0.1	26
	82	1.3	15.0	0.1	27
Commercial 09	14	2.3	17.6	0.1	26
Commercial 08	13	1.2	6.9	0.0	25
Commercial 07	12	1.5	7.3	0.0	24
Adler Street	11	3.7	12.7	0.1	22
Commercial 06	10	1.3	9.7	0.1	27
Commercial 05	9	0.4	5.4	0.0	28
Commercial 04	8	0.7	8.0	0.1	27
Park 02	7	1.9	22.2	0.2	27
N 40th Street	6	1.4	15.9	0.1	27
Commercial 03	5	2.0	18.7	0.1	27
Commercial 02	4	0.8	7.6	0.1	27
Commercial 01	3	1.5	13.9	0.1	27
Park Access 01	2	1.4	12.5	0.1	26
N 49th Street	1	5.0	37.7	0.3	27
	34	1.4	22.2	0.2	28
East Access	35	1.2	7.1	0.1	25
Site Access	33	4.4	9.6	0.0	18
Park Access	31	4.5	13.8	0.1	15
Total		54.1	313.9	2.1	25

Arterial Level of Service: SB N Ruston Way

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Baltimore Ext.	31	3.6	11.2	0.1	21
Site Access	33	4.7	14.3	0.1	14
East Access	35	0.6	9.0	0.0	19
	34	0.2	6.7	0.1	27
N 49th Street	1	1.4	21.8	0.2	28
Park Access 01	2	3.6	36.8	0.3	27
Commercial 01	3	1.4	12.6	0.1	26
Commercial 02	4	1.5	14.0	0.1	26
Commercial 03	5	1.0	7.7	0.1	26
N 40th Street	6	1.9	18.5	0.1	27
Park 02	7	2.2	16.6	0.1	26
Commercial 04	8	2.9	23.3	0.2	26
Commercial 05	9	1.3	8.7	0.1	25
Commercial 06	10	1.0	5.8	0.0	26
Adler Street	11	1.9	10.3	0.1	25
Commercial 07	12	2.0	11.0	0.1	26
Commercial 08	13	0.9	6.9	0.0	25
Commercial 09	14	1.0	6.7	0.0	26
	82	1.8	17.2	0.1	27
Commercial 10	15	2.3	16.0	0.1	25
N McCarver Street	16	12.0	25.9	0.1	17
Total		49.3	300.9	2.0	25

Hayashi, Karie

From: Kevin and Lynne [kevlynne@msn.com]
Sent: Tuesday, November 13, 2007 9:14 AM
To: Sue@mcconstruction.com; rochlin.kevin@epa.gov; khayashi@cityoftacoma.org
Subject: Letter on Human Health concerns.
Attachments: image001.wmz

Karie,
I am sending this from home prior to leaving on travel. I look forward to talking to you.

Kevin Rochlin



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

Nove
13,
2007

Reply to
Attn. of ECL-111

Karie A. Hayashi
Urban Planner III/Special Assistant
City of Tacoma
Public Works Department
747 Market Street, Room 345
Tacoma, WA 98402-3769

Dear Ms. Hayashi,

The purpose of this letter is to provide information to you regarding the Determination of Significance for the Point Ruston development. One of the required areas for providing comment was for environmental health (page 3 last bulleted paragraph).

EPA has been overseeing the remediation of the smelter site for more than a decade. All of the remediation work at the site has been performed under Consent Decrees with EPA first with Asarco, and now with Point Ruston. Our oversight includes impacts to human health and the environment, and compliance with the requirements of environmental laws.

Point Ruston purchased the Asarco Smelter and associated environmental liability following Asarco's bankruptcy. Their plan is to stage the remediation and development. While ideally, site remediation would have been completed prior to development, EPA has agreed to work with Point Ruston on their phased approach. EPA's primary consideration is the protection of site residents and recreational users of the site. Point Ruston and EPA have been developing means for ensuring that any work on the site after occupancy is surgically staged and protective with no perceived or real risk. They will have to have an EPA approved construction plan as well as a plan for monitoring and institutional controls. Temporary capping of the site is required. Additional ideas such as wind fences, tents, and chemical

11/13/2007

facifiers of excavation areas are being considered. I would welcome the opportunity to discuss these with you if you so desire.

Please call me with any questions you may have at 206-553-2106.

Sincerely,

A handwritten signature in black ink, appearing to read "Kevin Rochlin". The signature is fluid and cursive, with a prominent "K" and "R".

Kevin Rochlin
Project Manager

cc: Sue O'Neill, Point Ruston
Mike Cohen, Point Ruston

APPENDIX F

POINT RUSTON PROPERTY
LEGAL DESCRIPTION

EXHIBIT "A"

ALL OF BLOCKS 3, 5, 8, 11, 16, 19 AND 24, AND LOTS 3 AND 4, BLOCK 4, AND LOTS 1 THROUGH 4, INCLUSIVE, BLOCK 9, AND LOTS 1, THROUGH 3, INCLUSIVE, BLOCK 17, AND LOTS 1 THROUGH 6, INCLUSIVE, BLOCK 18, AND LOTS 1 THROUGH 6, INCLUSIVE, BLOCK 25, ALL IN THE PLAT OF BAY VIEW ADDITION, AS RECORDED IN VOLUME 2 OF PLATS, PAGE 21, RECORDS OF PIERCE COUNTY AUDITOR;

TOGETHER WITH THOSE PORTIONS OF VACATED 2ND STREET, COMMERCIAL STREET, COURT STREET, DOCK STREET, VILLARD STREET, THE NORTH 20.5 FEET OF 49TH STREET (PALACE AVENUE) AND ALLEYS ADJOINING, WHICH, UPON VACATION, ATTACHED TO SAID PROPERTY BY OPERATION OF LAW;

EXCEPT ANY PORTION LYING NORTHERLY OF THE SOUTHWESTERLY MARGIN OF THAT TUNNEL CONVEYED TO THE TOWN OF RUSTON BY INSTRUMENT RECORDED AUGUST 10, 1916 UNDER RECORDING NO. 446869, RECORDS OF PIERCE COUNTY AUDITOR, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE INTERSECTION OF BALTIMORE STREET AND NORTH 49TH STREET, BEING A BRASS MONUMENT SET IN A CASE;
THENCE ALONG THE MONUMENTED CENTERLINE OF BALTIMORE STREET, NORTH 02°23'48" EAST, 29.50 FEET TO THE WESTERLY EXTENSION OF THE SOUTHERLY LINE OF THE VACATED NORTHERLY 20.5 FEET OF NORTH 49TH STREET IN SAID BLOCK 24;
THENCE ALONG SAID SOUTHERLY LINE, SOUTH 87°34'17" EAST, 30.00 FEET TO THE EASTERLY MARGIN OF SAID BALTIMORE STREET AND THE TRUE POINT OF BEGINNING;
THENCE ALONG SAID EASTERLY MARGIN THE FOLLOWING COURSES;
NORTH 02°23'48" EAST, 310.61 FEET;
NORTH 02°24'36" EAST, 329.81 FEET;
NORTH 02°21'58" EAST, 479.85 FEET TO THE NORTHWEST CORNER OF SAID BLOCK 3;
THENCE ALONG THE NORTHERLY LINE OF SAID BLOCK 3, SOUTH 87°35'00" EAST, 16.17 FEET TO THE SOUTHWESTERLY LINE OF THAT TUNNEL CONVEYED TO THE TOWN OF RUSTON BY INSTRUMENT RECORDED AUGUST 10, 1916 UNDER RECORDING NO. 446869, AND A POINT OF CURVATURE;
THENCE ALONG SAID SOUTHWESTERLY LINE THE FOLLOWING COURSES;
SOUTHEASTERLY, 48.44 FEET ALONG THE ARC OF A NON-TANGENT CURVE TO THE LEFT, HAVING A RADIUS OF 70.00 FEET, THE RADIUS POINT OF WHICH BEARS NORTH 81°01'46" EAST, THROUGH A CENTRAL ANGLE OF 39°38'50";
SOUTH 56°54'35" EAST, 9.09 FEET;
SOUTH 60°56'16" EAST, 11.61 FEET;
SOUTH 72°53'00" EAST, 234.38 FEET;
SOUTH 87°35'05" EAST, 14.94 FEET;
SOUTH 02°26'35" WEST, 6.83 FEET TO A POINT OF CURVATURE;
SOUTHEASTERLY, 92.33 FEET ALONG THE ARC OF A NON-TANGENT CURVE TO THE RIGHT, HAVING A RADIUS OF 2662.79 FEET, THE RADIUS POINT OF WHICH BEARS SOUTH 19°11'20" WEST, THROUGH A CENTRAL ANGLE OF 01°59'12", TO THE CENTERLINE OF VACATED DOCK STREET;
THENCE ALONG SAID CENTERLINE, NORTH 87°35'05" WEST, 57.93 FEET TO THE CENTERLINE OF VACATED VILLARD STREET;
THENCE ALONG SAID CENTERLINE, SOUTH 02°26'35" WEST, 164.93 FEET, TO THE WESTERLY EXTENSION OF THE CENTERLINE OF THE VACATED ALLEY BETWEEN SAID BLOCK 4 AND BLOCK 9;
THENCE ALONG SAID CENTERLINE, SOUTH 87°35'17" EAST, 80.03 FEET TO THE SOUTHERLY

EXHIBIT "A" - Continued

EXTENSION OF THE WESTERLY LINE OF SAID LOT 3, BLOCK 4;
THENCE ALONG SAID WESTERLY LINE, NORTH 02°30'24" EAST, 157.26 FEET TO THE
SOUTHWESTERLY LINE OF SAID TUNNEL AND A POINT OF CURVATURE;
THENCE ALONG SAID SOUTHWESTERLY LINE, SOUTHEASTERLY, 53.32 FEET ALONG THE ARC OF A
NON-TANGENT CURVE TO THE RIGHT, HAVING A RADIUS OF 2662.79 FEET, THE RADIUS POINT
OF WHICH BEARS SOUTH 21°40'57" WEST, THROUGH A CENTRAL ANGLE OF 01°08'50", TO THE
NORTHERLY EXTENSION OF THE EASTERLY LINE OF SAID LOT 4, BLOCK 4;
THENCE SOUTH 02°34'14" WEST, 309.09 FEET, SAID LINE BEING COINCIDENT WITH THE
EASTERLY LINE OF SAID LOT 4, BLOCK 4 AND LOT 4, BLOCK 9, TO THE CENTERLINE OF VACATED
COMMERCIAL STREET;
THENCE ALONG SAID CENTERLINE, NORTH 87°35'29" WEST, 129.68 FEET TO THE CENTERLINE OF
SAID VILLARD STREET;
THENCE ALONG SAID CENTERLINE, SOUTH 02°26'35" WEST, 169.91 FEET TO THE WESTERLY
EXTENSION OF THE CENTERLINE OF THE ALLEY BETWEEN SAID BLOCK 10 AND BLOCK 17;
THENCE ALONG SAID CENTERLINE, SOUTH 87°35'26" EAST, 104.95 FEET TO THE NORTHERLY
EXTENSION OF THE EASTERLY LINE OF SAID LOT 3, BLOCK 17;

THENCE ALONG SAID EASTERLY LINE, SOUTH 02°31'57" WEST, 159.91 FEET TO THE CENTERLINE
OF VACATED COURT STREET;
THENCE ALONG SAID CENTERLINE, SOUTH 87°35'23" EAST, 75.37 FEET TO THE NORTHERLY
EXTENSION OF THE EASTERLY LINE OF LOT 6, BLOCK 18;
THENCE SOUTH 02°38'00" WEST, 310.73 FEET, SAID LINE BEING COINCIDENT WITH THE
EASTERLY LINE OF SAID LOT 6, BLOCK 18 AND LOT 6, BLOCK 25, TO THE SAID SOUTHERLY LINE
OF THE VACATED NORTHERLY 20.5 FEET OF NORTH 49TH STREET;
THENCE ALONG SAID SOUTHERLY LINE THE FOLLOWING COURSES;
NORTH 87°35'13" WEST, 149.03 FEET;
NORTH 87°34'45" WEST, 60.00 FEET;
NORTH 87°34'17" WEST, 299.60 FEET TO THE TRUE POINT OF BEGINNING;

SITUATE IN THE CITY OF RUSTON, COUNTY OF PIERCE, STATE OF WASHINGTON.

APPENDIX G

**JOBS WITH JUSTICE
ATTACHMENTS**

From: WA State Jobs with Justice [wsjwj@igc.org] on behalf of southsound@wsjwj.org

Sent: Thursday, February 14, 2008 3:19 PM

To: Khayashi@cityoftacoma.org

Subject: Addenda to Comments from Jobs with Justice on DSEIS Project File #s

40000090530/SHR2007,90531/PLT2007, /BLD2007, 90529/SEP2007, SEPA File # SEP2007-40000090529

Attachments: Dust clouds from shovel1-MCC Asarco site.JPG; Dust clouds from shovel2-MCC Asarco site.JPG; Dust from Trucks passing - Stack Hill Sept 19a-MCC Asarco site.jpg; Dust clouds from shovel3-MCC Asarco site.JPG; Shovel near home2-MCC Asarco site.JPG; collapsed silt fence1-MCC Asarco site.jpg; collapsed silt fence2-MCC Asarco site.jpg; collapsed silt fence3-MCC Asarco site.jpg; collapsed silt fence4-MCC Asarco site.jpg; dig&distant reloading water truck1a-MCC Asarco site.jpg; dig&distant reloading water truck2a-MCC Asarco site.jpg



SEPA Public Information Center

Tacoma Municipal Building, 3rd Flr

City of Tacoma Public Works Department

747 Market Street, Room 332

Tacoma, WA 98402-3769

Addenda By Email to: Karie Hayashi: Khayashi@cityoftacoma.org and hand delivery

February 14, 2008

To: Karie Hayashi SEPA Officer and William L Pugh, Assistant City Manager/Director Public Works

Re: Project File #s 40000090530/SHR2007, 40000090531/PLT2007, xxxxxxxxxxxx/BLD2007, 40000090529/SEP2007, SEPA File # SEP2007-40000090529; Comments on Draft Supplemental Environmental Impact Statement to the Asarco Smelter Site Master Development Plan Final EIS

Washington State Jobs with Justice is submitting the attached 11 photos to accompany our Comments in the public record for the above-referenced DSEIS submitted on February 14, 2008. Please contact us at the below info if you have any questions or concerns if the documents did not come across completely or you've had any problems accessing or opening the information in the files.

Please send us confirmation that you received this email. Thank you

Sincerely,

Wendy Hall, JwJ Pierce County Organizing Committee Co-Chair; Nora Leider, Chair to the Socially Responsible Development project JwJ Steering Committee workgroup; and Jacob Carton, South Sound staff organizer, on behalf of:

Washington State Jobs with Justice

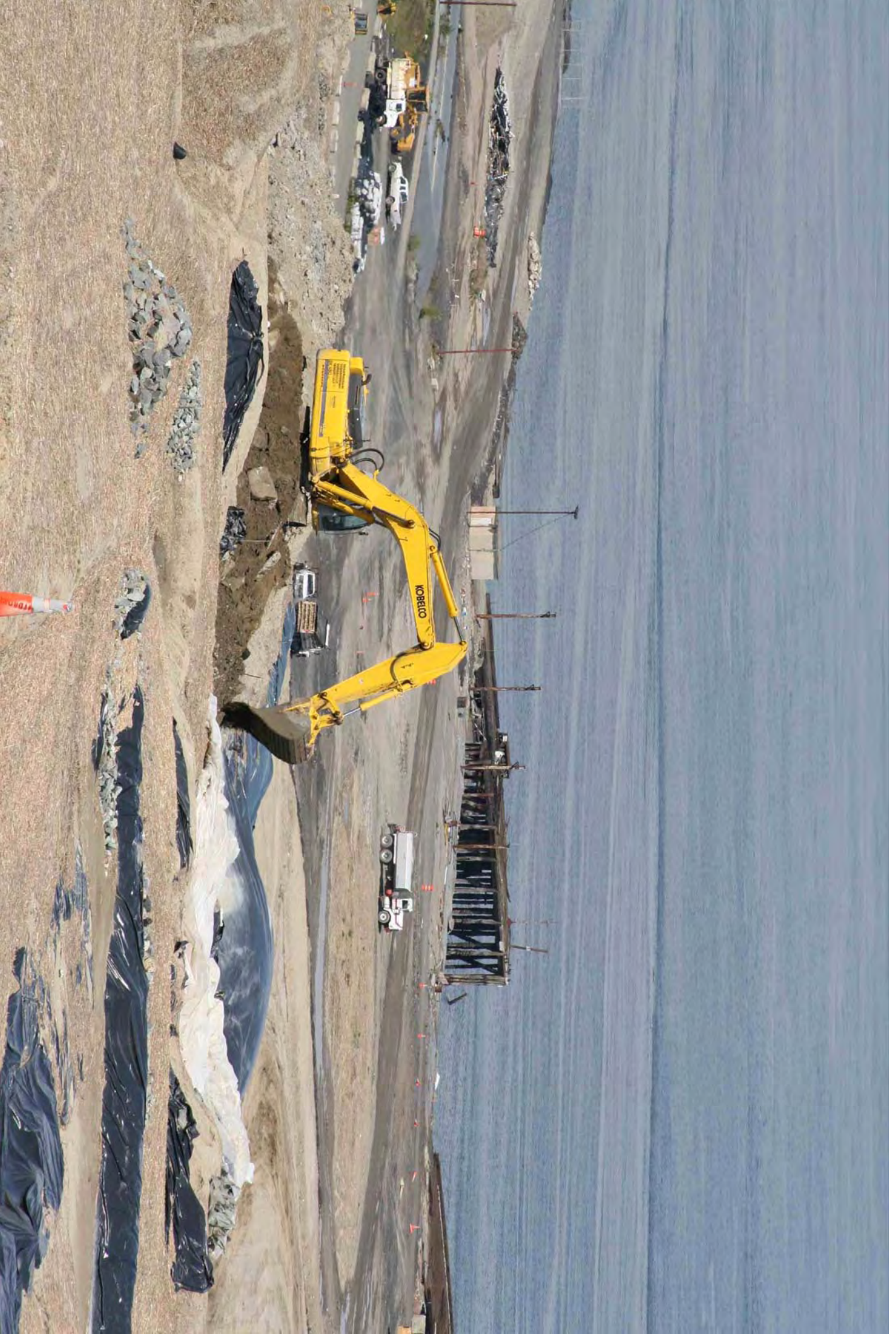
3049 S. 36 St, #201

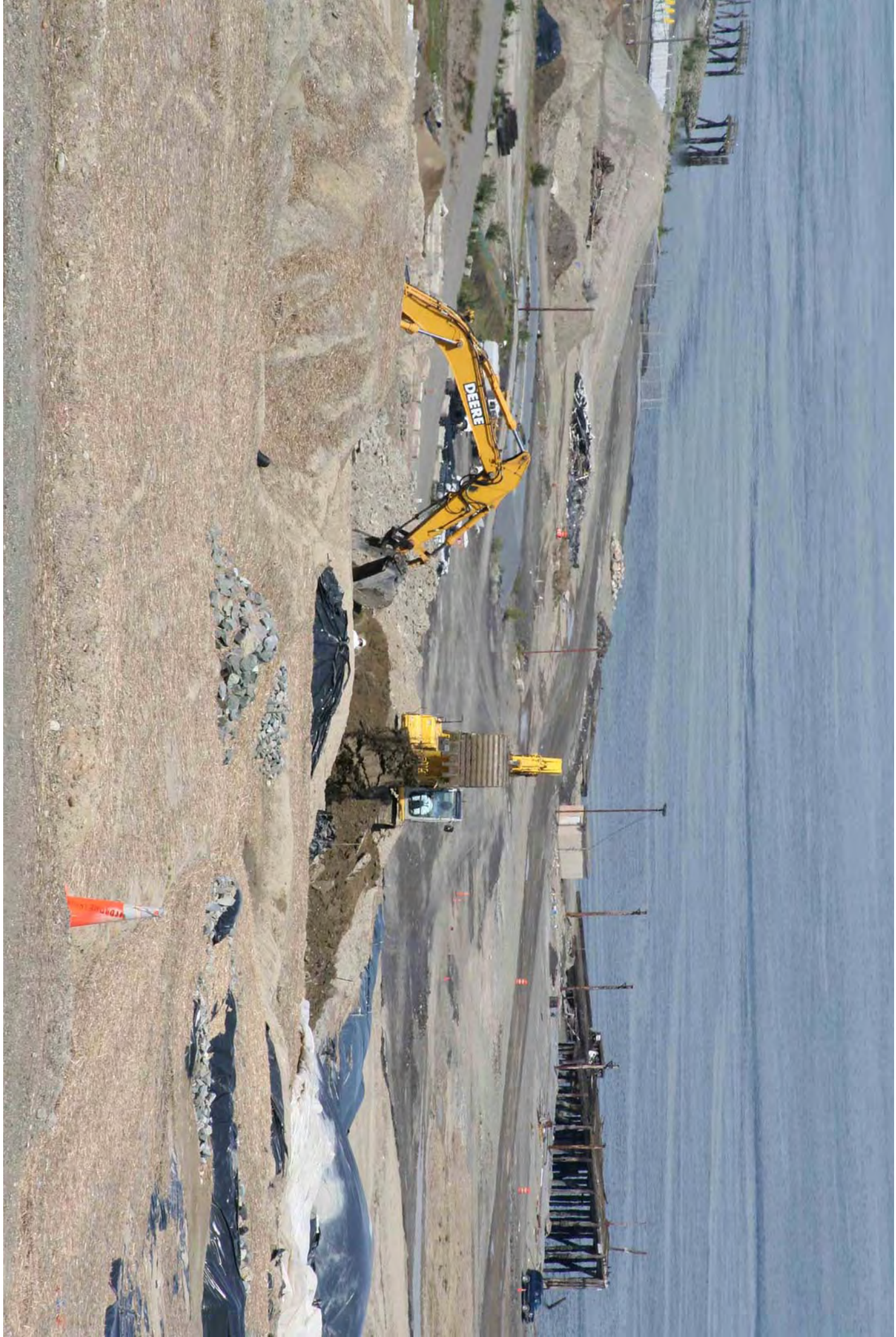
Tacoma, WA 98409-5801

(253) 459-5107



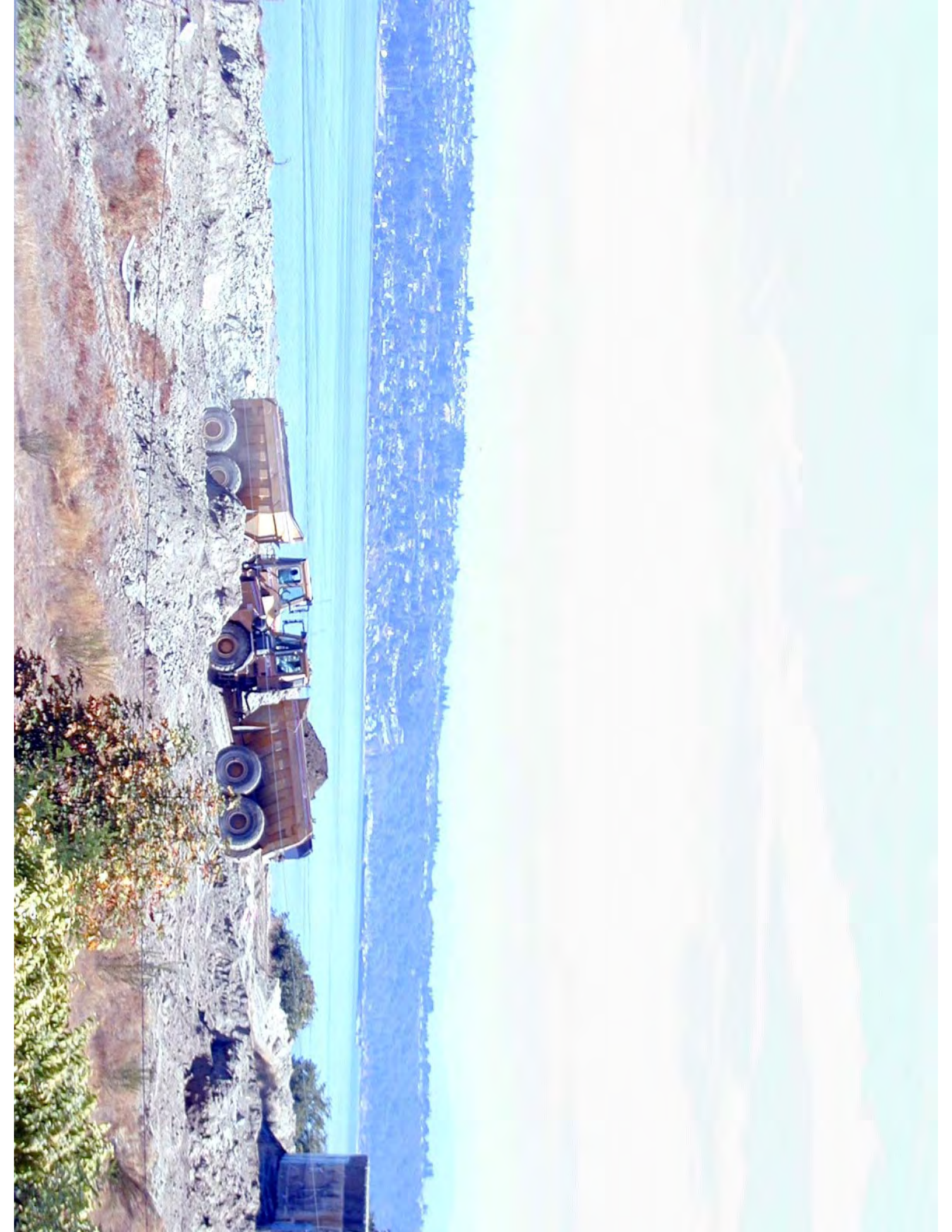


















POINT RUSTON
IS HERE!

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