Lompa Ranch North Specific Plan

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LOMPA RANCH NORTH SPECIFIC PLAN

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1. Introduction

1.1 Location

The Lompa Ranch North Specific Plan Area encompasses 251.31± acres. The majority of land (203.27±) acres is located on the west side of Interstate 580, north of East Fifth Street, east of Saliman Road, and south of US Highway 50 (East William Street). The remaining 48.04± acres is located on the east side of Interstate 580 along the western side of Airport Road. Figure 1 (below) depicts the Lompa Ranch North in context with the surrounding area.

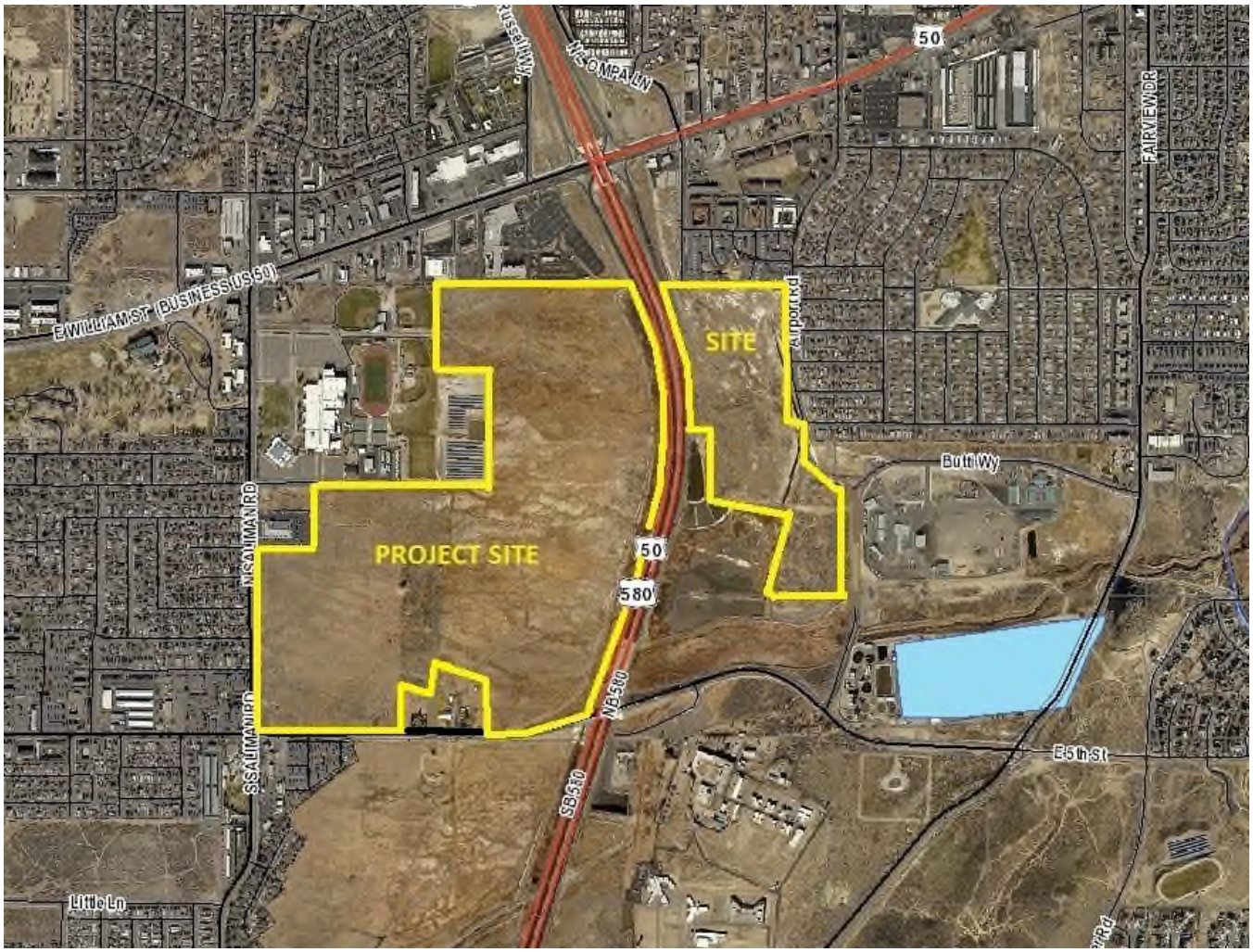


Figure 1 – Lompa Ranch North Specific Plan Area

1.2 Purpose

The purpose of this Development Handbook is to provide for the orderly development of the Lompa Ranch North Specific Plan Area (SPA) as envisioned, while assuring that the stated desired level of quality is achieved. Since implementation of public and private improvements will occur in multiple phases, over many years, the standards and guidelines contained herein establish a common framework to guide individual improvement plans. The development of the property is controlled and restricted by these development requirements as well as by all applicable government codes and regulations. This Development Handbook is not intended to limit creativity or prevent variation necessary to respond to unique site conditions, but rather to generate consistency and quality throughout the SPA.

This SPA is for the Lompa Ranch North properties specifically identified with this document. Future development of the remaining Lompa Ranch properties as identified in the 2006 Carson City Master Plan shall be required to receive approval of a new SPA for those areas prior to development.

1.3 Vision

The Lompa Ranch North SPA is intended to provide for a sustainable community that includes a range of land uses that complement not only each other but those that currently exist outside of the SPA boundaries. The vision is to provide for a viable community that promotes a variety of housing types supported by well-balanced commercial, recreational, and educational opportunities.

Complementing the commercial uses and neighborhoods within Lompa Ranch North will be a linear open space preserve along Interstate 580 as well as a network of trails and sidewalks throughout the community, providing non-vehicular connectivity to the various internal and regional components of the area. Throughout Lompa Ranch North, consistent design themes, entries, and landscape treatments will establish a sense of place/community and recall the property's ranching roots.

1.3.1 Land Use Pattern

The land use mix within Lompa Ranch North provides for varying levels of compatible densities and intensities that will result in a synergy that attracts both residents and businesses. This supports walkability within the community to commercial, recreational, employment, and public activities. It also minimizes the consumption of land associated with traditional suburban development by encouraging and creating a more compact development pattern that is efficient for infrastructure, public services and maintenance.

1.3.2 Sense of Place and Community

Creating a sense of place is one of the key components in creating a vibrant and balanced community. A sense of place is fostered within Lompa Ranch North by creating human-scale environments in which the individual can feel both comfortable and safe. This includes provisions for open space and walking paths, neighborhood parks, common design themes, and uses that complement each other. Furthermore, the Lompa Ranch North SPA promotes and provides for connectivity between various neighborhoods and uses that are integrated through the standards included within this handbook.

1.3.3 Diverse Housing Mix

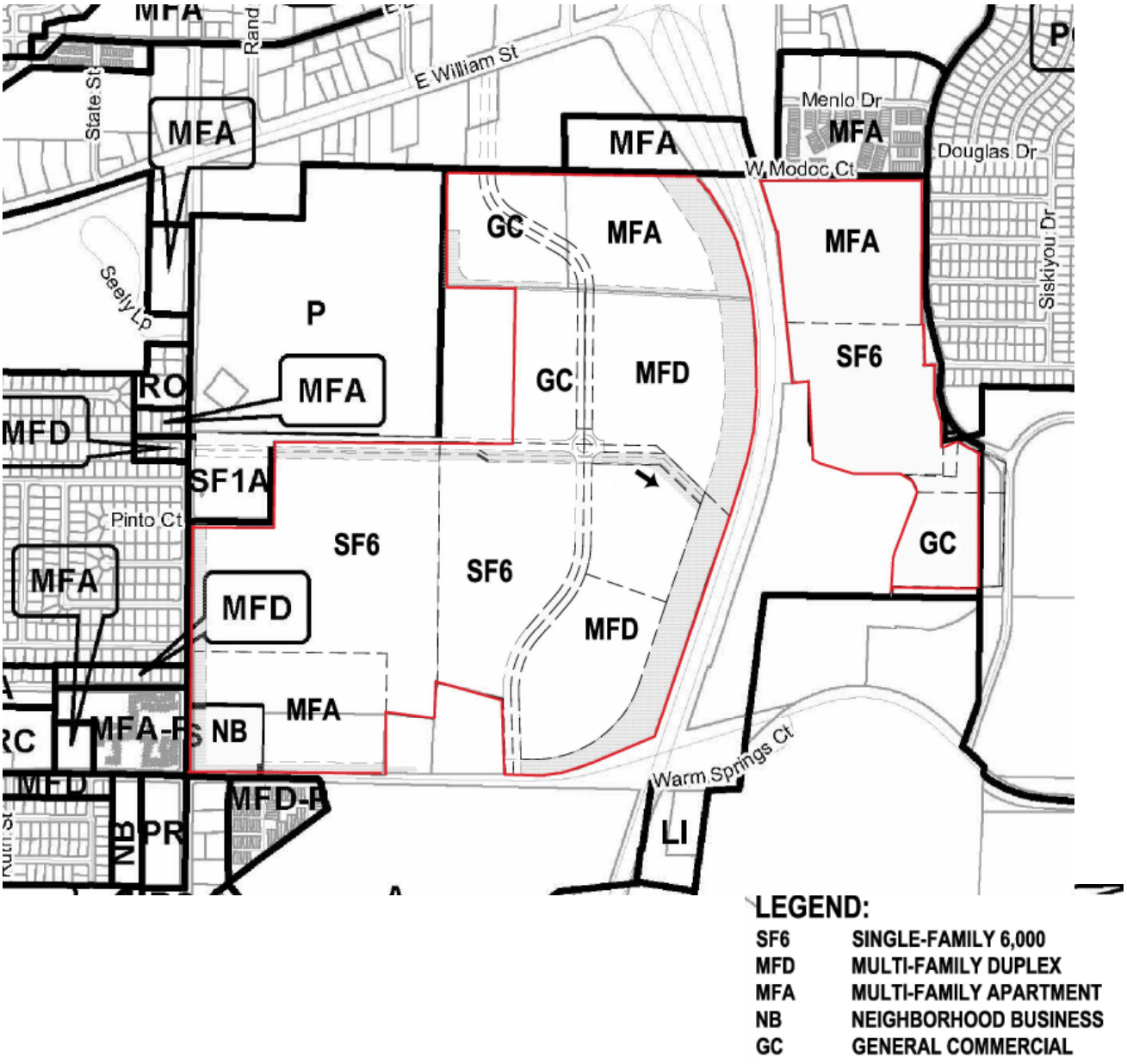
The Lompa Ranch North SPA provides for neighborhood diversity by allowing for a mix of residential densities and product types to support a wide range of resident interests and needs. The densities included in the SPA will also support and complement planned commercial uses within the Lompa Ranch North plan area. Furthermore, this diversity in densities and housing types serves top break up the monotony of traditional residential development by reinforcing the dynamics of character and identity within each of the neighborhoods.

1.3.4 Implementation

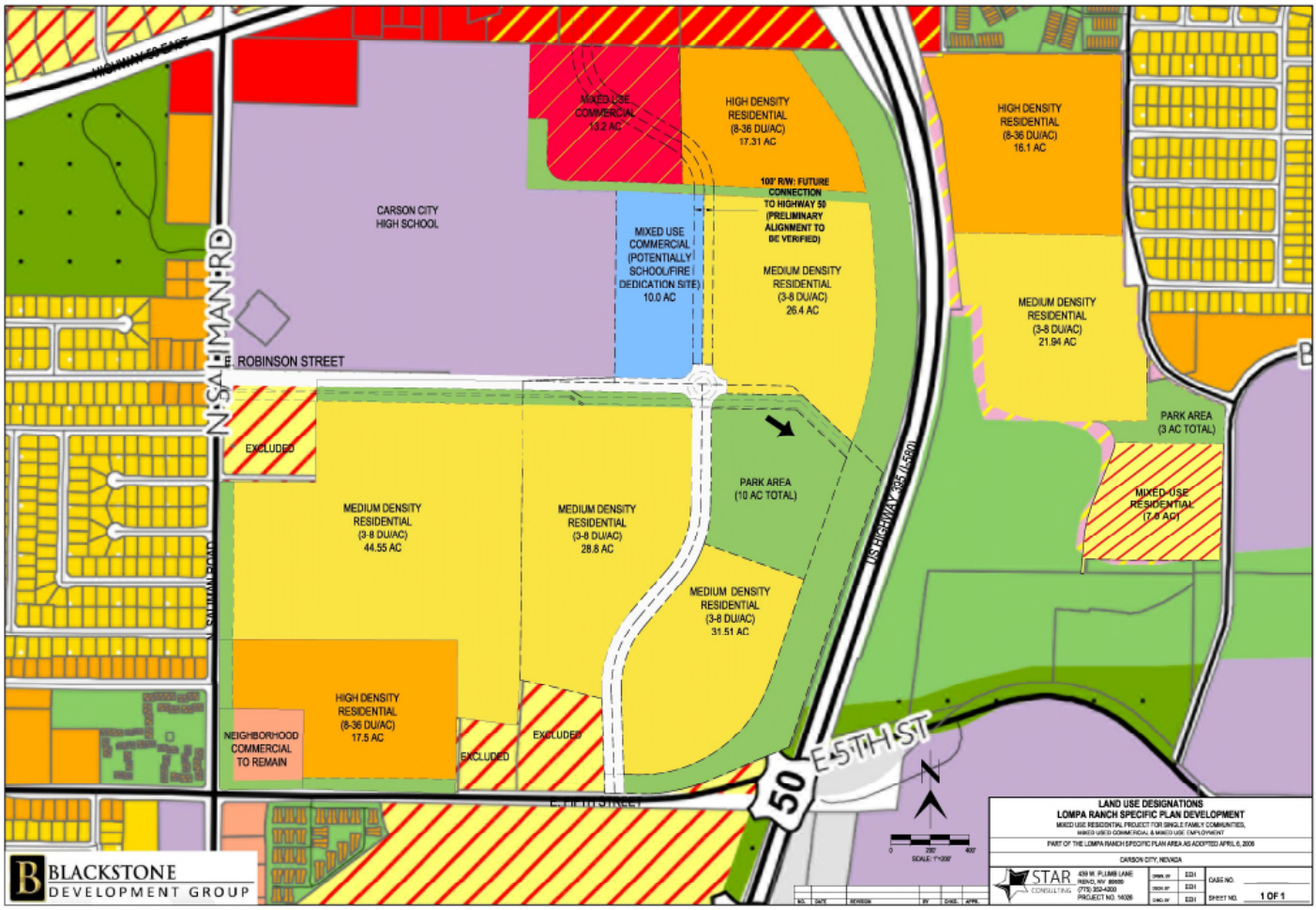
This handbook will be used by the Carson City Community Development Department as a guide for reviewing individual projects within the boundaries of the Lompa Ranch North SPA.

1.4 Allowed Uses

Allowed uses within the Lompa Ranch North SPA shall be determined based on the underlying zoning categories, as included in the Carson City Municipal Code Title 18. The zoning districts included within Lompa Ranch North are depicted below:



Master Plan land use designations for the Lompa Ranch North SPA are included below:



1.4.1 General Standards

a) The Lompa Ranch North SPA is envisioned to include a mix of residential uses ranging from 4 units per acre up to 36 units per acre.

b) Land use is determined based on zoning. Zoning adopted with this Specific Plan shall be reviewed and approved by the Carson City Planning Commission and Board of Supervisors and deemed to be appropriate for the site(s).

c) Commercial uses at a varying range of intensities are encouraged within the SPA to serve both new residents of Lompa Ranch North as well as those within the surrounding area. Commercial uses shall be located as to properly relate to adjoining uses.

d) Uses within Lompa Ranch North shall conform to the underlying zoning district(s) assigned to the individual parcels as outlined in Title 18 of the Carson City Municipal Code

e) Supplemental review required for specific uses within zoning categories such as Special Use Permits shall remain in effect per the Carson City Municipal Code (refer to allowed uses within individual zoning categories).

f) This Specific Plan shall not grant any special privileges or waivers in terms of public review or entitlements otherwise required under the Carson City Municipal code in terms of allowed uses or supplemental review.

2 Standards and Guidelines

The site planning standards and guidelines address general provisions of site development which include building orientation, grading and drainage, parking areas, landscape, lighting, signs, walls and fences, and service areas. Site planning controls the proper placement of buildings and internal roads that service and access the various land uses in the community. It addresses the linkages and land use relationships at a human-scale, in order to create a stimulating and visually pleasant community. The goal is to promote pedestrian activity and safety, create visual compatibility with surrounding neighborhoods and minimize negative impacts on the natural environment.

2.1 Commercial Uses

2.1.1 Commercial Site Planning Standards

a) Building placement and orientation shall be designed to create visual interest along public streets. Multiple buildings in a single project shall demonstrate a positive functional relationship to one another.

b) To the extent possible, buildings located within a single project shall be clustered. Plazas and pedestrian areas shall also be an important element in the design of clustered buildings. When clustering is impractical, a visual link should be established between buildings through the use of architectural features, landscaping, etc.

c) For general commercial uses, a minimum of 15 percent of the building area should be located at or near the front setback line. This minimizes large, continuous areas of parking and encourages active streetscapes.

d) Buildings shall be oriented so that public access or windows face adjoining streets.

e) Plazas or common areas within a project shall be located near building entrances or areas of high pedestrian traffic to ensure their use

f) To the extent possible, areas between buildings shall be utilized for plazas, outdoor seating, or landscape features in order to eliminate “dead zones” of underutilized space.

g) Bicycle racks shall be provided within all commercial centers.

2.1.2 Commercial Grading and Drainage

a) Design of commercial uses shall be sensitive to the natural terrain, and structures should be located to minimize necessary grading and preserve natural site features such as drainageways, wetlands, etc. Grading of commercial sites should blend with the natural topography of the site.

b) Grading within commercial areas shall be designed to complement the architectural and landscape design character of the center and surrounding area. Grading techniques can be used to screen parking and service areas, reduce the perception of height and mass on larger buildings, and provide reasonable transitions between uses.

c) Graded slopes should properly transition to existing natural terrain at project borders.

d) Man-made slopes shall not exceed an average of 3:1 slope and turf areas shall not exceed an average 4:1 slope.

e) Areas disturbed by grading activities shall be revegetated prior to the issuance of a certificate of occupancy. If climatic conditions or other circumstances prevent planting at the time of occupancy, a bond shall be provided for landscaping during the subsequent growing season. Drought tolerant plant species shall be utilized to help minimize erosion.

f) New commercial developments must include a final hydrology report to be reviewed and approved by the Carson City Engineering Department prior to the issuance of a building permit.

g) An erosion control plan shall be included with each grading permit.

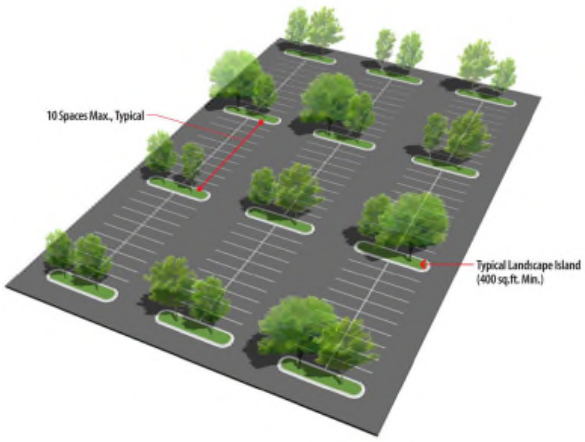
Appendix 1 contains the Conceptual Drainage Study and Stormwater Management Report for Lompa Ranch North.

2.1.3 Commercial Parking Lots

a) A minimum of 10 feet of landscaping shall be provided between parking lots and the public streets.

b) A minimum 400 square foot interior planter shall be provided at the end of parking aisles (refer to example to the right). Planters shall include a minimum of one deciduous tree (min. 1" caliper) – see example to right.

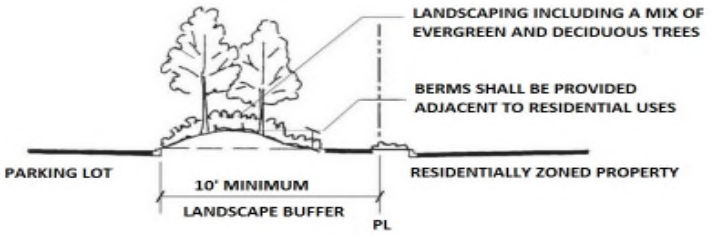
c) Landscape islands (minimum of 400 square feet) shall be provided for every 10 spaces in large parking fields and shall include a minimum of one tree (1 inch caliper minimum). See example to right.



d) Pedestrian connections between parking lots and buildings shall be provided along with connections to sidewalks along adjoining public streets.

e) No more than 10 percent of the required parking shall be in the rear service area of a project site.

f) Parking areas shall be screened from adjoining residential areas through the use of landscaping and berming. This buffer shall be a minimum of 10 feet in width (see example to right).



g) Commercial centers that include tenants that utilize shopping carts shall provide a "cart corral" within 150 feet of 85 percent of their parking stalls.

h) For commercial centers exceeding 5 acres, a maintenance plan shall be required for parking lots that includes regular sweeping and a snow removal/storage plan for winter weather events.

i) For commercial centers adjoining residential areas, parking lot sweeping shall be limited to the hours between 8:00 am and 9:00 pm.

j) Parking lot design, including space dimensions, aisle widths, etc. shall comply with the provisions of the Carson City Municipal Code.

k) Outdoor sales or special events may not reduce parking past minimum requirements mandated in the Carson City Municipal Code.

2.1.4 Commercial Landscaping

a) Landscaping, including plant materials and themes shall be consistent throughout the Lompa Ranch North SPA.

b) Landscaping standards contained in the Carson City Municipal Code shall apply within Lompa Ranch North. Where a conflict exists between these standards and the Municipal Code, the stricter of the standards shall apply.

c) Within commercial centers, areas not utilized for parking, buildings, plazas, or access/circulation shall be landscaped to the back of curb. Unbuilt pad areas shall be excluded from this standard.

d) Drought tolerant plantings shall be used in conjunction with low water demand principles and techniques.

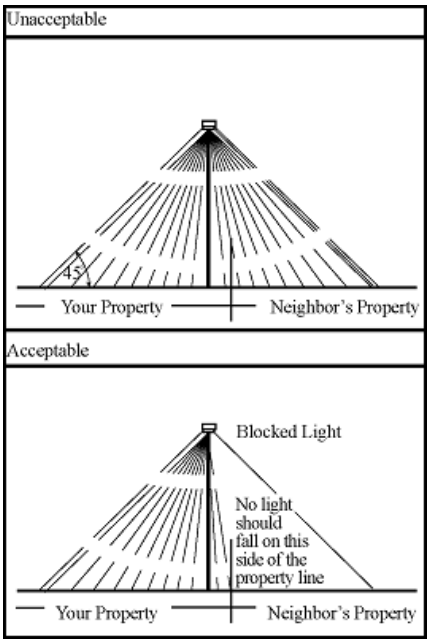
e) All landscaped areas shall be irrigated with permanent automatic irrigation systems. All irrigation systems shall be placed underground.

f) Landscape maintenance within commercial areas shall be the responsibility of individual property owners or completed through a private maintenance association.

2.1.5 Commercial Lighting

a) Adequate lighting shall be provided to ensure a safe pedestrian environment.

b) Parking lot lighting adjacent to residential areas shall be limited to 15 feet in height and shall incorporate shielded fixtures.



c) Parking lot lighting shall use shielded/directed fixtures to ensure that spill-over and glare do not occur on adjoining properties. See example to right

d) The use of bollard lighting is encouraged in pedestrian areas.

e) Exterior lighting shall be used for purposes of illumination and safety only, and shall not be designed for, or used as, an advertising display.

2.1.6 Commercial Signs

Signs and their integration into the project is a critical element in the design of Lompa Ranch North. Careful use of forms, styles, materials, and colors will establish continuity throughout the community. Signs are intended to be utilized only where necessary, and in an understated manner, emphasizing an image of permanence and quality.

a) Signs shall be included on facades or entry canopies of buildings and illuminated or backlit with indirect lighting. All tenant identification signs shall be consistently located and integrated into the architectural design of the building entry. Storefront signs shall be proportional with the building architecture (see example to right).

b) Flashing or animated signs are prohibited.

c) Building signs that project more than 4 inches beyond the wall façade are prohibited, unless incorporated as an architectural element.

d) Hanging signs may be included under eaves above walkways and shall maintain a minimum of 8 feet of clearance. These signs shall be architecturally compatible with the building they serve (see example to right).

2.1.7 Commercial Fencing

a) Walls and fences shall be utilized to provide a buffer between incompatible uses. It is important, however, that walls are appropriately integrated into each project

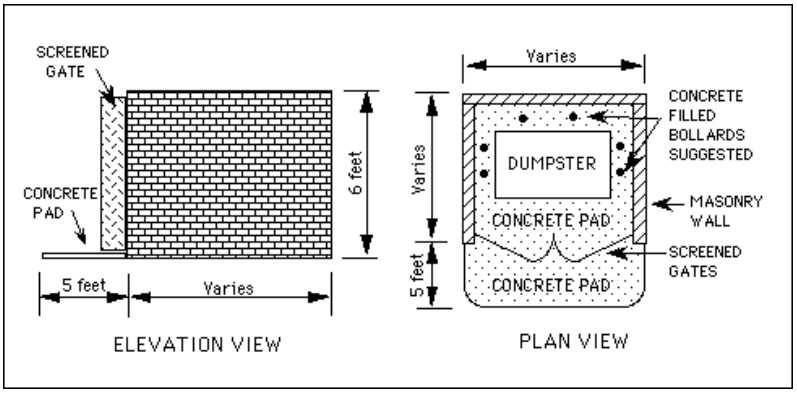
b) Solid fencing (6 foot minimum) shall be installed between commercial uses within Lompa Ranch North and adjoining residential uses. This can include wood or vinyl fencing, concrete block walls, pre-cast wall systems, or similar.

c) Chain link fencing shall be prohibited within commercial centers.

2.1.8 Commercial Trash and Utility Areas

a) Service, maintenance and storage areas shall be screened from adjacent public right-of-ways, pedestrian plazas or adjacent residential uses with landscaped berms, walls or plantings.

b) All trash and garbage bins shall be stored in an enclosure that includes solid screening, to the approval of the Carson City Community Development Department.



c) Trash enclosures shall incorporate building materials, colors, etc. that are complementary to the overall project architecture. Gates shall be constructed of durable building materials that screens at a minimum 80% of the view into the trash enclosure. Wood or chain link gates are not allowed (see example to left).

d) Trash enclosures must include provisions for concrete pads or appropriately designed asphalt sections in front of the enclosure. The area in front of the trash enclosure shall be a minimum of six (6) feet to reduce pavement damage from disposal trucks.

2.2 Single Family Residential Areas

2.2.1 Neighborhood Diversity

Single family areas within the Lompa Ranch North SPA will include varied densities and housing types in order to create separate and distinct neighborhoods within the project. This can be accomplished through the use of varied housing types, distinct architectural styles and elements, etc.

a) Densities within single family areas will range from 3 to 8 dwelling units per acre.

b) Neighborhood density shall properly relate to adjoining developed areas and provide for transition between neighborhood types. Proper transitions can include feathering of density/lot size, landscape buffers, or walls/fences that serve to identify community boundaries.

c) Individual single family projects within the SPA boundary may create their own sense of identity through the use of entry features that include distinctive signage, entry treatments, landscape improvements, water features, etc.

d) Varied densities are encouraged throughout the SPA boundary to encourage varied product types including single family detached homes, patio homes, duplexes, townhouses, etc. Additionally, new urbanism design principles such as house-forward designs with residential alleyways are permitted within the single family areas.

e) It is the intent of the SPA to provide a number of distinctly different neighborhood types rather than a single “large neighborhood” with a single product type.

f) Variation in architectural styles is encouraged throughout the SPA in order to provide distinct neighborhood identity to new subdivisions within the Lompa Ranch North

2.2.2 Single Family Neighborhood Design

Neighborhoods within Lompa Ranch North will promote quality development that is complementary to the existing built environment, while establishing its own sense of identity through uniform and innovative design. A variety of single family detached, as well as single family attached products are anticipated within the SPA boundary.

a) To the extent possible, "forward" architecture shall be used in the design of homes. This is accomplished by placing entries, windows, front porches, and living areas towards the street on most plan variations.

b) With the exception of zero lot line lots, plans should be reversed and plotted so that garages and entries are adjacent to each other. This creates an undulating sense of setback. Occasionally this pattern should be broken so that it will not become overly repetitious or reflected by the massing across the street.

c) The garage shall not be the dominant feature of the building facade facing the street and should be offset through architectural detailing for garage forward elevations.

d) So as not to contribute to a repetitious and monotonous appearance along the street, the use of varying building setbacks from the street right-of-way is encouraged.

e) Neighborhoods shall provide connections into the community trail system.

g) In order to avoid a "walled-in" feel, homes backing to parks, open space, or drainage corridors shall include open rear fencing. This includes the use of split rail or iron fencing. See example to right.

h) Setbacks for single family residential areas shall comply with the underlying zoning district for which the subdivision is located. In order to provide for visual interest within the streetscape, front setbacks may be reduced up to 5 feet in order to achieve a non-monotonous/repetitive streetscape pattern.

2.2.3 Single Family Grading

a) The design of residential neighborhoods shall be sensitive to the natural terrain, and structures shall be located in such a manner so as to minimize necessary grading and preserve natural site features and drainage ways. Any grading of the site terrain shall blend with the natural topography of the site.

c) Graded slopes shall be rounded resulting in smooth, harmonious transitions between the man-made terrain and the natural terrain.

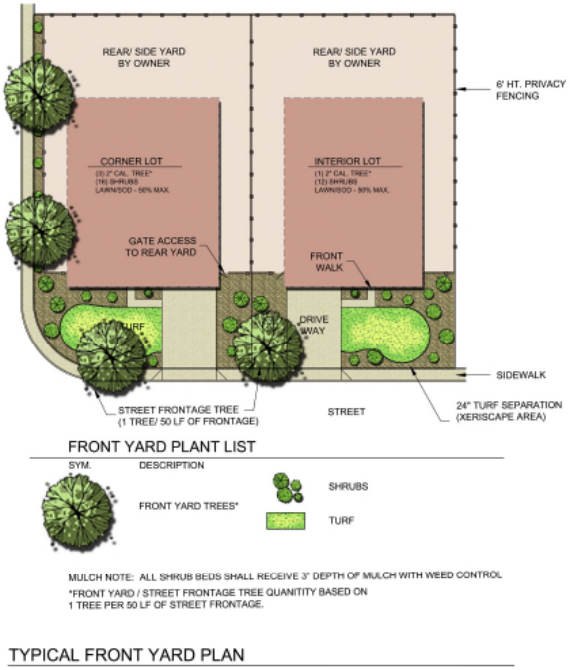
d) All graded slopes shall be revegetated prior to building occupancy. If climatic conditions or other circumstances prevent planting at the time of occupancy a bond shall be provided for landscaping during the subsequent growing season or other arrangements made for revegetation, subject to the approval of the administrator. Drought tolerant plant species shall be utilized to help minimize erosion.

2.2.4 Single Family Landscaping

a) Front yard landscaping shall be installed by the builder prior to the occupancy of the individual home. See example to right.

b) Front yard landscape packages shall provide for a minimum of 1 tree per 50 lineal feet of street frontage as well as a minimum of 12 shrubs. Trees shall be a minimum of 1 inch caliper for deciduous and 6 feet for evergreens. Shrubs shall be a minimum of 2 gallon.

c) Xeriscape options for front yards shall be permitted. Xeriscape packages must include the required trees and shrubs outlined under the previous standard.



TYPICAL FRONT YARD PLAN

c) Front yard landscaping is required for all homes and will be reviewed and approved with the tentative map establishing installation timing.

d) Front yard landscape packages shall include an automatic irrigation systems.

2.2.5 Single Family Lighting

a) Lighting shall be designed to differentiate land use areas, emphasize community amenities, provide continuity along street corridors and ensure the safety of residents and users.

b) Exterior lighting shall be shielded from projection offsite and designed to be compatible with the architectural and landscape design of the home.

2.2.6 Single Family Walls and Fencing

a) Walls may be used where necessary to provide privacy and security for residential neighborhoods when adjacent to arterial or collector roadways, or when adjoining non-residential uses.

b) Walls within the community shall not become the dominant visual element and walls where needed shall blend into the overall landscape.

c) Walls within Lompa Ranch North shall not exceed 6 feet in height. Acceptable materials include stone, stone veneer, split face/precision block, slump stone, and stuccoed CMU.

d) Open fencing shall be used where the rear of individual lots are adjacent to open space. See examples below.

e) Open fences at rear yards may include landscaping with trees and shrubs to screen views of private yards from adjacent properties, common areas, and/or roadways.

f) Acceptable open fencing materials include wood or vinyl split-rail or wrought iron. See examples below.



g) Single family residential lots may include solid privacy fences. Acceptable materials include wood and vinyl. Privacy fencing shall not exceed 6 feet in height.

h) Chain link fencing is prohibited within residential areas.

2.3 Multi-Family Residential Site Planning

2.3.1 Multi-Family Building Orientation

a) Multi-family structures should be grouped in clusters of buildings rather than one large continuous structure in order to minimize the scale of the project.

b) Open space areas and courtyard shall be created within multi-family developments in order to break up building mass and provide recreational opportunities. See example to left. Open space/recreational area shall be provided per the requirements of the Carson City Municipal Code.

c) To provide privacy between living spaces, there should be distance separations, buffering or changes in the angles of units. See examples below.

d) All multi-family/attached single family developments shall incorporate pedestrian connections to adjoining residential, recreational and commercial uses as well as to the community trail system (where practical).

e) Multi-family/attached single family projects in excess of 35 units shall provide a secure children's play area. Additionally, such projects shall incorporate a minimum of 5 recreational facilities. These can be any 5 of the following:

- Swimming pool
- Tennis courts
- Horseshoe Pits
- Spa
- Fitness Center/Gym
- Game room
- Community room
- Picnic areas to include tables with barbecues
- Volleyball court
- Basketball court

f) Recreation facilities shall be conveniently and centrally located for the majority of the units (see examples to right).

g) Private open space, such as decks or patios, shall be contiguous to the units with a minimum width of six (6) feet.

h) Setbacks shall conform to the underlying base zoning. Deviations to setbacks within 10% of requirements may be granted by the Carson City Community Development Director or his/her designee.

2.3.2 Multi-Family Grading and Drainage

a) The design of multi-family housing or attached single family housing shall be sensitive to the natural terrain, and structures shall be located in such as manner so as to minimize necessary grading and preserve natural site features and drainage ways. Any grading of the site terrain shall blend with the natural topography of the site.

b) Site grading shall be designed to complement the architectural and landscape design character of the community, screening parking and service areas, reducing the perception of height and mass on larger buildings, and providing reasonable transitions between on-site uses.

c) Graded slopes shall be rounded resulting in smooth, harmonious transitions between the man-made terrain and the natural terrain.

d) All graded slopes shall be revegetated prior to building occupancy. If climatic conditions or other circumstances prevent planting at the time of occupancy a bond shall be provided for landscaping during the subsequent growing season or other arrangements made for revegetation, subject to the approval of the administrator. Drought tolerant plant species shall be utilized to help minimize erosion.

Appendix 1 contains the Conceptual Drainage Study and Stormwater Management Report for Lompa Ranch North.

2.3.3 Multi-Family Parking

a) Parking areas shall not be located in excess of 400 feet from individual units within multi-family projects.

b) Pedestrian links between units (i.e. sidewalks) shall be provided between all units and parking areas.

c) Garages and covered parking shall be designed as an integral part of the architecture of the development and shall include the same colors, materials, etc. as the primary building(s). Carports should not have roof pitch of less than 3:12.

2.3.4 Multi-Family Landscaping

a) Minimum landscape requirements shall be established by the Carson City Municipal Code based on underlying zoning of the project site.

b) Drought tolerant and low water demand plantings shall be used to the extent possible. Xeriscaping may be substituted for turf areas and must contain trees and shrubs per the standards of the Carson City Municipal Code.

c) Automatic irrigation systems shall be installed with all multi-family projects. All irrigation systems shall be placed underground.

d) Large parking lots (in excess of 25 spaces) within multi-family shall provide a minimum 400 square foot landscape island containing at least one tree (1" caliper) for every 10 spaces of required parking.

e) Landscaping along adjoining rights-of-way shall be a minimum width of 15 feet and provide a mix of trees, shrubs, and living groundcover. Tees shall be provided at a rate of 1 tree per 25 lineal feet of street frontage with a minimum of 4 shrubs per tree.

2.3.5 Multi-Family Lighting

a) The height of lighting within multi-family projects shall be in scale with the setting and complement the architecture. Light fixtures over 10 feet shall include a cut-off shield to prevent the light source from being directly visible from off-site areas.

b) Light sources shall be kept as low to the ground as possible while ensuring safe and functional levels of illumination. For example, the use of bollard lighting rather than pole lighting is required in pedestrian areas. See examples below.

c) Illumination of landscape features or building facades for aesthetic purposes shall ensure that light does not project beyond the project boundary.

2.3.6 Multi-Family Walls and Fencing

a) Multi-family projects that adjoin common areas, open space, or drainageways shall include open fencing adjacent to such features. Acceptable materials include wood or vinyl split rail or wrought iron and shall not exceed 6 feet in height.

b) In areas where open fencing is employed, landscaping shall be used to screen views of private yards from adjacent properties and public streets.

c) Design of all walls and fences shall be consistent in terms of material, color and detail within each multi-family and attached single family residential project.

d) In areas where multi-family development adjoins either single family residential or commercial use, a minimum 6-foot wall shall be provided for separation. Acceptable materials include stone, stone veneer, split face/precision block, slump stone, and stuccoed CMU.

2.3.7 Multi-Family Service and Utility Areas

a) Enclosures shall be provided in order to screen all trash dumpsters and shall architecturally complement the primary building(s). Enclosures shall include solid gates and screen a minimum of 80% of the interior area. See example to right

b) Trash enclosures shall include durable materials that complement the primary architecture and shall be screened with landscape on three sides. See example to right.

c) The use of individual trash cans for multi-family projects in excess of 15 units shall be prohibited.

2.4 ARCHITECTURE STANDARDS AND GUIDELINES

2.4.1 Architectural Theme

It is the intent of the Lompa Ranch North SPA to promote a high quality development that incorporates an architectural style that reflect the historical ranching aspect of the area. Therefore, a ranch and craftsman architectural theme is adopted with the Lompa Ranch North SPA.

Variations on the ranch/craftsman style are encouraged in order to promote creative design, innovative features, and high quality elevations. Variations may include the introduction of a southwestern elements such as barrel tile roofs or Victorian elements such as wrap-around porches. These deviations will be complementary to the overall theme and can add visual interest within the community.

2.4.2 Residential Architectural Elements

a) New structures within Lompa Ranch North shall, at a minimum, incorporate a minimum of two of the following elements:

- Gable roofs with deep overhangs.
- Exposed rafters, brackets, columns, etc.
- Decorative doors and windows
- A mixture of 2 (at a minimum) exterior elements including stucco, wood siding or shingles, brick, or stone
- Exterior porches or courtyards

b) Acceptable roofing materials include concrete or clay tile, slate, or architectural grade (30+ year) composition asphalt shingles. Metal roofing may be used as an architectural element in conjunction with the previously listed materials.

c) Flat roofs are prohibited in residential areas.

d) Metal buildings, other than accessory sheds not to exceed 250 square feet, are prohibited.

e) Modular homes are not permitted within the Lompa Ranch North SPA.

f) Building articulation shall include a minimum of 4 separate roof planes incorporated on front/primary elevations. Front/primary elevations shall contain a minimum of 2 wall planes offset by a minimum of 3 feet.

g) Building colors shall utilize an earth tone pallet such as browns, tans, whites, greens, deep reds and oranges, pale yellows, etc. The use of bright or vibrant colors is prohibited with the exception of highlighting architectural elements.

2.4.3 Commercial Architecture

Commercial areas within the Lompa Ranch North SPA are envisioned to complement residential uses in function and form. Smaller retail uses will incorporate the ranch theme while larger commercial center s can take a more traditional center approach with the inclusion of the ranch theme elements such as rock, stone, brick, etc.

2.4.4 Commercial and School Building Mass and Form

a) Individual buildings, forms, and components within commercial centers shall be designed as a whole to ensure unity to the overall design of the center.

b) Facades shall include articulation to ensure that the large scale of commercial buildings is softened and appropriate for the area at a human scale.

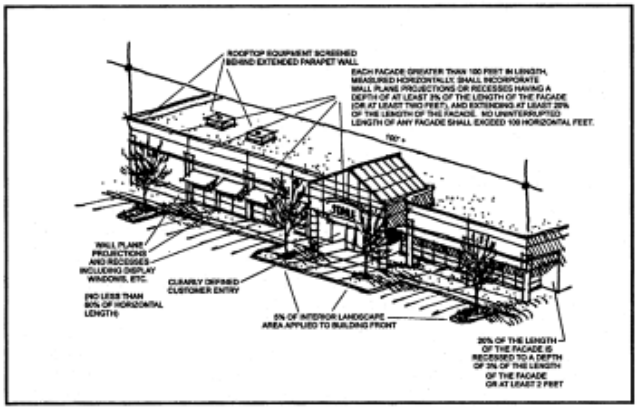
c) Visual interest shall be created in building facades through the incorporation of wall plane projections or recesses that are a minimum of two (2) feet in depth.

d) Wall plane projection or recess may be substituted with a combination of vertical or horizontal elements such as trellises, awnings, shed roofs, or columns. Any such element must have a minimum of 2 feet change in vertical or horizontal projection or recess. The proposed alternative design solution shall meet the intent of this standard.

e) In commercial areas adjoining residential uses, building heights shall relate to the adjacent development to enhance view corridors and ensure compatibility.

f) Multi-tenant commercial spaces shall use color change, texture change, material change, or relief change to avoid large expanses of blank walls and box-like structures (see example to the left).

g) Buildings in excess of 10,000 square feet should vary building and roof forms to give the appearance of smaller forms. See example to right.



h) Commercial centers that include multiple buildings shall incorporate a consistent architectural theme. Pad site buildings with conflicting architectural style are prohibited.

2.4.5 Commercial Roof Form

a) Rooflines shall include variations to add visual interest and reduce the scale of large buildings. Refer to example below.

b) Roof profile elements visible at ground level shall incorporate horizontal and vertical offsets as depicted in the example above.

c) All rooftop equipment shall be screened from public view at street level and the parking lot.

d) All roof mounted mechanical equipment must be screened from public view at the street level and the parking lot.

2.4.6 Commercial Materials and Colors

a) The colors and materials of new buildings shall be compatible with those of adjoining buildings/uses.

b) Exterior building materials shall be of high quality. These may include, but are not limited to:

- brick
- stained, painted, or weathered wood/cementitious products such as heavy timbers or stock lumber
- stone veneer/cultured stone
- integral color split face block or rough cut wood.
- metal such as corrugated, battened or standing panelized systems; performed painted or stained metal shapes
- fabric or metal awnings
- dimensioned asphalt or simulated wood shingles
- tilt-up concrete with wood texture, or other similar treatment

c) Accent colors (including vibrant colors) may be used to emphasize special façade elements in order to attract attention at focal points.

d) Facades shall include the use of earth tone palette colors in broad expanses. The use of high intensity colors, very dark colors or fluorescent colors are discouraged unless they are used to accentuate architectural forms or features.

e) Building trim and accent may feature a brighter, more intense palette of colors used to direct focus toward important building elements.

f) The following exterior building materials are not allowed as predominant features on building facades:

- integral color smooth-faced or painted concrete masonry
- tilt-up concrete panels without textures or finishes
- pre-fabricated steel panels
- unprotected wood
- dimensional asphalt shingles(architectural grade asphalt shingles may be used on roofs)

2.4.7 Single Family Residential Architecture

Architectural standards for residential areas promote an upscale development concept that reflects a western and ranching heritage while providing for modern amenities and features. Although neighborhoods may include distinctive architectural designs, common elements serve to create a cohesive community that creates a sense of place.

2.4.8 Single Family Building Mass and Form

a) Home facades shall incorporate the architectural style and materials outlined in section 2.4.1.

b) A minimum of 3distinctive floor plans shall be used within each subdivision. Subdivisions with less than 20 lots are exempt from this requirement. Phasing of 20 units or less does not circumvent this standard.

c) Architectural details and stylings used on the front of the home shall be carried over to all elevations.

d) A minimum of 3 distinctive front elevations shall be included for each model within subdivisions. Matching elevations shall not be allowed to repeat next to each other.

e) Varied setbacks, floorplans, and elevation packages shall be used within subdivisions to create a visually interesting streetscape.

2.4.9 Single Family Roof Form

a) Roof planes are required to vary through the use of architectural features such as dormers, gables, hipped roofs and variations in pitch appropriate to the homes chosen architectural style.

2.4.10 Single Family Materials and Colors

a) As mandated within other provisions of this handbook, single family homes shall incorporate and earth tone color palette. The use of bright and vibrant colors is prohibited with the exception of enhancing key architectural elements and features.

b) Conflicting architectural styles within a single subdivision shall be prohibited.

c) Building materials and elements shall be consistent with those outlined under previous standards.

2.4.11 Single Family Garages

a) Garages shall include a minimum of 5 feet offset from inhabitable areas. Front elevations should provide focus on living areas and not garages.

b) Home plans shall incorporate one of the garage designs listed below and each subdivision shall incorporate at least two of these techniques to reduce the emphasis of the garage on the street (see examples to left).

- Recessing garage back a minimum of five (5) feet in relationship to the front of the house.

- Incorporation of a side-load garage that eliminates the continuous view of garage doors from the street.

c) Garage forward plans shall be permitted when offsets (5 feet minimum) exist for the garage in order to provide visual distinction between the garage and residence. See examples below.

2.4.12 Multi-Family Architecture

Multi-family standards are intended to result in a visually pleasing product that does not reflect a "big box" appearance and incorporates elements to break up building masses, provide articulation at a human scale, and complement single family uses within the Lompa Ranch North SPA.

2.4.13 Multi-Family Building Mass and Form

a) Facades of multi-family buildings shall be articulated using at least one of the architectural elements previously listed in the Architectural Theme standards.

b) Buildings shall incorporate facade articulation with no long expanses of flat wall planes, vertically or horizontally, exceeding 50 feet (see example to left).

c) Architectural elements (i.e., exterior materials, fenestration, window trims, cornices, arches, etc) shall be utilized on all sides of the building.

d) Architectural elements such as towers, piers and varied rooflines may be used to break up the horizontal massing and provide visual interest.

e) Single family attached products such as townhomes that include garages and/or carport are more than 50 percent of the total width of the unit shall incorporate architectural features such as shutters, garage door window trim and minimum offsets of 2 feet, to reduce the visual impact of garages and carports on the front façade.

f) Garages and carports not attached to the main residential building shall match the main structure in building design, materials, roof pitch and architectural character.

2.4.14 Multi-Family Roof Form

a) Roofs planes shall include variation which can be accomplished with the inclusion of elements such as dormers, gables, hipped roofs and variations in pitch. (See example to right).

b) Roof materials shall include concrete tile, clay tile, slate, or architectural grade (30+ year) composition shingles. Metal roofing is prohibited as a primary material but may be used as an accent feature when combined with the allowed materials.

2.4.15 Multi-Family Materials and Colors

a) As mandated within other provisions of this handbook, multi-family uses shall incorporate and earth tone color palette. The use of bright and vibrant colors is prohibited with the exception of enhancing key architectural elements and features.

b) Varied elevations may be used within a single project. However, conflicting architectural styles within a single multi-family development shall be prohibited.

c) Building materials and elements shall be consistent with those outlined under previous standards.

3 Public Services and Infrastructure

3.1 Parks, Open Space, and Trails

The Lompa Ranch North SPA envisions a community that is linked together through a system of trails, open space, and parks. The intent of these standards is to implement the provisions of the *Unified Pathways Master Plan; Parks and Recreation Master Plan;* and *Open Space Plan* adopted by Carson City.

3.1.1 General Standards

a) A Landscape Maintenance District (LMD) shall be formed by the Master Developer to provide for the maintenance and upkeep of open space and common area landscaping, trails, and park/recreation facilities and amenities. The LMD shall be in place prior to the issuance of the first certificate of occupancy.

b) A private homeowner's association (HOA) shall provide for the maintenance of all private landscape features and non-public recreation facilities (i.e. private parks within gated communities, etc.).

c) Design of open space areas shall follow the standards and policies of the Carson City Open Space Plan, adopted by Carson City in June 2000.

d) Pathways and trails, other than those described in Section 3.2 (following) shall conform to the standards and policies of the Unified Pathways Master Plan adopted by Carson City on April 6, 2016 (as revised March 15, 2007).

e) Any new park facilities within the Lompa Ranch North SPA shall conform to the *Parks and Recreation Master Plan* as adopted by Carson City on April 6, 2006.

3.1.2 Trails and Pathways

a) Trails, pathways, and sidewalks not specifically called out within this section shall conform to the standards outlined in Section 6 of the Carson City Unified Pathways Master Plan (Pathway Types).

b) For the park area west of the freeway, a meandering path (consistent with Unified Pathways Master Plan standards) shall be constructed along a north/south route, connecting 5th Street to the northern boundary of the SPA area. This pathway may follow a proposed drainage channel(s) where feasible and shall meet the guidelines for an "off-street/multi-use trail." A multi-use path shall connect to the SPA's park/recreation facilities in this project.

c) For park area east of the freeway, the north/south trail being constructed by the City shall, at a minimum, include landscaping and pedestrian amenities. Trees (either evergreen or deciduous) shall be planted at a rate of 1 tree per 50 lineal feet with a minimum of 4 shrubs per tree. Park benches shall be located along the trails at a rate of 1 bench per 500 lineal feet of trail along with mileage markers at one-mile intervals.

d) A fitness course may be substituted for park benches along the north/south trail. See examples below:

e) An off-street multi-use path shall be constructed on the freeway's west side of the Lompa Ranch North SPA along 5th Street and connected to a minimum 10-acre park. Timing of this trail along with final alignment shall be in conjunction with new development and coordinated through the Department of Parks, Recreation, and Open Space.

f) An east-west multi-use path shall connect the existing path along 5th Street with the north/south trail, as depicted in the Unified Pathways Master Plan.

g) As individual subdivisions and/or projects are submitted for review, the applicant/developer shall be required to demonstrate that trail connectivity between parks, trails, and open space is being provided. This shall be to the satisfaction of the Community Development and Parks, Recreation, and Open Space Departments.

h) For park area west of the freeway, trails, pathways, and sidewalks shall provide off-street connectivity from 5th Street to Carson High School and Robinson Street.

3.1.3 Open Space

a) All identified wetland areas within the Lompa Ranch North SPA shall be preserved as dedicated open space.

b) Drainage channels shall be incorporated into open space areas and include trails/paths as described in section 3.1.2

c) Open space areas shall be maintained through a LMD and/or by a private homeowners association(s).

d) Landscape medians, parkways, corridors, etc. included within common or open space areas shall be maintained by a private homeowners association(s) and/or through the LMD.

e) Open space areas that remain private shall not include public access (if privately owned) and shall be maintained by a private homeowners association and not through an LMD.

3.1.4 Parks – General Standards

a) Parks within the Lompa Ranch North SPA shall be maintained through implementation of a Landscape Maintenance District. Any private parks (without general public access) shall be maintained by a private homeowners association(s).

b) Opportunities for joint use of park and open space facilities (i.e. stormwater detention basins) shall be a priority within the Lompa Ranch North SPA.

c) All park facilities and open space areas shall have access to the overall trail and pathway network within the SPA area.

d) Smaller public parks are discouraged within the SPA in favor of larger community parks. Private small parks or pocket parks may be permitted within individual subdivisions but shall be maintained by a private HOA, not the LMD.

e) Park facilities within Lompa Ranch North will be coordinated with the Carson City Parks, Recreation, and Open Space Department for review and approval as individual projects within the Lompa Ranch North SPA are brought forward.

f) Park design shall be consistent with Carson City Parks, Recreation, and Open Space Department guidelines and standards, including water conservation design elements.

3.1.5 West Side Park

a) Prior to the issuance of the certificate of occupancy for the 750th residential unit west of Interstate 580, the Master Developer shall make available a minimum 10-acre community park site on the west side of the freeway as shown on the adopted land use map. This shall be coordinated through and agreed upon by the Parks, Recreation, and Open Space Department.

3.1.6 East Side Park

a) The Master Developer shall work with the Carson City Parks, Recreation, and Open Space Department and provide for a 3-acre minimum neighborhood park site on the east side of Interstate 580 as depicted on the land use plan. The park site shall be dedicated prior to the issuance of the certificate of occupancy for the 250th residential unit located on the east side of I-580. This shall be coordinated through and agreed upon by the Parks, Recreation, and Open Space Department.

3.2 Sanitary Sewer

a) All new development within the Lompa Ranch North SPA shall be required to connect to municipal sanitary sewer service.

b) A final sewer report demonstrating capacity to serve the development shall be submitted with each individual project within the SPA boundary.

c) The site has no known constraints which would impact the ability to be served by a gravity fed extension of the public sewer.

d) An overall water and sewer technical report shall be submitted to Carson City prior to the first tentative map approval, to ensure that each project phase is properly sized and designed. The Lompa Ranch North Water and Sewer Demand Report is included as Appendix 5 of this document.

3.3 Water Service

a) All new development within the Lompa Ranch North SPA shall be required to connect to municipal water service.

b) All new development shall be required to pay applicable water connection fees and demonstrate that adequate water supply is available to serve the project and dedicated for use.

c) Separate irrigation meters will be employed in accordance with the guidelines present at the time of connection.

d) An overall water and sewer technical report shall be submitted to the County prior to the first tentative map approval, to ensure that each project phase is properly sized and designed. The Lompa Ranch North Water and Sewer Demands Study is included as Appendix 4 of this document.

3.4 Storm Water Management

The Lompa Ranch area benefits from extensive review and policy implementation that has been performed by Carson City as part of their long-range planning and infrastructure management processes. It is a goal of this Specific Plan to adhere to and complement this planning work. Policy *LR-SPA 3.1 Floodplain and Drainage*, from the Carson City Master Plan is therefore included in this document as a means of establishing long-range storm water management planning for Lompa Ranch North. This policy states:

- *The existing floodplain shall be identified based on FEMA mapping with post-freeway drainage improvements for development of the final SPA. In order to develop the property, drainage improvements will be required to mitigate the 100-year floodplain on the property. This may also require amending the FEMA mapping through a letter map amendment process. Once the new floodplain is determined, designated land use intensities shall be developed outside this floodplain area.*

- *An overall storm water management plan shall be developed with the final SPA to ensure adequate drainage facilities to serve the entire SPA area.*

- *A detailed wetlands delineation shall be provided with the final SPA identifying any areas that meet the Federal 404 definition of wetlands. Following wetland identification, designated land use intensities shall be developed outside the wetlands.*

Per the above policy, a wetlands delineation is currently planned for Spring 2016. The completion deadline for this task is June 30, 2016. No development shall occur within the Lompa Ranch North SPA until the wetlands delineation has been completed.

Additional resources for guiding storm water management (and other utilities) are the Conceptual Drainage Study and Stormwater Management Report for Lompa Ranch North (included in Appendix 1). In particular, this report states the following:

Based on the floodplain analysis, it is recommended that a LOMR be pursued based on the existing topography. The LOMR would remove much of the Lompa Ranch from the burden of delineated floodway both upstream and downstream of the Highway 395. It would establish discharges which could be used for the design of proposed drainage improvements including the design of channels along 5th Street, Saliman Drive, Robinson Road and north of Carson High School. In addition the model could be used for future site development planning and design and would be considered as the effective model for future modeling efforts, specifically those that would be part of a CLOMR for new development.

The existing *Master Plan Policy LR-SPA 3.1* and the *Conceptual Drainage Study and Stormwater Management Report* therefore form part of the standards for the Lompa Ranch North SPA.

The LOMR must be approved by Carson City and submitted to the Federal Emergency Management Agency (FEMA) prior to the submittal of the first tentative map. The CLOMR must be approved by Carson City and submitted to FEMA prior to the commencement of site development.

Additional standards include:

a) The primary channels provided along Robinson Street, Saliman Road, Interstate 580, and 5th Street shall be designed to contain the existing off-site watershed discharges as well as the existing discharges from the SPA area.

b) Onsite retention and detention facilities are required within the development of multi-family and commercial parcels.

c) Existing drainage patterns shall be maintained.

d) A comprehensive drainage impact analysis for the overall Lompa Ranch North SPA shall be reviewed and approved with the first tentative map and/or permit request. The analysis shall provide estimates of project impacts at buildout along with required upgrades, improvements, etc. as well as with triggers for when these improvements are required.

e) Updates to the master drainage analysis shall be provided for any project proposing multi-family or commercial uses.

Appendix 1 contains the Conceptual Drainage Study and Stormwater Management Report for Lompa Ranch North.

3.5 Utility Service

a) All utility services within the Lompa Ranch North SPA shall be undergrounded. Overhead power lines shall be prohibited.

b) Plans for electrical, natural gas, telephone, and cable service shall be reviewed and approved by the applicable purveyor (i.e. NV Energy, Southwest Gas, AT&T, etc) prior to the issuance of a building permit.

3.6 Roadways

A traffic impact study has been completed for Lompa Ranch North (included in Appendix 2). This study includes recommended roadway improvements that mitigate the projected impacts. These roadway improvements are included below under their relevant heading.

a) All roadways within the Lompa Ranch North SPA shall comply with the standards and requirements included within the Carson City Municipal Code. This includes the provision of sidewalks where appropriate. All sidewalks in the Lompa Ranch North SPA shall be designed to provide connectivity to multi-use paths, parks, and open space.

3.6.1 Saliman Road

a) Consistent with the conclusions/recommendations outlined in the traffic impact analysis (Appendix 2), add westbound right turn lane. Robinson Street should be extended to intersect with a new north-south "spine road" within the project area and as shown in Exhibit 2. The spine road should extend north from a new intersection with 5th Street. Both Robinson Street and the Spine Road can be constructed with one through lane in each direction. For Phase 1, the spine road does not need to extend north of the Robinson Road extension. Include drainage improvements. Channel section to include open space for multi-use path.

3.6.2 Robinson Street

a) Robinson Street shall be improved to collector standards established by the Carson City Municipal Code.

b) Consistent with the conclusions/recommendations outlined in the traffic impact analysis (Appendix 2), add northbound right turn lane and provide southbound dual lefts. This will require the widening of the east leg of Robinson Street to accept the two left turn lanes.

3.6.3 Fifth Street

a) Fifth Street shall include new drainage improvements to address site development conditions to the satisfaction of the Carson City Engineering and Public Works Departments.

b) Consistent with the conclusions/recommendations outlined in the traffic impact analysis (Appendix 2), add a northbound right turn lane, and a westbound right turn lane (which may already be warranted without the project).

3.6.4 Airport Road

a) Right-turn lanes will be added along Airport Road based on the recommendations included in the reviewed and approved traffic impact analysis. The Carson City Engineering Department shall determine compliance with this standard.

b) US 50/Airport – Consistent with the conclusions/recommendations outlined in the traffic impact analysis (Appendix 2), Provide northbound dual left turn lanes.

c) Airport/5th – Consistent with the conclusions/recommendations outlined in the traffic impact analysis (Appendix 2), Add a westbound right turn lane.

3.6.5 North/South Collector (Spine Road)

a) A collector roadway shall be constructed from 5th Street extending north to US Highway 50 (dependent upon required easements to be secured through adjoining parcels to the north). This road shall be designed as a limited access collector (per City standard) and include additional space for a multi-use path and landscaping, separated from vehicular traffic.

b) US 50/Gold Dust Casino – Consistent with the conclusions/recommendations outlined in the traffic impact analysis (Appendix 2), add a northbound right turn lane and, westbound dual lefts. This will require the widening of the south leg to accept a new lane. The south leg will continue to connect with the proposed north-south spine road.

c) Consistent with the conclusions/recommendations outlined in the traffic impact analysis (Appendix 2), a new three- to four-leg intersection at Robinson Street/Spine Road should be constructed to provide a north leg at this intersection. This north leg is proposed to continue to its connection with the south leg of the William Street/Casino intersection. This will require widening the existing south leg of this intersection to a standard two to three lane cross section.

d) The preferred northern intersection of the spine road is at the existing signalized intersection on William Street serving access to the Gold Dust Casino. The south leg of this intersection should be widened to accommodate a potential additional westbound to southbound left turn lane at this intersection. The spine road is anticipated to carry approximately 12,000 vehicles per day at Build Out. This volume approaches the threshold for a four-lane roadway. Further analysis and continuing discussions with the property owners south of William Road will be required.

3.7 Traffic Impacts

a) A comprehensive traffic impact analysis for the overall Lompa Ranch North SPA has been reviewed and improved with this Specific Plan. This analysis provides estimates of the project impacts at buildout along with required upgrades, improvements, etc. along with triggers for when these improvements are required.

b) Updates to the master traffic impact analysis shall be provided for any project generating more than 80 peak hour trips to determine if roadway upgrades/improvements are triggered. Such updates shall also address long-term cumulative impacts from the site as a whole so that appropriate refinements may be made to any mitigation measures.

Appendix 2 contains the Traffic Impact Study for Lompa Ranch North.

3.8 Fire Protection

The Carson City Fire Department currently services the Lompa Ranch North area from Fire Station # 1 located on Stewart Street. As development occurs within the Specific Plan boundary and surrounding area(s), an additional facility and/or equipment may be needed in order to ensure adequate levels of service for new development. As such, the following standards are included within this SPA:

a) As individual projects and subdivisions are submitted, the Carson City Fire Department shall review development plans in context with existing service limitations to ensure adequate levels of service are maintained.

b) The Carson City Fire Department has the ability to condition projects to ensure adequate levels of service are maintained for Lompa Ranch North. Such conditions include requiring fire sprinklers for new homes if response times are below accepted levels, inclusion of fire resistant building materials, requiring upgrades to existing equipment or purchase of new equipment, etc.

c) The Master Developer shall reserve land for a new fire station located central to the SPA area should the Fire Department determine that a new station within Lompa Ranch North best serves the community at large.

3.9 Police Protection

The Carson City Sheriff's Department currently operates patrols in the area. The following standards related to police protection are provided for the Lompa Ranch North SPA:

a) All new projects submitted for review by Carson City shall be routed through the Sheriff's Department for review and comment.

b) The Sheriff's Department shall reserve to the right to condition projects in order to implement and or incorporate crime prevention measures, etc.

c) New commercial projects within Lompa Ranch North shall be required to submit a lighting and security plan to the Sheriff's Department for review and approval.

3.10 Schools

The following standards have been developed in conjunction with the Carson City School District:

a) A new elementary school site (minimum of 10 acres) shall be reserved within Lompa Ranch North to meet future enrollments needs.

b) The elementary school site shall be made available prior to the issuance of the 700th residential certificate of occupancy.

c) Generally, the 10-acre elementary school site should be located on the west side of Interstate 580, central to the project site near the current terminus of Robinson Street.

c) All residential development within the Lompa Ranch North SPA shall be required to provide estimated student enrollment projections to the Carson City School District for review.

d) The Master Developer of the Lompa Ranch North SPA shall work with the School District to participate in the current (2016) School Facilities Master Plan Update process to ensure that needs identified within the SPA boundary are addressed.

APPENDIX 1

Conceptual Drainage Study and Stormwater Management Report for Lompa Ranch North

CONCEPTUAL DRAINAGE STUDY &

STORMWATER MANAGEMENT REPORT

FOR

LOMPA RANCH DEVELOPMENT

In association with a Specific Plan Amendment Application, Master Plan Amendment Application and Rezoning Application.

Prepared for:

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EXECUTIVE SUMMARY

The Lompa Ranch Specific Plan area is a large, unique and diverse development located in the heart of Carson City. The Lompa Ranch Specific Plan Area is located south of Highway 50 and north of Fairview Drive. The policies and guidelines contained in the Lompa Ranch Specific Plan are applicable to all properties contained within the Specific Plan boundary and more specifically this Project Area. The drainage and transportation systems extend throughout the development and connect to 5th Street and through to Highway 50 to the north.

Specifically, section LR-SPA 3.1 outlines the following Floodplain and Drainage Policies:

- *The existing floodplain shall be identified based on FEMA mapping with post-freeway drainage improvements for development of the final SPA In order to develop the property, drainage improvements will be required to mitigate the I00-year floodplain on the property. This may also require amending the FEMA mapping through a letter map amendment process. Once the new floodplain is determined, designated land use intensities shall be developed outside this floodplain area.*

- *An overall storm water management plan shall be developed with the final SPA to ensure adequate drainage facilities to serve the entire SPA area.*

- *A detailed wetlands delineation shall be provided with the final SPA identifying any areas that meet the Federal 404 definition of wetlands. Following wetland identification, designated land use intensities shall be developed outside the wetlands*

Several regional watercourses exist adjacent to or flow through the specific plan area.

Run south of 5th Street stems from two sources. Runoff that breaks out of the Kings Canyon Creek several miles west of the project area as well as runoff generated by the urbanized watershed south off 5th Street. The combined runoff conveyed east and is ultimately discharged into Tributary H – a constructed watercourse whose headwaters are located south and west of the project Lompa Ranch. As part of the improvements in the area, some of which are associated with the construction of Highway 395, Tributary H is aligned such that runoff is conveyed beneath 5th Street west and released into the Kings Canyon Creek directly west of the Highway 395 Bridge.

This project study area is subjected to runoff from five regulatory watercourses – Vicee Canyon Creek, Ash Canyon Creek, Kings Canyon Creek, Goni Canyon Creek and Tributary H, as well as the local watersheds north of Highway 50, south of 5th Street, and east of Highway 395, all of which contribute runoff to the Kings Creek drainage system. It is the intent of this development to design and construct all necessary drainage improvements (channels, road culverts, etc) to collect and convey these watersheds to their natural downstream location. The flow will have a clear and unobstructed path from the upstream inlet to the project to the downstream outlet. The roads and structures are proposed to be laid out and constructed in a manner that does not block or impede the flow as it

traverses the site. A 100-year design event will be used for all drainage conveyance systems. Capacity of the downstream system will also be evaluated and improved or mitigated as appropriate with additional drainage improvements.

At this time, the design intent for the Project Area is to construct open, trapezoidal channels to convey the discharge around or through the site. Maintenance of the channels is a top priority for design considerations. The Developer will continue to work with Carson City Storm Water Management to finalize a design section that both allows for the required conveyance capacity and is also reasonable to maintain in both the short and long term. Grass-lined, earthen channels are favored for this application as they are aesthetically pleasing as to be incorporated into the park and open space system, provide conveyance capacity and are easily maintained and inspected. Preliminary channel sections are provided in the body of this analysis showing both rock-lines and earthen configurations. The rock-lined sections are expected to only be necessary where velocities in the channels may cause erosion to a grass-lined channel. In these cases, in addition to culvert outlets or energy dissipaters, rock lining or splash pads will be used.

The construction of this project is expected to be completed in phases. While specific development phase lines are unknown at this time, it is the intent of the Developer to construct the necessary drainage facilities for each phase and to only mass-grade a block or area has development is permitted and ready to proceed. The mass-grading and ground disturbance of large areas is in proposed or anticipated due to the derogatory impact on the natural and built environments of leaving large areas of disturbed land open and disturbed. Land disturbance will be limited to those areas necessary for immediate development.

Based on the floodplain analysis, it is recommended that a LOMR be pursued based on the existing topography. The LOMR would remove much of the Lompa Ranch from the burden of delineated floodway both upstream and downstream of the Highway 395. It would establish discharges which could be used for the design of proposed drainage improvements including the design of channels along 5th Street, Saliman Drive, Robinson Road and north of Carson High School. In addition the model could be used for future site development planning and design and would be considered as the effective model for future modeling efforts, specifically those that would be part of a CLOMR for new development.

I. INTRODUCTION

A. DESCRIPTION OF PROJECT

The project area is currently undeveloped. The Lompa Ranch area has been planned for development since the Specific Plan stage. The current project area is bound by Fairview Drive to the east, Saliman Road to the west, Highway 50 to the north and 5th Street to the South. For ease of reference, the entire study area is referred to as Lompa Ranch, which specifically encompasses 246 acres. The land is divided such that 200 acres lies west of Highway 395 with the remaining 46 acres is located the east of the highway. A map depicting the project limits is incorporated with this document (Figure 1).

Adequate drainage systems shall be provided in order to preserve and promote the general health, welfare, and economic well-being of the region. Drainage is a regional feature that affects all of Carson City. Drainage plans shall be consistent with and integrated with the Carson City drainage master plan upon adoption. This characteristic of drainage requires coordination and cooperation from both the public and private sectors.

Storm water drainage systems are an integral part of the development process. The planning of drainage facilities shall be included in the development process and in preparation of improvement plans.

Drainage systems require space to accommodate conveyance and storage functions. When the space requirements are considered, the provision for adequate drainage becomes a competing use for space along with other land uses.

Storm drainage planning for all development shall include the allocation of space for drainage facility construction and maintenance, which may entail the dedication of right-of-way and/or easements. The provision of multi-use facilities such as combining with parks, open space, and recreation needs is strongly encouraged.

(Division 14.1- Storm Drainage Policy and Basic Principles)

The purpose of this Conceptual Drainage Report is to quantify and identify the drainage system requirements of this development for space, multi-use opportunities and general integration with the project plan.

B. EXISTING SITE CONDITIONS

Independent studies from various engineering firms have been completed which analyzed the hydrologic and hydraulic impacts of contributing watersheds and associated watercourses in and around the Lompa Ranch area. These studies expand upon the original FEMA Flood Insurance Study for Carson City. Among

these were hydrologic and hydraulic efforts completed by WRC as part of the feasibility and design of Highway 395, while a more recent study was prepared as part of a physical map revision (HDR 2009). The intent of HDR analysis was to delineate the floodplain through the developed area west of Lompa Ranch and culminated in the removal of Highway 395 from the floodplain. In addition Kimley Horn and Associates compiled a 2-dimensional model using FLO-2D that focused exclusively on the drainage south of 5th Street. The Kimley-Horn model included Tributary H – a watercourse which contributes flow in the Kings Canyon Drainage System at a location upstream of the Highway 395 Bridge. A list of the previous studies follows:

1) HDR, *Draft Hydrologic Analyses and Results for Carson City Flood Insurance Study*, June 2010
2) HDR; *Draft Hydraulic Analyses and Results for the Carson City Flood Insurance Study,* July 2010
3) Kimley-Horn and Associates; *Southwest Carson City Flood Study,* February 2014
4) Manhard Consulting, LTD; SW Carson City Regional Hydrologic Analysis Final Report, March 2010
5) Northwest Hydraulic Consultants; *Summary Findings for Vicee Canyon Channel HEC-RAS Analysis Preliminary FIS/FIRM Review Support Carson City, NV,* September 2001
6) WRC Nevada; Inc *Hydrologic Analysis US 395 Bypass Freeway, Carson City Nevada,* April 1997
7) WRC Nevada; Inc *US 395 Bypass Section 404(b)(1) Alternatives Development and Evaluation Report,* June 30, 1998
8) WRC Nevada; Inc *Carson City Northwest Alternatives Analysis, April 22*, 1999
9) WRC Nevada; Inc *Carson City Northwest Drainage Facilities Hydrologic and Hydraulic Report, November 5*, 1999

The study area is subjected to runoff from five regulatory watercourses – Vicee Canyon Creek, Ash Canyon Creek, Kings Canyon Creek, Goni Canyon Creek and Tributary H, as well as the local watersheds north of Highway 50, south of 5th Street, and east of Highway 395, all of which contribute runoff to the Kings Creek drainage system. Of these contributing flow sources, runoff from Vicee Canyon Creek, Ash Canyon Creek, Kings Canyon Creek and Tributary H and the local drainage from Highway 50 coalesce upstream of Highway 395. The combined flow is conveyed underneath Highway 395 where it coalesces with runoff from Goni Canyon Creek and runoff generated by the local watersheds south of 5th Street, and the local watersheds east of Highway 395. The combined flow is conveyed east ultimately discharging into the Carson River.

C. GENERAL LOCATION MAP

Figure 1 depicts the project area, general location, existing topography and existing aerial photo.

FIGURE 1-1: LOMPA RANCH SPECIFIC PLAN AREA

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FIGURE 1-2: PROJECT STUDY AREA

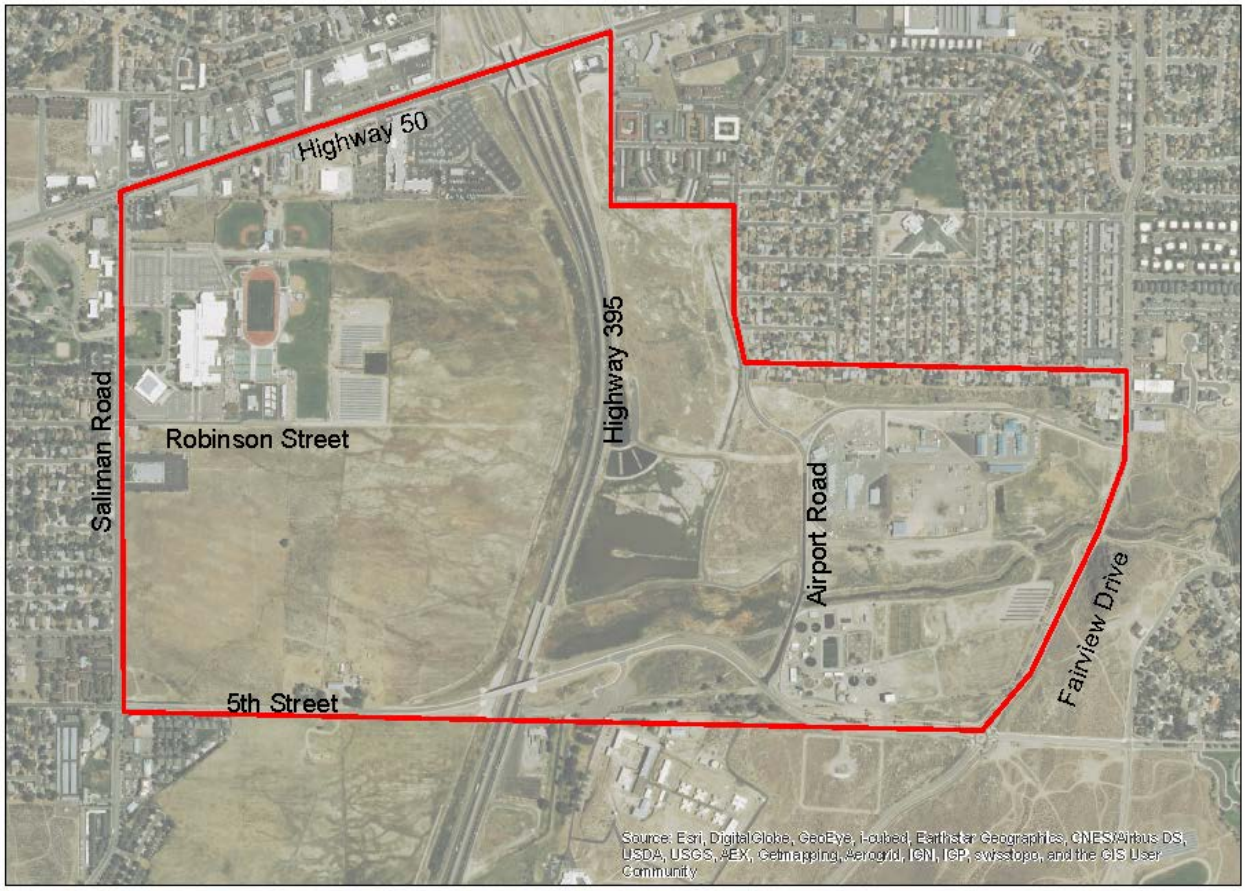

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FIGURE 1-3: EXISTING TOPOGRAPHY

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FIGURE 1-4: EXISTING AERIAL PHOTO

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II. EXISTING AND PROPOSED HYDROLOGY

A. EXISTING AND PROPOSED DRAINAGE BASIN BOUNDARIES

Detention is considered a viable method to reduce storm runoff from developed properties. Temporarily detaining storm runoff can significantly reduce downstream flood hazards as well as pipe and channel requirements. Storage also provides for sediment and debris collection which reduces maintenance requirements for downstream channels and streams.

Local detention storage for land development, which includes subdividing land, shall be required when the development increases flows and downstream conveyance capacities of the drainage system are not capable of handling non-detained flows, and the developer elects to not upgrade the existing storm drainage system. Onsite detention storage shall be sized to detain sufficient runoff to limit flows from a five (5) year storm (Q5) to their predevelopment condition.

The capacity of downstream conveyance systems shall be analyzed in accordance with this division and shall be based on runoff from the development as fully improved. Local detention can also be required when designated in flood or drainage master plans to reduce the peak rate in regional facilities. (Division 14.1.8)

A common detention facility is proposed to be incorporated into the neighborhood park proposed at the east end of Robinson. The area is proposed as a multi-use facility incorporating low depth storage.

The size and modeling of this neighborhood facility will be completed with the Tentative Map. The intent; however, is to detain the water for the Lompa Ranch area, north of 5th in a centralized system. This will allow for maintenance to be centralized and avoid the need for small individual basins throughout the community.

B. DESIGN STORM AND 100-YR DISCHARGES

As stated above numerous modeling efforts were completed for the LOMPA Ranch Area. However a comprehensive study incorporating the results of previous studies and creating a definitive hydrologic model accounting for the finalized improvements was still lacking.

As a part of the floodplain study, the various hydrologic analysis were reviewed and a single hydrologic model (broken into two parts) was created for the purpose of identifying the floodplain and floodway zones within Lompa Ranch east and west of Highway 395. Based on the previous studies, the hydrologic analysis was conducted using the Army Corps of Engineers Software HEC-1 and was based in part on the work

completed by WRC and the effective model prepared by HDR (August 2010). The new model effectively accounts for the current alignment of the known watercourses. Figure 2 illustrates the contributing watersheds. A table of preliminary discharges is provided on Table 1.

Localized drainage from the blocks will be directed to the channels through the streets. Curb will be used to contain the flow to the public right-of-way. The flow depth is not to exceed 6". In the event the capacity of the street is increased to allow for flow, one lane should be left available for emergency vehicles to pass.

Any development within a mapped floodplain will be required to provide a 1 to 1 volume and 2 feet of freeboard in accordance with the Carson City standards.

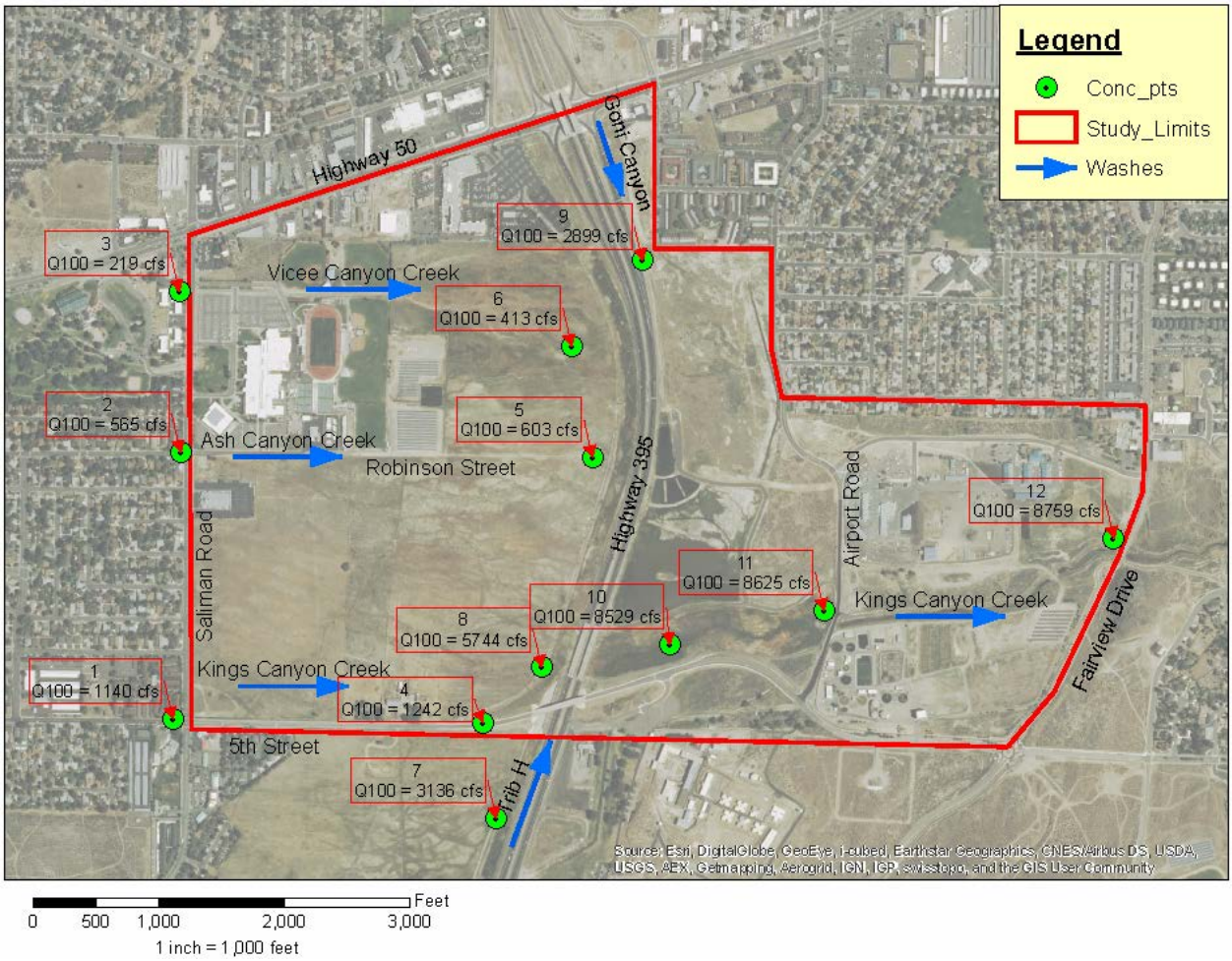
C. EXISTING DRAINAGE PROBLEMS

As the property is currently undeveloped, no existing drainage problems are known.

D. ON-SITE AND DOWNSTREAM DRAINAGE

The study area is subjected to runoff from five regulatory watercourses – Vicee Canyon Creek, Ash Canyon Creek, Kings Canyon Creek, Goni Canyon Creek and Tributary H, as well as the local watersheds north of Highway 50, south of 5th Street, and east of Highway 395, all of which contribute runoff to the Kings Creek drainage system. Of these contributing flow sources, runoff from Vicee Canyon Creek, Ash Canyon Creek, Kings Canyon Creek and Tributary H and the local drainage from Highway 50 coalesce upstream of Highway 395. The combined flow is conveyed underneath Highway 395 where it coalesces with runoff from Goni Canyon Creek and runoff generated by the local watersheds south of 5th Street, and the local watersheds east of Highway 395. The combined flow is conveyed east ultimately discharging into the Carson River. The watercourses and associated 100-yr discharges are illustrated in Figure 2.

FIGURE 2: PRELIMINARY DISCHARGE MAP



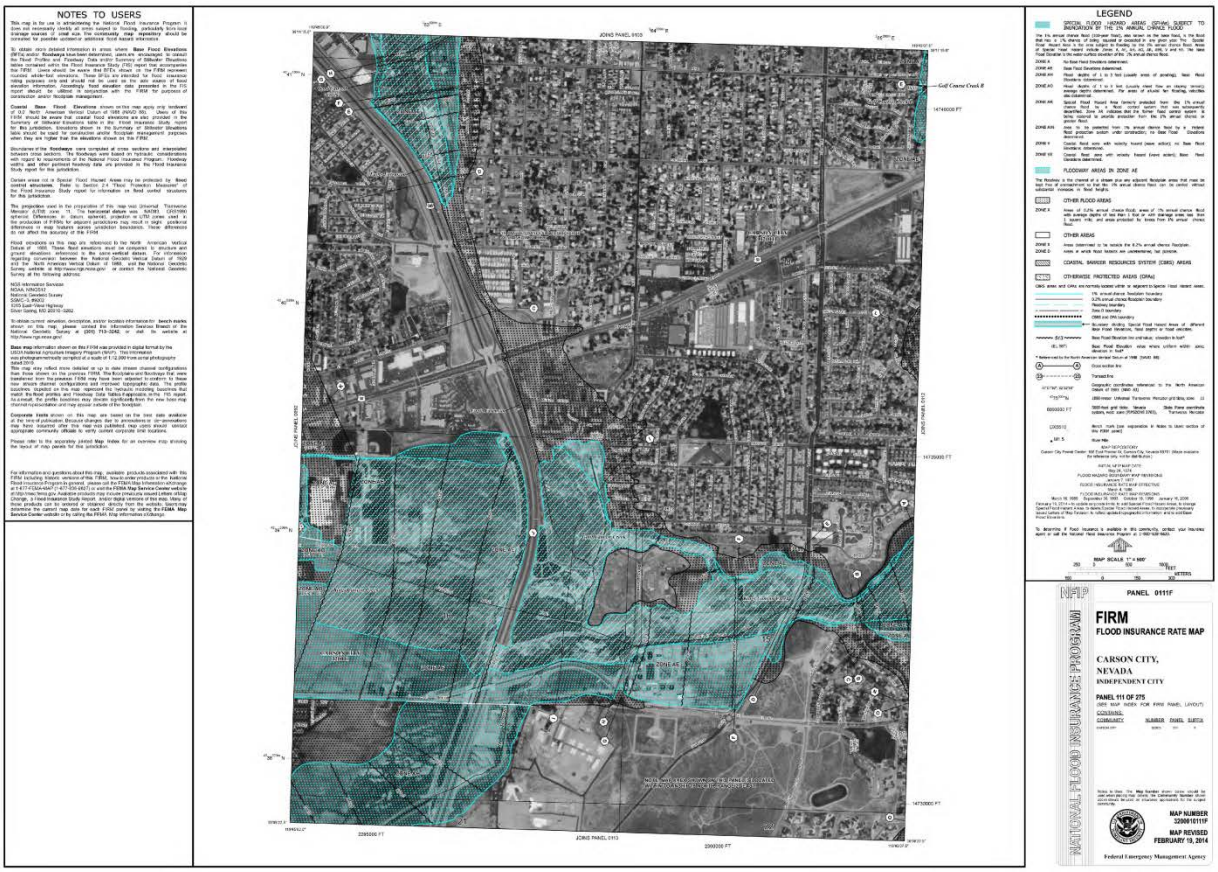
E. FLOODPLAIN

Based on the floodplain analysis, it is recommended that a LOMR be pursued based on the existing topography. The LOMR would remove much of the Lompa Ranch from the burden of delineated floodway both upstream and downstream of the Highway 395. It would establish discharges which could be used for the design of proposed drainage improvements including the design of channels along 5th Street, Saliman Drive, Robinson Road and north of Carson High School. In addition the model could be used for future site development planning and design and would be considered as the effective model for future modeling efforts, specifically those that would be part of a CLOMR for new development.

A CLOMR will be required for the proposed drainage infrastructure.

The existing floodway and floodplain is shown in Figure 3.

FIGURE 3-1: CURRENT EFFECTIVE FIRM



FIRM Flood Insurance Rate Map

Carson City, Nevada

Panel: 111 of 275

Map Number: 3200010111F

Revised: February 19, 2014

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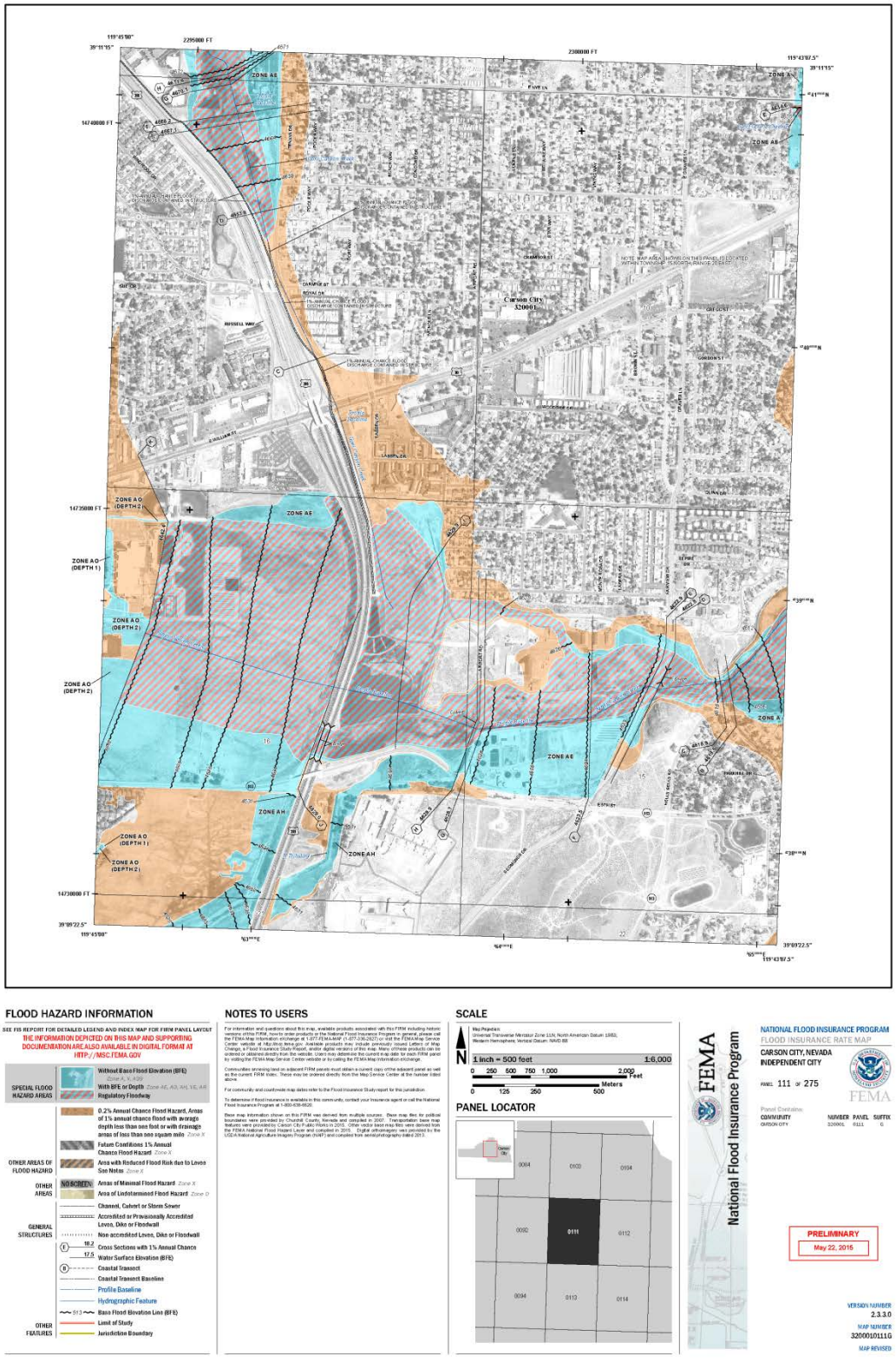
FIGURE 3-2: PRELIMINARY FIRM (MAY 22, 2015)



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III. PROPOSED DRAINAGE FACILITIES (ON-SITE AND OFF-SITE)

A. ROUTING

The hydraulic analysis used the Army Corps of Engineers' software package HEC-RAS. The model was based on uniform, steady flow to determine the water surface elevations at specified points along the study reaches. The water surface elevations were then used to delineate the 100-year (0.1%) floodplain. The downstream tie in location for the updated model was the effective floodplain east of Fairview Drive. The upstream tie in location was the floodplain east of Saliman Road as delineated in the recently approved FIS prepared by HDR (Reference 1). A map illustrating the revised floodplain is provided in Figure 3.

In addition to modeling the floodplain throughout the study reach, the revised hydraulic analysis examined the floodway. This analysis determined that the floodway should be removed for the area west of Highway 395. This recommendation was first suggested as part of the study prepared by HDR (Reference 1). In addition, the floodway can be adjusted such that it aligns with the new Highway 395 Bridge and is contained within the constructed channel downstream, thus eliminating Lompa Ranch from the floodway. The proposed floodplain and floodway alignment are presented on Figure 3.

As shown by the map, the analysis did not identify large areas of land that could be readily removed from the floodplain. However, the floodway reduction was significant which should allow for development within the floodplain with minimal effort outside of elevating the development parcels using compacted fill or constructing conveyance channels to capture and direct flow to a logical outlet (i.e. Highway 395 Bridge).

Future development of the property will direct the flow to the major watercourses in the same manner as existing conditions.

B. MITIGATION MEASURES

1. *CHANGE IN MANNER OF FLOW*

Development shall tend to concentrate existing natural sheet flow into point flows at property lines. These point flows are generally associated with outlets from gutter flow, storm drains, and detention facilities. Downstream properties may experience a longer duration of storm flows, and greater flows in general due to a shortened time of concentration. Discharge of point flows on downstream property can cause increased erosion at the discharge point and further downstream. Therefore, downstream facilities shall be evaluated for runoff capacity during the design and review process. Mitigation of these point flows can be accomplished through energy dissipaters or flow spreaders. Point

flows shall be discharged to downstream properties at non-erosive velocities and depths of flow. (Division 14.1.3)

2. *DIVERSION OF DRAINAGE*

Development can alter the historic or natural drainage paths. When these alterations result in a local on-site drainage system that discharges back into the natural drainage-way or wash at or near the historic location, then the alterations (inter-basin transfer) are generally acceptable. However, when flows from the local on-site drainage system do not return to the historic drainage-way or wash, then inter-basin transfer may result. These inter-basin transfers are generally not acceptable. Planning and design of drainage systems shall not be based on the premise that storm water can be transferred from one basin to another unless part of an adopted city regional drainage system plan.

The flow of storm runoff shall be maintained within its natural drainage course unless reasonable use is demonstrated otherwise. When storm water is discharged into an existing drainage course, the peak discharge into the water course shall not adversely affect or cause damage to property along the drainage course now or in the future based on existing zoning and the Carson City master plan build-out conditions. Erosional impacts due to concentration of flows and increased flow durations shall be evaluated and mitigated. (Division 14.1.4)

3. *PROPOSED MITIGATION*

The proposed drainage system uses a combination of open channels and culverts for road crossings to direct the flow to an existing channel or existing downstream drainage infrastructure. The manner of discharge into the existing channel will be concentrated and as such, erosion protection such as splash pads should be considered with the Drainage Improvement Plans. The time of concentration and quantity of discharge will not be effected due to the attenuation effect from the detention basin on the peaks. The discharge locations are consistent with the historical discharge locations.

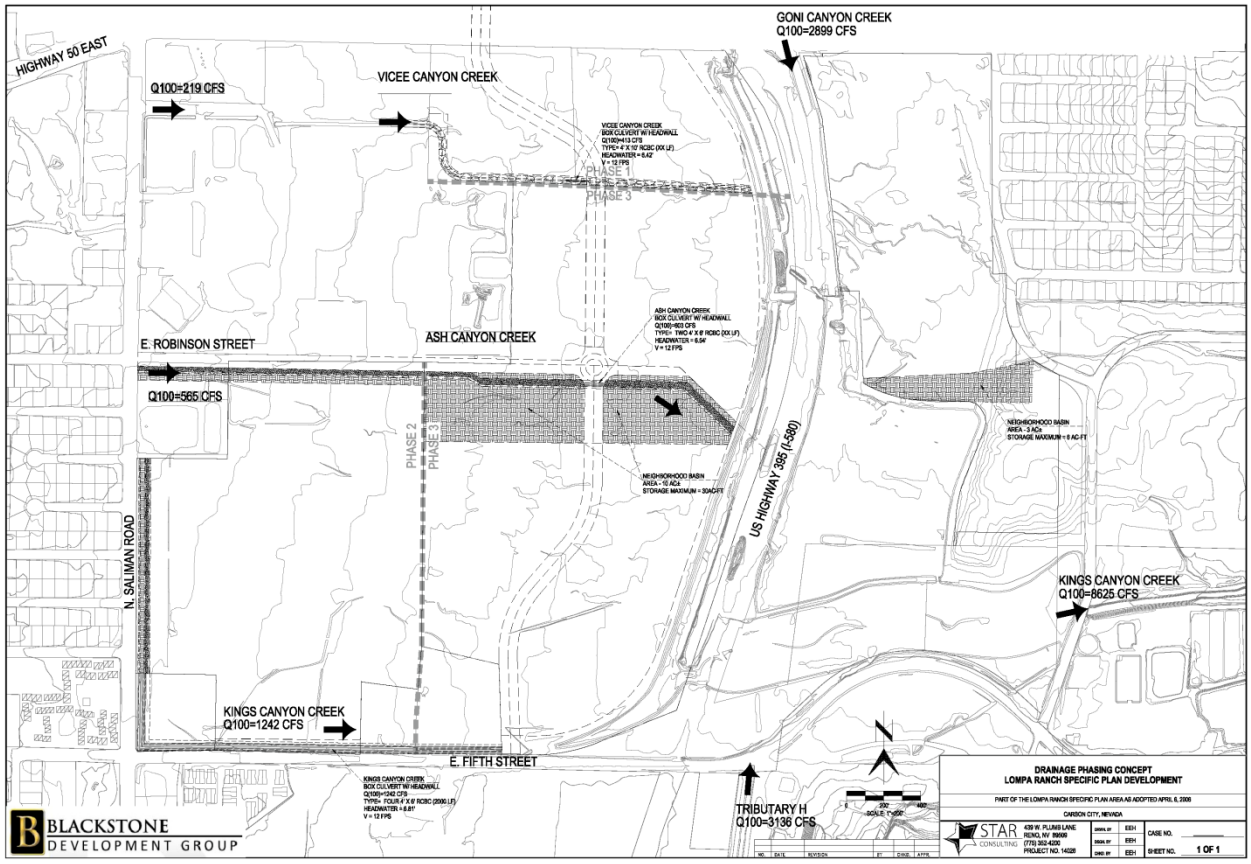
C. CONCEPTUAL DRAINAGE IMPROVEMENT EXHIBIT

The overall drainage concept for the master planned community is to construct several earthen channels at the perimeter and through the proposed development. Generally speaking, these channels are proposed to also incorporate recreational and open space components such as multi-use paths, benches, and supplemental vegetation. Maintenance access roads can also be incorporated into the multi-use path design and access. Culverts and storm drain is expected at road crossings and in the vicinity of commercial zones. The channels and culverts are sized for a design discharge which

allows for the clear flow path from the west to the east. The clear flow path for 100-yr discharges will allow for the existing discharges to pass through the site and exit to the east consistent with the manner in which it discharges under existing conditions. The storm water within each development is proposed to be contained within the pavement and curb with a depth not to exceed 6". In the event the road way drainage exceeds 6" in depth, a storm drain system will be added to direct the flow to the constructed channels.

Figure 4 shows the overall drainage concept for the development.

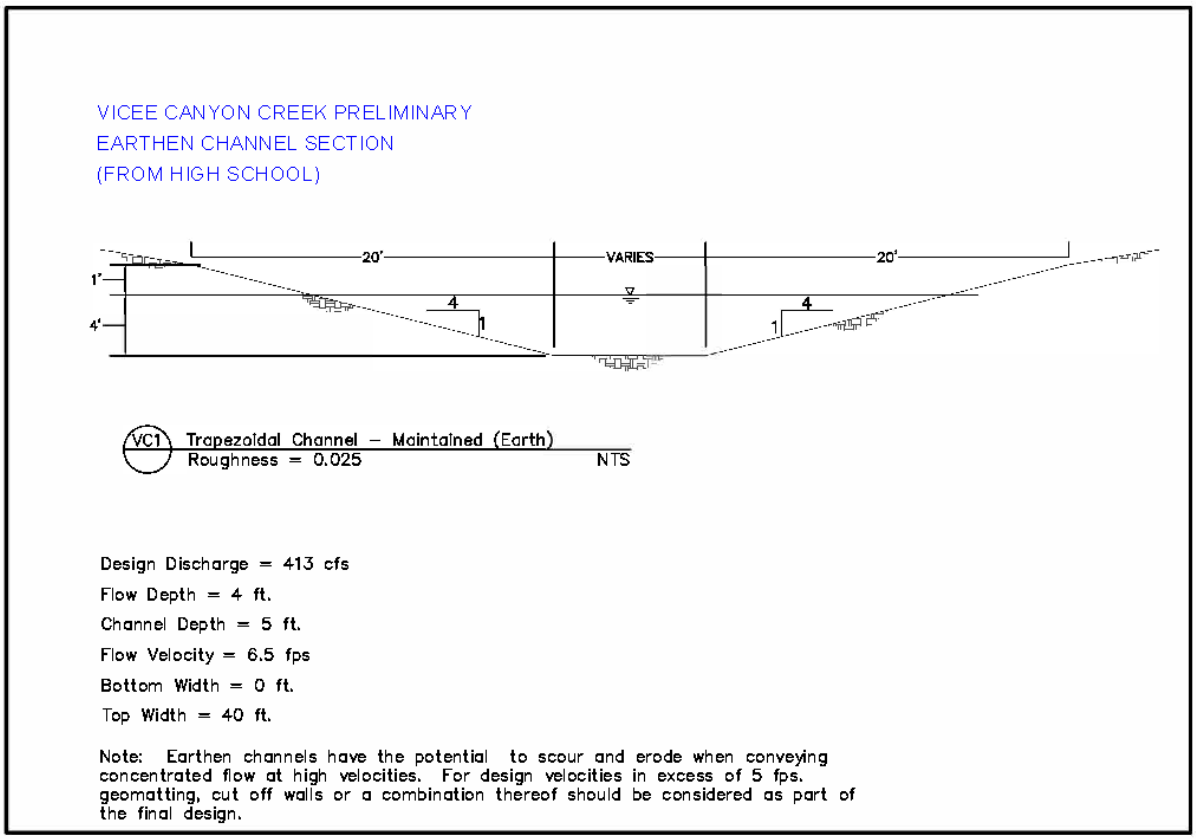
FIGURE 4: CONCEPTUAL DRAINAGE IMPROVEMENTS

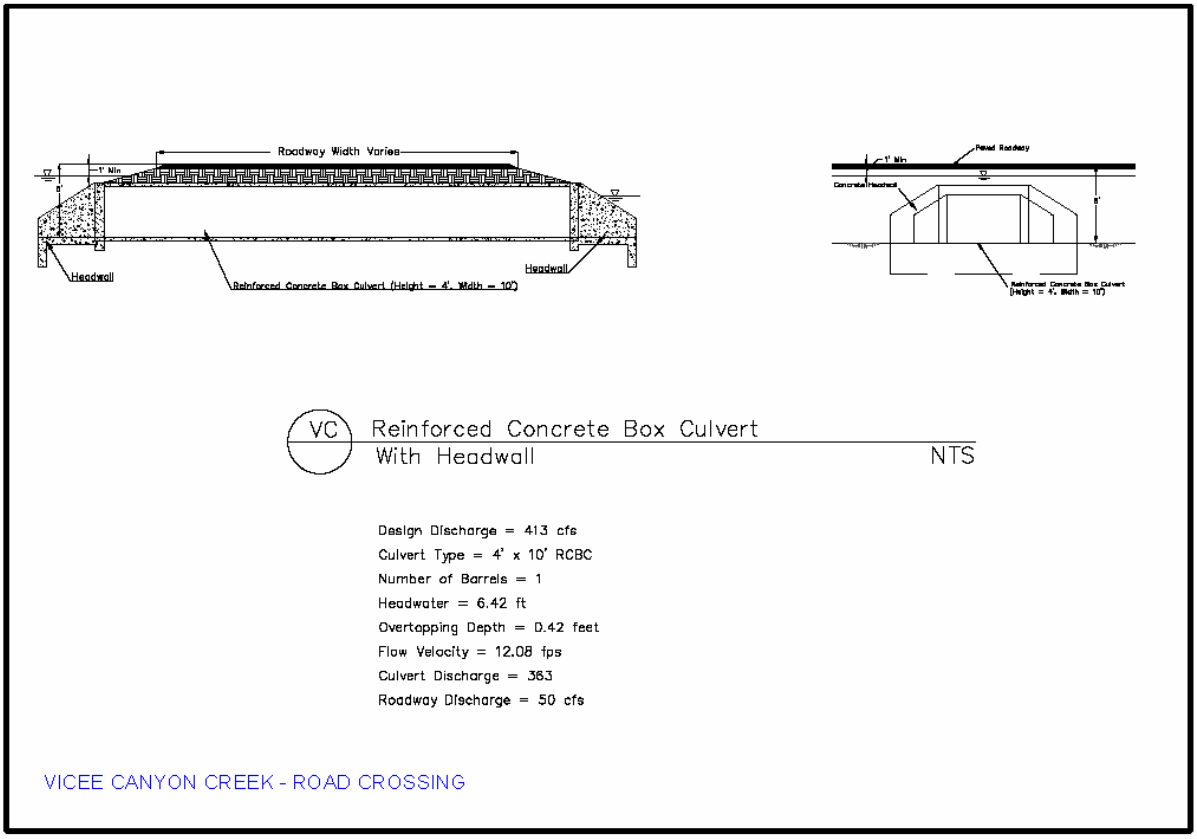


1. *VICEE CANYON CREEK*

The conceptual cross section for the Vicee Canyon Creek, from the high school to the Highway 395 channel is either an earthen or rock-lined open, trapezoidal channel. Pedestrian and multi-use paths are not proposed along this channel as it is not in a location or direction beneficial to circulation. One road crossing with the north-south spine road is expected. The preliminary design for this road crossing is a concrete box culvert. The flow will not be trapped behind the road crossing but will be allowed to flow under the road in the box culvert. Figure 5 shows the preliminary cross sections for the Vicee Canyon Creek improvements through Lompa Ranch.

FIGURE 5-1: VICEE CANYON CREEK CONCEPTUAL CROSS SECTIONS

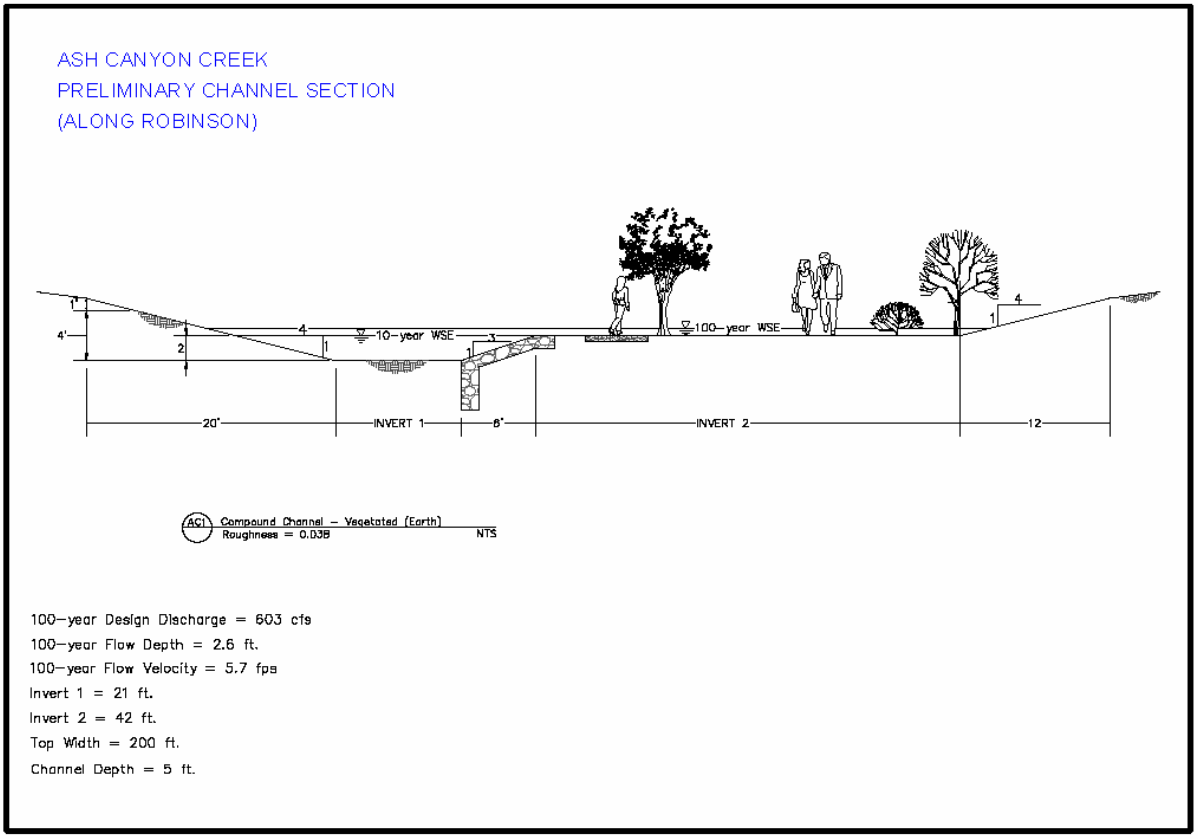


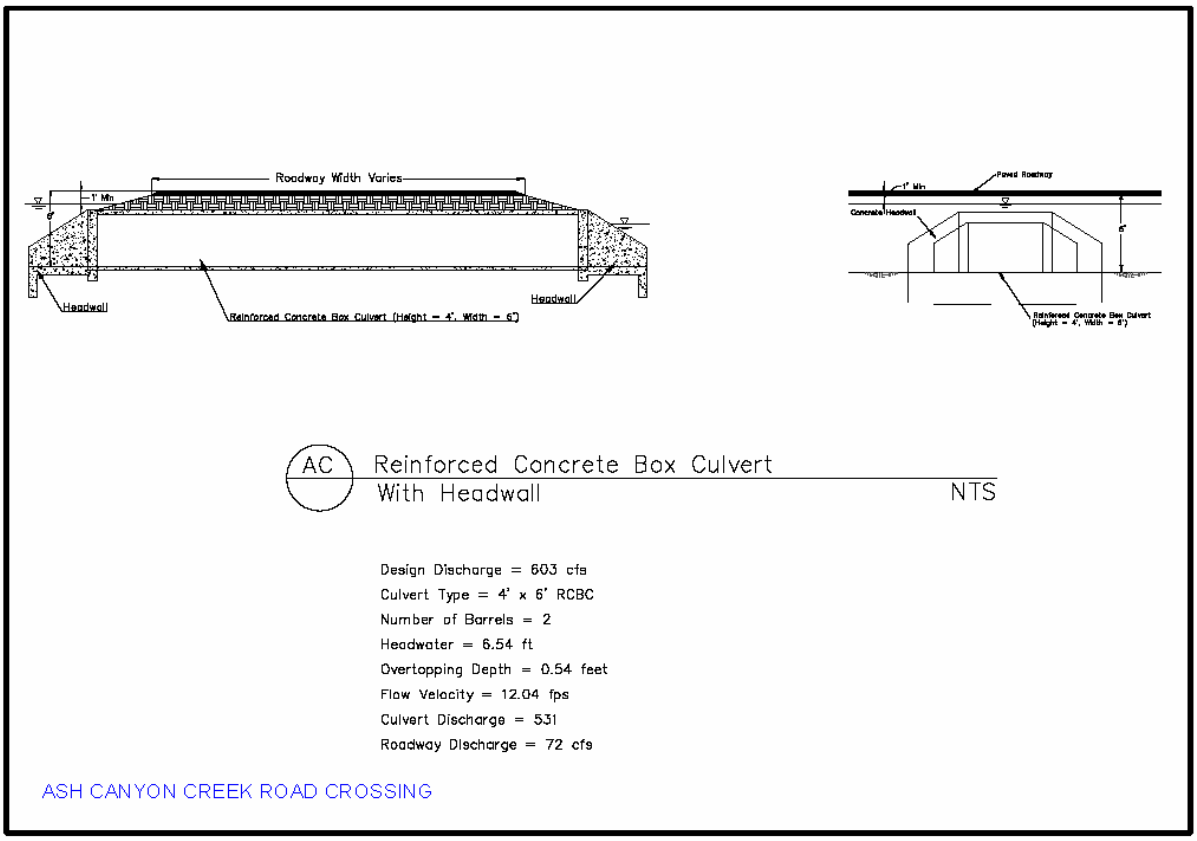

Roadway Width Varies
1' Min
Headwall
Reinforced Concrete Box Culvert (Height = 4', Width = 10')
Headwall
Road Roadway
1' Min
Concrete Headwall
Reinforced Concrete Box Culvert
(Height = 4', Width = 10')
VC
Reinforced Concrete Box Culvert
With Headwall
NTS
Design Discharge = 413 cfs
Culvert Type = 4' x 10' RCBC
Number of Barrels = 1
Headwater = 6.42 ft
Overtopping Depth = 0.42 feet
Flow Velocity = 12.08 fps
Culvert Discharge = 363
Roadway Discharge = 50 cfs
VICEE CANYON CREEK - ROAD CROSSING

2. *ASH CANYON CREEK*

The conceptual cross section for the Ash Canyon Creek, from Saliman Road, along Robison to the Highway 395 channel is either an earthen or rock-lined open, trapezoidal channel. Pedestrian and multi-use paths are a significant component to this design concept. The multi-use path proposed along this channel will provide a critical link between the multi-use path on 5th Street, east of the highway to the high school. One road crossing with the north-south spine road is expected. The preliminary design for this road crossing is a concrete box culvert. The flow will not be trapped behind the road crossing but will be allowed to flow under the road in the box culvert. Figure 6 shows the preliminary cross sections for the Ash Canyon Creek improvements along Robinson and through Lompa Ranch.

FIGURE 6-1: ASH CANYON CREEK CONCEPTUAL CROSS SECTIONS

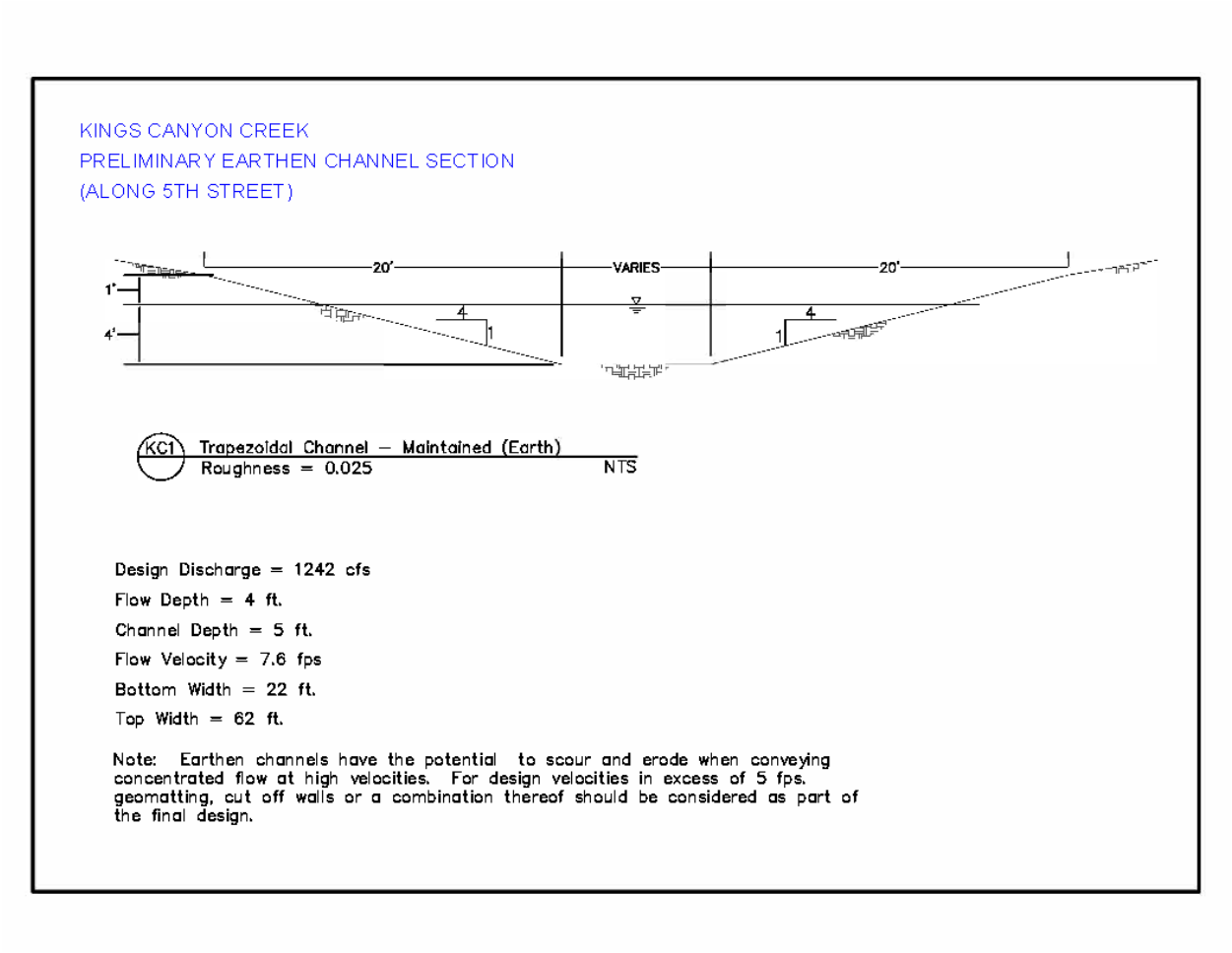


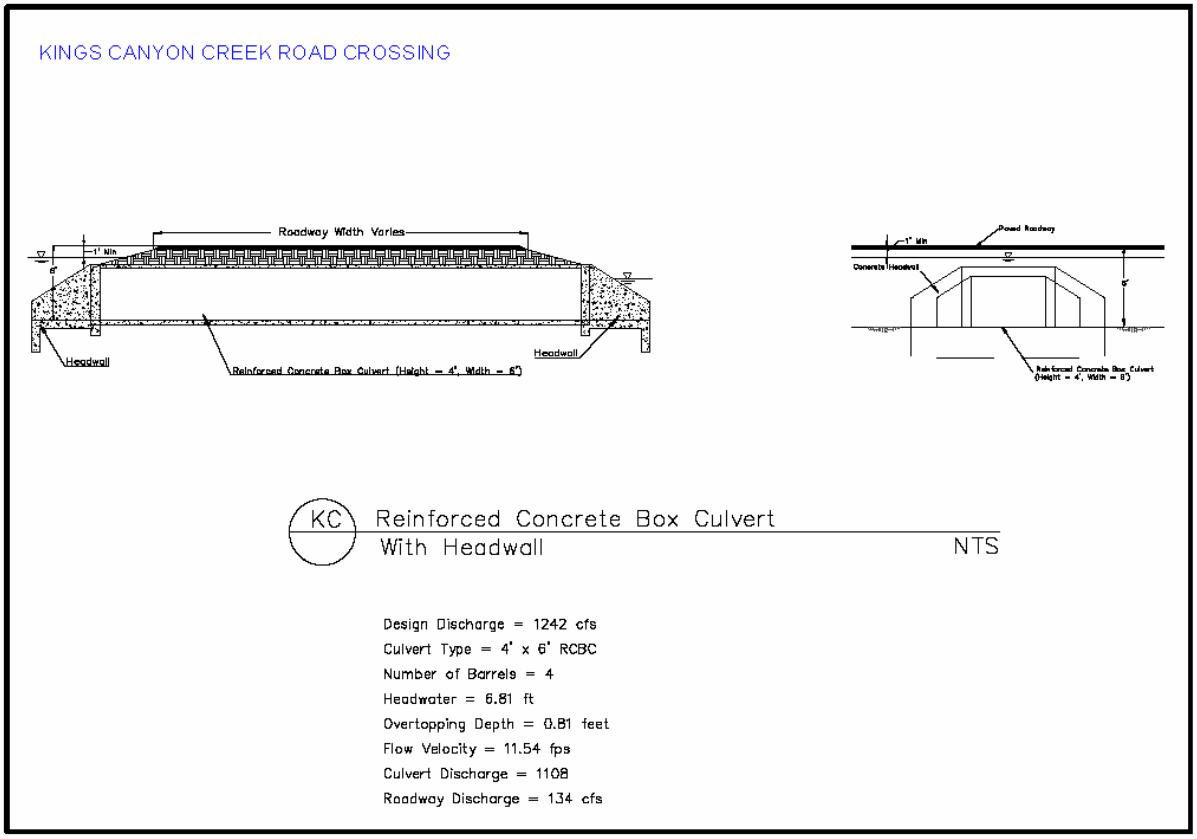

Roadway Width Varies
1' Min
6'
Headwall
Reinforced Concrete Box Culvert (Height = 4', Width = 6')
Headwall
1' Min
Paved Roadway
Concrete Headwall
6'
Reinforced Concrete Box Culvert
(Height = 4', Width = 6')
AC
Reinforced Concrete Box Culvert
With Headwall
NTS
Design Discharge = 603 cfs
Culvert Type = 4' x 6' RCBC
Number of Barrels = 2
Headwater = 6.54 ft
Overtopping Depth = 0.54 feet
Flow Velocity = 12.04 fps
Culvert Discharge = 531
Roadway Discharge = 72 cfs
ASH CANYON CREEK ROAD CROSSING

3. *KINGS CANYON CREEK*

The conceptual cross section for the Kings Canyon Creek, along 5th Street from Robinson to the Highway 395 channel is an open channel or storm drain system. A physical constraint of horizontal clearance within the existing right-of-way will likely be a design constraint in the vicinity of the two non-participating parcels. One road crossing with the north-south spine road is expected. The preliminary design for this road crossing is a concrete box culvert. The flow will not be trapped behind the road crossing but will be allowed to flow under the road in the box culvert. Figure 7 shows the preliminary cross sections for the Kings Canyon Creek improvements through Lompa Ranch.

FIGURE 7-1: KINGS CANYON CREEK CONCEPTUAL CROSS SECTIONS

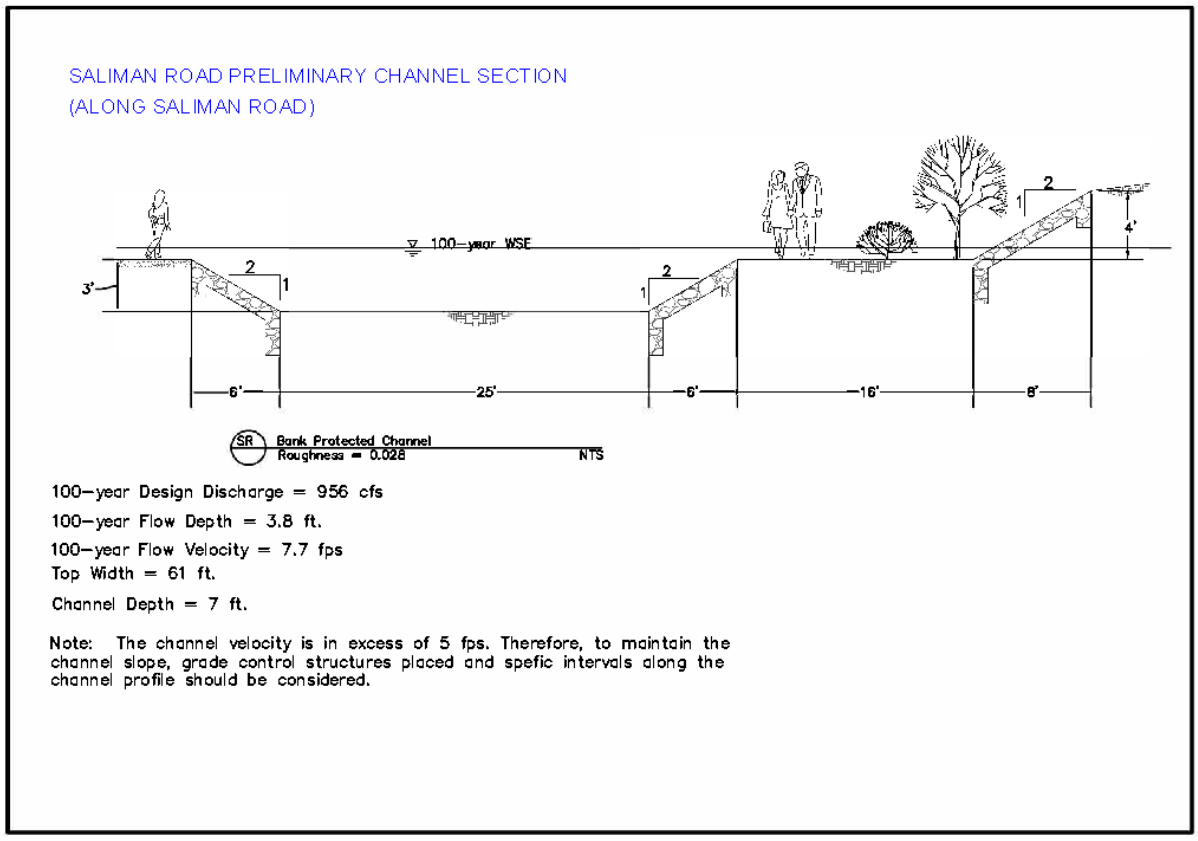



KINGS CANYON CREEK ROAD CROSSING
Roadway Width Varies
1' Min
6'
Headwall
Reinforced Concrete Box Culvert (Height = 4', Width = 6')
Headwall
Paved Roadway
1' Min
Concrete Headwall
6'
Reinforced Concrete Box Culvert (Height = 4', Width = 6')
KC
Reinforced Concrete Box Culvert
With Headwall
NTS
Design Discharge = 1242 cfs
Culvert Type = 4' x 6' RCBC
Number of Barrels = 4
Headwater = 6.81 ft
Overtopping Depth = 0.81 feet
Flow Velocity = 11.54 fps
Culvert Discharge = 1108
Roadway Discharge = 134 cfs

4. *SALIMAN ROAD CHANNEL*

The conceptual cross section for the Saliman Road channel, from the high school to 5th Street is either an earthen or rock-lined open, trapezoidal channel. Pedestrian and/or multi-use paths are a significant component to this design concept. The multi-use path proposed along this channel will provide a critical link between the pedestrian circulation on 5th Street to the high school and north to Highway 50. Road crossings are expected. A box culvert or multiple circular or squash pipes may be used depending on the grade of the road and vertical clearance. The flow will not be trapped behind the road crossing but will be allowed to flow under the road in the culvert. Figure 8 shows the preliminary cross sections for the Saliman Road Channel.

FIGURE 8: SALIMAN ROAD CHANNEL CONCEPTUAL CROSS SECTION



IV. EROSION AND SEDIMENT CONTROL

Storm drainage improvements shall incorporate water quality and erosion controls in accordance with the Nevada "Handbook of Best Management Practices," this division, and accepted engineering practice. Storm drainage leaving a development may not be of a quality that shall adversely affect downstream uses.

A SWPPP is required with the Grading and Drainage Plans for the on-site and off-site channel and drainage infrastructure. A SWPPP is also required with the construction of each block within the development.

The construction of this project is expected to be completed in phases. While specific development phase lines are unknown at this time, it is the intent of the Developer to construct the necessary drainage facilities for each phase and to only mass-grade a block or area has development is permitted and ready to proceed. The mass-grading and ground disturbance of large areas is in proposed or anticipated due to the derogatory impact on the natural and built environments of leaving large areas of disturbed land open and disturbed. Land disturbance will be limited to those areas necessary for immediate development.

Compliance with Division 13, Erosion and Sediment Control will be required for all phases of this development.

V. CONCLUSIONS

- All design and construction work shall be in compliance with Carson City Title 18 Division 13 Erosion / Sediment Control and 14 Storm Drainage policies and technical criteria.
- Storm drainage improvements shall incorporate water quality and erosion controls in accordance with the Nevada "Handbook of Best Management Practices," this division, and accepted engineering practice. Storm drainage leaving a development may not be of a quality that shall adversely affect downstream uses. (Division 14.1.5)
- Drainage improvements consist of curb and gutter, inlets and storm drains, culverts, bridges, swales, ditches, channels, detention areas, and other drainage facilities required to convey design storm runoff to the point of discharge. Drainage improvements are further defined as on-site (private) facilities that serve a specific development and are privately owned and maintained or off-site (public) facilities. Public and private drainage facilities shall be constructed in accordance with the requirements of this division. (Division 14.1.6)
- Floodplain management shall provide the guidance, conditions, and restrictions for development in floodplain areas while protecting the public's health, safety, welfare, and property from danger and damage. Development within the Federal Emergency Management Agency (FEMA) designated floodplains shall comply with CCMC, and requirements of the National Flood Insurance Program (NFIP). (Division 14.1.7)
- Easements shall be provided where necessary for access and maintenance of the storm drain system.
- Based on the floodplain analysis, it is recommended that a LOMR be pursued for removal of the floodway based on the existing topography. The LOMR would remove much of the Lompa Ranch from the burden of delineated floodway both upstream and downstream of the Highway 395. A CLOMR will then be pursued based on the design recommendations and conveyance infrastructure.
- A Technical Drainage Study in accordance with Division 14.9 shall be completed with or prior to the Drainage and Grading Improvement Plans for the drainage infrastructure.

APPENDIX 2

Traffic Impact Study for Lompa Ranch North

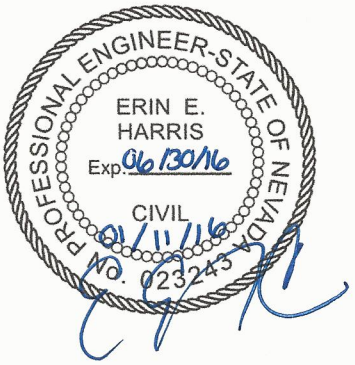
TRAFFIC IMPACT STUDY
FOR
LOMPA RANCH DEVELOPMENT

In association with a Specific Plan Amendment Application, Master Plan Amendment Application and Rezoning Application.

Prepared for:
Blackstone Development Group
333 N. Wilmot Road, Suite 340
Tucson, AZ 85711
(520) 618-5378

Prepared by:
STAR Consulting
439 W. Plumb Lane
Reno, NV 89509

Prepared: December 2015
Revised: January 2016



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List of Exhibits

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STAR CONSULTING

1. Introduction and Executive Summary

This traffic impact study (TIS) supports a comprehensive plan amendment and rezoning application and identifies the transportation-related impacts of a proposed Lompa Ranch mixed-use development. The project is generally located north of 5th Street, south of William Street/US 50, east of Saliman Road and west of Airport Road in Carson City, Nevada. The project includes proposed commercial and residential land uses. The site location is shown in Exhibit 1.

Exhibit 1 Site Location

This report provides general guidance and preliminary recommendations for anticipating traffic impacts at the area intersections based on site trip estimates and at the driveway access locations. This traffic report is provided to support a rezoning submittal and should be updated once the specific land uses are developed in better detail.

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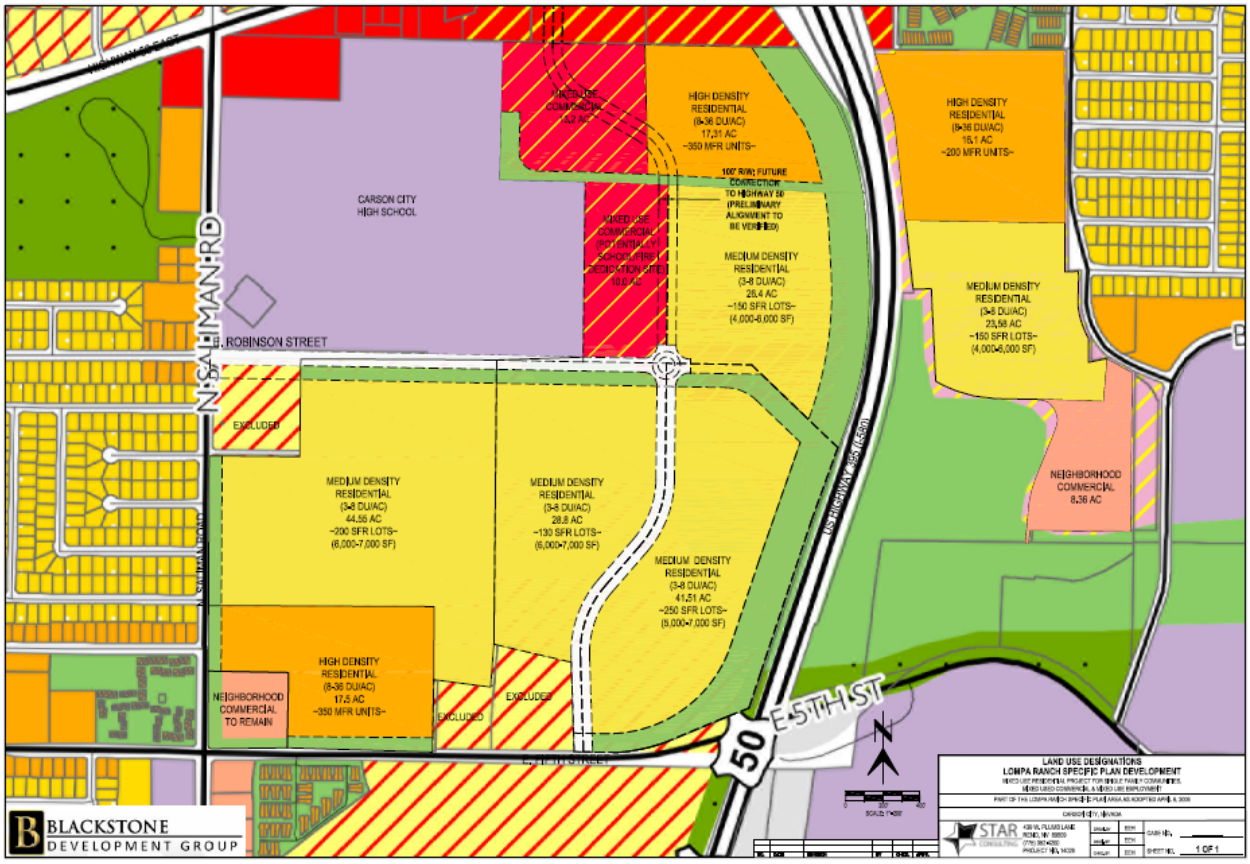
Development Description

The project is within twelve areas, or parcels comprising a total of approximately 250 acres. A conceptual plan, showing the potential location of the land use types is provided in Exhibit 2. The specific locations of access points have not yet been determined. However, for the purposes of this analysis, we have assumed that there would be driveways on Saliman Road, 5th Street, Robinson Street, and Airport Road.

Exhibit 2 Land Use Concept Plan



A preliminary land use scenario is shown in Exhibit 3. The land use designations plan identifies twelve areas either designated for medium density residential (MDR), high density residential (HDR), mixed use commercial or neighborhood commercial. The proposed residential densities are shown to range from 3 to 8 dwelling units per acre for MDR and for HDR, 8 to 36 dwelling units per acre.

The number of single family and multi-family residential units is estimated to be over 1,780. There are 310,000 square feet of commercial uses, estimated by applying a floor area ratio (FAR) of 0.20 to the acreage of the parcels designated "mixed use commercial" and "neighborhood commercial".

The current zoning is A (Agricultural). The developer is submitting a rezoning application for a Specific Plan authorizing the proposed land uses. Following Carson City's approval of the Specific Plan, the project is tentatively expected to be built out by 2035, although it will likely be developed in phases. The project developer has indicated that the area bordered by Robinson Street to the north, the new "spine road" to the east, 5th Street to the south and Saliman Road to the west may be constructed as Phase 1 by the year 2020. The remainder of the project is expected to be built out by 2035.

Exhibit 3 Land Use Scenario

Parcel	Acreage	Land Use	DU/Acre or FAR		Estimated Units (DU or KSF)
			Low Range	High Range	
A	**13.2**	Mixed Use Commercial	0.20	0.20	115
B	**17.31**	High Density Residential	8	36	350
C	**4.1**	Neighborhood Commercial to Remain	0.20	0.20	36
D	**44.55**	Medium Density Residential	3	8	200
E	**17.5**	High Density Residential	8	36	350
F	**10**	Mixed Use Commercial	0.20	0.20	87
G	**26.4**	Medium Density Residential	3	8	150
H	**41.51**	Medium Density Residential	3	8	250
I	**28.8**	Medium Density Residential	3	8	130
J	**16.1**	High Density Residential	8	36	200
K	**21.1**	Medium Density Residential	3	8	150
L	**8.3**	Neighborhood Commercial	0.20	0.20	72
	248.87	**Commercial KSF**			**310**
		Residential Units			**1,780**

For Phase 1, the project is the project generates approximately 7,000 daily one-way trips, with about 460 trips during the AM peak hour and 680 during the PM peak hour.

For the build out phase (year 2035), the project generates approximately 27,600 daily one-way trips, with about 1,400 trips during the AM peak hour and 2,600 during the PM peak hour.

This TIS, along with other documents supporting the project's rezoning application is subject to approval by Carson City. This study has been prepared in accordance with the Carson City's Code of Ordinances section on the *Preparation of Traffic Impact Studies*. The project is a large scale development expected to generate over 1,000 trips during the peak hour.

Study Objectives

The specific study objectives are:

- Evaluate existing intersections near the project site including:
  - Saliman Road/William Street (Signalized)
  - Saliman Road/Robinson Street (Unsignalized)
  - Saliman Road/5th Street (Signalized)
  - William Street/Casino Road (Signalized)
  - Airport Road/5th Street
  - Airport Road/US 50
- Evaluate the impact of the project on the streets near the project:
  - Saliman Road

  - William Street
  - Robinson Street
  - 5th Street
  - Airport Road
  - US 50
- Evaluate the effects the proposed development will have on pedestrian, bicycle and transit activity in the area.
- Provide recommendations to mitigate (if necessary) undesirable traffic conditions that the project may create.

Principal Findings

This project is located on both sides of US 395, between Saliman Road and Airport Road and 5th Street and William Street.

Assuming a preliminary land use estimate, at build out the project will generate approximately:

- 1,400 morning peak hour trips,
- 2,600 evening peak hour trips,
- 27,600 weekday trips.

Approximately ¼ of these trips will be generated during Phase 1 of the project.

Based on the projected 2020 Phase 1 total volumes which include background traffic, the project will not require the widening of adjacent roadways. There is currently enough capacity on the study area roads to accommodate the addition of Phase 1 site traffic, as described in this report.

The following recommendations are based on the estimated trip generation from the concept plan provided in Exhibit 2 at Phase 1 and at Build Out. Design and construction should not be commenced based on these recommendations. Rather, they are provided as a basis for anticipating the cost of roadway infrastructure that may be needed to maintain acceptable levels of service on the adjacent roadways and intersections. At the development plan stage, with a better defined site plan, an updated traffic impact study should be conducted.

Phase 1 General Recommendations (Year 2020)

Existing Intersection

- Saliman/Robinson – Add westbound right turn lane. Robinson Street should be extended to intersect with a new north-south "spine road" within the project area and as shown in Exhibit 2. The spine road should extend north from a new intersection with 5th Street. Both Robinson Street and the Spine Road can be constructed with one through lane in each direction. For Phase 1, the spine road does not need to extend north of the Robinson Road extension.

New Intersections

- 5th Street/Spine Road – Construct a new intersection with an eastbound left, westbound right, southbound exclusive left and right lanes and signalization (if warranted). 5th Street will need to be widened at the intersection to accommodate the turn lanes. The location of the spine road should avoid the gradient on the eastbound approach to the US 395 overpass.

Build out General Recommendations (Year 2035)

Existing Intersections

- Saliman/William – Northbound dual lefts.
- Saliman/Robinson –Add northbound right turn lane and provide southbound dual lefts. This will require the widening of the east leg of Robinson Street to accept the two left turn lanes.
- Saliman/5th – Add a northbound right turn lane, and a westbound right turn lane (which may already be warranted without the project).
- William/Gold Dust Casino – Add a northbound right turn lane and, westbound dual lefts. This will require the widening of the south leg to accept a new lane. The south leg will continue to connect with the proposed north-south spine road.
- US 50/US 395 TI – No improvements.
- US 50/Airport – Provide northbound dual left turn lanes.
- Airport/5th – Add a westbound right turn lane.
- A new three- to four-leg intersection at Robinson Street/Spine Road should be constructed to provide a north leg at this intersection. This north leg is proposed to continue to its connection with the south leg of the William Street/Casino intersection. This will require widening the existing south leg of this intersection to a standard two to three lane cross-section.
- The preferred northern intersection of the spine road is at the existing signalized intersection on William Street serving access to the Gold Dust Casino. The south leg of this intersection should be widened to accommodate a potential additional westbound to southbound left turn lane at this intersection. The spine road is anticipated to carry approximately 12,000 vehicles per day at Build Out. This volume approaches the threshold for a four-lane roadway. Further analysis and continuing discussions with the property owners south of William Road will be required.

The traffic impact study indicates where turn lane warrants may be met based on traffic volume triggers. However, at some locations, right-of-way constraints, or other physical constraints may limit the ability to construct these turn lanes.

As indicated above, the recommendations for Phase 1 and Build Out should be anticipated, but not constructed. They should be subject to an updated analysis at the development plan stage when the site plan is more refined.

Traffic signals are not preliminarily warranted at Saliman/Robinson or at the new 5th Street/Spine Road intersection. However, at the development plan stage, another signal warrant analysis should be conducted at these intersections.

A preliminary queuing analysis for the Phase 1 condition indicate that there a few existing turn lanes that should be extended to accommodate 95% queues, as calculated in the capacity analysis. However, this should be reanalyzed at the development plan stage.

Sidewalks and bike lanes exist along several of the project roadways. Sidewalks and bike lanes should be constructed along the spine road and wherever improved connectivity is required.

Adequate sight distance meeting Carson City requirements at the project intersections must be provided.

All signs and pavement markings must conform to the *MUTCD* and Carson City requirements.

2. Proposed Development

Site Location and Site Plan

The project is in Carson City. It is along both sides of US 395, between Saliman Road and Airport Road, and between US 50 and 5th Street. The existing site is generally undeveloped.

Land Use and Intensity

Land uses are conceptual at this time, but may include single family residential units, multi-family residential units and commercial and retail uses. The site is now zoned A (Agricultural) and the developer is submitting a rezoning application for Specific Plan for the entire site. The projected land uses may generate over 27,600 trips per day at build out. The conceptual land uses are listed in Exhibit 3.

Site Access

Access is proposed from the existing roadway network along Saliman Road, 5th Street, William Street and Airport Road. A new north-south internal spine road is proposed to be constructed between 5th Street to US 50, via the existing Gold Dust Casino entrance road and intersecting US 50 at the existing signalized intersection. Robinson Road is also proposed to be extended to the east to intersection with the new spine road.

Access Geometrics

Access geometrics are not defined at this time, although driveway design and driveway spacing and corner clearance will be done based on Carson City standards. The conceptual plan does not identify driveway locations, but when the plan is refined, the number of access locations on the arterials and collectors should be limited to reduce potential conflicts. The location of the access locations should also be opposite existing driveways or at sufficient distances from nearby driveways to reduce crash potential associated with closely spaced access points. For the purposes of this study, we assumed two driveways on Saliman Road, two on Robinson Street, one on 5th Street, two on Airport Road and three on the new spine road (at build out).

Development Phasing and Timing

For the purposes of this analysis, the project is projected to be built out by 2035. This year aligns with the horizon year associated with the current Regional Transportation Plan. However, it is likely that the project will be phased. For the purpose of this analysis, we have assumed that approximately 25% of the total project will be occupied by the year 2020. Carson City Department of Development Services provided travel demand model data for existing (Year 2013), year 2020 and year 2035 conditions.

3. Study Area Conditions

Study Area

The study area includes the intersections of Saliman Road/William Street, Saliman Road/Robinson Avenue, Saliman Road/5th Street, William Street/US 50, William Street/Gold Dust Casino, US 50/Airport Road, 5th Street/Airport Road. These intersections are adjacent to the project site. The analysis also includes a planning level capacity analysis of the segments of Saliman Road, 5th Street, William Street, Airport Road and Robinson Street in the vicinity of the project site. Aerial photos provided by the Carson City GIS map are in Exhibit 4.

Exhibit 4 Intersection Aerial Photos

Saliman-5th Intersection

Saliman-Robinson Intersection

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Saliman-William Intersection

William-Gold Dust Casino Intersection

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US 395-US 395 Traffic Interchange

US 50-Airport Road

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5th Street-Airport Road

Land Use

Existing Land Use

The project site is a working ranch with a residential building north of 5th Street and west of US 395. Most of the remaining project area is vacant.

Carson City High School is located on the northeast corner of the Saliman Road/Robinson Street intersection. High school buses are currently parked along the east side of the high school within the project area. The Gold Dust Casino and commercial and retail shops are north of the project area. There are residential areas east, west, and north of the project area. Another section of Lompa Ranch is south of 5th Street and is not part of this project.

Site Accessibility

Access is proposed from the existing roadway network along Saliman Road, 5th Street, William Street, Robinson Street and Airport Road.

4. Analysis of Existing Conditions

Physical Characteristics

Roadway Characteristics

Exhibit 5 is an inventory of the physical features and recorded volumes of the project area roadways.

Saliman Road is a north/south minor arterial with a posted speed limit of 35 mph. Between William Street and 5th Street, It has a five-lane cross-section with two though lanes in each direction and a two-way left turn lane. In the vicinity of the project, it has bike lanes and sidewalks on each side.

William Street is an urban east/west minor arterial with a posted speed limit of 40 mph. East of Saliman Street, It has a five-lane cross-section with two though lanes in each direction and a two-way left turn lane. As it approaches US 395, prior to the Gold Dust Casino, it transitions to a six-lane road with a raised median, and continues with this cross section to the east side of US 395. In the vicinity of the project, it has bike lanes on each side. On the east side of US 395 it becomes US Highway 50.

Robinson Street is a two-lane local road on both sides of Saliman Road. On the west side, it provides access to a residential area and has a posted speed limit of 25 mph. On the east side of Saliman Road, it is the primary access to Carson High School, and has a posted speed limit of 15 mph. It extends east into the Lompa Ranch area and terminates approximately 2,000 feet from Saliman Road.

US 50 continues from William Street as an urban east/west principal arterial with a posted speed limit of 40 mph. It has a six-lane cross-section with a raised median for about 900 feet from its interchange with US 395. It then transitions to a five-lane cross section with a two-way left turn lane. In the vicinity of the project, it has bike lanes on each side.

Airport Road is a residential collector near US 50 with a speed limit of 25 mph. It has 2 lanes with sidewalks. It serves retail and commercial services near US 50 and continues through a residential neighborhood to Butti Way. South of Butti Way to its intersection with 5th Street, the speed limit is 35 mph. It provides access to Carson City municipal services in the vicinity of Butti Lane.

5th Street is a two-lane east-west collector that runs along the south border of the project area. It has a speed limit of 40 mph and has bike lanes and sidewalks.

Transit Service

Jump Around Carson (JAC) is the public transit system in Carson City. Routes 2A and 2B (North Town, Clockwise and Counterclockwise West/East Carson Area) provide service on Airport Road south of US 50.

Bicycle/Pedestrian Facilities

There are several roads with striped bike lanes in the vicinity of the project, including Saliman Road, William Street, US 50 and 5th Street. Saliman Road, Airport Road, 5th Street and Robinson Street all have sidewalks on all or part of their segments.

Traffic Control Devices

The study area intersections of Saliman Road/William Street, Saliman Road/5th Street, William Street/Casino, William Street/US 50/US 395 are signal controlled. Saliman Road/Robinson Street and 5th Street/Airport Road are stop sign controlled intersections.

Exhibit 5 Roadway Inventory – Existing Conditions

Roadway Segment	Lanes	Recorded ADT	LOS D Threshold	Speed Limit	Bike Route	JAC Bus Route	Sidewalks
Saliman Road: 5th Street to William Street	5	6,100	29,160	35	Yes	No	Yes
William Street: Saliman Road to US 395	5	22,500	35,820	40	Yes	No	No
US 50: US 395 to Airport Road	5	26,500	39,800	40	Yes	No	No
Airport Road: US 50 to Butti Way	2	4,600	14,800	25	No	Yes	Yes
Airport Road: Butti Way to 5th Street	2	2,500	11,840	35	No	No	No
5th Street: Saliman Road to Airport road	2	5,900	17,700	40	Yes	No	Yes
Robinson Street: East of Saliman Road	2	<2,000	11,840	15	No	No	Yes
Robinson Street: West of Saliman Road	2	<2,000	11,840	25	No	No	Yes

ADTs from *State of Nevada Department of Transportation*
Annual Average Daily Traffic Count Stations
LOS D Thresholds from *Florida Department of Transportation Generalized Annual Average Daily Volumes for Florida's Urbanized Areas*

Traffic Volumes

The State of Nevada Department of Transportation publishes annual average daily traffic (ADT) counts on their website. Year 2014 counts for roadway segments in the vicinity of the project area are shown in Exhibit 5, Roadway Inventory. The ADTs on all roads are well below their Level of Service D capacity thresholds. Segment performance has been estimated using the planning methods contained in the Florida Department of Transportation Level of Service Handbook[1]. Segment performance is often overshadowed when intersection performance when signals are closely spaced.

Carson City staff provided am and pm peak hour traffic demand model counts for the study area signalized intersections. Peak hour turning movement counts were collected at the intersections of Saliman Road/Robinson Street, William Street/Casino Road and 5th Street/Airport Road the week of November 30th.

Peak hour traffic data are shown in Exhibit 6.

Level of Service

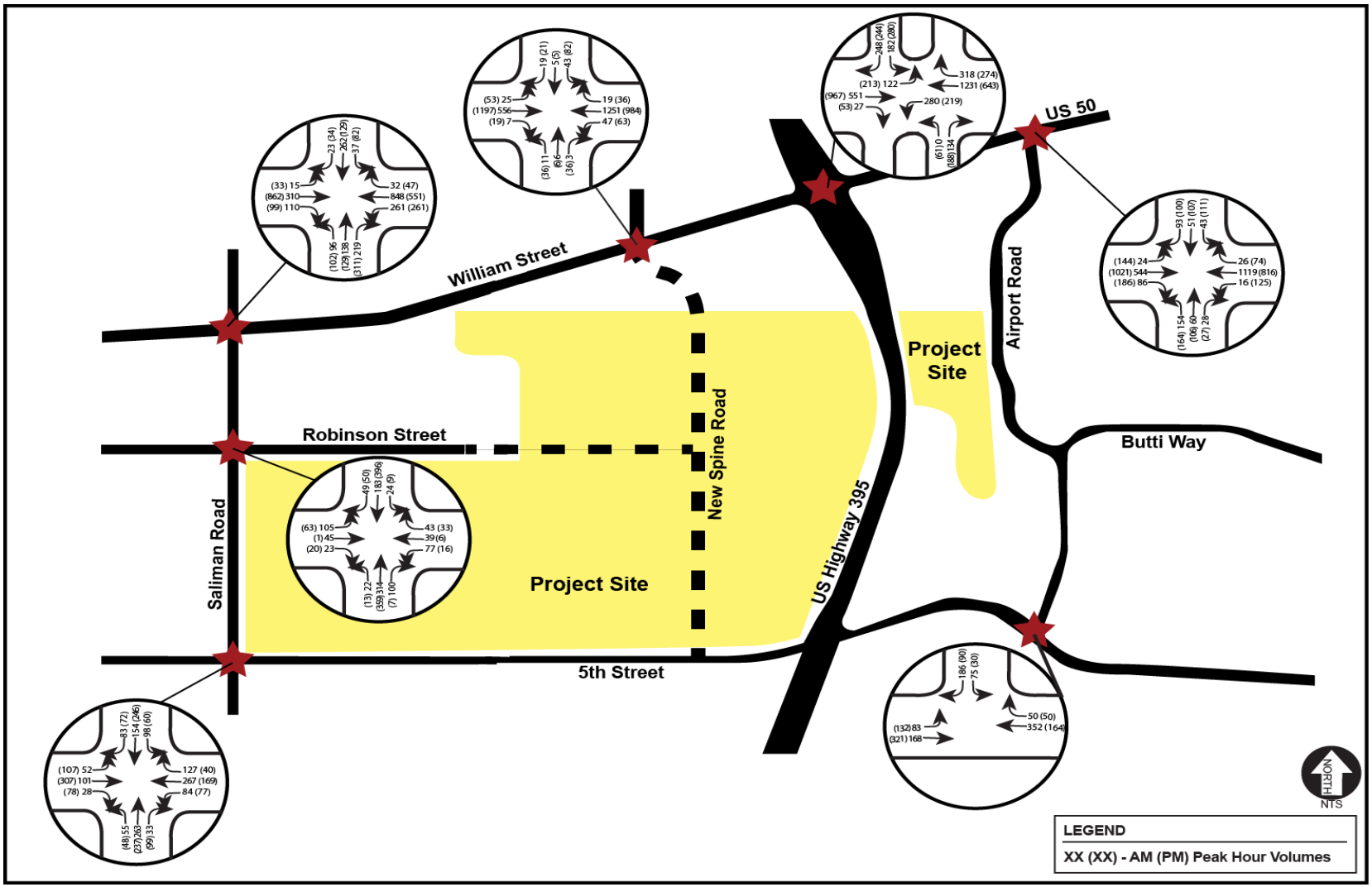
Level of service is a qualitative description of how well a roadway or intersection operates under prevailing traffic conditions based on traffic volumes, capacity and intersection delay. A grading system of A through F, similar to academic grades, is utilized. LOS A is free-flowing traffic, whereas LOS F is forced flow and extreme congestion. LOS D is generally accepted as the standard in urbanized areas although LOS E is sometimes accepted in more congested areas.

Roadway Performance

Exhibit 5, Roadway Inventory, provides a summary of ADT, current roadway capacity, and whether the segments operate under or over the LOS D capacity for the roadway.

[1] Florida Department of Transportation Generalized Annual Average Daily Volumes for Urbanized areas contained in *Quality / Level of Service Handbook, 2012*

Exhibit 6 Existing Peak Hour Volumes



Sources: Carson City, Traffic Works

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Intersection Performance

Under existing conditions, all intersections in the study area operate at LOS D with all lane movements operating at LOS D or better during the morning and afternoon/evening peak hours. The results are shown in Exhibit 7.

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Exhibit 7 Intersections Performance (Existing Conditions)

Saliman Road/William Street	**Existing 2015**			
	AM		**PM**	
	Delay (sec/veh)	**LOS**	**Delay (sec/veh)**	**LOS**
Eastbound William Street				
Left	28.9	C	29.6	C
Through	15.1	B	18.6	B
Right	13.8	B	12.3	B
Approach	*15.2*	*B*	*18.4*	*B*
Westbound William Street				
Left	28.3	C	38.1	D
Through	14.8	B	11.5	B
Right	10.0	B	9.6	A
Approach	*17.8*	*B*	*19.5*	*B*
Northbound Saliman Road				
Left	12.8	B	15.8	B
Through	12.5	B	15.4	B
Right	12.1	B	16.1	B
Approach	*12.4*	*B*	*15.9*	*B*
Southbound Saliman Road				
Left	18.4	B	23.4	C
Through/Right	19.6	B	21.5	C
Approach	*19.5*	*B*	*22.1*	*C*
Intersection	***16.5***	***B***	***18.6***	***B***

Saliman Road/Robinson Street	**Existing 2015**			
	AM		**PM**	
	Delay (sec/veh)	**LOS**	**Delay (sec/veh)**	**LOS**
Eastbound Robinson Street				
Left	21.2	C	14.0	B
Through/Right	16	C	10	B
Approach	*19.1*	*C*	*13*	*B*
Westbound Robinson Street				
Left	21.9	C	12.4	B
Through/Right	14.4	B	10.4	B
Approach	*18.1*	*C*	*11*	*B*
Northbound Saliman Road				
Left	7.8	A	8.4	A
Southbound Saliman Road				
Left	8.3	A	8.1	A

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Exhibit 7 (cont.) Intersections Performance (Existing Conditions)

Saliman Road/5th Street	**Existing 2015**			
	AM		**PM**	
	Delay (sec/veh)	**LOS**	**Delay (sec/veh)**	**LOS**
Eastbound 5th Street				
Left	6.3	A	6.6	A
Through/Right	5.9	A	6.3	A
Approach	*6.0*	*A*	*6.4*	*A*
Westbound 5th Street				
Left	6.3	A	6.5	A
Through/Right	8.3	A	6.6	A
Approach	*7.9*	*A*	*6.5*	*A*
Northbound Saliman Road				
Left	7.9	A	6.9	A
Through/Right	8	A	7.1	A
Approach	*8*	*A*	*7.1*	*A*
Southbound Saliman Road				
Left	8.7	A	7.1	A
Through/Right	7.8	A	7.1	A
Approach	*8*	*A*	*7.1*	*A*
Intersection	***7.7***	***A***	***6.8***	***A***

William Street/Casino Road	**Existing 2015**			
	AM		**PM**	
	Delay (sec/veh)	**LOS**	**Delay (sec/veh)**	**LOS**
Eastbound William Street				
Left	17.1	B	15.5	B
Through/Right	14.8	B	17.9	B
Approach	*14.9*	*B*	*17.8*	*B*
Westbound William Street				
Left	11.1	B	17.6	B
Through/Right	22.1	C	15.6	B
Approach	*21.7*	*C*	*15.7*	*B*
Northbound Casino Road				
Left	12.3	B	11.7	B
Through/Right	12.2	B	11.3	B
Approach	*12.3*	*B*	*11.5*	*B*
Southbound Casino Road				
Left	13.0	B	11.6	B
Through/Right	12.3	B	11.2	B
Approach	*12.7*	*B*	*11.4*	*B*
Intersection	***19.3***	***B***	***16.6***	***B***

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Exhibit 7 (cont.) Intersections Performance (Existing Conditions)

US 50/Airport Road	Existing 2015			
	AM		PM	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Eastbound US 50				
Left	30.6	C	41.6	D
Through	12.5	B	15.9	B
Right	10.6	B	10.7	B
Approach	*12.9*	*B*	*17.9*	*B*
Westbound US 50				
Left	39.1	D	39	D
Through	23.5	C	19.5	B
Right	11.1	B	13.5	B
Approach	*23.5*	*C*	*19.6*	*B*
Northbound Airport Road				
Left	15.6	B	20.7	C
Through/Right	19	B	23.7	C
Approach	*16.8*	*B*	*22*	*C*
Southbound Airport Road				
Left	19.9	B	21.2	C
Through	22.1	C	24.4	C
Right	21.5	C	22.5	C
Approach	*21.3*	*C*	*22.7*	*C*
Intersection	***19.5***	***B***	***19.4***	***B***

US 50/US 395	Existing 2015			
	AM		PM	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Eastbound US 50				
Left	17.3	B	21.4	C
Through	7.4	A	9.7	A
Approach	*9.6*	*A*	*12.6*	*B*
Westbound US 50				
Left	18.7	B	15.3	B
Through	7.3	A	8.6	A
Approach	*9.9*	*A*	*10.1*	*B*
Northbound US 395				
Left	18.8	B	15.9	B
Approach	*18.8*	*B*	*15.9*	*B*
Southbound US 395				
Left	0.0	A	13.6	B
Approach	*0*	*A*	*13.6*	*B*
Intersection	***10.6***	***B***	***12.0***	***B***

5th Street/Airport Road	Existing 2015			
	AM		PM	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Eastbound 5th Street				
Left	8.5	A	8.0	B
Southbound Airport Road				
Left	19.0	C	18.5	C
Right	13.2	B	9.9	A
Approach	*14.9*	*B*	*12.1*	*B*

5. Projected Traffic

Site Traffic Forecasting

Trip Generation

The future traffic from the project is estimated using the trip rates contained in the Institute of Traffic Engineers' *Trip Generation Handbook,* 9th Edition. The number of trips generated is the mathematical product of land use intensity (building square footage, number of dwelling units, etc.) and the trip generation rate. The result is the total number of one-way trips (not round trips) expected to be generated by the project. These trips represent the number of vehicles estimated to enter and leave the project.

The densities of the land uses are conceptual at this time, but the trip generation for conservative numbers of homes, apartments and commercial areas was estimated.

We applied average trip rates from the *Trip Generation Handbook* to estimate trip generation for the residential (single family dwelling units for the MDR and apartments for the HDR) and commercial (shopping center) uses. Exhibit 8 shows the trip rates and estimated trip generation. Based on the average trip rates for the project land uses, and an estimate of the residential lots and units by the developer, the project generates approximately 7,000 daily trips, 460 AM peak hour trips and 680 PM peak hour trips in Phase 1. At build out, the project is estimated to generate 27,600 daily one-way trips, 1,400 AM peak hour trips and 2,6,00 PM peak hour trips.

The *Trip Generation Handbook* also provides guidance on pass-by and diverted trip percentages for several land uses. The *Trip Generation Handbook* includes pm peak hour pass-by rates for the land use, Shopping Center. However due to the conceptual nature of the land uses, we did not consider these reductions.

Trip Distribution and Assignment

Trip distribution and assignment is somewhat premature given the conceptual level of the project. The completion of the southern section of US 395 will also change traffic patterns in the project vicinity. However, an estimated distribution of site trips is illustrated in Exhibit 9. Site trips would be distributed to the adjacent roads and beyond, including US Highway 395.

The number of site trips added to the adjacent and nearby roadway system would be dependent on the densities of the residential and commercial parcels. These would be further refined at the development plan stage.

We assigned the daily site traffic as shown in Exhibits 10 (Phase 1) and Exhibit 11 (Phase 2). The site trips at the project driveways and the off-site intersections are shown in Exhibits 12 and 13 for Phase 1 only. We did not assign peak hour trips at build out because it would be premature to do so at this time. This should be done at the development plan stage.

Exhibit 8 Trip Rates and Trip Generation

Trip Generation Rates

Parcel	Proposed Use	Unit	No.Units	ITE Categ.	Weekday AM In	Weekday AM Out	Weekday PM In	Weekday PM Out	Avg Weekday In	Avg Weekday Out
A	Shopping Center - North (13.2 Acres at 0.20 FAR)	1000 SF	115	820	0.96		3.71		42.7	
					62%	38%	48%	52%	50%	50%
B	Apartments- North (17.31 Acres)	DU	350	220	0.51		0.62		6.65	
					20%	80%	65%	35%	50%	50%
C	**Shopping Center - South (4.1 Acres at 0.20 FAR)**	**1000 SF**	**35.72**	**820**	**0.96**		**3.71**		**42.7**	
					62%	**38%**	**48%**	**52%**	**50%**	**50%**
D	**Residential - Single Family Dwelling (44.55 Acres)**	**DU**	**200**	**210**	**0.75**		**1.00**		**9.52**	
					25%	**75%**	**63%**	**37%**	**50%**	**50%**
E	**Apartments- North (17.5 Acres)**	**DU**	**350**	**220**	**0.51**		**0.62**		**6.65**	
					20%	**80%**	**65%**	**35%**	**50%**	**50%**
F	Shopping Center - South (10.0 Acres at 0.20 FAR)	1000 SF	87.12	820	0.96		3.71		42.7	
					62%	38%	48%	52%	50%	50%
G	Residential - Single Family Dwelling (26.4 Acres)	DU	150	210	0.75		1.00		9.52	
					25%	75%	63%	37%	50%	50%
H	Residential - Single Family Dwelling (41.51 Acres)	DU	250	210	0.75		1.00		9.52	
					25%	75%	63%	37%	50%	50%
I	**Residential - Single Family Dwelling (28.8 Acres)**	**DU**	**130**	**210**	**0.75**		**1.00**		**9.52**	
					25%	**75%**	**63%**	**37%**	**50%**	**50%**
J	Apartments- South (16.1 Acres)	DU	200	220	0.51		0.62		6.65	
					20%	80%	65%	35%	50%	50%
K	Residential - Single Family Dwelling (21.1 Acres)	DU	150	210	0.75		1.00		9.52	
					25%	75%	63%	37%	50%	50%
L	Shopping Center - South (8.3 Acres at 0.20 FAR)	1000 SF	72.31	820	0.96		3.71		42.7	
					62%	38%	48%	52%	50%	50%

Trip Generation

Parcel	Proposed Use	Unit	No. Units	Weekday AM In	Weekday AM Out	Weekday PM In	Weekday PM Out	Avg Weekday In	Avg Weekday Out
A	Shopping Center - North (13.2 Acres at 0.20 FAR)	1000 SF	115	110		427		4,910	
				68	42	205	222	2,455	2,455
B	Apartments- North (17.31 Acres)	DU	350	179		217		2,328	
				36	143	141	76	1,164	1,164
C	***Shopping Center - South (4.1 Acres at 0.20 FAR)***	***1000 SF***	***35.72***	***34***		***133***		***1,525***	
				21	***13***	***64***	***69***	***763***	***763***
D	***Residential - Single Family Dwelling (44.55 Acres)***	***DU***	***200***	***150***		***200***		***1,904***	
				38	***113***	***126***	***74***	***952***	***952***
E	***Apartments- North (17.5 Acres)***	***DU***	***350***	***179***		***217***		***2,328***	
				36	***143***	***141***	***76***	***1,164***	***1,164***
F	Shopping Center - South (10.0 Acres at 0.20 FAR)	1000 SF	87.12	84		323		3,720	
				52	32	155	168	1,860	1,860
G	Residential - Single Family Dwelling (26.4 Acres)	DU	150	113		150		1,428	
				28	84	95	56	714	714
H	Residential - Single Family Dwelling (41.51 Acres)	DU	250	188		250		2,380	
				47	141	158	93	1,190	1,190
I	***Residential - Single Family Dwelling (28.8 Acres)***	***DU***	***130***	***98***		***130***		***1,238***	
				24	***73***	***82***	***48***	***619***	***619***
J	Apartments- South (16.1 Acres)	DU	200	102		124		1,330	
				20	82	81	43	665	665
K	Residential - Single Family Dwelling (21.1 Acres)	DU	150	113		150		1,428	
				28	84	95	56	714	714
L	Shopping Center - South (8.3 Acres at 0.20 FAR)	1000 SF	72.31	69		268		3,088	
				43	26	129	139	1,544	1,544
	Totals - Phase 1 Only			***460***		***680***		***6,994***	
				119	***341***	***413***	***267***	***3,497***	***3,497***
	Totals - Build Out			1,417		2,589		27,606	
				441	975	1,469	1,119	13,803	13,803

Note: Phase 1 trips shown in ***Bold Italic***. DU = Dwelling Unit; FAR = Floor Area Ratio

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Exhibit 9 Site Traffic Distribution Percentages

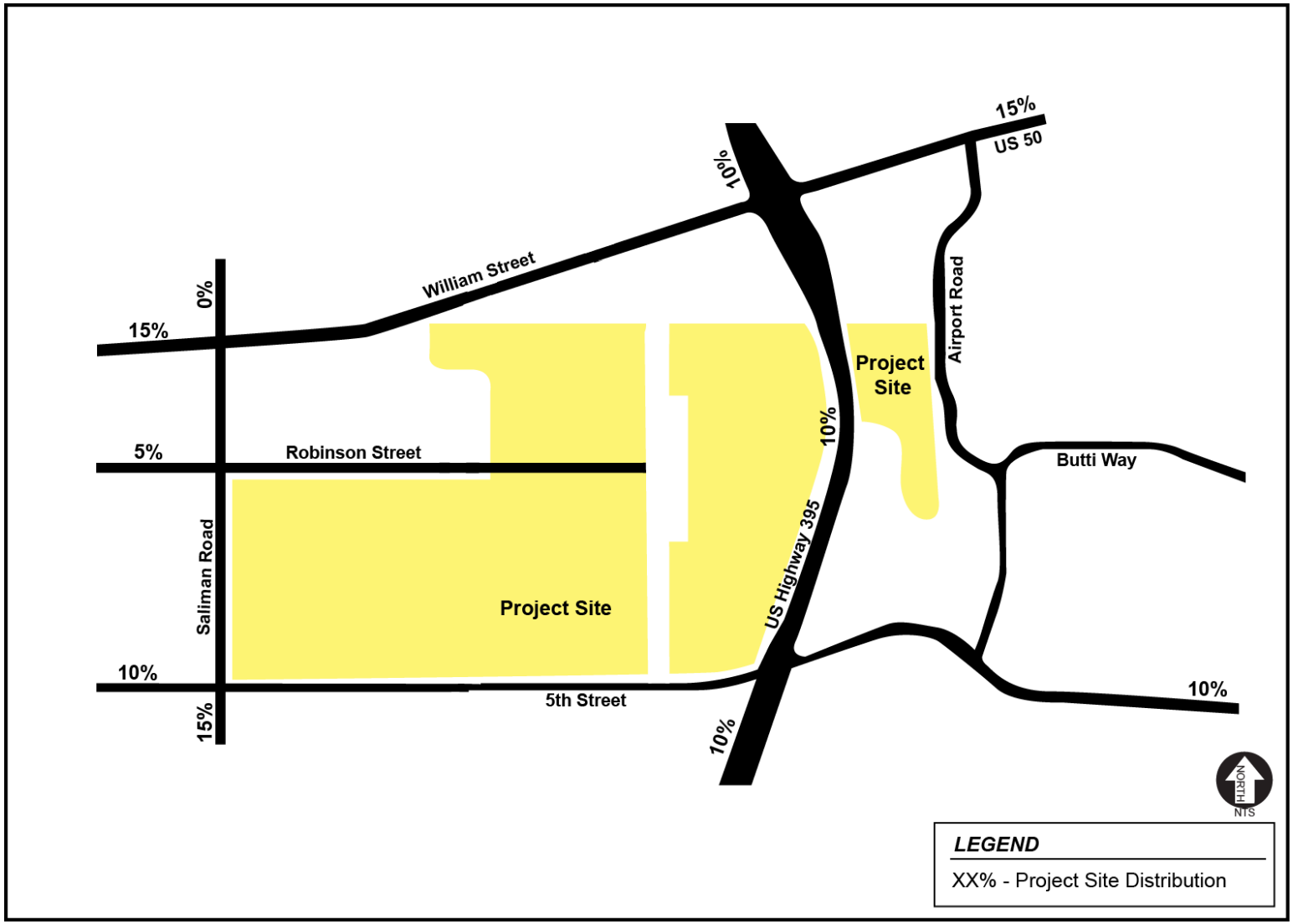

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Exhibit 10 Site Traffic Distribution – Phase 1 ADTs

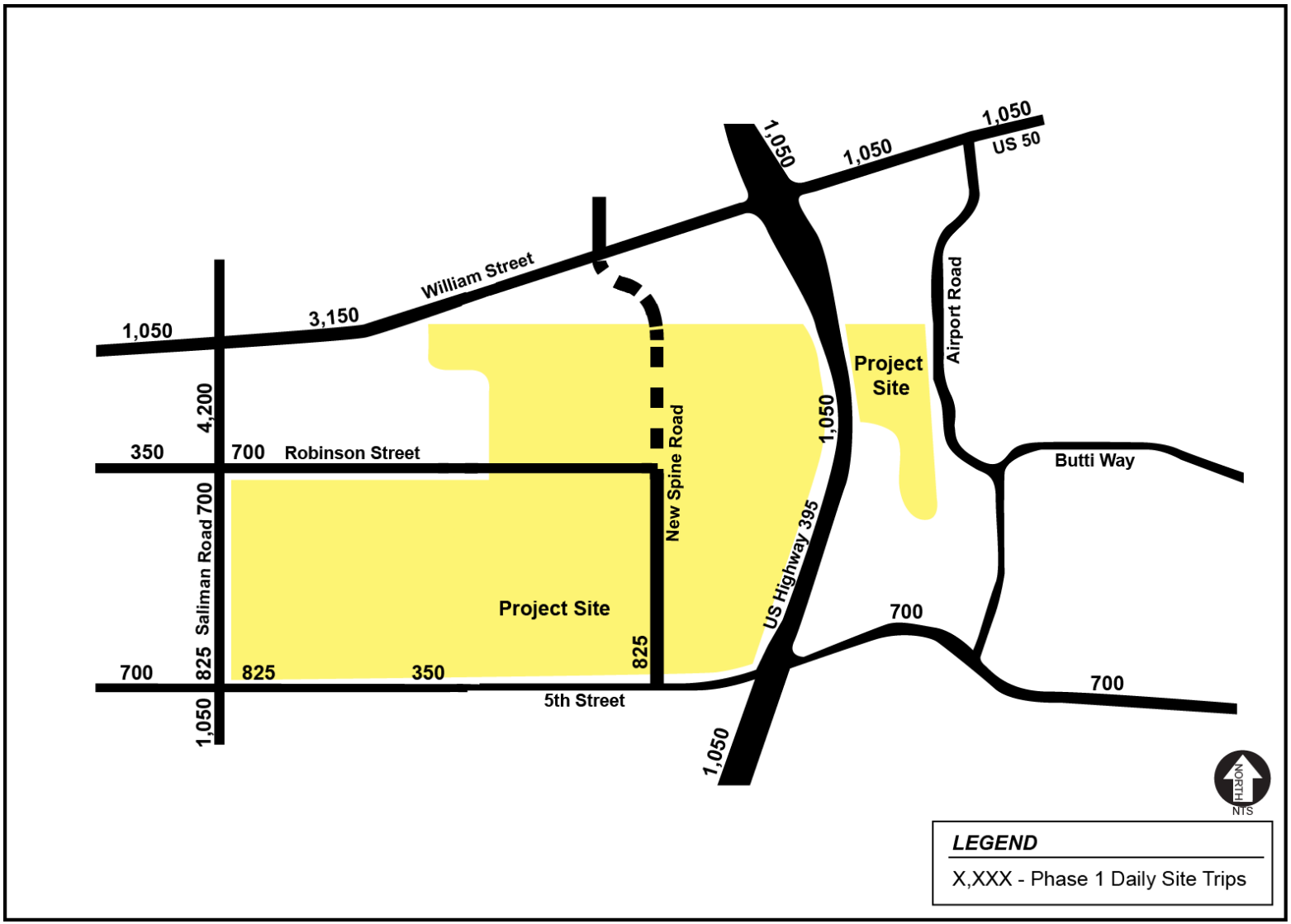

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Exhibit 11 Site Traffic Distribution – Build out ADTs

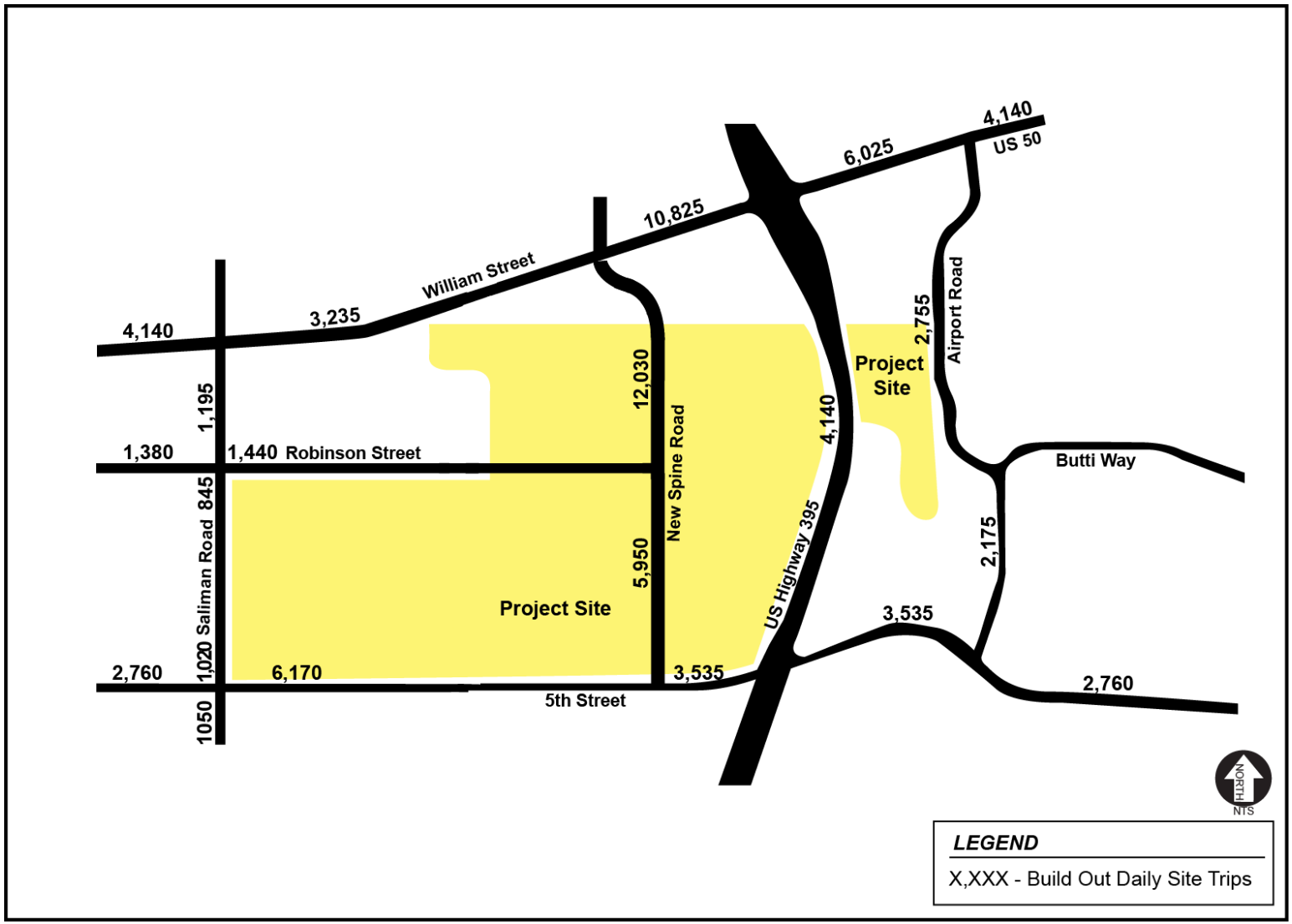

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Exhibit 12 Site Trips – Project Intersections (Phase 1)

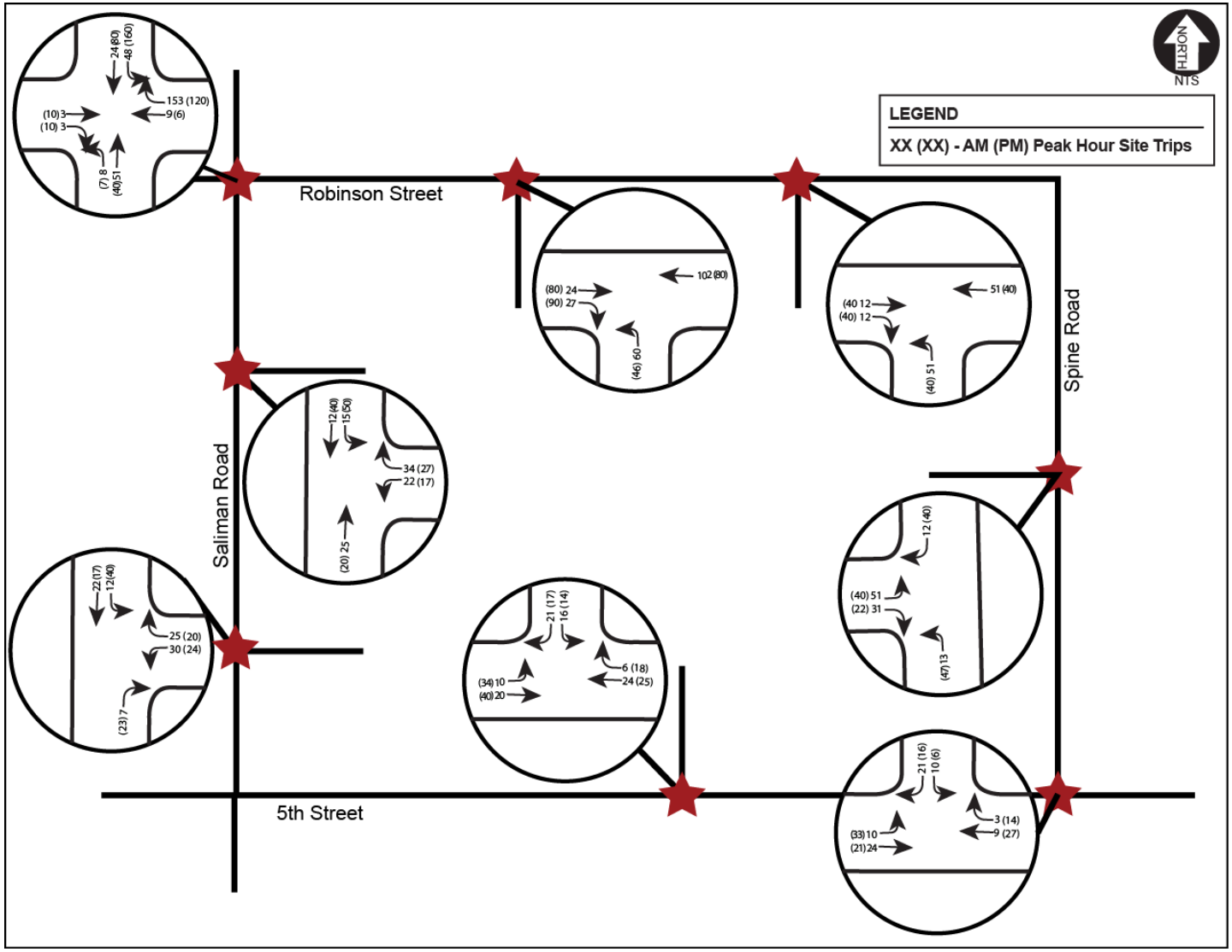

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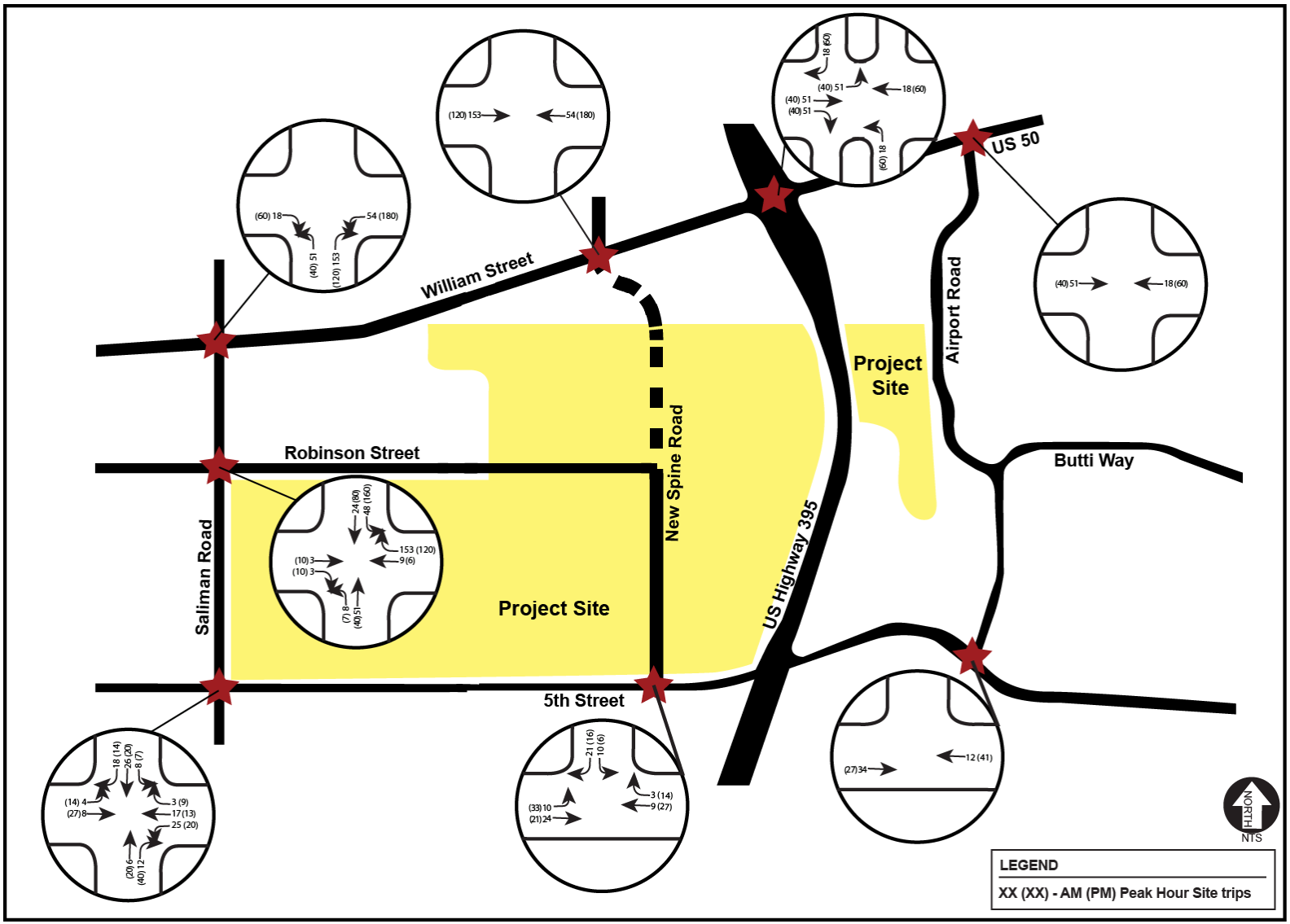
Exhibit 13 Site Trips – Project Off-Site Intersections (Phase 1)



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Non-Site Traffic Forecasting

Projections of Non-Site Traffic

The Carson Area Metropolitan Planning Organization's (CAMPO) travel demand model projects traffic volumes on city streets and intersections for the horizon years of 2020 and 2035. This model did not include the number of residential and commercial units proposed for this Lompa Ranch project, although a moderate increase in residential, and non-residential units was included in the year 2020 and year 2035 forecasts.

The demographic data estimates for the CAMPO model include a modest growth of about 45 new single family households and 31 new multi-family residential units in the Lompa Ranch study area by the year 2020[2]. A total of 120 and 83 new single-family and multi-family units are projected in the CAMPO model within the project study area by the year 2035. The CAMPO model includes two-thousand (2,000) new square feet of retail development, and a total of 5,000 new square feet of retail development by the year 2035.

Comparatively for this project, the conservative estimate of residential units, both single family and apartments, is almost 1,800. The projected commercial use in the project area is approximately 310,000 square feet. For the purposes of this report, we have reported the 2020 travel demand model volumes at the project intersections assuming that the modest growth would still occur for these years in the absence of this project. Exhibit 14 shows the future turning movement intersection counts under the no-project condition for the Phase 1 year 2020.

Total Traffic

Site traffic volumes associated with the Lompa Ranch Development were added to the background traffic. Because the proportion of residential and commercial units is small in the CAMPO model within the project area to the proposed number of units for this project, we did not subtract the CAMPO model residential and commercial units from the projected residential and non-residential units.

The resulting total peak hour turning volumes at the project intersections are illustrated in Exhibit 15.

[2] The area includes the CAMPO RTP transportation analysis zones (TAZ) 67, 138, 139, 140 and 141.

Exhibit 14 2020 Peak Hour Intersection Volumes – Without Project

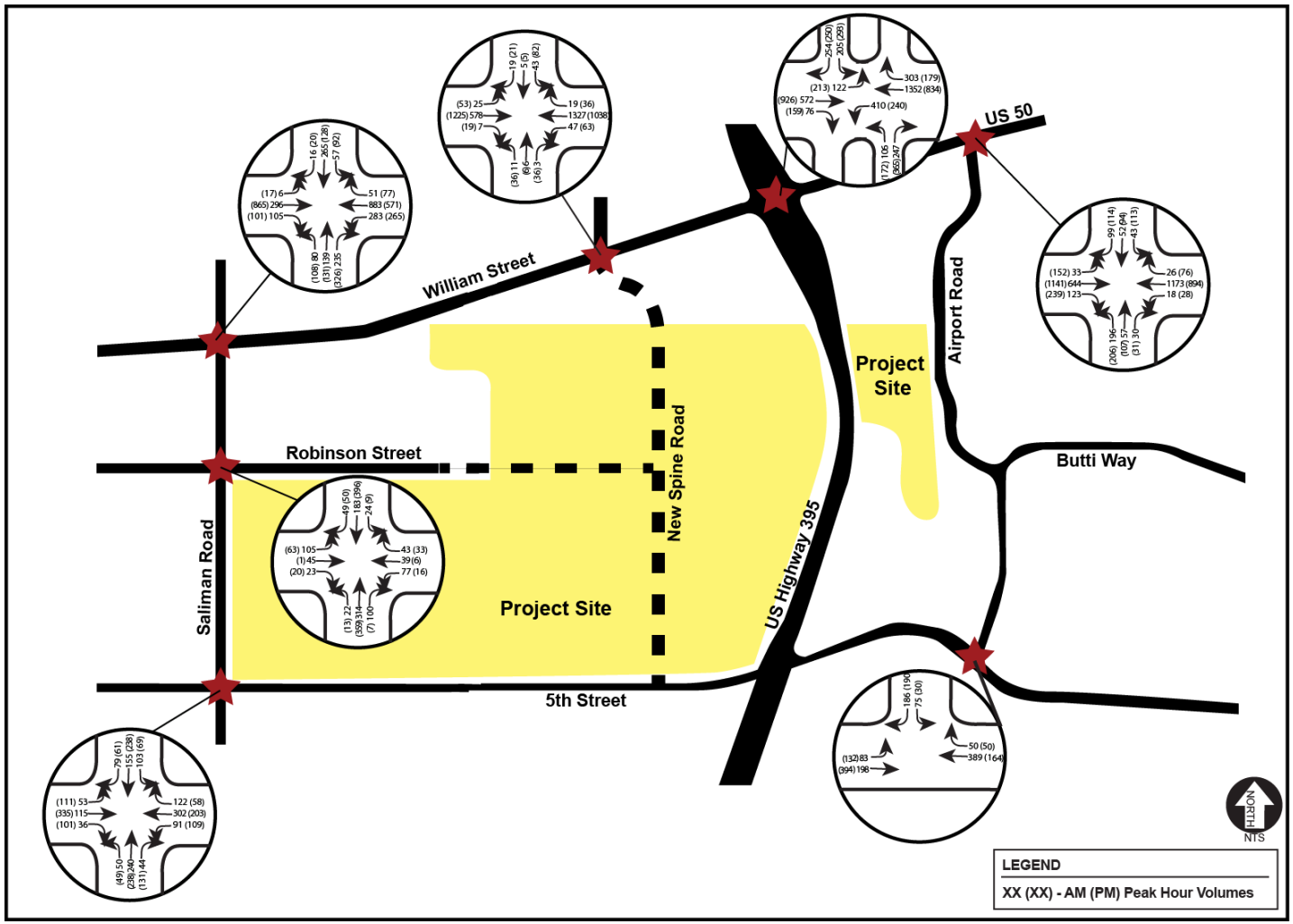

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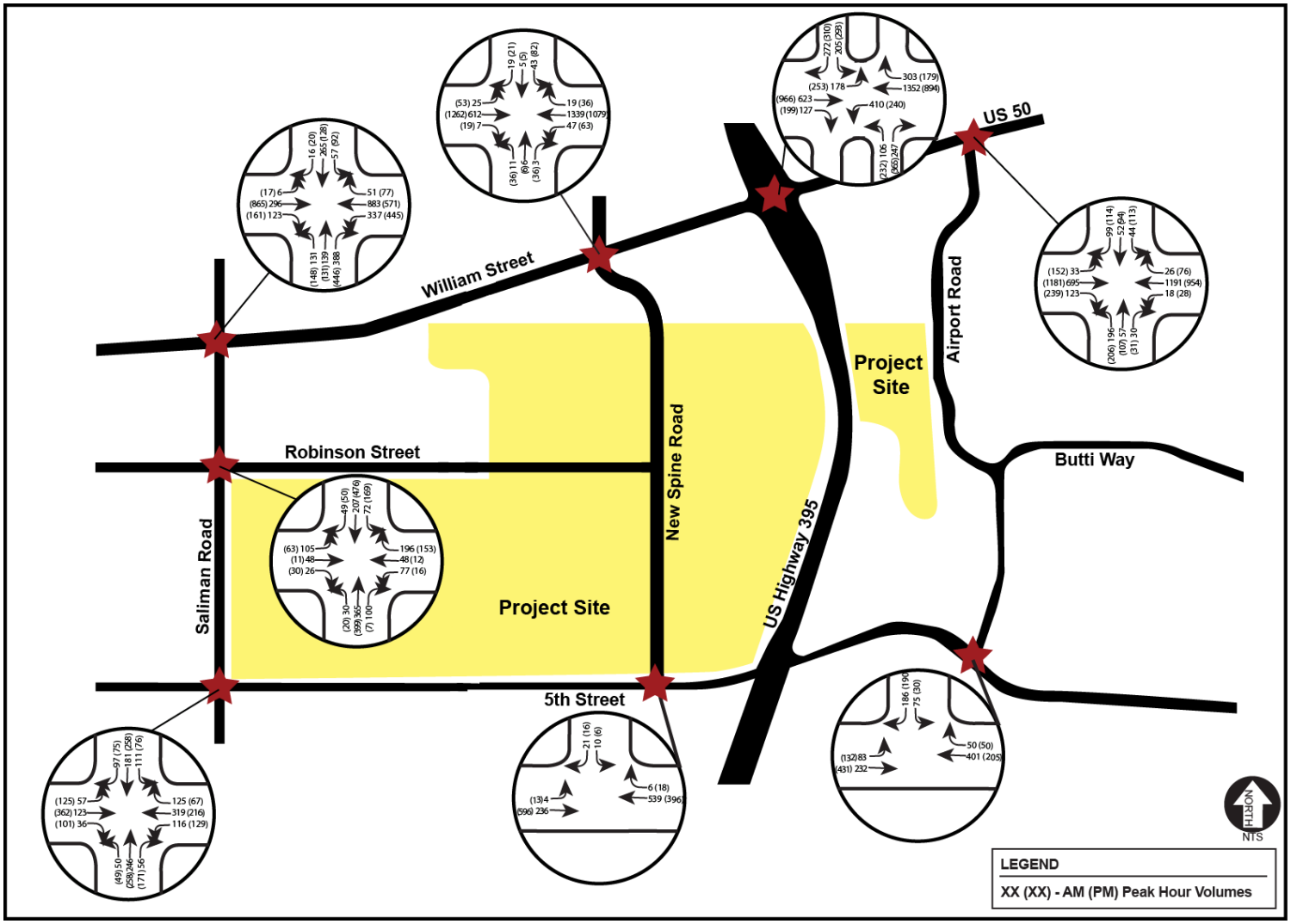
Exhibit 15 2020 With Project Peak Hour Volumes



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6. Traffic and Improvement Analysis

Level of Service Analysis

Roadway Performance

Exhibit 16 summarizes the new ADT and daily volume capacity (LOS D) of the roadway segment with and without the project in 2020 and 2035. The year 2020 with project volumes include the addition of Phase 1 site trips. The year 2035 With Project volumes include the site trips at build out. The build out daily site trips were distributed to the adjacent roadways, and assumes that the spine road is fully constructed between William Street and 5th Street. As such, the segment with the highest site trip volume is William Street east of the spine road.

The table show that all roads, with the exception of US 50, will operate at LOS D or better based on the FDOT LOS D thresholds. The west section of US 50 from US 395 to Airport Road is a six lane road that transitions to a four-lane road about halfway to Airport Road. The four-lane section is expected to exceed the LOS D threshold (35,820 vehicles per day) for a four-lane roadway by the year 2020 even without the project.

Exhibit 16 Future Roadway Volumes and Capacity

Roadway Segment	LOS D Threshold	*2020 Site Trips*	*2035 Site Trips*	2020 ADT (No Project)	2020 ADT (With Project)	2035 ADT (No Project)	2035 ADT (With Project)
Saliman Road: 5th Street to William Street	29,160	*4200*	*1200*	8,000	12,200	9,400	10,600
William Street: Saliman Road to 1000' east of Saliman	35,820	*3150*	*3235*	24,400	27,550	26,200	29,435
William Street: 1000' feet east of Saliman Road to US 395	53,910	*3150*	*10825*	24,400	27,550	26,200	37,025
US 50: US 395 to 900' east of US 395	53,910	*1050*	*6025*	36,300	37,350	39,200	45,225
US 50: 900' east of US 395 to Airport Road	35,820	*1050*	*6025*	**36,300**	**37,350**	**39,200**	**45,225**
Airport Road: US 50 to Butti Way	14,800	*0*	*2725*	8,200	8,200	8,400	11,125
Airport Road: Butti Way to 5th Street	11,840	*0*	*2175*	2,100	2,100	2,300	4,475
5th Street: Saliman Road to Airport Road	17,700	*825*	*6170*	5,500	6,325	6,500	12,670
Robinson Street: East of Saliman Road	11,840	*350*	*1380*	100	450	200	1,580
Robinson Street: West of Saliman Road	11,840	*700*	*1440*	2,200	2,900	2,600	4,040

ADTs from *State of Nevada Department of Transportation Annual Average Daily Traffic Count Stations*
LOS D Thresholds from *Florida Department of Transportation (FDOT) Generalized Annual Average Daily Volumes for Florida's Urbanized Areas*

Intersection Performance

For the year 2020, we analyzed the project intersections with and without project trips. For the "without project" scenario, we included the available traffic volumes from the CAMPO travel demand model. For the intersections for which there are no modeled volumes, (Saliman Road/Robinson Street, William Street/Gold Dust Casino and 5th Street/Airport Road), we reviewed both existing data at the intersections and the 2020 model volumes at the nearby intersections to estimate the turning movement volumes.

The results for the peak hour intersection analysis are provided in Exhibit 17. Although we assigned site traffic to a number of potential driveway locations on Robinson, Saliman, 5th Street and Airport Road, we did not analyze conditions at the project driveways since the number and location of the driveways are not yet defined.

As shown in the summary tables all intersections will operate at LOS D or better with the Phase 1 project traffic added through 2020.

Because the year 2035 site traffic projections for the study area intersections would be speculative at best, we did not conduct a similar intersection analysis for this horizon year.

Exhibit 17 Intersections Performance – Year 2020

Saliman Road/William Street	**2020 No Project**				**2020 With Project**			
	AM		**PM**		**AM**		**PM**	
	Delay (sec/veh)	**LOS**	**Delay (sec/veh)**	**LOS**	**Delay (sec/veh)**	**LOS**	**Delay (sec/veh)**	**LOS**
Eastbound William Street								
Left	25.8	C	33.3	C	26.5	C	43.8	D
Through	14.3	B	18.3	B	15.5	B	23.4	C
Right	13.1	B	12.3	B	14.3	B	16.1	B
Approach	*14.2*	*B*	*18*	*B*	*15.3*	*B*	*22.6*	*C*
Westbound William Street								
Left	32	C	42.2	D	34.7	C	36.8	D
Through	14.6	B	11.0	B	15.3	B	10.5	B
Right	9.7	A	9.2	A	10.1	B	8.8	A
Approach	*18.5*	*B*	*19.9*	*B*	*20.2*	*C*	*21.1*	*C*
Northbound Saliman Road								
Left	12.8	B	16.3	1.3	13.7	B	22.7	C
Through	12.6	B	15.8	15.8	12.7	B	20.8	C
Right	12.2	B	16.7	B	12.9	B	24.7	C
Approach	*12.4*	*B*	*16.4*	*B*	*13.0*	*B*	*23.6*	*C*
Southbound Saliman Road								
Left	18.2	B	24.3	B	19.2	B	31.1	C
Through/Right	18.7	B	21.8	B	19.8	B	27.9	C
Approach	*18.6*	*B*	*22.8*	*B*	*19.7*	*B*	*29.1*	*C*
Intersection	***16.6***	***B***	***18.7***	***C***	***17.6***	***B***	***22.8***	***C***

Saliman Road/Robinson Street	**2020 No Project**				**2020 With Project**			
	AM		**PM**		**AM**		**PM**	
	Delay (sec/veh)	**LOS**	**Delay (sec/veh)**	**LOS**	**Delay (sec/veh)**	**LOS**	**Delay (sec/veh)**	**LOS**
Eastbound Robinson Street								
Left	14.0	B	14.0	B	33.9	D	35.8	E
Through/Right	12.5	B	10	B	14.4	B	13.5	B
Approach	*13.4*	*B*	*13*	*B*	*25.8*	*D*	*26.9*	*D*
Westbound Robinson Street								
Left	13.9	B	12.4	B	16.6	C	19.3	C
Through/Right	11.9	B	10.4	B	14.5	B	12.3	B
Approach	*12.9*	*A*	*11*	*B*	*15*	*C*	*12.9*	*B*
Northbound Saliman Road								
Left	7.8	A	8.4	A	7.9	A	8.7	A
Southbound Saliman Road								
Left	8.3	A	8.1	A	8.7	A	8.9	A

Exhibit 17 (cont.) Intersections Performance – Year 2020

Saliman Road/5th Street	**2020 No Project**				**2020 With Project**			
	AM		**PM**		**AM**		**PM**	
	Delay (sec/veh)	**LOS**	**Delay (sec/veh)**	**LOS**	**Delay (sec/veh)**	**LOS**	**Delay (sec/veh)**	**LOS**
Eastbound 5th Street								
Left	6.2	A	6.7	A	6.4	A	7	A
Through/Right	5.8	A	6.5	A	5.9	A	6.7	A
Approach	*5.9*	*A*	*6.5*	*A*	*6*	*A*	*6.8*	*A*
Westbound 5th Street								
Left	6.2	A	7.1	A	6.5	A	7.7	A
Through/Right	8.6	A	6.9	A	9.1	A	7.2	A
Approach	*8.2*	*A*	*7*	*A*	*8.5*	*A*	*7.3*	*A*
Northbound Saliman Road								
Left	8.1	A	7.2	A	8.3	A	7.5	A
Through/Right	8.3	A	7.4	A	8.5	A	7.8	A
Approach	*8.3*	*A*	*7.4*	*A*	*8.4*	*A*	*7.8*	*A*
Southbound Saliman Road								
Left	9.1	A	7.6	A	9.4	A	8.1	A
Through/Right	8.1	A	7.3	A	8.3	A	7.7	A
Approach	*8.4*	*A*	*7.3*	*A*	*8.6*	*A*	*7.8*	*A*
Intersection	***7.9***	***A***	***7.0***	***A***	***8.2***	***A***	***7.4***	***A***

William Street/Casino Road	**2020 No Project**				**2020 With Project**			
	AM		**PM**		**AM**		**PM**	
	Delay (sec/veh)	**LOS**	**Delay (sec/veh)**	**LOS**	**Delay (sec/veh)**	**LOS**	**Delay (sec/veh)**	**LOS**
Eastbound William Street								
Left	18.8	B	16.0	B	18.5	B	16	B
Through/Right	13.6	B	18.2	B	13.3	B	16.4	B
Approach	*13.9*	*B*	*18.1*	*B*	*13.5*	*B*	*16.4*	*B*
Westbound William Street								
Left	9.6	A	17.9	B	10.1	B	17.9	B
Through/Right	16.3	B	16.0	B	16.3	B	14.9	B
Approach	*16.1*	*B*	*16.1*	*B*	*16.1*	*B*	*15.1*	*B*
Northbound Casino Road								
Left	12.5	B	11.7	B	12.6	B	13.5	B
Through/Right	12.4	B	11.3	B	12.5	B	13	B
Approach	*12.4*	*B*	*11.5*	*B*	*12.5*	*B*	*13.3*	*B*
Southbound Casino Road								
Left	13.1	B	12.7	B	13.2	B	14.7	B
Through/Right	12.5	B	11.2	B	12.5	B	12.9	B
Approach	*12.9*	*B*	*12.4*	*B*	*13.0*	*B*	*14.2*	*B*
Intersection	***15.3***	***B***	***16.8***	***B***	***15.2***	***B***	***15.7***	***B***

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Exhibit 17 (cont.) Intersections Performance – Year 2020

US 50/Airport Road	**2020 No Project**				**2020 With Project**			
	AM		**PM**		**AM**		**PM**	
	Delay (sec/veh)	**LOS**	**Delay (sec/veh)**	**LOS**	**Delay (sec/veh)**	**LOS**	**Delay (sec/veh)**	**LOS**
Eastbound US 50								
Left	32.2	C	42.2	D	32.2	C	42.7	D
Through	13.0	B	16.5	B	13.3	B	16.8	B
Right	10.6	B	10.9	B	10.6	B	10.8	B
Approach	*13.4*	*B*	*18.1*	*B*	*13.6*	*B*	*18.4*	*B*
Westbound US 50								
Left	41.7	D	53.3	D	41.7	D	53.5	D
Through	26.6	C	20.5	C	28.2	C	21.4	C
Right	11.1	B	13.6	B	11.1	B	13.5	B
Approach	*26.5*	*C*	*20.8*	*C*	*28.1*	*C*	*21.7*	*C*
Northbound Airport Road								
Left	17.8	B	26.8	C	17.8	B	27.5	C
Through/Right	18.6	B	25.7	C	18.6	B	26.1	C
Approach	*18,0*	*B*	*26.4*	*C*	*18.0*	*B*	*26.9*	*C*
Southbound Airport Road								
Left	19.9	B	23.3	C	19.9	B	23.6	C
Through	21.4	C	26.1	C	21.4	C	26.4	C
Right	20.8	C	24.4	C	20.8	C	24.7	C
Approach	*20.8*	*C*	*24.5*	*C*	*20.8*	*C*	*24.8*	*C*
Intersection	***20.9***	***C***	***20.5***	***C***	***21.6***	***C***	***21***	***C***

US 50/US 395	**2020 No Project**				**2020 With Project**			
	AM		**PM**		**AM**		**PM**	
	Delay (sec/veh)	**LOS**	**Delay (sec/veh)**	**LOS**	**Delay (sec/veh)**	**LOS**	**Delay (sec/veh)**	**LOS**
Eastbound US 50								
Left	18.9	B	27.0	C	19.1	B	21.5	C
Through	8.7	A	9.6	A	8.6	A	9.2	A
Approach	*11.0*	*B*	*12.9*	*B*	*10.9*	*B*	*11.8*	*B*
Westbound US 50								
Left	18.3	B	17.4	B	18.7	B	18.4	B
Through	7.1	A	7.7	A	7.1	A	8.2	A
Approach	*10.3*	*B*	*10.1*	*B*	*10.3*	*B*	*10.7*	*B*
Northbound US 395								
Left	23.3	C	19.3	B	23.6	C	22.7	C
Approach	*23.3*	*C*	*19.3*	*B*	*23.6*	*C*	*22.7*	*C*
Southbound US 395								
Left	18.1	B	16.2	B	18.2	B	18.8	B
Approach	*18.1*	*B*	*16.2*	*B*	*18.2*	*B*	*18.8*	*B*
Intersection	***11.9***	***B***	***12.9***	***B***	***12***	***B***	***13.2***	***B***

Exhibit 17 (cont.) Intersections Performance – Year 2020

5th Street/Airport Road	2020 No Project					2020 With Project			
	AM		PM			AM		PM	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Eastbound 5th Street									
Left	8.6	A	8.0	A		8.7	B	8.1	A
Southbound Airport Road									
Left	21.1	C	20.3	C		22.6	C	22.5	C
Right	13.8	B	9.9	A		14	B	10.2	B
Approach	*15.9*	*C*	*12.5*	*B*		*16.5*	*C*	*13.3*	*B*

5th Street/Spine Road	2020 No Project					2020 With Project			
	AM		PM			AM		PM	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Eastbound 5th Street									
Left	N/A		N/A			8.7	A	8.3	A
Southbound Airport Road									
Left	N/A		N/A			17.3	C	21.4	C
Right	N/A		N/A			12.4	B	11.0	B
Approach	*N/A*		*N/A*			*14.0*	*B*	*14.0*	*B*

Traffic Safety

Sight Distance

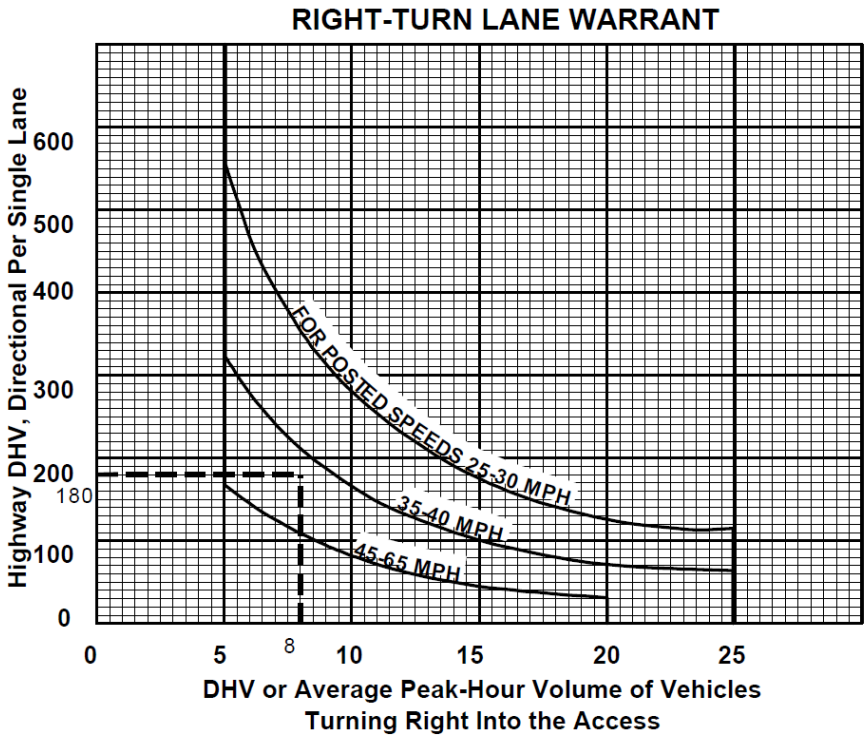
All project driveways and intersections should be designed to allow for acceptable sight distance. Sight distance is typically shown on the development plan and improvement drawings.

Turn Lane Analysis

A turn lane "warrant" is a justification for constructing a turn lane, based on traffic volumes at an intersection. Turn lanes are warranted based on these criteria when the peak hour turn lane volume exceeds a trigger based on the two-way daily volume (ADT, or Average Daily Traffic as indicated in the table) on the roadway. Carson City does not have a turn lane warrant policy or standard.

There are many examples of turn lane warrants. The Idaho Department of Transportation Traffic Manual provides examples and guidelines for turn lane warrants. Exhibits 18 and 19 show the warrant graph for right and left turn lane warrants. Exhibit 18 illustrates how a condition where there are eight right turns on a road with 180 vehicles per lane would warrant a right turn lane if the posted speed limit was 45 mph or higher, but would not be warranted if the posted speed limit was 40 mph or lower. Exhibit 19 shows a similar example for a left turn lane warrant.

Exhibit 18 Right Turn Lane Warrant Criteria



Source: Idaho DOT

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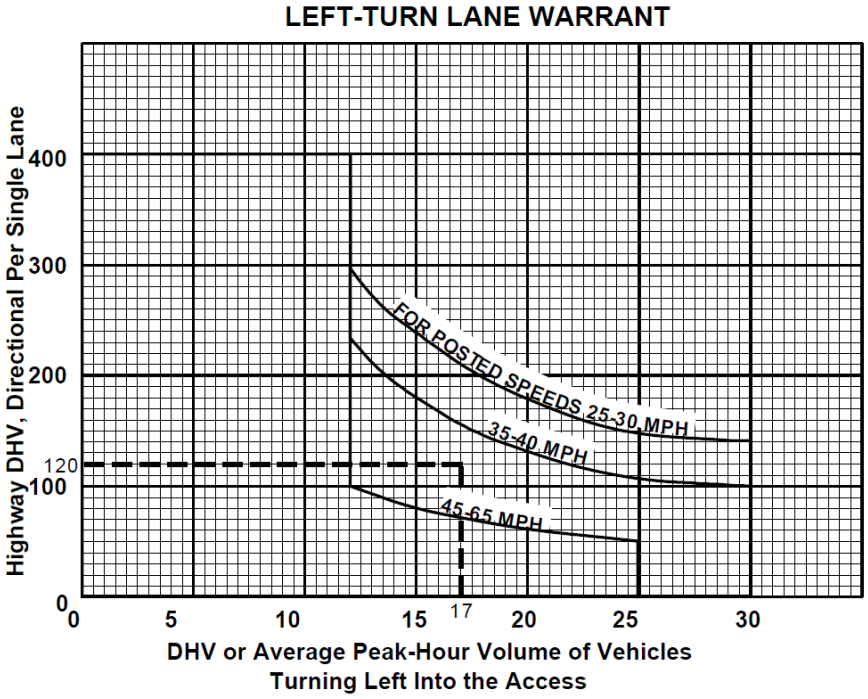
Exhibit 19 Left Turn Lane Warrant Criteria



Source: Idaho DOT

These examples indicate that a conservative (small) number of turns may warrant the provision of a turn lane. If applied in Carson City, there are several locations where a turn lane would be warranted today, where there is no turn lane, based on existing modeled volumes. For example, the southbound PM peak hour right turn volume at the Saliman/William intersection is 34 vehicles per hour. This exceeds the warrant threshold for a right turn lane by four vehicles per hour. However, the City should carefully consider the application of these or any warrants as there are other factors that may not justify the provision of a turn lane, at a particular time.

Nevertheless, the impact of the project on the City's roadway system should require the provision of turn lanes at certain intersections. Turn lanes should be considered at the following intersections at Phase 1 and at Build Out:

Year 2020 – Phase 1
Existing Intersection
Saliman/Robinson – Westbound Right

New Intersections
5th Street/Spine Road – Eastbound left, Westbound Right, Southbound Exclusive Left and Right Lanes

Robinson Street should be extended to intersect with a new north-south "spine road" within the project area and as shown in Exhibit 2. The spine road should extend north from a new intersection with 5th

Street. Both the Robinson Street extension and the Spine Road can be constructed with one through lane in each direction.

Year 2035 – Build Out

Existing Intersections

Saliman/William – NB Dual Lefts

Saliman/Robinson – WB Right Turn Lane, NB Right Turn Lane, SB Dual Lefts

Saliman/5th – NB Right Turn Lane (a WB right turn lane may already be warranted).

William/Gold Dust Casino – NB Right Turn Lane, WB Dual Lefts (requiring the widening of the south leg to accept a new lane)

US 50/US 395 TI – No improvements

US 50/Airport – NB Dual Lefts

Airport/5th – WB Right Turn Lane

The traffic impact study indicates where turn lane warrants may be met based on traffic volume triggers. However, at some locations, right-of-way constraints, or other physical constraints may limit the ability to construct these turn lanes.

A new three- to four-leg intersection at Robinson Street/Spine Road will be constructed to provide a north leg at this intersection. This north leg is proposed to continue to its connection with the south leg of the William Street/Casino intersection. This will require widening the existing south leg of this intersection to a standard two to three lane cross-section.

Pedestrian, Bicycle, and Transit Considerations

The project must consider the connectivity of existing and future roads and paths. Carson City's *Complete Streets Policy* provides guidance associated with project design and planning for multi-modal roads.

As indicated in the *Complete Streets Policy*,

> "Projects should be implemented so as to establish connectivity within the existing street network. Developing connections to existing pedestrian and bicycle facilities where ever possible is encouraged, and will improve the overall safety and accessibility to those that are dependent on those modes. Complete Streets concepts need to be applied to private developments as well in an effort to eliminate "islands" with no connection to the outside network. The private sector must be held to City standards and to the essence of Complete Streets concepts for proposed developments to ensure that the intent of this policy carries through approved site plans and the entire development process."

While most surrounding streets have sidewalks and/or bike paths, the design of the internal streets, such as the extension of Robinson Street and the proposed north/south spine road should include these facilities and related amenities to encourage non-motor vehicle use within the development. The provision of open space, parks and other recreational areas in Lompa Ranch would also encourage pedestrian and bicycle activity in the area.

Discussions should be held with JAC transit services to determine whether transit in the development should be provided.

Speed Considerations

The City must determine the posted speed for Robinson Street if it is extended to the east, as well as the Spine Road.

Other Considerations

Signal Spacing

The recommended minimum signal spacing is ¼ mile. This can be accommodated on Saliman Street if a signal is found to be warranted at Saliman Street/Robinson Street. The location of the spine road connection on 5th Street should also be at least ¼ mile from Saliman Road.

Corner and Driveway Clearances

Driveways should be located either across from existing streets or with at least 150 feet of offset. Driveways on collectors and arterials should also be located outside of the functional area of intersection turn lanes (beyond the storage length and taper).

Queuing Analysis

Storage lengths should be extended if existing or projected traffic volumes at intersections queue beyond the calculated 95th percentile queue length, so that queuing vehicles do not back up and encroach into other lanes.

The Synchro software estimates queue lengths for all intersection turning movements. Exhibit 20 shows the existing storage lengths for turn lanes at the project area off-site intersections and indicates whether the calculated 95th percentile queue lengths exceed the physical storage lengths of the turn lanes. The analysis was done for the year 2020 "With Project" conditions. These estimates should not be used for design purposes. A reassessment of the queue lengths should be conducted at the development plan stage.

Exhibit 20 Turn Lane Storage and Queue Lengths

Saliman/William			95% Queue Length 2020 With Project	
	Speed Limit	Existing Storage (ft)	AM	PM
Eastbound				
Left	40	210	6	14
Right		125	21	31
Westbound				
Left	40	175	150	198
Right		95	0	7
Northbound				
Left	45	155	69	99
Right		155	48	159
Southbound				
Left	45	160	47	84

Saliman/5th			95% Queue Length 2020 With Project	
	Speed Limit	Existing Storage (ft)	AM	PM
Eastbound				
Left	40	135	28	49
Westbound				
Left	40	100	47	55
Northbound				
Left	35	160	25	25
Southbound				
Left	35	160	50	37

US 50/Airport			95% Queue Length 2020 With Project	
	Speed Limit	Existing Storage (ft)	AM	PM
Eastbound				
Left	40	100	36	163
Right		100	25	77
Westbound				
Left	40	240	25	37
Right		145	0	5
Northbound				
Left	25	70	43	126
Southbound				
Left	25	190	35	73
Right		150	21	28

William/Casino			95% Queue Length 2020 With Project	
	Speed Limit	Existing Storage (ft)	AM	PM
Eastbound				
Left	40	180	13	23
Westbound				
Left	40	120	21	26
Northbound				
Left	n/a	50	13	29
Southbound				
Left	n/a	70	32	54

Traffic Control Needs

A preliminary traffic signal warrant analysis was conducted for the intersections of Saliman Road/Robinson Road and 5th Street/Spine Road. This analysis applies the Oregon DOT Preliminary Traffic Signal Warrant analysis[3] procedures. The highest volumes are projected to be during the pm peak hour. We applied a peak hour "K" factor of 0.09 for the peak hour in the calculation of the ADT from the future peak hour volumes to estimate the target ADT for the analysis.

As indicated in Exhibits 21 and 22, signalization may not be warranted at both intersections. However, these analyses should be updated at the development plan stage.

It should be noted that at the Saliman Road/Robinson Road, the existing weekday peak hour may occur between 2 and 3 pm because Carson High School classes end at 2:05. However, site traffic volumes associated with the Lompa Ranch project may change the peak hour at this location. It should be noted that the signal warrant analysis conducted was preliminary, and a full warrant analysis should be conducted as recommended by the Manual of Uniform Traffic Control Devices at the Development Plan stage. This analysis will require traffic data for the eight highest hours of the day at the intersection (which would likely include the school peak hour). There are other warrants, such as Peak Hour Warrant (Warrant #3), Pedestrian Volume Warrant (Warrant #4), and School Crossing Warrant (Warrant #5) that should be considered.

[3] This analysis is based on MUTCD signal warrant methods. It is conducted to screen potential intersections for a more rigorous signal warrant study, based on daily traffic volumes.

Exhibit 21 Preliminary Signal Warrant Analysis – Saliman/Robinson

Oregon Department of Transportation
Transportation Development Branch
Transportation Planning Analysis Unit

Preliminary Traffic Signal Warrant Analysis[1]

Major Street: Saliman Road	**Minor Street:** Robinson Street
Project: Lompa Ranch	**City/County:** Carson City
Year: 2020 -Peak Hour	**Alternative:** 2020 With Project

Preliminary Signal Warrant Volumes

Number of Approach lanes		ADT on major street approaching from both directions		ADT on minor street, highest approaching volume	
Major Street	Minor Street	Percent of standard warrants 100	70	Percent of standard warrants 100	70
Case A: Minimum Vehicular Traffic					
1	1	8850	6200	2650	1850
2 or more	1	10600	7400	2650	1850
2 or more	2 or more	10600	7400	3550	2500
1	2 or more	8850	6200	3550	2500
Case B: Interruption of Continuous Traffic					
1	1	13300	9300	1350	950
2 or more	1	15900	11100	1350	950
2 or more	2 or more	15900	11100	1750	1250
1	2 or more	13300	9300	1750	1250
X	100 percent of standard warrants				
	70 percent of standard warrants[2]				

Preliminary Signal Warrant Calculation

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	10600	13489	N
	Minor	1	2650	311	
Case B	Major	2	15900	13489	N
	Minor	1	1350	311	
Analyst and Date: ME-Eng 11-9-2015			Reviewer and Date:		

[1] Meeting preliminary signal warrants does **not** guarantee that a signal will be installed.

[2] Used due to 85th percentile speed in excess of 40 mph or isolated community with population of less than 10,000.

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STAR CONSULTING

Exhibit 22 Preliminary Signal Warrant Analysis 5th/Spine Road

Oregon Department of Transportation
Transportation Development Branch
Transportation Planning Analysis Unit

Preliminary Traffic Signal Warrant Analysis[1]

Major Street: 5th Ave	**Minor Street:** Spine Road
Project: Lompa Ranch	**City/County:** Carson City
Year: 2020 -Peak Hour	**Alternative:** 2020 With Project

Preliminary Signal Warrant Volumes

Number of Approach lanes		ADT on major street approaching from both directions		ADT on minor street, highest approaching volume	
Major Street	Minor Street	Percent of standard warrants 100	70	Percent of standard warrants 100	70
Case A: Minimum Vehicular Traffic					
1	1	8850	6200	2650	1850
2 or more	1	10600	7400	2650	1850
2 or more	2 or more	10600	7400	3550	2500
1	2 or more	8850	6200	3550	2500
Case B: Interruption of Continuous Traffic					
1	1	13300	9300	1350	950
2 or more	1	15900	11100	1350	950
2 or more	2 or more	15900	11100	1750	1250
1	2 or more	13300	9300	1750	1250
X	100 percent of standard warrants				
	70 percent of standard warrants[2]				

Preliminary Signal Warrant Calculation

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	10600	11367	N
	Minor	1	2650	67	
Case B	Major	2	15900	11367	N
	Minor	1	1350	67	

Analyst and Date: ME-Eng 11-9-2015 Reviewer and Date:

[1] Meeting preliminary signal warrants does **not** guarantee that a signal will be installed.

[2] Used due to 85th percentile speed in excess of 40 mph or isolated community with population of less than 10,000.

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7. Conclusions and Recommendations

1. This project is located on both sides of US 395, between Saliman Road and Airport Road and 5th Street and William Street.
2. Assuming a preliminary land use estimate, at build out the project will generate approximately:
   - 1,400 morning peak hour trips,
   - 2,600 evening peak hour trips,
   - 27,600 weekday trips.

   Approximately ¼ of these trips will be generated during Phase 1 of the project.
3. Based on the projected 2020 Phase 1 total volumes which include background traffic, the project will not require the widening of adjacent roadways. There is currently enough capacity on the study area roads to accommodate the addition of Phase 1 site traffic, as described in this report.
4. The following recommendations are based on the estimated trip generation from the concept plan provided in Exhibit 2 at Phase 1 and at Build Out. Design and construction should not be commenced based on these recommendations. Rather, they are provided as a basis for anticipating the cost of roadway infrastructure that may be needed to maintain acceptable levels of service on the adjacent roadways and intersections. At the development plan stage, with a better defined site plan, an updated traffic impact study should be conducted.

Phase 1 General Recommendations (Year 2020)

Existing Intersection

- Saliman/Robinson – Add westbound right turn lane. Robinson Street should be extended to intersect with a new north-south "spine road" within the project area and as shown in Exhibit 2. The spine road should extend north from a new intersection with 5th Street. Both Robinson Street and the Spine Road can be constructed with one through lane in each direction. For Phase 1, the spine road does not need to extend north of the Robinson Road extension.

New Intersections

- 5th Street/Spine Road – Construct a new intersection with an eastbound left, westbound right, southbound exclusive left and right lanes and signalization (if warranted). 5th Street will need to be widened at the intersection to accommodate the turn lanes. The location of the spine road should avoid the gradient on the eastbound approach to the US 395 overpass.

Build out General Recommendations (Year 2035)

Existing Intersections

- Saliman/William – Northbound dual lefts.
- Saliman/Robinson –Add northbound right turn lane and provide southbound dual lefts. This will require the widening of the east leg of Robinson Street to accept the two left turn lanes.
- Saliman/5th – Add a northbound right turn lane, and a westbound right turn lane (which may already be warranted without the project).

- William/Gold Dust Casino – Add a northbound right turn lane and, westbound dual lefts. This will require the widening of the south leg to accept a new lane. The south leg will continue to connect with the proposed north-south spine road.
- US 50/US 395 TI – No improvements.
- US 50/Airport – Provide northbound dual left turn lanes.
- Airport/5th – Add a westbound right turn lane.
- A new three- to four-leg intersection at Robinson Street/Spine Road should be constructed to provide a north leg at this intersection. This north leg is proposed to continue to its connection with the south leg of the William Street/Casino intersection. This will require widening the existing south leg of this intersection to a standard two to three lane cross-section.

  The traffic impact study indicates where turn lane warrants may be met based on traffic volume triggers. However, at some locations, right-of-way constraints, or other physical constraints may limit the ability to construct these turn lanes.

5. The preferred northern intersection of the spine road is at the existing signalized intersection on William Street serving access to the Gold Dust Casino. The south leg of this intersection should be widened to accommodate a potential additional westbound to southbound left turn lane at this intersection. The spine road is anticipated to carry approximately 12,000 vehicles per day at Build Out. This volume approaches the threshold for a four-lane roadway. Further analysis and continuing discussions with the property owners south of William Road will be required.
6. Traffic signals are not preliminarily warranted at Saliman/Robinson or at the new 5th Street/Spine Road intersection. However, at the development plan stage, another signal warrant analysis following full MUTCD signal warranting procedures should be conducted at these intersections.
7. A preliminary queuing analysis for the Phase 1 condition indicate that there a few existing turn lanes that should be extended to accommodate 95% queues, as calculated in the capacity analysis. However, this should be reanalyzed at the development plan stage.
8. Sidewalks and bike lanes exist along several of the project roadways. Sidewalks and bike lanes should be constructed along the spine road and wherever improved connectivity is required.
9. Adequate sight distance meeting Carson City requirements at the project intersections must be provided.
10. All signs and pavement markings must conform to the *MUTCD* and Carson City requirements.

APPENDIX

- Traffic Data
- Synchro Analysis Sheets

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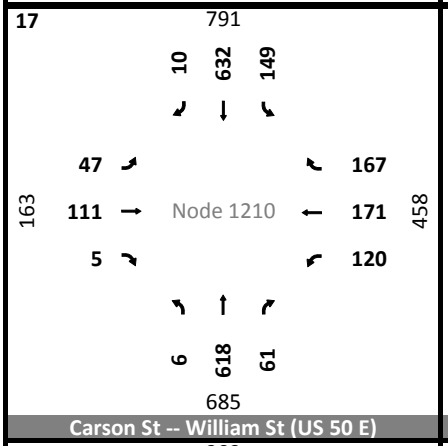	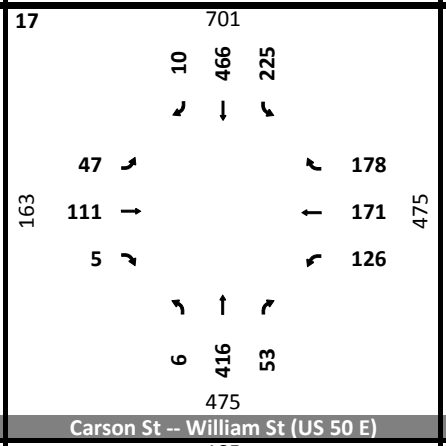	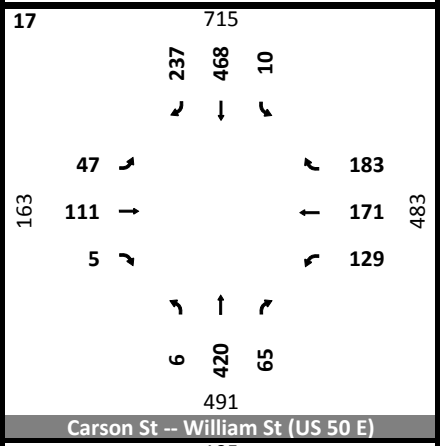
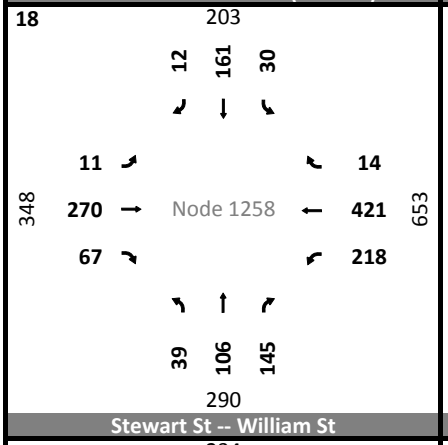	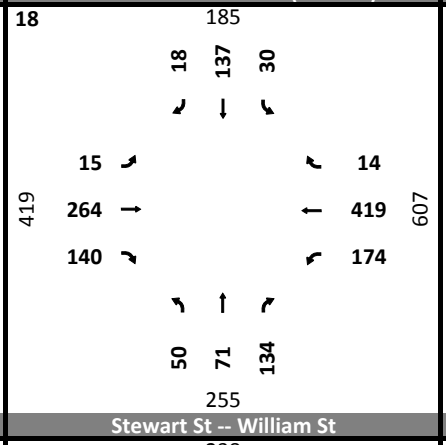	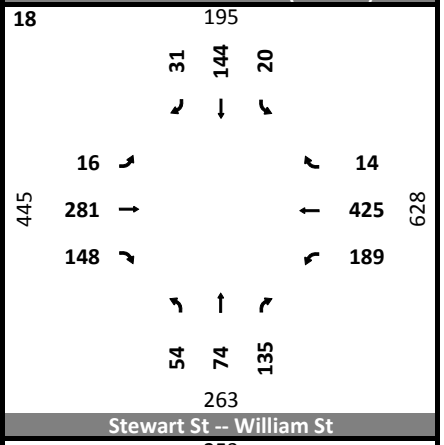
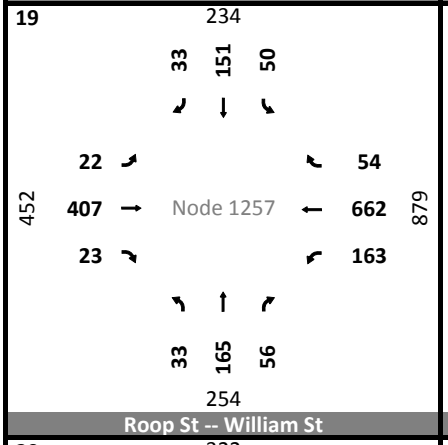	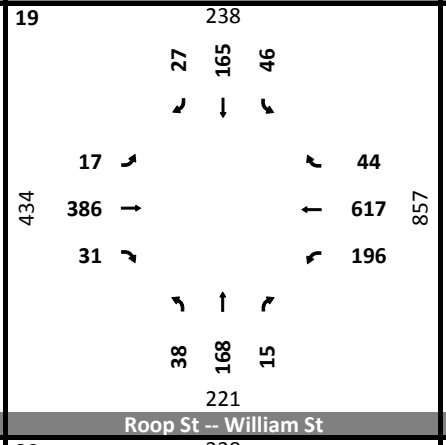	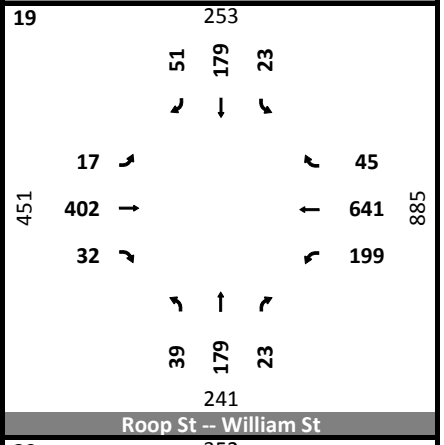
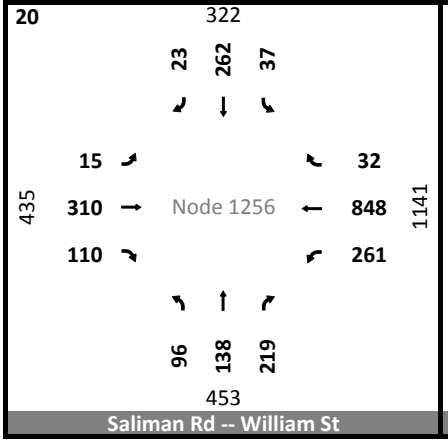	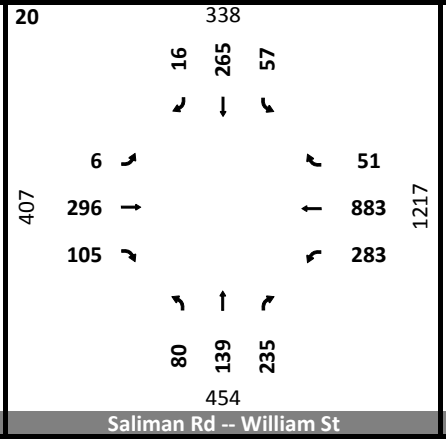	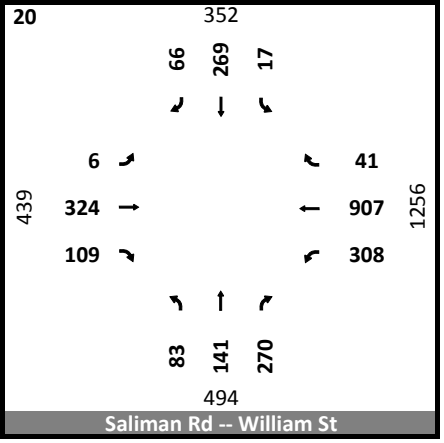

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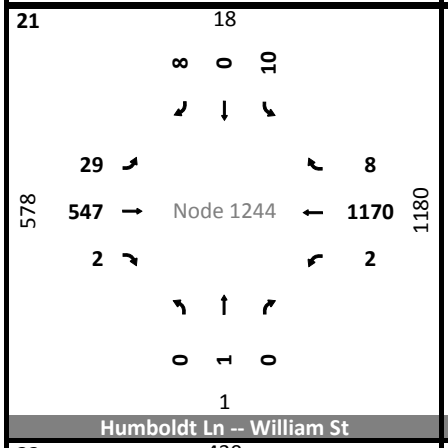	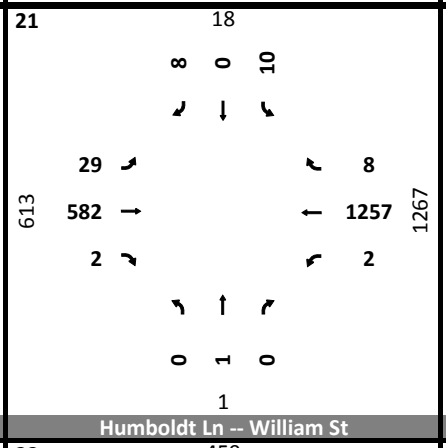	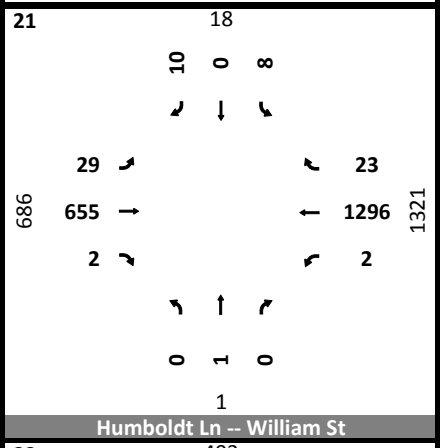
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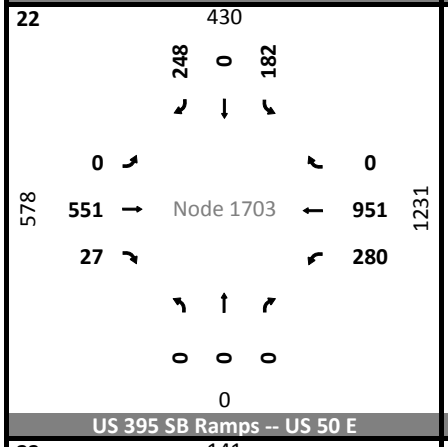	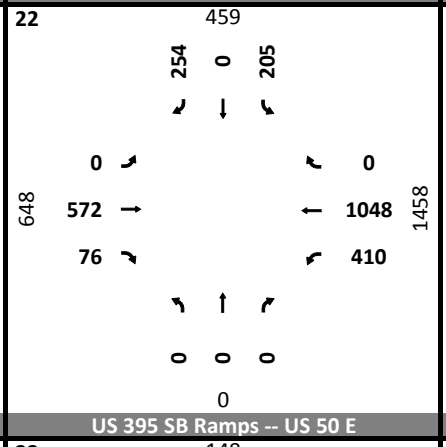	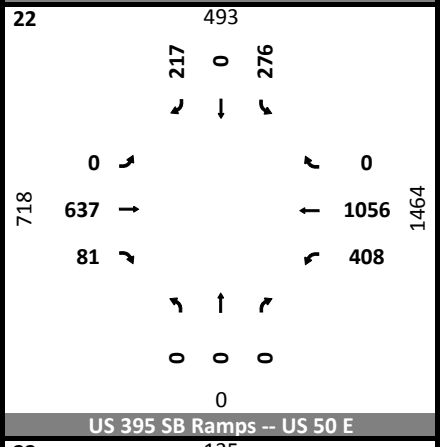
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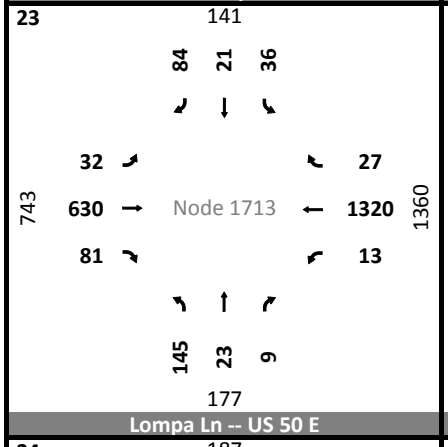	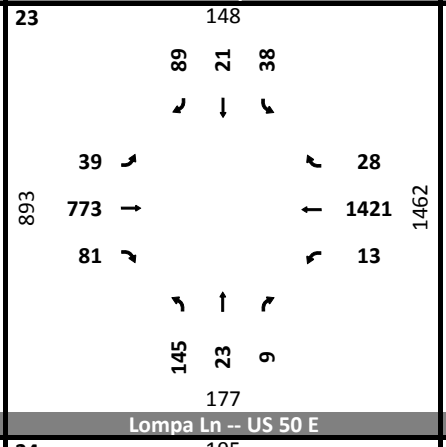	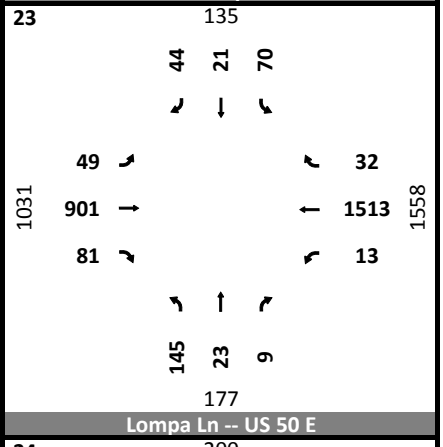
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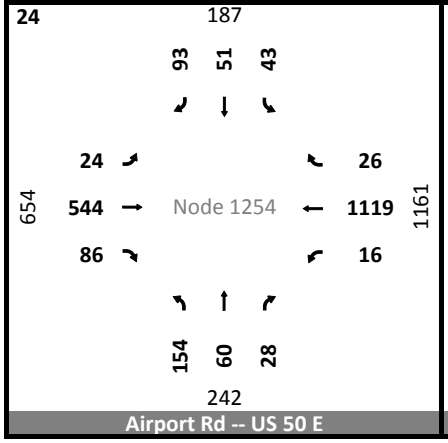	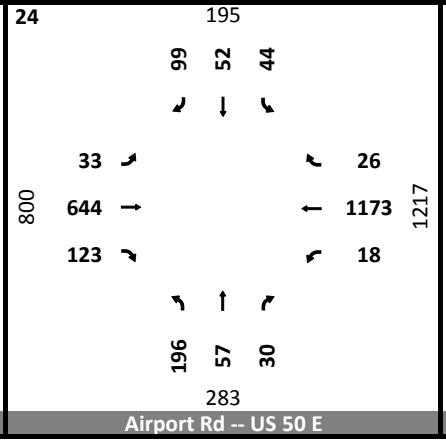	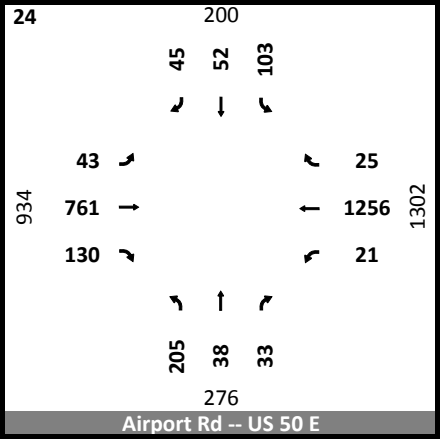
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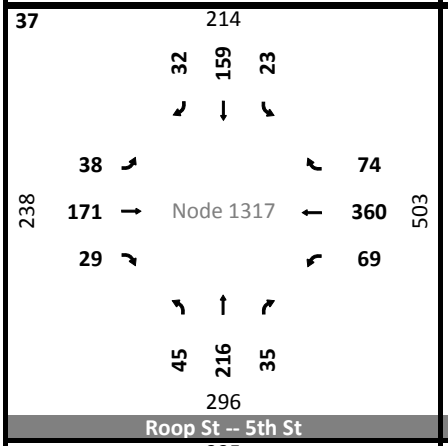	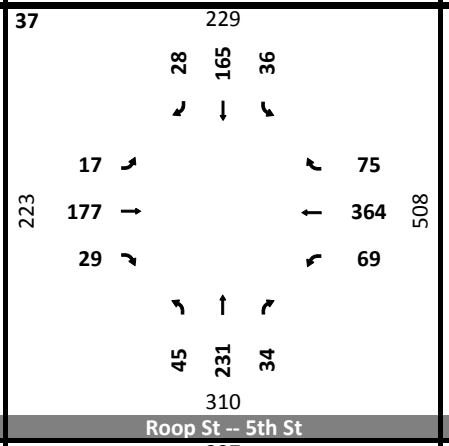	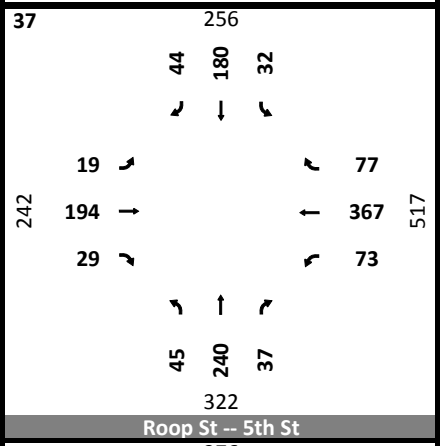
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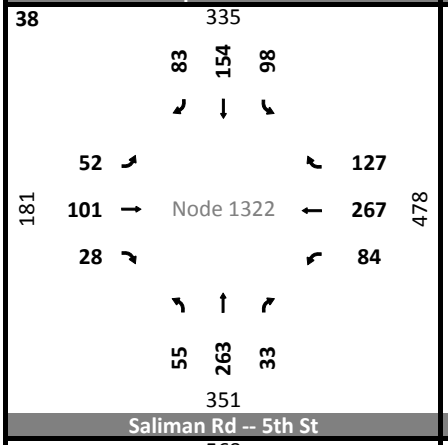
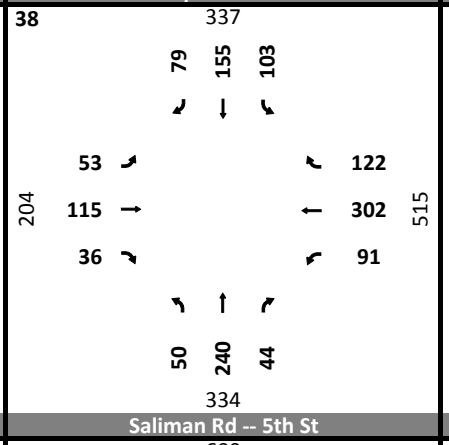
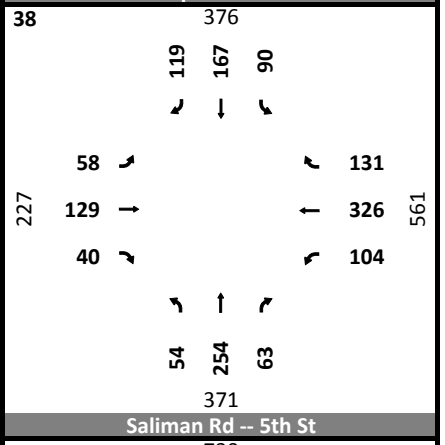
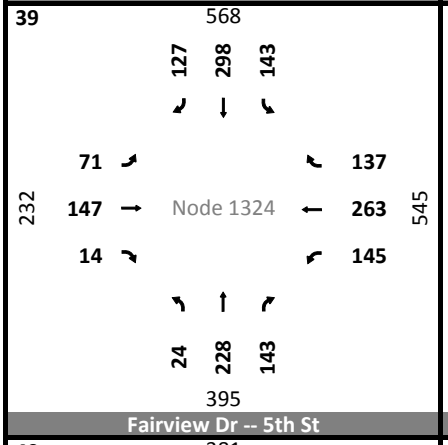
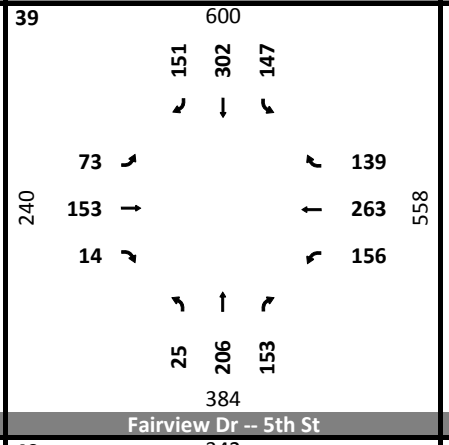
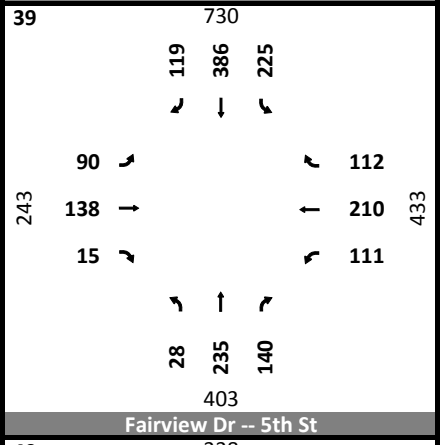
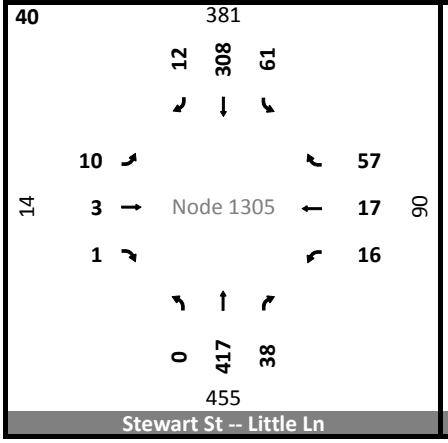
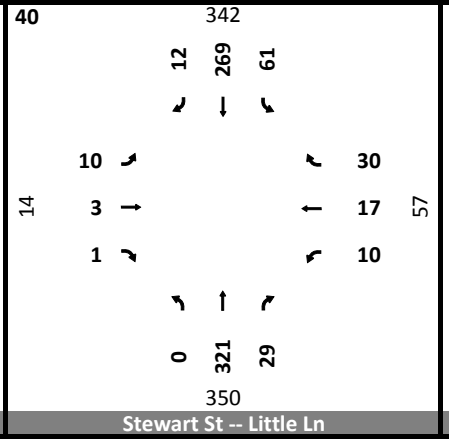
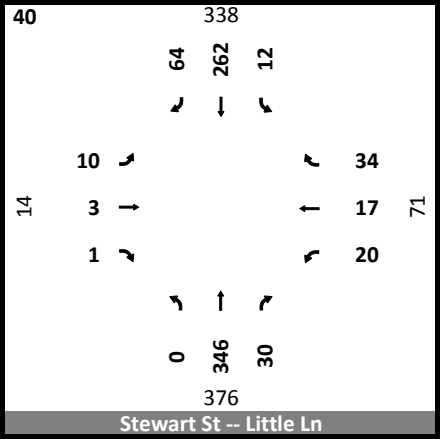
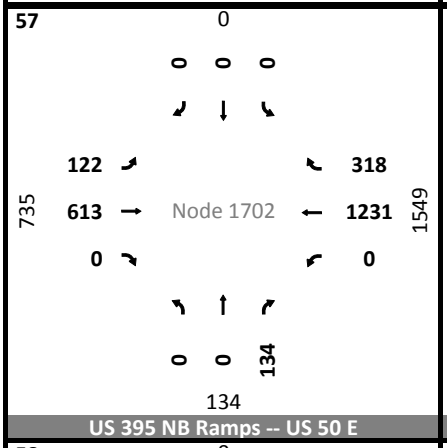
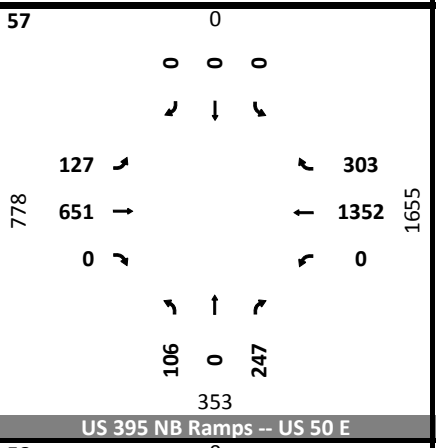
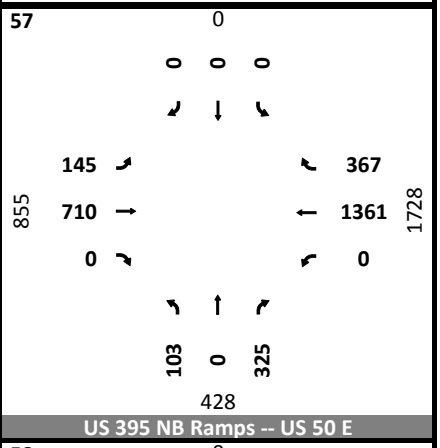
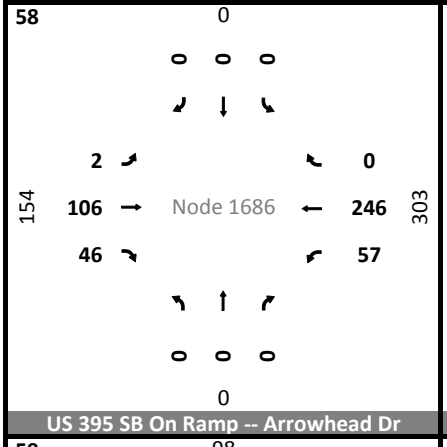
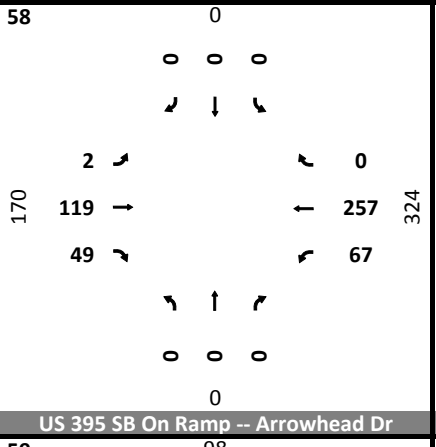
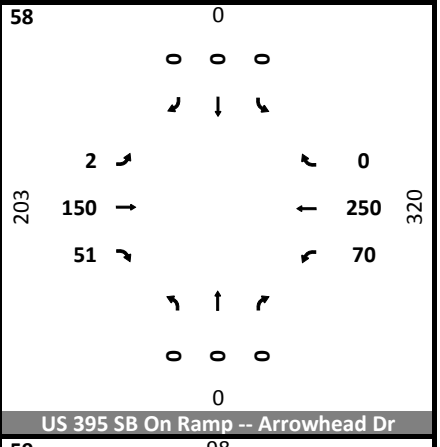
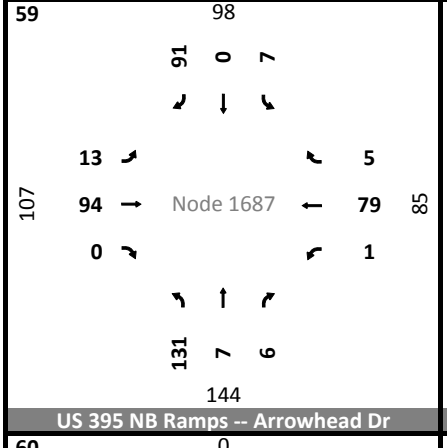
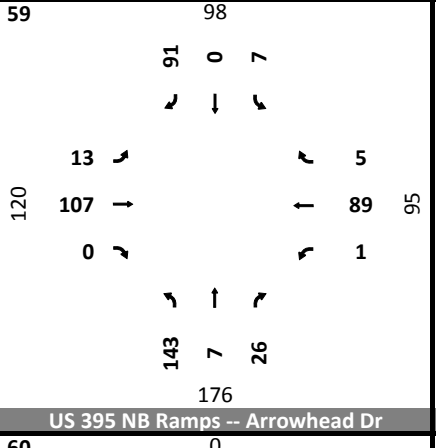
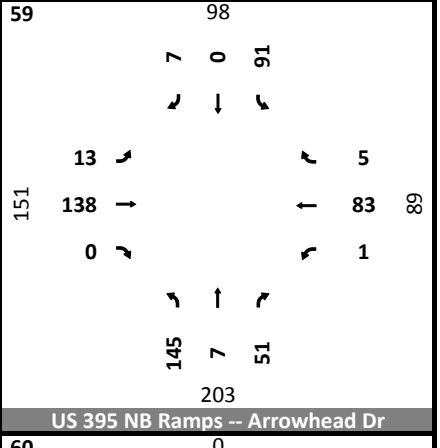
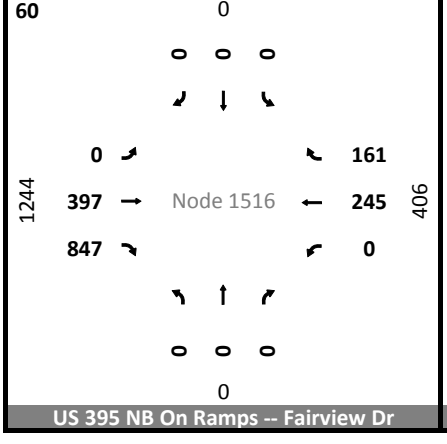
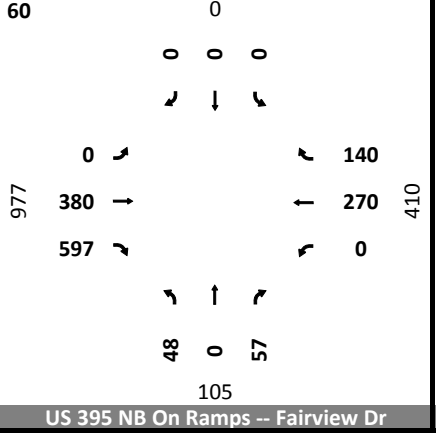
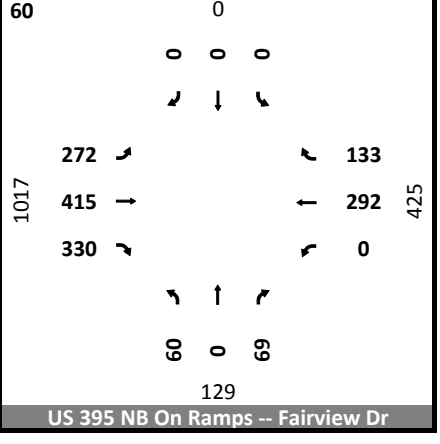
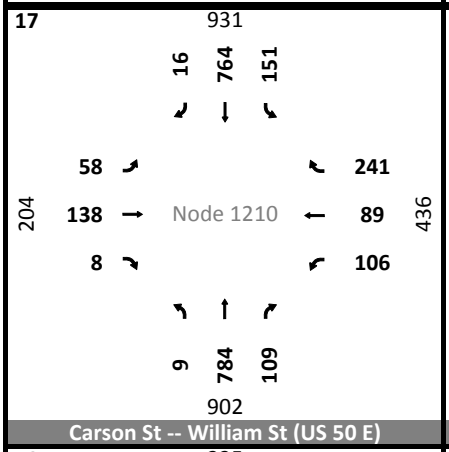
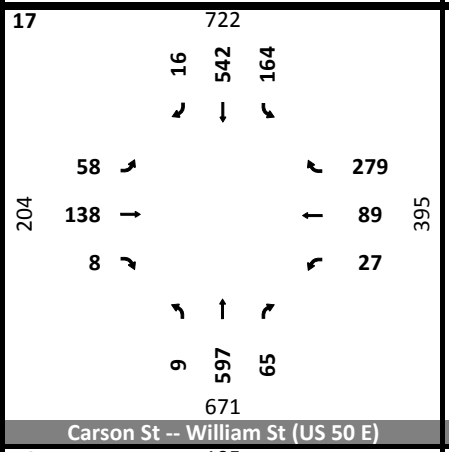
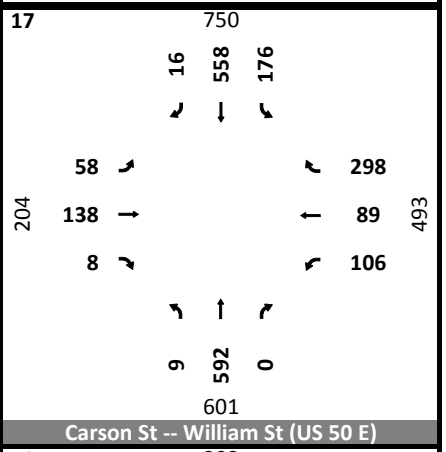
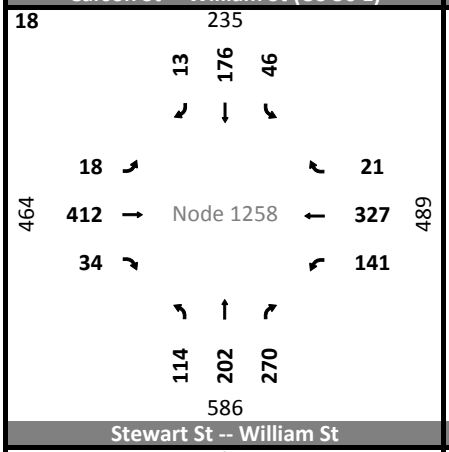
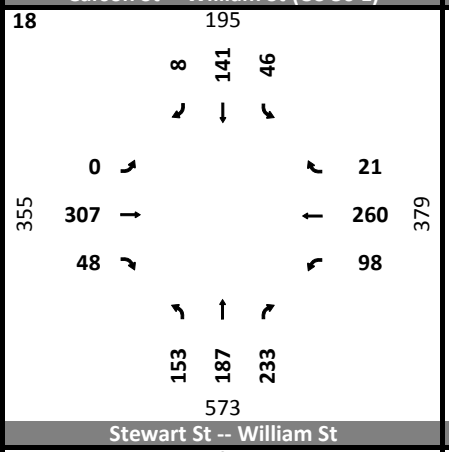
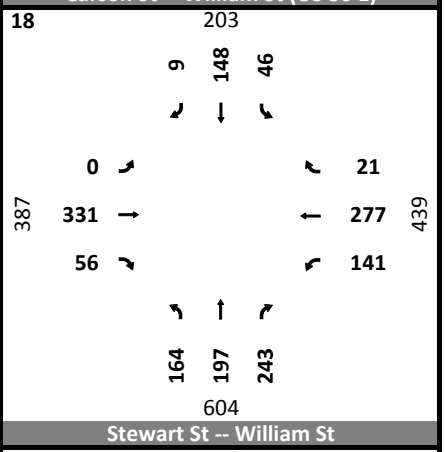
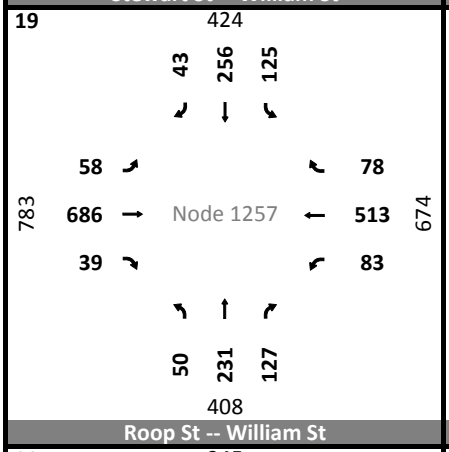
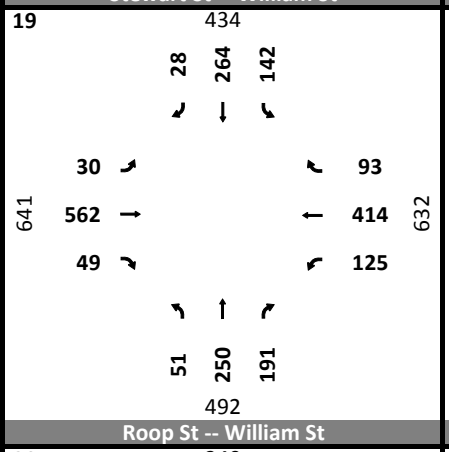
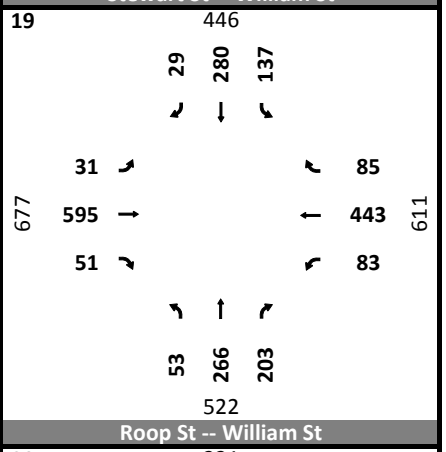
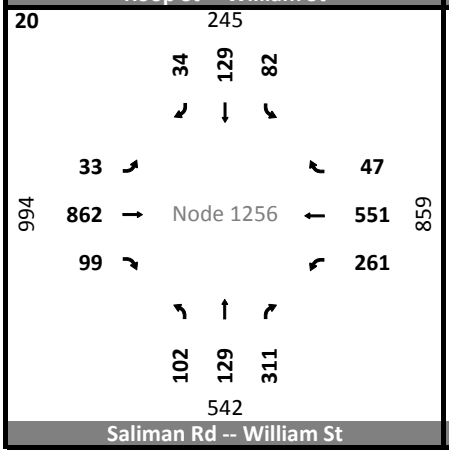
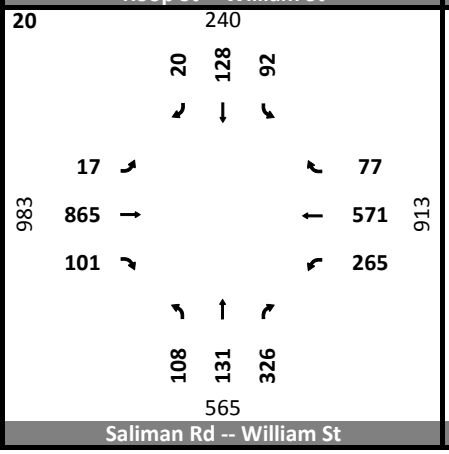
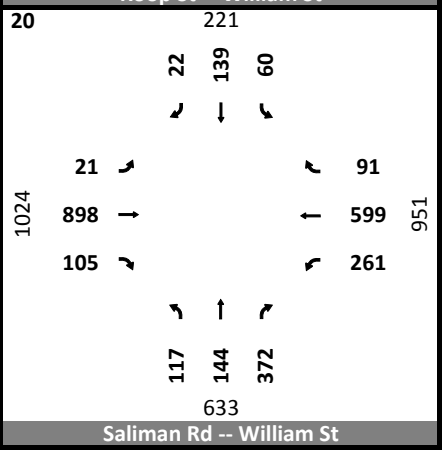
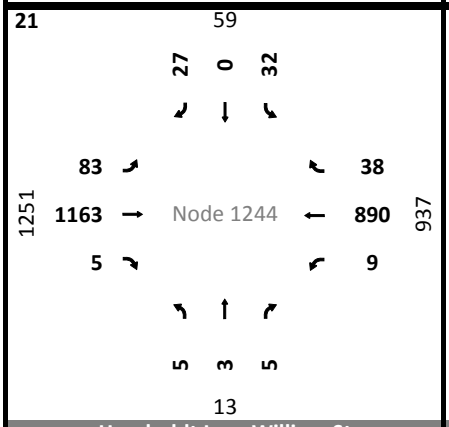
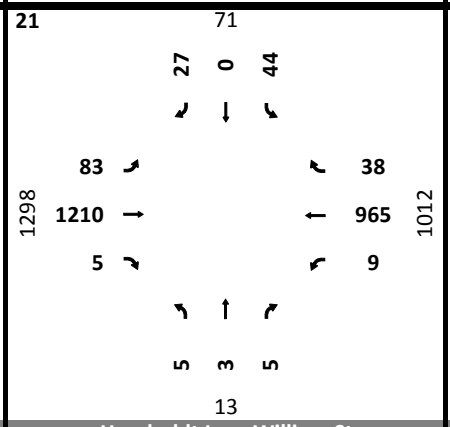
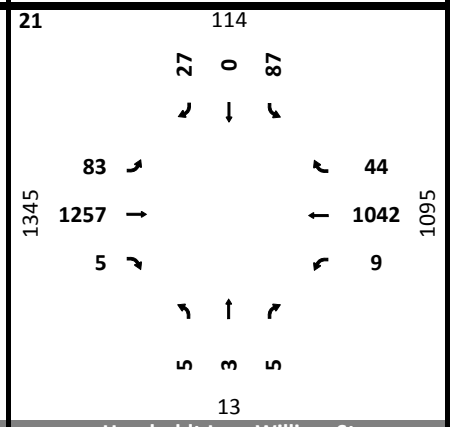
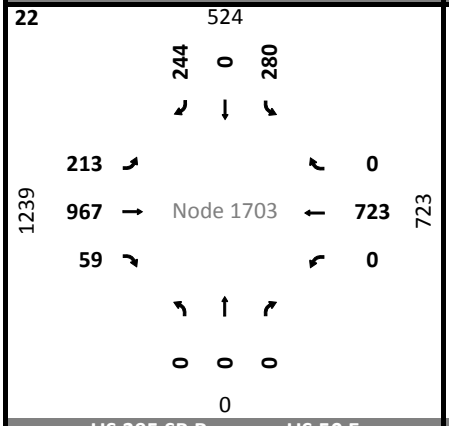
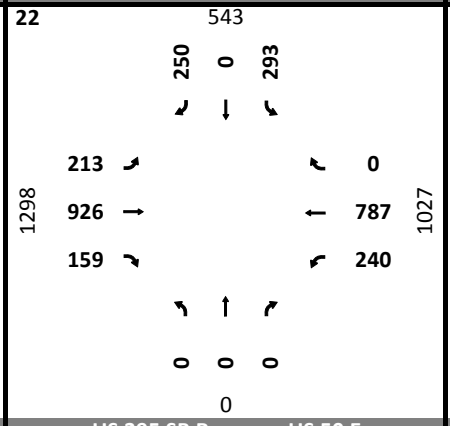
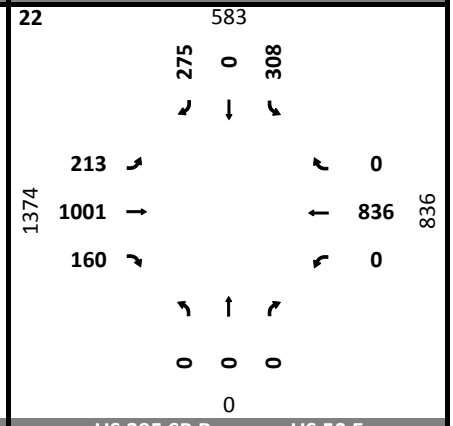
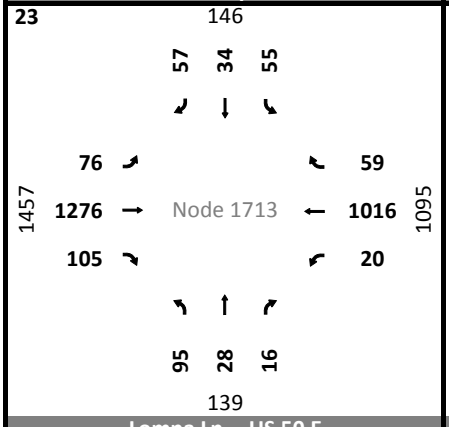
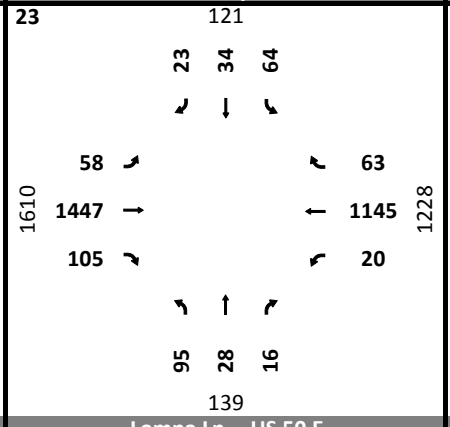
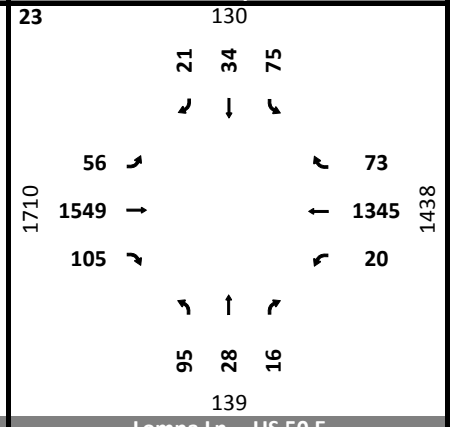
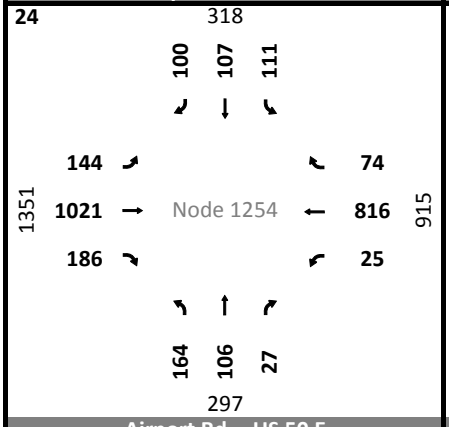
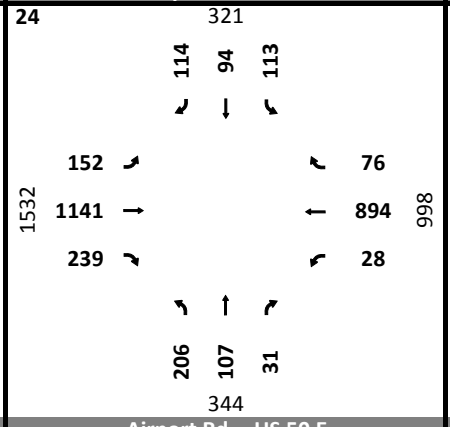
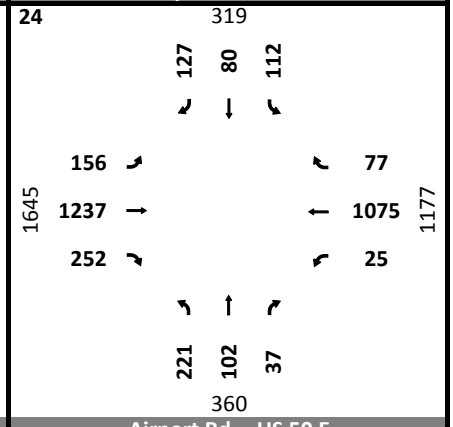
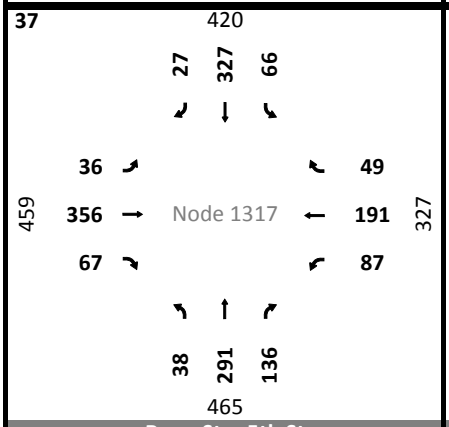
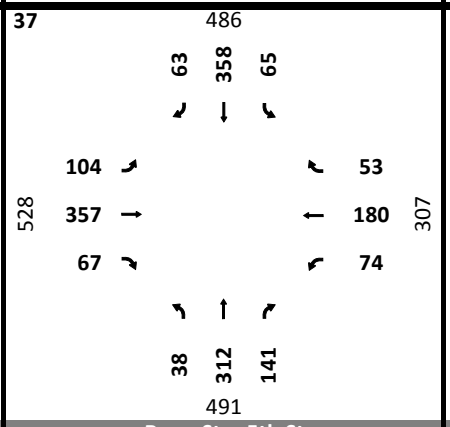
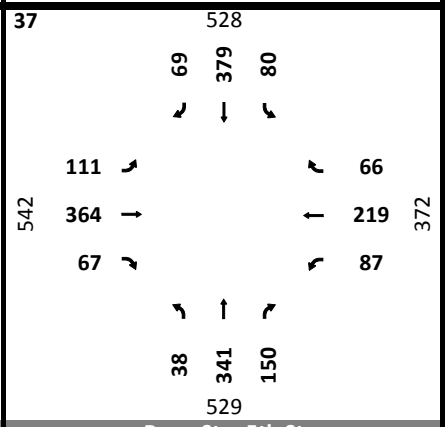
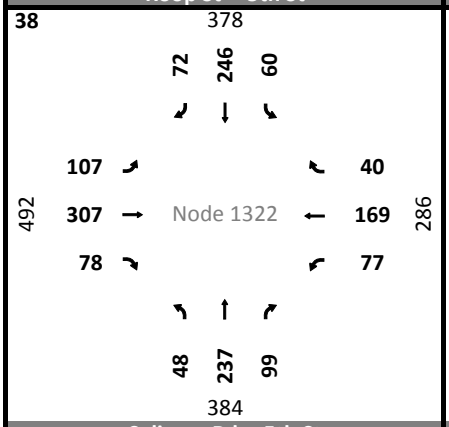
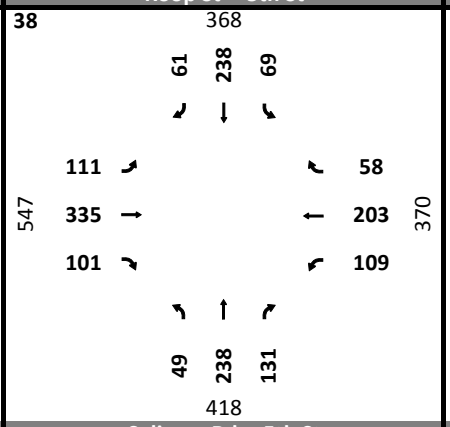
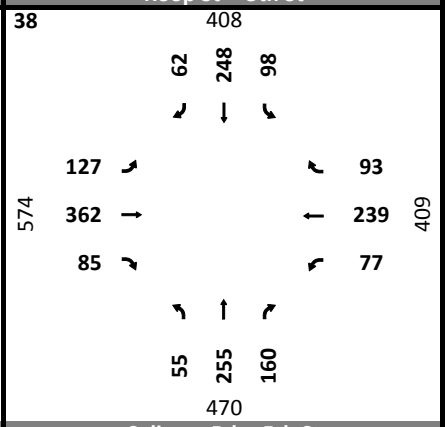
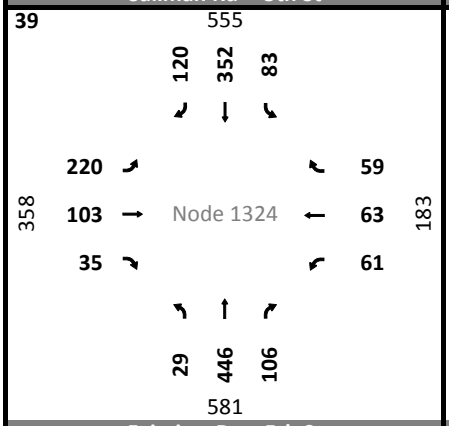
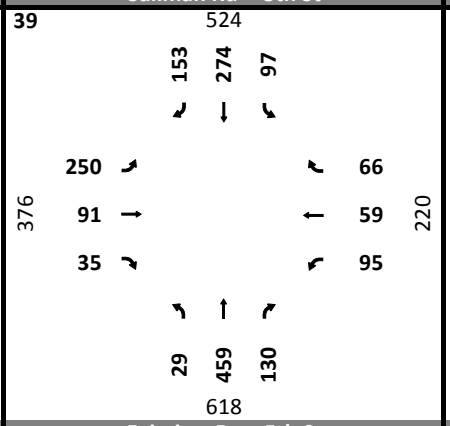
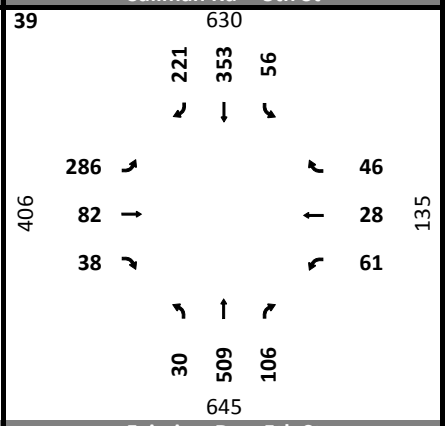
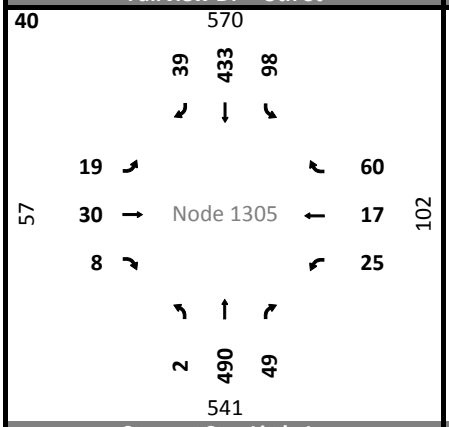
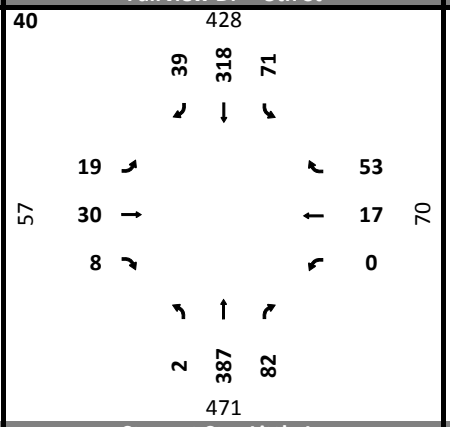
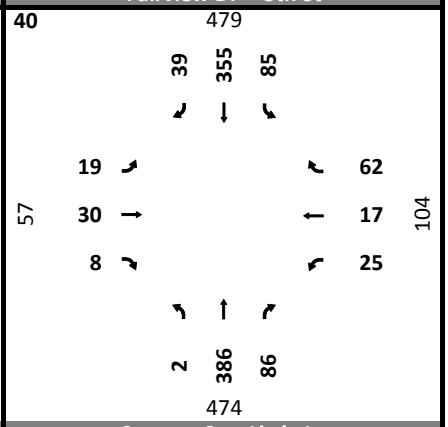
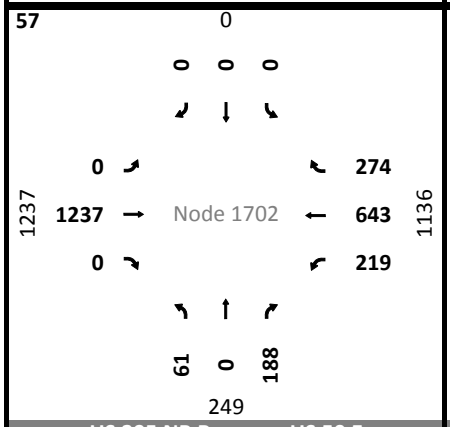
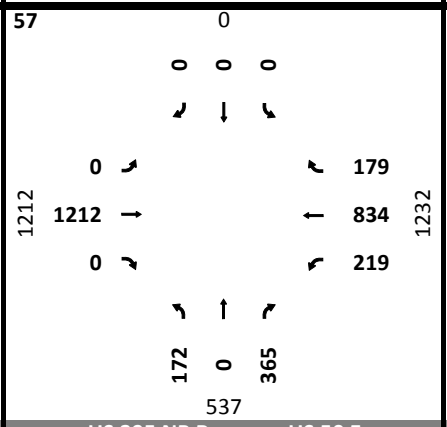
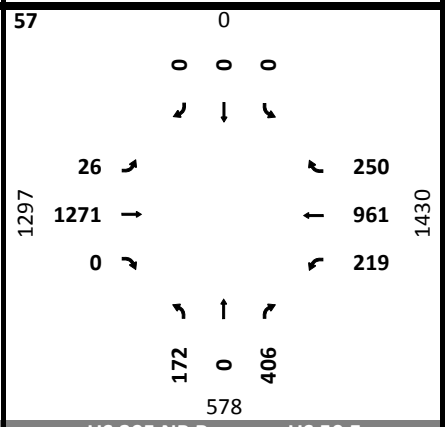
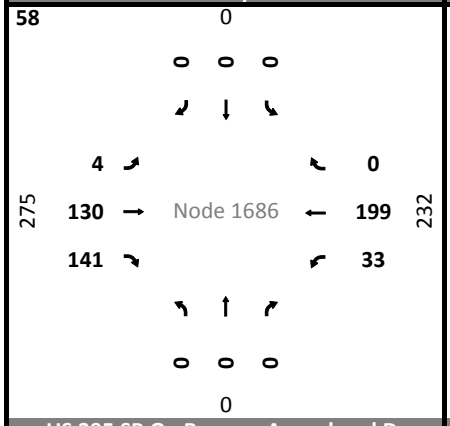
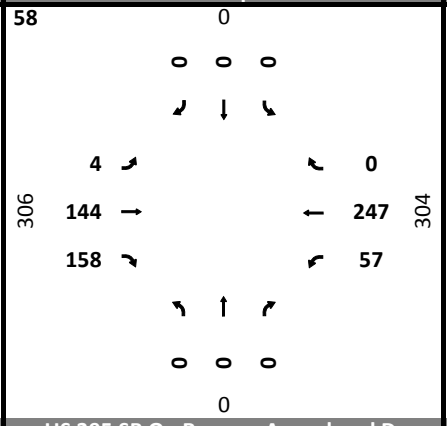
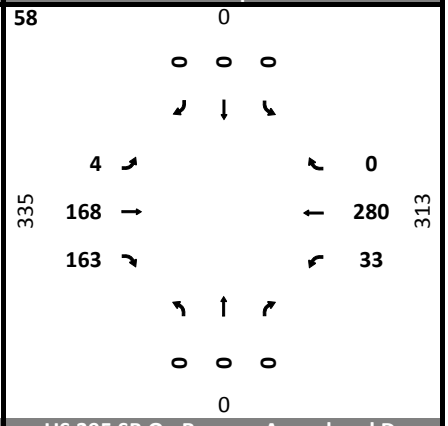
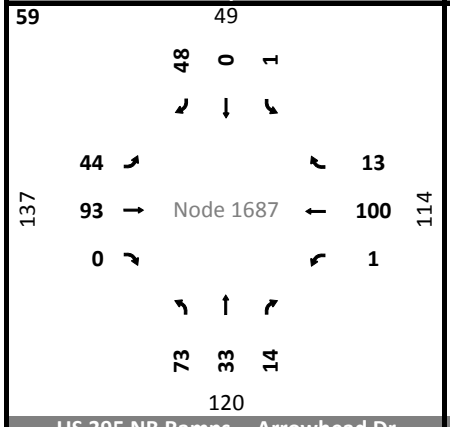
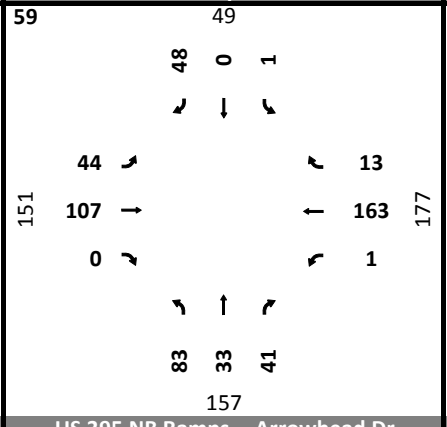
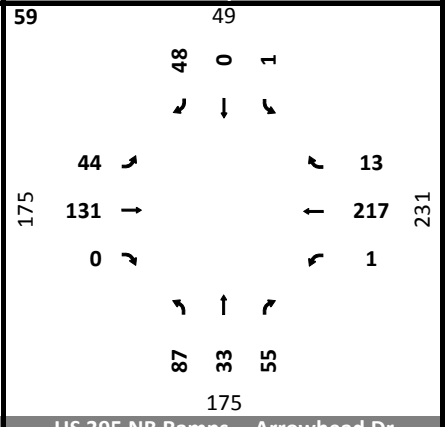
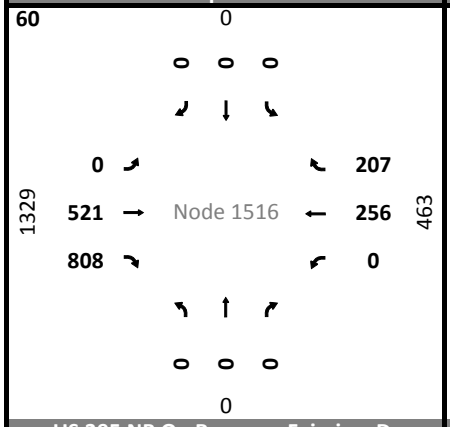
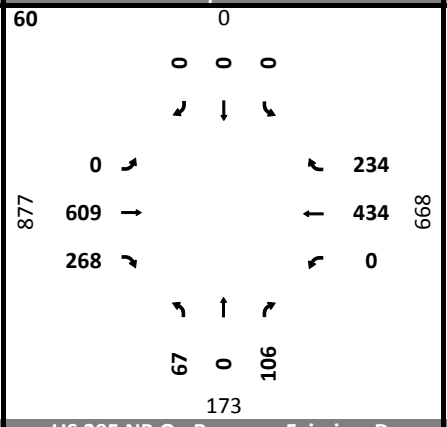
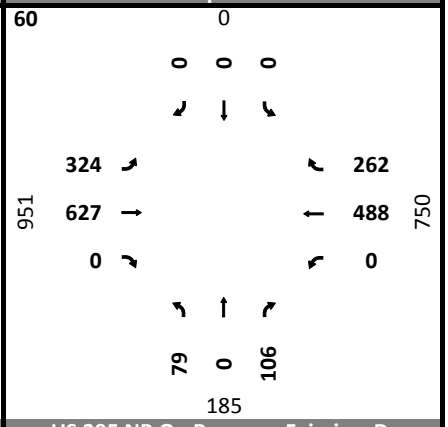
		
Saliman Rd -- 5th St	Saliman Rd -- 5th St	Saliman Rd -- 5th St
		
Fairview Dr -- 5th St	Fairview Dr -- 5th St	Fairview Dr -- 5th St
		
Stewart St -- Little Ln	Stewart St -- Little Ln	Stewart St -- Little Ln

AM Count	AM 2020 Adjusted	AM 2035 Adjusted
		
US 395 NB Ramps -- US 50 E	US 395 NB Ramps -- US 50 E	US 395 NB Ramps -- US 50 E
		
US 395 SB On Ramp -- Arrowhead Dr	US 395 SB On Ramp -- Arrowhead Dr	US 395 SB On Ramp -- Arrowhead Dr
		
US 395 NB Ramps -- Arrowhead Dr	US 395 NB Ramps -- Arrowhead Dr	US 395 NB Ramps -- Arrowhead Dr
		
US 395 NB On Ramps -- Fairview Dr	US 395 NB On Ramps -- Fairview Dr	US 395 NB On Ramps -- Fairview Dr

PM Count	PM 2020 Adjusted	PM 2035 Adjusted
		
Carson St -- William St (US 50 E)	Carson St -- William St (US 50 E)	Carson St -- William St (US 50 E)
		
Stewart St -- William St	Stewart St -- William St	Stewart St -- William St
		
Roop St -- William St	Roop St -- William St	Roop St -- William St
		
Saliman Rd -- William St	Saliman Rd -- William St	Saliman Rd -- William St

PM Count	PM 2020 Adjusted	PM 2035 Adjusted
		
Humboldt Ln -- William St	Humboldt Ln -- William St	Humboldt Ln -- William St
		
US 395 SB Ramps -- US 50 E	US 395 SB Ramps -- US 50 E	US 395 SB Ramps -- US 50 E
		
Lompa Ln -- US 50 E	Lompa Ln -- US 50 E	Lompa Ln -- US 50 E
		
Airport Rd -- US 50 E	Airport Rd -- US 50 E	Airport Rd -- US 50 E

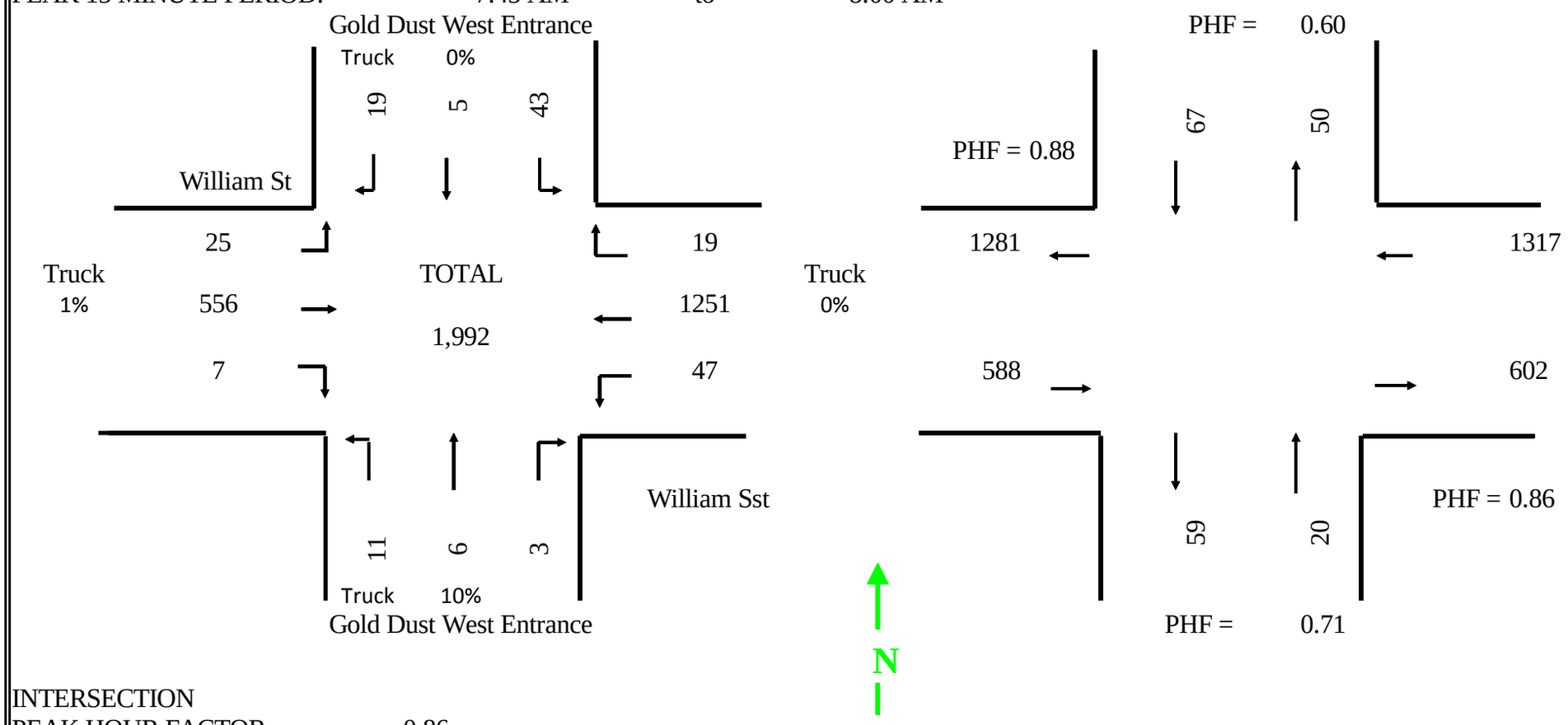
PM Count	PM 2020 Adjusted	PM 2035 Adjusted
		
Roop St -- 5th St	Roop St -- 5th St	Roop St -- 5th St
		
Saliman Rd -- 5th St	Saliman Rd -- 5th St	Saliman Rd -- 5th St
		
Fairview Dr -- 5th St	Fairview Dr -- 5th St	Fairview Dr -- 5th St
		
Stewart St -- Little Ln	Stewart St -- Little Ln	Stewart St -- Little Ln

PM Count	PM 2020 Adjusted	PM 2035 Adjusted
		
		
		
		

VEHICLE MOVEMENT SUMMARY

INTERSECTION:	William St & Gold Dust West Entrance		TIME:	7:00 AM to 9:00 AM	
JURISDICTION:	Carson City		DATE:	12/1/2015	
PROJECT TITLE:	Lompa Ranch Counts		PROJECT NO:	J170	

PEAK HOUR PERIOD: 7:15 AM to 8:15 AM
PEAK 15 MINUTE PERIOD: 7:45 AM to 8:00 AM



INTERSECTION
PEAK HOUR FACTOR: 0.86

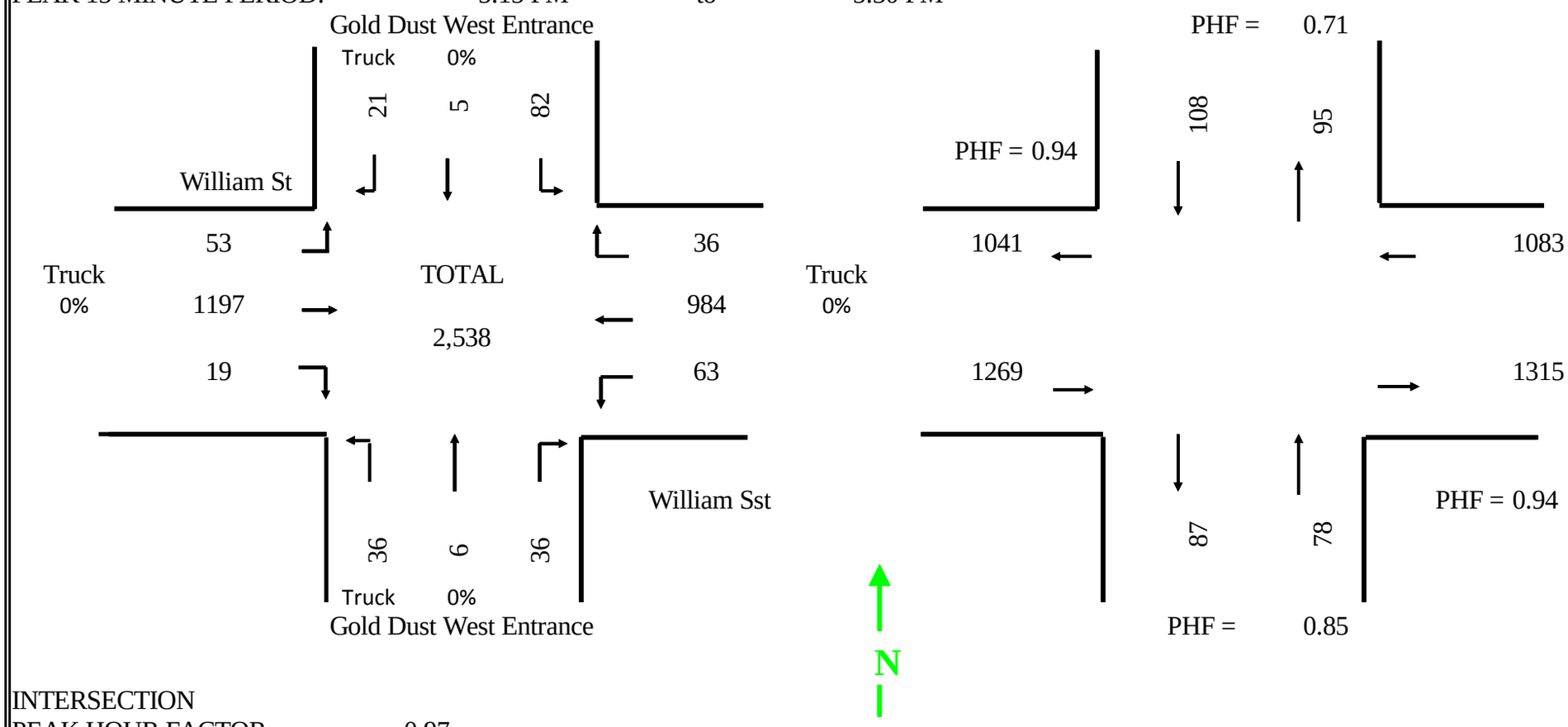
RUNNING COUNTS	William St Eastbound			William Sst Westbound			Gold Dust West Entrance Northbound			Gold Dust West Entrance Southbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Period End	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
7:15 AM	4	78	0	5	197	1	4	0	5	3	0	2	299
7:30 AM	8	215	2	13	479	3	7	0	5	10	0	7	749
7:45 AM	16	365	4	26	830	9	7	6	6	22	2	10	1303
8:00 AM	21	525	6	41	1191	14	10	6	8	41	4	17	1884
8:15 AM	29	634	7	52	1448	20	15	6	8	46	5	21	2291
8:30 AM	34	750	8	55	1670	32	18	7	9	58	5	24	2670
8:45 AM	39	877	12	63	1841	38	18	7	11	69	5	28	3008
9:00 AM	45	985	21	80	2052	45	23	8	15	75	8	33	3390

PERIOD COUNTS	William St Eastbound			William Sst Westbound			Gold Dust West Entrance Northbound			Gold Dust West Entrance Southbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Period End	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
7:15 AM	4	78	0	5	197	1	4	0	5	3	0	2	299
7:30 AM	4	137	2	8	282	2	3	0	0	7	0	5	450
7:45 AM	8	150	2	13	351	6	0	6	1	12	2	3	554
8:00 AM	5	160	2	15	361	5	3	0	2	19	2	7	581
8:15 AM	8	109	1	11	257	6	5	0	0	5	1	4	407
8:30 AM	5	116	1	3	222	12	3	1	1	12	0	3	379
8:45 AM	5	127	4	8	171	6	0	0	2	11	0	4	338
9:00 AM	6	108	9	17	211	7	5	1	4	6	3	5	382

VEHICLE MOVEMENT SUMMARY

INTERSECTION:	William St & Gold Dust West Entrance		TIME:	4:00 PM to 6:00 PM	
JURISDICTION:	Carson City		DATE:	12/1/2015	
PROJECT TITLE:	Lompa Ranch Counts		PROJECT NO:	J170	

PEAK HOUR PERIOD: 4:30 PM to 5:30 PM
PEAK 15 MINUTE PERIOD: 5:15 PM to 5:30 PM



INTERSECTION
PEAK HOUR FACTOR: 0.97

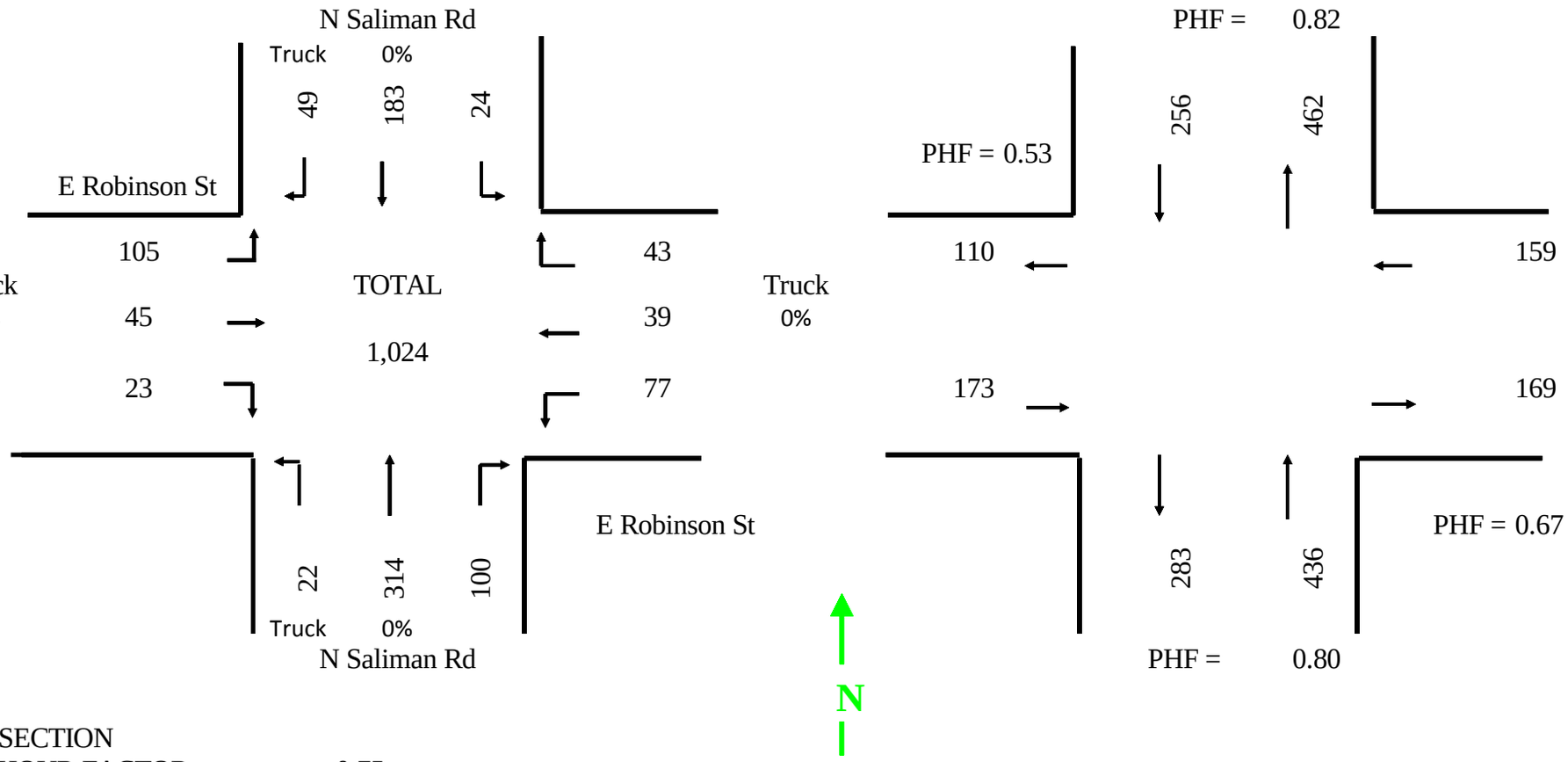
RUNNING COUNTS	William St Eastbound			William Sst Westbound			Gold Dust West Entrance Northbound			Gold Dust West Entrance Southbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Period End	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
4:15 PM	18	277	7	20	263	8	14	2	4	21	1	11	646
4:30 PM	26	527	14	32	490	20	33	2	13	50	4	25	1236
4:45 PM	34	788	22	43	724	28	40	4	24	79	6	32	1824
5:00 PM	53	1081	27	64	982	38	48	6	37	94	6	34	2470
5:15 PM	67	1404	29	79	1224	45	60	7	45	112	7	40	3119
5:30 PM	79	1724	33	95	1474	56	69	8	49	132	9	46	3774
5:45 PM	90	1991	35	107	1710	59	78	8	55	150	10	52	4345
6:00 PM	102	2212	40	119	1875	71	86	11	57	169	11	55	4808

PERIOD COUNTS	William St Eastbound			William Sst Westbound			Gold Dust West Entrance Northbound			Gold Dust West Entrance Southbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Period End	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
4:15 PM	18	277	7	20	263	8	14	2	4	21	1	11	646
4:30 PM	8	250	7	12	227	12	19	0	9	29	3	14	590
4:45 PM	8	261	8	11	234	8	7	2	11	29	2	7	588
5:00 PM	19	293	5	21	258	10	8	2	13	15	0	2	646
5:15 PM	14	323	2	15	242	7	12	1	8	18	1	6	649
5:30 PM	12	320	4	16	250	11	9	1	4	20	2	6	655
5:45 PM	11	267	2	12	236	3	9	0	6	18	1	6	571
6:00 PM	12	221	5	12	165	12	8	3	2	19	1	3	463

VEHICLE MOVEMENT SUMMARY

INTERSECTION:	E Robinson & N Saliman Rd		TIME:	7:00 AM to 9:00 AM	
JURISDICTION:	Carson City		DATE:	12/1/2015	
PROJECT TITLE:	Lompa Ranch Counts		PROJECT NO:	J170	

PEAK HOUR PERIOD: 7:00 AM to 8:00 AM
PEAK 15 MINUTE PERIOD: 7:30 AM to 7:45 AM



INTERSECTION
PEAK HOUR FACTOR: 0.75

RUNNING COUNTS	E Robinson St Eastbound			E Robinson St Westbound			N Saliman Rd Northbound			N Saliman Rd Southbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Period End	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
7:15 AM	14	14	3	15	9	15	2	57	37	15	33	4	218
7:30 AM	36	25	10	42	19	26	11	150	71	17	75	15	497
7:45 AM	88	45	20	72	36	38	18	250	93	22	118	38	838
8:00 AM	105	45	23	77	39	43	22	314	100	24	183	49	1024
8:15 AM	115	45	23	79	41	43	22	382	105	24	224	56	1159
8:30 AM	124	46	24	85	43	51	23	436	120	31	273	57	1313
8:45 AM	135	46	24	92	46	57	25	500	125	38	276	63	1427
9:00 AM	138	46	25	93	46	62	25	547	125	40	314	66	1527

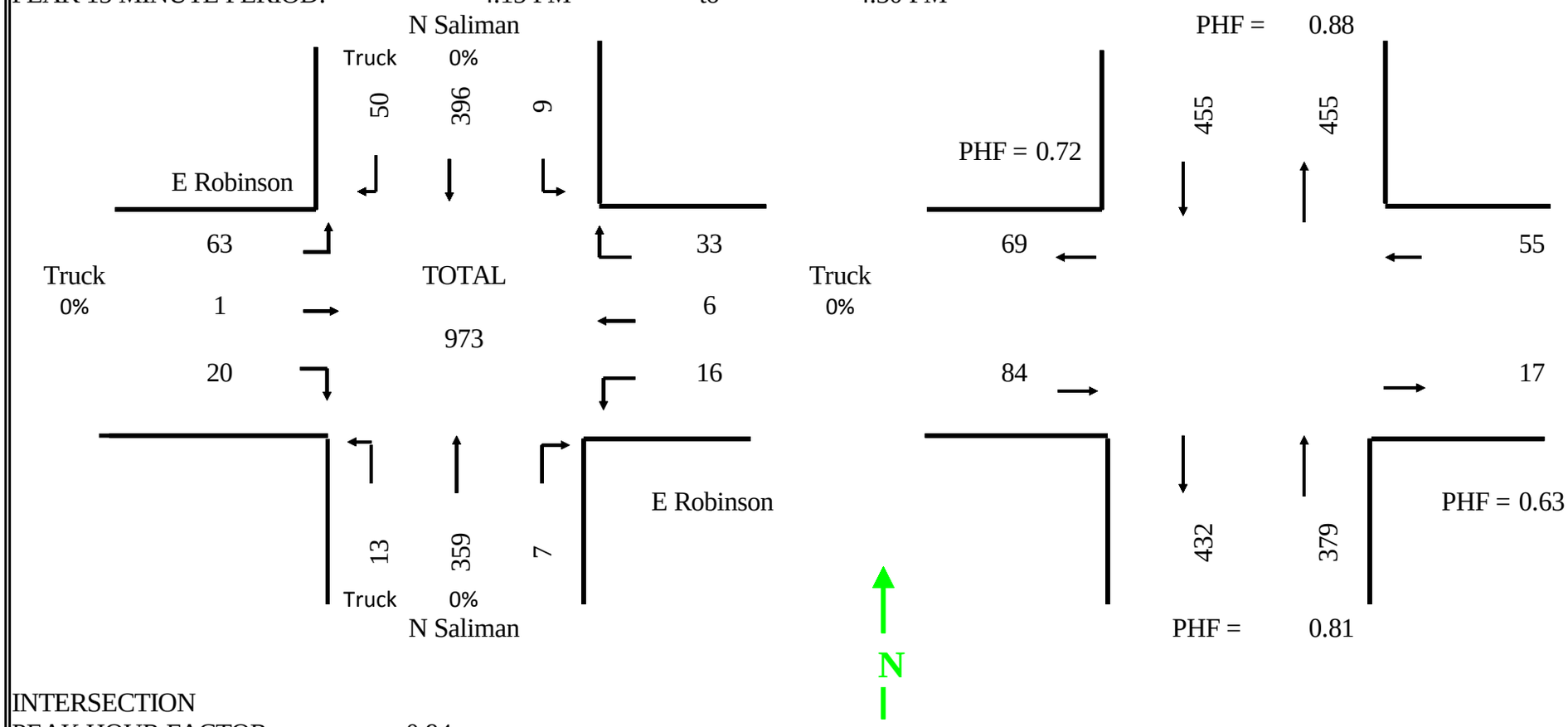
PERIOD COUNTS	E Robinson St Eastbound			E Robinson St Westbound			N Saliman Rd Northbound			N Saliman Rd Southbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Period End	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
7:15 AM	14	14	3	15	9	15	2	57	37	15	33	4	218
7:30 AM	22	11	7	27	10	11	9	93	34	2	42	11	279
7:45 AM	52	20	10	30	17	12	7	100	22	5	43	23	341
8:00 AM	17	0	3	5	3	5	4	64	7	2	65	11	186
8:15 AM	10	0	0	2	2	0	0	68	5	0	41	7	135
8:30 AM	9	1	1	6	2	8	1	54	15	7	49	1	154
8:45 AM	11	0	0	7	3	6	2	64	5	7	3	6	114
9:00 AM	3	0	1	1	0	5	0	47	0	2	38	3	100

*** No Truck Movements were observed at the intersection**

VEHICLE MOVEMENT SUMMARY

INTERSECTION:	E Robinson & N Saliman	TIME:	4:00 PM	to	6:00 PM
JURISDICTION:	Carson City	DATE:	12/1/2015		
PROJECT TITLE:	Lompa Ranch Counts	PROJECT NO:	J170		

PEAK HOUR PERIOD: 4:15 PM to 5:15 PM
PEAK 15 MINUTE PERIOD: 4:15 PM to 4:30 PM



INTERSECTION
PEAK HOUR FACTOR: 0.94

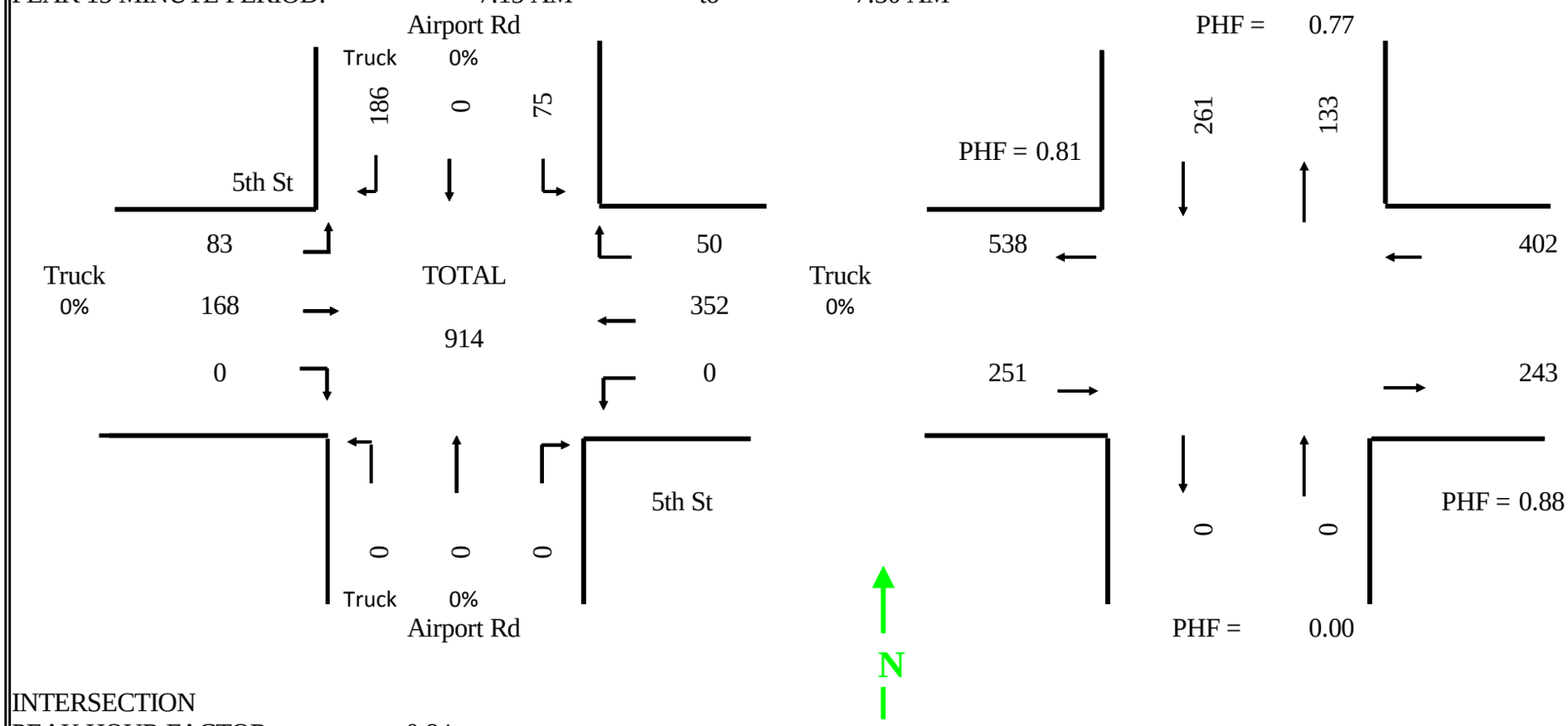
RUNNING COUNTS	E Robinson Eastbound			E Robinson Westbound			N Saliman Northbound			N Saliman Southbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Period End	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
4:15 PM	11	3	0	9	3	12	1	90	7	3	89	6	234
4:30 PM	25	4	8	14	6	26	5	166	11	7	198	22	492
4:45 PM	33	4	11	18	8	33	9	247	13	9	289	38	712
5:00 PM	50	4	15	23	8	39	9	338	13	9	393	49	950
5:15 PM	74	4	20	25	9	45	14	449	14	12	485	56	1207
5:30 PM	93	5	23	27	12	46	18	546	18	12	592	72	1464
5:45 PM	101	6	27	30	12	46	20	640	21	12	686	80	1681
6:00 PM	111	6	32	32	12	48	22	711	23	12	767	92	1868

PERIOD COUNTS	E Robinson Eastbound			E Robinson Westbound			N Saliman Northbound			N Saliman Southbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Period End	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
4:15 PM	11	3	0	9	3	12	1	90	7	3	89	6	234
4:30 PM	14	1	8	5	3	14	4	76	4	4	109	16	258
4:45 PM	8	0	3	4	2	7	4	81	2	2	91	16	220
5:00 PM	17	0	4	5	0	6	0	91	0	0	104	11	238
5:15 PM	24	0	5	2	1	6	5	111	1	3	92	7	257
5:30 PM	19	1	3	2	3	1	4	97	4	0	107	16	257
5:45 PM	8	1	4	3	0	0	2	94	3	0	94	8	217
6:00 PM	10	0	5	2	0	2	2	71	2	0	81	12	187

VEHICLE MOVEMENT SUMMARY

INTERSECTION:	5th St & Airport Rd		TIME:	7:00 AM to 9:00 AM	
JURISDICTION:	Carson City		DATE:	12/1/2015	
PROJECT TITLE:	Lompa Ranch Counts		PROJECT NO:	J170	

PEAK HOUR PERIOD: 7:15 AM to 8:15 AM
PEAK 15 MINUTE PERIOD: 7:15 AM to 7:30 AM



INTERSECTION
PEAK HOUR FACTOR: 0.84

RUNNING COUNTS	5th St Eastbound			5th St Westbound			Airport Rd Northbound			Airport Rd Southbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Period End	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
7:15 AM	21	18	0	0	64	8	0	0	0	11	0	24	146
7:30 AM	43	73	0	0	163	21	0	0	0	33	0	85	418
7:45 AM	65	122	0	0	250	42	0	0	0	64	0	139	682
8:00 AM	87	157	0	0	353	53	0	0	0	78	0	179	907
8:15 AM	104	186	0	0	416	58	0	0	0	86	0	210	1060
8:30 AM	124	212	0	0	467	65	0	0	0	94	0	248	1210
8:45 AM	141	241	0	0	492	68	0	0	0	101	0	282	1325
9:00 AM	148	262	0	0	524	70	0	0	0	113	0	295	1412

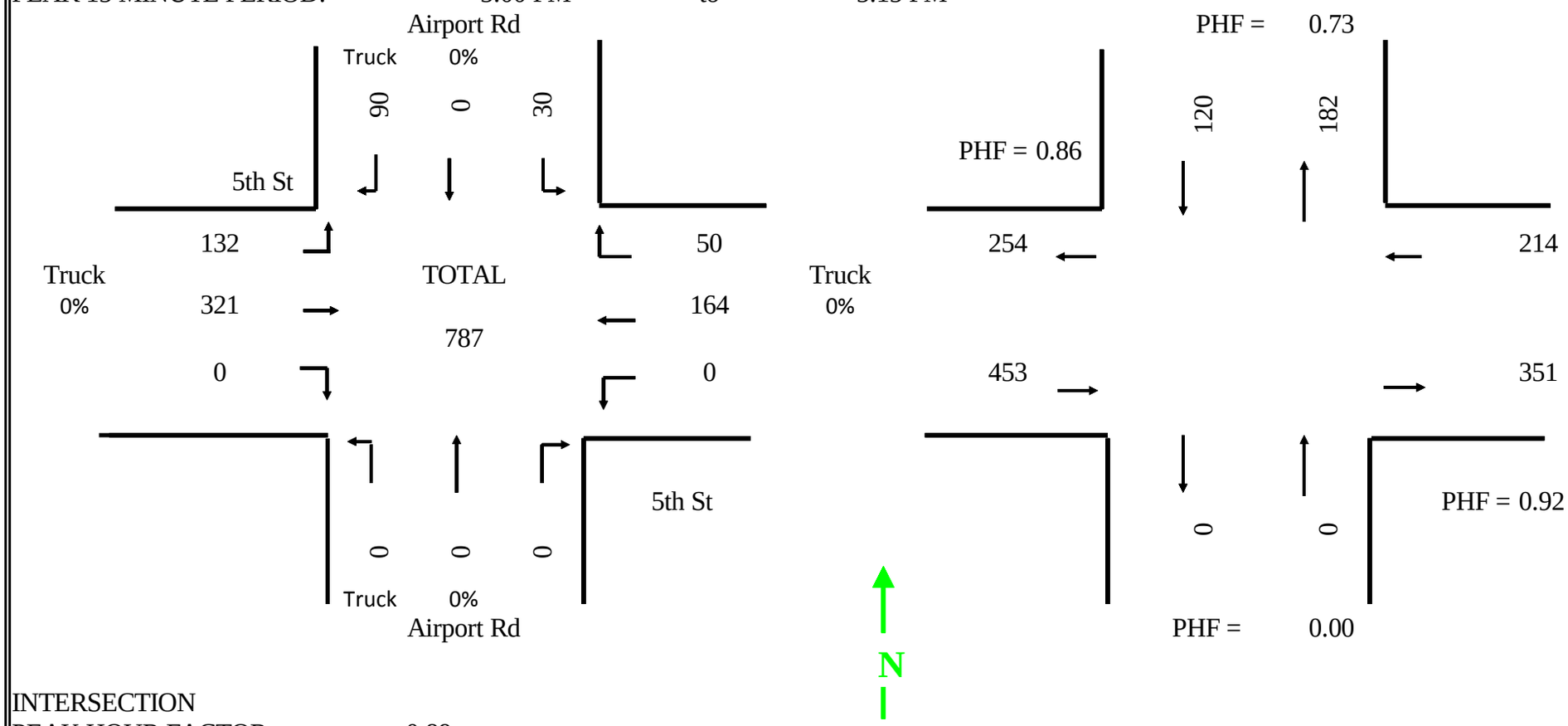
PERIOD COUNTS	5th St Eastbound			5th St Westbound			Airport Rd Northbound			Airport Rd Southbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Period End	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
7:15 AM	21	18	0	0	64	8	0	0	0	11	0	24	146
7:30 AM	22	55	0	0	99	13	0	0	0	22	0	61	272
7:45 AM	22	49	0	0	87	21	0	0	0	31	0	54	264
8:00 AM	22	35	0	0	103	11	0	0	0	14	0	40	225
8:15 AM	17	29	0	0	63	5	0	0	0	8	0	31	153
8:30 AM	20	26	0	0	51	7	0	0	0	8	0	38	150
8:45 AM	17	29	0	0	25	3	0	0	0	7	0	34	115
9:00 AM	7	21	0	0	32	2	0	0	0	12	0	13	87

*** No Pedestrian or Bicycle Movements were observed at the intersection**

VEHICLE MOVEMENT SUMMARY

INTERSECTION:	5th St & Airport Rd		TIME:	4:00 PM to 6:00 PM	
JURISDICTION:	Carson City		DATE:	12/1/2015	
PROJECT TITLE:	Lompa Ranch Counts		PROJECT NO:	J170	

PEAK HOUR PERIOD: 4:30 PM to 5:30 PM
PEAK 15 MINUTE PERIOD: 5:00 PM to 5:15 PM

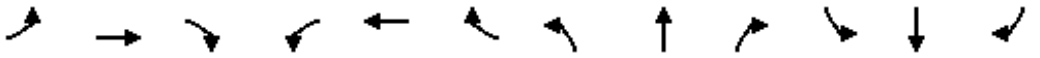


INTERSECTION
PEAK HOUR FACTOR: 0.89

RUNNING COUNTS	5th St Eastbound			5th St Westbound			Airport Rd Northbound			Airport Rd Southbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Period End	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
4:15 PM	28	67	0	0	41	5	0	0	0	9	0	26	176
4:30 PM	58	124	0	0	80	13	0	0	0	21	0	42	338
4:45 PM	81	209	0	0	126	22	0	0	0	34	0	70	542
5:00 PM	117	276	0	0	167	33	0	0	0	44	0	89	726
5:15 PM	156	369	0	0	209	49	0	0	0	48	0	117	948
5:30 PM	190	445	0	0	244	63	0	0	0	51	0	132	1125
5:45 PM	224	502	0	0	272	71	0	0	0	55	0	159	1283
6:00 PM	237	550	0	0	298	76	0	0	0	65	0	182	1408

PERIOD COUNTS	5th St Eastbound			5th St Westbound			Airport Rd Northbound			Airport Rd Southbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Period End	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**TOTAL**
4:15 PM	28	67	0	0	41	5	0	0	0	9	0	26	176
4:30 PM	30	57	0	0	39	8	0	0	0	12	0	16	162
4:45 PM	23	85	0	0	46	9	0	0	0	13	0	28	204
5:00 PM	36	67	0	0	41	11	0	0	0	10	0	19	184
5:15 PM	39	93	0	0	42	16	0	0	0	4	0	28	222
5:30 PM	34	76	0	0	35	14	0	0	0	3	0	15	177
5:45 PM	34	57	0	0	28	8	0	0	0	4	0	27	158
6:00 PM	13	48	0	0	26	5	0	0	0	10	0	23	125

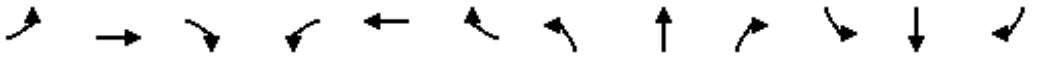
*** No Truck, Pedestrian or Bicycle Movements were observed at the intersection.**



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	310	110	261	848	32	96	138	219	37	262	23
Future Volume (vph)	15	310	110	261	848	32	96	138	219	37	262	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	1863	1583	1770	3496	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.38	1.00	1.00	0.66	1.00	
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	717	1863	1583	1232	3496	
Peak-hour factor, PHF	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)	16	337	120	284	922	35	104	150	238	40	285	25
RTOR Reduction (vph)	0	0	86	0	0	22	0	0	156	0	11	0
Lane Group Flow (vph)	16	337	34	284	922	13	104	150	82	40	299	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases			4			8	2		2	6		
Actuated Green, G (s)	0.8	14.9	14.9	6.1	20.2	20.2	18.0	18.0	18.0	9.7	9.7	
Effective Green, g (s)	0.8	14.9	14.9	6.1	20.2	20.2	18.0	18.0	18.0	9.7	9.7	
Actuated g/C Ratio	0.02	0.28	0.28	0.12	0.38	0.38	0.34	0.34	0.34	0.18	0.18	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	52	1004	449	398	1361	609	322	638	542	227	645	
v/s Ratio Prot	0.00	0.10		c0.08	c0.26		c0.02	0.08			c0.09	
v/s Ratio Perm			0.02			0.01	0.09		0.05	0.03		
v/c Ratio	0.31	0.34	0.08	0.71	0.68	0.02	0.32	0.24	0.15	0.18	0.46	
Uniform Delay, d1	25.6	14.9	13.8	22.4	13.4	10.0	12.3	12.3	12.0	18.0	19.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.3	0.2	0.1	6.0	1.4	0.0	0.6	0.2	0.1	0.4	0.5	
Delay (s)	28.9	15.1	13.8	28.3	14.8	10.0	12.8	12.5	12.1	18.4	19.6	
Level of Service	C	B	B	C	B	B	B	B	B	B	B	
Approach Delay (s)		15.2			17.8			12.4			19.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	52.5	Sum of lost time (s)	18.0
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

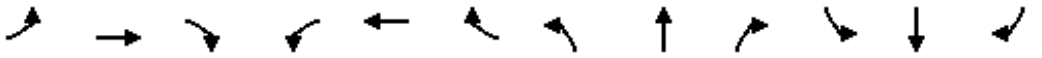
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	101	28	84	267	127	55	263	33	98	154	83
Future Volume (vph)	52	101	28	84	267	127	55	263	33	98	154	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.95		1.00	0.98		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3425		1770	1773		1770	3480		1770	3353	
Flt Permitted	0.46	1.00		0.66	1.00		0.59	1.00		0.56	1.00	
Satd. Flow (perm)	850	3425		1235	1773		1104	3480		1037	3353	
Peak-hour factor, PHF	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)	57	110	30	91	290	138	60	286	36	107	167	90
RTOR Reduction (vph)	0	18	0	0	38	0	0	25	0	0	62	0
Lane Group Flow (vph)	57	122	0	91	390	0	60	297	0	107	195	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.1	12.1		12.1	12.1		9.7	9.7		9.7	9.7	
Effective Green, g (s)	12.1	12.1		12.1	12.1		9.7	9.7		9.7	9.7	
Actuated g/C Ratio	0.39	0.39		0.39	0.39		0.31	0.31		0.31	0.31	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	333	1345		485	696		347	1095		326	1055	
v/s Ratio Prot		0.04			c0.22			0.09			0.06	
v/s Ratio Perm	0.07			0.07			0.05			c0.10		
v/c Ratio	0.17	0.09		0.19	0.56		0.17	0.27		0.33	0.19	
Uniform Delay, d1	6.1	5.9		6.1	7.3		7.6	7.9		8.1	7.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.0		0.2	1.0		0.2	0.1		0.6	0.1	
Delay (s)	6.3	5.9		6.3	8.3		7.9	8.0		8.7	7.8	
Level of Service	A	A		A	A		A	A		A	A	
Approach Delay (s)		6.0			7.9			8.0			8.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	30.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		

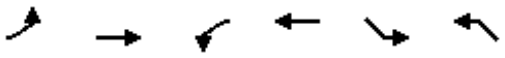
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	544	86	16	1119	26	154	60	28	43	51	93
Future Volume (vph)	24	544	86	16	1119	26	154	60	28	43	51	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1775		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.51	1.00		0.70	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	949	1775		1295	1863	1583
Peak-hour factor, PHF	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)	26	591	93	17	1216	28	167	65	30	47	55	101
RTOR Reduction (vph)	0	0	55	0	0	17	0	23	0	0	0	85
Lane Group Flow (vph)	26	591	38	17	1216	11	167	72	0	47	55	16
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8	2			6		6
Actuated Green, G (s)	2.5	24.6	24.6	1.2	23.3	23.3	19.7	13.3		11.9	9.4	9.4
Effective Green, g (s)	2.5	24.6	24.6	1.2	23.3	23.3	19.7	13.3		11.9	9.4	9.4
Actuated g/C Ratio	0.04	0.41	0.41	0.02	0.39	0.39	0.33	0.22		0.20	0.16	0.16
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	74	1460	653	35	1383	618	401	396		278	293	249
v/s Ratio Prot	c0.01	0.17		0.01	c0.34		c0.04	0.04		0.01	0.03	
v/s Ratio Perm			0.02			0.01	c0.09			0.03		0.01
v/c Ratio	0.35	0.40	0.06	0.49	0.88	0.02	0.42	0.18		0.17	0.19	0.06
Uniform Delay, d1	27.8	12.3	10.5	28.9	16.8	11.1	14.9	18.7		19.6	21.8	21.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.9	0.2	0.0	10.2	6.7	0.0	0.7	0.2		0.3	0.3	0.1
Delay (s)	30.6	12.5	10.6	39.1	23.5	11.1	15.6	19.0		19.9	22.1	21.5
Level of Service	C	B	B	D	C	B	B	B		B	C	C
Approach Delay (s)		12.9			23.5			16.8			21.3	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	59.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		

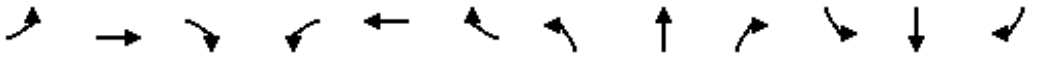
c Critical Lane Group



Movement	EBL	EBT	WBL	WBT	SEL	NWL
Lane Configurations						
Traffic Volume (vph)	122	431	280	951	182	0
Future Volume (vph)	122	431	280	951	182	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.97	0.91	0.97	0.91	0.97	
Frt	1.00	1.00	1.00	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	0.95	
Satd. Flow (prot)	3433	5085	3433	5085	3433	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	
Satd. Flow (perm)	3433	5085	3433	5085	3433	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	133	468	304	1034	198	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	133	468	304	1034	198	0
Turn Type	Prot	NA	Prot	NA	Prot	Prot
Protected Phases	5	2	1	6	7	3
Permitted Phases						
Actuated Green, G (s)	3.5	15.6	5.2	17.3	3.8	
Effective Green, g (s)	3.5	15.6	5.2	17.3	3.8	
Actuated g/C Ratio	0.09	0.41	0.14	0.45	0.10	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	315	2082	468	2308	342	
v/s Ratio Prot	0.04	0.09	c0.09	c0.20	c0.06	
v/s Ratio Perm						
v/c Ratio	0.42	0.22	0.65	0.45	0.58	
Uniform Delay, d1	16.3	7.3	15.6	7.1	16.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	0.1	3.1	0.1	2.4	
Delay (s)	17.3	7.4	18.7	7.3	18.8	
Level of Service	B	A	B	A	B	
Approach Delay (s)		9.6		9.9		
Approach LOS		A		A		

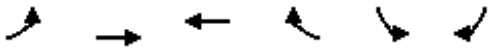
Intersection Summary			
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	38.1	Sum of lost time (s)	13.5
Intersection Capacity Utilization	38.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	556	7	47	1251	19	11	6	3	43	5	19
Future Volume (vph)	25	556	7	47	1251	19	11	6	3	43	5	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5075		1770	5074		1770	1779		1770	1637	
Flt Permitted	0.22	1.00		0.39	1.00		0.74	1.00		0.75	1.00	
Satd. Flow (perm)	414	5075		730	5074		1379	1779		1399	1637	
Peak-hour factor, PHF	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)	27	604	8	51	1360	21	12	7	3	47	5	21
RTOR Reduction (vph)	0	3	0	0	3	0	0	2	0	0	14	0
Lane Group Flow (vph)	27	609	0	51	1378	0	12	8	0	47	12	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.0	18.0		23.0	18.0		18.5	18.5		18.5	18.5	
Effective Green, g (s)	23.0	18.0		23.0	18.0		18.5	18.5		18.5	18.5	
Actuated g/C Ratio	0.42	0.33		0.42	0.33		0.34	0.34		0.34	0.34	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Grp Cap (vph)	296	1660		399	1660		463	598		470	550	
v/s Ratio Prot	0.01	0.12		c0.01	c0.27			0.00			0.01	
v/s Ratio Perm	0.03			0.04			0.01			c0.03		
v/c Ratio	0.09	0.37		0.13	0.83		0.03	0.01		0.10	0.02	
Uniform Delay, d1	16.5	14.1		10.5	17.1		12.2	12.2		12.5	12.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.6		0.7	5.0		0.1	0.0		0.4	0.1	
Delay (s)	17.1	14.8		11.1	22.1		12.3	12.2		13.0	12.3	
Level of Service	B	B		B	C		B	B		B	B	
Approach Delay (s)		14.9			21.7			12.3			12.7	
Approach LOS		B			C			B			B	

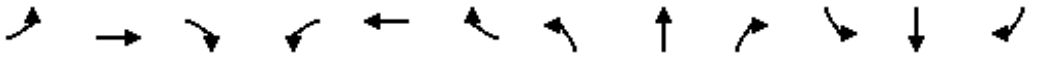
Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	83	168	352	50	75	186
Future Volume (Veh/h)	83	168	352	50	75	186
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)	90	183	383	54	82	202
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	437				773	410
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	437				773	410
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				76	69
cM capacity (veh/h)	1123				338	642

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	90	183	437	82	202
Volume Left	90	0	0	82	0
Volume Right	0	0	54	0	202
cSH	1123	1700	1700	338	642
Volume to Capacity	0.08	0.11	0.26	0.24	0.31
Queue Length 95th (ft)	7	0	0	23	34
Control Delay (s)	8.5	0.0	0.0	19.0	13.2
Lane LOS	A			C	B
Approach Delay (s)	2.8		0.0	14.9	
Approach LOS				B	

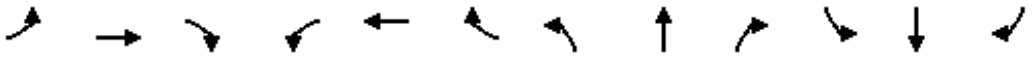
Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	40.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	45	23	77	39	43	22	314	100	24	183	49
Future Volume (Veh/h)	105	45	23	77	39	43	22	314	100	24	183	49
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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)	114	49	25	84	42	47	24	341	109	26	199	53
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	564	776	126	644	748	225	252			450		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	564	776	126	644	748	225	252			450		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	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 %	66	84	97	72	87	94	98			98		
cM capacity (veh/h)	335	314	901	296	326	778	1310			1107		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	114	74	84	89	24	227	223	26	133	119
Volume Left	114	0	84	0	24	0	0	26	0	0
Volume Right	0	25	0	47	0	0	109	0	0	53
cSH	335	402	296	470	1310	1700	1700	1107	1700	1700
Volume to Capacity	0.34	0.18	0.28	0.19	0.02	0.13	0.13	0.02	0.08	0.07
Queue Length 95th (ft)	37	17	28	17	1	0	0	2	0	0
Control Delay (s)	21.2	16.0	21.9	14.4	7.8	0.0	0.0	8.3	0.0	0.0
Lane LOS	C	C	C	B	A			A		
Approach Delay (s)	19.1		18.1		0.4			0.8		
Approach LOS	C		C							

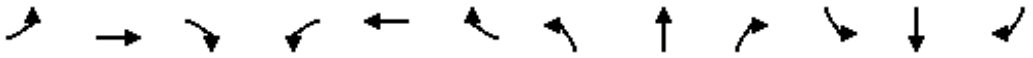
Intersection Summary				
Average Delay	6.4			
Intersection Capacity Utilization	37.7%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	862	99	261	551	47	102	129	311	82	129	34
Future Volume (vph)	33	862	99	261	551	47	102	129	311	82	129	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	1863	1583	1770	3428	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.44	1.00	1.00	0.67	1.00	
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	812	1863	1583	1244	3428	
Peak-hour factor, PHF	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)	36	937	108	284	599	51	111	140	338	89	140	37
RTOR Reduction (vph)	0	0	69	0	0	29	0	0	170	0	31	0
Lane Group Flow (vph)	36	937	39	284	599	22	111	140	168	89	146	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases			4			8	2		2	6		
Actuated Green, G (s)	1.8	20.9	20.9	6.0	25.1	25.1	17.9	17.9	17.9	9.6	9.6	
Effective Green, g (s)	1.8	20.9	20.9	6.0	25.1	25.1	17.9	17.9	17.9	9.6	9.6	
Actuated g/C Ratio	0.03	0.36	0.36	0.10	0.43	0.43	0.31	0.31	0.31	0.16	0.16	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	105	1268	567	353	1523	681	311	572	486	204	564	
v/s Ratio Prot	0.01	c0.26		c0.08	c0.17		0.02	0.08			0.04	
v/s Ratio Perm			0.02			0.01	c0.09		c0.11	0.07		
v/c Ratio	0.34	0.74	0.07	0.80	0.39	0.03	0.36	0.24	0.35	0.44	0.26	
Uniform Delay, d1	27.7	16.3	12.3	25.6	11.4	9.6	15.1	15.1	15.7	21.9	21.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.0	2.3	0.1	12.5	0.2	0.0	0.7	0.2	0.4	1.5	0.2	
Delay (s)	29.6	18.6	12.3	38.1	11.5	9.6	15.8	15.4	16.1	23.4	21.5	
Level of Service	C	B	B	D	B	A	B	B	B	C	C	
Approach Delay (s)		18.4			19.5			15.9			22.1	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	58.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

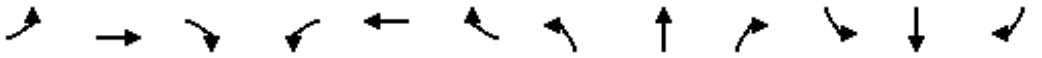
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	307	78	77	169	40	48	237	99	60	246	72
Future Volume (vph)	107	307	78	77	169	40	48	237	99	60	246	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.97		1.00	0.96		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)	1770	3432		1770	1810		1770	3383		1770	3419	
Flt Permitted	0.62	1.00		0.51	1.00		0.54	1.00		0.53	1.00	
Satd. Flow (perm)	1149	3432		944	1810		1014	3383		994	3419	
Peak-hour factor, PHF	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)	116	334	85	84	184	43	52	258	108	65	267	78
RTOR Reduction (vph)	0	54	0	0	20	0	0	75	0	0	54	0
Lane Group Flow (vph)	116	365	0	84	207	0	52	291	0	65	291	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.3	9.3		9.3	9.3		8.1	8.1		8.1	8.1	
Effective Green, g (s)	9.3	9.3		9.3	9.3		8.1	8.1		8.1	8.1	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.31	0.31		0.31	0.31	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	404	1209		332	637		311	1037		304	1049	
v/s Ratio Prot		0.11			c0.11			c0.09			0.09	
v/s Ratio Perm	0.10			0.09			0.05			0.07		
v/c Ratio	0.29	0.30		0.25	0.32		0.17	0.28		0.21	0.28	
Uniform Delay, d1	6.2	6.2		6.1	6.3		6.7	6.9		6.8	6.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.1		0.4	0.3		0.3	0.1		0.4	0.1	
Delay (s)	6.6	6.3		6.5	6.6		6.9	7.1		7.1	7.1	
Level of Service	A	A		A	A		A	A		A	A	
Approach Delay (s)		6.4			6.5			7.1			7.1	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	26.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		

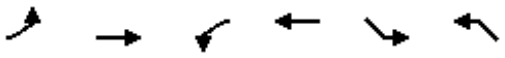
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	1021	186	25	819	74	164	106	27	111	107	100
Future Volume (vph)	144	1021	186	25	819	74	164	106	27	111	107	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1806		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.62	1.00		0.67	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1152	1806		1239	1863	1583
Peak-hour factor, PHF	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)	157	1110	202	27	890	80	178	115	29	121	116	109
RTOR Reduction (vph)	0	0	91	0	0	52	0	15	0	0	0	91
Lane Group Flow (vph)	157	1110	111	27	890	28	178	129	0	121	116	18
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8	2			6		6
Actuated Green, G (s)	7.5	28.3	28.3	1.9	22.7	22.7	16.7	11.7		14.5	10.6	10.6
Effective Green, g (s)	7.5	28.3	28.3	1.9	22.7	22.7	16.7	11.7		14.5	10.6	10.6
Actuated g/C Ratio	0.12	0.44	0.44	0.03	0.36	0.36	0.26	0.18		0.23	0.17	0.17
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	208	1569	702	52	1259	563	349	331		314	309	263
v/s Ratio Prot	c0.09	c0.31		0.02	0.25		c0.04	0.07		0.02	0.06	
v/s Ratio Perm			0.07			0.02	c0.09			0.06		0.01
v/c Ratio	0.75	0.71	0.16	0.52	0.71	0.05	0.51	0.39		0.39	0.38	0.07
Uniform Delay, d1	27.3	14.4	10.6	30.5	17.7	13.5	19.4	22.9		20.4	23.7	22.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	14.4	1.5	0.1	8.5	1.8	0.0	1.3	0.8		0.8	0.8	0.1
Delay (s)	41.6	15.9	10.7	39.0	19.5	13.5	20.7	23.7		21.2	24.4	22.5
Level of Service	D	B	B	D	B	B	C	C		C	C	C
Approach Delay (s)		17.9			19.6			22.0			22.7	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	63.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		

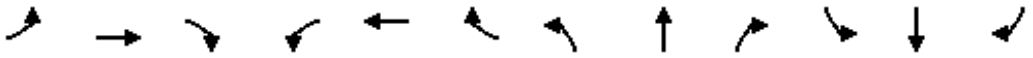
c Critical Lane Group



Movement	EBL	EBT	WBL	WBT	SEL	NWL
Lane Configurations						
Traffic Volume (vph)	213	654	219	723	280	61
Future Volume (vph)	213	654	219	723	280	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.91	0.97	0.91	0.97	0.97
Frt	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	0.95
Satd. Flow (prot)	3433	5085	3433	5085	3433	3433
Flt Permitted	0.95	1.00	0.95	1.00	0.95	0.95
Satd. Flow (perm)	3433	5085	3433	5085	3433	3433
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	232	711	238	786	304	66
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	232	711	238	786	304	66
Turn Type	Prot	NA	Prot	NA	Prot	Prot
Protected Phases	5	2	1	6	7	3
Permitted Phases						
Actuated Green, G (s)	3.7	12.4	5.4	14.1	5.8	5.8
Effective Green, g (s)	3.7	12.4	5.4	14.1	5.8	5.8
Actuated g/C Ratio	0.10	0.33	0.15	0.38	0.16	0.16
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	342	1699	499	1932	536	536
v/s Ratio Prot	0.07	0.14	c0.07	c0.15	c0.09	0.02
v/s Ratio Perm						
v/c Ratio	0.68	0.42	0.48	0.41	0.57	0.12
Uniform Delay, d1	16.1	9.6	14.6	8.4	14.5	13.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.3	0.2	0.7	0.1	1.4	0.1
Delay (s)	21.4	9.7	15.3	8.6	15.9	13.6
Level of Service	C	A	B	A	B	B
Approach Delay (s)		12.6		10.1		
Approach LOS		B		B		

Intersection Summary			
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	37.1	Sum of lost time (s)	13.5
Intersection Capacity Utilization	39.3%	ICU Level of Service	A
Analysis Period (min)	15		

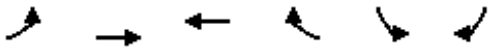
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	1197	19	63	984	36	36	6	36	28	5	12
Future Volume (vph)	53	1197	19	63	984	36	36	6	36	28	5	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.87		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5073		1770	5058		1770	1626		1770	1661	
Flt Permitted	0.22	1.00		0.22	1.00		0.75	1.00		0.73	1.00	
Satd. Flow (perm)	419	5073		416	5058		1389	1626		1354	1661	
Peak-hour factor, PHF	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)	58	1301	21	68	1070	39	39	7	39	30	5	13
RTOR Reduction (vph)	0	3	0	0	7	0	0	25	0	0	8	0
Lane Group Flow (vph)	58	1319	0	68	1102	0	39	21	0	30	10	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.6	17.8		20.8	17.9		18.6	18.6		18.6	18.6	
Effective Green, g (s)	20.6	17.8		20.8	17.9		18.6	18.6		18.6	18.6	
Actuated g/C Ratio	0.39	0.34		0.39	0.34		0.35	0.35		0.35	0.35	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	235	1710		238	1714		489	572		476	585	
v/s Ratio Prot	0.01	c0.26		c0.02	0.22			0.01			0.01	
v/s Ratio Perm	0.08			0.10			c0.03			0.02		
v/c Ratio	0.25	0.77		0.29	0.64		0.08	0.04		0.06	0.02	
Uniform Delay, d1	15.0	15.7		16.9	14.8		11.4	11.2		11.3	11.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	2.2		0.7	0.8		0.3	0.1		0.3	0.1	
Delay (s)	15.5	17.9		17.6	15.6		11.7	11.3		11.6	11.2	
Level of Service	B	B		B	B		B	B		B	B	
Approach Delay (s)		17.8			15.7			11.5			11.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	52.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

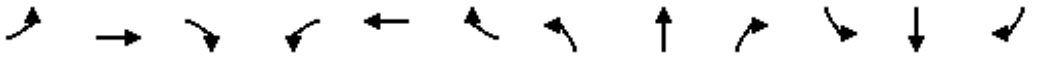
c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	132	321	164	50	30	90
Future Volume (Veh/h)	132	321	164	50	30	90
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)	143	349	178	54	33	98
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	232				840	205
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	232				840	205
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	89				89	88
cM capacity (veh/h)	1336				299	836

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	143	349	232	33	98
Volume Left	143	0	0	33	0
Volume Right	0	0	54	0	98
cSH	1336	1700	1700	299	836
Volume to Capacity	0.11	0.21	0.14	0.11	0.12
Queue Length 95th (ft)	9	0	0	9	10
Control Delay (s)	8.0	0.0	0.0	18.5	9.9
Lane LOS	A			C	A
Approach Delay (s)	2.3		0.0	12.1	
Approach LOS				B	

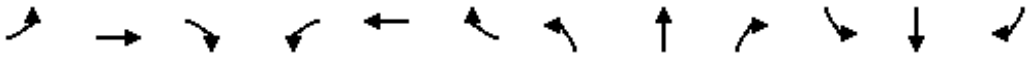
Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	32.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	1	20	16	6	33	13	359	7	9	396	50
Future Volume (Veh/h)	63	1	20	16	6	33	13	359	7	9	396	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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)	68	1	22	17	7	36	14	390	8	10	430	54
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	740	903	242	680	926	199	484			398		
vC1, stage 1 conf vol	477	477		422	422							
vC2, stage 2 conf vol	262	426		258	504							
vCu, unblocked vol	740	903	242	680	926	199	484			398		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	86	100	97	97	98	96	99			99		
cM capacity (veh/h)	470	451	759	504	440	809	1075			1157		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	68	23	17	43	14	260	138	10	287	197
Volume Left	68	0	17	0	14	0	0	10	0	0
Volume Right	0	22	0	36	0	0	8	0	0	54
cSH	470	737	504	712	1075	1700	1700	1157	1700	1700
Volume to Capacity	0.14	0.03	0.03	0.06	0.01	0.15	0.08	0.01	0.17	0.12
Queue Length 95th (ft)	13	2	3	5	1	0	0	1	0	0
Control Delay (s)	14.0	10.0	12.4	10.4	8.4	0.0	0.0	8.1	0.0	0.0
Lane LOS	B	B	B	B	A			A		
Approach Delay (s)	13.0		11.0		0.3			0.2		
Approach LOS	B		B							

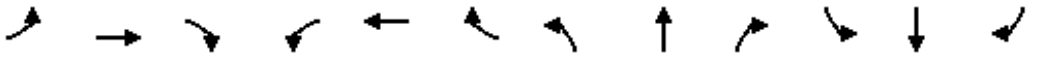
Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	29.4%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	296	105	283	883	51	80	139	235	57	265	16
Future Volume (vph)	6	296	105	283	883	51	80	139	235	57	265	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	1863	1583	1770	3510	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.39	1.00	1.00	0.66	1.00	
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	720	1863	1583	1231	3510	
Peak-hour factor, PHF	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)	7	322	114	308	960	55	87	151	255	62	288	17
RTOR Reduction (vph)	0	0	81	0	0	34	0	0	171	0	7	0
Lane Group Flow (vph)	7	322	33	308	960	21	87	151	84	62	298	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases			4			8	2		2	6		
Actuated Green, G (s)	0.8	14.8	14.8	5.8	19.8	19.8	16.8	16.8	16.8	9.7	9.7	
Effective Green, g (s)	0.8	14.8	14.8	5.8	19.8	19.8	16.8	16.8	16.8	9.7	9.7	
Actuated g/C Ratio	0.02	0.29	0.29	0.11	0.39	0.39	0.33	0.33	0.33	0.19	0.19	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	53	1029	460	391	1376	615	291	614	522	234	668	
v/s Ratio Prot	0.00	0.09		c0.09	c0.27		0.02	c0.08			c0.08	
v/s Ratio Perm			0.02			0.01	0.08		0.05	0.05		
v/c Ratio	0.13	0.31	0.07	0.79	0.70	0.03	0.30	0.25	0.16	0.26	0.45	
Uniform Delay, d1	24.7	14.1	13.1	22.0	13.0	9.6	12.2	12.4	12.1	17.6	18.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	0.2	0.1	10.1	1.6	0.0	0.6	0.2	0.1	0.6	0.5	
Delay (s)	25.8	14.3	13.1	32.0	14.6	9.7	12.8	12.6	12.2	18.2	18.7	
Level of Service	C	B	B	C	B	A	B	B	B	B	B	
Approach Delay (s)		14.2			18.5			12.4			18.6	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	50.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

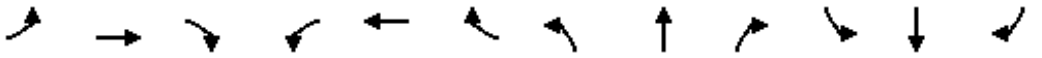
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	115	36	91	302	122	50	240	44	103	155	79
Future Volume (vph)	53	115	36	91	302	122	50	240	44	103	155	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.96		1.00	0.98		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3413		1770	1782		1770	3457		1770	3359	
Flt Permitted	0.42	1.00		0.65	1.00		0.59	1.00		0.56	1.00	
Satd. Flow (perm)	790	3413		1207	1782		1107	3457		1050	3359	
Peak-hour factor, PHF	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)	58	125	39	99	328	133	54	261	48	112	168	86
RTOR Reduction (vph)	0	23	0	0	32	0	0	33	0	0	60	0
Lane Group Flow (vph)	58	141	0	99	429	0	54	276	0	112	194	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.6	12.6		12.6	12.6		9.5	9.5		9.5	9.5	
Effective Green, g (s)	12.6	12.6		12.6	12.6		9.5	9.5		9.5	9.5	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.31	0.31		0.31	0.31	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	320	1382		489	721		338	1055		320	1026	
v/s Ratio Prot		0.04			c0.24			0.08			0.06	
v/s Ratio Perm	0.07			0.08			0.05			c0.11		
v/c Ratio	0.18	0.10		0.20	0.59		0.16	0.26		0.35	0.19	
Uniform Delay, d1	5.9	5.7		6.0	7.2		7.9	8.2		8.4	8.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.0		0.2	1.3		0.2	0.1		0.7	0.1	
Delay (s)	6.2	5.8		6.2	8.6		8.1	8.3		9.1	8.1	
Level of Service	A	A		A	A		A	A		A	A	
Approach Delay (s)		5.9			8.2			8.3			8.4	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	31.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

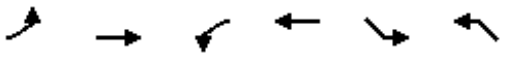
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	644	123	18	1173	26	196	57	30	44	52	99
Future Volume (vph)	33	644	123	18	1173	26	196	57	30	44	52	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1766		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.54	1.00		0.70	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1008	1766		1295	1863	1583
Peak-hour factor, PHF	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)	36	700	134	20	1275	28	213	62	33	48	57	108
RTOR Reduction (vph)	0	0	78	0	0	17	0	25	0	0	0	89
Lane Group Flow (vph)	36	700	56	20	1275	11	213	70	0	48	57	19
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8	2			6		6
Actuated Green, G (s)	2.7	25.2	25.2	1.3	23.8	23.8	19.3	14.1		12.3	10.6	10.6
Effective Green, g (s)	2.7	25.2	25.2	1.3	23.8	23.8	19.3	14.1		12.3	10.6	10.6
Actuated g/C Ratio	0.04	0.42	0.42	0.02	0.39	0.39	0.32	0.23		0.20	0.18	0.18
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	79	1478	661	38	1396	624	388	412		277	327	278
v/s Ratio Prot	c0.02	0.20		0.01	c0.36		c0.05	0.04		0.00	0.03	
v/s Ratio Perm			0.04			0.01	c0.13			0.03		0.01
v/c Ratio	0.46	0.47	0.08	0.53	0.91	0.02	0.55	0.17		0.17	0.17	0.07
Uniform Delay, d1	28.1	12.7	10.6	29.2	17.3	11.1	16.2	18.4		19.6	21.1	20.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.1	0.2	0.1	12.5	9.4	0.0	1.6	0.2		0.3	0.3	0.1
Delay (s)	32.2	13.0	10.6	41.7	26.6	11.1	17.8	18.6		19.9	21.4	20.8
Level of Service	C	B	B	D	C	B	B	B		B	C	C
Approach Delay (s)		13.4			26.5			18.0			20.8	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	60.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		

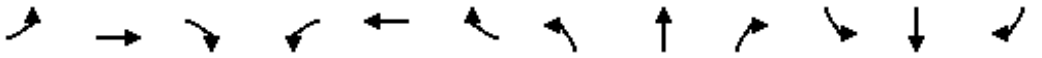
c Critical Lane Group



Movement	EBL	EBT	WBL	WBT	SEL	NWL
Lane Configurations						
Traffic Volume (vph)	127	446	410	1048	205	106
Future Volume (vph)	127	446	410	1048	205	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.91	0.97	0.91	0.97	0.97
Frt	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	0.95
Satd. Flow (prot)	3433	5085	3433	5085	3433	3433
Flt Permitted	0.95	1.00	0.95	1.00	0.95	0.95
Satd. Flow (perm)	3433	5085	3433	5085	3433	3433
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	138	485	446	1139	223	115
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	138	485	446	1139	223	115
Turn Type	Prot	NA	Prot	NA	Prot	Prot
Protected Phases	5	2	1	6	7	3
Permitted Phases						
Actuated Green, G (s)	3.7	15.9	7.9	20.1	4.0	4.0
Effective Green, g (s)	3.7	15.9	7.9	20.1	4.0	4.0
Actuated g/C Ratio	0.09	0.38	0.19	0.49	0.10	0.10
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	307	1957	656	2474	332	332
v/s Ratio Prot	0.04	0.10	c0.13	c0.22	c0.06	0.03
v/s Ratio Perm						
v/c Ratio	0.45	0.25	0.68	0.46	0.67	0.35
Uniform Delay, d1	17.8	8.6	15.5	7.0	18.0	17.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.1	2.8	0.1	5.3	0.6
Delay (s)	18.9	8.7	18.3	7.1	23.3	18.1
Level of Service	B	A	B	A	C	B
Approach Delay (s)		11.0		10.3		
Approach LOS		B		B		

Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	41.3	Sum of lost time (s)	13.5
Intersection Capacity Utilization	41.5%	ICU Level of Service	A
Analysis Period (min)	15		

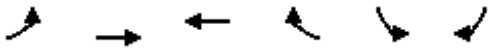
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	578	7	47	1327	19	11	6	3	43	5	19
Future Volume (vph)	25	578	7	47	1327	19	11	6	3	43	5	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5076		1770	5074		1770	1779		1770	1637	
Flt Permitted	0.20	1.00		0.38	1.00		0.74	1.00		0.75	1.00	
Satd. Flow (perm)	376	5076		712	5074		1379	1779		1399	1637	
Peak-hour factor, PHF	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)	27	628	8	51	1442	21	12	7	3	47	5	21
RTOR Reduction (vph)	0	2	0	0	2	0	0	2	0	0	14	0
Lane Group Flow (vph)	27	634	0	51	1461	0	12	8	0	47	12	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	21.6	19.8		25.8	21.9		19.1	19.1		19.1	19.1	
Effective Green, g (s)	21.6	19.8		25.8	21.9		19.1	19.1		19.1	19.1	
Actuated g/C Ratio	0.38	0.35		0.46	0.39		0.34	0.34		0.34	0.34	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	188	1785		399	1973		467	603		474	555	
v/s Ratio Prot	0.00	0.12		c0.01	c0.29			0.00			0.01	
v/s Ratio Perm	0.05			0.05			0.01			c0.03		
v/c Ratio	0.14	0.36		0.13	0.74		0.03	0.01		0.10	0.02	
Uniform Delay, d1	18.5	13.5		9.4	14.8		12.4	12.3		12.7	12.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.1		0.1	1.5		0.1	0.0		0.4	0.1	
Delay (s)	18.8	13.6		9.6	16.3		12.5	12.4		13.1	12.5	
Level of Service	B	B		A	B		B	B		B	B	
Approach Delay (s)		13.9			16.1			12.4			12.9	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	56.3	Sum of lost time (s)	13.5
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

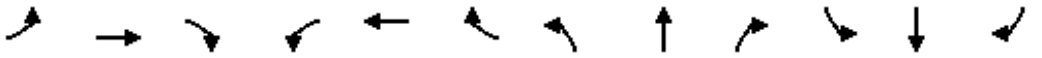
c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	83	198	389	50	75	186
Future Volume (Veh/h)	83	198	389	50	75	186
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)	90	215	423	54	82	202
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	477				845	450
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	477				845	450
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				73	67
cM capacity (veh/h)	1085				305	609

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	90	215	477	82	202
Volume Left	90	0	0	82	0
Volume Right	0	0	54	0	202
cSH	1085	1700	1700	305	609
Volume to Capacity	0.08	0.13	0.28	0.27	0.33
Queue Length 95th (ft)	7	0	0	27	36
Control Delay (s)	8.6	0.0	0.0	21.1	13.8
Lane LOS	A			C	B
Approach Delay (s)	2.5		0.0	15.9	
Approach LOS				C	

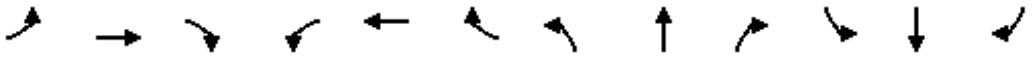
Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	45	23	77	39	43	22	314	100	24	183	49
Future Volume (Veh/h)	105	45	23	77	39	43	22	314	100	24	183	49
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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)	114	49	25	84	42	47	24	341	109	26	199	53
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	564	776	126	644	748	225	252			450		
vC1, stage 1 conf vol	278	278		444	444							
vC2, stage 2 conf vol	286	498		201	304							
vCu, unblocked vol	564	776	126	644	748	225	252			450		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	78	89	97	83	91	94	98			98		
cM capacity (veh/h)	511	464	901	488	489	778	1310			1107		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	114	74	84	89	24	227	223	26	133	119
Volume Left	114	0	84	0	24	0	0	26	0	0
Volume Right	0	25	0	47	0	0	109	0	0	53
cSH	511	555	488	608	1310	1700	1700	1107	1700	1700
Volume to Capacity	0.22	0.13	0.17	0.15	0.02	0.13	0.13	0.02	0.08	0.07
Queue Length 95th (ft)	21	11	15	13	1	0	0	2	0	0
Control Delay (s)	14.0	12.5	13.9	11.9	7.8	0.0	0.0	8.3	0.0	0.0
Lane LOS	B	B	B	B	A			A		
Approach Delay (s)	13.4		12.9		0.4			0.8		
Approach LOS	B		B							

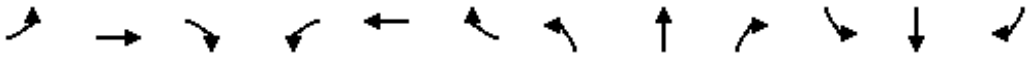
Intersection Summary				
Average Delay	4.6			
Intersection Capacity Utilization	37.7%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	865	101	265	571	77	108	131	326	92	128	20
Future Volume (vph)	17	865	101	265	571	77	108	131	326	92	128	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	1863	1583	1770	3467	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.45	1.00	1.00	0.67	1.00	
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	835	1863	1583	1241	3467	
Peak-hour factor, PHF	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)	18	940	110	288	621	84	117	142	354	100	139	22
RTOR Reduction (vph)	0	0	70	0	0	46	0	0	170	0	18	0
Lane Group Flow (vph)	18	940	40	288	621	38	117	142	184	100	143	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases			4			8	2		2	6		
Actuated Green, G (s)	0.9	21.9	21.9	6.0	27.0	27.0	18.3	18.3	18.3	10.0	10.0	
Effective Green, g (s)	0.9	21.9	21.9	6.0	27.0	27.0	18.3	18.3	18.3	10.0	10.0	
Actuated g/C Ratio	0.02	0.37	0.37	0.10	0.45	0.45	0.31	0.31	0.31	0.17	0.17	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	51	1298	580	345	1600	715	315	571	485	207	580	
v/s Ratio Prot	0.01	c0.27		c0.08	0.18		0.02	0.08			0.04	
v/s Ratio Perm			0.03			0.02	0.09		c0.12	c0.08		
v/c Ratio	0.35	0.72	0.07	0.83	0.39	0.05	0.37	0.25	0.38	0.48	0.25	
Uniform Delay, d1	29.1	16.3	12.3	26.4	10.9	9.2	15.6	15.5	16.2	22.5	21.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.2	2.0	0.1	15.8	0.2	0.0	0.7	0.2	0.5	1.8	0.2	
Delay (s)	33.3	18.3	12.3	42.2	11.0	9.2	16.3	15.8	16.7	24.3	21.8	
Level of Service	C	B	B	D	B	A	B	B	B	C	C	
Approach Delay (s)		18.0			19.9			16.4			22.8	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	59.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		

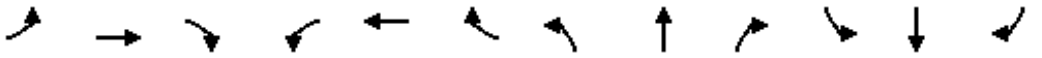
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	111	335	101	109	203	58	49	238	131	69	238	61
Future Volume (vph)	111	335	101	109	203	58	49	238	131	69	238	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.97		1.00	0.95		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)	1770	3416		1770	1801		1770	3351		1770	3431	
Flt Permitted	0.59	1.00		0.48	1.00		0.56	1.00		0.52	1.00	
Satd. Flow (perm)	1091	3416		895	1801		1034	3351		961	3431	
Peak-hour factor, PHF	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)	121	364	110	118	221	63	53	259	142	75	259	66
RTOR Reduction (vph)	0	67	0	0	24	0	0	98	0	0	46	0
Lane Group Flow (vph)	121	407	0	118	260	0	53	303	0	75	279	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.0	10.0		10.0	10.0		8.5	8.5		8.5	8.5	
Effective Green, g (s)	10.0	10.0		10.0	10.0		8.5	8.5		8.5	8.5	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.31	0.31		0.31	0.31	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	396	1242		325	654		319	1035		297	1060	
v/s Ratio Prot		0.12			c0.14			c0.09			0.08	
v/s Ratio Perm	0.11			0.13			0.05			0.08		
v/c Ratio	0.31	0.33		0.36	0.40		0.17	0.29		0.25	0.26	
Uniform Delay, d1	6.3	6.3		6.4	6.5		6.9	7.2		7.1	7.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.2		0.7	0.4		0.2	0.2		0.4	0.1	
Delay (s)	6.7	6.5		7.1	6.9		7.2	7.4		7.6	7.3	
Level of Service	A	A		A	A		A	A		A	A	
Approach Delay (s)		6.5			7.0			7.4			7.3	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	27.5	Sum of lost time (s)	9.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

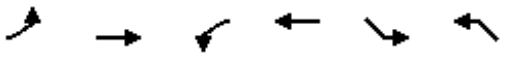
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	152	1141	239	28	894	76	206	107	31	113	94	114
Future Volume (vph)	152	1141	239	28	894	76	206	107	31	113	94	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1799		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.62	1.00		0.66	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1161	1799		1232	1863	1583
Peak-hour factor, PHF	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)	165	1240	260	30	972	83	224	116	34	123	102	124
RTOR Reduction (vph)	0	0	81	0	0	52	0	16	0	0	0	104
Lane Group Flow (vph)	165	1240	179	30	972	31	224	134	0	123	102	20
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8	2			6		6
Actuated Green, G (s)	8.5	32.2	32.2	1.9	25.6	25.6	17.3	12.2		14.9	11.0	11.0
Effective Green, g (s)	8.5	32.2	32.2	1.9	25.6	25.6	17.3	12.2		14.9	11.0	11.0
Actuated g/C Ratio	0.12	0.47	0.47	0.03	0.38	0.38	0.25	0.18		0.22	0.16	0.16
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	220	1670	747	49	1328	594	340	321		299	300	255
v/s Ratio Prot	c0.09	c0.35		0.02	0.27		c0.05	0.07		0.02	0.05	
v/s Ratio Perm			0.11			0.02	c0.12			0.07		0.01
v/c Ratio	0.75	0.74	0.24	0.61	0.73	0.05	0.66	0.42		0.41	0.34	0.08
Uniform Delay, d1	28.8	14.6	10.7	32.8	18.3	13.6	22.2	24.9		22.4	25.4	24.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	13.4	1.8	0.2	20.5	2.1	0.0	4.6	0.9		0.9	0.7	0.1
Delay (s)	42.2	16.5	10.9	53.3	20.5	13.6	26.8	25.7		23.3	26.1	24.4
Level of Service	D	B	B	D	C	B	C	C		C	C	C
Approach Delay (s)		18.1			20.8			26.4			24.5	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	68.2	Sum of lost time (s)	18.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

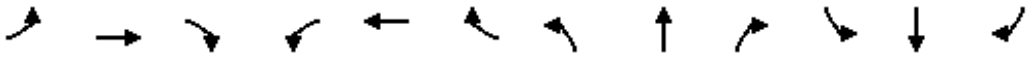
c Critical Lane Group



Movement	EBL	EBT	WBL	WBT	SEL	NWL
Lane Configurations						
Traffic Volume (vph)	213	926	219	662	293	172
Future Volume (vph)	213	926	219	662	293	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.91	0.97	0.91	0.97	0.97
Frt	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	0.95
Satd. Flow (prot)	3433	5085	3433	5085	3433	3433
Flt Permitted	0.95	1.00	0.95	1.00	0.95	0.95
Satd. Flow (perm)	3433	5085	3433	5085	3433	3433
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	232	1007	238	720	318	187
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	232	1007	238	720	318	187
Turn Type	Prot	NA	Prot	NA	Prot	Prot
Protected Phases	5	2	1	6	7	3
Permitted Phases						
Actuated Green, G (s)	3.7	15.8	5.4	17.5	5.8	5.8
Effective Green, g (s)	3.7	15.8	5.4	17.5	5.8	5.8
Actuated g/C Ratio	0.09	0.39	0.13	0.43	0.14	0.14
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	313	1983	457	2197	491	491
v/s Ratio Prot	0.07	c0.20	c0.07	0.14	c0.09	0.05
v/s Ratio Perm						
v/c Ratio	0.74	0.51	0.52	0.33	0.65	0.38
Uniform Delay, d1	17.9	9.4	16.3	7.6	16.4	15.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.1	0.2	1.1	0.1	2.9	0.5
Delay (s)	27.0	9.6	17.4	7.7	19.3	16.2
Level of Service	C	A	B	A	B	B
Approach Delay (s)		12.9		10.1		
Approach LOS		B		B		

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	40.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

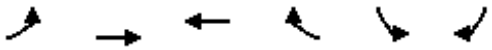
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	1225	19	63	1038	36	36	6	36	82	5	21
Future Volume (vph)	53	1225	19	63	1038	36	36	6	36	82	5	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.87		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5073		1770	5060		1770	1626		1770	1633	
Flt Permitted	0.22	1.00		0.22	1.00		0.74	1.00		0.73	1.00	
Satd. Flow (perm)	416	5073		416	5060		1377	1626		1354	1633	
Peak-hour factor, PHF	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)	58	1332	21	68	1128	39	39	7	39	89	5	23
RTOR Reduction (vph)	0	3	0	0	7	0	0	25	0	0	15	0
Lane Group Flow (vph)	58	1350	0	68	1160	0	39	21	0	89	13	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.7	17.9		20.7	17.9		18.6	18.6		18.6	18.6	
Effective Green, g (s)	20.7	17.9		20.7	17.9		18.6	18.6		18.6	18.6	
Actuated g/C Ratio	0.39	0.34		0.39	0.34		0.35	0.35		0.35	0.35	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	234	1719		234	1715		485	572		476	575	
v/s Ratio Prot	0.01	c0.27		c0.02	0.23			0.01			0.01	
v/s Ratio Perm	0.08			0.10			0.03			c0.07		
v/c Ratio	0.25	0.79		0.29	0.68		0.08	0.04		0.19	0.02	
Uniform Delay, d1	15.4	15.7		17.2	15.0		11.4	11.2		11.9	11.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	2.4		0.7	1.1		0.3	0.1		0.9	0.1	
Delay (s)	16.0	18.2		17.9	16.0		11.7	11.3		12.7	11.2	
Level of Service	B	B		B	B		B	B		B	B	
Approach Delay (s)		18.1			16.1			11.5			12.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	52.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		

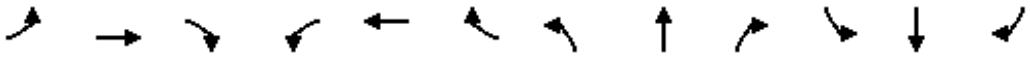
c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	132	394	164	50	30	90
Future Volume (Veh/h)	132	394	164	50	30	90
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)	143	428	178	54	33	98
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	232				919	205
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	232				919	205
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	89				88	88
cM capacity (veh/h)	1336				269	836

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	143	428	232	33	98
Volume Left	143	0	0	33	0
Volume Right	0	0	54	0	98
cSH	1336	1700	1700	269	836
Volume to Capacity	0.11	0.25	0.14	0.12	0.12
Queue Length 95th (ft)	9	0	0	10	10
Control Delay (s)	8.0	0.0	0.0	20.3	9.9
Lane LOS	A			C	A
Approach Delay (s)	2.0		0.0	12.5	
Approach LOS				B	

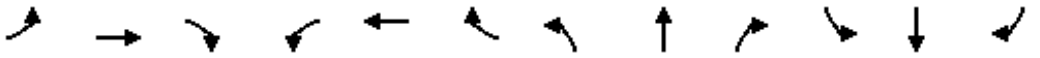
Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	32.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	1	20	16	6	33	13	359	7	9	396	50
Future Volume (Veh/h)	63	1	20	16	6	33	13	359	7	9	396	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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)	68	1	22	17	7	36	14	390	8	10	430	54
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	740	903	242	680	926	199	484			398		
vC1, stage 1 conf vol	477	477		422	422							
vC2, stage 2 conf vol	262	426		258	504							
vCu, unblocked vol	740	903	242	680	926	199	484			398		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	86	100	97	97	98	96	99			99		
cM capacity (veh/h)	470	451	759	504	440	809	1075			1157		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	68	23	17	43	14	260	138	10	287	197
Volume Left	68	0	17	0	14	0	0	10	0	0
Volume Right	0	22	0	36	0	0	8	0	0	54
cSH	470	737	504	712	1075	1700	1700	1157	1700	1700
Volume to Capacity	0.14	0.03	0.03	0.06	0.01	0.15	0.08	0.01	0.17	0.12
Queue Length 95th (ft)	13	2	3	5	1	0	0	1	0	0
Control Delay (s)	14.0	10.0	12.4	10.4	8.4	0.0	0.0	8.1	0.0	0.0
Lane LOS	B	B	B	B	A			A		
Approach Delay (s)	13.0		11.0		0.3			0.2		
Approach LOS	B		B							

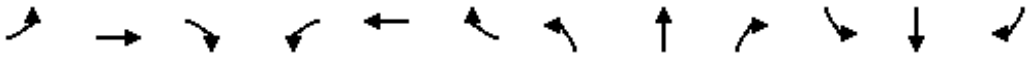
Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	29.4%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	296	123	337	883	51	131	139	388	57	265	16
Future Volume (vph)	6	296	123	337	883	51	131	139	388	57	265	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	1863	1583	1770	3510	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.39	1.00	1.00	0.66	1.00	
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	720	1863	1583	1231	3510	
Peak-hour factor, PHF	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)	7	322	134	366	960	55	142	151	422	62	288	17
RTOR Reduction (vph)	0	0	97	0	0	34	0	0	278	0	7	0
Lane Group Flow (vph)	7	322	37	366	960	21	142	151	144	62	298	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases			4			8	2		2	6		
Actuated Green, G (s)	0.9	14.6	14.6	6.8	20.5	20.5	18.0	18.0	18.0	9.7	9.7	
Effective Green, g (s)	0.9	14.6	14.6	6.8	20.5	20.5	18.0	18.0	18.0	9.7	9.7	
Actuated g/C Ratio	0.02	0.28	0.28	0.13	0.39	0.39	0.34	0.34	0.34	0.18	0.18	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	58	976	436	441	1371	613	320	633	538	225	643	
v/s Ratio Prot	0.00	0.09		c0.11	c0.27		c0.03	0.08			0.08	
v/s Ratio Perm			0.02			0.01	c0.12		0.09	0.05		
v/c Ratio	0.12	0.33	0.08	0.83	0.70	0.03	0.44	0.24	0.27	0.28	0.46	
Uniform Delay, d1	25.6	15.3	14.2	22.5	13.6	10.1	12.7	12.5	12.7	18.6	19.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	0.2	0.1	12.2	1.6	0.0	1.0	0.2	0.3	0.7	0.5	
Delay (s)	26.5	15.5	14.3	34.7	15.3	10.1	13.7	12.7	12.9	19.2	19.8	
Level of Service	C	B	B	C	B	B	B	B	B	B	B	
Approach Delay (s)		15.3			20.2			13.0			19.7	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	52.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		

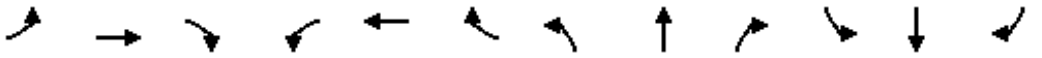
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	123	36	116	319	125	50	246	56	111	181	97
Future Volume (vph)	57	123	36	116	319	125	50	246	56	111	181	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.96		1.00	0.97		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3420		1770	1784		1770	3440		1770	3355	
Flt Permitted	0.40	1.00		0.64	1.00		0.57	1.00		0.55	1.00	
Satd. Flow (perm)	740	3420		1197	1784		1057	3440		1031	3355	
Peak-hour factor, PHF	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)	62	134	39	126	347	136	54	267	61	121	197	105
RTOR Reduction (vph)	0	23	0	0	31	0	0	42	0	0	73	0
Lane Group Flow (vph)	62	150	0	126	452	0	54	286	0	121	229	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	13.1	13.1		13.1	13.1		9.9	9.9		9.9	9.9	
Effective Green, g (s)	13.1	13.1		13.1	13.1		9.9	9.9		9.9	9.9	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.31	0.31		0.31	0.31	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	302	1400		490	730		327	1064		318	1037	
v/s Ratio Prot		0.04			c0.25			0.08			0.07	
v/s Ratio Perm	0.08			0.11			0.05			c0.12		
v/c Ratio	0.21	0.11		0.26	0.62		0.17	0.27		0.38	0.22	
Uniform Delay, d1	6.1	5.8		6.2	7.5		8.0	8.3		8.6	8.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.0		0.3	1.6		0.2	0.1		0.8	0.1	
Delay (s)	6.4	5.9		6.5	9.1		8.3	8.5		9.4	8.3	
Level of Service	A	A		A	A		A	A		A	A	
Approach Delay (s)		6.0			8.5			8.4			8.6	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	32.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

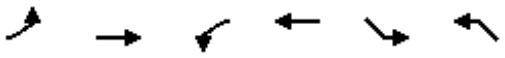
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	695	123	18	1191	26	196	57	30	44	52	99
Future Volume (vph)	33	695	123	18	1191	26	196	57	30	44	52	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1766		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.54	1.00		0.70	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1008	1766		1295	1863	1583
Peak-hour factor, PHF	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)	36	755	134	20	1295	28	213	62	33	48	57	108
RTOR Reduction (vph)	0	0	78	0	0	17	0	25	0	0	0	89
Lane Group Flow (vph)	36	755	56	20	1295	11	213	70	0	48	57	19
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8	2			6		6
Actuated Green, G (s)	2.7	25.2	25.2	1.3	23.8	23.8	19.3	14.1		12.3	10.6	10.6
Effective Green, g (s)	2.7	25.2	25.2	1.3	23.8	23.8	19.3	14.1		12.3	10.6	10.6
Actuated g/C Ratio	0.04	0.42	0.42	0.02	0.39	0.39	0.32	0.23		0.20	0.18	0.18
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	79	1478	661	38	1396	624	388	412		277	327	278
v/s Ratio Prot	c0.02	0.21		0.01	c0.37		c0.05	0.04		0.00	0.03	
v/s Ratio Perm			0.04			0.01	c0.13			0.03		0.01
v/c Ratio	0.46	0.51	0.08	0.53	0.93	0.02	0.55	0.17		0.17	0.17	0.07
Uniform Delay, d1	28.1	13.0	10.6	29.2	17.4	11.1	16.2	18.4		19.6	21.1	20.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.1	0.3	0.1	12.5	10.8	0.0	1.6	0.2		0.3	0.3	0.1
Delay (s)	32.2	13.3	10.6	41.7	28.2	11.1	17.8	18.6		19.9	21.4	20.8
Level of Service	C	B	B	D	C	B	B	B		B	C	C
Approach Delay (s)		13.6			28.1			18.0			20.8	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	60.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	61.2%	ICU Level of Service	B
Analysis Period (min)	15		

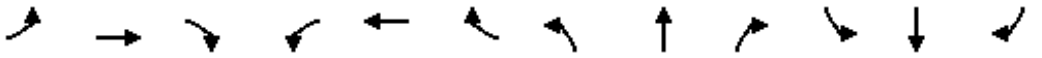
c Critical Lane Group



Movement	EBL	EBT	WBL	WBT	SEL	NWL
Lane Configurations						
Traffic Volume (vph)	127	446	410	1066	205	106
Future Volume (vph)	127	446	410	1066	205	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.91	0.97	0.91	0.97	0.97
Frt	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	0.95
Satd. Flow (prot)	3433	5085	3433	5085	3433	3433
Flt Permitted	0.95	1.00	0.95	1.00	0.95	0.95
Satd. Flow (perm)	3433	5085	3433	5085	3433	3433
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	138	485	446	1159	223	115
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	138	485	446	1159	223	115
Turn Type	Prot	NA	Prot	NA	Prot	Prot
Protected Phases	5	2	1	6	7	3
Permitted Phases						
Actuated Green, G (s)	3.7	16.2	7.9	20.4	4.0	4.0
Effective Green, g (s)	3.7	16.2	7.9	20.4	4.0	4.0
Actuated g/C Ratio	0.09	0.39	0.19	0.49	0.10	0.10
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	305	1980	651	2493	330	330
v/s Ratio Prot	0.04	0.10	c0.13	c0.23	c0.06	0.03
v/s Ratio Perm						
v/c Ratio	0.45	0.24	0.69	0.46	0.68	0.35
Uniform Delay, d1	18.0	8.6	15.7	7.0	18.2	17.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.1	3.0	0.1	5.4	0.6
Delay (s)	19.1	8.6	18.7	7.1	23.6	18.2
Level of Service	B	A	B	A	C	B
Approach Delay (s)		10.9		10.3		
Approach LOS		B		B		

Intersection Summary			
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	41.6	Sum of lost time (s)	13.5
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

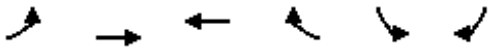
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	612	7	47	1339	19	11	6	3	43	5	19
Future Volume (vph)	25	612	7	47	1339	19	11	6	3	43	5	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5076		1770	5074		1770	1779		1770	1637	
Flt Permitted	0.20	1.00		0.36	1.00		0.74	1.00		0.75	1.00	
Satd. Flow (perm)	363	5076		677	5074		1379	1779		1399	1637	
Peak-hour factor, PHF	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)	27	665	8	51	1455	21	12	7	3	47	5	21
RTOR Reduction (vph)	0	2	0	0	2	0	0	2	0	0	14	0
Lane Group Flow (vph)	27	671	0	51	1474	0	12	8	0	47	12	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	22.3	20.5		25.5	22.1		19.1	19.1		19.1	19.1	
Effective Green, g (s)	22.3	20.5		25.5	22.1		19.1	19.1		19.1	19.1	
Actuated g/C Ratio	0.39	0.36		0.45	0.39		0.34	0.34		0.34	0.34	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	188	1841		371	1984		466	601		472	553	
v/s Ratio Prot	0.00	0.13		c0.01	c0.29			0.00			0.01	
v/s Ratio Perm	0.05			0.05			0.01			c0.03		
v/c Ratio	0.14	0.36		0.14	0.74		0.03	0.01		0.10	0.02	
Uniform Delay, d1	18.2	13.2		9.9	14.8		12.5	12.4		12.8	12.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.1		0.2	1.5		0.1	0.0		0.4	0.1	
Delay (s)	18.5	13.3		10.1	16.3		12.6	12.5		13.2	12.5	
Level of Service	B	B		B	B		B	B		B	B	
Approach Delay (s)		13.5			16.1			12.5			13.0	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	56.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

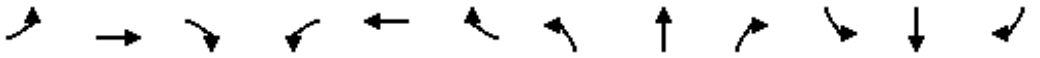
c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	83	232	401	50	75	186
Future Volume (Veh/h)	83	232	401	50	75	186
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)	90	252	436	54	82	202
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	490				895	463
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	490				895	463
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				71	66
cM capacity (veh/h)	1073				285	599

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	90	252	490	82	202
Volume Left	90	0	0	82	0
Volume Right	0	0	54	0	202
cSH	1073	1700	1700	285	599
Volume to Capacity	0.08	0.15	0.29	0.29	0.34
Queue Length 95th (ft)	7	0	0	29	37
Control Delay (s)	8.7	0.0	0.0	22.6	14.0
Lane LOS	A			C	B
Approach Delay (s)	2.3		0.0	16.5	
Approach LOS				C	

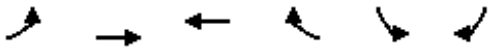
Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	48	26	77	48	196	30	365	100	72	207	49
Future Volume (Veh/h)	105	48	26	77	48	196	30	365	100	72	207	49
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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)	114	52	28	84	52	213	33	397	109	78	225	53
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	911	980	139	840	952	253	278			506		
vC1, stage 1 conf vol	408	408		518	518							
vC2, stage 2 conf vol	504	572		322	434							
vCu, unblocked vol	911	980	139	840	952	253	278			506		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	52	86	97	79	87	71	97			93		
cM capacity (veh/h)	235	370	884	393	408	746	1282			1055		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	114	80	84	265	33	265	241	78	150	128
Volume Left	114	0	84	0	33	0	0	78	0	0
Volume Right	0	28	0	213	0	0	109	0	0	53
cSH	235	465	393	642	1282	1700	1700	1055	1700	1700
Volume to Capacity	0.48	0.17	0.21	0.41	0.03	0.16	0.14	0.07	0.09	0.08
Queue Length 95th (ft)	61	15	20	51	2	0	0	6	0	0
Control Delay (s)	33.9	14.4	16.6	14.5	7.9	0.0	0.0	8.7	0.0	0.0
Lane LOS	D	B	C	B	A			A		
Approach Delay (s)	25.8		15.0		0.5			1.9		
Approach LOS	D		C							

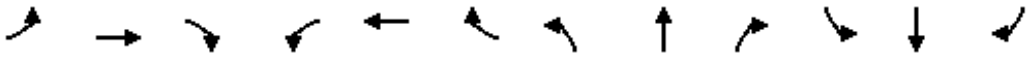
Intersection Summary				
Average Delay	7.8			
Intersection Capacity Utilization	51.0%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	286	539	6	10	21
Future Volume (Veh/h)	4	286	539	6	10	21
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)	4	311	586	7	11	23
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	593				908	590
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	593				908	590
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				96	95
cM capacity (veh/h)	983				304	508

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	4	311	593	11	23
Volume Left	4	0	0	11	0
Volume Right	0	0	7	0	23
cSH	983	1700	1700	304	508
Volume to Capacity	0.00	0.18	0.35	0.04	0.05
Queue Length 95th (ft)	0	0	0	3	4
Control Delay (s)	8.7	0.0	0.0	17.3	12.4
Lane LOS	A			C	B
Approach Delay (s)	0.1		0.0	14.0	
Approach LOS				B	

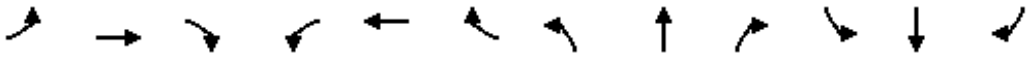
Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	38.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	865	161	445	571	77	148	131	446	92	128	20
Future Volume (vph)	17	865	161	445	571	77	148	131	446	92	128	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	1863	1583	1770	3467	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.47	1.00	1.00	0.67	1.00	
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	872	1863	1583	1241	3467	
Peak-hour factor, PHF	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)	18	940	175	484	621	84	161	142	485	100	139	22
RTOR Reduction (vph)	0	0	113	0	0	40	0	0	223	0	18	0
Lane Group Flow (vph)	18	940	62	484	621	44	161	142	262	100	143	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases			4			8	2		2	6		
Actuated Green, G (s)	0.9	26.5	26.5	13.1	38.7	38.7	21.2	21.2	21.2	11.6	11.6	
Effective Green, g (s)	0.9	26.5	26.5	13.1	38.7	38.7	21.2	21.2	21.2	11.6	11.6	
Actuated g/C Ratio	0.01	0.36	0.36	0.18	0.52	0.52	0.29	0.29	0.29	0.16	0.16	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	41	1262	564	605	1843	824	310	531	451	193	541	
v/s Ratio Prot	0.01	c0.27		c0.14	0.18		0.04	0.08			0.04	
v/s Ratio Perm			0.04			0.03	0.11		c0.17	0.08		
v/c Ratio	0.44	0.74	0.11	0.80	0.34	0.05	0.52	0.27	0.58	0.52	0.26	
Uniform Delay, d1	36.4	20.9	16.0	29.3	10.3	8.8	21.2	20.5	22.7	28.8	27.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.3	2.4	0.1	7.5	0.1	0.0	1.5	0.3	1.9	2.3	0.3	
Delay (s)	43.8	23.4	16.1	36.8	10.5	8.8	22.7	20.8	24.7	31.1	27.9	
Level of Service	D	C	B	D	B	A	C	C	C	C	C	
Approach Delay (s)		22.6			21.1			23.6			29.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	74.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		

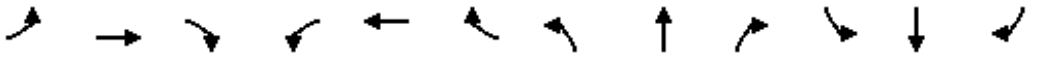
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	362	101	129	216	67	49	258	171	76	258	75
Future Volume (vph)	125	362	101	129	216	67	49	258	171	76	258	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.96		1.00	0.94		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)	1770	3423		1770	1797		1770	3327		1770	3419	
Flt Permitted	0.57	1.00		0.47	1.00		0.54	1.00		0.48	1.00	
Satd. Flow (perm)	1067	3423		870	1797		998	3327		902	3419	
Peak-hour factor, PHF	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)	136	393	110	140	235	73	53	280	186	83	280	82
RTOR Reduction (vph)	0	59	0	0	26	0	0	127	0	0	56	0
Lane Group Flow (vph)	136	444	0	140	282	0	53	339	0	83	306	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	11.1	11.1		11.1	11.1		9.3	9.3		9.3	9.3	
Effective Green, g (s)	11.1	11.1		11.1	11.1		9.3	9.3		9.3	9.3	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.32	0.32		0.32	0.32	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	402	1292		328	678		315	1052		285	1081	
v/s Ratio Prot		0.13			0.16			c0.10			0.09	
v/s Ratio Perm	0.13			c0.16			0.05			0.09		
v/c Ratio	0.34	0.34		0.43	0.42		0.17	0.32		0.29	0.28	
Uniform Delay, d1	6.5	6.5		6.8	6.8		7.3	7.7		7.6	7.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.2		0.9	0.4		0.3	0.2		0.6	0.1	
Delay (s)	7.0	6.7		7.7	7.2		7.5	7.8		8.1	7.7	
Level of Service	A	A		A	A		A	A		A	A	
Approach Delay (s)		6.8			7.3			7.8			7.8	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	29.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		

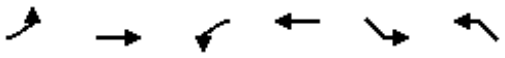
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	152	1181	239	28	954	76	206	107	31	113	94	114
Future Volume (vph)	152	1181	239	28	954	76	206	107	31	113	94	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1799		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.62	1.00		0.66	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1160	1799		1232	1863	1583
Peak-hour factor, PHF	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)	165	1284	260	30	1037	83	224	116	34	123	102	124
RTOR Reduction (vph)	0	0	80	0	0	51	0	16	0	0	0	104
Lane Group Flow (vph)	165	1284	180	30	1037	32	224	134	0	123	102	20
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8	2			6		6
Actuated Green, G (s)	8.5	32.7	32.7	1.9	26.1	26.1	17.2	12.1		14.8	10.9	10.9
Effective Green, g (s)	8.5	32.7	32.7	1.9	26.1	26.1	17.2	12.1		14.8	10.9	10.9
Actuated g/C Ratio	0.12	0.48	0.48	0.03	0.38	0.38	0.25	0.18		0.22	0.16	0.16
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	219	1686	754	49	1346	602	336	317		296	296	251
v/s Ratio Prot	c0.09	c0.36		0.02	0.29		c0.05	0.07		0.02	0.05	
v/s Ratio Perm			0.11			0.02	c0.12			0.07		0.01
v/c Ratio	0.75	0.76	0.24	0.61	0.77	0.05	0.67	0.42		0.42	0.34	0.08
Uniform Delay, d1	29.0	14.7	10.6	33.0	18.6	13.4	22.5	25.1		22.7	25.7	24.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	13.6	2.1	0.2	20.5	2.8	0.0	4.9	0.9		0.9	0.7	0.1
Delay (s)	42.7	16.8	10.8	53.5	21.4	13.5	27.5	26.1		23.6	26.4	24.7
Level of Service	D	B	B	D	C	B	C	C		C	C	C
Approach Delay (s)		18.4			21.7			26.9			24.8	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	68.6	Sum of lost time (s)	18.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		

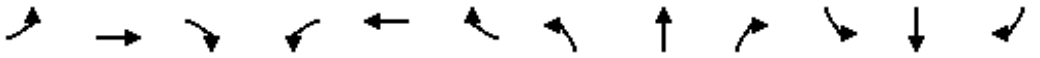
c Critical Lane Group



Movement	EBL	EBT	WBL	WBT	SEL	NWL
Lane Configurations						
Traffic Volume (vph)	253	966	219	662	293	232
Future Volume (vph)	253	966	219	662	293	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.97	0.91	0.97	0.91	0.97	0.97
Frt	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	0.95
Satd. Flow (prot)	3433	5085	3433	5085	3433	3433
Flt Permitted	0.95	1.00	0.95	1.00	0.95	0.95
Satd. Flow (perm)	3433	5085	3433	5085	3433	3433
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	275	1050	238	720	318	252
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	275	1050	238	720	318	252
Turn Type	Prot	NA	Prot	NA	Prot	Prot
Protected Phases	5	2	1	6	7	3
Permitted Phases						
Actuated Green, G (s)	5.2	17.9	5.6	18.3	5.6	5.6
Effective Green, g (s)	5.2	17.9	5.6	18.3	5.6	5.6
Actuated g/C Ratio	0.12	0.42	0.13	0.43	0.13	0.13
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	419	2136	451	2184	451	451
v/s Ratio Prot	c0.08	c0.21	0.07	0.14	c0.09	0.07
v/s Ratio Perm						
v/c Ratio	0.66	0.49	0.53	0.33	0.71	0.56
Uniform Delay, d1	17.8	9.0	17.3	8.1	17.7	17.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.7	0.2	1.1	0.1	5.0	1.5
Delay (s)	21.5	9.2	18.4	8.2	22.7	18.8
Level of Service	C	A	B	A	C	B
Approach Delay (s)		11.8		10.7		
Approach LOS		B		B		

Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	42.6	Sum of lost time (s)	13.5
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

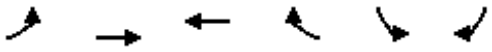
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	1262	19	63	1079	36	36	6	36	82	5	21
Future Volume (vph)	53	1262	19	63	1079	36	36	6	36	82	5	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.87		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5074		1770	5061		1770	1626		1770	1633	
Flt Permitted	0.19	1.00		0.18	1.00		0.74	1.00		0.73	1.00	
Satd. Flow (perm)	345	5074		343	5061		1377	1626		1354	1633	
Peak-hour factor, PHF	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)	58	1372	21	68	1173	39	39	7	39	89	5	23
RTOR Reduction (vph)	0	2	0	0	6	0	0	26	0	0	15	0
Lane Group Flow (vph)	58	1391	0	68	1206	0	39	20	0	89	13	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.5	21.6		24.7	21.7		18.8	18.8		18.8	18.8	
Effective Green, g (s)	24.5	21.6		24.7	21.7		18.8	18.8		18.8	18.8	
Actuated g/C Ratio	0.43	0.38		0.43	0.38		0.33	0.33		0.33	0.33	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	221	1926		224	1930		454	537		447	539	
v/s Ratio Prot	0.01	c0.27		c0.02	0.24			0.01			0.01	
v/s Ratio Perm	0.10			0.12			0.03			c0.07		
v/c Ratio	0.26	0.72		0.30	0.63		0.09	0.04		0.20	0.02	
Uniform Delay, d1	15.4	15.1		17.2	14.3		13.1	12.9		13.7	12.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	1.4		0.8	0.6		0.4	0.1		1.0	0.1	
Delay (s)	16.0	16.4		17.9	14.9		13.5	13.0		14.7	12.9	
Level of Service	B	B		B	B		B	B		B	B	
Approach Delay (s)		16.4			15.1			13.3			14.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	56.9	Sum of lost time (s)	13.5
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		

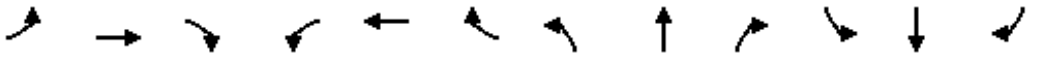
c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	132	431	205	50	30	90
Future Volume (Veh/h)	132	431	205	50	30	90
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)	143	468	223	54	33	98
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	277				1004	250
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	277				1004	250
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	89				86	88
cM capacity (veh/h)	1286				238	789

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	143	468	277	33	98
Volume Left	143	0	0	33	0
Volume Right	0	0	54	0	98
cSH	1286	1700	1700	238	789
Volume to Capacity	0.11	0.28	0.16	0.14	0.12
Queue Length 95th (ft)	9	0	0	12	11
Control Delay (s)	8.1	0.0	0.0	22.5	10.2
Lane LOS	A			C	B
Approach Delay (s)	1.9		0.0	13.3	
Approach LOS				B	

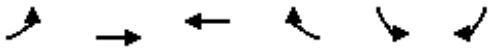
Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	34.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	11	30	16	12	153	20	399	7	169	476	50
Future Volume (Veh/h)	63	11	30	16	12	153	20	399	7	169	476	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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)	68	12	33	17	13	166	22	434	8	184	517	54
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1346	1398	286	1148	1421	221	571			442		
vC1, stage 1 conf vol	912	912		482	482							
vC2, stage 2 conf vol	434	486		666	939							
vCu, unblocked vol	1346	1398	286	1148	1421	221	571			442		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	63	95	95	94	95	79	98			83		
cM capacity (veh/h)	183	244	711	268	244	783	998			1114		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	68	45	17	179	22	289	153	184	345	226
Volume Left	68	0	17	0	22	0	0	184	0	0
Volume Right	0	33	0	166	0	0	8	0	0	54
cSH	183	470	268	674	998	1700	1700	1114	1700	1700
Volume to Capacity	0.37	0.10	0.06	0.27	0.02	0.17	0.09	0.17	0.20	0.13
Queue Length 95th (ft)	40	8	5	27	2	0	0	15	0	0
Control Delay (s)	35.8	13.5	19.3	12.3	8.7	0.0	0.0	8.9	0.0	0.0
Lane LOS	E	B	C	B	A			A		
Approach Delay (s)	26.9		12.9		0.4			2.2		
Approach LOS	D		B							

Intersection Summary				
Average Delay	4.8			
Intersection Capacity Utilization	47.5%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	596	396	18	6	16
Future Volume (Veh/h)	13	596	396	18	6	16
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)	14	648	430	20	7	17
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	450				1116	440
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	450				1116	440
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				97	97
cM capacity (veh/h)	1110				227	617

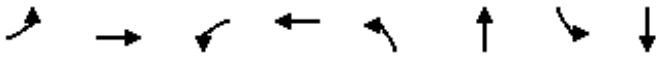
Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	14	648	450	7	17
Volume Left	14	0	0	7	0
Volume Right	0	0	20	0	17
cSH	1110	1700	1700	227	617
Volume to Capacity	0.01	0.38	0.26	0.03	0.03
Queue Length 95th (ft)	1	0	0	2	2
Control Delay (s)	8.3	0.0	0.0	21.4	11.0
Lane LOS	A			C	B
Approach Delay (s)	0.2		0.0	14.0	
Approach LOS				B	

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	7	322	134	366	960	55	142	151	422	62	305
v/c Ratio	0.02	0.41	0.28	0.76	0.64	0.07	0.39	0.23	0.51	0.25	0.43
Control Delay	23.2	18.5	3.4	37.1	16.8	0.2	14.8	12.4	4.1	21.1	19.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.2	18.5	3.4	37.1	16.8	0.2	14.8	12.4	4.1	21.1	19.7
Queue Length 50th (ft)	1	42	0	53	105	0	25	27	0	15	39
Queue Length 95th (ft)	6	78	21	#150	#287	0	69	72	48	47	81
Internal Link Dist (ft)		677			1275			181			412
Turn Bay Length (ft)	210		125	175		95	155			160	
Base Capacity (vph)	480	1408	735	480	1515	778	363	1062	1084	450	1289
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.23	0.18	0.76	0.63	0.07	0.39	0.14	0.39	0.14	0.24

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



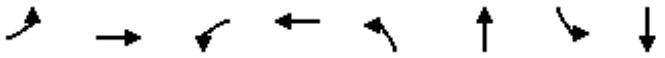
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	62	173	126	483	54	328	121	302
v/c Ratio	0.21	0.12	0.26	0.65	0.17	0.30	0.39	0.28
Control Delay	9.3	5.6	8.9	12.2	10.5	8.2	13.8	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.3	5.6	8.9	12.2	10.5	8.2	13.8	6.7
Queue Length 50th (ft)	6	6	12	48	7	17	16	12
Queue Length 95th (ft)	28	23	47	154	25	42	50	34
Internal Link Dist (ft)		675		762		283		2078
Turn Bay Length (ft)	135		100		160		160	
Base Capacity (vph)	434	2024	703	1069	621	2045	606	2014
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.09	0.18	0.45	0.09	0.16	0.20	0.15

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	36	755	134	20	1295	28	213	95	48	57	108
v/c Ratio	0.16	0.45	0.16	0.10	0.86	0.04	0.58	0.20	0.14	0.22	0.31
Control Delay	25.4	11.8	2.7	25.6	24.7	0.1	25.3	16.1	15.8	24.4	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.4	11.8	2.7	25.6	24.7	0.1	25.3	16.1	15.8	24.4	4.7
Queue Length 50th (ft)	9	67	0	5	145	0	43	11	9	14	0
Queue Length 95th (ft)	36	176	25	25	#423	0	#141	59	35	48	21
Internal Link Dist (ft)		1082			334			601		361	
Turn Bay Length (ft)	100		100	240		145	70		190		150
Base Capacity (vph)	352	1660	824	352	1513	764	370	655	352	669	666
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.45	0.16	0.06	0.86	0.04	0.58	0.15	0.14	0.09	0.16

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



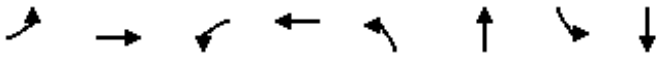
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	27	673	51	1476	12	10	47	26
v/c Ratio	0.09	0.35	0.11	0.71	0.02	0.02	0.09	0.04
Control Delay	8.2	13.7	8.3	16.0	13.9	12.2	14.3	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.2	13.7	8.3	16.0	13.9	12.2	14.3	8.2
Queue Length 50th (ft)	2	42	8	115	2	1	9	1
Queue Length 95th (ft)	13	96	21	217	13	11	32	16
Internal Link Dist (ft)		411		252		440		71
Turn Bay Length (ft)	180		120		50		75	
Base Capacity (vph)	308	2148	457	2148	489	634	496	595
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.31	0.11	0.69	0.02	0.02	0.09	0.04

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	18	940	175	484	621	84	161	142	485	100	161
v/c Ratio	0.07	0.82	0.27	0.76	0.32	0.09	0.49	0.25	0.70	0.50	0.28
Control Delay	34.2	30.7	3.5	37.8	10.8	0.9	24.9	20.0	13.8	35.7	23.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.2	30.7	3.5	37.8	10.8	0.9	24.9	20.0	13.8	35.7	23.4
Queue Length 50th (ft)	4	194	0	104	64	0	55	48	60	41	28
Queue Length 95th (ft)	14	#350	31	#198	160	7	99	88	159	84	53
Internal Link Dist (ft)		677			1275			181			412
Turn Bay Length (ft)	210		125	175		95	155			160	
Base Capacity (vph)	245	1187	667	661	1940	932	326	784	847	352	1000
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.79	0.26	0.73	0.32	0.09	0.49	0.18	0.57	0.28	0.16

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



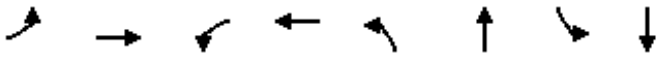
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	136	503	140	308	53	466	83	362
v/c Ratio	0.34	0.38	0.43	0.45	0.17	0.40	0.30	0.32
Control Delay	10.1	6.6	12.5	8.7	10.0	6.3	12.0	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.1	6.6	12.5	8.7	10.0	6.3	12.0	7.4
Queue Length 50th (ft)	13	20	14	26	5	15	9	15
Queue Length 95th (ft)	49	55	55	83	25	48	37	45
Internal Link Dist (ft)		675		762		283		2078
Turn Bay Length (ft)	135		100		160		160	
Base Capacity (vph)	680	2217	555	1160	636	2189	575	2210
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.23	0.25	0.27	0.08	0.21	0.14	0.16

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	165	1284	260	30	1037	83	224	150	123	102	124
v/c Ratio	0.71	0.72	0.30	0.22	0.82	0.12	0.67	0.43	0.38	0.36	0.33
Control Delay	47.9	18.1	6.5	33.9	26.2	0.9	30.5	25.8	21.2	28.3	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.9	18.1	6.5	33.9	26.2	0.9	30.5	25.8	21.2	28.3	5.7
Queue Length 50th (ft)	65	166	18	12	191	0	71	49	37	37	0
Queue Length 95th (ft)	#163	#405	77	37	#322	5	126	98	73	77	28
Internal Link Dist (ft)		1082			334			601		361	
Turn Bay Length (ft)	100		100	240		145	70		190		150
Base Capacity (vph)	233	1783	873	137	1315	684	336	556	325	559	582
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.72	0.30	0.22	0.79	0.12	0.67	0.27	0.38	0.18	0.21

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	58	1393	68	1212	39	46	89	28
v/c Ratio	0.19	0.70	0.22	0.60	0.08	0.08	0.19	0.05
Control Delay	10.4	16.8	10.9	15.3	15.3	7.2	16.4	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.4	16.8	10.9	15.3	15.3	7.2	16.4	8.3
Queue Length 50th (ft)	9	153	11	125	10	2	24	1
Queue Length 95th (ft)	23	201	26	167	29	21	54	16
Internal Link Dist (ft)		411		252		440		71
Turn Bay Length (ft)	180		120		50		75	
Base Capacity (vph)	308	2106	315	2121	469	580	461	572
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.66	0.22	0.57	0.08	0.08	0.19	0.05

Intersection Summary

APPENDIX 3

Wetlands Delineation Memo

for Lompa Ranch North

WETLAND DELINEATION MEMO

FOR

LOMPA RANCH DEVELOPMENT

In association with a Specific Plan Amendment Application, Master Plan Amendment Application and Rezoning Application.

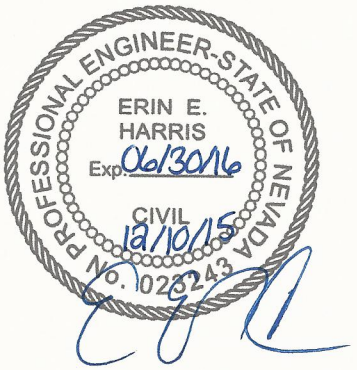
Prepared for:

Blackstone Development Group
333 N. Wilmot Road, Suite 340
Tucson, AZ 85711
(520) 618-5378

Prepared by:

STAR Consulting
439 W. Plumb Lane
Reno, NV 89509

December 2015



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439 W. Plumb Lane Reno, NV 89509
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STAR CONSULTING

PURPOSE OF REPORT AND STUDY OBJECTIVES

The purpose of this report is to identify potential areas that meet the Federal 404 definition of wetlands. Following wetland identification by the Army Corps of Engineers, designated land use intensities shall be developed outside of the wetlands.

SECTION 404 PERMITTING (U.S. ENVIRONMENTAL PROTECTION AGENCY)

Section 404 of the Clean Water Act (CWA) establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Activities in waters of the United States regulated under this program include fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports) and mining projects. Section 404 requires a permit before dredged or fill material may be discharged into waters of the United States, unless the activity is exempt from Section 404 regulation (e.g. certain farming and forestry activities). The basic premise of the program is that no discharge of dredged or fill material may be permitted if: (1) a practicable alternative exists that is less damaging to the aquatic environment or (2) the nation's waters would be significantly degraded. In other words, when you apply for a permit, you must first show that steps have been taken to avoid impacts to wetlands, streams and other aquatic resources; that potential impacts have been minimized; and that compensation will be provided for all remaining unavoidable impacts. Proposed activities are regulated through a permit review process. An individual permit is required for potentially significant impacts. Individual permits are reviewed by the U.S. Army Corps of Engineers, which evaluates applications under a public interest review, as well as the environmental criteria set forth in the CWA Section 404(b)(1) Guidelines, regulations promulgated by EPA. However, for most discharges that will have only minimal adverse effects, a general permit may be suitable. General permits are issued on a nationwide, regional, or State basis for particular categories of activities. The general permit process eliminates individual review and allows certain activities to proceed with little or no delay, provided that the general or specific conditions for the general permit are met. For example, minor road activities, utility line backfill, and bedding are activities that can be considered for a general permit. States also have a role in Section 404 decisions, through State program general permits, water quality certification, or program assumption.

(http://water.epa.gov/lawsregs/guidance/cwa/dredgdis/)

PROJECT BACKGROUND

In June 1994 a Proposed Jurisdictional Delineation Report was prepared for the Carson City Highway 395 Bypass (94-031-03 and 94-031-07) by Resource Concepts. In July 1997 an Addendum was prepared (199400539). Per NDOT, both report were accepted by the Corps.

In June of 1998 WRC Engineering prepared a US 395 Bypass Section 404 Alternatives Development and Evaluation Report (WRC File 1879/42). Figure 9 of this report is shown on the following pages of this memo as Figure 1.

In February of 1999 Palmer and Lauder Engineers prepared a Development Constraint Analysis of the Lompa Ranch (Job No. 990101). The following excerpt is taken from this report:

> *WETLANDS I WATERS OF THE US: The U.S. Army Corp of Engineers {COE) regulates Section 404 of the Clean Water Act, which requires approval prior to discharging dredged or fill material into the Waters .of the U.S. Waters of the U.S. include surface waters such as all navigable waters and their tributaries, all interstate waters and their tributaries, all wetlands adjacent to these waters, and all impoundments of these waters.*
>
> *In conjunction with the design for the U.S. 395 Bypass, a jurisdictional delineation of wetlands and other Waters of the US. were performed on a portion of the Lompa Ranch by Resource Concepts, Inc.; in June 1994. An addendum to that report was issued in July 1997. The drawing illustrating the study area, waters of the U.S. and the wetland boundaries is included herein, along with the text of both reports. NDOT staff has advised us that both delineations have been verified by the Corp of Engineers.*
>
> *Waters of the U.S. have been identified in several locations traversing Parcel A. Additionally; they have been identified on both Parcels B and C, near the linear ditch. A total of approximately 25 acres of wetlands were delineated on the Lompa Ranch property. It is important to note, however, that the delineation only extended as far as the project limits for the U.S. Highway 395 Bypass. The western 2,000 feet of the ranch was not included. While we are not aware of any specific areas that could be delineated as Waters of the U.S., including wetlands, an effort should be made in the future to determine if any exist.*

Development of or near "Waters of the US· requires either a permit or determination that a permit is not required from the COE. Permits are a means to assure that a conveyance is provided. With respect to the wetlands, they can be avoided, impacted minimally, or mitigated. Mitigation typically requires creation of new wetland, of equal biological value to that which was destroyed, at a two-to-one ratio. Because of the expense of developing new wetland and the development costs associated with the existing wetland, we have assumed that the wetlands would be avoided and/or subject to minimal impact. Therefore, these lands would not be available for development.

Based on aerial photography, it appears that the mitigation required for disturbance of the wetlands during the Highway 395 Bypass project were completed east of the highway and north of 5th Street. Recent topography shows this area as being a collector basin for numerous watercourses in the vicinity as well as an area subject to backwater ponding.

FIGURE 1: 404 DELINEATION BEFORE HIGHWAY 395 CHANNEL AND ROADWAY (WRC FIGURE 9)

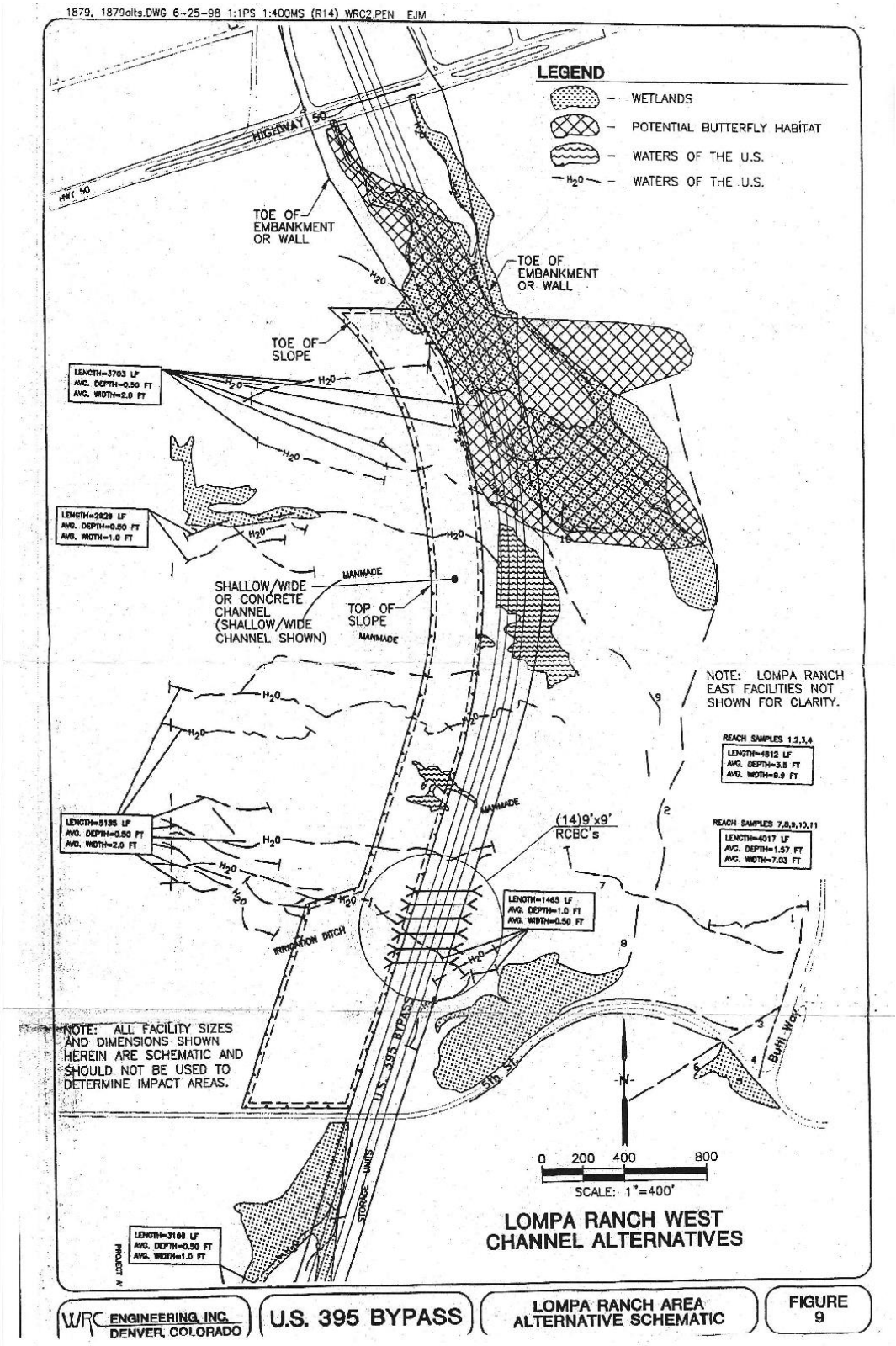

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FIGURE 2: EXISTING TOPOGRAPHY

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FIGURE 3: 2015 AERIAL PHOTO

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FIGURE 4: AREAS OF POTENTIAL WETLANDS

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CONCLUSION

The construction of Highway 395 and the associated drainage channels has impacted the natural waterways and wetlands in the area. These improvements have reduced or eliminated much of the previously flooded area in the immediate vicinity. Following the LOMR acceptance by FEMA, it is recommended that an updated Delineation be completed by the Corps for Lompa Ranch.

Recommended Actions:

1. Blackstone Development Group is currently working with Resource Concept Inc to conduct an updated Wetland Jurisdictional Delineation in early spring (when weather allows).
2. Engage a resource management or environmental engineering firm to study the effects of the constructed channel and highway improvements on the previously mapped waterways and wetlands and coordinate those results with the Corps. In discussion, Resource Concepts believes the wetlands will be less than the approved JD's in 1997 and 1998 due to construction of the existing highway and channel improvements.
3. Following wetland identification by the Army Corps of Engineers, designated land use intensities shall be developed outside of the wetlands.

APPENDIX 4

Water and Sewer Demands Technical Engineering Memo for Lompa Ranch North

WATER AND SEWER DEMANDS
TECHNICAL ENGINEERING MEMO
FOR
LOMPA RANCH NORTH DEVELOPMENT

In association with a Specific Plan Amendment Application, Master Plan Amendment Application and Rezoning Application.

Prepared for:
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Prepared by:
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439 W. Plumb Lane
Reno, NV 89509

January 2016

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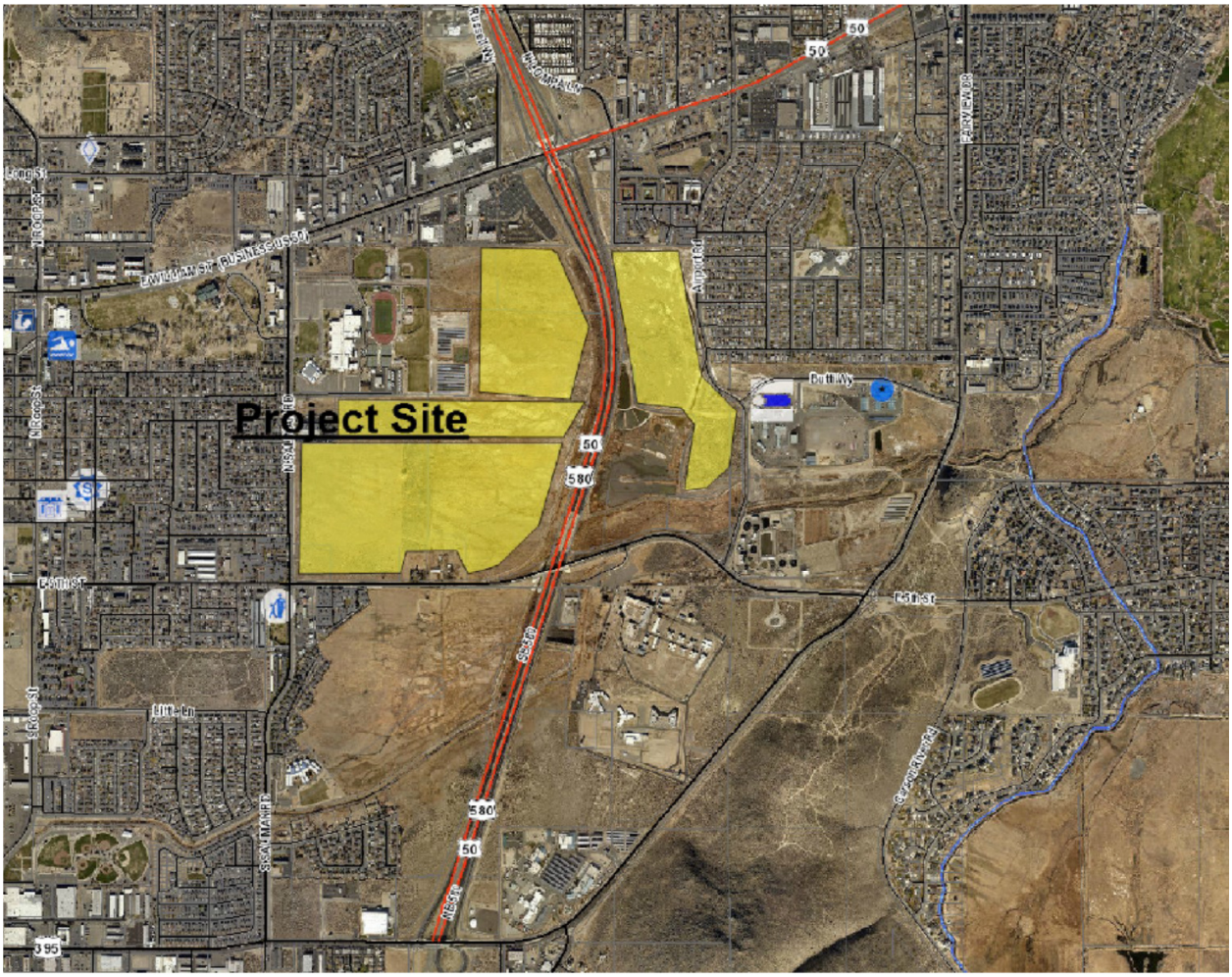
STAR CONSULTING

1. Introduction and Executive Summary

This Sewer and Water Demands Technical Engineering Memo supports a comprehensive plan amendment and rezoning application and identifies the utility-related impacts of a proposed Lompa Ranch mixed-use development. The project is generally located north of 5th Street, south of William Street/US 50, east of Saliman Road and west of Airport Road in Carson City, Nevada. The project includes proposed commercial and residential land uses. The site location is shown in Exhibit 1.

Exhibit 1 Site Location

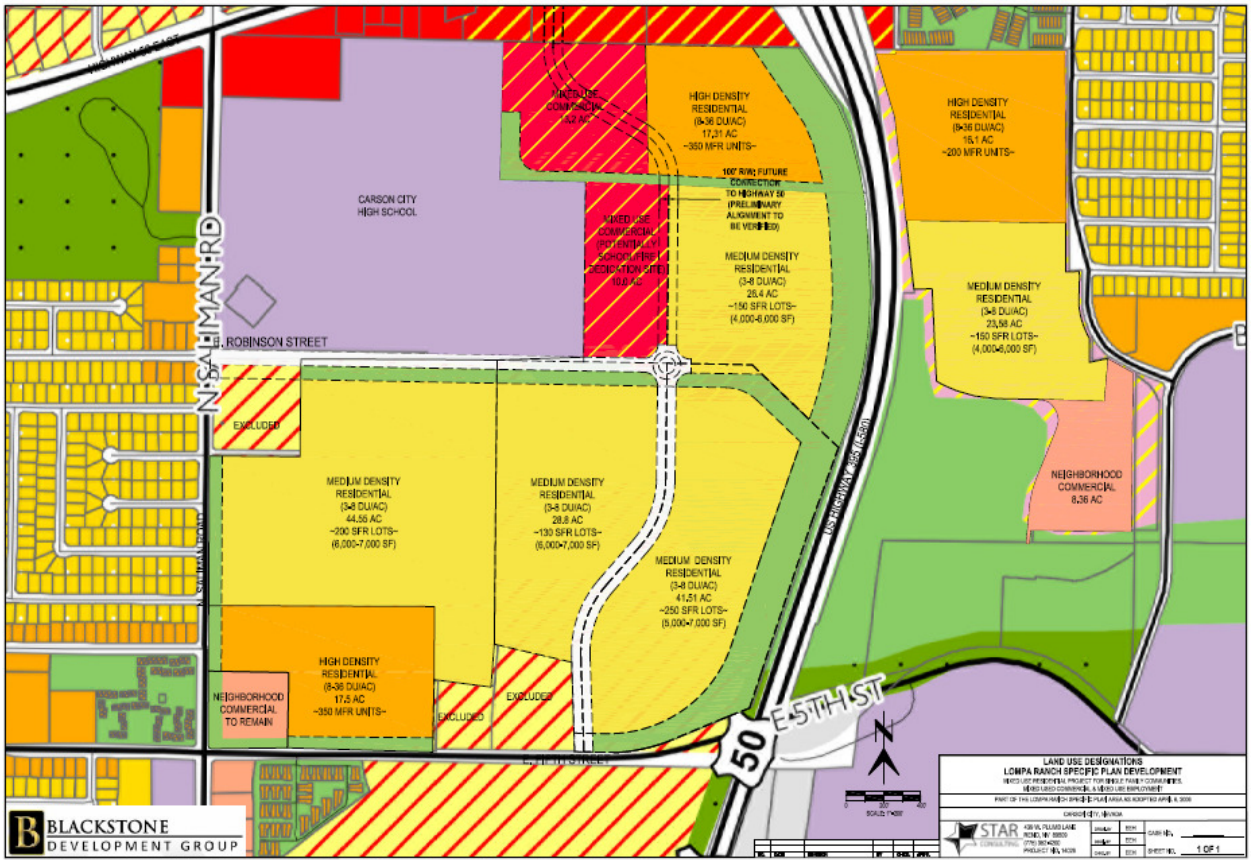


This memo provides general guidance and preliminary recommendations for anticipating sewer and water demands from the project.

Development Description

The project is within twelve areas, or parcels comprising a total of approximately 250 acres. A conceptual plan, showing the potential location of the land use types is provided in Exhibit 2. The specific locations of system connection points have not yet been determined..

Exhibit 2 Land Use Concept Plan



A preliminary land use scenario is shown in Exhibit 3. The land use designations plan identifies twelve areas either designated for medium density residential (MDR), high density residential (HDR), mixed use commercial or neighborhood commercial. The proposed residential densities are shown to range from 3 to 8 dwelling units per acre for MDR and for HDR, 8 to 36 dwelling units per acre.

The number of single family and multi-family residential units is estimated to be over 1,780. There are 310,000 square feet of commercial uses, estimated by applying a floor area ratio (FAR) of 0.20 to the acreage of the parcels designated “mixed use commercial” and “neighborhood commercial”.

Study Objectives

The specific study objectives are:

- Find the range of sewer demands projected for the development
- Find the range of water demands projected for the development
- Provide a general description of how the area will be served by the existing systems

Principal Findings

This project is located on both sides of US 395, between Saliman Road and Airport Road and 5th Street and William Street.

Assuming a preliminary land use estimate, at build out the project will generate approximately:

- 1,628,185 gpd (peak flow rate) of sewage west of the Highway
- 503,250 gpd (peak flow rate) of sewage east of the Highway

- The recommended sewer line through the development on the north-south spine road is a 15” diameter line. No public sewer shall be less than 8” in diameter.
- No individual sewer service connection shall be less than 4” in diameter.
- All gravity sewers must be so designed and constructed to give mean velocities for the design condition, when flowing full or half full, of not less than two feet (2') per second minimum nor more than ten feet (10') per second maximum.
- Mannings formula shall be used in determining the slope, velocity, design flow and diameter using "n" coefficients for the appropriate pipe material to be used. Mannings "n" for PVC is thirteen thousandths (0.013). The minimum pipe slope for eight-inch (8") pipe is five tenths of a percent (0.5%).
- Minimum pipe slope for dead end sewers shall be five tenths of a percent (0.5%) unless it can be shown by calculations that the velocity in the pipe is two (2) fps or greater unless waived by the utilities director or designee.
- The sewer collection system and HCS connections are proposed to be covered with at least 3' of earth.
- Maximum spacing for manholes shall be four hundred feet (400') for all lines smaller than fifteen inches (15"), and five hundred feet (500') for lines fifteen inches (15") to twenty-four inches (24"), and six hundred feet (600') for twenty-four inches (24") and larger

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2. Demand Analysis

Sewer:

A Public Sewer extension line and new public manholes will be proposed with this project. The Public Sewer line will be designed and constructed via an approved Public Sewer Plan. It is anticipated that the new public sewer lines will be installed in public rights of way, to be dedicated with each phase of development. The system in each phase will drain to either existing lines in Saliman and 5th or to a trunk line in the Lompa Ranch Spine Road. The area east of the Highway will drain to Airport Road.

The following flows are based on Chapter 12.06.280 of the Carson City code.

West of Highway 395								
Parcel	Acreage	Land Use	Equivalent Population per Acre (12.06.270.B)	Population Estimate	Average Daily Flow Rate (150 gpcd)	Minimum Daily Flow Rate (90 gpcd)	Peak Design Flow Rate (250 gpcd)	Inflitration (200gal/acre/day)
A	13.2	Commercial	12	158	23,760	14,256	39,600	2,640
B	17.31	High Density Res.	60	1,039	155,790	93,474	259,650	3,462
C	4.1	Commercial	12	49	7,380	4,428	12,300	820
D	44.55	Medium Density Res.	29	1,292	193,793	116,276	322,988	8,910
E	17.5	High Density Res.	60	1,050	157,500	94,500	262,500	3,500
F	10	Commercial	12	120	18,000	10,800	30,000	2,000
G	26.4	Medium Density Res.	29	766	114,840	68,904	191,400	5,280
H	41.51	Medium Density Res.	29	1,204	180,569	108,341	300,948	8,302
I	28.8	Medium Density Res.	29	835	125,280	75,168	208,800	5,760
Totals WEST	203.37			6,513	976,911	586,147	1,628,185	40,674

East of Highway 395								
Parcel	Acreage	Land Use	Equivalent Population per Acre (12.06.270.B)	Population Estimate	Average Daily Flow Rate (150 gpcd)	Minimum Daily Flow Rate (90 gpcd)	Peak Design Flow Rate (300 gpcd)	Inflitration (200gal/acre/day)
J	16.1	High Density Res.	60	966	144,900	86,940	289,800	3,220
K	21.1	Medium Density Res.	29	612	91,785	55,071	183,570	4,220
L	8.3	Commercial	12	100	14,940	8,964	29,880	1,660
Totals EAST	45.5			1,678	251,625	150,975	503,250	9,100

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FLOW VELOCITY

Mannings equation:

V = k / n * (A / P)^2/3 * S^1/2
k = 1.49, for unit conversion
n = 0.013

For 8" Sewer Pipe:
Diameter of Pipe = 8" (0.67 ft)
Radius of Pipe = 4" (0.335 ft)

A = Pi * R2
= 3.1416 * $(0.335ft)^2$
= 0.352566 ft^2
P = 2 * Pi * R
= 2.105 ft
Rh = A / P
= 0.167 ft
Smin=0.50%
Smax=N/A
V = 1.49 / 0.013 * $0.167^{2/3}$ * $0.005^{1/2}$
Vmin = 2.45fps

A velocity of 2 fps or greater is required. A minimum slope of 0.4% is permitted per section 12.06.300 of the Carson City code.

RATIO OF FLOW DEPTH

The common formula for gravity flow in pipes is called Manning's formula and is written as:
Q = 1.5/n x A x R^2/3 x S^1/2
Where Q = discharge capacity in (ft3/s)
1.5 = constant for U.S. units
n = channel roughness coefficient (Manning's n) dimensionless
A = cross-sectional flow area (not the cross section of pipe) in ft2
R = hydraulic radius of the pipe in (ft)
S = slope of the channel bottom, dimensionless
From the variables above the hydraulic radius of a channel R, is defined as the ratio of the cross-sectional flow area A to the wetted perimeter P.
In formula form: R = A/P
Where R = hydraulic radius of the pipe in (ft)
A = cross-sectional flow area (not the cross section of pipe) in ft2
P = wetted perimeter in ft

For: d=8", 12" and 15"
s=0.5%
n=0.013

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Q(8" ff) = 0.8544 cfs
= 383 gpm (1 cfs = 448 gpm)
Flowing Full = 551,520 gpd
Flowing at 75% = 349 gpm
= 502,560 gpd

Q(12" ff) = 2.5190 cfs
= 1131 gpm (1 cfs = 448 gpm)
Flowing Full = 1,628,035 gpd
Flowing at 75% = 1031 gpm
= 1,484,640 gpd

Q(15" ff) = 4.5673 cfs
= 2050 gpm (1 cfs = 448 gpm)
Flowing Full = 2,952,000 gpd
Flowing at 75% = 1869 gpm
= 2,691,360 gpd

Peak Daily Flow (WEST) = 1,628,185 gpd
Peak Daily Flow (EAST) = 503,250 gpd

Water:

Parcel	Acreage	Land Use	DU/Acre or FAR		Estimated Units (DU or KSF)
			Low Range	High Range	
A	**13.2**	Mixed Use Commercial	0.20	0.20	115
B	**17.31**	High Density Residential	8	36	350
C	**4.1**	Neighborhood Commercial to Remain	0.20	0.20	36
D	**44.55**	Medium Density Residential	3	8	200
E	**17.5**	High Density Residential	8	36	350
F	**10**	Mixed Use Commercial	0.20	0.20	87
G	**26.4**	Medium Density Residential	3	8	150
H	**41.51**	Medium Density Residential	3	8	250
I	**28.8**	Medium Density Residential	3	8	130
J	**16.1**	High Density Residential	8	36	200
K	**21.1**	Medium Density Residential	3	8	150
L	**8.3**	Neighborhood Commercial	0.20	0.20	72
	248.87	**Commercial KSF**			**310**
		Residential Units			**1,780**

The International Plumbing Code fixture unit tables shall be used to determine the actual demand for all commercial users at the time of development.

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West of Highway 395							
Parcel	Acreage	Land Use	Equivalent Population per Acre (12.06.270.B)	Population Estimate	Average Day Water Demand (60 gpd)	Maximum Day Water Demand (1.6XADD)	Peak Hour Water Demand (2.5XADD)
A	13.2	Commercial	12	158	9,504	15,206	23,760
B	17.31	High Density Res.	60	1,039	62,316	99,706	155,790
C	4.1	Commercial	12	49	2,952	4,723	7,380
D	44.55	Medium Density Res.	29	1,292	77,517	124,027	193,793
E	17.5	High Density Res.	60	1,050	63,000	100,800	157,500
F	10	Commercial	12	120	7,200	11,520	18,000
G	26.4	Medium Density Res.	29	766	45,936	73,498	114,840
H	41.51	Medium Density Res.	29	1,204	72,227	115,564	180,569
I	28.8	Medium Density Res.	29	835	50,112	80,179	125,280
Totals WEST	203.37			6,513	390,764	586,147	976,911

East of Highway 395							
Parcel	Acreage	Land Use	Equivalent Population per Acre (12.06.270.B)	Population Estimate	Average Day Water Demand (60 gpd)	Maximum Day Water Demand (1.6XADD)	Peak Hour Water Demand (2.5XADD)
J	16.1	High Density Res.	60	966	57,960	92,736	144,900
K	21.1	Medium Density Res.	29	612	91,785	146,856	229,463
L	8.3	Commercial	12	100	14,940	23,904	37,350
Totals EAST	45.5			1,678	251,625	150,975	411,713

The preceding water demand is an estimation only. In many cases the fire flow requirements, not supply or demand, will determine the minimum system improvements necessary.

The proposed development west of the highway is estimated to have an average day demand of 390,764 gallons.
The proposed development east of the highway is estimated to have an average day demand of 251,625 gallons.

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3. Proximity to Existing System

The existing water and sewer systems are illustrated in the follow diagrams from Carson City GIS:

North of Robinson:

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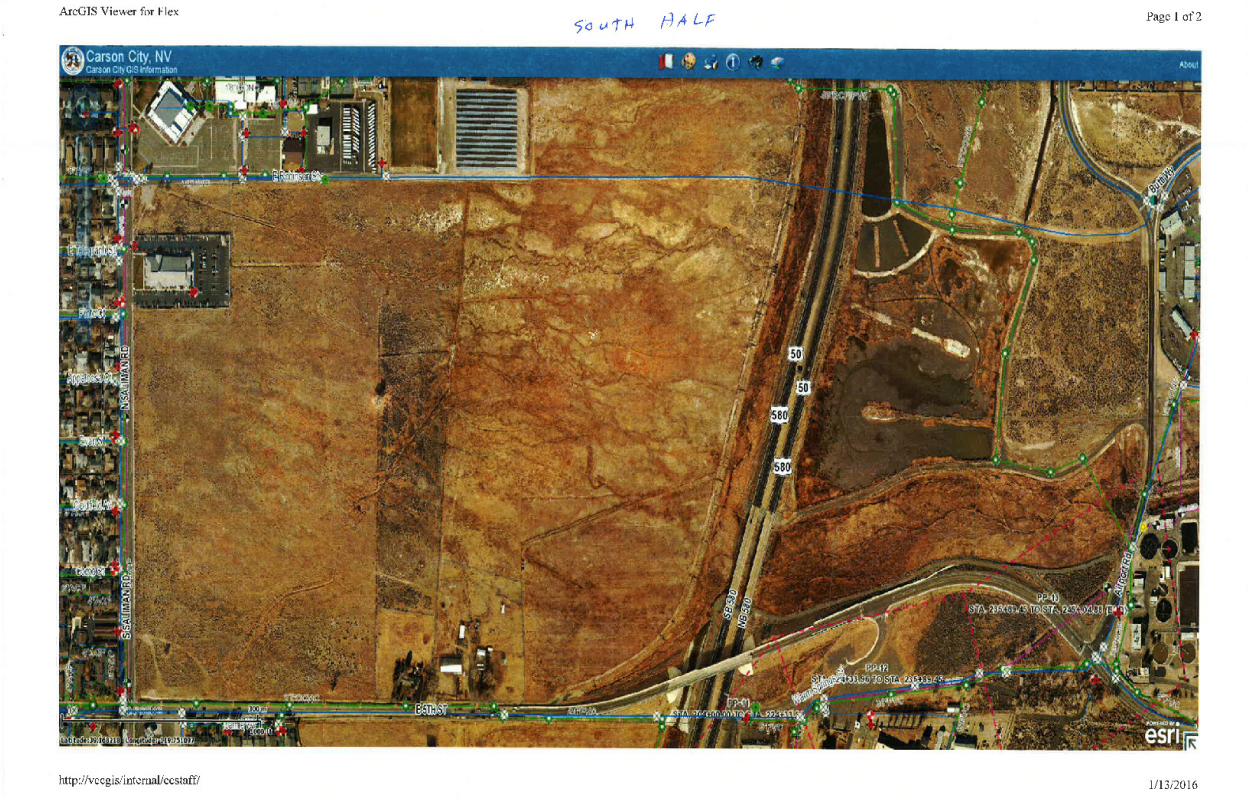
South of Robinson:



The sewer sizes are as follows:

- The sewer line in Robinson is 18" PVC
- The sewer line that bisects the northern portion the Ranch is 18" PVC
- The sewer line in 5th Street is 24" PVC
- The sewer line in Airport Road is 18" PVC

The water sizes are as follows:

- The large transmission main that runs along Robinson through the middle of the property is 24" PVC
- The main in Saliman at Robinson is 8" ACP
- The main into Robinson is 8" ACP
- On Saliman at Fifth st the main is 10" ACP
- The main on Fifth St is 16" ACP
- The main along Airport Rd. varies between 6" and 8" PVC

The proposed Lompa Ranch systems will tie into these existing infrastructure systems at Saliman, Robinson, 5th and Airport.

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4. Conclusions and Recommendations

1. This project is located on both sides of US 395, between Saliman Road and Airport Road and 5th Street and William Street.

2. Assuming a preliminary land use estimate, at build out the project will generate approximately:
    - 1,628,185 gpd (peak flow rate) of sewage west of the Highway
    - 503,250 gpd (peak flow rate) of sewage east of the Highway

3. All public sewer design shall be in conformance with the Carson City Municipal Code.

4. Downstream sewer capacity shall be evaluated at the time of development.

5. Assuming a preliminary land use estimate, at build out the project will have a daily domestic water supply demand of approximately:
    - The proposed development west of the highway is estimated to have an average day demand of 390,764 gallons.
    - The proposed development east of the highway is estimated to have an average day demand of 251,625 gallons.

6. Water system capacity and fire flow shall be evaluated at the time of development.

7. The proposed Lompa Ranch water and sewer systems will tie into the existing infrastructure systems at Saliman, Robinson, 5th and Airport.