

# Northwest Corner of 59<sup>th</sup> Avenue & Van Buren Street - Industrial

## PLANNED UNIT DEVELOPMENT

Land Use  
and  
Development Standards

Case: Z-43-12-7

Submitted: October 5, 2011

Resubmitted: January 31, 2013

Public Hearing Draft Submitted:

**Final City Council Approval:**

A Planned Unit Development (PUD) is intended to be a stand-alone document of zoning regulations for a particular project. Provisions not specifically regulated by the PUD are governed by the zoning ordinance. A PUD may include substantial background information to help illustrate the intent of the development. The purpose and intent statements are not requirements that will be enforced by the City. The PUD only modifies zoning ordinance regulations and does not modify other City Codes or requirements. Additional public hearings may be necessary such as, but not limited to, right-of-way abandonments.

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# Northwest Corner of 59th Avenue & Van Buren Street - Industrial

## Planned Unit Development

### *Land Use and Development Standards*

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## Executive Summary

The *Northwest Corner of 59th Avenue & Van Buren Street – Industrial Planned Unit Development (“PUD”)* establishes the regulatory framework necessary to facilitate the proposed development of an industrial oriented expansion within this area of the Estrella Village in order to provide a better, and more appropriate, land use and transition as well as employment on seventy-nine (79) net acres. (See **Figure 1, Context Exhibit.**) The *Northwest Corner of 59th Avenue & Van Buren Street – Industrial PUD* compliments the existing and future development occurring within this area of the Estrella Village, which was planned as an important regional employment, warehousing, and industrial center. The City of Phoenix has invested significant infrastructure resources in this area too. The Arizona Department of Transportation (“ADOT”) is also planning for the western (north/south) portion 202 freeway extension to connect with I-10 at 59th Avenue. The proposed development at this corner will capitalize on and broaden economic development opportunities in this area by acting as a catalyst for additional development/redevelopment. The **Context Exhibit**, provided on the following page, provides a graphic overview of the planning area, street/freeway system, and the available vacant land.

The *Northwest Corner of 59th Avenue & Van Buren Street – Industrial PUD* represents the evolution of this property from high density multi-family housing to a more appropriate industrial project that fulfills a community need to provide more employment as well as a transitional use between the existing industrial development along Van Buren Street and the residential development along Fillmore Street. The proposed industrial development for this property is anticipated to develop either in phases or all at once depending on the market demand. This PUD is designed to create the framework to allow for flexibility while protecting the adjacent residential homes along Fillmore Street.

Thus, the *Northwest Corner of 59th Avenue & Van Buren Street – Industrial PUD* provides for uses and development standards that fulfill the needs of both the community and the City of Phoenix.

### A. Purpose and Intent

The *Northwest Corner of 59th Avenue & Van Buren Street – Industrial Planned Unit Development (“PUD”)* is consistent with the Estrella Village Plan. The PUD encourages new development to be compatible with the surrounding area both currently and in the future. The property is located directly adjacent to established industrial uses, a major arterial street, and existing residential homes. The PUD provides adequate landscaping, screening, and building setbacks to buffer the existing residential homes to the north while still allowing future employment opportunities within close proximity to these homes, an existing freeway corridor (I-10), and a future freeway corridor. The primary goals of the PUD are to:

1. Facilitate development of a proposed industrial development.
2. Expand development options.
3. Create flexible and appropriate development standards that promote the City's goals/policies for the Estrella Village.

The PUD will ensure compatibility with surrounding properties; provide for a variety of services and employment opportunities; and generate new tax revenues to the City of Phoenix.

**Figure 1: Context Exhibit**



**1. Regulatory Provisions**

The PUD has been prepared pursuant to Section 671 of the Zoning Ordinance of City of Phoenix, Arizona (Planned Unit Development) to establish the regulatory framework for the *Northwest Corner of 59th Avenue & Van Buren Street – Industrial PUD* development by creating development standards specific to the context of the project site.

The PUD is a stand-alone document comprised of project specific zoning regulations, including permitted uses, conditions/limitations, development standards, building heights, landscaping, outdoor storage, driveway locations, and monument signage. Zoning provisions not specifically regulated by the PUD are governed by the Zoning Ordinance of the City of Phoenix, Arizona. In the event of a conflict between a provision of the PUD and a provision of the Zoning Ordinance of the City of Phoenix, the PUD prevails. The PUD does not modify other City Code provisions or requirements.

The provisions of the PUD apply to all property within the project boundary (see Appendix A, PUD Area Legal Description).

All images within the PUD are intended to be illustrative. The images do not convey the final design concepts for the property, but just the potential limits/restrictions of the property. Specific site plan(s) for an individual development project or for the entire PUD property will be processed in the future through the City of Phoenix site plan review process.

## **2. Zoning Ordinance Applicability**

The intended regulatory applicability of the Zoning Ordinance of the City of Phoenix, Arizona as adopted and periodically amended, is applicable to the *Northwest Corner of 59th Avenue & Van Buren Street – Industrial PUD* except as modified by the Development Standards contained within this Planned Unit Development. Specifically, the applicability of Zoning Ordinance Provisions is defined as follows:

Chapter 1	Purpose and Applicability: All provisions are applicable to this PUD.
Chapter 2	Rules of Construction and Definitions: The defined terms within Chapter 2 are applicable.
Chapter 3	Decision Making and Administrative Bodies: All provisions are applicable to this PUD.
Chapter 4	Planning Documents: All provisions are applicable to this PUD.
Chapter 5	Development Review Procedures: All provisions are applicable to this PUD.
Chapter 6	Zoning Districts: All provisions are replaced and superseded by this PUD.
Chapter 7	Development Standards of General Applicability: As modified by this PUD.
Chapter 8	Historic Preservations: All provisions are not applicable to this PUD.
Chapter 9	Nonconformities: All provisions are not applicable to this PUD.
Chapter 10	Enforcement: All provisions are applicable to this PUD.
Chapter 11	Severability: All provisions are applicable to this PUD.
Chapter 12	Downtown Core: All provisions are not applicable to this PUD.
Appendix A	Zoning Fee Schedule: All fees are applicable to this PUD.

## **B. Development Plan**

The *Northwest Corner of 59th Avenue & Van Buren Street – Industrial PUD* is created to capitalize on the property's location to two (2) important regional transportation corridors, expand on the City's planning and infrastructure investments, and act as a catalyst for future economic development opportunities within the Estrella Village. The *Northwest Corner of 59th Avenue & Van Buren Street – Industrial PUD Concept Exhibit* (See **Figure 2**) for the property are intended to facilitate the proposed industrial development. The PUD also expands uses from the City of Phoenix Zoning Ordinance and promotes flexibility in site design while ensuring compatibility. See **Figure 2, Concept Exhibit** for a reference of potential site development standards.

### **1. Location and Access**

The *Northwest Corner of 59th Avenue & Van Buren Street – Industrial PUD* is a seventy-nine (79) net acre property generally bounded by 59<sup>th</sup> Avenue to the east (future 202 freeway alignment), Van Buren Street to the south, heavy (C-3) commercial type use and a senior living facility to the west, and Fillmore street to the north. Access to the site will occur from various locations along both Van

Buren Street and 59<sup>th</sup> Avenue. No access will be allowed along Fillmore Street to the north.

**2. Uses**

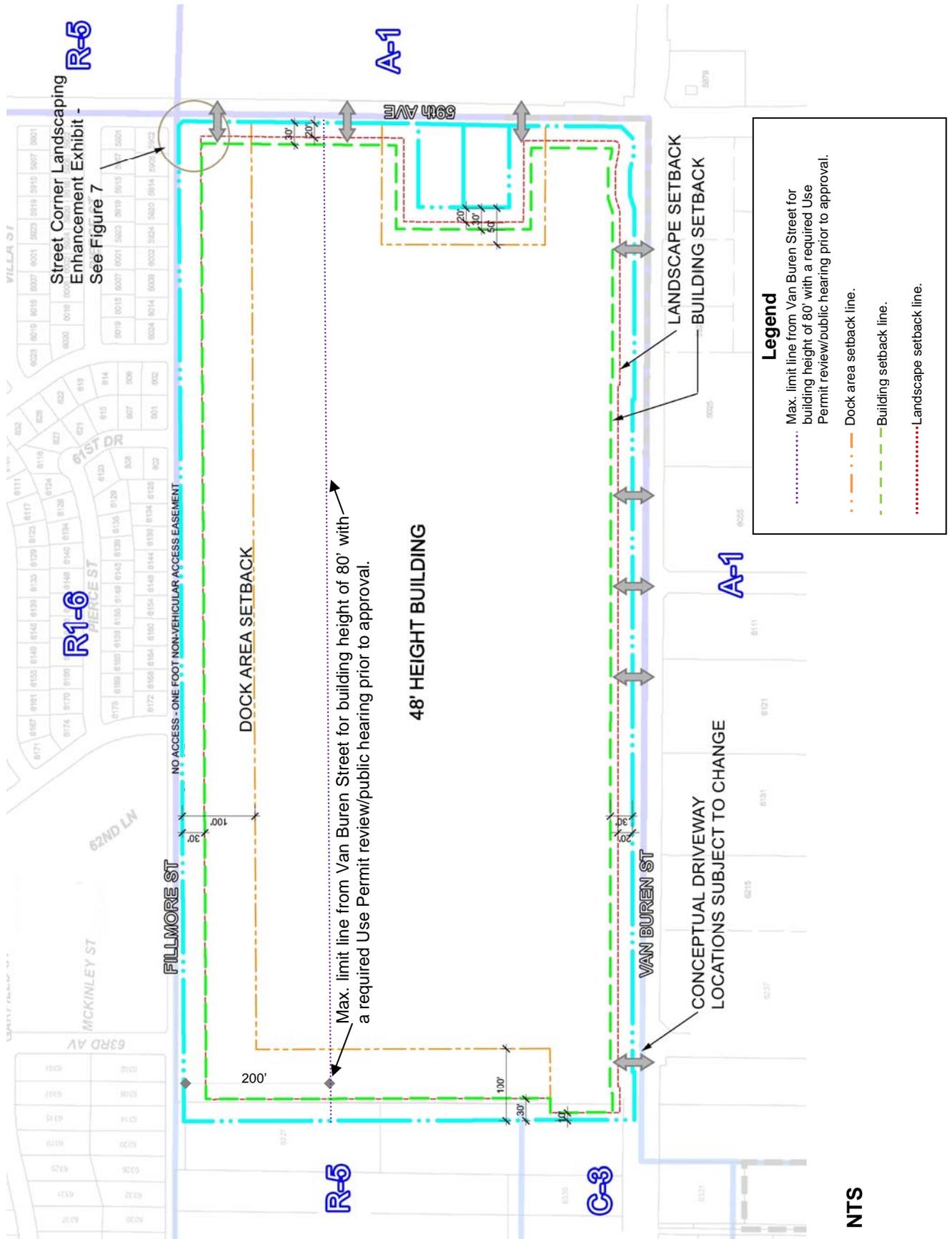
A comprehensive list of uses has been developed that includes permitted uses and permitted uses subject to certain conditions/imitations from the City of Phoenix's Zoning Ordinance.

The *Northwest Corner of 59th Avenue & Van Buren Street – Industrial PUD* provides flexibility for any of the permitted uses to locate anywhere on the site.

**3. Standards**

The development standards for PUD provides for strategic changes, where appropriate, to facilitate reasonable development based on the current/future context of the area. Monument sign standards are also included within the PUD to provide certainty to the type and possible location of those signs with the future development. Another important component to the *Northwest Corner of 59th Avenue & Van Buren Street – Industrial PUD* is the allowable building heights. The location of the property being adjacent to both 59<sup>th</sup> Street (future 202 freeway alignment and Van Buren Street could support increased building heights. Further, as indicated by the City of Phoenix General Plan Land Use Map, those areas of the subject property are surrounded by land uses that are not anticipated to be sensitive to building height. In addition, the current zoning on the property (R-5) allows up to forty-eight (48) feet. Higher buildings can also serve to protect residential homes from traffic noise from the surrounding streets and the future freeway. Thus, the need for flexibility in building heights from forty-eight (48) feet along Fillmore Street up to a maximum of eighty (80) feet along Van Buren Street (with a use permit) may be necessary for reasonable industrial development. The additional height allowance and location on the site shall be determined via the use permitting and public hearing process. However, the maximum building height of eighty (80) feet shall be no closer than two-hundred (200) feet from the residential zoned properties along Fillmore Street. Building setbacks, landscape setbacks, plantings, and screening will also serve to soften and transition the building heights without impacting the existing homes along Fillmore Street. See **Figure 2, Concept Exhibit**.

**Figure 2: Concept Exhibit**



## C. Site Location and Conditions

### 1. Site Location and Conditions

The Northwest Corner of 59th Avenue & Van Buren Street – Industrial PUD is a seventy-nine (79) net acre property generally bounded by 59th Avenue to the east (future 202 freeway alignment and vacant land), Van Buren Street to the south (existing industrial uses), heavy (C-3) commercial type use/senior living facility (R-5) to the east, and Fillmore street to the north (existing residential homes/public park). The legal description and ALTA survey for the PUD is provided in Appendix A.

The Northwest Corner of 59th Avenue & Van Buren Street – Industrial PUD property is currently under single ownership and is in escrow to be purchased by Wentworth Property Company, LLC. The continued transfer to a single ownership and this PUD provides a significant opportunity to plan a cohesive and thoughtful industrial development.

### 2. Topography and Physical Features

The Northwest Corner of 59th Avenue & Van Buren Street PUD property is flat, undeveloped, and currently being farmed. (Refer to **Figure 3, Existing Site Conditions.**)

**Figure 3: Existing Site Conditions**



## D. General Plan Conformance

### 1. A Statement of Conformity

The current City of Phoenix General Plan designates the *Northwest Corner of 59th Avenue & Van Buren Street PUD* property as a mix of land uses including designations of Industrial, 15 du/acre Higher Density, and Residential 3.5 to 5 du/acre. **Note:** A companion Minor General Plan Amendment case (General Plan Case No. GPA-EST-4-12-7) is being processed concurrently with the rezoning request to change the above designations to an Industrial designation. The approval of the Minor General Plan Amendment case (GPA-EST-4-12-7) will bring the *Northwest Corner of 59th Avenue & Van Buren Street PUD* in to conformance with the Industrial land use designation as well as being consistent with many of the goals and policies outlined in the City of Phoenix General Plan. Moreover, the property is located within the Southwest Phoenix Employment Center and the Enterprise Zone. These areas focus on creating quality employment opportunities for the community. The property is also located less than one mile south of the I-10 freeway and at the intersection of two arterial streets. Thus, this location is appropriate for the proposed industrial designation and supports the intent of the Southwest Employment Center and Enterprise Zone. (Refer to **Figure 4, Current/Proposed General Plan Land Use Maps.**)

### 2. Conformance with General Plan Goals

Land Use Element, Goal 3 Infill, Policy 2: Identify Transitional Neighborhoods in which the Surrounding Land Use Patterns, Zoning Districts, and Resident Desires Indicate Conversion to Commercial and Industrial Uses.

*The vacant property is located 1-mile south of I-10, along two (2) major arterial streets (future 202 freeway alignment), and has industrial zoning/uses located to the south, west, and east.*

Land Use Element/Goal 2, Employment and Population Balance: Development of Each Village's Potential Should be Encouraged by Distributing a Diversity of Employment and Housing in a Way that Achieves a Balanced Citywide Plan and that Is Consistent with Commute Travel Patterns and the Current Character of Each Developed Village.

*The proposed industrial development will be located south of I-10 and adjacent to the future 202 freeway, which will reduce commuter travel and encourage employment opportunities that supports residential uses.*

Growth Element, Goal 1 – Growth: Maintain a High Quality of Life and Economically Healthy Community.

*The proposed PUD request will promote economically healthy and balanced environment. The future industrial users will be supported by the surrounding industrial, commercial, and residential uses that currently exist in the area. The proposed Northwest Corner of 59th Avenue & Van Buren Street PUD request is consistent with the existing industrial zoning designation to the south, west, and east.*

**Figure 4: Current/Proposed General Plan Land Use Maps**

GENERAL PLAN – CURRENT LAND USES – TO BE AMENDED UNDER SEPARATE APPLICATION.



**Proposed: Industrial Land Use.**



## E. Zoning and Land Use Compatibility

### 1. Surrounding Zoning and Land Use

The existing zoning on the *Northwest Corner of 59th Avenue & Van Buren Street PUD* property is predominately zoned R-5 (Multi-Family Residence District) with approximately 12 acres zoned C-2 (Intermediate Commercial) and 1 acre zoned C-3 (General Commercial). (Refer to **Table 1**.) The property is undeveloped. (Refer to **Figure 5, Existing Zoning**.)

**Table 1: Surrounding Zoning and Land Use**

Location	General Plan	Zoning	Land Use
North	Residential 3.5-5 du/acre and Parks/Open Space Public	R1-6 (Single -Family Residence District)	Single-family homes and public park.
South	Industrial	A-1 (Light Industrial District)	Industrial uses.
East	Industrial	A-1 (Light Industrial District)	Vacant / Future 202 freeway.
West	Residential 3.5-5 du/acre	C-3 (General Commercial District) / R-5 (Multi-Family Residence District)	Heavy commercial and senior living facility.

The *Northwest Corner of 59th Avenue & Van Buren Street PUD* proposes a land use and development standards that are consistent with adjacent development as well as in harmony with the City's future planning framework for the area. (Refer to **Figure 6, Proposed Zoning**.)

## F. Land Uses

The following list of uses (**Table 2: Permitted Use List**) defines permitted uses and permitted uses subject to certain conditions/limitations from the City of Phoenix's Zoning Ordinance. The proposed uses, hybrid A-1 and General Commerce type uses, along with the necessary development standards provides for a hybrid/transitional zoning district. The PUD provides for an optimal level of uses and development standards that are compatible with the surrounding area (i.e., existing A-1 uses and residential). Moreover, the allowance for managed and mitigated outdoor storage, trailer parking, etc. is an appropriate and quite use adjacent to residential areas.

The *Northwest Corner of 59th Avenue & Van Buren Street – Industrial PUD* provides flexibility for any of the permitted uses to locate anywhere on the site.

The master developer or any property owner within the defined limits of the PUD may request an interpretation of analogous use to the defined list below from the City of Phoenix Zoning Administrator. The Zoning Administrator may administratively approve a

use analogous to those listed below. Brief descriptions of the two (2) types of permitted uses are defined on the following page.

**Figure 5: Existing Zoning**



**Figure 6: Proposed Zoning**



**1. Permitted Principal Uses**

Uses specifically permitted as set forth in **Table 2** or analogous to those specifically permitted as determined by the City of Phoenix Zoning Administrator.

**2. Permitted Uses Subject to Conditions/Limitations Standards**

- a) Uses specifically permitted subject to conditions/limitations as set forth in **Table 2**. Performance Standards are specific for each individual use as defined. Some uses subject to conditions/limitations may also require a Use Permit which is processed in accordance with the provisions of the City of Phoenix Zoning Ordinance.
- b) Temporary uses shall be permitted pursuant to the City of Phoenix Zoning Ordinance’s regulations and standards for temporary uses.
- c) The outdoor use of a public address system shall be prohibited.
- d) Outdoor storage, trailer or freight storage, storage containers, and dock areas.
  - 1. Shall be screened, see Walls and Screening Section of the PUD.
  - 2. All outdoor storage, trailers, freight, storage containers shall be no higher than fifteen (15 feet) and no closer than thirty (30) feet of residentially zoned properties.
  - 3. The area used for storage or circulation shall be dust-free.
  - 4. Dock areas.
    - a. A dock area shall be considered as the area immediately adjacent to the building where trucks with trailers are parked for the purpose of loading and unloading to and from the building.
    - b. A dock area shall be no closer than one-hundred (100) feet to residentially zoned properties along west and north sides of the PUD.
    - c. A dock area shall be no closer than fifty (50) feet to those residentially zoned R-5 properties notched out from the PUD on the east and along 59<sup>th</sup> Avenue.

**Table 2: Permitted Use List**

Permitted Uses		Conditions/Limitations
1.	Agricultural Implements Repair and Service	
2.	Agricultural Tillage, Contractors	
3.	Air Conditioning Equipment, Fabrication	
4.	Aircraft Fabrication and Assembly	A Use Permit shall be obtained.
5.	Aircraft Sales and Repair	A Use Permit shall be obtained.
6.	Auto Seat Covers and Trim Shop	

Permitted Uses		Conditions/Limitations
7.	Automobile Parts and Supplies, New/Used Retail and Wholesale	Indoors.
8.	Automobiles: Parts and Supplies Used, Salvage Storage	Indoors.
9.	Awnings, Custom Fabrication and Sales	
10.	Bakers and Baked Goods, Manufacturing Wholesale and Storage	
11.	Beer, Ale and Wine Distributor, Wholesale, Storage, and bottling	
12.	Belting, Manufacturing	
13.	Beverages, Wholesale, Storage and bottling	
14.	Biomedical and Medical Research Office and/or Laboratory	
15.	Boat, Manufacturing	
16.	Boats, Custom Fabrication	
17.	Boilers, Repairing	
18.	Bookbinders, Commercial	
19.	Boxes, Sales and Manufacturing	
20.	Breweries	
21.	Brick Storage	A Use Permit shall be obtained for storage outdoors.
22.	Brooms, Mtg.	
23.	Brushes, Manufacturing	
24.	Building Contractors: Equipment and Material; Storage	
25.	Building Materials, Wholesale and Storage	
26.	Bus Line Depots with repair and light maintenance, including washing facilities	A Use Permit shall be obtained.
27.	Bus Line Shops, Garage Repair	
28.	Button Manufacturing, Metal, Plastics	

Permitted Uses		Conditions/Limitations
29.	Cabinet Makers	
30.	Candle, Manufacturing	
31.	Candy, Wholesale Distribution	
32.	Canvas, Manufacturing	
33.	Carbonic Ice, Manufacturing	
34.	Carpets and Rugs, Wholesale, and Warehouse	
35.	Caskets, Manufacturing	
36.	Cement Products, Manufacturing (pipe, blocks, etc.)	Indoors.
37.	Cement Storage	A Use Permit shall be obtained for storage outdoors.
38.	Chemicals and Drugs, Storage and Distribution	
39.	Chocolate and Coca Products, Manufacturing	
40.	Cigarette Manufacturing	
41.	Cleaning and Dyeing Plants	
42.	Clothing, Wholesale and Distribution	
43.	Coffee, Wholesale, Storage, and Roasting	
44.	Coin Machines, Rental and Service	
45.	Commercial Vehicle s and Boats for Sale (Outdoor)	<p>(1) Shall be allowed along Van Buren Street.</p> <p>(2) A maximum of six (6) foot high view fence may be allowed, which may have a solid base of no more than two (2) feet above finished grade, with the upper four (4) foot portion open to allow visibility, such as with wrought iron.</p> <p>(3) View fencing shall vary every four-hundred (400) lineal feet to visually reflect a meandering or staggered appearance. Design features should be used to break up the appearance of a long, straight fence. Such design features may include planters, pilasters, use of</p>

Permitted Uses		Conditions/Limitations
		different block, texture, integral color, or dense landscaping.
46.	Concrete Products, Manufacturing	Indoors.
47.	Concrete Products, Storage	
48.	Confectioners, Wholesale	
49.	Contractors Equipment and Supplies, Retail Sales	
50.	Contractors Equipment and Supplies, Storage	
51.	Cranes, Storage	Indoors.
52.	Crockery, Manufacturing	
53.	Crop Dusting Equipment Yards	Excluding airplanes.
54.	Decoration, Workshop and Equipment Yard	
55.	Dental Laboratories	
56.	Diaper Supply Service	
57.	Diesel Engines Service, Equipment and Supplies	
58.	Display Designers and Builders' Shops	
59.	Distillers, Distribution, Warehouse	
60.	Doors, Metal, Manufacturing	
61.	Doors, Sash and Trim, Wood, Manufacturing	
62.	Draperies, Manufacturing	
63.	Drugs, Manufacturing	
64.	Drugs, Wholesale Storage	
65.	Dry Goods, Wholesale and Storage	
66.	Electric Equipment, Retail Sales and Repair	
67.	Electric Light and Power Companies, Storage	
68.	Electric Plating	

Permitted Uses		Conditions/Limitations
69.	Electrical Appliances, Manufacturing	
70.	Excelsior Manufacturing	
71.	Exhibition Hall	
72.	Exterminating and Fumigating Warehouse	
73.	Family Game Center	
74.	Farm Implements and Machinery Assembly	Indoors.
75.	Farm Implements and Machinery, Retail Sales	A Use Permit shall be obtained for sales outdoors.
76.	Feed and Seed, Wholesale and Storage	
77.	Fences, Metal Fabrication, Mfg;	
78.	Fences, Metal, Wholesale and Storage	
79.	Fertilizers, Processed, Storage Only	
80.	Fire Protection Equipment and Supplies, Retail Sales and Service	
81.	Floor Coverings, Retail and Wholesale	
82.	Flour and Grain Storage and Elevators	Elevators no higher than allowed for an enclosed building or via Use Permit.
83.	Freight Storage	
84.	Frozen Foods, Wholesale Storage and Distribution	
85.	Fruit and Vegetable Juice, Processing	
86.	Fruits and Vegetables, Processing	
87.	Furniture Manufacturing, Metal, Wood	
88.	Furniture, Repairing and Refinishing	
89.	Furniture, Wholesale and Storage	
90.	Furs, Custom Cleaning, Storage	
91.	Garment Factory	

Permitted Uses		Conditions/Limitations
92.	Gasoline, Storage Tanks (subject to approval by Fire Prevention Supervisor)	Ancillary to a permitted use.
93.	Glass Shops, Custom	
94.	Gymnasiums, Private or Commercial	
95.	Hay and Straw, Sales, Storage (subject to approval by Fire Prevention Supervisor)	
96.	Heating and Ventilating Equip., Storage	
97.	Hotel Equipment, Assembly and Custom Fabrication	
98.	Hotel Equipment, Supplies and Retail Sales	
99.	House Movers, Equipment Storage	Indoors.
100.	Ice, Manufacturing	
101.	Insulation Materials, Storage and Wholesale	
102.	Insulation, Contractors' Equipment Yards	
103.	Iron, Custom Decorative Wrought Iron Shops	
104.	Janitors' Supplies, Storage and Warehouse	
105.	Jewelers, Manufacturing	
106.	Laboratories, Testing and Research	
107.	Landscape Contractors	
108.	Laundries	
109.	Laundry Equipment and Supplies	
110.	Lawn Mower Repair Shops	
111.	Linen Supply Laundry Service	
112.	Liquor, Storage and Wholesale	
113.	Livestock Supplies, Storage and Wholesale	
114.	Lockers, Food Storage	

Permitted Uses		Conditions/Limitations
115.	Machinery Rental	
116.	Machinery Rentals, other than industrial	
117.	Machinery Used, Storage	
118.	Meat Packing and Smoking (no slaughtering except rabbits and poultry).	
119.	Millwork (woodworking) Manufacturing	
120.	Mineral Water Distillation and Bottling	
121.	Mining Machinery, Wholesale Storage	Indoors.
122.	Monuments, Retail Sales and Display	
123.	Motion Picture Equipment, Retail Sales and Display	
124.	Motor Freight Co., Warehouses	
125.	Motor Repairing and Rewinding, Transformers, Generators, Heavy Duty	
126.	Neighborhood Collection Center, subject to the following limitations:	(1) All loose materials shall be stored within an enclosed container or building. (2) No bay door shall face a residential zoning district if the use is located within one hundred (100) feet of such a district.
127.	Notions, Manufacturing and Wholesale	
128.	Office Furniture, Manufacturing	
129.	Office Uses	
130.	Ornamental Metal Work, Custom Hand, Fabrication	
131.	Orthopedic Appliances, Manufacturing and Sales	
132.	Paint and Varnish, Bulk Storage, Warehouse	
133.	Painters' Equipment and Supplies Shops, Wholesale and Storage	

Permitted Uses		Conditions/Limitations
134.	Paving Contractors' Equipment, Materials Storage	Indoors.
135.	Petroleum Products, Packaging and Storage	
136.	Pickled Products, Manufacturing	
137.	Pipe, Manufacturing	Indoors.
138.	Pipe, Fittings Storage	
139.	Pipe, Fittings Wholesale	
140.	Pipe, Metal, Storage	
141.	Pipe, Used, Storage and Sales	
142.	Planing Mills	
143.	Plant Nurseries, Outdoor	The outdoor sales area must be enclosed within a perimeter screen wall and/or decorative fence to ensure the proper screening of stock merchandise as approved by the Planning and Development Department. Plant materials are excluded from this requirement and may be displayed without solid screening.
144.	Plaster, Wholesale and Storage	Indoors.
145.	Plastic and Plastic Products Manufacturing	
146.	Plastic and Plastic Products, Retail and Wholesale	
147.	Plating and Polishing Shops	
148.	Playground Equipment Sales	
149.	Pottery and Ceramics, Wholesale	
150.	Poultry Supplies Wholesale and Storage	
151.	Produce Packing Plants	
152.	Public Storage Garages	
153.	Public Utility Plants	
154.	Public Utility Service Yards	(1) All outside storage or uses shall be enclosed by a minimum six (6) foot

Permitted Uses		Conditions/Limitations
		high and maximum ten (10) foot high masonry wall. (2) A ten (10) foot wide landscaped area shall be required outside of the wall, with screen plantings maintained to a height of ten (10) feet. (3) No lighting fixtures shall exceed fifteen (15) feet in height.
155.	Pumps, Repairing and Rental	
156.	Quarters for caretakers or watchman	
157.	Recycling Center, subject to the following limitations:	(1) Processing may include baling of recyclable materials but not basic processing or compounding to reform the materials into a usable state and shall not include shredding of automobile metals or other uses of similar intensity. (2) All loose materials shall be stored within an enclosed container or building. (3) No bay door shall face a residential zoning district if the use is located within one hundred (100) feet of such a district.
158.	Refrigeration Equipment, Repairs and Sales	
159.	Restaurant Equipment, Supplies and Retail Sales	
160.	Riding Equipment Sales	
161.	Road Building Equipment, Storage	Indoors.
162.	Saddlery Shops, Custom, Handmade	
163.	Scaffolds, Equipment Storage	
164.	Scales, Commercial Weighing	
165.	School Equipment and Supplies Wholesale	
166.	Screens, Doors and Windows, Manufacturing	
167.	Self-Service Storage Warehouses	All storage shall be within a closed building except that boats, trailers and motor vehicles may be placed in outdoor storage areas which are

Permitted Uses		Conditions/Limitations
		separate from the buildings and screened from view from adjacent streets and property by walls, fences or landscaping. Outdoor storage areas shall not count toward meeting parking requirements.
168.	Septic Tanks, Contractors, Construction	Indoors.
169.	Sewer Pipe, Manufacturing, Concrete	Indoors.
170.	Sewer Pipe, Storage	
171.	Sewing Machines, Commercial and Industrial Type, Retail Sales and Repairing	
172.	Sign Fabrication	
173.	Slip Covers, Custom Manufacturing	
174.	Soaps, Detergent Bleach Manufacturing	
175.	Soaps, Wholesale and Storage	
176.	Special School or Training Institution not offering curriculum of general instruction comparable to public schools	
177.	Spices, Wholesale and Storage	
178.	Spraying Supplies, Equipment Yard	
179.	Storage Warehouse	
180.	Storage Yards, Bulk Material	
181.	Storage Yards, Equipment	
182.	Surgical Supplies, Wholesale	
183.	Tile Manufacturing Decorative	
184.	Tile Manufacturing, Structural	
185.	Tobacco, Wholesale and Storage	
186.	Tombstones, Sales and Display	
187.	Tools and Hardware, Manufacturing	
188.	Tools, Wholesale and Distribution	
189.	Tractors, Retail Sales, Display	

Permitted Uses		Conditions/Limitations
190.	Trailers and Storage Containers, Outdoor	
191.	Trailers, Assembly and Manufacturing	
192.	Venetian Blinds, Custom Manufacturing and Cleaning	
193.	Water Based or Water Emulsion Type Paint Only, Manufacturing	
194.	Water or Mineral, Drinking or Curative, Bottling and Distribution	
195.	Water Softening Equipment, Service and Repairs	
196.	Welding Shop	
197.	Welding, Equipment and Supplies Storage	
198.	Well Drilling, Equipment	
199.	Window Display Installations, Studio and Shops	
200.	Window Glass Installation Shops	
201.	Wines, Storage and Wholesale	
202.	Wireless Communication Facility	Wireless communication facilities must adhere to the standards for disguised or concealed facilities as set forth within the City of Phoenix Zoning Ordinance.
203.	Wood Products, Manufacturing Bulk	

**G. Development Standards**

To protect surrounding neighborhoods and preserve the public welfare, development standards are herein established for yard, height, landscaping, outdoor storage, signage, and general overall development requirements to provide an appropriate transition between industrial and residential uses.

**1. Building Setbacks**

Perimeter property line building setbacks shall be in accordance with **Figure 2, Concept Exhibit**.

## 2. **Building Height**

Maximum building heights shall be in accordance with **Figure 2, Concept Exhibit**. Additional height up to eighty (80) feet may be granted with a Use Permit and public hearing process, per the City of Phoenix's Zoning Ordinance process, along Van Buren Street. **Note:** The current zoning on the property (R-5) allows up to forty-eight (48) feet. Higher buildings can serve to protect residential homes from traffic noise from the surrounding streets and the future freeway. Moreover, the need for flexibility in building heights from forty-eight (48) feet along Fillmore Street up to a maximum of eighty (80) feet may be necessary for a future development project that may require additional height to operate their equipment successfully. The additional height allowance and location on the site shall be determined via the use permitting and public hearing process. However, the maximum building height of eighty (80) feet shall be no closer than two-hundred (200) feet from the residential zoned properties along Fillmore Street.

It is the intent of this provision of the PUD to express the maximum building height as a measurement of feet and not as an expression of total number of stories. Any stepback provision defined within the City of Phoenix Zoning Ordinance is not applicable to development within this PUD. Height standards shall be measured in accordance with the defined term for building height provided within the Phoenix Zoning Ordinance.

## 3. **Perimeter Landscape Setbacks**

Perimeter landscape buffer setbacks shall be in accordance with **Figure 2, Concept Exhibit**.

The Perimeter Landscape Buffer will set the tone for the development's appearance from the public's vantage point as well as from adjacent properties, and provide a sense of edge in order to define property boundaries. An appropriate mix of canopy trees, groundcovers and shrubs provided between street and sidewalk, and between the sidewalk and parking or building areas, can create an attractive, comfortable pedestrian environment. Landscaped berms and undulating landforms used in conjunction with vegetation are encouraged to provide both visual interest and screening of employee parking and maneuvering areas.

The following standards shall apply:

- (1) Landscaping within perimeter landscape buffer areas shall incorporate an appropriate mix of shade trees along all property lines.
- (2) Trees shall be spaced at twenty (20) feet on center average with five (5) shrubs per tree and a minimum fifty percent (50%) groundcover.
- (3) A mix of tree sizes shall be used along Fillmore Street and adjacent to those areas with a residential zoning district. These areas should contain a mix of; two (2) inch caliper trees fifty percent (50%); three (3) inch caliper trees fifty percent (50%) (in accordance with the Arizona Nurseryman's Association Standards).
- (4) A mix of tree sizes shall be used along Van Buren Street. These areas should contain a mix of; two (2) inch caliper trees fifty percent (50%); three (3) inch caliper trees twenty-five percent (25%), and four (4) inch

caliper trees twenty-five percent (25%) (in accordance with the Arizona Nurseryman's Association Standards).

#### 4. **Fillmore Street**

Street Corner and Landscaping.

The southwest corner of Fillmore Street and 59<sup>th</sup> Avenue corner shall be designed to create a visually enhanced sense of arrival for the residents living north of the PUD.

Landscape treatments shall be comprised of mature specimen trees (2 inch caliper or greater) and dense mass plantings of flowering shrubs, groundcover, and accent plantings at this corner. (See **Figure 7**, Street Corner Landscaping Enhancement Exhibit.)

The following additional landscape standards shall apply to this corner:

- (1) The Landscape treatments at this corner shall be a minimum of six-hundred (600) square feet of landscape area with a minimum depth dimension along Fillmore Street of thirty (30) feet.
- (2) Turf may also be used at this location.

A minimum thirty (30) foot wide landscape setback shall be provided the full length of Fillmore Street for the benefit of the residents living north of the PUD.

**Figure 7: Street Corner Landscaping Enhancement Exhibit.**



**5. Landscape Adjacent to the Main Building Office - Public Entrances**

Foundation landscape areas shall be incorporated at the main office public entrances in order to soften the vertical planes of structures and create comfortable space for pedestrians and employees. Appropriately selected tree species will be important for these areas in order to prevent growth from interfering with structures. An appropriate mix of evergreen and flowering shrubs and groundcover shall be used. Main public office entrances shall be treated with flowering shrubs, potted accent plants and shade trees where possible. Landscape areas will allow for the placement of shade trees, which in turn will provide sun and heat protection to those building facades and windows, contributing to energy efficiency and building sustainability.

The following standards shall apply:

- (1) A minimum three (3) foot wide by five (5) foot long landscape planter or planter box shall be provided on both sides of the main public office entrance.
- (2) A mix of tree sizes, shrubs, and flowering plants may be used in this area to provide visual and interest relief.
- (3) A minimum of one (1) tree at two (2) inch caliper and five (5) shrubs/flowering plants (five (5) gal) per landscape area.
- (4) Turf may be used in replace of shrubs.

**6. Parking Lot Landscaping**

Designated surface employee/vistor parking areas shall provide for landscaping. Landscape islands shall be dispersed throughout the parking areas to provide sufficient shade cover and be sized accordingly. Landscaping located within parking lots helps in reducing the heat island effect and provides refuge from intense heat and sunlight for the parked vehicles. This landscaping also provides “green” space within the parking fields to break up the expanses of asphalt and concrete.

The following standards shall apply:

- (1) Provide a minimum of 5% of landscaping within the interior (exclusive of perimeter landscaping) designated surface employee parking lot area.
- (2) Parking islands shall be at the ends of each row of parking and approximately every one-hundred-ten (110) feet in between.
- (3) Trees selected for parking islands shall be of the same species and selected to provide shade.
- (4) Trees used in parking islands shall be a minimum of two (2) inch caliper in accordance with the Arizona Nurseryman’s Association Standards.
- (5) Trees and shrubs shall be included at one (1) tree and five (5) shrubs (five (5) gal) per parking island row.

**7. Retention Basin Landscape Area**

Improved retention basin landscape areas shall be incorporated into the site development of the project when adjacent and visible to Fillmore Street. It is the

intent of this PUD to encourage the development of these spaces to create interesting arrangements of shrub and groundcover plantings for those living north of the PUD. In providing these elements, the retention basin landscape areas will promote a pleasant environment. The landscaping in these areas shall be designed so that the plant material has the opportunity to use the storm water runoff to supplement the irrigation system and provide groundwater recharge. Limited use of turf may be used in the bottom of basins where appropriate, otherwise fractured granite rip rap or river rock should be placed in the low water areas to hide unsightly dirt and oils from storm water runoff.

The following standards shall apply:

- (1) Retention basin landscape areas will be owned, managed and maintained by a common association formed to address all common areas and facilities within this PUD, unless all of the property is owned by the same entity.
- (2) Landscaping within/surrounding retention basin areas shall incorporate an appropriate mix of shade trees. However, the basin area drainage system shall not be impacted by landscaping materials (i.e., groundcovers, etc.) and shall be designed appropriately to minimize impact, maintain a visually pleasing environment, and minimize long-term maintenance issues.
- (3) Trees and shrubs shall be included at minimum of one (1) tree at two (2) inch caliper and five (5) shrubs per five-hundred (500) square feet of landscape area.
- (4) Turf may be used in select locations within retention basin areas.

## **8. Landscape Sustainability**

Sustainable landscape and irrigation design practices shall be considered. A minimum of three (3) of the six (6) items described below shall be implemented within the overall development or in each phase as developed.

- (1) Capture gray water discharge from developments facilities and re-use for landscape irrigation.
- (2) Utilize “Smart” irrigation control systems.
- (3) Utilize efficient drip irrigation technology.
- (4) Locate plant material in or near storm water drainage swales or basins to maximize water benefit for landscape areas.
- (5) Use low water use plant material.
- (6) Provide slope stabilizing plant material where appropriate to limit erosion.

## **9. Off-Street Parking & Loading Standards**

Refer to the Off-Street Parking and Loading Standards of the Phoenix Zoning Ordinance for the required parking and loading standards.

A one (1) foot non-vehicular access easement will be required at the time of the final plat for those parcels abutting Fillmore Street to protect the residents north from truck and vehicular traffic exiting and entering this PUD.

**10. Shade**

Designated surface employee/visitor parking areas shall provide a minimum of fifteen percent (15%) shade cover through a combination of shade trees and/or shade canopies.

**11. Lighting Standards**

To promote safety and continuity in design of the fixtures as well as the color and intensity of light, this PUD shall comply with lighting standards as defined within the Phoenix Zoning Ordinance except as modified below.

a) Outdoor Storage/Trailer or Freight Storage/Storage Containers/Dock Areas.

- (1) Shall utilize metal halide luminaires, mounted at a height not to exceed twenty-five (25) feet, except that poles installed within thirty (30) feet of the PUD boundary shall not exceed eighteen (18) feet in height. Building mounted luminaires shall not exceed fourteen (14) feet in height.
- (2) Provide a photometric analysis at the time of building permits that shall demonstrate the lighting design will not produce lighting levels that exceed 1-foot candle at the PUD boundary.
- (3) Exterior lighting within thirty (30) feet of residentially zoned properties shall be fully shielded.

**12. Walls and Screening**

a) A three (3) foot high solid wall shall screen designated surface employee/visitor parking areas from street frontages or a combination of solid wall and shrubbery.

b) Combination solid wall and view fencing may be allowed to screen designated surface employee/visitor parking areas along street frontages.

- (1) A maximum of six (6) foot high, which may have a solid base a minimum of three (3) feet above finished grade, with the upper portion open to allow visibility, such as with wrought iron.
- (2) View fencing shall vary every four-hundred (400) lineal feet to visually reflect a meandering or staggered appearance. Design features should be used to break up the appearance of a long, straight fence. Such design features may include planters, pilasters, use of different block, texture, integral color, or dense landscaping adjacent to the wall or fence.

c) An eight (8) foot high solid screen wall shall be utilized to screen outdoor storage areas, trailer or freight storage areas, storage containers, and dock areas from view along street frontages. (Refer to **Figure 8, Screen Wall Detail.**)

- (1) The eight (8) foot high solid screen wall shall vary every four-hundred (400) lineal feet to visually reflect a meandering or staggered appearance. Design features should be used to break

up the appearance of a long, straight fence. Such design features may include planters, pilasters, use of different block, texture, integral color, or dense landscaping adjacent to the wall.

- d) If there is an existing six (6) foot solid block wall along an exterior property line separating two (2) properties then said wall may remain or it may be rebuilt up to a maximum of eight (8) feet in height. If there is no wall along an exterior property line separating two (2) properties then a solid block wall shall be installed up to a maximum of eight (8) feet in height.
- e) Retaining walls may be required and shall comply with the regulations applicable to retaining walls as described in the Phoenix Zoning Ordinance.

**Figure 8, Screen Wall Detail**



### 13. Sign Standards

#### a) Signage Purpose and Intent

Ensure that all uses have adequate signs for individual project identity and regulatory signage needs. The sign regulations within the *Northwest Corner of 59th Avenue & Van Buren Street – Industrial PUD* will follow the City of Phoenix Zoning Ordinance standards for signage.

However, the sign standards for monument signage included within this PUD are intended to replace and supersede the comparable sign standards contained within the City of Phoenix Zoning Ordinance. In the event of a conflict between a provision of the PUD and a provision of the City of Phoenix Zoning Ordinance, the PUD prevails. In the event that the PUD is silent regarding a specific sign standard, the City of Phoenix Zoning Ordinance prevails (i.e., the A-1, Light Industrial Zoning District).

**Note:** If in the future, via text amendment to add the 202 freeway at this location in Phoenix, off-premise structures are permitted to locate by the 202 freeway then off-premise structures may be located within this PUD. However, any proposed off-premise signs shall comply with the City of Phoenix Zoning Ordinance sign standards and spacing requirements for off-premise signs within PUD's.

b) Monument Sign Standards

No monument signs shall be allowed along Fillmore Street.

One (1) sign on a multiple-use parcel or for the entire development shall include center identification (i.e. the name of the center), if any.

Freeway signs shall only be located on property with freeway frontage and must be within three hundred (300) feet of, and oriented to 202 freeway. No setback is required and may include electronic message centers for a freeway sign.

Sign area for the freeway pylon sign is calculated based on the total area of the freeway signage excluding the pylon structure and architectural embellishments. (See **Table 3.**)

**Table 3: Sign Standards**

Type of Sign	Number of Signs & Spacing	Maximum Height	Maximum Area
Primary Sign	<ul style="list-style-type: none"> <li>• 1 sign permitted per 300 lineal feet of street frontage</li> <li>• minimum of 1 regardless of street frontage</li> <li>• 100 foot minimum spacing between signs</li> </ul>	16 feet	187 square feet
Primary Sign Freeway Frontage	<ul style="list-style-type: none"> <li>• 1 sign permitted per 300 lineal feet of street frontage</li> <li>• minimum of 1 regardless of street frontage</li> <li>• 100 foot minimum spacing between signs</li> </ul>	30 feet	187 square feet
Directional Sign	2 per driveway	6feet	7 square feet

Type of Sign	Number of Signs & Spacing	Maximum Height	Maximum Area
<i>Freeway Pylon Sign</i>	<ul style="list-style-type: none"> <li>• 3 maximum</li> <li>• 100 foot minimum spacing between signs</li> </ul>	70 feet	1,122 square feet. (A maximum of 672 square feet of the 1,122 square feet may be allowed for an Electronic Message Display* for users within the PUD development.)

\* Electronic message displays shall be permitted upon satisfying the following minimum conditions:

- a. The sign copy shall change only through an immediate transition of the sign copy or message that does not have the appearance of moving text or images. The sign copy shall not use flashing, intermittent or moving lights or produce the optical illusion of movement. No part of the sign structure or cabinet may move or rotate, except as otherwise permitted by these sign provisions.
- b. The sign copy shall be displayed for a minimum of eight (8) seconds.
- c. The sign shall include photocell technology to control and vary the intensity of lighting depending on the amount of ambient light that is present (e.g. daytime, nighttime, cloudy conditions). The intensity of the lighting shall not exceed three hundred (300) nits from dusk until 11 PM.
- d. From 11:00 p.m. until sunrise, illumination shall be extinguished and shall be equipped with an automatic device to ensure compliance.

## H. Sustainability Guidelines

The “Leadership in Energy and Environmental Design” (LEED) Green Building Rating System is presently a voluntary standard for developing high-performance sustainable buildings. Developers of this PUD property are strongly encouraged to incorporate current LEED standards within the project.

This PUD encourages sustainability principles through the implementation of at least three (3) of the following Design Review Presumptions, or other sustainability principles as approved by the City.

- a) Building designs should respond to the harsh southwest climate by incorporating materials and design methods suitable for the region.
- b) The orientation of buildings should recognize the value of human comfort zones, and surrounding buildings with appropriate landscaping and abundant shading.
- c) Orientation of buildings and fenestration design should maximize solar benefits while minimizing the negative impacts of heat gain.
- d) Recognizing that sustainability methods are continually improving and evolving over time, incorporate state-of-the-art sustainability methods and products as the project is phased.

- e) Incorporate solar collection technologies for providing and storing energy as well as heated water systems for individual buildings.
- f) Design to reduce project energy loads by addressing passive design elements (i.e. daylight, natural ventilation, materials solar mass properties) and active design elements (i.e. environmental conditioning methods, radiant heating and cooling, shared building systems).
- g) Design for effective water usage and conservation methods in buildings by using low flow plumbing fixtures using minimal amounts of potable water.
- h) Design for effective use of energy efficient appliances and HVAC systems by demonstrating reductions in on-going power consumption.
- i) Design for the capture of gray water discharge from buildings for reuse for landscape irrigation.
- j) Incorporate "Smart" irrigation control systems into the design and development of the development phase.
- k) Use roofing materials that specify a high Solar Reflectance Index for a minimum of 75% of the roof surface area.
- l) Use paints and coatings on the interior of the building (i.e., inside of the weatherproofing system and applied on-site) that comply with the following criteria as applicable to the project scope 1:
  - (1) Architectural paints and coatings applied to interior walls and ceilings must not exceed the volatile organic compound (VOC) content limits established in Green Seal Standard GS-11, Paints, 1st Edition, May 20, 1993.
  - (2) Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates must not exceed the VOC content limit of 250 g/L established in Green Seal Standard GC-03, Anti-Corrosive Paints, 2nd Edition, January 7, 1997.
  - (3) Clear wood finishes, floor coatings, stains, primers, and shellacs applied to interior elements must not exceed the VOC content limits established in South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, rules in effect on January 1, 2004.

## I. Infrastructure Standards

### a) Circulation System

The Northwest Corner of 59th Avenue & Van Buren Street PUD has great access from the major streets in the area.

Improvements to Van Buren Street and 59<sup>th</sup> Avenue were completed by the City. Driveways will be provided from these streets only and no driveways will be allowed along Fillmore Street. A one (1) foot non-vehicular access easement will be required.

- (1) Van Buren Street: Van Buren Street is a fully improved and dedicated major arterial road with three (3) westbound and two (2) eastbound travel lanes.
- (2) 59<sup>th</sup> Avenue: 59<sup>th</sup> Avenue is an improved major arterial road with two (2) northbound and southbound travel lanes. Per the City of Phoenix Streets Department, no right-of-way dedication is needed along 59th Avenue unless a future driveway entrance requires a decel/right turn lane, which

may require additional right-of-way. Future driveways would need to fit between the existing 69 KV poles.

- (3) Fillmore Street: Fillmore Street is planned as a local street with one (1) travel lane in each direction and appropriate right-of-way dedication and improvements will be made, pursuant to the City of Phoenix Streets Department.

b) Grading and Drainage

The site is vacant and all finished floor elevations will be established a minimum of one foot above the high adjacent water surface elevations. The proposed development will provide retention for the one hundred year, two hour storm event per the City of Phoenix design standards. Retention for the proposed development will be provided on individual parcels and/or within common retention areas servicing large portions of the development or the overall PUD. The common retention areas will be limited to a maximum of three feet of water depth and graded with maximum side slope ratio of 3:1. Retention areas provided on individual parcels may be either by retention basins or underground storage. All retention facilities will be drained within thirty-six hours of a major storm event as required by the City of Phoenix Drainage Design Manual.

c) Water and Sewer Service

- (1) Wastewater Design: The Northwest Corner of 59th Avenue & Van Buren Street PUD development may need to extend the sewer mains along Van Buren Street to provide sanitary service to the property. The option to utilize the existing sewer main along Fillmore Street shall be reviewed and approved by the Planning & Development Department in order to avoid disturbing the existing improvements made to Van Buren Street.
- (2) Water Design: The Northwest Corner of 59th Avenue & Van Buren Street PUD development will utilize existing water mains in the area to provide water service connection to the property. The PUD is located within the City of Phoenix water service area.

# Appendices

## Appendix A: PUD Area Legal Description and Alta Survey

### LEGAL DESCRIPTION OF PROPERTY

PARCEL NO. 1:

THE EAST THREE-QUARTERS OF THE EAST HALF OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 6, TOWNSHIP 1 NORTH, RANGE 2 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN;

EXCEPT ANY PORTION LYING WITHIN THAT CERTAIN DITCH KNOWN AS A SUB-LATERAL TO LATERAL 14 OF THE GRAND CANAL AS THE SAID SUB-LATERAL IS NOW LOCATED AND CONSTRUCTED THROUGH, OVER AND ACROSS THE NORTH HALF OF THE SOUTHEAST QUARTER OF SECTION 6, TOWNSHIP 1 NORTH, RANGE 2 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, THE CENTER LINE OF THE SAID SUB-LATERAL BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHEAST CORNER OF THE SAID SECTION 6, AND USING AS A BASE THE EAST BOUNDARY LINE OF THE SAID SECTION, (THE SAID EAST BOUNDARY LINE HAVING A BEARING OF NORTH 0 DEGREES 40 MINUTES EAST, BASED ON A MAGNETIC BEARING OF NORTH 13 DEGREES 42 MINUTES WEST);

THENCE NORTH 00 DEGREES 40 MINUTES EAST, A DISTANCE OF 1323.00 FEET;

THENCE NORTH 89 DEGREES 20 MINUTES WEST, A DISTANCE OF 26.00 FEET TO THE TRUE POINT OF BEGINNING;

THENCE SOUTH 88 DEGREES 56 MINUTES WEST, A DISTANCE OF 574.00 FEET;

THENCE SOUTH 89 DEGREES 00 MINUTES WEST, A DISTANCE OF 600.00 FEET;

THENCE SOUTH 89 DEGREES 40 MINUTES WEST, A DISTANCE OF 440.00 FEET;

THENCE SOUTH 89 DEGREES 15 MINUTES WEST, A DISTANCE OF 1001.00 FEET TO A POINT IN THE NORTH AND SOUTH MID-SECTION LINE OF THE SAID SECTION 6, FROM WHICH POINT THE SOUTH QUARTER CORNER OF THE SAID SECTION BEARS SOUTH 00 DEGREES 26 MINUTES WEST, A DISTANCE OF 1309.60 FEET; AND

EXCEPT THAT PORTION CONVEYED TO THE CITY OF PHOENIX, IN INSTRUMENT NUMBERS 2005-215472 OF OFFICIAL RECORDS AND 2005-0215474 OF OFFICIAL RECORDS; DESCRIBED AS FOLLOWS:

THE NORTH 22.00 FEET OF THE SOUTH 55.00 FEET OF THE EAST THREE-QUARTERS OF THE EAST HALF OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 6, TOWNSHIP 1 NORTH, RANGE 2 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA.

PARCEL NO. 2:

THE EAST HALF OF THE WEST HALF OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER AND THE WEST QUARTER OF THE EAST HALF OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 6, TOWNSHIP 1 NORTH, RANGE 2 EAST, GILA AND SALT RIVER BASE AND MERIDIAN;

EXCEPT ANY PORTION LYING WITHIN THAT CERTAIN DITCH KNOWN AS A SUB-LATERAL TO LATERAL 14 OF THE GRAND CANAL AS THE SAID SUB-LATERAL IS NOW LOCATED AND CONSTRUCTED THROUGH, OVER AND ACROSS THE NORTH HALF OF THE SOUTHEAST QUARTER OF SECTION 6, TOWNSHIP 1 NORTH, RANGE 2 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, THE CENTER LINE OF THE SAID SUB-LATERAL BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHEAST CORNER OF THE SAID SECTION 6, AND USING AS A BASE THE EAST BOUNDARY LINE OF THE SAID SECTION, (THE SAID EAST BOUNDARY LINE HAVING A BEARING OF NORTH 0 DEGREES 40 MINUTES EAST, BASED ON A MAGNETIC BEARING OF NORTH 13 DEGREES 42 MINUTES WEST);

THENCE NORTH 00 DEGREES 40 MINUTES EAST, A DISTANCE OF 1323.00 FEET;

THENCE NORTH 89 DEGREES 20 MINUTES WEST, A DISTANCE OF 26.00 FEET TO THE TRUE POINT OF BEGINNING;

THENCE SOUTH 88 DEGREES 56 MINUTES WEST, A DISTANCE OF 574.00 FEET;

THENCE SOUTH 89 DEGREES 00 MINUTES WEST, A DISTANCE OF 600.00 FEET;

THENCE SOUTH 89 DEGREES 40 MINUTES WEST, A DISTANCE OF 440.00 FEET;

THENCE SOUTH 89 DEGREES 15 MINUTES WEST, A DISTANCE OF 1001.00 FEET TO A POINT IN THE NORTH AND SOUTH MID-SECTION LINE OF THE SAID SECTION 6, FROM WHICH POINT THE SOUTH QUARTER CORNER OF THE SAID SECTION BEARS SOUTH 00 DEGREES 26 MINUTES WEST, A DISTANCE OF 1309.60 FEET; AND

EXCEPT THAT PORTION CONVEYED TO THE CITY OF PHOENIX, IN INSTRUMENT NUMBER 2005-0190120 OF OFFICIAL RECORDS, DESCRIBED AS FOLLOWS:

THE NORTH 22.00 FEET OF THE SOUTH 55.00 FEET OF THE EAST HALF OF THE WEST HALF AND THE WEST QUARTER OF THE EAST HALF OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 6, TOWNSHIP 1 NORTH, RANGE 2 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA.

PARCEL NO. 3:

THE WEST HALF OF THE WEST HALF OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER AND THE EAST QUARTER OF THE EAST HALF OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 6, TOWNSHIP 1 NORTH, RANGE 2 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA;

EXCEPT ANY PORTION LYING WITHIN THAT CERTAIN DITCH KNOWN AS A SUB-LATERAL TO LATERAL 14 OF THE GRAND CANAL AS THE SAID SUB-LATERAL IS NOW LOCATED AND CONSTRUCTED THROUGH, OVER AND ACROSS THE NORTH HALF OF THE SOUTHEAST QUARTER OF SECTION 6, TOWNSHIP 1 NORTH, RANGE 2 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, THE

CENTER LINE OF THE SAID SUB-LATERAL BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHEAST CORNER OF THE SAID SECTION 6, AND USING AS A BASE THE EAST BOUNDARY LINE OF THE SAID SECTION, (THE SAID EAST BOUNDARY LINE HAVING A BEARING OF NORTH 0 DEGREES 40 MINUTES EAST, BASED ON A MAGNETIC BEARING OF NORTH 13 DEGREES 42 MINUTES WEST);

THENCE NORTH 00 DEGREES 40 MINUTES EAST, A DISTANCE OF 1323.00 FEET;

THENCE NORTH 89 DEGREES 20 MINUTES WEST, A DISTANCE OF 26.00 FEET TO THE TRUE POINT OF BEGINNING;

THENCE SOUTH 88 DEGREES 56 MINUTES WEST, A DISTANCE OF 574.00 FEET;

THENCE SOUTH 89 DEGREES 00 MINUTES WEST, A DISTANCE OF 600.00 FEET;

THENCE SOUTH 89 DEGREES 40 MINUTES WEST, A DISTANCE OF 440.00 FEET;

THENCE SOUTH 89 DEGREES 15 MINUTES WEST, A DISTANCE OF 1001.00 FEET TO A POINT IN THE NORTH AND SOUTH MID-SECTION LINE OF THE SAID SECTION 6, FROM WHICH POINT THE SOUTH QUARTER CORNER OF THE SAID SECTION BEARS SOUTH 00 DEGREES 26 MINUTES WEST, A DISTANCE OF 1309.60 FEET; AND

EXCEPT THAT PORTION CONVEYED TO THE CITY OF PHOENIX, IN INSTRUMENT NUMBER 2004-078521 OF OFFICIAL RECORDS DESCRIBED AS FOLLOWS:

THE NORTH 22.00 FEET OF THE SOUTH 55.00 FEET OF THE WEST HALF OF THE WEST HALF OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 6, TOWNSHIP 1 NORTH, RANGE 2 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA; AND EXCEPT THAT PORTION CONVEY TO THE CITY OF PHOENIX, IN INSTRUMENT NUMBER 2004-0078519 OF OFFICIAL RECORDS, DESCRIBED AS FOLLOWS:

THE NORTH 17.00 FEET OF THE SOUTH 50.00 FEET OF THE EAST QUARTER OF THE EAST HALF OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 6, AND THE NORTH 5.00 FEET OF THE SOUTH 55.00 FEET OF THE EAST 25.00 FEET OF THE EAST QUARTER OF THE EAST HALF OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 6, TOWNSHIP 1 NORTH, RANGE 2 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA.

PARCEL NO. 4:

A PORTION OF THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 6, TOWNSHIP 1 NORTH, RANGE 2 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT A BRASS CAP FLUSH WITH THE PAVEMENT MARKING THE SOUTHWEST CORNER OF SAID SOUTHEAST QUARTER FROM WHICH A BRASS CAP IN A HAND HOLE MARKING THE SOUTHEAST CORNER OF SAID SECTION 6 BEARS SOUTH 89 DEGREES 59 MINUTES 43 SECONDS EAST, A DISTANCE OF 1311.64 FEET;

THENCE NORTH 00 DEGREES 01 MINUTES 34 SECONDS WEST, A DISTANCE OF 55.00 FEET ALONG THE WEST LINE OF SAID SOUTHEAST QUARTER TO THE POINT OF BEGINNING;

THENCE CONTINUING NORTH 00 DEGREES 01 MINUTES 34 SECONDS WEST, A DISTANCE OF 1266.67 FEET ALONG SAID WEST LINE TO THE NORTHWEST CORNER OF SAID SOUTHEAST QUARTER;

THENCE NORTH 89 DEGREES 41 MINUTES 33 SECONDS EAST, ALONG THE NORTH LINE OF SAID SOUTHEAST QUARTER, A DISTANCE OF 1158.89 FEET;

THENCE SOUTH 76 DEGREES 14 MINUTES 39 SECONDS EAST, A DISTANCE OF 102.88 FEET TO THE SOUTH LINE OF THE NORTH 25.00 FEET OF SAID SOUTHEAST QUARTER;

THENCE NORTH 89 DEGREES 41 MINUTES 33 SECONDS EAST ALONG SAID SOUTH LINE, A DISTANCE OF 5.00 FEET;

THENCE SOUTH 45 DEGREES 04 MINUTES 31 SECONDS EAST, A DISTANCE OF 16.90 FEET TO THE WEST LINE OF THE EAST 40.00 FEET OF SAID SOUTHEAST QUARTER;

THENCE SOUTH 00 DEGREES 09 MINUTES 25 SECONDS WEST ALONG SAID WEST LINE, A DISTANCE OF 426.52 FEET;

THENCE SOUTH 01 DEGREES 18 MINUTES 10 SECONDS WEST, A DISTANCE OF 220.52 FEET;

THENCE NORTH 89 DEGREES 50 MINUTES 35 SECONDS WEST, A DISTANCE OF 230.00 FEET;

THENCE SOUTH 00 DEGREES 09 MINUTES 25 SECONDS WEST, A DISTANCE OF 63.25 FEET;

THENCE NORTH 89 DEGREES 59 MINUTES 43 SECONDS WEST, A DISTANCE OF 669.92 FEET;

THENCE SOUTH 00 DEGREES 09 MINUTES 25 SECONDS WEST, A DISTANCE OF 527.00 FEET TO THE NORTH LINE OF THE SOUTH 55.00 FEET OF SAID SOUTHEAST QUARTER AND THE NORTHERLY RIGHT-OF-WAY LINE OF VAN BUREN STREET AS DESCRIBED IN DOCUMENT NOS. 2004-1521174 AND 2004-1521176, RECORDS OF MARICOPA COUNTY;

THENCE NORTH 89 DEGREES 59 MINUTES 43 SECONDS WEST, A DISTANCE OF 367.48 FEET ALONG SAID NORTHERLY RIGHT-OF-WAY LINE TO THE POINT OF BEGINNING.

PARCEL NO. 5:

THAT PORTION OF THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 6, TOWNSHIP 1 NORTH, RANGE 2 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHWEST CORNER OF THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 6 FROM WHICH THE SOUTHEAST CORNER OF SAID SECTION 6 BEARS SOUTH 89 DEGREES 59 MINUTES 43 SECONDS EAST, 1311.64 FEET;

THENCE SOUTH 89 DEGREES 59 MINUTES 43 SECONDS EAST, 367.31 FEET;

THENCE NORTH 00 DEGREES 09 MINUTES 25 SECONDS EAST, 55.00 FEET TO THE NORTH LINE OF THE SOUTH 55.00 FEET OF SAID SECTION 6 AND THE POINT OF BEGINNING;

THENCE CONTINUING NORTH 00 DEGREES 09 MINUTES 25 SECONDS EAST, 527.00 FEET;

THENCE SOUTH 89 DEGREES 59 MINUTES 43 SECONDS EAST, 669.92 FEET;

THENCE SOUTH 00 DEGREES 09 MINUTES 25 SECONDS WEST, 186.75 FEET;

THENCE SOUTH 89 DEGREES 50 MINUTES 35 SECONDS EAST, 225.00 FEET TO THE EAST RIGHT OF WAY LINE OF 59TH AVENUE;

THENCE SOUTH 01 DEGREES 18 MINUTES 10 SECONDS WEST, 79.54 FEET ALONG SAID EAST RIGHT OF WAY LINE TO THE WEST LINE OF THE EAST 51.00 FEET OF SAID SECTION 6;

THENCE SOUTH 00 DEGREES 09 MINUTES 25 SECONDS WEST, 228.14 FEET ALONG SAID WEST LINE;

THENCE SOUTH 45 DEGREES 11 MINUTES 36 SECONDS WEST, 49.66 FEET TO THE NORTH LINE OF THE SOUTH 52.00 FEET OF SAID SECTION 6;

THENCE NORTH 89 DEGREES 59 MINUTES 43 SECONDS WEST, 40.01 FEET ALONG SAID NORTH LINE;

THENCE ALONG THE NORTHERLY RIGHT OF WAY LINE OF VAN BUREN STREET AS DESCRIBED IN DOCUMENT NO. 2004-1521174 OF OFFICIAL RECORDS, RECORDS OF MARICOPA COUNTY, ARIZONA, THE FOLLOWING 6 COURSES:

THENCE NORTH 77 DEGREES 27 MINUTES 59 SECONDS WEST, 46.10 FEET;

THENCE NORTH 89 DEGREES 59 MINUTES 43 SECONDS WEST, 70.00 FEET;

THENCE SOUTH 72 DEGREES 28 MINUTES 45 SECONDS WEST, 39.85 FEET;

THENCE NORTH 89 DEGREES 59 MINUTES 43 SECONDS WEST, 522.00 FEET;

THENCE NORTH 00 DEGREES 00 MINUTES 17 SECONDS EAST, 5.00 FEET;

THENCE NORTH 89 DEGREES 59 MINUTES 43 SECONDS WEST, 143.18 FEET TO THE POINT OF BEGINNING.



## **Appendix B: Traffic Impact Study**

# NWC 59th Avenue & Van Buren Street Traffic Impact Study

Prepared for:  
Wentworth Property Company, LLC

January 31, 2013



1904 East Medlock Drive

Phoenix, Arizona 85016

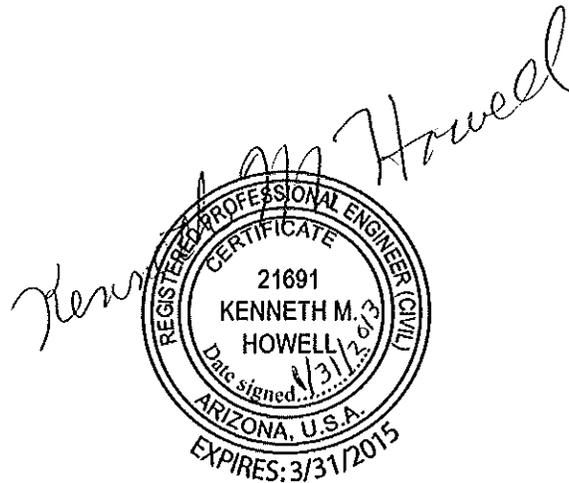
Phone: 602-277-4224 Fax: 602-277-4228

Email: [task@taskeng.net](mailto:task@taskeng.net) [www.taskeng.net](http://www.taskeng.net)

Northwest Corner of 59<sup>th</sup> Avenue  
& Van Buren Street  
Traffic Impact Study

Phoenix, Arizona

Prepared for:  
Wentworth Property Company, LLC  
2701 East Camelback Road, Suite 185  
Phoenix, AZ 85016



By:

TASK Engineering Company, Inc.  
1904 East Medlock Drive  
Phoenix, AZ 85016

Phone: (602) 277-4224  
Fax: (602) 277-4228

January 31, 2013

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## **INTRODUCTION**

This traffic study analyzes the traffic impacts of a proposed distribution center on the northwest corner of 59<sup>th</sup> Avenue and Van Buren Street in Phoenix, Arizona. The proposed site is projected to have about 1,162,000 square feet of distribution space. Figure 1 identifies the site's location.

The purposes of this study are:

1. To review driveway locations, access, and lane configurations on adjacent roadways,
2. To evaluate the traffic impact of the site on the area roadway network, and
3. To prepare a traffic impact study for submittal to the City of Phoenix.

This study present projects traffic conditions for opening year (2015) with current roadways, and long range (2030) with completion of the South Mountain Freeway. For comparison, traffic conditions are analyzed for the No Build condition. This analysis shows that the existing and planned road system can serve the site at good levels of service with the proposed recommendations.

It is expected that only the first phase of the development will be open by 2015, but road design must accommodate traffic for the entire development. Therefore traffic conditions were analyzed for background traffic plus complete development for 2015 and 2030. Site access driveways and nearby intersections were analyzed with existing roadways for 2015. For 2030, completion of the South Mountain Freeway was assumed.

The conclusions of this report are listed in the final section, **RECOMMENDATIONS**. Appendix A contains summaries of individual capacity analyses. The following sections detail the methodology used to reach the report's conclusions.

## **DESCRIPTION OF PROPOSED DEVELOPMENT**

The site plan for the site is shown on Figure 2. The site is ±82.9 gross acres in the northwest quadrant of 59<sup>th</sup> Avenue and Van Buren Street. It stretches about half a mile along Van Buren Street, and about a quarter of a mile along 59<sup>th</sup> Avenue. It is bordered on the north by Fillmore Street. There is no street right of way along the west boundary of the site.

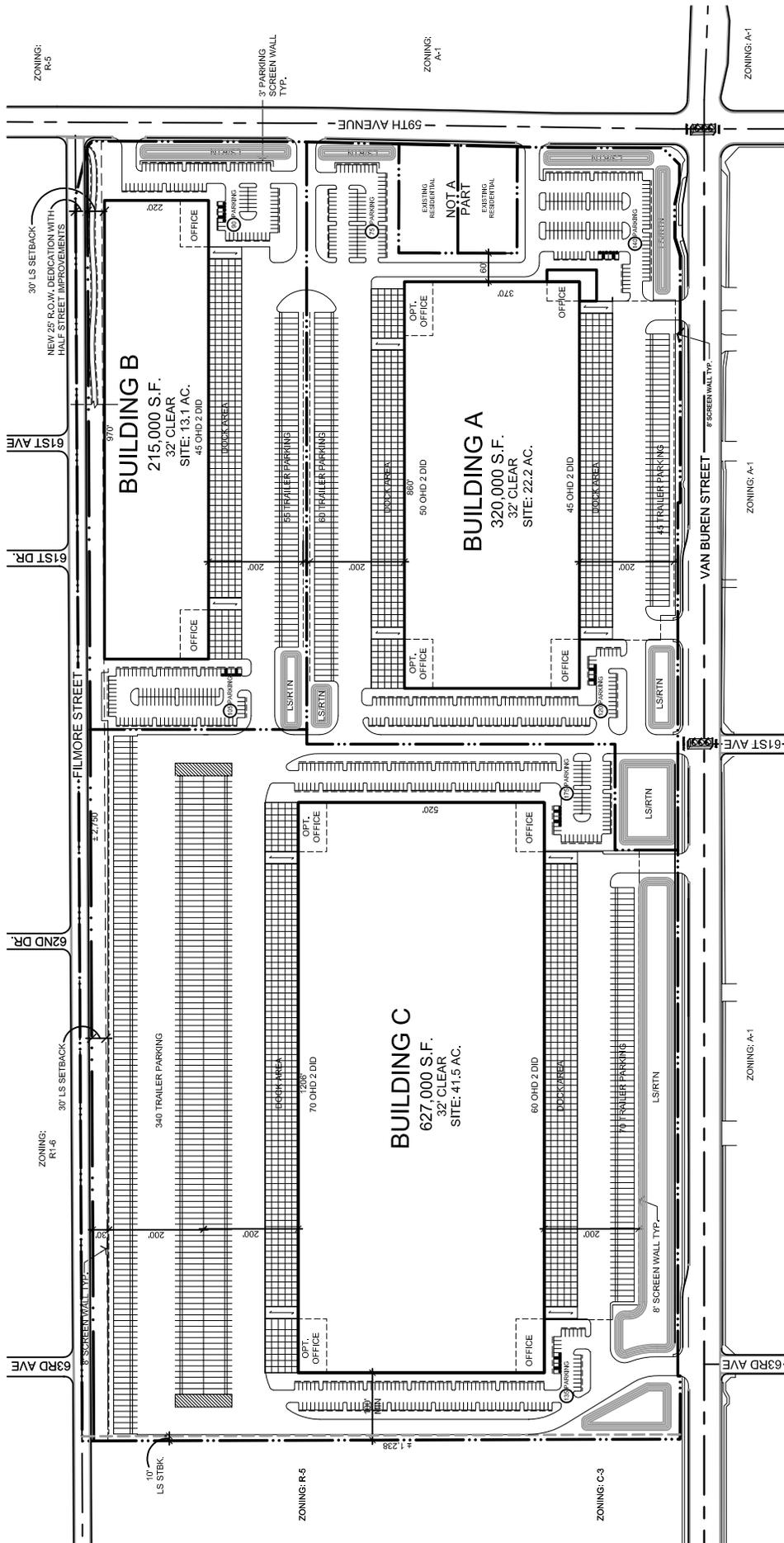
There are two residential lots that are outparcels along 59<sup>th</sup> Avenue. To the east of 59<sup>th</sup> Avenue is the planned right of way of the future South Mountain Freeway. This is currently agricultural land. To the north of the site are residential neighborhoods. West and south of the site are various smaller commercial and industrial concerns.

The distribution center will likely be built in two phases. The first phase consists of the eastern ±40 acres, and is planned for 540,000 square feet of distribution center space. The second phase consists of the western ±40 acres, which will contain a planned ±625,000 square foot distribution center.



<https://maps.google.com>

*NWC 59th Avenue & Van Buren Street TIS*

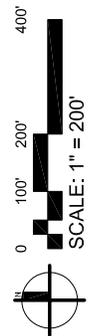


**SITE DATA**

Gross Site Area:	3,611,167 S.F. (82.9 AC.)
Net Site Area:	3,346,649 S.F. (76.8 AC.)
Building Area:	1,162,000 S.F.
Proposed Building Height:	32' CLEAR
Coverage:	34.7 % NSA

**PROJECT TEAM**

Developer:	Wentworth Property Company 2701 E. Camelback Rd., suite 155 Phoenix, AZ 85028 602-997-1800 602-996-1893
Architect:	Butler Design Group Butler Design Group, Suite 107 1000 N. Central Expressway Phoenix, AZ 85004 602-997-1800 Contact: Jeff Culbreth



# NWC 59TH AVE & VAN BUREN

## CONCEPTUAL SITE PLAN

Phoenix, Arizona



Figure 2  
Page 6  
1/2013



11-13-12  
12092-S105A

## DESCRIPTION OF ROAD NETWORK

Figure 1 shows the roadway network serving the site. The future South Mountain Freeway is programmed east of 59<sup>th</sup> Avenue and will have a half diamond interchange at Van Buren Street with ramps to and from the south.

There is currently a traffic signal at 59<sup>th</sup> Avenue/Van Buren Street. Fifty-Ninth Avenue has two southbound, three northbound lanes and a center turn lane. The outside southbound lane becomes a right turn only lane at Van Buren Street. Van Buren Street has three westbound lanes, two eastbound lanes and a center turn lane. Fifty-Ninth Avenue has a diamond interchange at I-10, about three-quarter miles north of Van Buren Street.

There is a traffic signal at 59<sup>th</sup> Avenue/Roosevelt Street, one-half mile north of Van Buren Street. Roosevelt Street provides access to and from the residential neighborhoods north of the proposed distribution center. Roosevelt Street has one lane in each direction and left turn pockets at 59<sup>th</sup> Avenue.

Fillmore Street north of the site and McKinley Street about 1/8<sup>th</sup> mile north of Fillmore Street are two-lane local streets that intersect 59<sup>th</sup> Avenue at STOP sign controlled intersections. These streets also provide access to the neighborhood north of the site.

Van Buren Street has local street connections to 61<sup>st</sup> Avenue and 63<sup>rd</sup> Avenue south of the site. Neither street extends north of Van Buren Street through the site. Both streets end at a cul-de-sac south of Van Buren Street.

In addition to the 59<sup>th</sup> Avenue interchange, 51<sup>st</sup> Avenue located one mile east, and 67<sup>th</sup> Avenue located one mile west also provide full access to I-10.

The South Mountain Freeway (SR 202) is currently in the Environmental Review process. A draft Environmental Impact Report is anticipated to be published in Spring 2013, and this alignment is expected to be the preferred alternative. Appendix F includes the current design concept for this section of the freeway.

The current ramps from 59<sup>th</sup> Avenue to I-10 will be removed to allow a system interchange between I-10 and the South Mountain Freeway. Instead, collector-distributor roads will connect 59<sup>th</sup> Avenue to the 67<sup>th</sup> Avenue interchange and the 51<sup>st</sup> Avenue interchange. This will allow continued good access to I-10 east and west.

Fifty Ninth Avenue will remain on its existing alignment from Roosevelt Street north. At some point south of Roosevelt Street, 59<sup>th</sup> Avenue will transition into two one-way frontage roads, with the southbound frontage road on the current alignment and the northbound frontage road veering under the elevated freeway to the east side of the freeway.

It is recommended that Fillmore Street be allowed eastbound to northbound left turns onto 59<sup>th</sup> Avenue, and northbound to westbound left turn lanes from 59<sup>th</sup> Avenue in order to maintain current access into the residential neighborhoods north of the site. This can be achieved if the 59<sup>th</sup> Avenue-frontage road transition begins at or south of Fillmore Street. This issue was discussed with ADOT Right of Way staff and engineering consultants on December 4, 2012. ADOT indicated a favorable response to design concepts allowing the maintenance of full access at 59<sup>th</sup> Avenue/Fillmore Street.

The South Mountain Freeway will overpass Van Buren Street. The east and west frontage roads will connect to on and off ramps located south of Van Buren Street to form a half-diamond interchange. The east and west ramp junctions are both anticipated to be signalized.

Following publication of the Environmental Impact Report, final freeway design will begin. This allows right of way acquisition to begin sometime in 2014. The section of the South Mountain Freeway from I-10 south to Broadway Road is anticipated to be built first. If everything goes well, this section can be expected to open in 2017 at best. The South Mountain Freeway can be expected to be fully complete to a connection to I-10 East and the San Tan Freeway in 2021 at best. All of these estimated dates are of course subject to events.

Van Buren Street west of 59<sup>th</sup> Avenue will be widened, perhaps needing additional right of way. Current right of way on Van Buren Street west of 59<sup>th</sup> Avenue is about 102 feet wide. The anticipated right of way taking for the freeway may extend up to 600 to 750 feet and then taper to the existing road cross section and right of way.

Current Arizona Department of Transportation (ADOT) access control policy prohibits any access within 300 feet of the end of the curb return of the freeway ramp junction. This will apply to both Van Buren Street and 59<sup>th</sup> Avenue. The remainder of the 59<sup>th</sup> Avenue frontage will allow right-in, right-out access to the site, subject to good design practices. On Van Buren Street, the first access right-in, right-out access should be at least 300 feet west of the 59<sup>th</sup> Avenue curb return, and preferably further. Full un-signalized access will have to be at least 700 feet west of 59<sup>th</sup> Avenue because of the median on Van Buren Street for eastbound to northbound left turn storage. Signalized access on Van Buren Street should be no closer than 61<sup>st</sup> Avenue to avoid operations conflict with the signals at the freeway interchange.

The existing 63<sup>rd</sup> Avenue Bridge over I-10 will be removed in the planned construction because it is not wide enough for the new lanes and collector-distributor roads to go under the bridge. It may be rebuilt. Access to the distribution center is not affected by the presence or absence of the 63<sup>rd</sup> Avenue Bridge. Moreover neighborhood access is not worse if the bridge is removed and is improved if the bridge is rebuilt.

After construction of the Loop 202, South Mountain Freeway, access to residential neighborhoods along 59<sup>th</sup> Avenue would remain unchanged from I-10 to McKinley Street. Access at Villa Street, Pierce Street and Fillmore Street would be modified to right-in, right-out along the 59<sup>th</sup> Avenue southbound frontage road. This provides access

in both directions along 59<sup>th</sup> Avenue, especially with the traffic signal at Roosevelt Street. These modifications to the neighborhood street network, as a result of the freeway, will help to reduce cut through traffic along Fillmore Street and other local streets and insulate the neighborhood from extraneous traffic. The proposed schematic design for this intersection is shown on Figure 3.

Sixty-Third Avenue between Fillmore Street and Van Buren Street does not exist today and is not recommended to be built. If built, this connection would encourage cut-through traffic through the residential neighborhood north of the distribution center. It would attract truck traffic from other nearby truck facilities, and it would result in access problems for the site. It is recommended that 63<sup>rd</sup> Avenue not be built from Fillmore Street to Van Buren Street and that the north leg of 63<sup>rd</sup> Avenue/Van Buren Street serve the proposed distribution center only.

During construction of SR 202, the intention is to maintain at least partial access open on Van Buren Street. At some time it may be necessary to reduce the number of lanes while building the freeway bridge over Van Buren Street. It will be easier to keep 59<sup>th</sup> Avenue open during construction, but at some point the ramps to and from I-10 will be closed. For that time period, access from the site to I-10 will have to be along Van Buren Street to 51<sup>st</sup> Avenue and 67<sup>th</sup> Avenue.

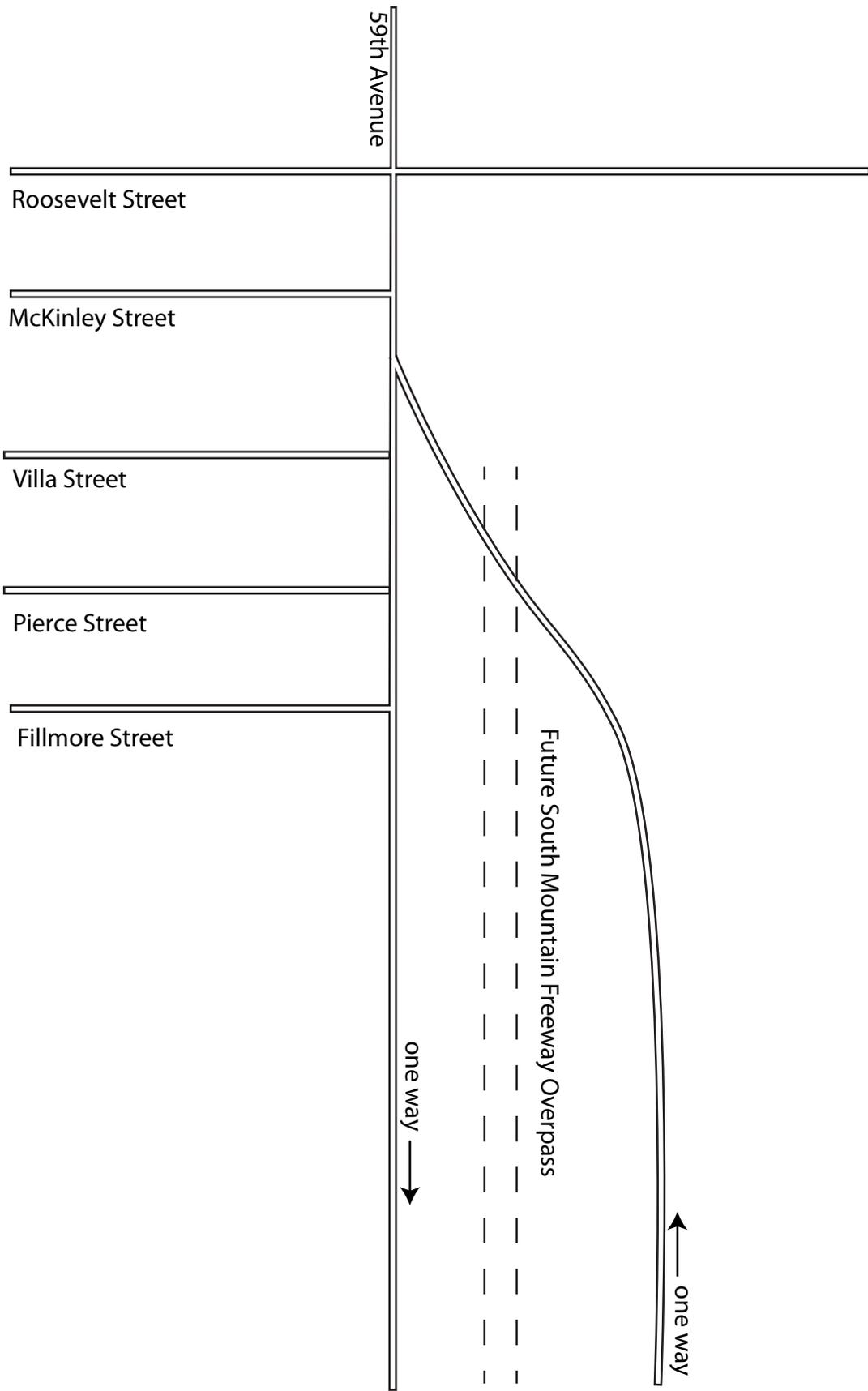
Access from the site is proposed by way of major full-movement accesses onto Van Buren Street aligning with 61<sup>st</sup> Avenue and 63<sup>rd</sup> Avenue. In order to allow truck to leave the site, a traffic-actuated traffic signal is anticipated at 61<sup>st</sup> Avenue. These are supplemented by right in, right out accesses located  $\pm 500$  feet west of the centerline of 59<sup>th</sup> Avenue and  $\pm 300$  feet west of the centerline of 61<sup>st</sup> Avenue. Two accesses are anticipated on 59<sup>th</sup> Avenue, located  $\pm 450$  feet north of the centerline of Van Buren Street and  $\pm 475$  feet south of Fillmore Street.

There will be no access between the site and Fillmore Street to avoid mixing truck and residential traffic. There will be a 25-foot half-street right of way dedication and construction of the south half of a local street on Fillmore Street adjacent to the site.

## **BACKGROUND TRAFFIC**

Background traffic is the amount of traffic that would exist on study area roads if the proposed development was not built. United Civil Group took traffic counts at the following locations on weekdays during November and December 2012:

- All Approaches and Departures from 59<sup>th</sup> Avenue/Van Buren Street
- 67<sup>th</sup> Avenue North of Van Buren Street
- Roosevelt Street West of 59<sup>th</sup> Avenue
- Fillmore Street West of 59<sup>th</sup> Avenue
- 63<sup>rd</sup> Avenue South of Van Buren Street



These are supplemented by counts from the Maricopa Association of Governments Transportation Data Management System

(<http://mag.ms2soft.com/tcds/tsearch.asp?loc=Mag&mod=>) at the following locations:

- Van Buren Street between 47<sup>th</sup> Avenue and 43<sup>rd</sup> Avenue (2011)
- 51<sup>st</sup> Avenue north of Van Buren Street (2011)
- 59<sup>th</sup> Avenue between I-10 and Van Buren Street (2011)

Manual turning movements from the above source were included for the following locations:

- 59<sup>th</sup> Avenue/Van Buren Street (2010)
- 67<sup>th</sup> Avenue/Van Buren Street (2010)

Existing traffic counts are summarized on Figure 4 and included in Appendix B. The traffic counts on Figure 4 are factored up to 2015, and converted to turning movements to represent opening year background traffic. The traffic volumes in Figure 4 are increased by 1.6 percent per year to obtain estimated 2015 background traffic.

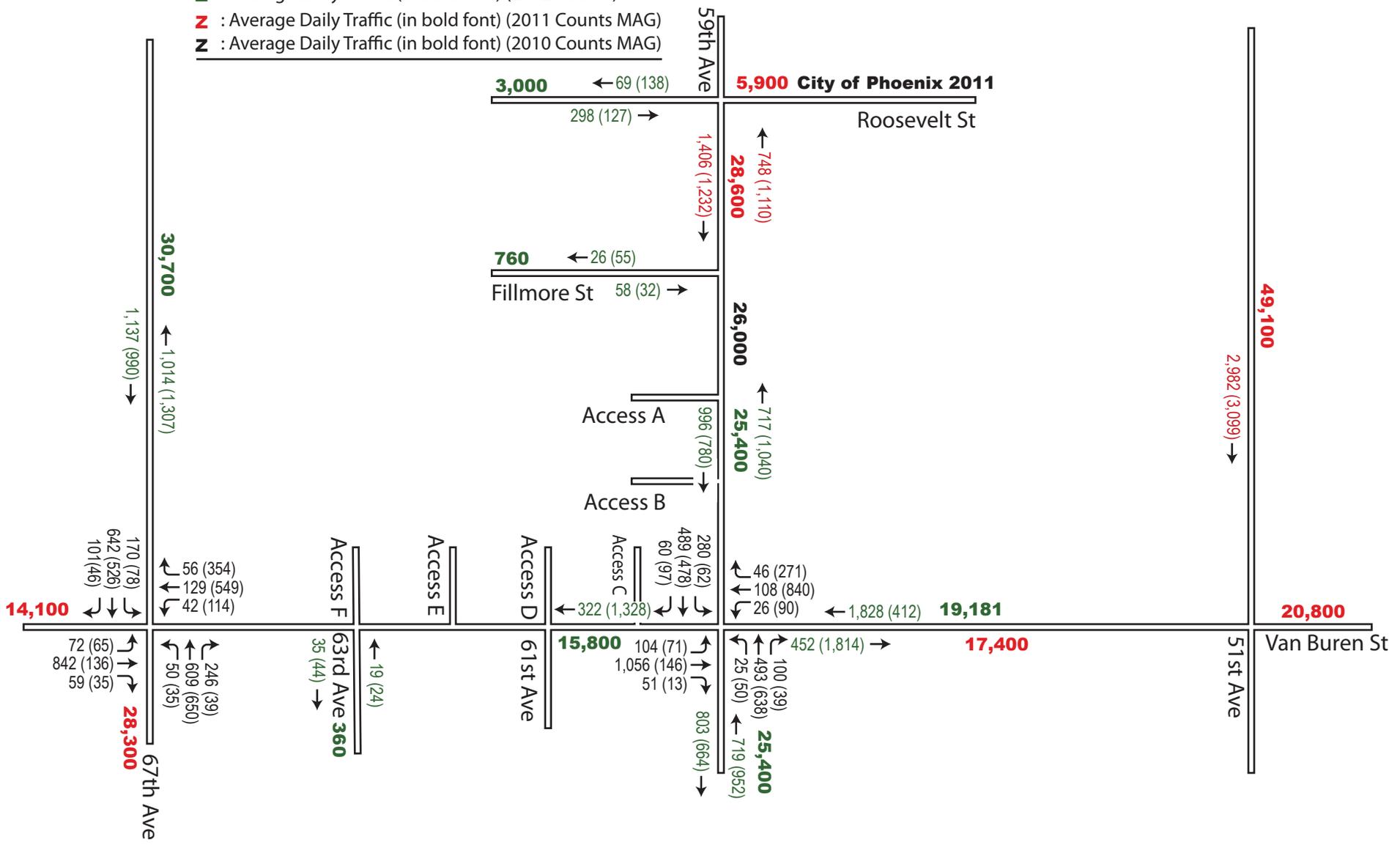
The growth factor of 1.6 percent is taken from Phoenix Metro Area Population projections, medium series, by Arizona Department of Administration. These projections were updated December 7, 2012 and show a population estimate of 4,273,400 for 2012 and 4,478,700 for 2015.

For year 2030 background traffic, Average Daily Traffic forecasts prepared by Maricopa Association of Governments for a study of the southwest valley were used. These were prepared in August 2010 and include the South Mountain Freeway on the 59<sup>th</sup> Avenue alignment. They appear to be a reasonable representation of traffic volumes in this area with completion of the South Mountain Freeway. These projections are included in Appendix E.

These daily 2030 estimates were then converted into peak hour volumes by estimating eight percent of daily traffic in the AM peak and nine percent in the PM peak. Traffic by direction was split 60/40 with the peak directions being eastbound and northbound in the morning and westbound and southbound in the evenings. Traffic for local and collector streets is not included in the MAG forecasts. Roosevelt Street and Fillmore Street is assumed to be the same in 2030 as in 2015 because the area served by these streets is essentially built out. The cul de sac streets, 61<sup>st</sup> Avenue and 63<sup>rd</sup> Avenue are assumed to continue growing at 1.6 percent yearly on the assumption that the businesses on these streets will continue growing. Traffic estimates on 61<sup>st</sup> Avenue south of Van Buren are the same as on 63<sup>rd</sup> Avenue, because the streets are similar. Neither carries more than local street volumes.

Turns at major intersections were synthesized from AM and PM approach and departure volumes by a procedure that balances approach and departure volumes and minimizes the sum of the squared differences of input turn estimates and output turn estimates.

- X (Y) : AM (PM) Peak Hour Traffic (2012 Counts)
- X (Y) : AM (PM) Peak Hour Traffic (2011 Counts MAG)
- X (Y) : AM (PM) Peak Hour Traffic (2010 Counts)
- Z** : Average Daily Traffic (in bold font) (2012 Counts)
- Z** : Average Daily Traffic (in bold font) (2011 Counts MAG)
- Z** : Average Daily Traffic (in bold font) (2010 Counts MAG)



NWC 59th Avenue & Van Buren Street TIS

Figure 5 is an intersection key map of intersections with detailed peak hour turns. The resulting background traffic volumes are shown on Figures 6-1 through 6-3 for Year 2015 and Figures 7-1 through 7-3 for Year 2030. Year 2030 traffic is sometimes less than 2015 traffic because of a diversion of traffic onto the new freeway.

## TRIP GENERATION

The next step in estimating traffic from the proposed development is to calculate the total estimated vehicle trips to and from the site on an average weekday after the site has been completely built out. This is called trip generation. Vehicle trips are estimated for a total average weekday and for AM and PM peak hours. *Trip Generation, Ninth Edition*, published by the Institute of Transportation Engineers (ITE) in 2012, was the source for the trip rates used in this study.

Table 1 estimates trip generation for Phase 1 and total site development. The equation for average daily trips was used to calculate the daily trip rate. The average rates for peak hour of adjacent street were used for the AM and PM peak hours.

The total site will generate an estimated 4,078 trip ends per day with 349 morning peak hour trips and 373 evening peak hour trips. Phase 1 of the site generates 2,101 daily trips. Table 1 presents the resulting trip generation for the development. The rows in Table 1 are explained below.

**LUC** is the Institute of Transportation Engineers (ITE) Land Use Code. It refers to the section of the ITE manual from which the trip rates were obtained.

**Units** specify the type of land used for generating trips.

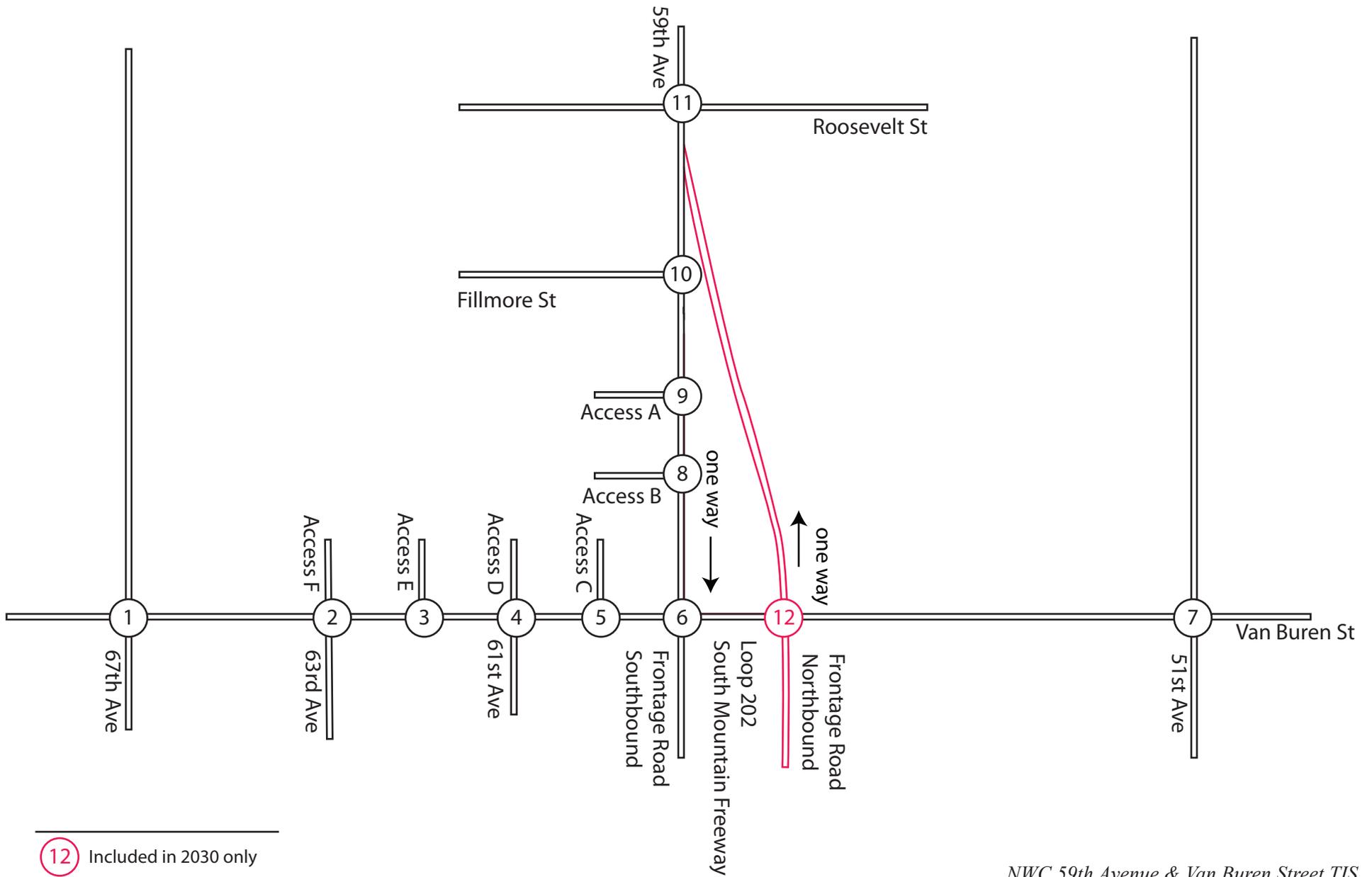
**Amount** is the amount of space in thousands of gross square feet (TGSF).

**Rates** present the number of daily, AM peak hour and PM peak hour vehicle trips to and from the subject land use per unit.

**Percent In** is the percentage of AM and PM vehicle trips arriving inbound at the land use. The remaining percent of trips are leaving outbound. For instance, 61 percent of AM peak hour trips are arriving at a commercial site, and the remaining 39 percent are leaving the complex. For daily trips, it is assumed that 50 percent are inbound trips and 50 percent are outbound trips.

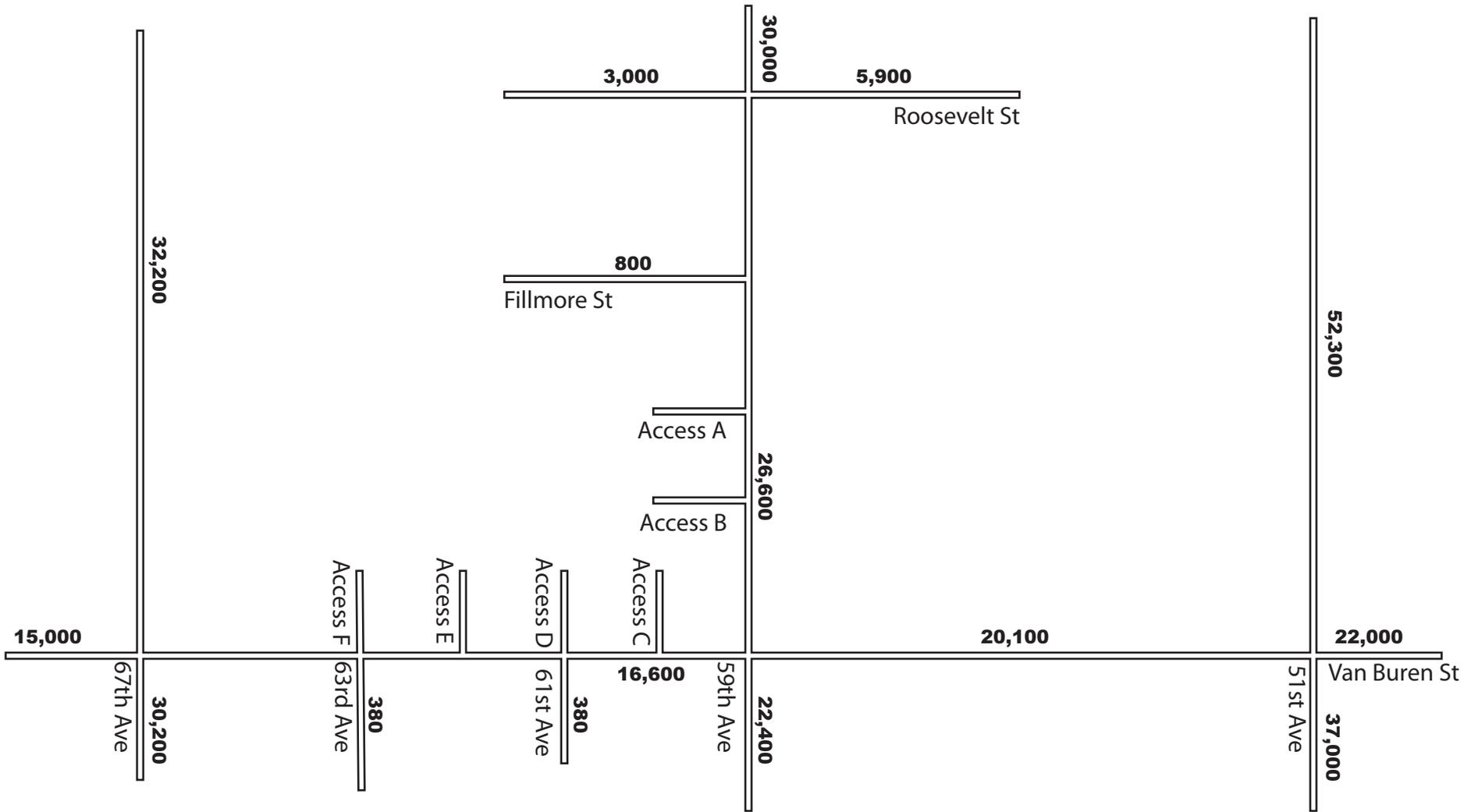
**Trips** are the calculated number of trips. They are calculated as the amount times the rate times the percent inbound or outbound.

The ITE Trip Generation, Ninth Edition reports that about 20 percent of daily trips to distribution centers are truck (heavy duty vehicle) trips. Reasonably, truck trips represent a lower percent during morning and evening peak hours because these hours include many auto trips to and from work.



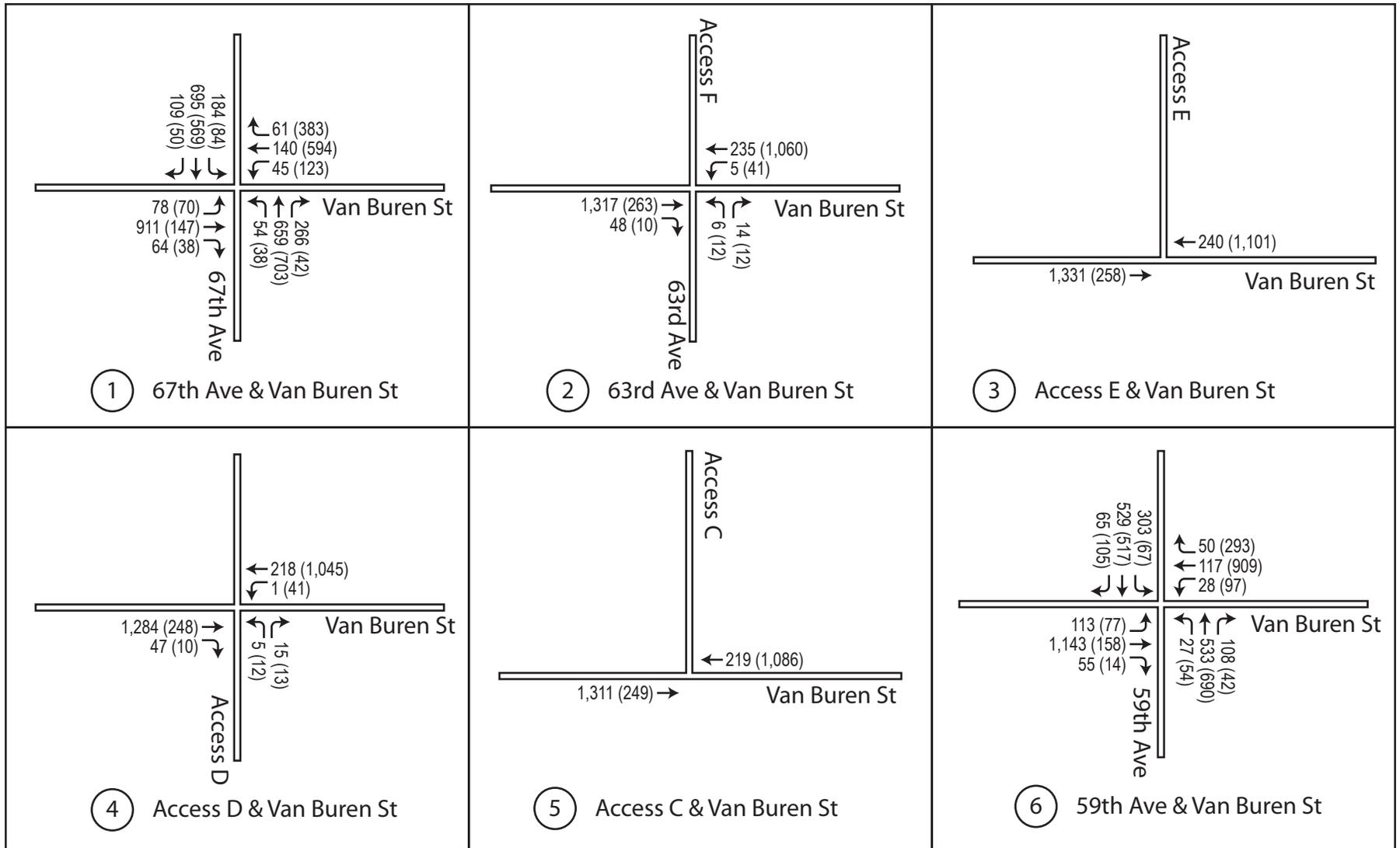
12 Included in 2030 only

NWC 59th Avenue & Van Buren Street TIS



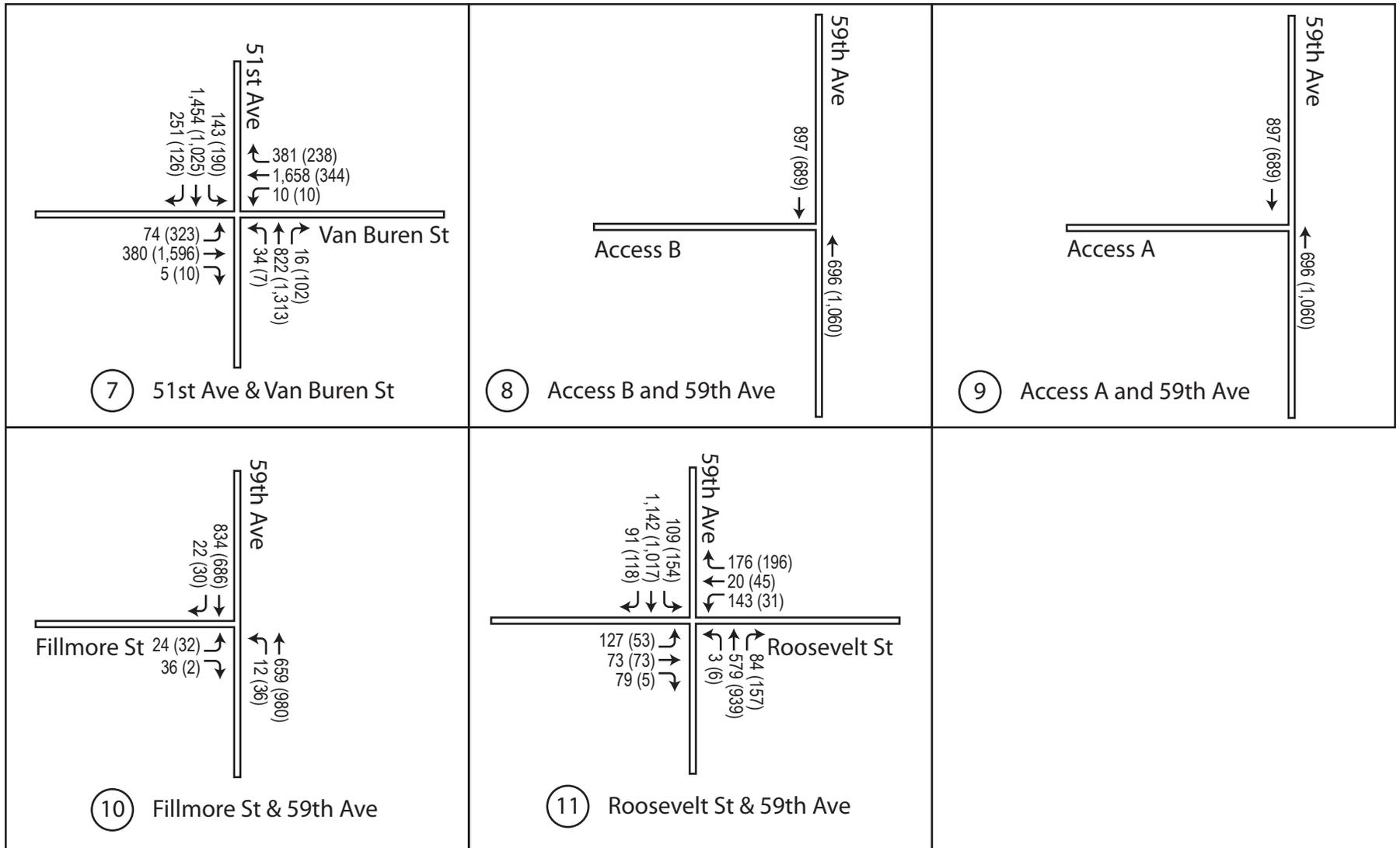
**Z** : Average Daily Traffic (in bold font)

NWC 59th Avenue & Van Buren Street TIS



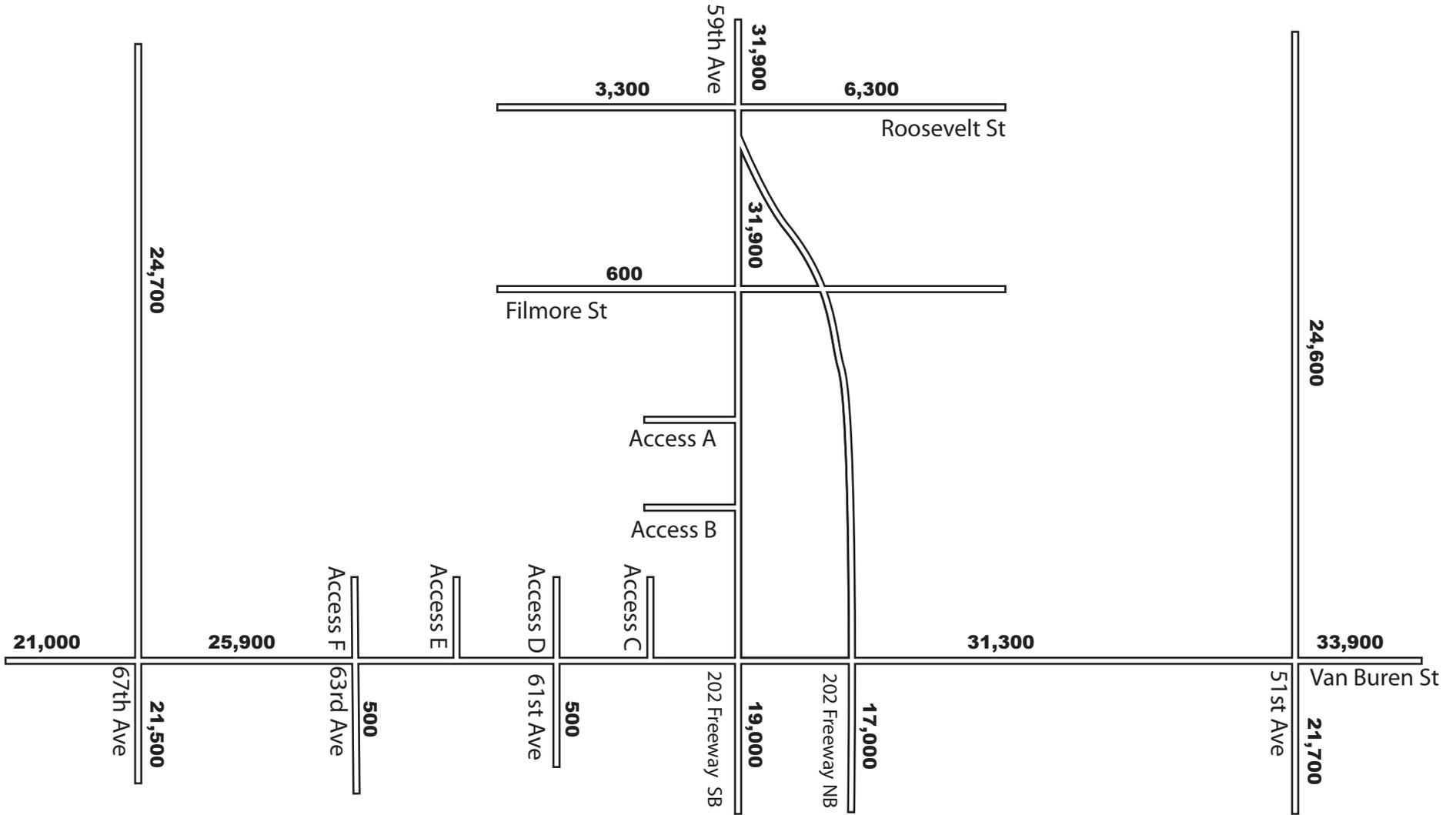
X (Y) : AM (PM) Peak Hour Traffic

NWC 59th Avenue & Van Buren Street TIS



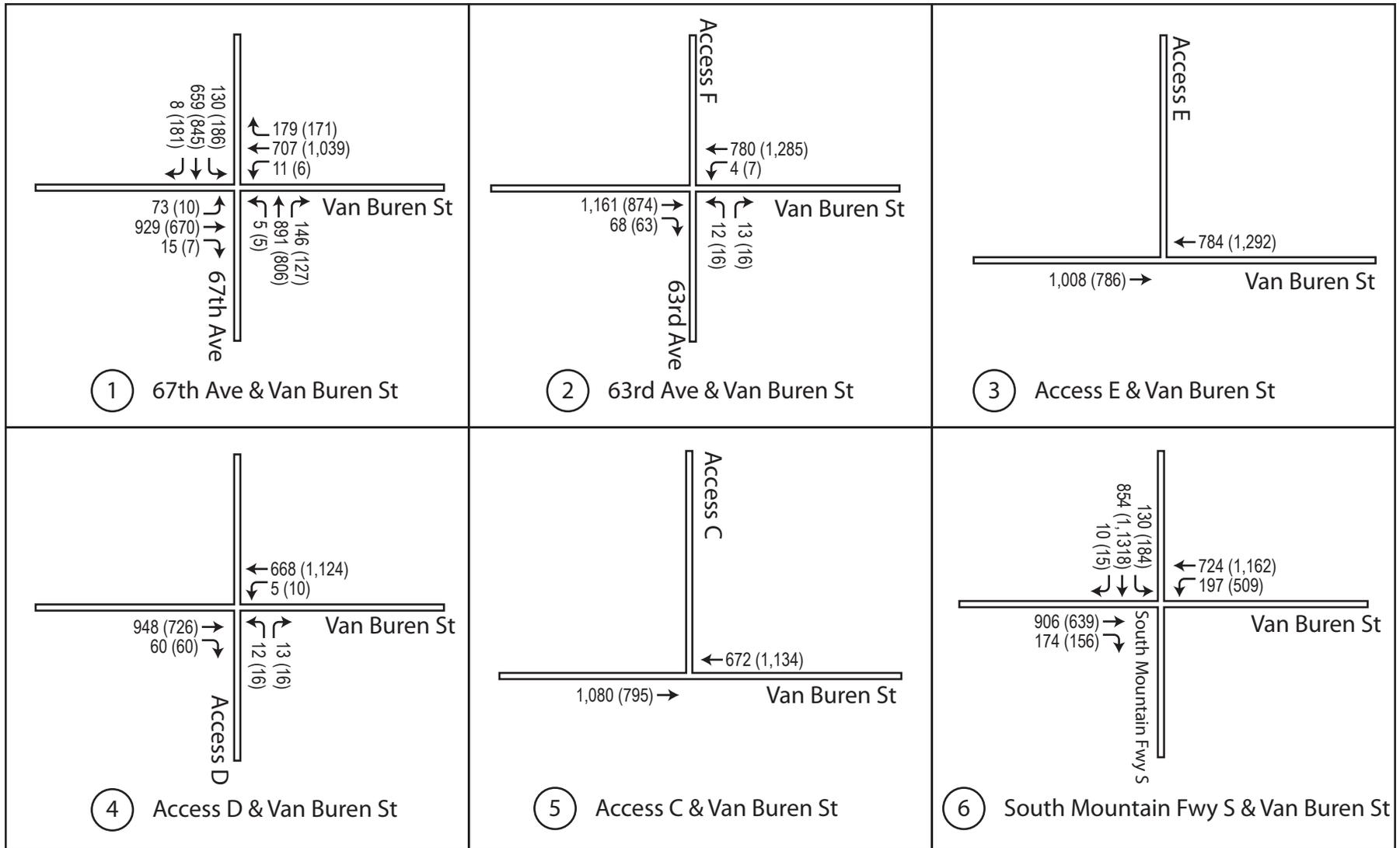
X (Y) : AM (PM) Peak Hour Traffic

NWC 59th Avenue & Van Buren Street TIS



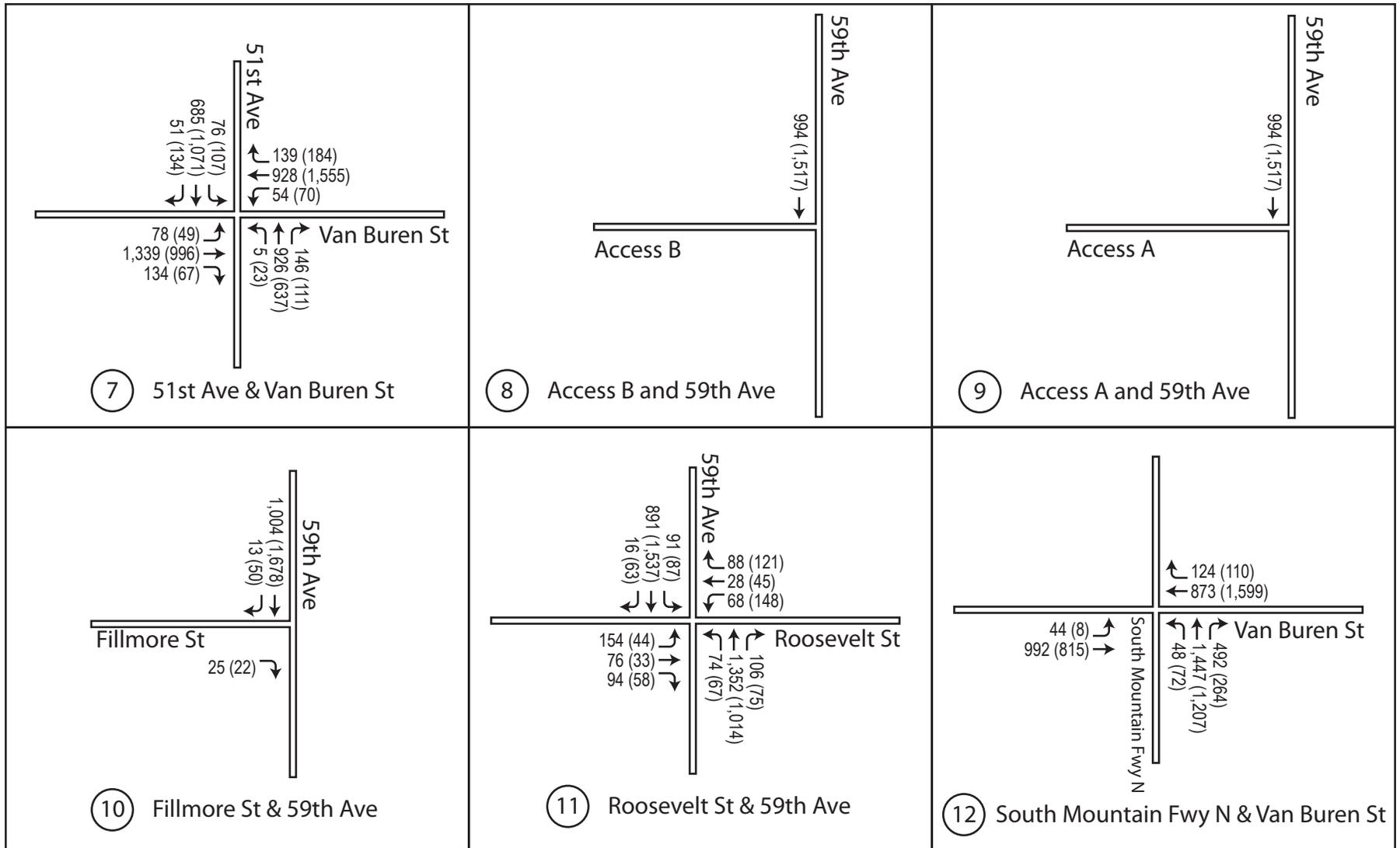
**Z** : Average Daily Traffic (in bold font)

NWC 59th Avenue & Van Buren Street TIS



X (Y) : AM (PM) Peak Hour Traffic

NWC 59th Avenue & Van Buren Street TIS



X (Y) : AM (PM) Peak Hour Traffic

NWC 59th Avenue & Van Buren Street TIS

**Table 1**  
**Trip Generation**

*NWC 59<sup>th</sup> Avenue & Van Buren TIS*

Land Use	Phase 1	Total
	Distribution Center	Distribution Center
LUC	150	150
Units	TGSF	TGSF
Amount	540	1165
Trips Rates		
Daily	3.89	3.50
AM Peak Hour	0.30	0.30
PM Peak Hour	0.32	0.32
% Inbound		
AM Peak Hour	79%	79%
PM Peak Hour	25%	25%
Trips:		
Weekday	2,101	4,078
AM Peak Hour Inbound	128	276
AM Peak Hour Outbound	34	73
Total AM Peak Hour	162	349
PM Peak Hour Inbound	43	93
PM Peak Hour Outbound	130	280
Total PM Peak Hour	173	373

A truck trip generation study conducted for the City of Fortuna, California in 2003 estimated AM and PM peak hour total vehicle and truck trip generation for “Heavy Warehouse”. It found the truck trip rates for peak hours were about ten percent of total vehicle trip rates. The ten percent truck trips estimate is used for peak hour traffic flows to and from site entrances in the capacity and level of service analysis included in this report.

## **TRIP DISTRIBUTION**

Trip distribution is the process of assigning a starting location for each inbound trip to the site and an ending location for each outbound trip. Daily, AM peak hour and PM peak hour trips are distributed separately.

There are several types of traffic to and from the distribution center: Major intercity trucks, distribution vehicles and work/service trips. Major intercity trucks will arrive and depart at all hours. Distribution vehicles will attempt to travel outside of peak hours to avoid congestion on roads and at the other end of their trip. Work/service trips are concentrated into the peak hours by the nature of typical work schedules.

There is little direct information on truck trips. The *ITE Trip Generation, Ninth Edition*, estimates that large trucks make up 20 percent of daily trips at Distribution Centers (Land Use Code 150). A major study of truck trips in Fortuna, California in the early 2000's estimated the truck trip generation rate at 0.30 trips per TGSF in the AM peak hour of site traffic, and it estimated the PM peak hour rate at 0.33 trips per TGSF. This is about ten percent of total peak hour traffic.

Based on this, it is estimated that the major intercity truck movement represents ten percent of peak and daily trips. Based on discussions with operators of such facilities, most of these trips will be going to and from I-10 west. Before construction of SR 202, the South Mountain Freeway, these trips will be to and from the I-10/59<sup>th</sup> Avenue interchange. After construction, the fastest way to I-10 west will be along Van Buren Street to 67<sup>th</sup> Avenue and hence to the I-10/67<sup>th</sup> Avenue interchange.

The remaining 90 percent of trips represents distribution, work and service trips. These are assumed to be distributed proportional to population in 2020 within 10 miles of the site. The major part of this traffic is to the east, which is assumed to split evenly between Van Buren Street and I-10 East. In 2015, traffic to I-10 East travels to the I-10/59<sup>th</sup> Avenue interchange and after construction of the South Mountain Freeway it is assumed that this traffic travels east to 51<sup>st</sup> Avenue and then north to the I-10/51<sup>st</sup> Avenue interchange.

Note that after construction of the South Mountain Freeway, it will still be possible to travel north on 59<sup>th</sup> Avenue and then access I-10 east or west by distribution roads. This access is made more indirect because 59<sup>th</sup> Avenue adjacent to the site becomes a southbound frontage road. A small but unknown amount of site traffic may still use these routes, but for simplicity this study assumes that site traffic to and from I-10 will find it easier to divert to adjacent interchanges.

The resulting trip distribution percentages are shown in Table 2. Truck trip rates and population distribution by quadrant are found in Appendix D.

**Table 2**  
**Trip Distribution**

*NWC 59<sup>th</sup> Avenue/Van Buren Street TIS*

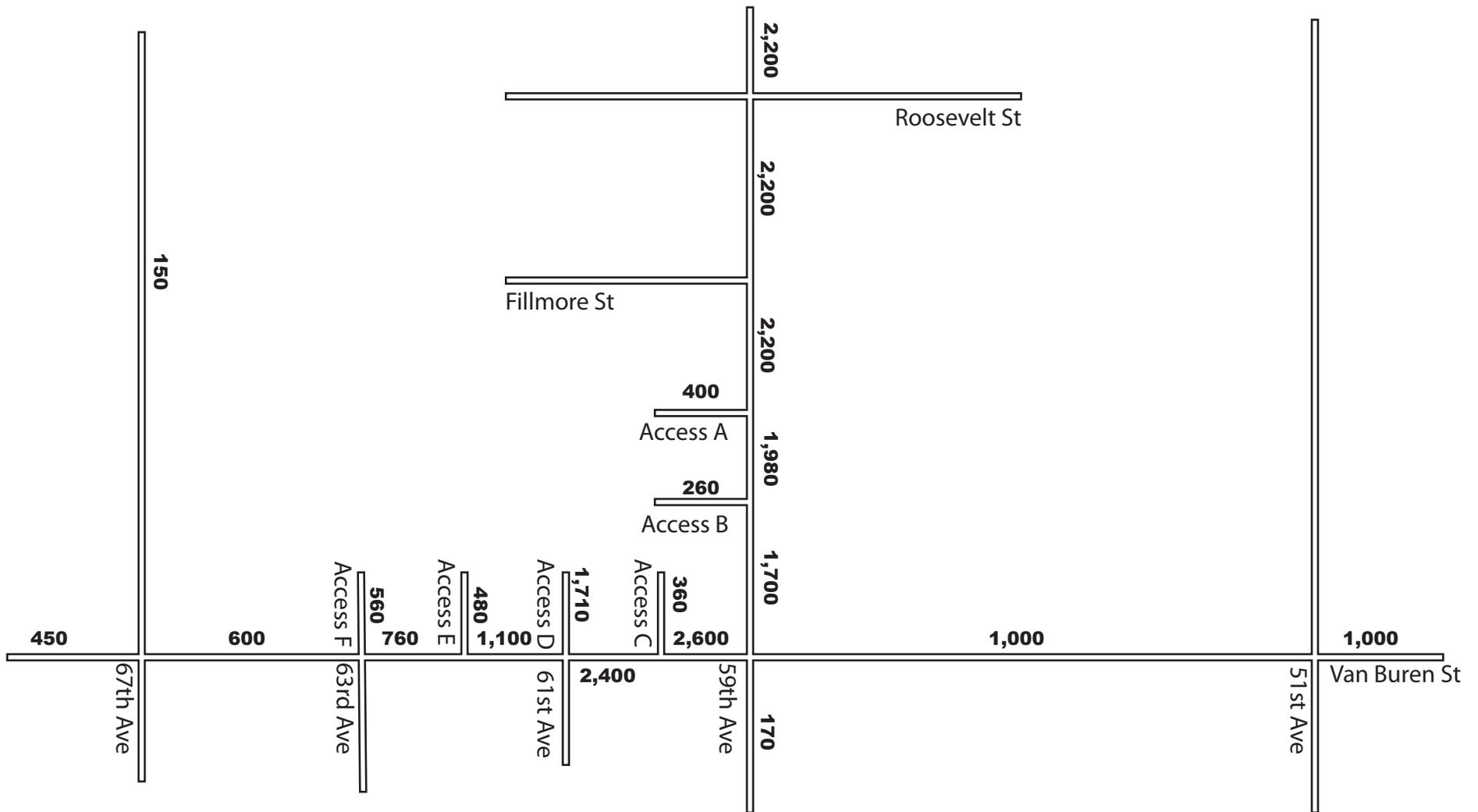
<b>Street</b>	<b>2015</b>	<b>2020</b>
67 <sup>th</sup> Avenue, North to I-10 West	0%	10%
59 <sup>th</sup> Avenue, North	57%	19%
51 <sup>st</sup> Avenue, North to I-10 East	0%	28%
Van Buren Street, East	28%	28%
59 <sup>th</sup> Avenue, South (South Mountain Freeway)	4%	4%
Van Buren Street, West	11%	11%
Total	100%	100%

## **SITE TRAFFIC ASSIGNMENT**

The next step is to assign site traffic to specific routes. Assignments were prepared for AM and PM peak hours and daily traffic using the above trip distributions using a spreadsheet. The resulting average daily traffic, as well as AM and PM peak hour turning movements, is shown on Figures 8-1 through 8-3 for opening Year 2015 and Figures 9-1 through 9-3 for long range 2030 traffic after completion of the South Mountain Freeway.

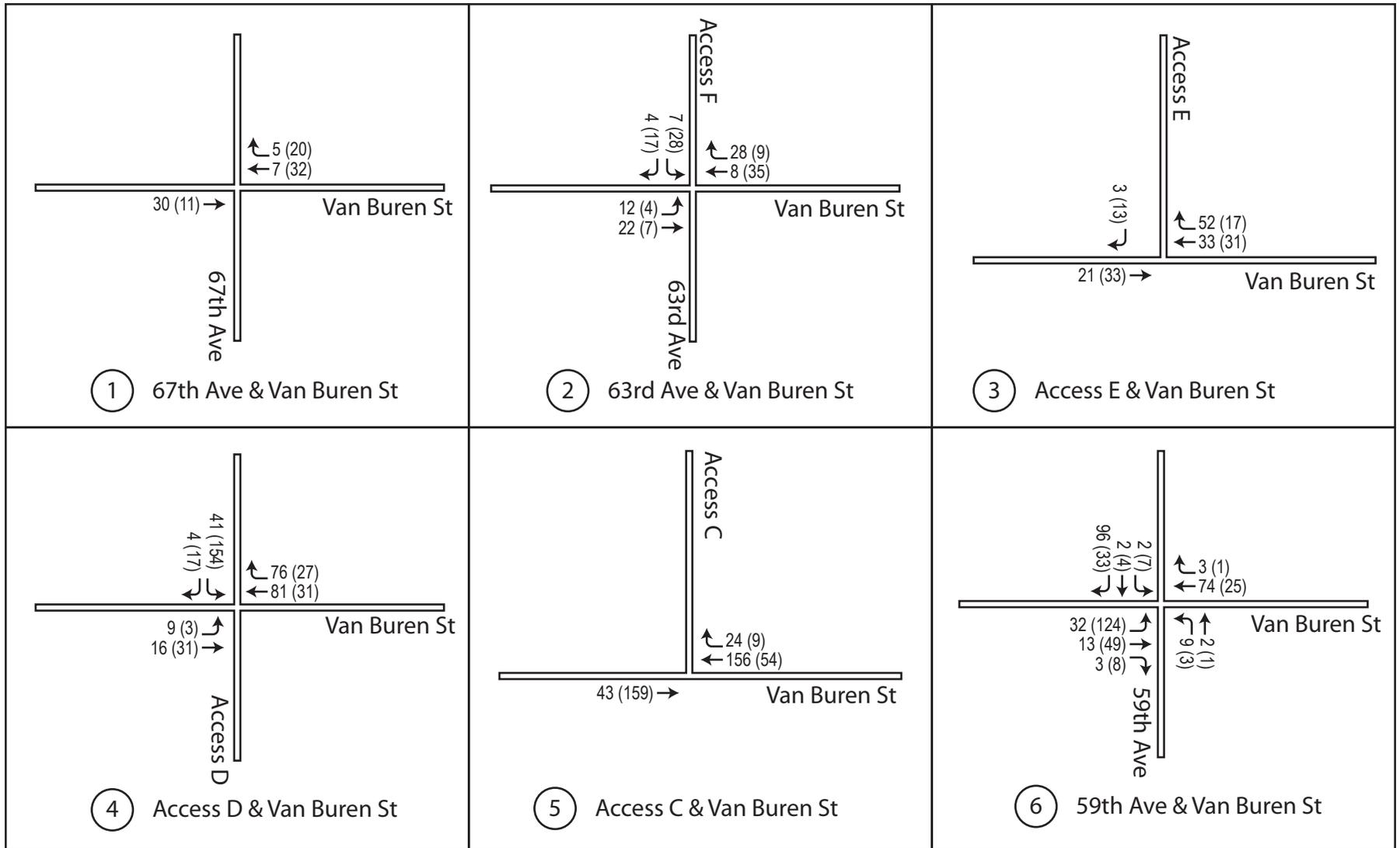
## **TOTAL TRAFFIC**

Total traffic is the sum of site plus background traffic. The resulting total average daily traffic, as well as AM and PM peak hour turning movements, are shown on Figures 10-1 through 10-3 for Year 2015 with opening year site traffic, and Figures 11-1 through 11-3 for Year 2030 with completion of the South Mountain Freeway.



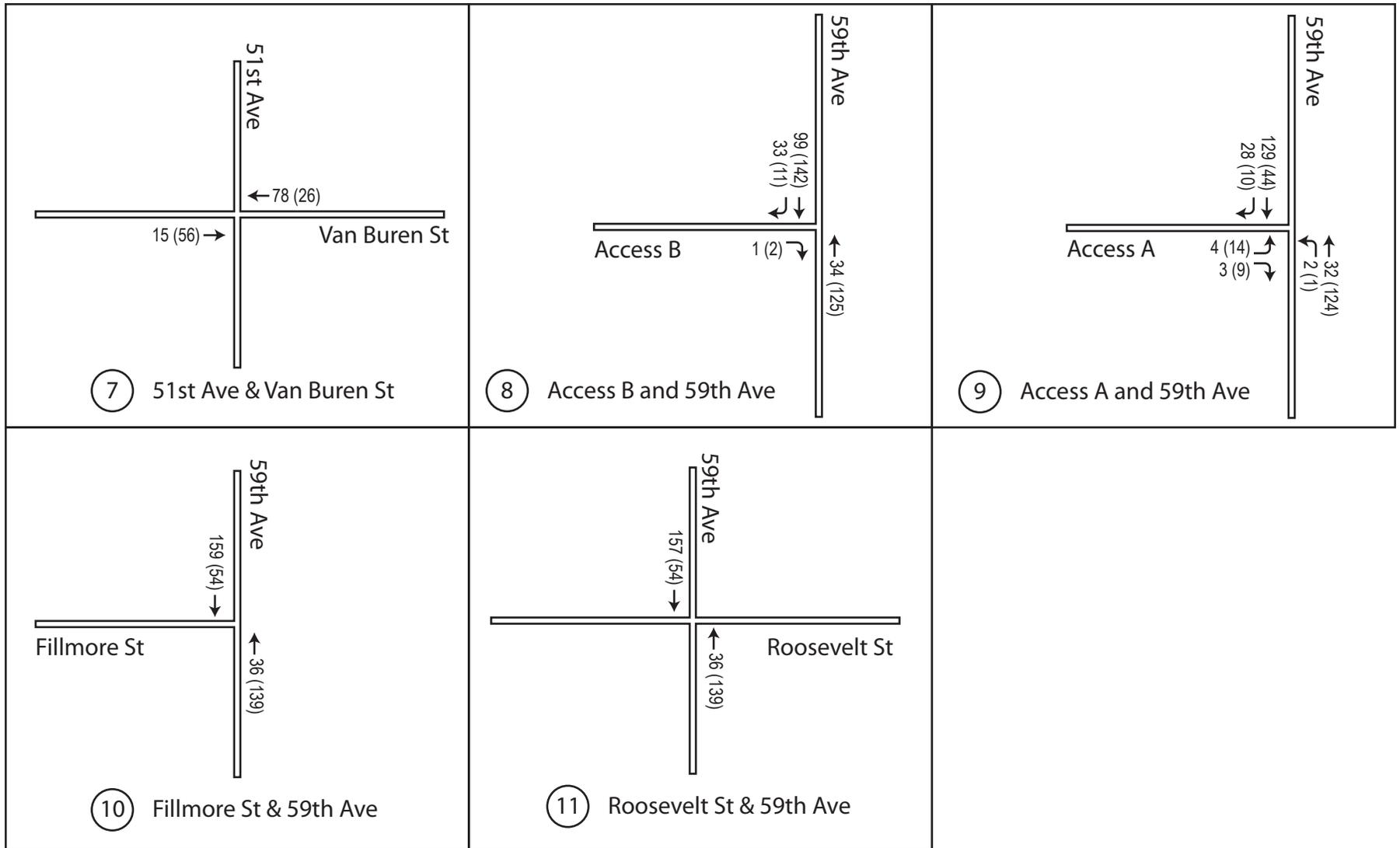
**Z** : Average Daily Traffic (in bold font)

NWC 59th Avenue & Van Buren Street TIS



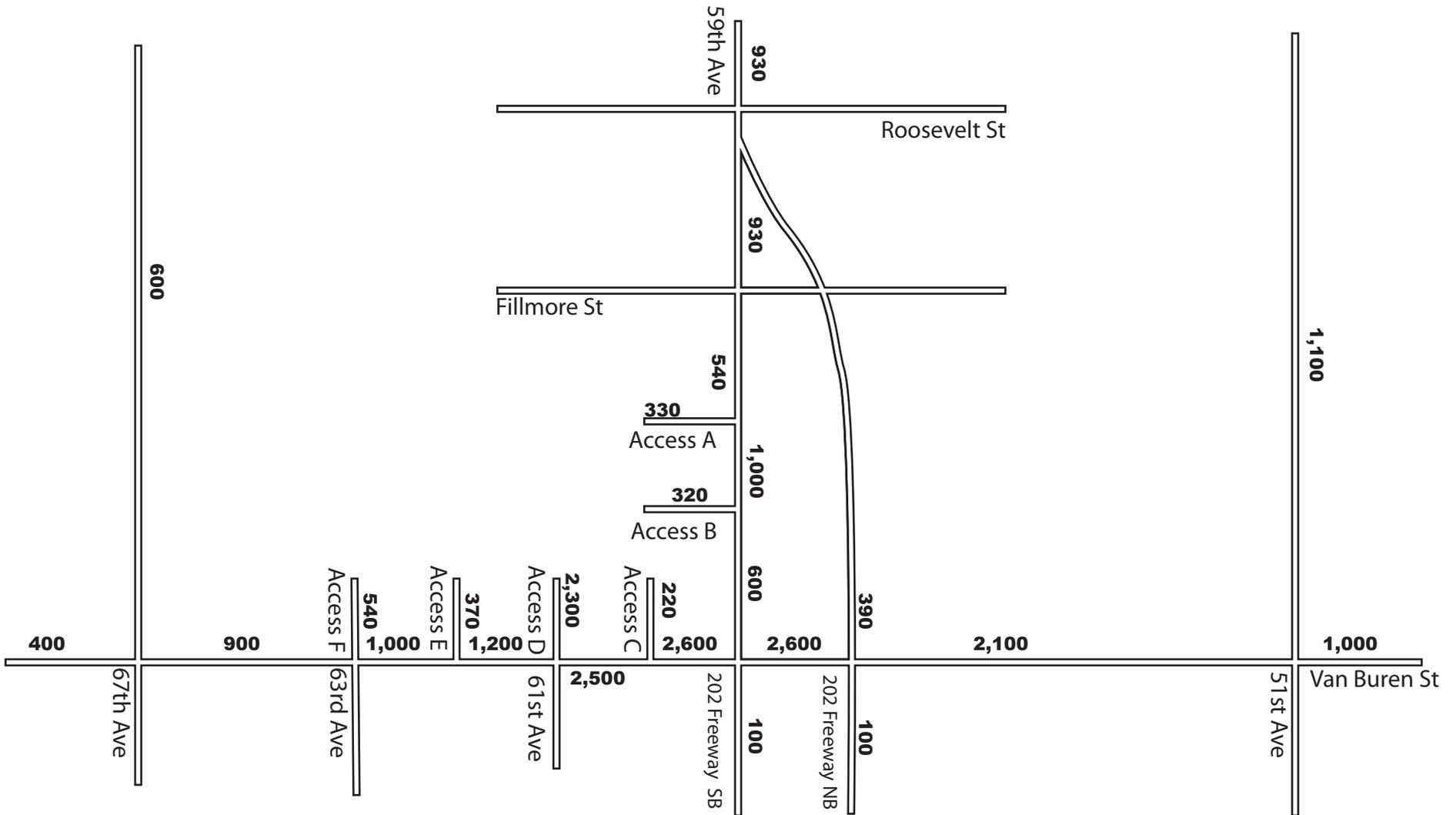
X (Y) : AM (PM) Peak Hour Traffic

NWC 59th Avenue & Van Buren Street TIS



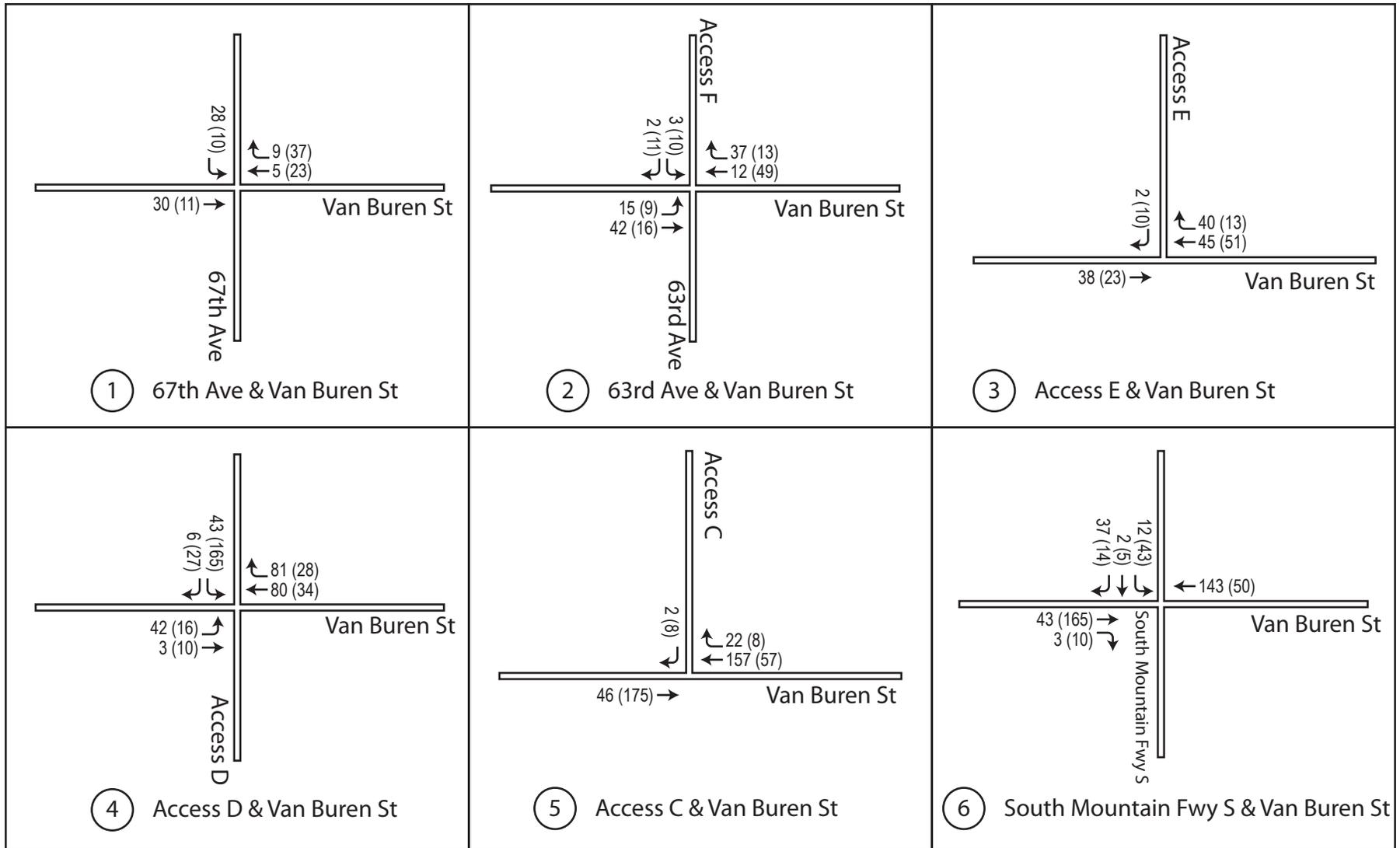
X (Y) : AM (PM) Peak Hour Traffic

NWC 59th Avenue & Van Buren Street TIS



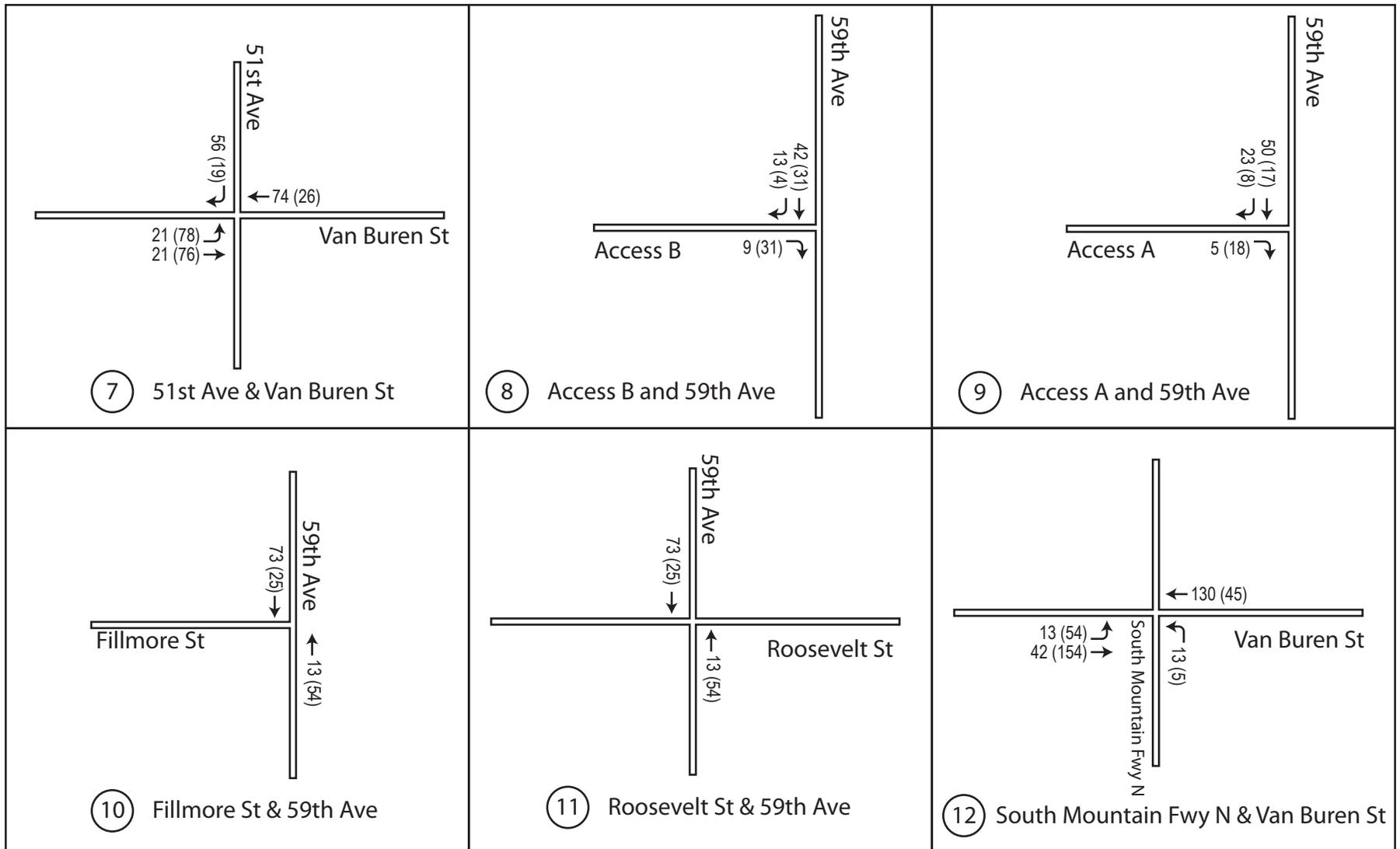
**Z** : Average Daily Traffic (in bold font)

NWC 59th Avenue & Van Buren Street TIS



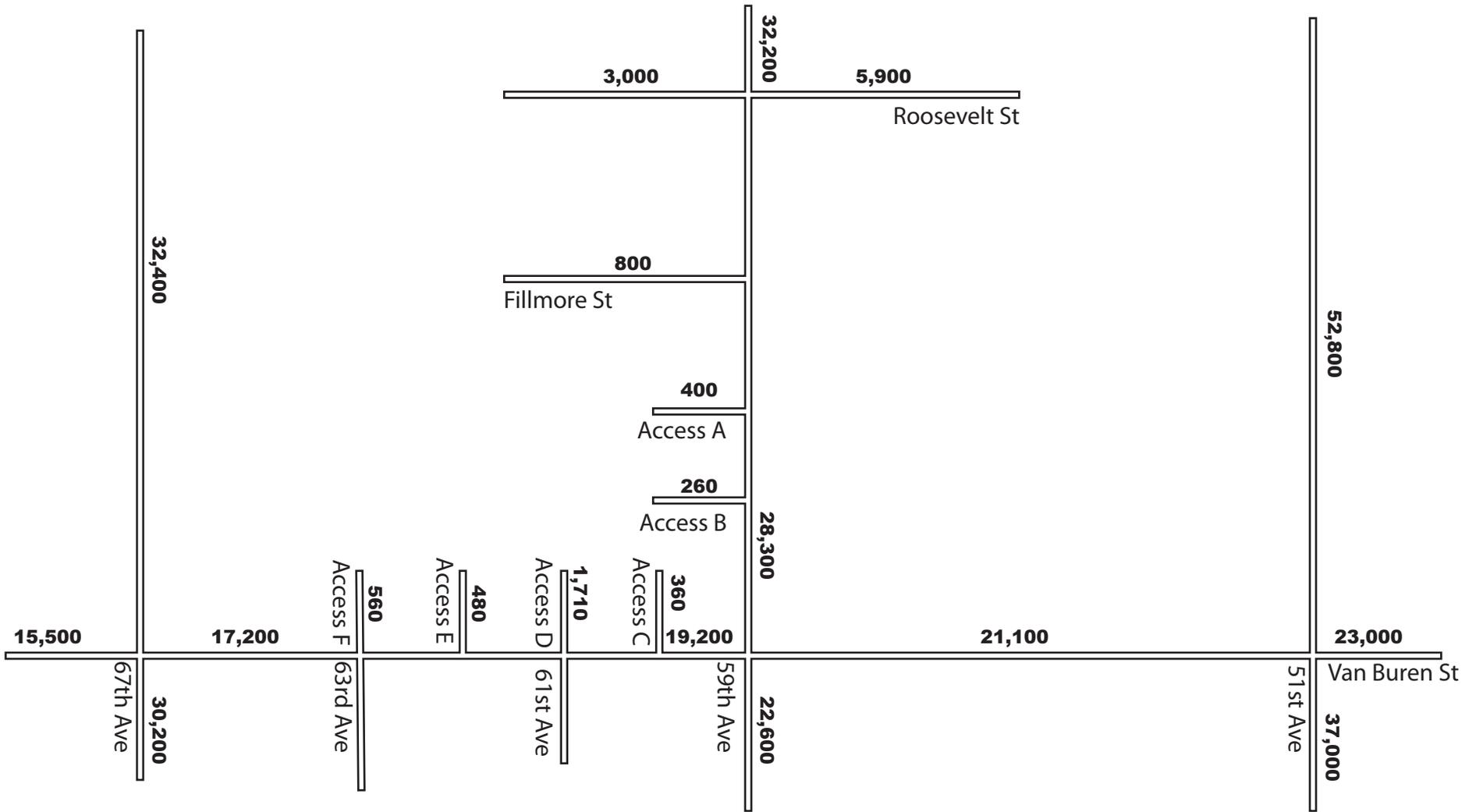
X (Y) : AM (PM) Peak Hour Traffic

NWC 59th Avenue & Van Buren Street TIS



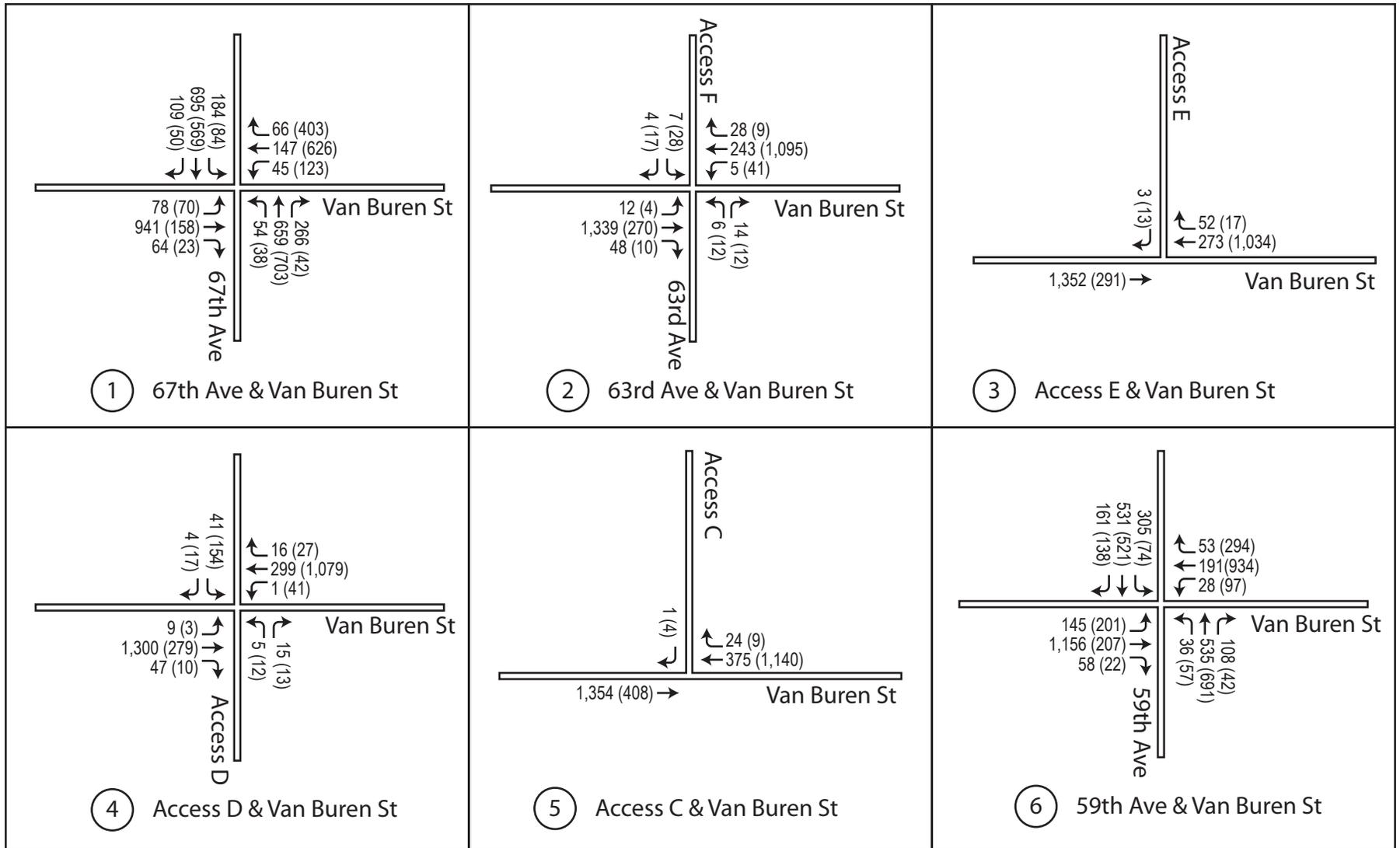
X (Y) : AM (PM) Peak Hour Traffic

NWC 59th Avenue & Van Buren Street TIS



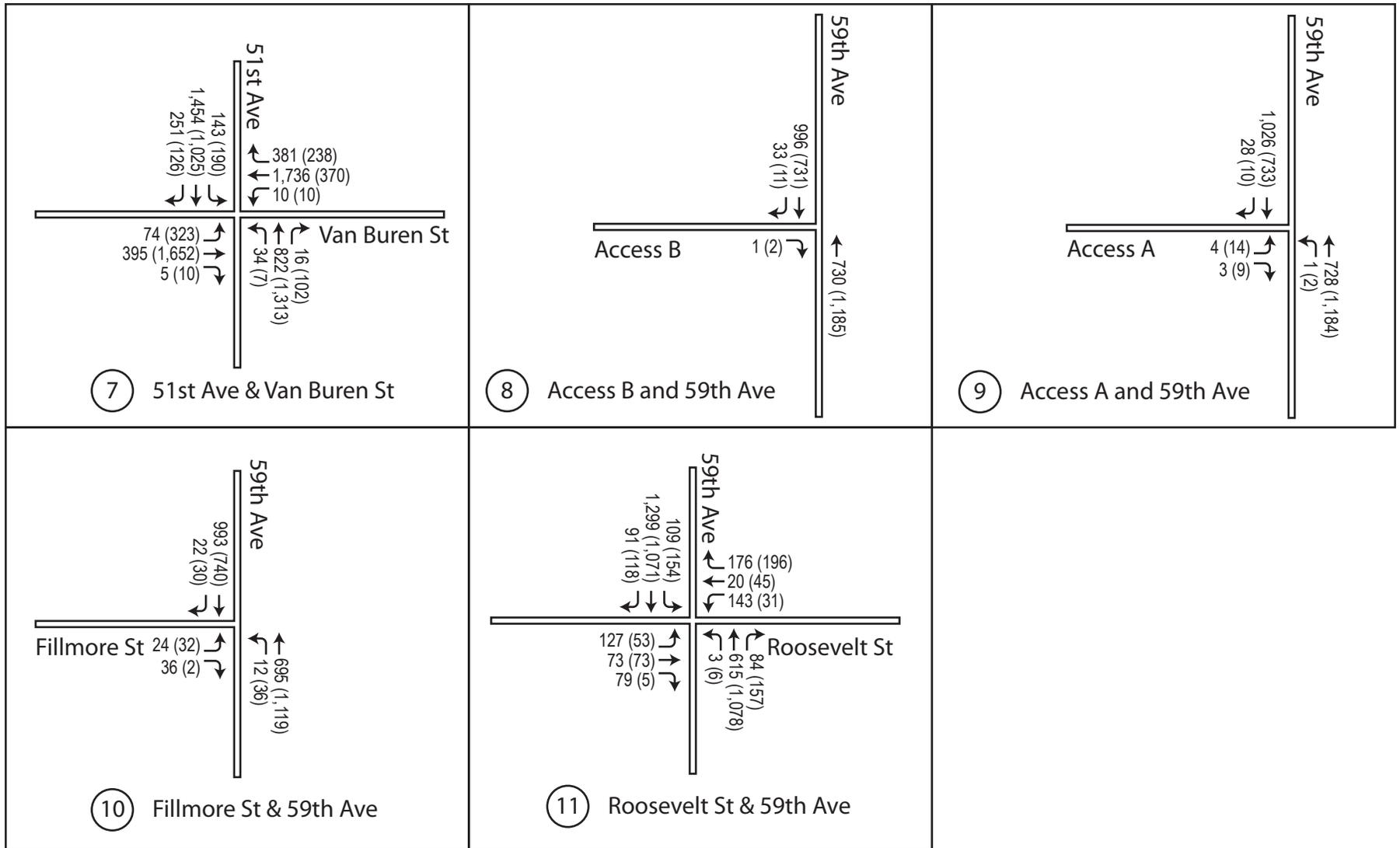
**Z** : Average Daily Traffic (in bold font)

NWC 59th Avenue & Van Buren Street TIS



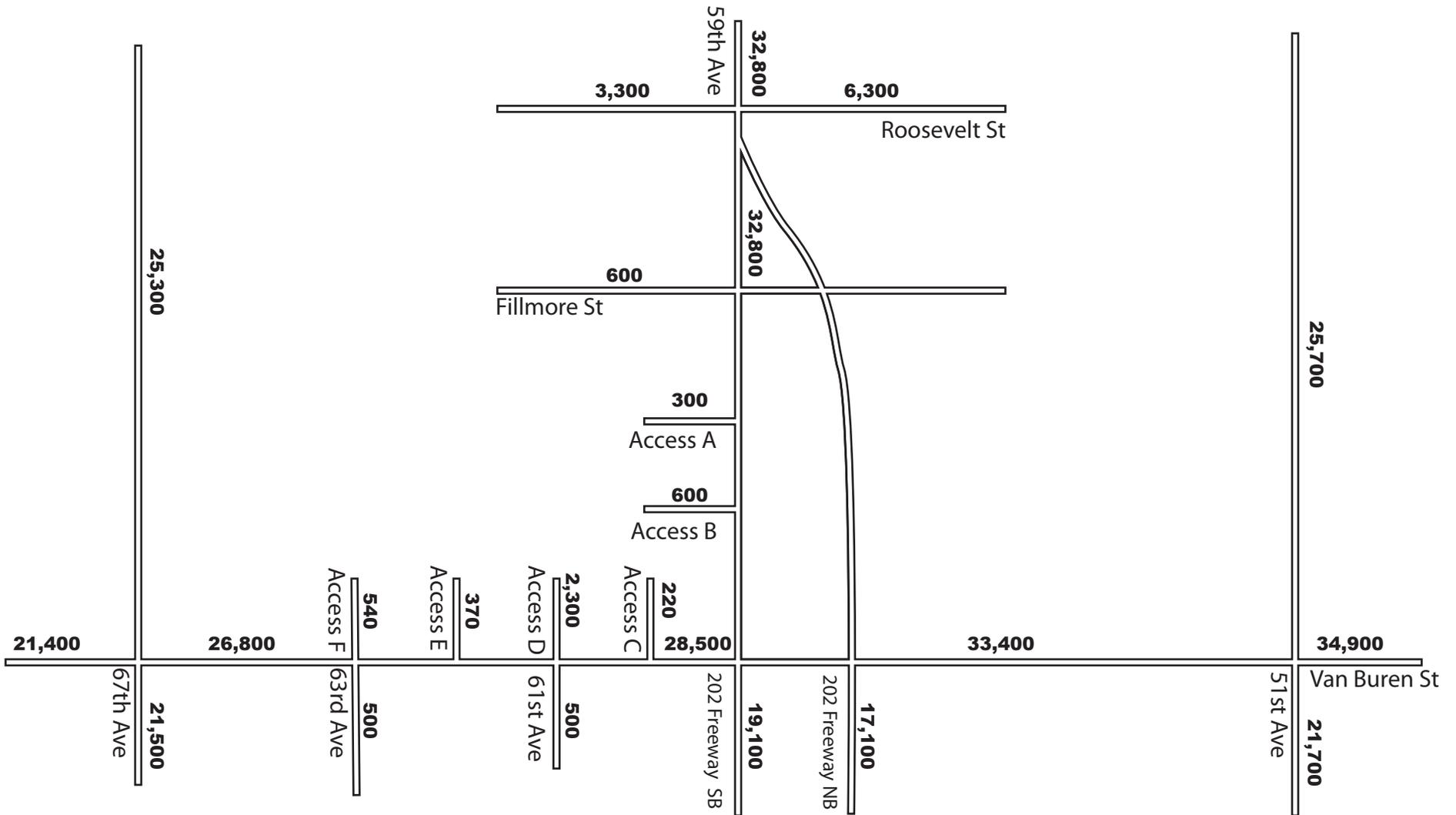
X (Y) : AM (PM) Peak Hour Traffic

NWC 59th Avenue & Van Buren Street TIS



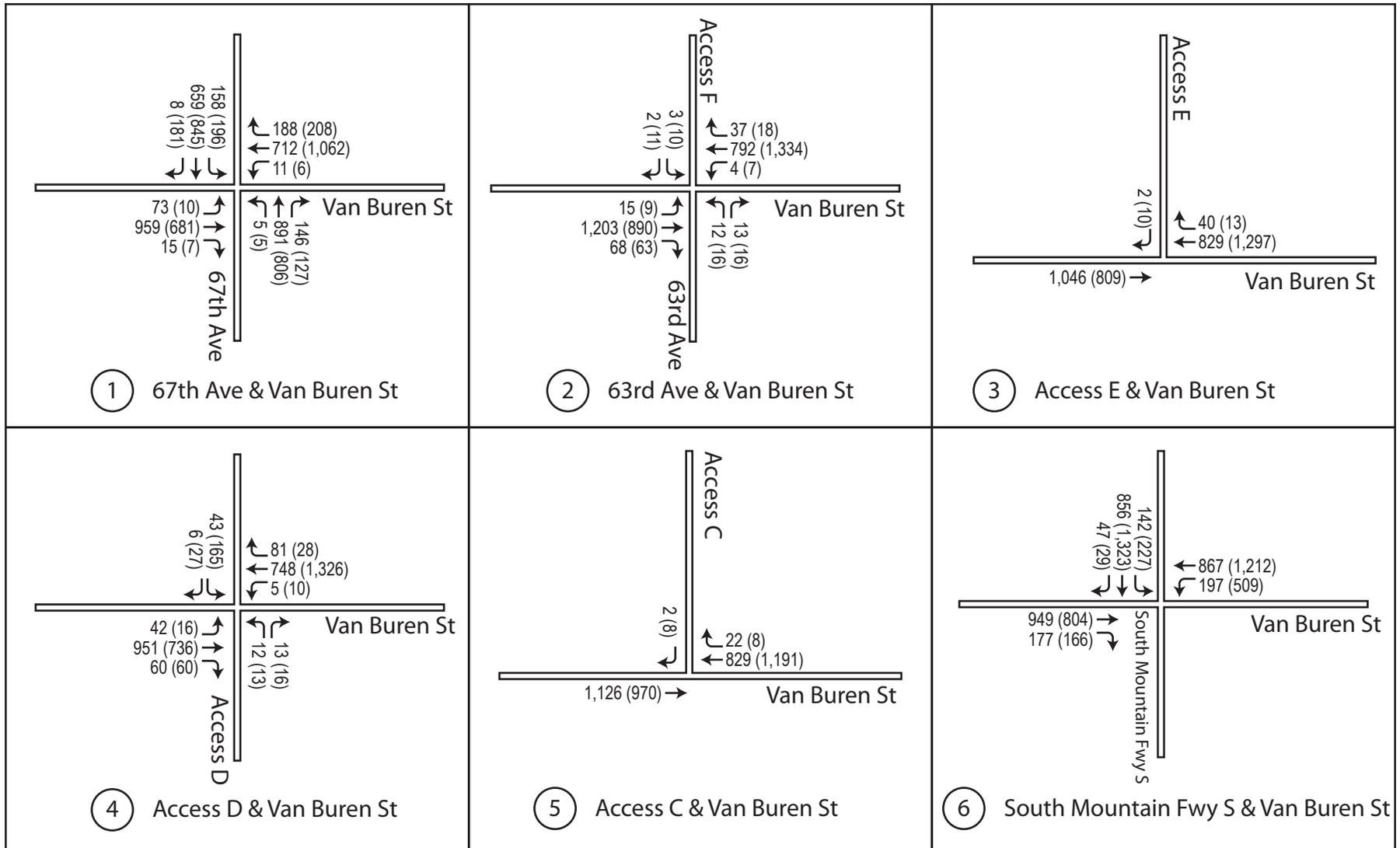
X (Y) : AM (PM) Peak Hour Traffic

NWC 59th Avenue & Van Buren Street TIS



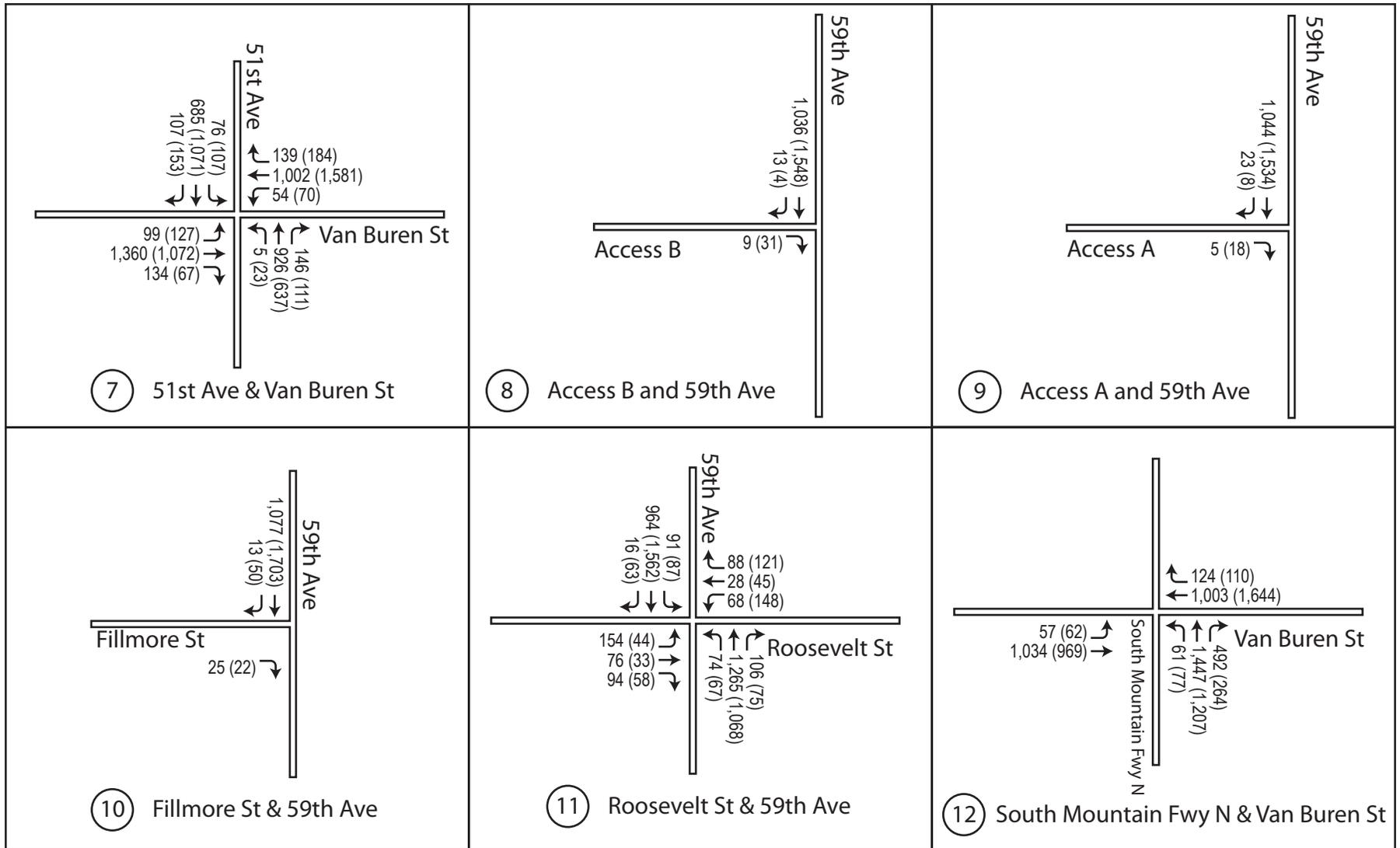
**Z** : Average Daily Traffic (in bold font)

NWC 59th Avenue & Van Buren Street TIS



X (Y) : AM (PM) Peak Hour Traffic

NWC 59th Avenue & Van Buren Street TIS



X (Y) : AM (PM) Peak Hour Traffic

NWC 59th Avenue & Van Buren Street TIS

## TRAFFIC ANALYSIS

The critical intersections were analyzed using the methodologies presented in the *Highway Capacity Manual*, and were evaluated using the *Highway Capacity Software* (HCS 2010). The 2010 HCS version was used for intersection analysis. Capacity analysis was completed for both AM and PM peak hours for Year 2015 and Year 2030 total traffic conditions. Additionally, analysis was completed for Year 2015 and Year 2030 no build conditions assuming that the proposed development was not built.

Unsignalized intersections were analyzed as STOP sign controlled intersections using the unsignalized intersection portion of the Highway Capacity Software. Sometimes, the level of service (LOS) of the most difficult turning movement was reported for unsignalized intersections at the access drives. Usually, this is the left turn from the minor street. The LOS for unsignalized intersections is reported in Table 3.

Signalized intersection analysis is based on control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The level of service (LOS) criteria for signalized intersection analysis is given in Table 4.

A peak hour factor of .92 is assumed for background traffic. Truck percentage is five percent on arterials, and ten percent on accesses to and from the site.

The resulting LOS is shown on Figure 12 for Year 2015 no build conditions, Figure 13 for Year 2030 no build conditions, Figure 14 for Year 2015 build conditions and Figure 15 for Year 2030 build conditions.

Most intersections operate at LOS D or better for Year 2015 and 2030. For signalized intersections with LOS E or LOS F, the average delay is also shown.

**Table 3**  
**Level of Service Criteria for**  
**Unsignalized Intersections**

*NWC 59<sup>th</sup> Ave/Van Buren TIS*

Level of Service	Control Delay (sec./veh.)
A	≤ 10.0
B	> 10.0 and ≤ 15.0
C	> 15.0 and ≤ 25.0
D	> 25.0 and ≤ 35.0
E	> 35.0 and ≤ 50.0
F	> 50.0

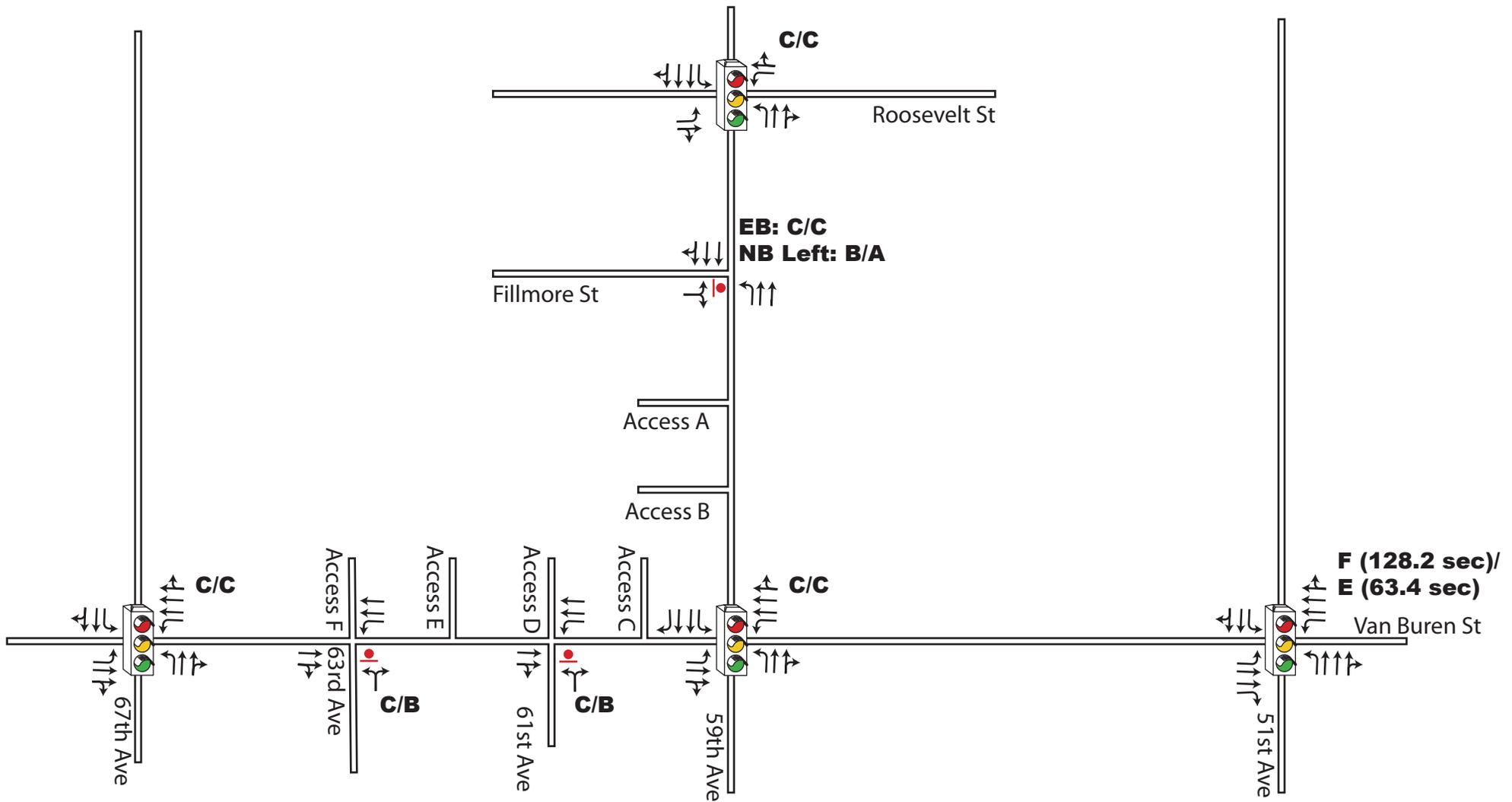
Source: *Highway Capacity Manual, 2010*, Transportation Research Board

**Table 4**  
**Level of Service Criteria**  
**for Signalized Intersections**

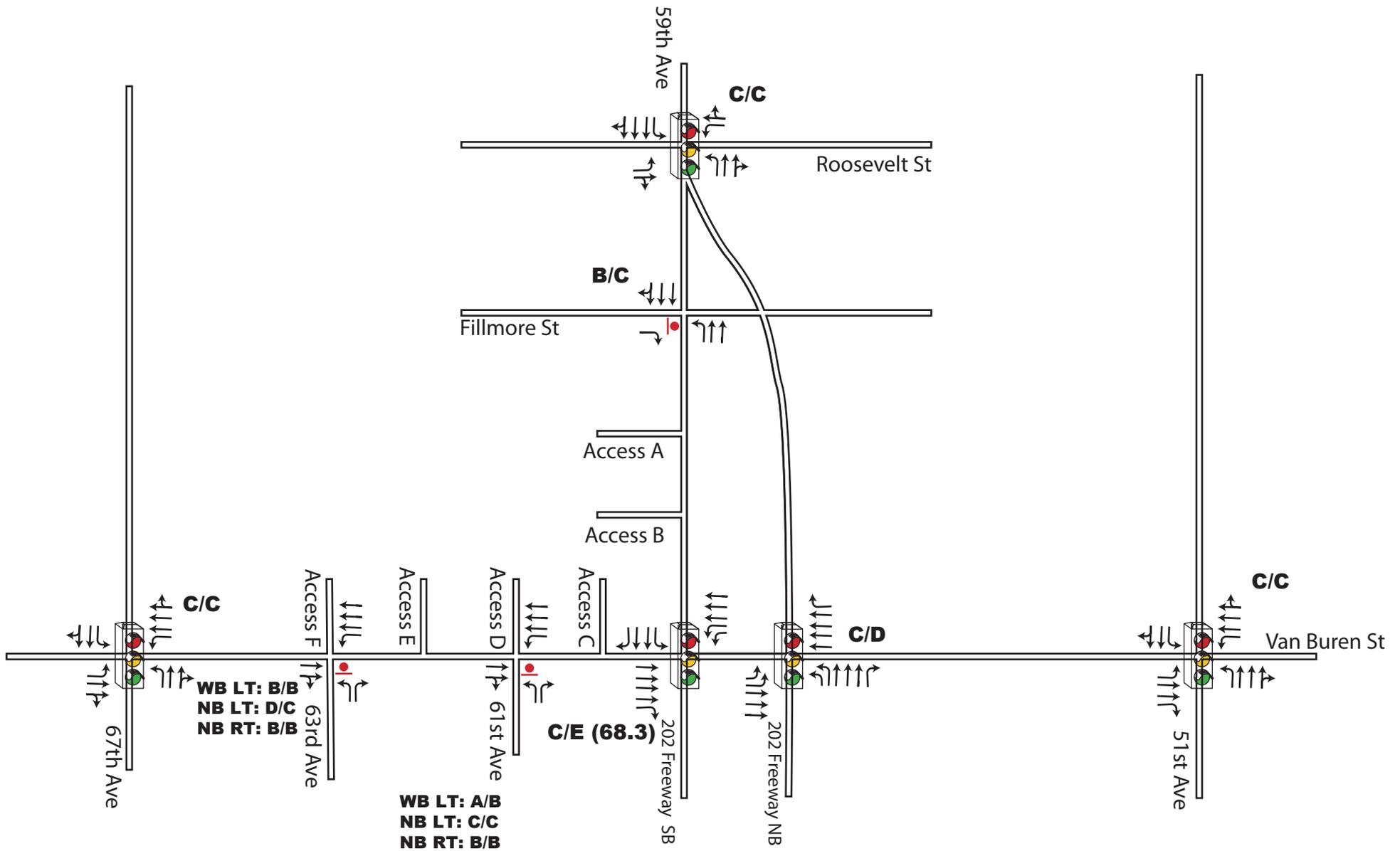
*NWC 59<sup>th</sup> Ave/Van Buren TIS*

Level of Service	Control Delay (sec./veh.)
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 35.0
D	> 35.0 and ≤ 55.0
E	> 55.0 and ≤ 80.0
F	> 80.0

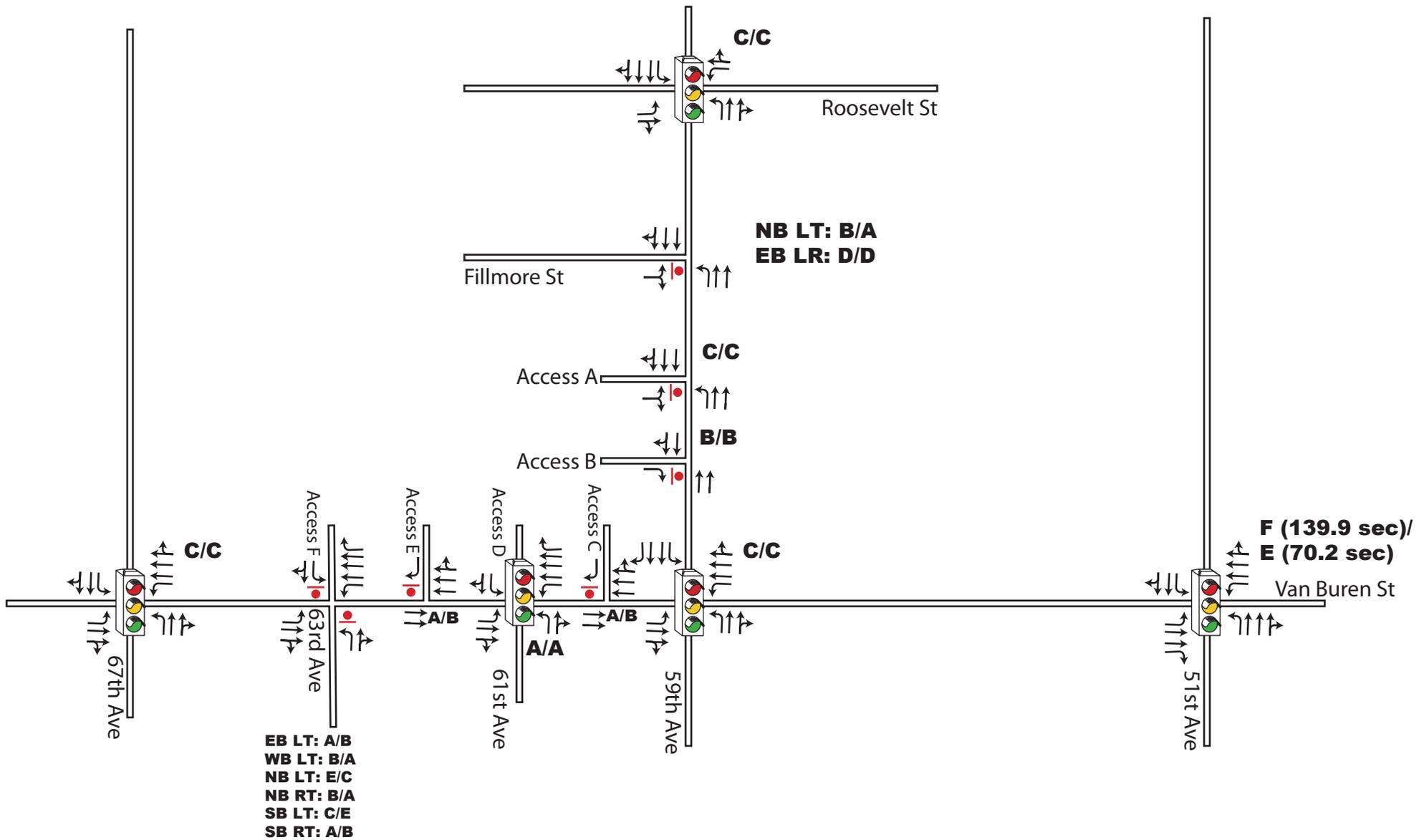
Source: *Highway Capacity Manual, 2010*, Transportation Research Board



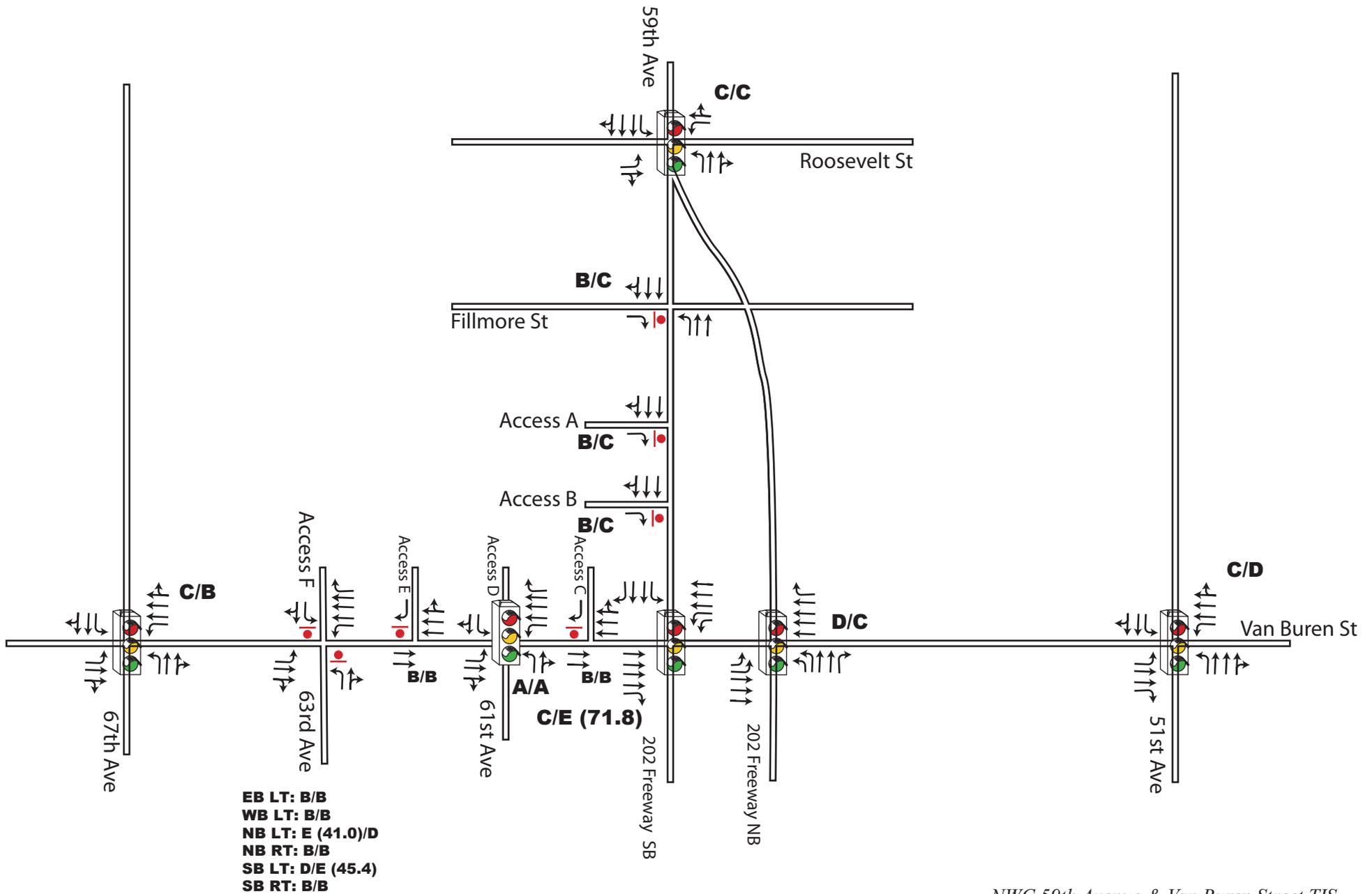
NWC 59th Avenue & Van Buren Street TIS



NWC 59th Avenue & Van Buren Street TIS



NWC 59th Avenue & Van Buren Street TIS



NWC 59th Avenue & Van Buren Street TIS

For the 2015 No Build scenario, the intersection of Van Buren Street/51<sup>st</sup> Avenue operates at LOS F in the AM with 128.2 seconds delay, and LOS E in the PM with 63.4 Seconds Delay. For the 2015 Build Scenario, this increases to 139.9 seconds in the AM and 70.2 seconds in the PM peak periods. These poor levels of service are due to the very high traffic estimates found on 51<sup>st</sup> Avenue (49,000 in 2011 and 52,800 in 2015). This high traffic level contributes to the need for the proposed South Mountain Freeway.

A traffic signal at Van Buren Street/61<sup>st</sup> Avenue provides good traffic service to the site, with LOS A in both peak hours in 2015. Stop Sign control at this location will result in LOS F for traffic trying to turn left from the main site access (Access D) onto Van Buren Street.

In 2030 with completion of the South Mountain Freeway, the peak hour LOS at 51<sup>st</sup> Avenue/Van Buren Street improves to C in the AM peak hour and D in the PM peak hour with full site traffic included.

For 2030 with completion of the South Mountain Freeway, traffic patterns shift. 59<sup>th</sup> Avenue adjacent to the site becomes a southbound one-way road, and there is a half diamond with ramps to and from the south at 59<sup>th</sup> Avenue/Van Buren Street. The southbound traffic signal at 59<sup>th</sup> Avenue/Van Buren Street operates at LOS C in the AM peak hour, but at LOS E in the PM peak hour. The 2030 PM peak hour delay increases slightly from 68.3 seconds in the No Build Case to 71.8 seconds in the build case.

The PM peak hour LOS estimate at the southbound ramp junction at Van Buren Street is affected by the limitation of the analysis program. The eastbound approach will have 3 through lanes and two lanes feeding the northbound on ramp for a total of five storage lanes. The program only allows four through lanes. It is anticipated that actual results will be somewhat better than the calculated results in this case.

Capacity summaries are included in Appendix A.

## **TRAFFIC SIGNAL WARRANT ANALYSIS**

A traffic signal is very useful to allow large trucks to leave the site. The most reasonable location for near term and far term traffic is the main entrance on Van Buren Street – Access D. A traffic signal warrant analysis was completed for this intersection for Year 2015 and Year 2030. The *Manual on Uniform Traffic Control Devices (MUTCD)* Chapter 4C presents traffic signal warrants. A traffic signal should not be turned on until one or more of the traffic signal warrants of the MUTCD are met.

The Arizona Department of Transportation's (ADOT) *Traffic Engineering Policies, Guidelines and Procedures (PGP), Part 611-Traffic Signal Needs Studies* provide a method to estimate 4<sup>th</sup> highest hour, and 8<sup>th</sup> highest hour volumes in cases where detailed traffic counts are not available. The summary section of the ADOT Traffic Signal Needs Studies is included in Appendix C. Projected traffic volumes used to determine if the intersection meets traffic signal warrants are shown in Table 5.

The highest hour volume for traffic on the minor street is the PM peak hour. The fourth high hour is assumed to be 0.656 of ADT and eighth highest hour is estimated as 0.0572 of ADT, estimation factors from the above-mentioned ADOT source. For Access D, 75% of total 2015 ADT is outbound, and 60% of total 2030 ADT is outbound. Inbound traffic is spread to other locations, but outbound traffic can use the traffic signal.

According to Section 4C.01 of the MUTCD, “The study should consider the effects of the right-turn vehicles from the minor street approaches. Engineering judgment should be used to determine what, if any, portion of the right-turn traffic is subtracted from the minor-street traffic count when evaluating the count against the above traffic warrants.”

The issue of right turn reductions was discussed in “Traffic Signal Warrants: Two Agencies Preferences,” by David R. McDonald, Jr. in *ITE Journal*, January 2001. The summary of these procedures is included in Appendix C. In this case, a 60% reduction in right turn volumes is made to account for this adjustment.

The traffic volume warrants of the MUTCD require determining the number of lanes on the major and minor approaches. For this study, Van Buren Street has two or more lanes on each approach, and 61<sup>st</sup> Avenue - Access D has one lane.

For 2015, traffic signal warrants are checked with only Phase 1 of the distribution center open. This report makes no specific traffic assignment for this scenario, but the Phase 1 trip generation in Table 1 was used to estimate minor street volumes and to adjust major street volumes.

### **Warrant 1 – Eight Hour Vehicular Volume**

The Minimum Vehicular Volume, Condition A, is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal. The Interruption of Continuous Traffic, Condition B, is intended for application at locations where Condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.

The two possible warranting volumes for Warrant 1 are Condition A - Minimum Vehicular Volume, and Condition B - Interruption of Continuous Traffic. The 100 percent column is used since the speed limit on Van Buren Street not higher than 40 mph. Table 6 compare warranting volume and warrants for Warrant 1, Condition A and Condition B for Year 2013 and Year 2018. There is one lane on 61<sup>st</sup> Avenue – Access D and 2 or more lanes on Van Buren Street.

**Table 5**  
**Traffic Volumes for Warrant Analysis: Van Buren Street/61<sup>st</sup> Avenue-Access D**  
*NWC 59th Avenue/Van Buren TIS*

Approach	Street ADT	Highest Hour	Fourth Highest Hour	Eighth Highest Hour
<b>Van Buren Street/61<sup>st</sup> Avenue (2015 With Phase 1)</b>				
Major Street – Van Buren St. (Total of both approach volumes)	19,200	1,338	1,181	1,030
Minor Street – 61 <sup>st</sup> Avenue-Access D (Highest approach volume)	661	86	50	44
Less Right Turn Reduction		15	3	3
Minor Street Warranting Volume		81	47	39
<b>Van Buren Street/61<sup>st</sup> Avenue (2015 With Site Build Out)</b>				
Major Street – Van Buren St. (Total of both approach volumes)	18,000	1,429	1,260	1,098
Minor Street – 61 <sup>st</sup> Avenue-Access D (Highest approach volume)	1,283	171	84	73
Less Right Turn Reduction		10	5	4
Minor Street Warranting Volume		161	79	69
<b>Van Buren Street/61<sup>st</sup> Avenue (2030 With Site Build Out)</b>				
Major Street – Van Buren St. (Total of both approach volumes)	28,500	2,176	1,870	1,630
Minor Street – 61 <sup>st</sup> Avenue-Access D (Highest approach volume)	1,380	192	91	79
Less Right Turn Reduction		16	7	6
Minor Street Warranting Volume		176	84	73

This intersection does not meet Warrant 1 for any of the scenarios under study; although it comes close to meeting the warrant for 2015 and 2030 with build out of the site. This is significant because there is no adjustment for large trucks in the MUTCD traffic signal warrants. For this intersection, about 20 percent of the minor street volumes during the eighth highest hour are heavy trucks. If each heavy truck were counted as two vehicles, then Warrant 1 would be met for 2015 and 2030 with build out of the site.

The design and analysis of roadways recognizes that trucks use more physical road space and are slower and accelerate slower than light vehicles. The *2010 Highway Capacity Manual* (Published by Transportation Research Board, 2010, Page 9-8) addresses how trucks are handled in road design and analysis. Heavy Vehicles are defined by the manual. A vehicle with more than four wheels touching the pavement during normal operation is the formal definition of “heavy trucks.” For intersection analysis, the equivalent number of through cars for each heavy vehicle is 2.0 (*2010 Highway Capacity Manual*, Page 18-36). Using this figure, a flow of cars and trucks can be converted into “Passenger car equivalents”. The traffic signal warrants of the MUTCD do not explicitly require the use of passenger car equivalents, and usually truck volumes are low enough that it does not affect the result. Due to the nature of the project and the background traffic in this area, it is appropriate to consider trucks as 2.0 passenger car equivalents in this case.

**Table 6**  
**Warrant 1, Eight-Hour Vehicular Volumes: Van Buren Street/61<sup>st</sup> Ave – Access D**  
*NWC 59<sup>th</sup> Avenue/Van Buren TIS*

Approach	Minimum Hourly Volume	Warranting Volume	Meets Warrant?
<b>Van Buren St/61<sup>st</sup> Ave – Access D (2015 Phase 1)</b>			
Condition A - Minimum Vehicular Volume			
Major Street	600	1030	Yes
Minor Street	150	39	No
Condition B - Interruption of Continuous Traffic			
Major Street	900	1030	Yes
Minor Street	75	39	No
<b>Van Buren St/61<sup>st</sup> Ave – Access D (2015 Build Out)</b>			
Condition A - Minimum Vehicular Volume			
Major Street	600	1098	Yes
Minor Street	150	69	No
Condition B - Interruption of Continuous Traffic			
Major Street	900	1098	Yes
Minor Street	75	69	No
<b>Van Buren St/61<sup>st</sup> Ave – Access D (2030 Build Out)</b>			
Condition A - Minimum Vehicular Volume			
Major Street	600	1630	Yes
Minor Street	150	73	No
Condition B - Interruption of Continuous Traffic			
Major Street	900	1630	Yes
Minor Street	75	73	No

**Warrant 2 – Four Hour Vehicular Volume**

The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

The Four-Hour warrant is met if for each of any four hours of an average day, the plotted points representing the vehicles per hour on the major street and the corresponding vehicles per hour on the higher-volume minor-street approach exceed the applicable curve from the MUTCD. The Four-Hour warrant curves from the MUTCD are included in Appendix E. The 100 percent column is used for one lane on the minor approach and two or more lanes the major approach.

According to the warrant curves, Van Buren Street/61<sup>st</sup> Avenue – Access D meets Warrant 2 for 2030 with site build out.

**Warrant 3 – Peak Hour**

The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street suffers undue delay when entering or crossing the major street. The peak hour warrant is applied only in unusual cases such as office complexes, manufacturing plants, industrial complexes or

HOV facilities that attract or discharge large numbers of vehicles over a short time. It appears that the Peak Hour warrant will be appropriate at this location.

There are two conditions for the peak hour warrant. Condition A is met if all three of the following conditions are true for the same one-hour:

1. The total stopped delay on one minor street approach controlled by a STOP sign equals or exceeds 4 vehicles hours for a one-lane approach, or 5 hours for a two-lane approach, and
2. The volume on the same minor street approach equals or exceeds 100 vph for one lane or 150 vph for two moving lanes, and
3. The total entering volume during the hour equals or exceeds 650 vph for intersections with 3 approaches or 800 vph for intersections with four or more approaches.

For this location, Condition A was not tested.

Condition B is met if the plotted point representing the vehicles per hour on the major street and the corresponding vehicles per hour on the higher-volume minor-street approach for one hour on an average day falls above the applicable curve found in Appendix C.

Again, since Van Buren Street does not have a speed limit over 40 mph, Warrant 3 uses the 100 percent factor graph, with two lanes on Van Buren Street approaches and one lane on the 61<sup>st</sup> Avenue – Access D approach. The second condition of Warrant 3 is met for 2015 and 2030 with Site Build Out. Therefore, a traffic signal is recommended at Van Buren Street/61<sup>st</sup> Avenue – Access D for these conditions.

**Summary.** Table 7 summarizes the results of the analysis of traffic volume warrants for this location. Based on the projections used in this analysis, a traffic signal will be warranted at Van Buren Street/61<sup>st</sup> Avenue in 2015 and 2030 with build out of the Site.

If heavy vehicles are counted as two vehicles instead of one, the 8-hour and 4-hour warrants are met for Build Out conditions as well as the Peak Hour Warrant.

The design and analysis of roadways recognizes that trucks use more physical road space and are slower and accelerate slower than light vehicles. The *2010 Highway Capacity Manual* (Published by Transportation Research Board, 2010, Page 9-8) addresses how trucks are handled in road design and analysis. Heavy Vehicles are defined by the manual. A vehicle with more than four wheels touching the pavement during normal operation is the formal definition of “heavy trucks.” For intersection analysis, the equivalent number of through cars for each heavy vehicle is 2.0 (*2010 Highway Capacity Manual*, Page 18-36). Using this figure, a flow of cars and trucks can be converted into “Passenger car equivalents”. The traffic signal warrants of the MUTCD do not explicitly require the use of passenger car equivalents, and usually truck volumes are low enough that it does not affect the result. Due to the nature of the project and the background traffic in this area, it is appropriate to consider trucks as 2.0 passenger car equivalents in this case.

This intersection is located one-quarter mile west of the major intersection of 59<sup>th</sup> Avenue/Van Buren Street. To reduce the impact on Van Buren Street, the traffic signal should be demand actuated by vehicles on the minor approaches.

**Table 7**  
**Summary of Traffic Signal Warrants for Van Buren St/61<sup>st</sup> Ave – Access D**  
*NWC 59<sup>th</sup> Avenue/Van Buren TIS*

	<b>2015 with Phase 1</b>	<b>2015 with Build Out</b>	<b>2030 with Build Out</b>
Warrant 1 (8-Hour)			
Condition A	No	No	No
Condition B	No	Yes*	Yes*
Warrant 2 (4- Hour)	No	Yes*	Yes
Warrant 3 (1- Hour)	No	Yes	Yes

\* Meets Warrant if heavy trucks are counted as 2 vehicles.

## DESIGN ISSUES

Accesses B, is recommended to be right in, right out accesses in order to provide adequate room for queuing at 59<sup>th</sup> Avenue. When the South Mountain Freeway is built, Access A will also become right in, right out because 59<sup>th</sup> Avenue adjacent to the site will become one way southbound.

If a traffic signal is installed at Van Buren Street/61<sup>st</sup> Avenue, then left turns from the project onto Van Buren Street will be made at this location.

Access C and Access E on Van Buren Street can allow left turns in and out of them if they are far enough from the adjacent traffic signals that they do not interfere with expected queues. The expected maximum eastbound left turn queue at Access D is 3 vehicles. At 25 feet per vehicle, and adding 40 feet to account for large trucks, the needed storage for the eastbound left turn lane is 115 feet. This can be accommodated if the distance between Access D and Access E is at least 215 feet measured from near curb to near curb.

Access C can have left turns in and out if it is far enough away from 59<sup>th</sup> Street that the left turn queue from 59<sup>th</sup> Street does not block left turns in and out of Access C. The maximum expected queue on Van Buren Street at 59<sup>th</sup> Avenue is 6 vehicles, At 25 feet per vehicle and adding 40 feet for heavy trucks, this translates into a needed storage length of 190 feet. This can be accommodated if the distance between 59<sup>th</sup> Avenue and Access C is at least 290 feet, measured from near curb to near curb.

The current design allows placing Access C and Access E far enough from the adjacent traffic signals to allow full access at these driveways.

The proposed traffic signal at the main entrance to the site (Access D at Van Buren Street/61<sup>st</sup> Avenue) is one-quarter mile west of the existing and future traffic signal at

59<sup>th</sup> Avenue. Arizona Department of Transportation expresses that they do not have any issues with the distance between the two signals, and that the proposed signal at Access D will be beyond ADOT right of way restrictions.

The operations of the signals at 59<sup>th</sup> Avenue and 61<sup>st</sup> Avenue were examined to determine whether the queues for one intersection would likely interfere with the operations of the adjacent intersection. According to the capacity analysis for this report, the longest expected queue (peak hour 95<sup>th</sup> percentile queue) on the west leg of Van Buren Street at 59<sup>th</sup> Avenue is 475 feet. The longest expected queue (peak hour 95<sup>th</sup> percentile queue) on the east leg of Van Buren Street and 61<sup>st</sup> Avenue is two vehicles, or 50 feet. A minimum 150-foot westbound storage lane is recommended at 61<sup>st</sup> Street. The combined length of 150 feet westbound and 475 feet eastbound queues can easily be accommodated by the two traffic signals located one-quarter mile apart.

It is anticipated that signal progression on Van Buren Street adjacent to the site will favor eastbound traffic in the morning and westbound traffic in the afternoon. Good signal progression in the off-peak direction will not be achievable at the proposed traffic signal located at 61<sup>st</sup> Avenue.

When the South Mountain Freeway is built, 59<sup>th</sup> Avenue will transition into two one-way frontage roads north of Van Buren Street. North of Van Buren Street, the northbound frontage road crosses under the freeway to join 59<sup>th</sup> Avenue forming a traditional two-way arterial. The neighborhood north of the site has three intersections with 59<sup>th</sup> Avenue, one of these, Roosevelt Street, has a traffic signal. If these intersections are on a one-way street, then certain movements in and out of the neighborhood will be limited. The preliminary design of the South Mountain Freeway shows that the 59<sup>th</sup> Avenue/Roosevelt Street signalized intersection will be maintained as it is, and that the local street intersection with McKinley Street south of Roosevelt Street will also be maintained. The preliminary design shows the split in 59<sup>th</sup> Avenue may occur north of Fillmore Street, meaning that left turns from the south and left turns from Fillmore Street will not be possible.

If this transition occurs south of Fillmore Street, then Fillmore Street can maintain access both from the north and the south. This will allow the neighborhood north of the site to maintain the same level of access after the construction of the South Mountain Freeway as before. This design question was discussed with representatives of Arizona Department of Transportation (ADOT) Right of Way Group and the design consultant for the South Mountain Freeway on December 4, 2012. The consensus was that this design concept is viable and will be taken into account in the final design of the South Mountain Freeway.

The preliminary design of the South Mountain Freeway does not require additional right of way from the site along 59<sup>th</sup> Avenue. Some additional right of way may be needed along Van Buren Street from 59<sup>th</sup> Avenue west for as much as 1,500 feet (650 to 700 feet plus taper back to existing cross section) to accommodate widening for the traffic interchange.

The third southbound lane on 59<sup>th</sup> Avenue currently becomes a right turn only lane at Van Buren Street. This could remain a right turn lane in the future, or become a right-through lane. This depends on the detailed design of this intersection.

Right turn deceleration lanes may be warranted at driveway locations with 30 or more right turns in a peak hour. This volume is exceeded at Access D and Access F. A right turn lane provides little or no benefit to large trucks turning right because they cannot make the sharp “S” curve maneuver to enter them. But during peak hours, most of the turns into these driveways will be light duty vehicles. A minimum straight section of 100 feet and a 100-foot taper will allow adequate deceleration for turning vehicles on an arterial with a speed limit of 45 mph. This will require that these intersections be at least 250 feet from the nearest upstream intersection, measured from near curb to near curb.

## RECOMMENDATIONS

The proposed distribution center at the northwest corner of 59<sup>th</sup> Avenue and Van Buren Street is anticipated to generate 4,078 trips per day when built out, with 349 total morning peak hour trips and 373 total evening peak hour trips. Phase 1 is expected to generate 2,101 daily trips, 162 morning peak hour trips, and 173 afternoon peak hour trips. The traffic disperses in such a way that it can be accommodated on the roadway system with the following recommended improvements.

- After construction of the Loop 202, South Mountain Freeway, access to residential neighborhoods along 59<sup>th</sup> Avenue will remain unchanged from I-10 to McKinley Street. Access a Villa Street, Pierce Street and Fillmore Street would be modified to right-in, right-out along the 59<sup>th</sup> Avenue southbound frontage road. This provides access in both directions along 59<sup>th</sup> Avenue, especially with the traffic signal at Roosevelt Street. It will also help to reduce cut through traffic along Fillmore Street and other local streets.. The proposed schematic design for this intersection is shown on Figure 3.
- For the freeway construction project, right of way will be required from the site along the north side of Van Buren Street. Van Buren Street west of 59<sup>th</sup> Avenue will be widened, and additional right of way may be needed. Current right of way on Van Buren Street west of 59<sup>th</sup> Avenue is about 102 feet wide. The anticipated right of way taking for the freeway may extend up to 600 to 750 feet and then taper to the existing road cross section and right of way up to 1,500 feet west of Van Buren Street. Final design and alignment are not complete, but right of way acquisition may begin sometime in 2014.
- The 63<sup>rd</sup> Avenue alignment at the west part of the site does not exist today and is not recommended to be constructed in order to avoid increasing traffic levels in the residential neighborhood north of the site. Instead, it is recommended that the north leg of Van Buren Street/63rd Avenue be developed into an access to the western part of the proposed distribution center.

- A traffic signal is recommended to be built at Access D, the main entrance on Van Buren Street at 61<sup>st</sup> Avenue. This traffic signal will meet warrants with the full development of the site. It is needed to provide access from the site by large trucks. To reduce impact on Van Buren Street traffic, it should be activated by presence of vehicles on the minor approaches.
- Two accesses are recommended to the site from 59<sup>th</sup> Avenue. The southern access will be right in, right out only. The northern access should be at least 150 feet south of Fillmore Street, measured from near curb to near curb. It will become right in, right out only when this section of 59<sup>th</sup> Avenue becomes one-way southbound with construction of the South Mountain Freeway.
- Four driveway accesses are recommended along Van Buren Street. The main access is at the 61<sup>st</sup> Avenue alignment, and another full access is recommended at the 63<sup>rd</sup> Avenue alignment. Two additional accesses (Access C and Access E) are recommended between these locations.
- In order to maintain full access to Access C, it should be located at least 290 feet west of 59<sup>th</sup> Avenue, measured from nearest curb to nearest curb.
- In order to maintain full access to Access E, it should be located at least 215 feet west of Access D/61<sup>st</sup> Avenue, measured from near curb to near curb.
- A westbound right turn deceleration lane is recommended to be built on Van Buren Street at the main entrance (61<sup>st</sup> Avenue – Access D), and at 63<sup>rd</sup> Avenue (Access F). A 100-foot long taper and minimum 100-foot long straight section is adequate for 45 mph speed limit.
- There will be no access from the site to Fillmore Street to avoid increasing traffic through the residential neighborhood. The development will complete the south half of Fillmore Street as a residential local street.

**APPENDIX A**

**CAPACITY SUMMARIES**

## **APPENDIX A**

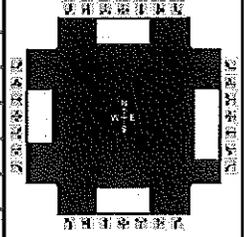
### **CAPACITY SUMMARIES**

**APPENDIX A**

**2015 NO BUILD**

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 28, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	AM Pk Hr	PHF	0.92		
Intersection	Van Buren St/67th Avenue	Analysis Year	2020	Analysis Period	1> 7:00		
File Name	VB67 AM .xus						
Project Description	2015 No Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	78	911	64	45	140	61	54	659	266	184	695	109

Signal Information				Signal Phases													
Cycle, s	100.0	Reference Phase	2														
Offset, s	0	Reference Point	End	Green	3.7	2.6	36.0	4.0	1.0	32.8							
Uncoordinated	No	Simult. Gap EW	On	Yellow	3.0	0.0	3.0	3.0	3.0	3.0							
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	0.0	1.0	1.0	1.0	1.0							

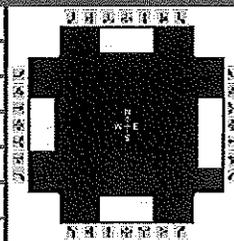
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.3	42.5	7.7	40.0	8.0	36.8	13.0	41.7
Change Period, (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (gs), s	6.8		3.8		4.2	28.9	8.8	20.3
Green Extension Time (ge), s	0.1	0.0	0.1	0.0	0.0	3.8	0.2	4.3
Phase Call Probability	0.91		0.74		0.80	1.00	1.00	1.00
Max Out Probability	0.00		0.00		0.00	0.18	0.02	0.02

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	85	536	524	49	152	66	59	529	477	200	448	426
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1810	1767	1723	1810	1533	1723	1810	1631	1723	1810	1723
Queue Service Time (gs), s	4.8	23.8	23.8	1.8	2.3	2.4	2.2	26.9	26.9	6.8	18.3	18.3
Cycle Queue Clearance Time (gc), s	4.8	23.8	23.8	1.8	2.3	2.4	2.2	26.9	26.9	6.8	18.3	18.3
Capacity (c), veh/h	108	697	681	212	1301	551	260	593	535	258	683	650
Volume-to-Capacity Ratio (X)	0.784	0.769	0.769	0.231	0.117	0.120	0.226	0.891	0.891	0.774	0.655	0.656
Available Capacity (ca), veh/h	452	697	681	600	1301	551	467	778	702	379	868	827
Back of Queue (Q), veh/ln (95th percentile)	3.8	15.0	14.7	1.2	1.8	1.6	1.6	16.9	15.7	4.7	10.7	10.3
Overflow Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.50	0.00	0.00	0.16	0.00	0.00	0.20	0.00	0.00	0.62	0.00	0.00
Uniform Delay (d1), s/veh	45.1	20.7	20.7	20.9	17.3	17.3	21.4	26.5	26.5	21.6	20.0	20.0
Incremental Delay (d2), s/veh	4.6	8.0	8.2	0.2	0.2	0.4	0.2	8.7	9.5	3.0	0.5	0.6
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	49.8	28.7	28.9	21.2	17.5	17.7	21.5	35.2	36.0	24.6	20.6	20.6
Level of Service (LOS)	D	C	C	C	B	B	C	D	D	C	C	C
Approach Delay, s/veh / LOS	30.4	C		18.2	B		34.8	C			21.3	C
Intersection Delay, s/veh / LOS	28.0						C					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.8	C		2.8	C		2.9	C			3.2	C
Bicycle LOS Score / LOS	1.4	A		0.6	A		1.4	A			1.4	A

## HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 28, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	PM Pk Hr	PHF	0.92		
Intersection	Van Buren St/67th Avenue	Analysis Year	2020	Analysis Period	1> 7:00		
File Name	VB67 PM .xus						
Project Description	2015 No Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	70	147	38	123	594	383	38	703	42	84	569	50

Signal Information													
Cycle, s	100.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	5.7	0.4	46.5	3.4	1.9	26.1			
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.0	0.0	3.0	3.0	0.0	3.0			
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	0.0	1.0	1.0	0.0	1.0			

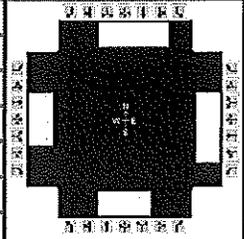
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	9.7	50.5	10.1	50.9	7.4	30.1	9.4	32.0
Change Period, (Y+R <sub>c</sub> ), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.0	3.1	3.0
Queue Clearance Time (g <sub>s</sub> ), s	6.3		6.0		3.7	23.1	5.7	17.8
Green Extension Time (g <sub>e</sub> ), s	0.1	0.0	0.2	0.0	0.0	2.9	0.1	3.0
Phase Call Probability	0.88		0.98		0.68	1.00	0.92	1.00
Max Out Probability	0.00		0.00		0.00	0.01	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	76	102	99	134	646	416	41	409	401	91	341	332
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1810	1683	1723	1810	1533	1723	1810	1773	1723	1810	1758
Queue Service Time (g <sub>s</sub> ), s	4.3	2.3	2.4	4.0	8.8	15.9	1.7	21.1	21.1	3.7	15.8	15.8
Cycle Queue Clearance Time (g <sub>c</sub> ), s	4.3	2.3	2.4	4.0	8.8	15.9	1.7	21.1	21.1	3.7	15.8	15.8
Capacity (c), veh/h	98	842	783	680	1698	719	221	472	462	196	507	492
Volume-to-Capacity Ratio (X)	0.778	0.121	0.127	0.197	0.380	0.579	0.187	0.867	0.868	0.465	0.673	0.675
Available Capacity (c <sub>a</sub> ), veh/h	631	842	783	1206	1698	719	438	844	827	380	879	854
Back of Queue (Q), veh/ln (95th percentile)	3.5	1.7	1.7	2.5	5.7	8.5	1.3	13.2	13.0	2.7	10.2	10.0
Overflow Queue (Q <sub>3</sub> ), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.45	0.00	0.00	0.33	0.00	0.00	0.16	0.00	0.00	0.35	0.00	0.00
Uniform Delay (d <sub>1</sub> ), s/veh	45.6	10.6	10.6	11.8	11.6	12.9	26.2	31.0	31.0	26.0	27.5	27.5
Incremental Delay (d <sub>2</sub> ), s/veh	4.9	0.3	0.3	0.1	0.6	3.4	0.2	1.9	2.0	0.6	0.6	0.6
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	50.5	10.9	10.9	11.8	12.2	16.3	26.3	32.9	33.0	26.7	28.1	28.1
Level of Service (LOS)	D	B	B	B	B	B	C	C	C	C	C	C
Approach Delay, s/veh / LOS	21.8	C		13.6	B		32.6	C		27.9	C	
Intersection Delay, s/veh / LOS	23.1						C					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.8	C		2.8	C		3.0	C		3.2	C	
Bicycle LOS Score / LOS	0.7	A		1.1	A		1.2	A		1.1	A	

## HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 28, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	AM Pk Hr	PHF	0.92		
Intersection	Van Buren St/59th Avenue	Analysis Year	2020	Analysis Period	1> 7:00		
File Name	VB59 AM .xus						
Project Description	2015 No Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	113	1143	55	28	117	50	27	533	108	303	529	65

Signal Information				Signal Phases													
Cycle, s	100.0	Reference Phase	2														
Offset, s	0	Reference Point	End	Green	2.9	3.0	39.9	2.8	7.9	23.6							
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.0	0.0	3.0	3.0	3.0	3.0							
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	0.0	1.0	1.0	1.0	1.0							

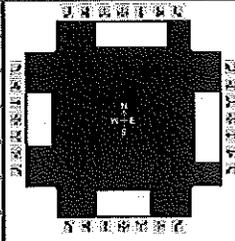
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	3.0
Phase Duration, s	9.9	46.9	6.9	43.9	6.8	27.6	18.7	39.5
Change Period, (Y+R <sub>c</sub> ), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g <sub>s</sub> ), s	5.9		3.0		3.3	20.6	14.2	13.3
Green Extension Time (g <sub>e</sub> ), s	0.2	0.0	0.0	0.0	0.0	3.0	0.5	3.0
Phase Call Probability	0.97		0.57		0.56	1.00	1.00	1.00
Max Out Probability	0.00		0.00		0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB			
	L	T	R	L	T	R	L	T	R	L	T	R	
Approach Movement													
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14	
Adjusted Flow Rate (v), veh/h	123	656	646	30	127	54	29	358	339	329	575	71	
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1810	1780	1723	1810	1533	1723	1810	1703	1723	1723	1610	
Queue Service Time (g <sub>s</sub> ), s	3.9	30.0	30.1	1.0	1.7	1.7	1.3	18.4	18.6	12.2	11.3	2.5	
Cycle Queue Clearance Time (g <sub>c</sub> ), s	3.9	30.0	30.1	1.0	1.7	1.7	1.3	18.4	18.6	12.2	11.3	2.5	
Capacity (c), veh/h	617	776	763	173	1443	611	299	426	401	362	1222	571	
Volume-to-Capacity Ratio (X)	0.199	0.845	0.847	0.176	0.088	0.089	0.098	0.840	0.844	0.911	0.471	0.124	
Available Capacity (c <sub>a</sub> ), veh/h	1200	776	763	809	1443	611	699	856	806	556	2040	953	
Back of Queue (Q), veh/ln (95th percentile)	2.5	17.9	17.8	0.7	1.3	1.2	0.9	11.9	11.4	8.9	7.3	1.6	
Overflow Queue (Q <sub>3</sub> ), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Queue Storage Ratio (RQ) (95th percentile)	0.33	0.00	0.00	0.09	0.00	0.00	0.12	0.00	0.00	0.92	0.00	0.00	
Uniform Delay (d <sub>1</sub> ), s/veh	13.5	18.7	18.7	20.5	14.5	14.5	27.3	32.5	32.6	21.2	20.0	17.7	
Incremental Delay (d <sub>2</sub> ), s/veh	0.1	10.9	11.2	0.2	0.1	0.3	0.1	1.7	1.9	10.1	0.1	0.0	
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh	13.5	29.6	29.9	20.6	14.6	14.8	27.4	34.3	34.5	31.3	20.1	17.7	
Level of Service (LOS)	B	C	C	C	B	B	C	C	C	C	C	B	
Approach Delay, s/veh / LOS	28.3	C		15.5	B		34.1	C			23.7	C	
Intersection Delay, s/veh / LOS	27.4						C						

Multimodal Results	EB			WB			NB			SB			
Pedestrian LOS Score / LOS	2.8	C		2.9	C		3.0	C			3.2	C	
Bicycle LOS Score / LOS	1.7	A		0.6	A		1.1	A			1.3	A	

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 28, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	PM Pk Hr	PHF	0.92		
Intersection	Van Buren St/59th Avenue	Analysis Year	2020	Analysis Period	1 > 7:00		
File Name	VB59 PM .xus						
Project Description	2015 No Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	77	158	14	97	909	293	54	690	42	67	517	105

Signal Information				Signal Timing Diagram															
Cycle, s	100.0	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	No	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
		Green		4.5	0.4	48.7	4.0	0.4	26.0										
		Yellow		3.0	0.0	3.0	3.0	0.0	3.0										
		Red		1.0	0.0	1.0	1.0	0.0	1.0										

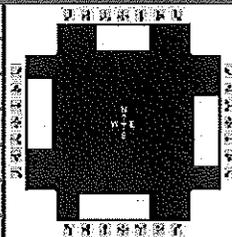
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	3.0
Phase Duration, s	8.5	52.7	8.9	53.1	8.0	30.0	8.5	30.4
Change Period, (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (qs), s	4.4		5.0		4.5	22.6	5.0	15.5
Green Extension Time (ge), s	0.1	0.0	0.2	0.0	0.1	3.3	0.1	3.3
Phase Call Probability	0.90		0.95		0.80	1.00	0.87	1.00
Max Out Probability	0.00		0.00		0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	84	94	93	105	909	398	59	402	394	73	562	114
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1810	1758	1723	1810	1582	1723	1810	1773	1723	1723	1610
Queue Service Time (qs), s	2.4	2.0	2.0	3.0	13.1	13.1	2.5	20.6	20.6	3.0	13.5	5.1
Cycle Queue Clearance Time (qc), s	2.4	2.0	2.0	3.0	13.1	13.1	2.5	20.6	20.6	3.0	13.5	5.1
Capacity (c), veh/h	296	880	855	697	1776	776	237	470	460	184	910	425
Volume-to-Capacity Ratio (X)	0.283	0.107	0.109	0.151	0.512	0.513	0.248	0.855	0.856	0.396	0.618	0.268
Available Capacity (ca), veh/h	1038	880	855	1432	1776	776	615	1041	1020	555	1997	934
Back of Queue (Q), veh/ln (95th percentile)	1.6	1.4	1.4	1.9	7.8	7.4	1.8	12.9	12.7	2.2	8.7	3.4
Overflow Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.20	0.00	0.00	0.25	0.00	0.00	0.23	0.00	0.00	0.23	0.00	0.00
Uniform Delay (d1), s/veh	12.3	9.4	9.4	11.1	11.1	11.1	25.9	30.9	31.0	27.0	28.2	25.5
Incremental Delay (d2), s/veh	0.2	0.2	0.3	0.0	1.1	2.4	0.2	1.8	1.8	0.5	0.3	0.1
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	12.5	9.6	9.6	11.2	12.1	13.5	26.1	32.7	32.8	27.5	28.5	25.6
Level of Service (LOS)	B	A	A	B	B	B	C	C	C	C	C	C
Approach Delay, s/veh / LOS	10.5		B	12.4		B	32.3		C	27.9		C
Intersection Delay, s/veh / LOS	21.0						C					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.8		C	2.9		C	3.0		C	3.2		C
Bicycle LOS Score / LOS	0.7		A	1.3		A	1.2		A	1.1		A

## HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 28, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	AM Pk Hr	PHF	0.92		
Intersection	Van Buren St/51st Avenue	Analysis Year	2020	Analysis Period	1> 7:00		
File Name	VB51 AM .xus						
Project Description	2015 No Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	74	380	5	10	1658	381	34	822	16	143	1454	251

Signal Information				Signal Timing (s)						Signal Phases				
Cycle, s	100.0	Reference Phase	2	Green	1.3	3.3	27.4	3.2	3.2	45.5	Left	Thru	Right	Left
Offset, s	0	Reference Point	End	Yellow	3.0	0.0	3.0	3.0	0.0	3.0	Left	Thru	Right	Left
Uncoordinated	No	Simult. Gap E/W	On	Red	1.0	0.0	1.0	1.0	0.0	1.0	Left	Thru	Right	Left
Force Mode	Fixed	Simult. Gap N/S	On											

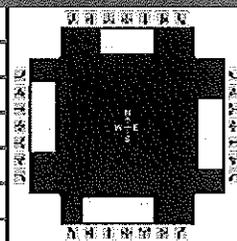
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	8.6	34.7	5.3	31.4	7.2	49.5	10.4	52.8
Change Period, (Y+R <sub>c</sub> ), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g <sub>s</sub> ), s	5.1		2.5		3.1	10.5	6.4	50.8
Green Extension Time (g <sub>e</sub> ), s	0.1	0.0	0.0	0.0	0.0	8.7	0.2	0.0
Phase Call Probability	0.89		0.26		0.64	1.00	0.99	1.00
Max Out Probability	0.00		0.00		0.00	0.09	0.00	1.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	80	413	5	11	1482	690	37	609	302	155	910	900
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1723	1610	1723	1810	1650	1723	1810	1791	1723	1810	1730
Queue Service Time (g <sub>s</sub> ), s	3.1	8.4	0.2	0.5	27.4	27.4	1.1	8.5	8.5	4.4	48.8	48.8
Cycle Queue Clearance Time (g <sub>c</sub> ), s	3.1	8.4	0.2	0.5	27.4	27.4	1.1	8.5	8.5	4.4	48.8	48.8
Capacity (c), veh/h	152	1058	494	304	991	452	132	1648	816	402	883	844
Volume-to-Capacity Ratio (X)	0.530	0.390	0.011	0.036	1.495	1.527	0.279	0.370	0.370	0.387	1.031	1.066
Available Capacity (c <sub>a</sub> ), veh/h	348	1058	494	557	991	452	353	1648	816	567	883	844
Back of Queue (Q), veh/ln (95th percentile)	2.2	6.0	0.1	0.3	64.2	63.0	0.8	5.4	5.4	2.7	32.3	35.1
Overflow Queue (Q <sub>3</sub> ), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.29	0.00	0.00	0.04	0.00	0.00	0.10	0.00	0.00	0.35	0.00	0.00
Uniform Delay (d <sub>1</sub> ), s/veh	25.8	22.9	20.5	25.6	31.7	31.7	23.4	12.4	12.4	11.3	17.5	17.5
Incremental Delay (d <sub>2</sub> ), s/veh	1.1	1.1	0.0	0.0	228.2	248.4	0.4	0.1	0.1	0.2	38.6	50.1
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	26.8	24.0	20.6	25.6	260.0	280.1	23.8	12.4	12.5	11.5	56.1	67.6
Level of Service (LOS)	C	C	C	C	F	F	C	B	B	B	F	F
Approach Delay, s/veh / LOS	24.4	C		265.2	F		12.9	B		57.8	E	
Intersection Delay, s/veh / LOS	128.2						F					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	3.0	C		3.2	C		3.0	C		3.2	C	
Bicycle LOS Score / LOS	0.9	A		1.7	A		1.0	A		2.1	B	

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 28, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	PM Pk Hr	PHF	0.92		
Intersection	Van Buren St/51st Avenue	Analysis Year	2020	Analysis Period	1> 7:00		
File Name	VB51 PM .xus						
Project Description	2015 No Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	323	1596	10	10	344	238	7	1313	102	190	1025	126

Signal Information				Signal Timing (s)								Signal Phases										
Cycle, s	100.0	Reference Phase	2	Green	1.3	8.9	26.9	1.0	3.8	34.1	Yellow	3.0	3.0	3.0	3.0	Red	1.0	1.0	1.0	1.0	1.0	1.0
Offset, s	0	Reference Point	End																			
Uncoordinated	No	Simult. Gap E/W	On																			
Force Mode	Fixed	Simult. Gap N/S	On																			

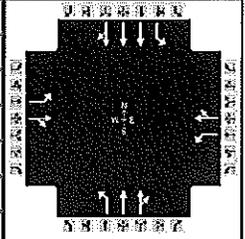
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	18.2	43.8	5.3	30.9	5.0	38.1	12.7	45.9
Change Period, (Y+R <sub>c</sub> ), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (q <sub>s</sub> ), s	13.6		2.5		2.3	27.3	8.5	29.8
Green Extension Time (g <sub>e</sub> ), s	0.6	0.0	0.0	0.0	0.0	6.8	0.2	7.6
Phase Call Probability	1.00		0.26		0.19	1.00	1.00	1.00
Max Out Probability	0.00		0.00		0.00	0.35	0.01	0.23

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	351	1735	11	11	374	215	8	1039	499	207	618	600
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1723	1610	1723	1810	1533	1723	1810	1740	1723	1810	1755
Queue Service Time (q <sub>s</sub> ), s	11.6	39.8	0.3	0.5	7.7	11.1	0.3	25.3	25.3	6.5	27.7	27.8
Cycle Queue Clearance Time (q <sub>c</sub> ), s	11.6	39.8	0.3	0.5	7.7	11.1	0.3	25.3	25.3	6.5	27.7	27.8
Capacity (c), veh/h	443	1372	641	100	975	413	151	1236	594	251	759	736
Volume-to-Capacity Ratio (X)	0.792	1.264	0.017	0.109	0.383	0.521	0.050	0.841	0.841	0.822	0.815	0.816
Available Capacity (c <sub>a</sub> ), veh/h	632	1372	641	510	975	413	410	1566	753	376	924	896
Back of Queue (Q), veh/ln (95th percentile)	7.3	54.3	0.2	0.3	5.9	7.6	0.2	14.8	15.0	4.7	15.2	14.9
Overflow Queue (Q <sub>3</sub> ), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.95	0.00	0.00	0.04	0.00	0.00	0.03	0.00	0.00	0.61	0.00	0.00
Uniform Delay (d <sub>1</sub> ), s/veh	17.0	23.5	14.2	29.0	25.9	26.9	23.1	24.8	24.8	21.1	18.9	18.9
Incremental Delay (d <sub>2</sub> ), s/veh	2.7	124.9	0.0	0.2	1.1	4.6	0.1	2.8	5.6	5.3	3.9	4.1
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	19.7	148.4	14.2	29.2	27.0	31.6	23.2	27.7	30.5	26.3	22.8	23.0
Level of Service (LOS)	B	F	B	C	C	C	C	C	C	C	C	C
Approach Delay, s/veh / LOS	126.1	F		28.7	C		28.5	C		23.4	C	
Intersection Delay, s/veh / LOS	63.4						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	3.2	C	3.0	C	3.3	C
Bicycle LOS Score / LOS	2.2	B	0.8	A	1.3	A	1.7	A

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 28, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	AM Pk Hr	PHF	0.92		
Intersection	59th Avenue/Roosevelt St	Analysis Year	2020	Analysis Period	1> 7:00		
File Name	59 Roo AM .xus						
Project Description	2015 No Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	127	73	79	143	20	176	3	579	84	109	1142	91

Signal Information				Signal Diagrams																
Cycle, s	100.0	Reference Phase	2																	
Offset, s	0	Reference Point	End																	
Uncoordinated	No	Simult. Gap E/W	On																	
Force Mode	Fixed	Simult. Gap N/S	On																	
		Green		6.3	0.6	45.2	0.4	1.9	25.6											
		Yellow		3.0	0.0	3.0	3.0	3.0	3.0											
		Red		1.0	0.0	1.0	1.0	1.0	1.0											

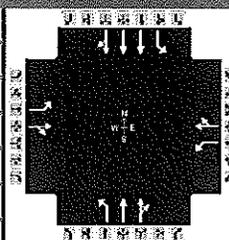
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.3	49.2	10.9	49.7	4.4	29.6	10.3	35.5
Change Period, (Y+R <sub>c</sub> ), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g <sub>s</sub> ), s	6.2		6.7		2.1	20.4	6.5	23.8
Green Extension Time (g <sub>e</sub> ), s	0.2	0.0	0.3	0.0	0.0	5.2	0.1	5.2
Phase Call Probability	0.98		0.99		0.09	1.00	0.96	1.00
Max Out Probability	0.00		0.00		0.00	0.04	0.00	0.03

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	138	165		155	213		3	368	353	118	905	435
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1655		1723	1558		1723	1810	1729	1723	1810	1738
Queue Service Time (g <sub>s</sub> ), s	4.2	6.1		4.7	8.6		0.1	18.4	18.4	4.5	21.8	21.8
Cycle Queue Clearance Time (g <sub>c</sub> ), s	4.2	6.1		4.7	8.6		0.1	18.4	18.4	4.5	21.8	21.8
Capacity (c), veh/h	600	747		191	712		118	464	443	232	1141	548
Volume-to-Capacity Ratio (X)	0.230	0.221		0.815	0.299		0.028	0.793	0.796	0.511	0.794	0.794
Available Capacity (c <sub>a</sub> ), veh/h	1113	747		693	712		386	827	790	399	1866	896
Back of Queue (Q), veh/ln (95th percentile)	2.8	4.3		3.4	5.7		0.1	11.7	11.3	3.1	12.9	12.6
Overflow Queue (Q <sub>3</sub> ), veh/ln	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.37	0.00		0.44	0.00		0.01	0.00	0.00	0.40	0.00	0.00
Uniform Delay (d <sub>1</sub> ), s/veh	13.2	16.7		22.8	17.1		28.6	30.5	30.5	23.0	26.2	26.2
Incremental Delay (d <sub>2</sub> ), s/veh	0.1	0.7		3.2	1.1		0.0	1.2	1.3	0.6	0.5	1.0
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	13.2	17.4		26.0	18.1		28.6	31.7	31.8	23.7	26.6	27.2
Level of Service (LOS)	B	B		C	B		C	C	C	C	C	C
Approach Delay, s/veh / LOS	15.5	B		21.5	C		31.7	C		26.6	C	
Intersection Delay, s/veh / LOS	26.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.2	C	2.9	C	2.3	B	2.3	B
Bicycle LOS Score / LOS	1.0	A	1.1	A	1.1	A	1.3	A

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	TASK Engineering			Duration, h	0.25
Analyst	Ken Howell	Analysis Date	Dec 28, 2012	Area Type	Other
Jurisdiction	City of Phoenix	Time Period	PM Pk Hr	PHF	0.92
Intersection	59th Avenue/Roosevelt St	Analysis Year	2020	Analysis Period	1> 7:00
File Name	59 Roo PM .xus				
Project Description	2015 No Build				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	53	73	5	31	45	196	6	939	157	154	1017	118

Signal Information				Signal Phases																		
Cycle, s	100.0	Reference Phase	2																			
Offset, s	0	Reference Point	End																			
Uncoordinated	No	Simult. Gap E/W	On																			
Force Mode	Fixed	Simult. Gap N/S	On																			
		Green		3.0	1.0	35.1	0.8	2.4	37.8													
		Yellow		3.0	0.0	3.0	3.0	3.0	3.0													
		Red		1.0	0.0	1.0	1.0	1.0	1.0													

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	8.0	40.0	7.0	39.1	4.8	41.8	11.2	48.1
Change Period, (Y+R <sub>c</sub> ), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g <sub>s</sub> ), s	4.1		3.2		2.2	32.6	7.1	15.8
Green Extension Time (g <sub>e</sub> ), s	0.1	0.0	0.0	0.0	0.0	5.2	0.2	6.8
Phase Call Probability	0.80		0.61		0.17	1.00	0.99	1.00
Max Out Probability	0.00		0.00		0.00	0.38	0.00	0.03

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	58	85		34	262		7	610	581	167	837	396
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1789		1723	1578		1723	1810	1719	1723	1810	1710
Queue Service Time (g <sub>s</sub> ), s	2.1	3.2		1.2	12.9		0.2	30.4	30.6	5.1	13.8	13.8
Cycle Queue Clearance Time (g <sub>c</sub> ), s	2.1	3.2		1.2	12.9		0.2	30.4	30.6	5.1	13.8	13.8
Capacity (c), veh/h	380	644		150	553		219	683	649	229	1597	754
Volume-to-Capacity Ratio (X)	0.152	0.132		0.225	0.473		0.030	0.893	0.895	0.732	0.525	0.525
Available Capacity (c <sub>a</sub> ), veh/h	709	644		495	553		480	811	770	380	1852	875
Back of Queue (Q), veh/ln (95th percentile)	1.5	2.5		0.9	8.9		0.2	18.4	17.8	3.4	8.2	7.9
Overflow Queue (Q <sub>o</sub> ), veh/ln	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.19	0.00		0.12	0.00		0.02	0.00	0.00	0.44	0.00	0.00
Uniform Delay (d <sub>1</sub> ), s/veh	19.6	21.5		25.2	25.3		19.2	23.0	23.0	21.4	14.3	14.3
Incremental Delay (d <sub>2</sub> ), s/veh	0.1	0.4		0.3	2.9		0.0	10.0	10.6	1.7	0.1	0.2
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	19.7	21.9		25.4	28.2		19.2	33.0	33.7	23.1	14.4	14.6
Level of Service (LOS)	B	C		C	C		B	C	C	C	B	B
Approach Delay, s/veh / LOS	21.0	C		27.9	C		33.2	C		15.5	B	
Intersection Delay, s/veh / LOS	24.0						C					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	3.2	C		2.9	C		2.3	B		2.3	B	
Bicycle LOS Score / LOS	0.7	A		1.0	A		1.5	A		1.3	A	

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>59th Avenue/Fillmore Street</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/31/2012</i>	Analysis Year	<i>2015</i>
Analysis Time Period	<i>PM Pk Hr</i>		

Project Description <i>2015 No Build</i>	
East/West Street: <i>Fillmore Street</i>	North/South Street: <i>59th Avenue</i>
Intersection Orientation: <i>North-South</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound			
	Movement	1	2	3	4	5	6
		L	T	R	L	T	R
Volume (veh/h)		36	980			686	30
Peak-Hour Factor, PHF		0.92	0.92	1.00	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)		39	1065	0	0	745	32
Percent Heavy Vehicles		5	--	--	0	--	--
Median Type	<i>Two Way Left Turn Lane</i>						
RT Channelized				0			0
Lanes		1	2	0	0	2	1
Configuration		L	T			T	R
Upstream Signal			0			0	

Minor Street	Eastbound			Westbound			
	Movement	7	8	9	10	11	12
		L	T	R	L	T	R
Volume (veh/h)		32		2			
Peak-Hour Factor, PHF		0.92	1.00	0.92	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)		34	0	2	0	0	0
Percent Heavy Vehicles		5	0	5	0	0	0
Percent Grade (%)		0			0		
Flared Approach			N			N	
Storage			0			0	
RT Channelized				0			0
Lanes		0	0	0	0	0	0
Configuration			LR				

### Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
	1	4	7	8	9	10	11	12
Movement								
Lane Configuration	L						LR	
v (veh/h)	39						36	
C (m) (veh/h)	816						272	
v/c	0.05						0.13	
95% queue length	0.15						0.45	
Control Delay (s/veh)	9.6						20.2	
LOS	A						C	
Approach Delay (s/veh)	--	--					20.2	
Approach LOS	--	--					C	

## TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information					
Analyst	<i>kmh</i>	Intersection	<i>59th Avenue/Fillmore Street</i>					
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>					
Date Performed	<i>12/28/2012</i>	Analysis Year	<i>2015</i>					
Analysis Time Period	<i>AM PK Hr</i>							
Project Description <i>2015 No Build</i>								
East/West Street: <i>Fillmore Street</i>			North/South Street: <i>59th Avenue</i>					
Intersection Orientation: <i>North-South</i>			Study Period (hrs): <i>0.25</i>					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	<i>12</i>	<i>659</i>			<i>834</i>	<i>22</i>		
Peak-Hour Factor, PHF	<i>0.92</i>	<i>0.92</i>	<i>1.00</i>	<i>1.00</i>	<i>0.92</i>	<i>0.92</i>		
Hourly Flow Rate, HFR (veh/h)	<i>13</i>	<i>716</i>	<i>0</i>	<i>0</i>	<i>906</i>	<i>23</i>		
Percent Heavy Vehicles	<i>5</i>	<i>--</i>	<i>--</i>	<i>0</i>	<i>--</i>	<i>--</i>		
Median Type	<i>Undivided</i>							
RT Channelized			<i>0</i>			<i>0</i>		
Lanes	<i>1</i>	<i>2</i>	<i>0</i>	<i>0</i>	<i>2</i>	<i>1</i>		
Configuration	<i>L</i>	<i>T</i>			<i>T</i>	<i>R</i>		
Upstream Signal		<i>0</i>			<i>0</i>			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	<i>24</i>		<i>36</i>					
Peak-Hour Factor, PHF	<i>0.92</i>	<i>1.00</i>	<i>0.92</i>	<i>1.00</i>	<i>1.00</i>	<i>1.00</i>		
Hourly Flow Rate, HFR (veh/h)	<i>26</i>	<i>0</i>	<i>39</i>	<i>0</i>	<i>0</i>	<i>0</i>		
Percent Heavy Vehicles	<i>5</i>	<i>0</i>	<i>5</i>	<i>0</i>	<i>0</i>	<i>0</i>		
Percent Grade (%)	<i>0</i>			<i>0</i>				
Flared Approach		<i>N</i>			<i>N</i>			
Storage		<i>0</i>			<i>0</i>			
RT Channelized			<i>0</i>			<i>0</i>		
Lanes	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>		
Configuration		<i>LR</i>						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	<i>L</i>						<i>LR</i>	
v (veh/h)	<i>13</i>						<i>65</i>	
C (m) (veh/h)	<i>714</i>						<i>270</i>	
v/c	<i>0.02</i>						<i>0.24</i>	
95% queue length	<i>0.06</i>						<i>0.92</i>	
Control Delay (s/veh)	<i>10.1</i>						<i>22.5</i>	
LOS	<i>B</i>						<i>C</i>	
Approach Delay (s/veh)	<i>--</i>	<i>--</i>					<i>22.5</i>	
Approach LOS	<i>--</i>	<i>--</i>					<i>C</i>	

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	kmh	Intersection	Van Buren Street/61st Avenue
Agency/Co.	TASK	Jurisdiction	City of Phoenix
Date Performed	1/1/2013	Analysis Year	2015
Analysis Time Period	AM Pk Hr		

Project Description 2015 No Build	
East/West Street: Van Buren Street	North/South Street: 61st Avenue
Intersection Orientation: East-West	Study Period (hrs): 0.25

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
	Movement	1	2	3	4	5
	L	T	R	L	T	R
Volume (veh/h)		1284	47	1	218	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	1.00
Hourly Flow Rate, HFR (veh/h)	0	1395	51	1	236	0
Percent Heavy Vehicles	5	--	--	5	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	0	2	0	1	2	0
Configuration		T	TR	L	T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
	Movement	7	8	9	10	11
	L	T	R	L	T	R
Volume (veh/h)	5		15			
Peak-Hour Factor, PHF	0.92	0.92	0.92	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	5	0	16	0	0	0
Percent Heavy Vehicles	5	5	5	0	5	5
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
	1	4	7	8	9	10	11	12
Movement		L		LR				
Lane Configuration		L		LR				
v (veh/h)		1		21				
C (m) (veh/h)		450		302				
v/c		0.00		0.07				
95% queue length		0.01		0.22				
Control Delay (s/veh)		13.0		17.8				
LOS		B		C				
Approach Delay (s/veh)	--	--		17.8				
Approach LOS	--	--		C				

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	kmh	Intersection	Van Buren Street/61st Avenue
Agency/Co.	TASK	Jurisdiction	City of Phoenix
Date Performed	1/1/2013	Analysis Year	2015
Analysis Time Period	PM Pk Hr		

Project Description 2015 No Build	
East/West Street: Van Buren Street	North/South Street: 61st Avenue
Intersection Orientation: East-West	Study Period (hrs): 0.25

### Vehicle Volumes and Adjustments

Major Street Movement	Eastbound			Westbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume (veh/h)		248	10	41	1045	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	1.00
Hourly Flow Rate, HFR (veh/h)	0	269	10	44	1135	0
Percent Heavy Vehicles	5	--	--	5	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	0	2	0	1	2	0
Configuration		T	TR	L	T	
Upstream Signal		0			0	

Minor Street Movement	Northbound			Southbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume (veh/h)	12		13			
Peak-Hour Factor, PHF	0.92	0.92	0.92	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	13	0	14	0	0	0
Percent Heavy Vehicles	5	5	5	0	5	5
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
			7	8	9	10	11	12
Movement	1	4						
Lane Configuration		L		LR				
v (veh/h)		44		27				
C (m) (veh/h)		1259		523				
v/c		0.03		0.05				
95% queue length		0.11		0.16				
Control Delay (s/veh)		8.0		12.3				
LOS		A		B				
Approach Delay (s/veh)	--	--	12.3					
Approach LOS	--	--	B					

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	kmh	Intersection	Van Buren Street/63rd Avenue
Agency/Co.	TASK	Jurisdiction	City of Phoenix
Date Performed	1/1/2013	Analysis Year	2015
Analysis Time Period	AM Pk Hr		

Project Description 2015 No Build	
East/West Street: Van Buren Street	North/South Street: 63rd Avenue
Intersection Orientation: East-West	Study Period (hrs): 0.25

### Vehicle Volumes and Adjustments

Major Street Movement	Eastbound			Westbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume (veh/h)		1317	48	5	235	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	1.00
Hourly Flow Rate, HFR (veh/h)	0	1431	52	5	255	0
Percent Heavy Vehicles	5	--	--	5	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	0	2	0	1	2	0
Configuration		T	TR	L	T	
Upstream Signal		0			0	

Minor Street Movement	Northbound			Southbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume (veh/h)	6		14			
Peak-Hour Factor, PHF	0.92	0.92	0.92	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	6	0	15	0	0	0
Percent Heavy Vehicles	5	5	5	0	5	5
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
			7	8	9	10	11	12
Movement	1	4						
Lane Configuration		L		LR				
v (veh/h)		5		21				
C (m) (veh/h)		435		276				
v/c		0.01		0.08				
95% queue length		0.03		0.25				
Control Delay (s/veh)		13.4		19.1				
LOS		B		C				
Approach Delay (s/veh)	--	--		19.1				
Approach LOS	--	--		C				

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	kmh	Intersection	Van Buren Street/63rd Avenue
Agency/Co.	TASK	Jurisdiction	City of Phoenix
Date Performed	1/1/2013	Analysis Year	2015
Analysis Time Period	PM Pk Hr		

Project Description 2015 No Build	
East/West Street: Van Buren Street	North/South Street: 63rd Avenue
Intersection Orientation: East-West	Study Period (hrs): 0.25

### Vehicle Volumes and Adjustments

Major Street Movement	Eastbound			Westbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume (veh/h)		263	10	41	1060	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	1.00
Hourly Flow Rate, HFR (veh/h)	0	285	10	44	1152	0
Percent Heavy Vehicles	5	--	--	5	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	0	2	0	1	2	0
Configuration		T	TR	L	T	
Upstream Signal		0			0	

Minor Street Movement	Northbound			Southbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume (veh/h)	12		12			
Peak-Hour Factor, PHF	0.92	0.92	0.92	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	13	0	13	0	0	0
Percent Heavy Vehicles	5	5	5	0	5	5
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

### Delay, Queue Length, and Level of Service

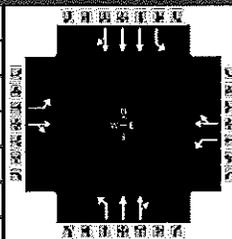
Approach	Eastbound	Westbound	Northbound			Southbound		
			7	8	9	10	11	12
Movement	1	4						
Lane Configuration		L		LR				
v (veh/h)		44		26				
C (m) (veh/h)		1242		505				
v/c		0.04		0.05				
95% queue length		0.11		0.16				
Control Delay (s/veh)		8.0		12.5				
LOS		A		B				
Approach Delay (s/veh)	--	--	12.5					
Approach LOS	--	--	B					

## **APPENDIX A**

### **2030 NO BUILD**

## HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 30, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	AM Pk Hr	PHF	0.92		
Intersection	59th Avenue/Roosevelt St	Analysis Year	2030	Analysis Period	1> 7:00		
File Name	59 Roo AM .xus						
Project Description	2030 No Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	154	76	94	68	28	88	74	1352	106	91	891	16

Signal Information				Signal Timing (s)													
Cycle, s	100.0	Reference Phase	2	Green	4.6	0.1	24.3	4.5	0.3	46.3	Yellow	3.0	3.0	3.0	3.0	3.0	3.0
Offset, s	0	Reference Point	End	Red	1.0	1.0	1.0	1.0	0.0	1.0	Simult. Gap E/W	On	On	On	On	On	On
Uncoordinated	No	Simult. Gap N/S	On	Force Mode	Fixed	Simult. Gap N/S	On	Signal Diagrams									

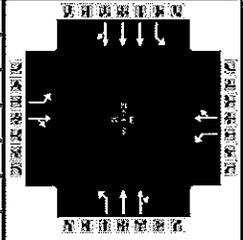
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	12.7	32.4	8.6	28.3	8.5	50.3	8.8	50.6
Change Period, (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.0	3.1	3.0
Queue Clearance Time (qs), s	8.6		5.2		4.4	44.1	5.0	11.1
Green Extension Time (ge), s	0.2	0.0	0.1	0.0	0.1	2.1	0.1	7.5
Phase Call Probability	0.99		0.87		0.89	1.00	0.94	1.00
Max Out Probability	0.00		0.00		0.00	0.99	0.00	0.05

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	167	185		74	126		80	799	786	99	659	327
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1646		1723	1592		1723	1810	1763	1723	1810	1792
Queue Service Time (gs), s	6.6	9.1		3.2	6.5		2.4	41.1	42.1	3.0	9.1	9.1
Cycle Queue Clearance Time (gc), s	6.6	9.1		3.2	6.5		2.4	41.1	42.1	3.0	9.1	9.1
Capacity (c), veh/h	439	467		375	387		356	837	816	167	1685	834
Volume-to-Capacity Ratio (X)	0.381	0.395		0.197	0.325		0.226	0.954	0.964	0.593	0.391	0.392
Available Capacity (ca), veh/h	583	467		589	387		554	855	833	361	1720	852
Back of Queue (Q), veh/ln (95th percentile)	4.6	6.9		2.3	4.8		1.6	24.1	24.5	2.0	5.7	5.7
Overflow Queue (Qo), veh/ln	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.80	0.00		0.40	0.00		0.28	0.00	0.00	0.35	0.00	0.00
Uniform Delay (d1), s/veh	21.5	28.9		26.5	31.1		13.0	18.2	18.4	22.8	11.9	11.9
Incremental Delay (d2), s/veh	0.2	2.5		0.1	2.2		0.1	19.9	22.2	1.3	0.1	0.1
Initial Queue Delay (d3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	21.7	31.4		26.6	33.3		13.1	38.1	40.6	24.0	11.9	12.0
Level of Service (LOS)	C	C		C	C		B	D	D	C	B	B
Approach Delay, s/veh / LOS	26.8	C		30.8	C		38.1	D		13.0	B	
Intersection Delay, s/veh / LOS	28.2						C					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	3.2	C		3.0	C		2.3	B		2.3	B	
Bicycle LOS Score / LOS	1.1	A		0.8	A		1.9	A		1.1	A	

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	TASK Engineering			Duration, h	0.25
Analyst	Ken Howell	Analysis Date	Jan 28, 2013	Area Type	Other
Jurisdiction	City of Phoenix	Time Period	PM Pk Hr	PHF	0.92
Intersection	59th Avenue/Roosevelt St	Analysis Year	2030	Analysis Period	1 > 7:00
File Name	59 Roo PM .xus				
Project Description	2030 No Build				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	44	33	58	148	45	121	67	1014	75	87	1537	63

Signal Information				Signal Timing (s)									
Cycle, s	100.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	3.7	4.0	33.0	4.3	0.6	38.4			
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.0	0.0	3.0	3.0	0.0	3.0			
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	0.0	1.0	1.0	0.0	1.0			

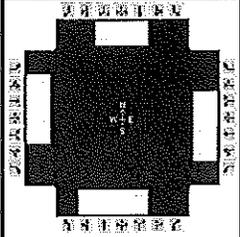
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	7.7	37.0	11.6	41.0	8.3	42.4	9.0	43.0
Change Period, (Y+R <sub>c</sub> ), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.0	3.1	3.0
Queue Clearance Time (g <sub>s</sub> ), s	3.8		7.5		4.5	31.0	5.3	29.2
Green Extension Time (g <sub>e</sub> ), s	0.1	0.0	0.2	0.0	0.1	7.4	0.1	7.8
Phase Call Probability	0.74		0.99		0.87	1.00	0.93	1.00
Max Out Probability	0.00		0.00		0.00	0.39	0.00	0.33

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	48	99		161	180		73	599	585	95	1167	572
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1623		1723	1600		1723	1810	1765	1723	1810	1771
Queue Service Time (g <sub>s</sub> ), s	1.8	4.3		5.5	8.0		2.5	28.9	29.0	3.3	27.2	27.2
Cycle Queue Clearance Time (g <sub>c</sub> ), s	1.8	4.3		5.5	8.0		2.5	28.9	29.0	3.3	27.2	27.2
Capacity (c), veh/h	473	536		563	592		178	694	677	200	1411	691
Volume-to-Capacity Ratio (X)	0.101	0.185		0.286	0.305		0.408	0.863	0.864	0.472	0.827	0.828
Available Capacity (c <sub>a</sub> ), veh/h	835	536		857	592		379	851	830	391	1725	844
Back of Queue (Q), veh/ln (95th percentile)	1.3	3.1		3.8	5.7		1.8	16.9	16.7	2.3	15.0	15.4
Overflow Queue (Q <sub>3</sub> ), veh/ln	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.17	0.00		0.49	0.00		0.23	0.00	0.00	0.29	0.00	0.00
Uniform Delay (d <sub>1</sub> ), s/veh	20.7	23.9		16.3	22.4		21.6	22.1	22.1	21.7	21.2	21.2
Incremental Delay (d <sub>2</sub> ), s/veh	0.0	0.8		0.1	1.3		0.6	6.7	6.9	0.6	2.4	4.8
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	20.7	24.6		16.4	23.7		22.2	28.8	29.0	22.4	23.6	26.0
Level of Service (LOS)	C	C		B	C		C	C	C	C	C	C
Approach Delay, s/veh / LOS	23.4	C		20.3	C		28.5	C		24.3	C	
Intersection Delay, s/veh / LOS	25.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.2	C	2.9	C	2.3	B	2.3	B
Bicycle LOS Score / LOS	0.7	A	1.1	A	1.5	A	1.5	A

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 30, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	AM PK Hr	PHF	0.92		
Intersection	Van Buren St/51st Avenue	Analysis Year	2030	Analysis Period	1 > 7:00		
File Name	VB51 AM .xus						
Project Description	2030 No Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	78	1339	134	54	928	139	5	926	146	76	685	51

Signal Information				Signal Timing (s)						Signal Phases						
Cycle, s	100.0	Reference Phase	2	Green	4.0	0.5	48.0	0.7	4.0	26.7	Yellow	3.0	0.0	3.0	3.0	3.0
Offset, s	0	Reference Point	End	Uncoordinated	No	Simult. Gap E/W	On	Force Mode	Fixed	Simult. Gap N/S	On					
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	0.0	1.0	1.0	0.0	1.0						

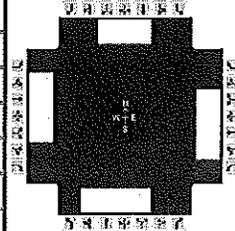
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	8.5	52.6	8.0	52.0	4.7	30.7	8.7	34.7
Change Period, (Y+R <sub>c</sub> ), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g <sub>s</sub> ), s	4.4		3.7		2.2	22.1	5.2	19.2
Green Extension Time (g <sub>e</sub> ), s	0.1	0.0	0.1	0.0	0.0	4.6	0.1	4.7
Phase Call Probability	0.91		0.80		0.14	1.00	0.90	1.00
Max Out Probability	0.00		0.00		0.00	0.03	0.00	0.01

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	85	1455	146	59	756	360	5	795	370	83	379	377
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1723	1610	1723	1810	1717	1723	1810	1680	1723	1810	1799
Queue Service Time (g <sub>s</sub> ), s	2.4	34.1	3.6	1.7	10.4	10.5	0.2	20.0	20.1	3.2	17.2	17.2
Cycle Queue Clearance Time (g <sub>c</sub> ), s	2.4	34.1	3.6	1.7	10.4	10.5	0.2	20.0	20.1	3.2	17.2	17.2
Capacity (c), veh/h	333	1673	782	186	1739	825	177	967	449	184	556	553
Volume-to-Capacity Ratio (X)	0.254	0.870	0.186	0.316	0.435	0.436	0.031	0.822	0.824	0.449	0.682	0.682
Available Capacity (c <sub>a</sub> ), veh/h	886	1673	782	747	1739	825	440	1712	795	379	928	923
Back of Queue (Q), veh/ln (95th percentile)	1.6	16.3	2.3	1.1	6.6	6.6	0.2	12.4	11.8	2.2	10.7	10.7
Overflow Queue (Q <sub>3</sub> ), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.21	0.00	0.00	0.15	0.00	0.00	0.02	0.00	0.00	0.29	0.00	0.00
Uniform Delay (d <sub>1</sub> ), s/veh	12.1	15.1	9.7	18.6	11.2	11.2	27.2	30.0	30.0	24.3	25.5	25.5
Incremental Delay (d <sub>2</sub> ), s/veh	0.1	6.5	0.5	0.4	0.8	1.7	0.0	0.7	1.5	0.6	0.6	0.6
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	12.3	21.6	10.2	19.0	12.0	12.9	27.3	30.7	31.5	24.9	26.1	26.1
Level of Service (LOS)	B	C	B	B	B	B	C	C	C	C	C	C
Approach Delay, s/veh / LOS	20.1	C		12.6	B		30.9	C		26.0	C	
Intersection Delay, s/veh / LOS	21.9						C					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.9	C		3.2	C		3.0	C		3.3	C	
Bicycle LOS Score / LOS	1.9	A		1.1	A		1.1	A		1.2	A	

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 30, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	PM Pk Hr	PHF	0.92		
Intersection	Van Buren St/51st Avenue	Analysis Year	2030	Analysis Period	1> 7:00		
File Name	VB51 PM .xus						
Project Description	2030 No Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	49	996	67	70	1555	184	33	637	111	107	1071	134

Signal Information				Signal Phases											
Cycle, s	100.0	Reference Phase	2												
Offset, s	0	Reference Point	End	Green	3.9	0.5	37.1	3.2	2.7	36.7					
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.0	0.0	3.0	3.0	0.0	3.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	0.0	1.0	1.0	0.0	1.0					

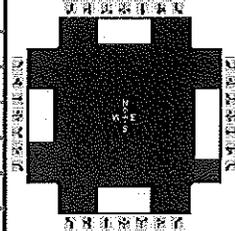
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	7.9	41.1	8.4	41.7	7.2	40.7	9.8	43.3
Change Period, (Y+R <sub>c</sub> ), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g <sub>s</sub> ), s	3.9		4.7		3.3	12.0	5.9	34.8
Green Extension Time (g <sub>e</sub> ), s	0.1	0.0	0.1	0.0	0.0	5.3	0.1	4.6
Phase Call Probability	0.77		0.88		0.63	1.00	0.96	1.00
Max Out Probability	0.00		0.00		0.00	0.01	0.00	0.22

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	53	1083	73	76	1249	598	36	554	259	116	648	629
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1723	1610	1723	1810	1728	1723	1810	1670	1723	1810	1753
Queue Service Time (g <sub>s</sub> ), s	1.9	27.3	2.4	2.7	31.8	32.0	1.3	9.8	10.0	3.9	32.6	32.8
Cycle Queue Clearance Time (g <sub>c</sub> ), s	1.9	27.3	2.4	2.7	31.8	32.0	1.3	9.8	10.0	3.9	32.6	32.8
Capacity (c), veh/h	152	1279	598	194	1363	651	154	1327	612	345	712	689
Volume-to-Capacity Ratio (X)	0.350	0.846	0.122	0.393	0.916	0.919	0.233	0.417	0.424	0.337	0.910	0.913
Available Capacity (c <sub>a</sub> ), veh/h	525	1279	598	558	1363	651	375	1671	771	521	884	856
Back of Queue (Q), veh/ln (95th percentile)	1.3	15.8	1.7	1.9	19.3	20.6	0.9	6.7	6.3	2.7	19.3	19.0
Overflow Queue (Q <sub>3</sub> ), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.17	0.00	0.00	0.24	0.00	0.00	0.12	0.00	0.00	0.34	0.00	0.00
Uniform Delay (d <sub>1</sub> ), s/veh	23.8	22.8	16.5	21.8	23.4	23.5	23.2	18.7	18.7	16.5	22.2	22.2
Incremental Delay (d <sub>2</sub> ), s/veh	0.5	7.0	0.4	0.5	11.1	20.2	0.3	0.1	0.2	0.2	10.4	11.0
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	24.3	29.8	16.9	22.3	34.6	43.7	23.5	18.8	18.9	16.7	32.6	33.2
Level of Service (LOS)	C	C	B	C	C	D	C	B	B	B	C	C
Approach Delay, s/veh / LOS	28.8	C		36.9	D		19.0	B		31.5	C	
Intersection Delay, s/veh / LOS	30.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	3.2	C	3.0	C	3.3	C
Bicycle LOS Score / LOS	1.5	A	1.5	A	1.0	A	1.6	A

# HCS 2010 Signalized Intersection Results Summary

General Information					Intersection Information			
Agency	TASK Engineering				Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 30, 2012		Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	AM Pk Hr		PHF	0.92		
Intersection	Van Buren St/67th Avenue	Analysis Year	2030		Analysis Period	1> 7:00		
File Name	VB67 AM .xus							
Project Description	2030 No Build							



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	73	929	15	11	707	179	5	891	146	130	659	8

Signal Information				Signal Diagrams																		
Cycle, s	100.0	Reference Phase	2																			
Offset, s	0	Reference Point	End																			
Uncoordinated	No	Simult. Gap E/W	On																			
Force Mode	Fixed	Simult. Gap N/S	On																			
		Green		1.4	0.5	36.4	0.7	1.8	35.2													
		Yellow		3.0	3.0	3.0	3.0	3.0	3.0													
		Red		1.0	1.0	1.0	1.0	1.0	1.0													

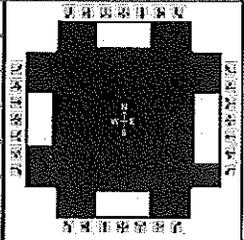
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	9.9	44.8	5.4	40.4	4.7	39.2	10.5	45.0
Change Period, (Y+R <sub>c</sub> ), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (q <sub>s</sub> ), s	6.5		2.4		2.2	31.5	6.5	14.4
Green Extension Time (g <sub>e</sub> ), s	0.1	0.0	0.0	0.0	0.0	3.7	0.2	4.1
Phase Call Probability	0.89		0.28		0.14	1.00	0.98	1.00
Max Out Probability	0.00		0.00		0.00	0.17	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	79	515	512	12	663	300	5	578	550	141	363	362
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1810	1799	1723	1810	1621	1723	1810	1720	1723	1810	1802
Queue Service Time (q <sub>s</sub> ), s	4.5	20.9	20.9	0.4	12.5	12.7	0.2	29.5	29.5	4.5	12.4	12.4
Cycle Queue Clearance Time (q <sub>c</sub> ), s	4.5	20.9	20.9	0.4	12.5	12.7	0.2	29.5	29.5	4.5	12.4	12.4
Capacity (c), veh/h	102	739	735	202	1316	589	286	637	606	212	743	740
Volume-to-Capacity Ratio (X)	0.781	0.696	0.696	0.059	0.504	0.510	0.019	0.907	0.908	0.666	0.489	0.489
Available Capacity (c <sub>a</sub> ), veh/h	452	739	735	630	1316	589	550	822	782	375	928	924
Back of Queue (Q), veh/ln (95th percentile)	3.6	12.8	12.8	0.3	8.5	8.2	0.1	18.2	17.6	3.1	7.9	7.8
Overflow Queue (Q <sub>3</sub> ), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.47	0.00	0.00	0.04	0.00	0.00	0.02	0.00	0.00	0.40	0.00	0.00
Uniform Delay (d <sub>1</sub> ), s/veh	45.4	18.2	18.2	20.8	19.6	19.7	20.8	25.0	25.0	22.0	16.2	16.2
Incremental Delay (d <sub>2</sub> ), s/veh	4.8	5.4	5.4	0.0	1.4	3.1	0.0	10.0	10.6	1.3	0.2	0.2
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	50.3	23.6	23.6	20.8	21.0	22.8	20.8	35.0	35.6	23.4	16.3	16.3
Level of Service (LOS)	D	C	C	C	C	C	C	D	D	C	B	B
Approach Delay, s/veh / LOS	25.5	C		21.5	C		35.2	D		17.5	B	
Intersection Delay, s/veh / LOS	25.6						C					

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS	2.8	C	2.9	C
Bicycle LOS Score / LOS	1.4	A	1.4	A

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 30, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	PM Pk Hr	PHF	0.92		
Intersection	Van Buren St/67th Avenue	Analysis Year	2030	Analysis Period	1> 7:00		
File Name	VB67 PM .xus						
Project Description	2030 No Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	10	670	7	6	1039	171	5	806	127	186	845	181

Signal Information				Signal Phases											
Cycle, s	100.0	Reference Phase	2												
Offset, s	0	Reference Point	End	Green	0.8	0.5	41.2	0.7	4.0	32.7					
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.0	0.0	3.0	3.0	3.0	3.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	0.0	1.0	1.0	1.0	1.0					

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	5.3	45.7	4.8	45.2	4.7	36.7	12.7	44.8
Change Period, (Y+R <sub>c</sub> ), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g <sub>s</sub> ), s	2.6		2.2		2.2	28.2	8.5	27.2
Green Extension Time (g <sub>e</sub> ), s	0.0	0.0	0.0	0.0	0.0	4.5	0.2	5.0
Phase Call Probability	0.26		0.17		0.14	1.00	1.00	1.00
Max Out Probability	0.00		0.00		0.00	0.22	0.01	0.07

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	11	369	367	7	899	416	5	519	495	202	575	540
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1810	1803	1723	1810	1675	1723	1810	1723	1723	1810	1698
Queue Service Time (g <sub>s</sub> ), s	0.6	12.4	12.4	0.2	16.7	16.7	0.2	26.2	26.2	6.5	25.2	25.2
Cycle Queue Clearance Time (g <sub>c</sub> ), s	0.6	12.4	12.4	0.2	16.7	16.7	0.2	26.2	26.2	6.5	25.2	25.2
Capacity (c), veh/h	22	755	752	291	1492	691	160	593	564	257	738	692
Volume-to-Capacity Ratio (X)	0.484	0.488	0.488	0.022	0.602	0.603	0.034	0.877	0.877	0.786	0.780	0.781
Available Capacity (c <sub>a</sub> ), veh/h	457	755	752	734	1492	691	424	783	746	383	928	871
Back of Queue (Q), veh/ln (95th percentile)	0.5	8.4	8.4	0.2	10.0	9.9	0.2	16.3	15.7	4.5	14.0	13.3
Overflow Queue (Q <sub>3</sub> ), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.07	0.00	0.00	0.02	0.00	0.00	0.02	0.00	0.00	0.59	0.00	0.00
Uniform Delay (d <sub>1</sub> ), s/veh	48.8	15.7	15.7	17.5	17.0	17.0	23.7	26.3	26.3	21.2	19.3	19.3
Incremental Delay (d <sub>2</sub> ), s/veh	5.9	2.3	2.3	0.0	1.8	3.9	0.0	7.3	7.6	3.3	2.5	2.7
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	54.7	17.9	18.0	17.5	18.8	20.9	23.7	33.6	33.9	24.5	21.8	22.0
Level of Service (LOS)	D	B	B	B	B	C	C	C	C	C	C	C
Approach Delay, s/veh / LOS	18.5		B	19.4		B	33.7		C	22.3		C
Intersection Delay, s/veh / LOS	23.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.9	C	3.2	C
Bicycle LOS Score / LOS	1.1	A	1.2	A	1.3	A	1.6	A

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>59th Avenue/Fillmore Street</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>1/28/2013</i>	Analysis Year	<i>2030</i>
Analysis Time Period			

Project Description <i>2030 No Build</i>	
East/West Street: <i>Fillmore Street</i>	North/South Street: <i>59th Avenue</i>
Intersection Orientation: <i>North-South</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound			
	Movement	1	2	3	4	5	6
		L	T	R	L	T	R
Volume (veh/h)						<i>1004</i>	<i>13</i>
Peak-Hour Factor, PHF	<i>0.92</i>	<i>0.92</i>	<i>1.00</i>	<i>1.00</i>	<i>0.92</i>	<i>0.92</i>	<i>0.92</i>
Hourly Flow Rate, HFR (veh/h)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>1091</i>	<i>14</i>	
Percent Heavy Vehicles	<i>5</i>	<i>--</i>	<i>--</i>	<i>0</i>	<i>--</i>	<i>--</i>	<i>--</i>
Median Type	<i>Two Way Left Turn Lane</i>						
RT Channelized			<i>0</i>				<i>0</i>
Lanes	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>2</i>	<i>1</i>	
Configuration					<i>T</i>	<i>R</i>	
Upstream Signal		<i>0</i>			<i>0</i>		

Minor Street	Eastbound			Westbound			
	Movement	7	8	9	10	11	12
		L	T	R	L	T	R
Volume (veh/h)	<i>0</i>			<i>25</i>			
Peak-Hour Factor, PHF	<i>0.92</i>	<i>1.00</i>	<i>0.92</i>	<i>1.00</i>	<i>1.00</i>	<i>1.00</i>	<i>1.00</i>
Hourly Flow Rate, HFR (veh/h)	<i>0</i>	<i>0</i>	<i>27</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Percent Heavy Vehicles	<i>5</i>	<i>0</i>	<i>5</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Percent Grade (%)		<i>0</i>			<i>0</i>		
Flared Approach		<i>N</i>			<i>N</i>		
Storage		<i>0</i>			<i>0</i>		
RT Channelized			<i>0</i>				<i>0</i>
Lanes	<i>0</i>						
Configuration		<i>LR</i>					

### Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
	1	4	7	8	9	10	11	12
Movement								
Lane Configuration							<i>LR</i>	
v (veh/h)							<i>27</i>	
C (m) (veh/h)							<i>532</i>	
v/c							<i>0.05</i>	
95% queue length							<i>0.16</i>	
Control Delay (s/veh)							<i>12.1</i>	
LOS							<i>B</i>	
Approach Delay (s/veh)	<i>--</i>	<i>--</i>					<i>12.1</i>	
Approach LOS	<i>--</i>	<i>--</i>					<i>B</i>	

## TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information					
Analyst	kmh		Intersection	59th Avenue/Fillmore Street				
Agency/Co.	TASK		Jurisdiction	City of Phoenix				
Date Performed	1/28/2013		Analysis Year	2030				
Analysis Time Period	PM Pk Hr							
Project Description 2030 No Build								
East/West Street: Fillmore Street			North/South Street: 59th Avenue					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)					1678	50		
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0	0	1823	54		
Percent Heavy Vehicles	5	--	--	0	--	--		
Median Type	Two Way Left Turn Lane							
RT Channelized			0			0		
Lanes	0	0	0	0	2	1		
Configuration					T	R		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	0		22					
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	0	0	23	0	0	0		
Percent Heavy Vehicles	5	0	5	0	0	0		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration		LR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration							LR	
v (veh/h)							23	
C (m) (veh/h)							328	
v/c							0.07	
95% queue length							0.22	
Control Delay (s/veh)							16.8	
LOS							C	
Approach Delay (s/veh)	--	--					16.8	
Approach LOS	--	--					C	

## TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information					
Analyst	kmh		Intersection	Van Buren Street/63rd Avenue				
Agency/Co.	TASK		Jurisdiction	City of Phoenix				
Date Performed	12/30/2012		Analysis Year	2030				
Analysis Time Period	AM Peak Hour							
Project Description 2030 No Build								
East/West Street: Van Buren Street			North/South Street: 63rd Avenue					
Intersection Orientation: East-West			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		1161	68	4	780			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	1.00		
Hourly Flow Rate, HFR (veh/h)	0	1261	73	4	847	0		
Percent Heavy Vehicles	5	--	--	5	--	--		
Median Type	Two Way Left Turn Lane							
RT Channelized			0			0		
Lanes	0	2	0	1	2	0		
Configuration		T	TR	L	T			
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	12		13					
Peak-Hour Factor, PHF	0.92	0.92	0.92	1.00	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	13	0	14	0	0	0		
Percent Heavy Vehicles	5	5	5	0	5	5		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	1	0	1	0	0	0		
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		4	13		14			
C (m) (veh/h)		497	169		449			
v/c		0.01	0.08		0.03			
95% queue length		0.02	0.25		0.10			
Control Delay (s/veh)		12.3	28.1		13.3			
LOS		B	D		B			
Approach Delay (s/veh)	--	--	20.4					
Approach LOS	--	--	C					

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>Van Buren Street/63rd Avenue</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/30/2012</i>	Analysis Year	<i>2030</i>
Analysis Time Period	<i>PM Peak Hour</i>		

Project Description <i>2030 No Build</i>	
East/West Street: <i>Van Buren Street</i>	North/South Street: <i>63rd Avenue</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound			
	Movement	1	2	3	4	5	6
		L	T	R	L	T	R
Volume (veh/h)			874	63	7	1285	
Peak-Hour Factor, PHF		0.92	0.92	0.92	0.92	0.92	1.00
Hourly Flow Rate, HFR (veh/h)		0	949	68	7	1396	0
Percent Heavy Vehicles		5	--	--	5	--	--
Median Type	<i>Two Way Left Turn Lane</i>						
RT Channelized				0			0
Lanes		0	2	0	1	2	0
Configuration			T	TR	L	T	
Upstream Signal			0			0	

Minor Street	Northbound			Southbound			
	Movement	7	8	9	10	11	12
		L	T	R	L	T	R
Volume (veh/h)		16		16			
Peak-Hour Factor, PHF		0.92	0.92	0.92	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)		17	0	17	0	0	0
Percent Heavy Vehicles		5	5	5	0	5	5
Percent Grade (%)		0			0		
Flared Approach			N			N	
Storage			0			0	
RT Channelized				0			0
Lanes		1	0	1	0	0	0
Configuration		L		R			

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound			
	Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R				
v (veh/h)		7	17		17				
C (m) (veh/h)		660	202		554				
v/c		0.01	0.08		0.03				
95% queue length		0.03	0.27		0.09				
Control Delay (s/veh)		10.5	24.5		11.7				
LOS		B	C		B				
Approach Delay (s/veh)	--	--	18.1						
Approach LOS	--	--	C						

## TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information				
Analyst	kmh		Intersection	Van Buren Street/61st Avenue			
Agency/Co.	TASK		Jurisdiction	City of Phoenix			
Date Performed	12/30/2012		Analysis Year	2030			
Analysis Time Period	PM Peak Hour						
Project Description 2030 No Build							
East/West Street: Van Buren Street			North/South Street: 61st Avenue				
Intersection Orientation: East-West			Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments							
Major Street	Eastbound			Westbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)		726	60	10	1124		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	1.00	
Hourly Flow Rate, HFR (veh/h)	0	789	65	10	1221	0	
Percent Heavy Vehicles	5	--	--	5	--	--	
Median Type	Two Way Left Turn Lane						
RT Channelized			0			0	
Lanes	0	2	0	1	2	0	
Configuration		T	TR	L	T		
Upstream Signal		0			0		
Minor Street	Northbound			Southbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	16		16				
Peak-Hour Factor, PHF	0.92	0.92	0.92	1.00	0.92	0.92	
Hourly Flow Rate, HFR (veh/h)	17	0	17	0	0	0	
Percent Heavy Vehicles	5	5	5	0	5	5	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	1	0	1	0	0	0	
Configuration	L		R				
Delay, Queue Length, and Level of Service							
Approach	Eastbound	Westbound	Northbound			Southbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		L	L		R		
v (veh/h)		10	17		17		
C (m) (veh/h)		762	247		617		
v/c		0.01	0.07		0.03		
95% queue length		0.04	0.22		0.08		
Control Delay (s/veh)		9.8	20.6		11.0		
LOS		A	C		B		
Approach Delay (s/veh)	--	--	15.8				
Approach LOS	--	--	C				

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>Van Buren Street/61st Avenue</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/30/2012</i>	Analysis Year	<i>2030</i>
Analysis Time Period	<i>AM Peak Hour</i>		

Project Description <i>2030 No Build</i>	
East/West Street: <i>Van Buren Street</i>	North/South Street: <i>61st Avenue</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound			
	Movement	1	2	3	4	5	6
		L	T	R	L	T	R
Volume (veh/h)			948	60	10	1124	
Peak-Hour Factor, PHF		0.92	0.92	0.92	0.92	0.92	1.00
Hourly Flow Rate, HFR (veh/h)		0	1030	65	10	1221	0
Percent Heavy Vehicles		5	--	--	5	--	--
Median Type	<i>Two Way Left Turn Lane</i>						
RT Channelized				0			0
Lanes		0	2	0	1	2	0
Configuration			T	TR	L	T	
Upstream Signal			0			0	

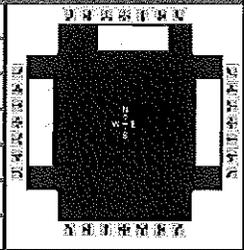
Minor Street	Northbound			Southbound			
	Movement	7	8	9	10	11	12
		L	T	R	L	T	R
Volume (veh/h)		12		13			
Peak-Hour Factor, PHF		0.92	0.92	0.92	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)		13	0	14	0	0	0
Percent Heavy Vehicles		5	5	5	0	5	5
Percent Grade (%)			0			0	
Flared Approach			N			N	
Storage			0			0	
RT Channelized				0			0
Lanes		1	0	1	0	0	0
Configuration		L		R			

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound				
			Movement	1	4	7	8	9	10	11
Lane Configuration			L	L		R				
v (veh/h)			10	13		14				
C (m) (veh/h)			616	197		526				
v/c			0.02	0.07		0.03				
95% queue length			0.05	0.21		0.08				
Control Delay (s/veh)			10.9	24.6		12.0				
LOS			B	C		B				
Approach Delay (s/veh)	--	--	18.1							
Approach LOS	--	--	C							

# Intersection Results Summary HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK			Duration, h	0.25		
Analyst	ken Howell	Analysis Date	Dec 29, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	PM Pk Hr	PHF	0.92		
Intersection	59th Avenue, SB	Analysis Year	2030	Analysis Period	1> 7:00		
File Name	Van Buren SMF TI PM.xus						
Project Description	2030 No Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h		639	156	509	1162					184	1318	15

Signal Information				Signal Timing (s)						Signal Phases				
Cycle, s	110.0	Reference Phase	2	Green	12.4	47.6	35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Offset, s	0	Reference Point	End	Yellow	4.0	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Red	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On											

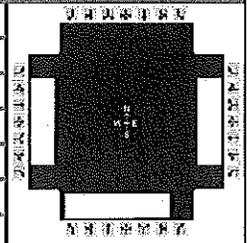
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6				4
Case Number		7.3	1.0	4.0				9.0
Phase Duration, s		52.6	17.4	70.0				40.0
Change Period, (Y+R <sub>c</sub> ), s		5.0	5.0	5.0				5.0
Max Allow Headway (MAH), s		0.0	3.1	0.0				3.0
Queue Clearance Time (g <sub>s</sub> ), s			11.1					37.0
Green Extension Time (g <sub>e</sub> ), s		0.0	1.4	0.0				0.0
Phase Call Probability			1.00					1.00
Max Out Probability			0.00					1.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6					7	4	14
Adjusted Flow Rate (v), veh/h		695	159	553	1263					200	1433	16
Adjusted Saturation Flow Rate (s), veh/h/ln		1643	1533	1673	1643					1723	1723	1533
Queue Service Time (g <sub>s</sub> ), s		5.7	5.6	9.1	8.5					9.8	35.0	0.8
Cycle Queue Clearance Time (g <sub>c</sub> ), s		5.7	5.6	9.1	8.5					9.8	35.0	0.8
Capacity (c), veh/h		2843	663	984	2913					548	1096	488
Volume-to-Capacity Ratio (X)		0.244	0.239	0.562	0.434					0.365	1.307	0.033
Available Capacity (c <sub>a</sub> ), veh/h		2843	663	1672	2913					548	1096	488
Back of Queue (Q), veh/ln (95th percentile)		3.7	3.6	6.8	4.1					7.3	53.9	0.5
Overflow Queue (Q <sub>3</sub> ), veh/ln		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)		0.00	0.00	0.44	0.00					0.47	0.00	0.00
Uniform Delay (d <sub>1</sub> ), s/veh		14.4	14.4	14.3	5.3					28.9	37.5	25.8
Incremental Delay (d <sub>2</sub> ), s/veh		0.2	0.9	0.2	0.4					0.2	144.7	0.0
Initial Queue Delay (d <sub>3</sub> ), s/veh		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Control Delay (d), s/veh		14.6	15.2	14.4	5.7					29.1	182.2	25.9
Level of Service (LOS)		B	B	B	A					C	F	C
Approach Delay, s/veh / LOS	14.7	B		8.4	A		0.0			162.1	F	
Intersection Delay, s/veh / LOS	68.3						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.1	B	3.7	D	3.4	C
Bicycle LOS Score / LOS	0.8	A	1.5	A			1.8	A

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK			Duration, h	0.25		
Analyst	ken Howell	Analysis Date	Dec 29, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	PM Pk Hr	PHF	0.92		
Intersection	59th Avenue NB	Analysis Year	2030	Analysis Period	1> 7:00		
File Name	Van Buren South Mountain Fwy TI PM.xus						
Project Description	2030 No Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	8	815			1599	110	72	1207	264			

Signal Information				Signal Timing Diagram											
Cycle, s	110.0	Reference Phase	2												
Offset, s	110	Reference Point	End												
Uncoordinated	No	Simult. Gap E/W	On												
Force Mode	Fixed	Simult. Gap N/S	On												
Green	61.4	1.2	32.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Red	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			

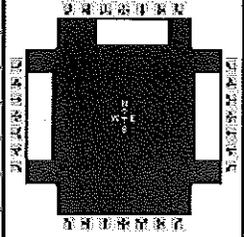
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		
Case Number	2.0	4.0		7.3		9.0		
Phase Duration, s	6.2	72.6		66.4		37.4		
Change Period, (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Allow Headway (MAH), s	3.1	0.0		0.0		3.1		
Queue Clearance Time (gs), s	2.3					30.1		
Green Extension Time (ge), s	0.9	0.0		0.0		2.3		
Phase Call Probability	0.23					1.00		
Max Out Probability	1.00					0.68		

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16	3	8	18			
Adjusted Flow Rate (v), veh/h	9	886			1738	109	78	1312	222			
Adjusted Saturation Flow Rate (s), veh/h/ln	1673	1643			1643	1533	1673	1643	1533			
Queue Service Time (gs), s	0.3	12.8			11.5	2.2	1.9	28.1	13.1			
Cycle Queue Clearance Time (gc), s	0.3	12.8			11.5	2.2	1.9	28.1	13.1			
Capacity (c), veh/h	36	3028			3669	856	986	1453	452			
Volume-to-Capacity Ratio (X)	0.245	0.293			0.474	0.127	0.079	0.903	0.491			
Available Capacity (ca), veh/h	152	3028			3669	856	1065	1568	488			
Back of Queue (Q), veh/ln (95th percentile)	0.2	8.8			5.7	1.4	1.3	17.6	8.4			
Overflow Queue (Qs), veh/ln	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Queue Storage Ratio (RQ) (95th percentile)	0.01	0.00			0.00	0.00	0.09	0.00	0.00			
Uniform Delay (d1), s/veh	53.3	15.6			7.7	6.5	28.0	37.3	32.0			
Incremental Delay (d2), s/veh	1.3	0.2			0.4	0.3	0.0	7.0	0.3			
Initial Queue Delay (d3), s/veh	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Control Delay (d), s/veh	54.6	15.8			8.1	6.8	28.0	44.2	32.3			
Level of Service (LOS)	D	B			A	A	C	D	C			
Approach Delay, s/veh / LOS	16.2	B		8.0	A		41.8	D		0.0		
Intersection Delay, s/veh / LOS	22.2						C					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.5	B		2.9	C		3.4	C		3.7	D	
Bicycle LOS Score / LOS	1.0	A		1.2	A		1.4	A				

## HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK			Duration, h	0.25		
Analyst	ken Howell	Analysis Date	Dec 29, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	AM Pk Hr	PHF	0.92		
Intersection	59th Avenue, SB	Analysis Year	2030	Analysis Period	1> 7:00		
File Name	Van Buren South Mountain Fwy TI.xus						
Project Description	2030 No Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h		906	174	197	724					130	854	10

Signal Information				Signal Timing (s)						Signal Phases							
Cycle, s	110.0	Reference Phase	2	Green	9.5	53.4	32.1	0.0	0.0	0.0	Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Offset, s	0	Reference Point	End	Red	1.0	1.0	1.0	0.0	0.0	0.0	Force Mode	Fixed	Simult. Gap N/S	On			
Uncoordinated	No	Simult. Gap E/W	On														

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6				4
Case Number		7.3	2.0	4.0				9.0
Phase Duration, s		58.4	14.5	72.9				37.1
Change Period, (Y+R <sub>c</sub> ), s		5.0	5.0	5.0				5.0
Max Allow Headway (MAH), s		0.0	3.1	0.0				3.0
Queue Clearance Time (g <sub>s</sub> ), s			9.0					30.7
Green Extension Time (g <sub>e</sub> ), s		0.0	0.5	0.0				1.4
Phase Call Probability			1.00					1.00
Max Out Probability			0.00					0.65

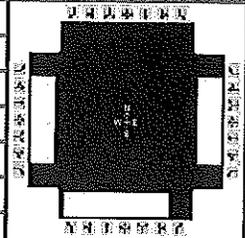
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6					7	4	14
Adjusted Flow Rate (v), veh/h		985	178	214	787					141	928	11
Adjusted Saturation Flow Rate (s), veh/h/ln		1643	1533	1673	1643					1723	1723	1533
Queue Service Time (g <sub>s</sub> ), s		7.3	5.3	7.0	3.5					7.0	28.7	0.6
Cycle Queue Clearance Time (g <sub>c</sub> ), s		7.3	5.3	7.0	3.5					7.0	28.7	0.6
Capacity (c), veh/h		3191	745	289	3043					503	1005	447
Volume-to-Capacity Ratio (X)		0.309	0.239	0.740	0.259					0.281	0.924	0.024
Available Capacity (c <sub>a</sub> ), veh/h		3191	745	1153	3043					548	1096	488
Back of Queue (Q), veh/ln (95th percentile)		4.4	3.3	5.7	1.9					5.2	19.4	0.4
Overflow Queue (Q <sub>3</sub> ), veh/ln		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)		0.00	0.00	0.37	0.00					0.34	0.00	0.00
Uniform Delay (d <sub>1</sub> ), s/veh		11.3	10.9	53.7	3.6					30.1	37.8	27.8
Incremental Delay (d <sub>2</sub> ), s/veh		0.3	0.8	1.4	0.2					0.1	11.6	0.0
Initial Queue Delay (d <sub>3</sub> ), s/veh		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Control Delay (d), s/veh		11.5	11.7	55.1	3.8					30.2	49.4	27.8
Level of Service (LOS)		B	B	E	A					C	D	C
Approach Delay, s/veh / LOS	11.5	B		14.8	B		0.0			46.7	D	
Intersection Delay, s/veh / LOS	24.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.1	B	3.7	D	3.4	C
Bicycle LOS Score / LOS	1.0	A	1.0	A			1.4	A

# HCS 2010 Signalized Intersection Results Summary

## General Information

Agency	TASK			Duration, h	0.25
Analyst	ken Howell	Analysis Date	Dec 29, 2012	Area Type	Other
Jurisdiction	City of Phoenix	Time Period	AM Pk Hr	PHF	0.92
Intersection	59th Avenue NB	Analysis Year	2030	Analysis Period	1> 7:00
File Name	Van Buren South Mountain Fwy Tl.xus				
Project Description	2030 No Build				



## Demand Information

Approach Movement	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	44	992			873	124	48	1447	492			

## Signal Information

Cycle, s	110.0	Reference Phase	2											
Offset, s	110	Reference Point	End											
Uncoordinated	No	Simult. Gap E/W	On	Green	56.2	3.8	35.0	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	4.0	0.0	0.0	0.0				
				Red	1.0	1.0	1.0	0.0	0.0	0.0				

## Timer Results

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		
Case Number	2.0	4.0		7.3		9.0		
Phase Duration, s	8.8	70.0		61.2		40.0		
Change Period, (Y+R <sub>c</sub> ), s	5.0	5.0		5.0		5.0		
Max Allow Headway (MAH), s	3.1	0.0		0.0		3.1		
Queue Clearance Time (g <sub>s</sub> ), s	3.5					37.0		
Green Extension Time (g <sub>e</sub> ), s	0.7	0.0		0.0		0.0		
Phase Call Probability	0.77					1.00		
Max Out Probability	1.00					1.00		

## Movement Group Results

Approach Movement	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16	3	8	18			
Adjusted Flow Rate (v), veh/h	48	1078			949	124	52	1573	470			
Adjusted Saturation Flow Rate (s), veh/h/ln	1673	1643			1643	1533	1673	1643	1533			
Queue Service Time (g <sub>s</sub> ), s	1.5	12.3			6.3	3.2	1.2	35.0	33.1			
Cycle Queue Clearance Time (g <sub>c</sub> ), s	1.5	12.3			6.3	3.2	1.2	35.0	33.1			
Capacity (c), veh/h	117	2913			3355	783	1065	1568	488			
Volume-to-Capacity Ratio (X)	0.409	0.370			0.283	0.158	0.049	1.003	0.962			
Available Capacity (c <sub>a</sub> ), veh/h	152	2913			3355	783	1065	1568	488			
Back of Queue (Q), veh/ln (95th percentile)	1.1	7.5			3.7	2.0	0.8	23.8	22.8			
Overflow Queue (Q <sub>3</sub> ), veh/ln	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Queue Storage Ratio (RQ) (95th percentile)	0.07	0.00			0.00	0.00	0.06	0.00	0.00			
Uniform Delay (d <sub>1</sub> ), s/veh	49.9	11.3			9.6	9.1	26.0	37.5	36.9			
Incremental Delay (d <sub>2</sub> ), s/veh	0.8	0.3			0.2	0.4	0.0	23.4	31.0			
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Control Delay (d), s/veh	50.7	11.7			9.8	9.5	26.0	60.9	67.9			
Level of Service (LOS)	D	B			A	A	C	F	E			
Approach Delay, s/veh / LOS	13.3	B		9.8	A		61.6	E	0.0			
Intersection Delay, s/veh / LOS	36.0						D					

## Multimodal Results

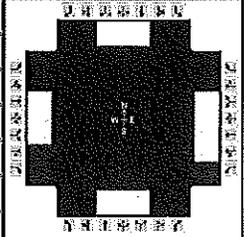
	EB	WB	NB	SB
Pedestrian LOS Score / LOS	2.5 / B	2.9 / C	3.4 / C	3.7 / D
Bicycle LOS Score / LOS	1.1 / A	0.9 / A	1.6 / A	

# **APPENDIX A**

**2015 BUILD**

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 28, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	AM Pk Hr	PHF	0.92		
Intersection	Van Buren St/67th Avenue	Analysis Year	2020 15	Analysis Period	1 > 7:00		
File Name	VB67 AM .xus						
Project Description	2015 Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	78	941	64	45	147	66	54	659	266	184	695	109

Signal Information				Signal Phases												
Cycle, s	100.0	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	3.7	2.6	36.0	4.0	1.0	32.8						
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.0	0.0	3.0	3.0	3.0	3.0						
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	0.0	1.0	1.0	1.0	1.0						

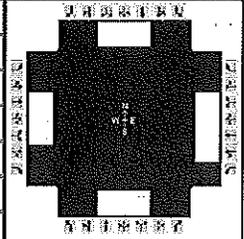
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.3	42.5	7.7	40.0	8.0	36.8	13.0	41.7
Change Period, (Y+R <sub>c</sub> ), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g <sub>s</sub> ), s	6.8		3.8		4.2	28.9	8.8	20.3
Green Extension Time (g <sub>e</sub> ), s	0.1	0.0	0.1	0.0	0.0	3.8	0.2	4.3
Phase Call Probability	0.91		0.74		0.80	1.00	1.00	1.00
Max Out Probability	0.00		0.00		0.00	0.18	0.02	0.02

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	85	552	540	49	160	72	59	529	477	200	448	426
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1810	1769	1723	1810	1533	1723	1810	1631	1723	1810	1723
Queue Service Time (g <sub>s</sub> ), s	4.8	25.0	25.1	1.8	2.4	2.6	2.2	26.9	26.9	6.8	18.3	18.3
Cycle Queue Clearance Time (g <sub>c</sub> ), s	4.8	25.0	25.1	1.8	2.4	2.6	2.2	26.9	26.9	6.8	18.3	18.3
Capacity (c), veh/h	108	697	681	203	1301	551	260	593	535	258	683	650
Volume-to-Capacity Ratio (X)	0.784	0.792	0.793	0.241	0.123	0.130	0.226	0.891	0.891	0.774	0.655	0.656
Available Capacity (c <sub>a</sub> ), veh/h	452	697	681	591	1301	551	467	778	702	379	868	827
Back of Queue (Q), veh/ln (95th percentile)	3.8	15.8	15.5	1.2	1.8	1.7	1.6	16.9	15.7	4.7	10.7	10.3
Overflow Queue (Q <sub>3</sub> ), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.50	0.00	0.00	0.16	0.00	0.00	0.20	0.00	0.00	0.62	0.00	0.00
Uniform Delay (d <sub>1</sub> ), s/veh	45.1	21.0	21.0	21.2	17.3	17.3	21.4	26.5	26.5	21.6	20.0	20.0
Incremental Delay (d <sub>2</sub> ), s/veh	4.6	9.0	9.2	0.2	0.2	0.5	0.2	8.7	9.5	3.0	0.5	0.6
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	49.8	30.0	30.2	21.5	17.5	17.8	21.5	35.2	36.0	24.6	20.6	20.6
Level of Service (LOS)	D	C	C	C	B	B	C	D	D	C	C	C
Approach Delay, s/veh / LOS	31.5	C		18.3	B		34.8	C		21.3	C	
Intersection Delay, s/veh / LOS	28.4						C					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.8	C		2.8	C		2.9	C		3.2	C	
Bicycle LOS Score / LOS	1.5	A		0.6	A		1.4	A		1.4	A	

# HCS 2010 Signalized Intersection Results Summary

General Information					Intersection Information				
Agency	TASK Engineering				Duration, h	0.25			
Analyst	Ken Howell	Analysis Date	Dec 28, 2012		Area Type	Other			
Jurisdiction	City of Phoenix		Time Period	PM Pk Hr	PHF	0.92			
Intersection	Van Buren St/67th Avenue	Analysis Year	2020 15		Analysis Period	1> 7:00			
File Name	VB67 PM .xus								
Project Description	2015 Build								



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	70	158	23	123	626	403	38	703	42	84	569	50

Signal Information				Signal Phases													
Cycle, s	100.0	Reference Phase	2														
Offset, s	0	Reference Point	End	Green	5.7	0.4	46.5	3.4	1.9	26.1							
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.0	0.0	3.0	3.0	0.0	3.0							
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	0.0	1.0	1.0	0.0	1.0							

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	9.7	50.5	10.1	50.9	7.4	30.1	9.4	32.0
Change Period, (Y+R <sub>c</sub> ), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.0	3.1	3.0
Queue Clearance Time (q <sub>s</sub> ), s	6.3		6.0		3.7	23.1	5.7	17.8
Green Extension Time (g <sub>e</sub> ), s	0.1	0.0	0.2	0.0	0.0	2.9	0.1	3.0
Phase Call Probability	0.88		0.98		0.68	1.00	0.92	1.00
Max Out Probability	0.00		0.00		0.00	0.01	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	76	99	98	134	680	438	41	409	401	91	341	332
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1810	1730	1723	1810	1533	1723	1810	1773	1723	1810	1758
Queue Service Time (q <sub>s</sub> ), s	4.3	2.2	2.3	4.0	9.4	17.3	1.7	21.1	21.1	3.7	15.8	15.8
Cycle Queue Clearance Time (q <sub>c</sub> ), s	4.3	2.2	2.3	4.0	9.4	17.3	1.7	21.1	21.1	3.7	15.8	15.8
Capacity (c), veh/h	98	842	805	684	1698	719	221	472	462	196	507	492
Volume-to-Capacity Ratio (X)	0.778	0.118	0.121	0.196	0.401	0.609	0.187	0.867	0.868	0.465	0.673	0.675
Available Capacity (c <sub>a</sub> ), veh/h	631	842	805	1210	1698	719	438	844	827	380	879	854
Back of Queue (Q), veh/ln (95th percentile)	3.5	1.7	1.6	2.5	6.1	9.0	1.3	13.2	13.0	2.7	10.2	10.0
Overflow Queue (Q <sub>3</sub> ), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.45	0.00	0.00	0.33	0.00	0.00	0.16	0.00	0.00	0.35	0.00	0.00
Uniform Delay (d <sub>1</sub> ), s/veh	45.6	10.6	10.6	11.8	11.7	13.2	26.2	31.0	31.0	26.0	27.5	27.5
Incremental Delay (d <sub>2</sub> ), s/veh	4.9	0.3	0.3	0.1	0.7	3.8	0.2	1.9	2.0	0.6	0.6	0.6
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	50.5	10.9	10.9	11.8	12.4	17.0	26.3	32.9	33.0	26.7	28.1	28.1
Level of Service (LOS)	D	B	B	B	B	B	C	C	C	C	C	C
Approach Delay, s/veh / LOS	21.9	C		13.9	B		32.6	C		27.9	C	
Intersection Delay, s/veh / LOS	23.1						C					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.8	C		2.8	C		3.0	C		3.2	C	
Bicycle LOS Score / LOS	0.7	A		1.2	A		1.2	A		1.1	A	

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>59th Avenue/Fillmore Street</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/28/2012</i>	Analysis Year	<i>2015</i>
Analysis Time Period	<i>AM Pk Hr</i>		

Project Description <i>2015 Build</i>	
East/West Street: <i>Fillmore Street</i>	North/South Street: <i>59th Avenue</i>
Intersection Orientation: <i>North-South</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street Movement	Northbound			Southbound		
	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	12	695			993	22
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	13	755	0	0	1079	23
Percent Heavy Vehicles	5	--	--	0	--	--
Median Type	<i>Undivided</i>					
RT Channelized			0			0
Lanes	1	2	0	0	2	1
Configuration	L	T			T	R
Upstream Signal		0			0	

Minor Street Movement	Eastbound			Westbound		
	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	24		36			
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	26	0	39	0	0	0
Percent Heavy Vehicles	5	0	5	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

### Delay, Queue Length, and Level of Service

Approach Movement	Northbound	Southbound	Westbound			Eastbound		
	1	4	7	8	9	10	11	12
Lane Configuration	L						LR	
v (veh/h)	13						65	
C (m) (veh/h)	612						211	
v/c	0.02						0.31	
95% queue length	0.07						1.25	
Control Delay (s/veh)	11.0						29.5	
LOS	B						D	
Approach Delay (s/veh)	--	--					29.5	
Approach LOS	--	--					D	

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>59th Avenue/Fillmore Street</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/28/2012</i>	Analysis Year	<i>2015</i>
Analysis Time Period	<i>PM Pk Hr</i>		

Project Description <i>2015 Build</i>	
East/West Street: <i>Fillmore Street</i>	North/South Street: <i>59th Avenue</i>
Intersection Orientation: <i>North-South</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound			
	Movement	1	2	3	4	5	6
		L	T	R	L	T	R
Volume (veh/h)		36	1119			740	30
Peak-Hour Factor, PHF		0.92	0.92	1.00	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)		39	1216	0	0	804	32
Percent Heavy Vehicles		5	--	--	0	--	--
Median Type	<i>Undivided</i>						
RT Channelized				0			0
Lanes		1	2	0	0	2	1
Configuration		L	T			T	R
Upstream Signal			1			1	

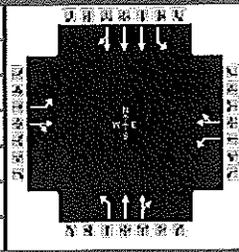
Minor Street	Eastbound			Westbound			
	Movement	7	8	9	10	11	12
		L	T	R	L	T	R
Volume (veh/h)		32		2			
Peak-Hour Factor, PHF		0.92	1.00	0.92	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)		34	0	2	0	0	0
Percent Heavy Vehicles		5	0	5	0	0	0
Percent Grade (%)			0			0	
Flared Approach			N			N	
Storage			0			0	
RT Channelized				0			0
Lanes		0	0	0	0	0	0
Configuration			LR				

### Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
			7	8	9	10	11	12
Movement	1	4						
Lane Configuration	L						LR	
v (veh/h)	39						36	
C (m) (veh/h)	775						163	
v/c	0.05						0.22	
95% queue length	0.16						0.81	
Control Delay (s/veh)	9.9						33.2	
LOS	A						D	
Approach Delay (s/veh)	--	--					33.2	
Approach LOS	--	--					D	

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 28, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	AM Pk Hr	PHF	0.92		
Intersection	59th Avenue/Roosevelt St	Analysis Year	2015	Analysis Period	1 > 7:00		
File Name	59 Roo AM .xus						
Project Description	2015 Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	127	73	79	143	20	176	3	615	84	109	1299	91

Signal Information				Signal Phases											
Cycle, s	100.0	Reference Phase	2												
Offset, s	0	Reference Point	End												
Uncoordinated	No	Simult. Gap E/W	On												
Force Mode	Fixed	Simult. Gap N/S	On												
Green	6.5	0.6	43.4	0.4	1.8	27.4									
Yellow	3.0	0.0	3.0	3.0	3.0	3.0									
Red	1.0	0.0	1.0	1.0	1.0	1.0									

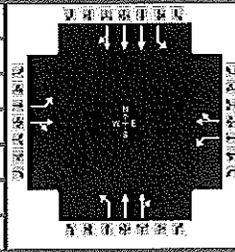
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.5	47.4	11.0	48.0	4.4	31.4	10.2	37.1
Change Period, (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (gc), s	6.4		6.9		2.1	21.1	6.3	27.2
Green Extension Time (ge), s	0.2	0.0	0.3	0.0	0.0	6.0	0.1	6.0
Phase Call Probability	0.98		0.99		0.09	1.00	0.96	1.00
Max Out Probability	0.00		0.00		0.00	0.07	0.00	0.07

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	138	165		155	213		3	388	372	118	1019	492
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1655		1723	1558		1723	1810	1733	1723	1810	1746
Queue Service Time (gs), s	4.4	6.3		4.9	8.9		0.1	19.1	19.1	4.3	25.2	25.2
Cycle Queue Clearance Time (gc), s	4.4	6.3		4.9	8.9		0.1	19.1	19.1	4.3	25.2	25.2
Capacity (c), veh/h	580	718		631	685		106	495	474	235	1199	579
Volume-to-Capacity Ratio (X)	0.238	0.230		0.246	0.311		0.031	0.783	0.785	0.503	0.850	0.850
Available Capacity (ca), veh/h	1062	718		1103	685		374	828	793	404	1866	900
Back of Queue (Q), veh/ln (95th percentile)	2.9	4.4		3.2	5.9		0.1	11.9	11.6	3.0	14.5	14.4
Overflow Queue (Q3), veh/ln	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.38	0.00		0.42	0.00		0.01	0.00	0.00	0.39	0.00	0.00
Uniform Delay (d1), s/veh	14.1	17.8		13.5	18.2		28.0	29.1	29.1	22.3	25.7	25.7
Incremental Delay (d2), s/veh	0.1	0.7		0.1	1.2		0.0	1.0	1.1	0.6	1.4	2.8
Initial Queue Delay (d3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	14.1	18.5		13.5	19.4		28.0	30.2	30.2	22.9	27.1	28.5
Level of Service (LOS)	B	B		B	B		C	C	C	C	C	C
Approach Delay, s/veh / LOS	16.5		B	16.9		B	30.2		C	27.2		C
Intersection Delay, s/veh / LOS	25.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.2	C	2.9	C	2.3	B	2.3	B
Bicycle LOS Score / LOS	1.0	A	1.1	A	1.1	A	1.4	A

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 28, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	PM Pk Hr	PHF	0.92		
Intersection	59th Avenue/Roosevelt St	Analysis Year	2020   5	Analysis Period	1> 7:00		
File Name	59 Roo PM .xus						
Project Description	2015 Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	53	73	5	31	45	196	6	1078	157	154	1071	118

Signal Information				Signal Phases									
Cycle, s	100.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	3.0	1.0	31.8	0.8	2.1	41.3	Yellow	3.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Red	3.0	0.0	3.0	3.0	3.0	3.0	Red	1.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	0.0	1.0	1.0	1.0	1.0	Red	1.0	0.0

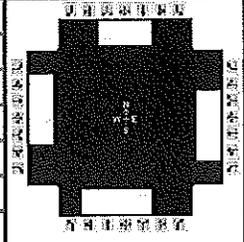
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	8.0	36.8	7.0	35.8	4.8	45.3	10.9	51.4
Change Period, (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (gs), s	4.2		3.3		2.2	36.7	6.8	15.2
Green Extension Time (ge), s	0.1	0.0	0.0	0.0	0.0	4.6	0.2	7.9
Phase Call Probability	0.80		0.61		0.17	1.00	0.99	1.00
Max Out Probability	0.00		0.00		0.00	0.63	0.00	0.06

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	58	85		34	262		7	684	658	167	877	416
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1789		1723	1578		1723	1810	1729	1723	1810	1714
Queue Service Time (gs), s	2.2	3.3		1.3	13.6		0.2	34.3	34.7	4.8	13.2	13.2
Cycle Queue Clearance Time (gc), s	2.2	3.3		1.3	13.6		0.2	34.3	34.7	4.8	13.2	13.2
Capacity (c), veh/h	338	586		498	502		227	748	714	217	1714	812
Volume-to-Capacity Ratio (X)	0.171	0.145		0.068	0.522		0.029	0.915	0.921	0.773	0.511	0.512
Available Capacity (ca), veh/h	610	586		787	502		489	816	780	374	1852	877
Back of Queue (Q), veh/ln (95th percentile)	1.6	2.6		0.9	9.4		0.2	20.5	20.2	3.4	7.7	7.3
Overflow Queue (Q3), veh/ln	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.20	0.00		0.12	0.00		0.02	0.00	0.00	0.44	0.00	0.00
Uniform Delay (d1), s/veh	21.8	23.7		21.7	27.9		17.0	20.9	21.0	21.7	12.1	12.1
Incremental Delay (d2), s/veh	0.1	0.5		0.0	3.8		0.0	13.5	14.8	2.2	0.1	0.2
Initial Queue Delay (d3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	21.9	24.3		21.7	31.7		17.0	34.4	35.8	23.9	12.2	12.3
Level of Service (LOS)	C	C		C	C		B	C	D	C	B	B
Approach Delay, s/veh / LOS	23.3		C	30.6		C	35.0		C	13.6		B
Intersection Delay, s/veh / LOS	24.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.2	C	2.9	C	2.3	B	2.3	B
Bicycle LOS Score / LOS	0.7	A	1.0	A	1.6	A	1.3	A

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	TASK Engineering			Duration, h	0.25
Analyst	Ken Howell	Analysis Date	Dec 28, 2012	Area Type	Other
Jurisdiction	City of Phoenix	Time Period	AM PK Hr	PHF	0.92
Intersection	Van Buren St/51st Avenue	Analysis Year	202015	Analysis Period	1> 7:00
File Name	VB51 AM .xus				
Project Description	2015 Build				



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	74	395	5	10	1736	381	34	822	16	143	1454	251

Signal Information				Signal Timing Diagram										
Cycle, s	100.0	Reference Phase	2											
Offset, s	0	Reference Point	End	Green	1.3	3.3	27.4	3.2	3.2	45.5				
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.0	0.0	3.0	3.0	0.0	3.0				
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	0.0	1.0	1.0	0.0	1.0				

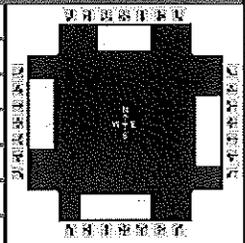
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	8.6	34.7	5.3	31.4	7.2	49.5	10.4	52.8
Change Period, (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (qs), s	5.1		2.5		3.1	10.5	6.4	50.8
Green Extension Time (ge), s	0.1	0.0	0.0	0.0	0.0	8.7	0.2	0.0
Phase Call Probability	0.89		0.26		0.64	1.00	0.99	1.00
Max Out Probability	0.00		0.00		0.00	0.09	0.00	1.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	80	429	5	11	1536	721	37	609	302	155	910	900
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1723	1610	1723	1810	1656	1723	1810	1791	1723	1810	1730
Queue Service Time (gs), s	3.1	8.8	0.2	0.5	27.4	27.4	1.1	8.5	8.5	4.4	48.8	48.8
Cycle Queue Clearance Time (gc), s	3.1	8.8	0.2	0.5	27.4	27.4	1.1	8.5	8.5	4.4	48.8	48.8
Capacity (c), veh/h	152	1058	494	297	991	454	132	1648	816	402	883	844
Volume-to-Capacity Ratio (X)	0.530	0.406	0.011	0.037	1.550	1.590	0.279	0.370	0.370	0.387	1.031	1.066
Available Capacity (ca), veh/h	348	1058	494	551	991	454	353	1648	816	567	883	844
Back of Queue (Q), veh/ln (95th percentile)	2.2	6.3	0.1	0.3	69.6	68.9	0.8	5.4	5.4	2.7	32.3	35.1
Overflow Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.29	0.00	0.00	0.04	0.00	0.00	0.10	0.00	0.00	0.35	0.00	0.00
Uniform Delay (d1), s/veh	25.8	23.1	20.5	25.6	31.7	31.7	23.4	12.4	12.4	11.3	17.5	17.5
Incremental Delay (d2), s/veh	1.1	1.2	0.0	0.0	252.3	275.7	0.4	0.1	0.1	0.2	38.6	50.1
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	26.8	24.2	20.6	25.6	284.1	307.5	23.8	12.4	12.5	11.5	56.1	67.6
Level of Service (LOS)	C	C	C	C	F	F	C	B	B	B	F	F
Approach Delay, s/veh / LOS	24.6		C	290.3		F	12.9		B	57.8		E
Intersection Delay, s/veh / LOS	139.9						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.0	C	3.2	C	3.0	C	3.2	C
Bicycle LOS Score / LOS	0.9	A	1.7	A	1.0	A	2.1	B

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 28, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	PM Pk Hr	PHF	0.92		
Intersection	Van Buren St/51st Avenue	Analysis Year	2015	Analysis Period	1 > 7:00		
File Name	VB51 PM .xus						
Project Description	2015 Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	323	1652	10	10	370	238	7	1313	102	190	1025	126

Signal Information				Signal Diagrams														
Cycle, s	100.0	Reference Phase	2															
Offset, s	0	Reference Point	End															
Uncoordinated	No	Simult. Gap E/W	On															
Force Mode	Fixed	Simult. Gap N/S	On															
		Green		1.3	8.9	26.9	1.0	3.8	34.1									
		Yellow		3.0	3.0	3.0	3.0	3.0	3.0									
		Red		1.0	1.0	1.0	1.0	1.0	1.0									

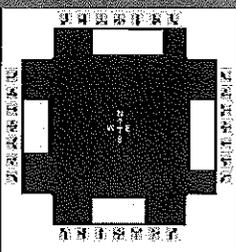
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	18.2	43.8	5.3	30.9	5.0	38.1	12.7	45.9
Change Period, (Y+R <sub>c</sub> ), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g <sub>s</sub> ), s	13.6		2.5		2.3	27.3	8.5	29.8
Green Extension Time (g <sub>e</sub> ), s	0.6	0.0	0.0	0.0	0.0	6.8	0.2	7.6
Phase Call Probability	1.00		0.26		0.19	1.00	1.00	1.00
Max Out Probability	0.00		0.00		0.00	0.35	0.01	0.23

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	351	1796	11	11	402	215	8	1039	499	207	618	600
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1723	1610	1723	1810	1533	1723	1810	1740	1723	1810	1755
Queue Service Time (g <sub>s</sub> ), s	11.6	39.8	0.3	0.5	8.4	11.1	0.3	25.3	25.3	6.5	27.7	27.8
Cycle Queue Clearance Time (g <sub>c</sub> ), s	11.6	39.8	0.3	0.5	8.4	11.1	0.3	25.3	25.3	6.5	27.7	27.8
Capacity (c), veh/h	440	1372	641	100	975	413	151	1236	594	251	759	736
Volume-to-Capacity Ratio (X)	0.798	1.309	0.017	0.109	0.412	0.521	0.050	0.841	0.841	0.822	0.815	0.816
Available Capacity (c <sub>a</sub> ), veh/h	629	1372	641	510	975	413	410	1566	753	376	924	896
Back of Queue (Q), veh/ln (95th percentile)	7.3	60.2	0.2	0.3	6.4	7.6	0.2	14.8	15.0	4.7	15.2	14.9
Overflow Queue (Q <sub>3</sub> ), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.96	0.00	0.00	0.04	0.00	0.00	0.03	0.00	0.00	0.61	0.00	0.00
Uniform Delay (d <sub>1</sub> ), s/veh	17.0	23.5	14.2	29.0	26.1	26.9	23.1	24.8	24.8	21.1	18.9	18.9
Incremental Delay (d <sub>2</sub> ), s/veh	2.9	144.3	0.0	0.2	1.3	4.6	0.1	2.8	5.6	5.3	3.9	4.1
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	20.0	167.7	14.2	29.2	27.4	31.6	23.2	27.7	30.5	26.3	22.8	23.0
Level of Service (LOS)	B	F	B	C	C	C	C	C	C	C	C	C
Approach Delay, s/veh / LOS	142.9	F		28.8	C		28.5	C		23.4	C	
Intersection Delay, s/veh / LOS	70.2						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	3.2	C	3.0	C	3.3	C
Bicycle LOS Score / LOS	2.3	B	0.8	A	1.3	A	1.7	A

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 28, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	AM Pk Hr	PHF	0.92		
Intersection	Van Buren St/59th Avenue	Analysis Year	2020 15	Analysis Period	1> 7:00		
File Name	VB59 AM .xus						
Project Description	2015 Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	145	1156	58	28	191	53	37	535	108	305	531	151

Signal Information				Signal Diagrams															
Cycle, s	100.0	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	No	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
		Green		2.9	0.2	38.4	3.4	7.4	23.8										
		Yellow		3.0	3.0	3.0	3.0	3.0	3.0										
		Red		1.0	1.0	1.0	1.0	1.0	1.0										

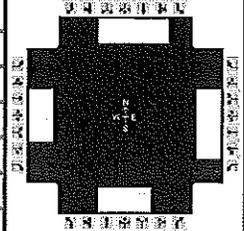
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	3.0
Phase Duration, s	11.1	46.6	6.9	42.4	7.4	27.8	18.7	39.2
Change Period, (Y+R <sub>c</sub> ), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (q <sub>s</sub> ), s	6.9		3.1		3.7	20.5	14.2	13.5
Green Extension Time (g <sub>e</sub> ), s	0.3	0.0	0.0	0.0	0.0	3.3	0.5	3.3
Phase Call Probability	0.99		0.57		0.67	1.00	1.00	1.00
Max Out Probability	0.00		0.00		0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	158	665	655	30	179	86	40	359	340	332	577	164
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1810	1779	1723	1810	1615	1723	1810	1704	1723	1723	1610
Queue Service Time (g <sub>s</sub> ), s	4.9	31.1	31.2	1.1	2.6	2.8	1.7	18.4	18.5	12.2	11.5	6.3
Cycle Queue Clearance Time (g <sub>c</sub> ), s	4.9	31.1	31.2	1.1	2.6	2.8	1.7	18.4	18.5	12.2	11.5	6.3
Capacity (c), veh/h	578	771	758	167	1389	620	295	431	406	364	1212	566
Volume-to-Capacity Ratio (X)	0.273	0.862	0.864	0.182	0.129	0.139	0.137	0.833	0.837	0.911	0.476	0.290
Available Capacity (c <sub>a</sub> ), veh/h	1136	771	758	798	1389	620	685	856	806	558	2020	944
Back of Queue (Q), veh/ln (95th percentile)	3.1	18.7	18.6	0.7	1.9	1.9	1.3	11.9	11.4	8.8	7.4	4.0
Overflow Queue (Q <sub>3</sub> ), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.41	0.00	0.00	0.10	0.00	0.00	0.16	0.00	0.00	0.92	0.00	0.00
Uniform Delay (d <sub>1</sub> ), s/veh	13.0	19.1	19.1	21.3	15.7	15.7	26.8	32.3	32.3	20.9	20.3	18.9
Incremental Delay (d <sub>2</sub> ), s/veh	0.1	12.2	12.5	0.2	0.2	0.5	0.1	1.6	1.8	10.2	0.1	0.1
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	13.1	31.3	31.6	21.5	15.9	16.2	26.9	33.9	34.1	31.1	20.4	19.0
Level of Service (LOS)	B	C	C	C	B	B	C	C	C	C	C	B
Approach Delay, s/veh / LOS	29.5	C		16.5	B		33.6	C		23.5	C	
Intersection Delay, s/veh / LOS	27.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.9	C	3.0	C	3.2	C
Bicycle LOS Score / LOS	1.7	A	0.7	A	1.1	A	1.4	A

# HCS 2010 Signalized Intersection Results Summary

General Information					Intersection Information				
Agency	TASK Engineering				Duration, h	0.25			
Analyst	Ken Howell	Analysis Date	Dec 28, 2012		Area Type	Other			
Jurisdiction	City of Phoenix		Time Period	PM Pk Hr	PHF	0.92			
Intersection	Van Buren St/59th Avenue	Analysis Year	2015		Analysis Period	1 > 7:00			
File Name	VB59 PM .xus								
Project Description	2015 Build								



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	201	207	22	97	934	294	57	691	42	74	521	138

Signal Information				Signal Diagrams															
Cycle, s	100.0	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	No	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
		Green		5.2	3.4	44.5	4.1	0.8	26.1										
		Yellow		3.0	0.0	3.0	3.0	0.0	3.0										
		Red		1.0	0.0	1.0	1.0	0.0	1.0										

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	3.0
Phase Duration, s	12.6	51.9	9.2	48.5	8.1	30.1	8.9	30.8
Change Period, (Y+R <sub>c</sub> ), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (g <sub>s</sub> ), s	8.2		5.3		4.6	22.6	5.3	15.5
Green Extension Time (g <sub>e</sub> ), s	0.4	0.0	0.2	0.0	0.1	3.4	0.1	3.5
Phase Call Probability	1.00		0.95		0.82	1.00	0.89	1.00
Max Out Probability	0.00		0.00		0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB			
	L	T	R	L	T	R	L	T	R	L	T	R	
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14	
Adjusted Flow Rate (v), veh/h	218	125	123	105	928	407	62	402	394	80	566	150	
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1810	1749	1723	1810	1585	1723	1810	1773	1723	1723	1610	
Queue Service Time (g <sub>s</sub> ), s	6.2	2.8	2.8	3.3	15.9	15.9	2.6	20.6	20.6	3.3	13.5	6.8	
Cycle Queue Clearance Time (g <sub>c</sub> ), s	6.2	2.8	2.8	3.3	15.9	15.9	2.6	20.6	20.6	3.3	13.5	6.8	
Capacity (c), veh/h	333	866	837	647	1609	705	237	472	462	192	925	432	
Volume-to-Capacity Ratio (X)	0.655	0.145	0.148	0.163	0.577	0.577	0.261	0.853	0.853	0.419	0.612	0.347	
Available Capacity (c <sub>a</sub> ), veh/h	996	866	837	1369	1609	705	615	1034	1013	556	1995	932	
Back of Queue (Q), veh/ln (95th percentile)	3.9	2.0	2.0	2.2	9.3	8.9	1.9	12.9	12.7	2.4	8.7	4.5	
Overflow Queue (Q <sub>3</sub> ), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Queue Storage Ratio (RQ) (95th percentile)	0.50	0.00	0.00	0.28	0.00	0.00	0.24	0.00	0.00	0.25	0.00	0.00	
Uniform Delay (d <sub>1</sub> ), s/veh	14.3	9.9	9.9	13.3	14.5	14.6	25.8	30.8	30.8	26.6	27.8	25.7	
Incremental Delay (d <sub>2</sub> ), s/veh	0.8	0.4	0.4	0.0	1.5	3.4	0.2	1.7	1.8	0.5	0.2	0.2	
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh	15.1	10.3	10.3	13.3	16.1	18.0	26.0	32.6	32.6	27.1	28.1	25.9	
Level of Service (LOS)	B	B	B	B	B	B	C	C	C	C	C	C	
Approach Delay, s/veh / LOS	12.6	B		16.4	B		32.1	C			27.6	C	
Intersection Delay, s/veh / LOS	22.2						C						

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS	2.8 / C	2.9 / C	3.0 / C	3.2 / C
Bicycle LOS Score / LOS	0.9 / A	1.3 / A	1.2 / A	1.1 / A

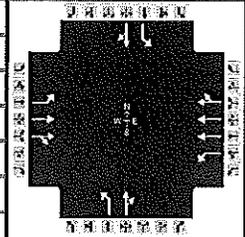
# HCS 2010 Signalized Intersection Results Summary

## General Information

Agency	TASK Engineering			Duration, h	0.25
Analyst	Ken Howell	Analysis Date	Dec 28, 2012	Area Type	Other
Jurisdiction	City of Phoenix	Time Period	AM Pk Hr	PHF	0.92
Intersection	Van Buren St/61st Avenue	Analysis Year	2020 15	Analysis Period	1 > 7:00
File Name	VB61 AM .xus				
Project Description	2015 Build				

## Intersection Information

Duration, h	0.25
Area Type	Other
PHF	0.92
Analysis Period	1 > 7:00



## Demand Information

Approach Movement	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	9	1300	47	1	299	16	5	0	15	41	0	4

## Signal Information

Cycle, s	100.0	Reference Phase	2	[Signal Diagrams]								
Offset, s	0	Reference Point	End	[Signal Diagrams]								
Uncoordinated	No	Simult. Gap E/W	On	[Signal Diagrams]								
Force Mode	Fixed	Simult. Gap N/S	On	[Signal Diagrams]								
Green	0.1	1.0	76.7	0.7	2.8	2.6						
Yellow	3.0	0.0	3.0	3.0	0.0	3.0						
Red	1.0	0.0	1.0	1.0	0.0	1.0						

## Timer Results

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	5.2	81.7	4.1	80.7	4.7	6.6	7.6	9.4
Change Period, (Y+R <sub>c</sub> ), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.4	3.1	3.4
Queue Clearance Time (g <sub>s</sub> ), s	2.6		2.0		2.3	3.0	4.5	2.3
Green Extension Time (g <sub>e</sub> ), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Phase Call Probability	0.24		0.03		0.14	0.52	0.71	0.84
Max Out Probability	0.00		0.00		0.00	0.00	0.00	0.00

## Movement Group Results

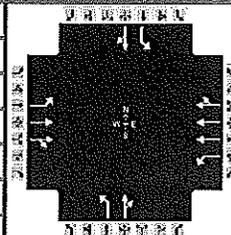
Approach Movement	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	10	735	729	1	229	113	5	16		45	4	
Adjusted Saturation Flow Rate (s), veh/h/ln	1645	1810	1787	1723	1810	1761	1723	1533		1645	1464	
Queue Service Time (g <sub>s</sub> ), s	0.6	0.0	0.0	0.0	0.0	0.0	0.3	1.0		2.5	0.3	
Cycle Queue Clearance Time (g <sub>c</sub> ), s	0.6	0.0	0.0	0.0	0.0	0.0	0.3	1.0		2.5	0.3	
Capacity (c), veh/h	20	1406	1389	343	2775	1350	119	40		150	79	
Volume-to-Capacity Ratio (X)	0.499	0.523	0.525	0.003	0.083	0.084	0.046	0.412		0.296	0.055	
Available Capacity (c <sub>a</sub> ), veh/h	1018	1406	1389	1407	2775	1350	383	743		355	751	
Back of Queue (Q), veh/ln (95th percentile)	0.5	1.0	1.0	0.0	0.0	0.1	0.2	0.8		1.8	0.2	
Overflow Queue (Q <sub>3</sub> ), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio (RQ) (95th percentile)	0.07	0.00	0.00	0.00	0.00	0.00	0.06	0.00		0.33	0.00	
Uniform Delay (d <sub>1</sub> ), s/veh	48.9	0.0	0.0	2.7	0.0	0.0	46.9	48.0		41.9	44.9	
Incremental Delay (d <sub>2</sub> ), s/veh	7.1	1.4	1.4	0.0	0.1	0.1	0.1	2.5		0.4	0.1	
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	56.0	1.4	1.4	2.7	0.1	0.1	47.0	50.5		42.3	45.0	
Level of Service (LOS)	E	A	A	A	A	A	D	D		D	D	
Approach Delay, s/veh / LOS	1.8	A		0.1	A		49.6	D		42.5	D	
Intersection Delay, s/veh / LOS	3.1						A					

## Multimodal Results

	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.2	B		2.2	B		3.0	C		3.2	C	
Bicycle LOS Score / LOS	1.7	A		0.7	A		0.5	A		0.6	A	

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 28, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	PM Pk Hr	PHF	0.92		
Intersection	Van Buren St/61st Avenue	Analysis Year	2020 15	Analysis Period	1> 7:00		
File Name	VB61 PM .xus						
Project Description	2015 Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	3	279	10	41	1079	27	12	0	13	154	0	17

Signal Information				Signal Timing (s)						Signal Phases							
Cycle, s	100.0	Reference Phase	2	Green	0.4	3.1	66.3	1.5	5.1	3.6	Yellow	3.0	0.0	3.0	3.0	3.0	3.0
Offset, s	0	Reference Point	End	Red	1.0	0.0	1.0	1.0	1.0	1.0							
Uncoordinated	No	Simult. Gap E/W	On														
Force Mode	Fixed	Simult. Gap N/S	On														

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	4.4	70.3	7.6	73.4	5.5	7.6	14.6	16.6
Change Period, (Y+R <sub>c</sub> ), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.4	3.1	3.4
Queue Clearance Time (g <sub>s</sub> ), s	2.1		2.7		2.7	2.9	10.5	3.1
Green Extension Time (g <sub>e</sub> ), s	0.0	0.0	0.1	0.0	0.0	0.1	0.2	0.1
Phase Call Probability	0.09		0.71		0.30	0.72	0.99	1.00
Max Out Probability	0.00		0.00		0.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	3	158	157	45	805	397	13	14		167	18	
Adjusted Saturation Flow Rate (s), veh/h/ln	1645	1810	1787	1723	1810	1786	1723	1533		1645	1464	
Queue Service Time (g <sub>s</sub> ), s	0.1	1.1	1.2	0.7	2.4	2.4	0.7	0.9		8.5	1.1	
Cycle Queue Clearance Time (g <sub>c</sub> ), s	0.1	1.1	1.2	0.7	2.4	2.4	0.7	0.9		8.5	1.1	
Capacity (c), veh/h	364	1199	1185	804	2512	1239	147	55		281	185	
Volume-to-Capacity Ratio (X)	0.009	0.131	0.132	0.055	0.320	0.321	0.089	0.256		0.596	0.100	
Available Capacity (c <sub>a</sub> ), veh/h	1324	1199	1185	1757	2512	1239	482	712		453	812	
Back of Queue (Q), veh/ln (95th percentile)	0.0	0.8	0.8	0.3	1.2	1.4	0.6	0.6		6.0	0.7	
Overflow Queue (Q <sub>o</sub> ), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio (RQ) (95th percentile)	0.00	0.00	0.00	0.04	0.00	0.00	0.14	0.00		0.81	0.00	
Uniform Delay (d <sub>1</sub> ), s/veh	5.5	2.0	2.0	3.6	1.2	1.2	45.4	46.9		31.9	38.6	
Incremental Delay (d <sub>2</sub> ), s/veh	0.0	0.2	0.2	0.0	0.3	0.7	0.1	0.9		0.8	0.1	
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	5.5	2.3	2.3	3.6	1.6	1.9	45.5	47.8		32.7	38.7	
Level of Service (LOS)	A	A	A	A	A	A	D	D		C	D	
Approach Delay, s/veh / LOS	2.3		A	1.8		A	46.7		D	33.3		C
Intersection Delay, s/veh / LOS	5.8						A					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.2		B	2.2		B	3.0		C	3.2		C
Bicycle LOS Score / LOS	0.7		A	1.2		A	0.5		A	0.8		A

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>59th Avenue/Access A</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/28/2012</i>	Analysis Year	<i>2015</i>
Analysis Time Period	<i>AM Pk Hr</i>		

Project Description <i>2015 Build</i>	
East/West Street: <i>Access A</i>	North/South Street: <i>59th Avenue</i>
Intersection Orientation: <i>North-South</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound			
	Movement	1	2	3	4	5	6
		L	T	R	L	T	R
Volume (veh/h)		<i>1</i>	<i>728</i>			<i>1026</i>	<i>28</i>
Peak-Hour Factor, PHF		<i>0.92</i>	<i>0.92</i>	<i>1.00</i>	<i>1.00</i>	<i>0.92</i>	<i>0.92</i>
Hourly Flow Rate, HFR (veh/h)		<i>1</i>	<i>791</i>	<i>0</i>	<i>0</i>	<i>1115</i>	<i>30</i>
Percent Heavy Vehicles		<i>5</i>	<i>--</i>	<i>--</i>	<i>0</i>	<i>--</i>	<i>--</i>
Median Type	<i>Two Way Left Turn Lane</i>						
RT Channelized				<i>0</i>			<i>0</i>
Lanes		<i>1</i>	<i>2</i>	<i>0</i>	<i>0</i>	<i>2</i>	<i>1</i>
Configuration		<i>L</i>	<i>T</i>			<i>T</i>	<i>R</i>
Upstream Signal			<i>0</i>			<i>0</i>	

Minor Street	Eastbound			Westbound			
	Movement	7	8	9	10	11	12
		L	T	R	L	T	R
Volume (veh/h)		<i>4</i>		<i>3</i>			
Peak-Hour Factor, PHF		<i>0.92</i>	<i>1.00</i>	<i>0.92</i>	<i>1.00</i>	<i>1.00</i>	<i>1.00</i>
Hourly Flow Rate, HFR (veh/h)		<i>4</i>	<i>0</i>	<i>3</i>	<i>0</i>	<i>0</i>	<i>0</i>
Percent Heavy Vehicles		<i>5</i>	<i>0</i>	<i>5</i>	<i>0</i>	<i>0</i>	<i>0</i>
Percent Grade (%)			<i>0</i>			<i>0</i>	
Flared Approach			<i>N</i>			<i>N</i>	
Storage			<i>0</i>			<i>0</i>	
RT Channelized				<i>0</i>			<i>0</i>
Lanes		<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Configuration			<i>LR</i>				

### Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound			
	Movement	1	4	7	8	9	10	11	12
Lane Configuration		<i>L</i>						<i>LR</i>	
v (veh/h)		<i>1</i>						<i>7</i>	
C (m) (veh/h)		<i>589</i>						<i>283</i>	
v/c		<i>0.00</i>						<i>0.02</i>	
95% queue length		<i>0.01</i>						<i>0.08</i>	
Control Delay (s/veh)		<i>11.1</i>						<i>18.0</i>	
LOS		<i>B</i>						<i>C</i>	
Approach Delay (s/veh)		<i>--</i>	<i>--</i>					<i>18.0</i>	
Approach LOS		<i>--</i>	<i>--</i>					<i>C</i>	

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>59th Avenue/Access A</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/28/2012</i>	Analysis Year	<i>2015</i>
Analysis Time Period	<i>PM Pk Hr</i>		

Project Description <i>2015 Build</i>	
East/West Street: <i>Access A</i>	North/South Street: <i>59th Avenue</i>
Intersection Orientation: <i>North-South</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street Movement	Northbound			Southbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume (veh/h)	<i>2</i>	<i>1184</i>			<i>733</i>	<i>10</i>
Peak-Hour Factor, PHF	<i>0.92</i>	<i>0.92</i>	<i>0.92</i>	<i>1.00</i>	<i>0.92</i>	<i>0.92</i>
Hourly Flow Rate, HFR (veh/h)	<i>2</i>	<i>1286</i>	<i>0</i>	<i>0</i>	<i>796</i>	<i>10</i>
Percent Heavy Vehicles	<i>5</i>	<i>--</i>	<i>--</i>	<i>0</i>	<i>--</i>	<i>--</i>
Median Type	<i>Two Way Left Turn Lane</i>					
RT Channelized			<i>0</i>			<i>0</i>
Lanes	<i>1</i>	<i>2</i>	<i>0</i>	<i>0</i>	<i>2</i>	<i>1</i>
Configuration	<i>L</i>	<i>T</i>			<i>T</i>	<i>R</i>
Upstream Signal		<i>0</i>			<i>0</i>	

Minor Street Movement	Eastbound			Westbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume (veh/h)	<i>14</i>		<i>9</i>			
Peak-Hour Factor, PHF	<i>0.92</i>	<i>1.00</i>	<i>0.92</i>	<i>1.00</i>	<i>1.00</i>	<i>1.00</i>
Hourly Flow Rate, HFR (veh/h)	<i>15</i>	<i>0</i>	<i>9</i>	<i>0</i>	<i>0</i>	<i>0</i>
Percent Heavy Vehicles	<i>5</i>	<i>0</i>	<i>5</i>	<i>0</i>	<i>0</i>	<i>0</i>
Percent Grade (%)		<i>0</i>			<i>0</i>	
Flared Approach		<i>N</i>			<i>N</i>	
Storage		<i>0</i>			<i>0</i>	
RT Channelized			<i>0</i>			<i>0</i>
Lanes	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Configuration		<i>LR</i>				

### Delay, Queue Length, and Level of Service

Approach Movement	Northbound	Southbound	Westbound			Eastbound		
	1	4	7	8	9	10	11	12
Lane Configuration	<i>L</i>						<i>LR</i>	
v (veh/h)	<i>2</i>						<i>24</i>	
C (m) (veh/h)	<i>795</i>						<i>325</i>	
v/c	<i>0.00</i>						<i>0.07</i>	
95% queue length	<i>0.01</i>						<i>0.24</i>	
Control Delay (s/veh)	<i>9.5</i>						<i>17.0</i>	
LOS	<i>A</i>						<i>C</i>	
Approach Delay (s/veh)	<i>--</i>	<i>--</i>					<i>17.0</i>	
Approach LOS	<i>--</i>	<i>--</i>					<i>C</i>	

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>59th Avenue/Access B</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/28/2012</i>	Analysis Year	<i>2015</i>
Analysis Time Period	<i>AM Pk Hr</i>		
Project Description <i>2015 Build</i>			
East/West Street: <i>Access B</i>		North/South Street: <i>59th Avenue</i>	
Intersection Orientation: <i>North-South</i>		Study Period (hrs): <i>0.25</i>	

Vehicle Volumes and Adjustments						
Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		730			996	33
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	793	0	0	1082	35
Percent Heavy Vehicles	5	--	--	0	--	--
Median Type	<i>Two Way Left Turn Lane</i>					
RT Channelized			0			0
Lanes	0	2	0	0	2	1
Configuration		T			T	R
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)			1			
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	0	1	0	0	0
Percent Heavy Vehicles	5	0	5	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	1	0	0	0
Configuration			R			

Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								R
v (veh/h)								1
C (m) (veh/h)								531
v/c								0.00
95% queue length								0.01
Control Delay (s/veh)								11.8
LOS								B
Approach Delay (s/veh)	--	--				11.8		
Approach LOS	--	--				B		

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>59th Avenue/Access B</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/28/2012</i>	Analysis Year	<i>2015</i>
Analysis Time Period	<i>PM Pk Hr</i>		
Project Description <i>2015 Build</i>			
East/West Street: <i>Access B</i>		North/South Street: <i>59th Avenue</i>	
Intersection Orientation: <i>North-South</i>		Study Period (hrs): <i>0.25</i>	

Vehicle Volumes and Adjustments						
Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		1185			731	11
Peak-Hour Factor, PHF	0.92	0.92	0.92	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	1288	0	0	794	11
Percent Heavy Vehicles	5	--	--	0	--	--
Median Type	<i>Two Way Left Turn Lane</i>					
RT Channelized			0			0
Lanes	0	2	0	0	2	1
Configuration		T			T	R
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)			2			
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	0	2	0	0	0
Percent Heavy Vehicles	5	0	5	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	1	0	0	0
Configuration			R			

Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								R
v (veh/h)								2
C (m) (veh/h)								642
v/c								0.00
95% queue length								0.01
Control Delay (s/veh)								10.6
LOS								B
Approach Delay (s/veh)	--	--				10.6		
Approach LOS	--	--				B		

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>Van Buren Street/Access C</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/28/2012</i>	Analysis Year	<i>2015</i>
Analysis Time Period	<i>AM Pk Hr</i>		

Project Description <i>2015 Build</i>	
East/West Street: <i>Van Buren Street</i>	North/South Street: <i>Access C</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound			
	Movement	1	2	3	4	5	6
		L	T	R	L	T	R
Volume (veh/h)			<i>1354</i>			<i>375</i>	<i>24</i>
Peak-Hour Factor, PHF	<i>0.92</i>	<i>0.92</i>	<i>0.92</i>	<i>1.00</i>	<i>0.92</i>	<i>0.92</i>	
Hourly Flow Rate, HFR (veh/h)	<i>0</i>	<i>1471</i>	<i>0</i>	<i>0</i>	<i>407</i>	<i>26</i>	
Percent Heavy Vehicles	<i>5</i>	<i>--</i>	<i>--</i>	<i>0</i>	<i>--</i>	<i>--</i>	
Median Type	<i>Two Way Left Turn Lane</i>						
RT Channelized			<i>0</i>			<i>0</i>	
Lanes	<i>0</i>	<i>2</i>	<i>0</i>	<i>0</i>	<i>2</i>	<i>1</i>	
Configuration		<i>T</i>			<i>T</i>	<i>R</i>	
Upstream Signal		<i>0</i>			<i>0</i>		

Minor Street	Northbound			Southbound			
	Movement	7	8	9	10	11	12
		L	T	R	L	T	R
Volume (veh/h)							<i>1</i>
Peak-Hour Factor, PHF	<i>0.92</i>	<i>0.92</i>	<i>1.00</i>	<i>1.00</i>	<i>0.92</i>	<i>0.92</i>	
Hourly Flow Rate, HFR (veh/h)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>1</i>	
Percent Heavy Vehicles	<i>5</i>	<i>5</i>	<i>0</i>	<i>0</i>	<i>5</i>	<i>5</i>	
Percent Grade (%)		<i>0</i>			<i>0</i>		
Flared Approach		<i>N</i>			<i>N</i>		
Storage		<i>0</i>			<i>0</i>		
RT Channelized			<i>0</i>			<i>0</i>	
Lanes	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>1</i>	
Configuration						<i>R</i>	

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
			7	8	9	10	11	12
Movement	<i>1</i>	<i>4</i>						
Lane Configuration								<i>R</i>
v (veh/h)								<i>1</i>
C (m) (veh/h)								<i>826</i>
v/c								<i>0.00</i>
95% queue length								<i>0.00</i>
Control Delay (s/veh)								<i>9.4</i>
LOS								<i>A</i>
Approach Delay (s/veh)	<i>--</i>	<i>--</i>					<i>9.4</i>	
Approach LOS	<i>--</i>	<i>--</i>					<i>A</i>	

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>Van Buren Street/Access C</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/28/2012</i>	Analysis Year	<i>2015</i>
Analysis Time Period	<i>PM Pk Hr</i>		

Project Description <i>2015 Build</i>	
East/West Street: <i>Van Buren Street</i>	North/South Street: <i>Access C</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound			
	Movement	1	2	3	4	5	6
		L	T	R	L	T	R
Volume (veh/h)			<i>408</i>			<i>1140</i>	<i>9</i>
Peak-Hour Factor, PHF	<i>0.92</i>	<i>0.92</i>	<i>0.92</i>	<i>1.00</i>	<i>0.92</i>	<i>0.92</i>	
Hourly Flow Rate, HFR (veh/h)	<i>0</i>	<i>443</i>	<i>0</i>	<i>0</i>	<i>1239</i>	<i>9</i>	
Percent Heavy Vehicles	<i>5</i>	--	--	<i>0</i>	--	--	
Median Type	<i>Two Way Left Turn Lane</i>						
RT Channelized			<i>0</i>			<i>0</i>	
Lanes	<i>0</i>	<i>2</i>	<i>0</i>	<i>0</i>	<i>2</i>	<i>1</i>	
Configuration		<i>T</i>			<i>T</i>	<i>R</i>	
Upstream Signal		<i>0</i>			<i>0</i>		

Minor Street	Northbound			Southbound			
	Movement	7	8	9	10	11	12
		L	T	R	L	T	R
Volume (veh/h)							<i>4</i>
Peak-Hour Factor, PHF	<i>0.92</i>	<i>0.92</i>	<i>1.00</i>	<i>1.00</i>	<i>0.92</i>	<i>0.92</i>	
Hourly Flow Rate, HFR (veh/h)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>4</i>	
Percent Heavy Vehicles	<i>5</i>	<i>5</i>	<i>0</i>	<i>0</i>	<i>5</i>	<i>5</i>	
Percent Grade (%)		<i>0</i>			<i>0</i>		
Flared Approach		<i>N</i>			<i>N</i>		
Storage		<i>0</i>			<i>0</i>		
RT Channelized			<i>0</i>			<i>0</i>	
Lanes	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>1</i>	
Configuration						<i>R</i>	

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound			
	Movement	1	4	7	8	9	10	11	12
Lane Configuration									<i>R</i>
v (veh/h)									<i>4</i>
C (m) (veh/h)									<i>478</i>
v/c									<i>0.01</i>
95% queue length									<i>0.03</i>
Control Delay (s/veh)									<i>12.6</i>
LOS									<i>B</i>
Approach Delay (s/veh)	--	--						<i>12.6</i>	
Approach LOS	--	--						<i>B</i>	

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>Van Buren Street/Access E</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/28/2012</i>	Analysis Year	<i>2015</i>
Analysis Time Period	<i>AM Pk Hr</i>		

Project Description <i>2015 Build</i>	
East/West Street: <i>Van Buren Street</i>	North/South Street: <i>Access E</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound			
	Movement	1	2	3	4	5	6
		L	T	R	L	T	R
Volume (veh/h)			<i>1352</i>			<i>273</i>	<i>52</i>
Peak-Hour Factor, PHF	<i>0.92</i>	<i>0.92</i>	<i>0.92</i>	<i>1.00</i>	<i>0.92</i>	<i>0.92</i>	<i>0.92</i>
Hourly Flow Rate, HFR (veh/h)	<i>0</i>	<i>1469</i>	<i>0</i>	<i>0</i>	<i>296</i>	<i>56</i>	
Percent Heavy Vehicles	<i>5</i>	--	--	<i>0</i>	--	--	
Median Type	<i>Two Way Left Turn Lane</i>						
RT Channelized			<i>0</i>			<i>0</i>	
Lanes	<i>0</i>	<i>2</i>	<i>0</i>	<i>0</i>	<i>2</i>	<i>1</i>	
Configuration		<i>T</i>			<i>T</i>	<i>R</i>	
Upstream Signal		<i>0</i>			<i>0</i>		

Minor Street	Northbound			Southbound			
	Movement	7	8	9	10	11	12
		L	T	R	L	T	R
Volume (veh/h)							<i>3</i>
Peak-Hour Factor, PHF	<i>0.92</i>	<i>0.92</i>	<i>1.00</i>	<i>1.00</i>	<i>0.92</i>	<i>0.92</i>	<i>0.92</i>
Hourly Flow Rate, HFR (veh/h)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>3</i>
Percent Heavy Vehicles	<i>5</i>	<i>5</i>	<i>0</i>	<i>0</i>	<i>5</i>	<i>5</i>	
Percent Grade (%)	<i>0</i>			<i>0</i>			
Flared Approach		<i>N</i>			<i>N</i>		
Storage		<i>0</i>			<i>0</i>		
RT Channelized			<i>0</i>			<i>0</i>	
Lanes	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>1</i>	
Configuration						<i>R</i>	

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound						
			Movement	1	4	7	8	9	10	11	12	
Lane Configuration												<i>R</i>
v (veh/h)												<i>3</i>
C (m) (veh/h)												<i>888</i>
v/c												<i>0.00</i>
95% queue length												<i>0.01</i>
Control Delay (s/veh)												<i>9.1</i>
LOS												<i>A</i>
Approach Delay (s/veh)	--	--										<i>9.1</i>
Approach LOS	--	--										<i>A</i>

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>Van Buren Street/Access E</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/28/2012</i>	Analysis Year	<i>2015</i>
Analysis Time Period	<i>PM Pk Hr</i>		

Project Description <i>2015 Build</i>	
East/West Street: <i>Van Buren Street</i>	North/South Street: <i>Access E</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound			
	Movement	1	2	3	4	5	6
		L	T	R	L	T	R
Volume (veh/h)			<i>291</i>			<i>1034</i>	<i>17</i>
Peak-Hour Factor, PHF	<i>0.92</i>	<i>0.92</i>	<i>0.92</i>	<i>1.00</i>	<i>0.92</i>	<i>0.92</i>	<i>0.92</i>
Hourly Flow Rate, HFR (veh/h)	<i>0</i>	<i>316</i>	<i>0</i>	<i>0</i>	<i>1123</i>	<i>18</i>	
Percent Heavy Vehicles	<i>5</i>	--	--	<i>0</i>	--	--	--
Median Type	<i>Two Way Left Turn Lane</i>						
RT Channelized			<i>0</i>			<i>0</i>	
Lanes	<i>0</i>	<i>2</i>	<i>0</i>	<i>0</i>	<i>2</i>	<i>1</i>	
Configuration		<i>T</i>			<i>T</i>	<i>R</i>	
Upstream Signal		<i>0</i>			<i>0</i>		

Minor Street	Northbound			Southbound			
	Movement	7	8	9	10	11	12
		L	T	R	L	T	R
Volume (veh/h)							<i>13</i>
Peak-Hour Factor, PHF	<i>0.92</i>	<i>0.92</i>	<i>1.00</i>	<i>1.00</i>	<i>0.92</i>	<i>0.92</i>	<i>0.92</i>
Hourly Flow Rate, HFR (veh/h)	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>14</i>
Percent Heavy Vehicles	<i>5</i>	<i>5</i>	<i>0</i>	<i>0</i>	<i>5</i>	<i>5</i>	
Percent Grade (%)		<i>0</i>			<i>0</i>		
Flared Approach		<i>N</i>			<i>N</i>		
Storage		<i>0</i>			<i>0</i>		
RT Channelized			<i>0</i>				<i>0</i>
Lanes	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>1</i>
Configuration							<i>R</i>

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound					
			Movement	1	4	7	8	9	10	11	12
Lane Configuration											<i>R</i>
v (veh/h)											<i>14</i>
C (m) (veh/h)											<i>516</i>
v/c											<i>0.03</i>
95% queue length											<i>0.08</i>
Control Delay (s/veh)											<i>12.2</i>
LOS											<i>B</i>
Approach Delay (s/veh)	--	--									<i>12.2</i>
Approach LOS	--	--									<i>B</i>

## TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information					
Analyst	kmh		Intersection	Van Buren Street/Access F				
Agency/Co.	TASK		Jurisdiction	City of Phoenix				
Date Performed	12/28/2012		Analysis Year	2015				
Analysis Time Period	AM Pk Hr							
Project Description 2015 Build								
East/West Street: Van Buren Street			North/South Street: Access F					
Intersection Orientation: East-West			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	12	1339	48	5	243	28		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	13	1455	52	5	264	30		
Percent Heavy Vehicles	5	--	--	5	--	--		
Median Type	Two Way Left Turn Lane							
RT Channelized			0			0		
Lanes	1	2	0	1	2	1		
Configuration	L	T	TR	L	T	R		
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	6	0	14	7	0	4		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	6	0	15	7	0	4		
Percent Heavy Vehicles	10	10	10	10	10	10		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	1	1	0	1	1	0		
Configuration	L		TR	L		TR		
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	L		TR	L		TR
v (veh/h)	13	5	6		15	7		4
C (m) (veh/h)	1243	426	102		387	265		891
v/c	0.01	0.01	0.06		0.04	0.03		0.00
95% queue length	0.03	0.04	0.18		0.12	0.08		0.01
Control Delay (s/veh)	7.9	13.6	42.5		14.7	19.0		9.1
LOS	A	B	E		B	C		A
Approach Delay (s/veh)	--	--	22.6			15.4		
Approach LOS	--	--	C			C		

## TWO-WAY STOP CONTROL SUMMARY

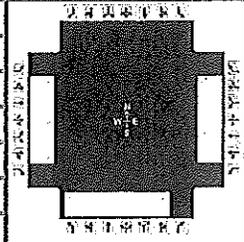
General Information			Site Information					
Analyst	kmh		Intersection	Van Buren Street/Access F				
Agency/Co.	TASK		Jurisdiction	City of Phoenix				
Date Performed	12/28/2012		Analysis Year	2015				
Analysis Time Period	PM Pk Hr							
Project Description 2015 Build								
East/West Street: Van Buren Street			North/South Street: Access F					
Intersection Orientation: East-West			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	4	270	10	41	1095	9		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	4	293	10	44	1190	9		
Percent Heavy Vehicles	5	--	--	5	--	--		
Median Type	Two Way Left Turn Lane							
RT Channelized			0			0		
Lanes	1	2	0	1	2	1		
Configuration	L	T	TR	L	T	R		
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	12	0	12	28	0	17		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	13	0	13	30	0	18		
Percent Heavy Vehicles	10	10	10	10	10	10		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	1	1	0	1	1	0		
Configuration	L		TR	L		TR		
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound		Southbound			
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	L		TR	L		TR
v (veh/h)	4	44	13		13	30		18
C (m) (veh/h)	561	1233	280		867	137		481
v/c	0.01	0.04	0.05		0.01	0.22		0.04
95% queue length	0.02	0.11	0.15		0.05	0.79		0.12
Control Delay (s/veh)	11.5	8.0	18.5		9.2	38.5		12.8
LOS	B	A	C		A	E		B
Approach Delay (s/veh)	--	--	13.8		28.9			
Approach LOS	--	--	B		D			

# **APPENDIX A**

## **2030 BUILD**

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK			Duration, h	0.25		
Analyst	ken Howell	Analysis Date	Dec 30, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	AM Pk Hr	PHF	0.92		
Intersection	59th Avenue NB	Analysis Year	2030	Analysis Period	1> 7:00		
File Name	Van Buren South Mountain Fwy TI AM.xus						
Project Description	2030 Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	57	1034			1003	124	61	1447	492			

Signal Information				Signal Diagram																		
Cycle, s	110.0	Reference Phase	2																			
Offset, s	110	Reference Point	End																			
Uncoordinated	No	Simult. Gap E/W	On																			
Force Mode	Fixed	Simult. Gap N/S	On																			
				Green	55.8	4.2	35.0	0.0	0.0	0.0												
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0												
				Red	1.0	1.0	1.0	0.0	0.0	0.0												

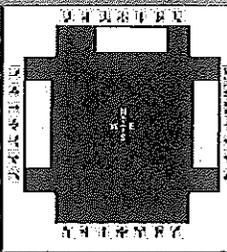
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		
Case Number	2.0	4.0		7.3		9.0		
Phase Duration, s	9.2	70.0		60.8		40.0		
Change Period, (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Allow Headway (MAH), s	3.1	0.0		0.0		3.1		
Queue Clearance Time (qs), s	4.0					37.0		
Green Extension Time (ge), s	0.5	0.0		0.0		0.0		
Phase Call Probability	0.85					1.00		
Max Out Probability	1.00					1.00		

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16	3	8	18			
Adjusted Flow Rate (v), veh/h	62	1124			1090	124	66	1573	470			
Adjusted Saturation Flow Rate (s), veh/h/ln	1673	1643			1643	1533	1673	1643	1533			
Queue Service Time (gs), s	2.0	13.2			7.6	3.2	1.5	35.0	33.1			
Cycle Queue Clearance Time (gc), s	2.0	13.2			7.6	3.2	1.5	35.0	33.1			
Capacity (c), veh/h	129	2913			3331	777	1065	1568	488			
Volume-to-Capacity Ratio (X)	0.479	0.386			0.327	0.159	0.062	1.003	0.962			
Available Capacity (ca), veh/h	152	2913			3331	777	1065	1568	488			
Back of Queue (Q), veh/ln (95th percentile)	1.5	8.0			4.4	2.0	1.1	23.8	22.8			
Overflow Queue (Qs), veh/ln	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Queue Storage Ratio (RQ) (95th percentile)	0.10	0.00			0.00	0.00	0.07	0.00	0.00			
Uniform Delay (d1), s/veh	50.0	11.8			10.0	9.3	26.1	37.5	36.9			
Incremental Delay (d2), s/veh	1.0	0.4			0.3	0.4	0.0	23.4	31.0			
Initial Queue Delay (d3), s/veh	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Control Delay (d), s/veh	50.9	12.1			10.3	9.8	26.1	60.9	67.9			
Level of Service (LOS)	D	B			B	A	C	F	E			
Approach Delay, s/veh / LOS	14.2	B		10.2	B	61.4	E	0.0				
Intersection Delay, s/veh / LOS	35.2						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.5	B	2.9	C	3.4	C	3.7	D
Bicycle LOS Score / LOS	1.1	A	1.0	A	1.6	A		

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK			Duration, h	0.25		
Analyst	ken Howell	Analysis Date	Dec 30, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	AM Pk Hr	PHF	0.92		
Intersection	59th Avenue, SB	Analysis Year	2030	Analysis Period	1> 7:00		
File Name	Van Buren South Mountain Fwy TI AM.xus						
Project Description	2030 Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h		949	177	197	867					142	856	47

Signal Information				Signal Timing (s)												
Cycle, s	110.0	Reference Phase	2	Green	9.5	53.3	32.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Offset, s	0	Reference Point	End	Yellow	4.0	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Uncoordinated	No	Simult. Gap E/W	On	Red	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On													

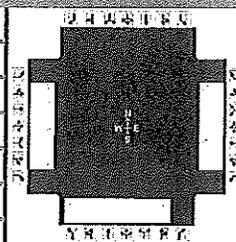
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6				4
Case Number		7.3	2.0	4.0				9.0
Phase Duration, s		58.3	14.5	72.8				37.2
Change Period, (Y+Rc), s		5.0	5.0	5.0				5.0
Max Allow Headway (MAH), s		0.0	3.1	0.0				3.1
Queue Clearance Time (gs), s			9.0					30.8
Green Extension Time (ge), s		0.0	0.5	0.0				1.4
Phase Call Probability			1.00					1.00
Max Out Probability			0.00					0.68

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6					7	4	14
Adjusted Flow Rate (v), veh/h		1032	182	214	942					154	930	51
Adjusted Saturation Flow Rate (s), veh/h/ln		1643	1533	1673	1643					1723	1723	1533
Queue Service Time (gs), s		7.7	5.5	7.0	5.3					7.7	28.8	2.7
Cycle Queue Clearance Time (gc), s		7.7	5.5	7.0	5.3					7.7	28.8	2.7
Capacity (c), veh/h		3184	743	289	3038					504	1008	449
Volume-to-Capacity Ratio (X)		0.324	0.244	0.740	0.310					0.306	0.923	0.114
Available Capacity (ca), veh/h		3184	743	1150	3038					548	1096	488
Back of Queue (Q), veh/ln (95th percentile)		4.6	3.4	5.7	2.8					5.7	19.4	1.8
Overflow Queue (Qs), veh/ln		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)		0.00	0.00	0.37	0.00					0.37	0.00	0.00
Uniform Delay (d1), s/veh		11.4	11.0	53.7	4.5					30.2	37.7	28.5
Incremental Delay (d2), s/veh		0.3	0.8	1.4	0.3					0.1	11.5	0.0
Initial Queue Delay (d3), s/veh		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Control Delay (d), s/veh		11.7	11.8	55.0	4.7					30.4	49.2	28.5
Level of Service (LOS)		B	B	E	A					C	D	C
Approach Delay, s/veh / LOS	11.7	B		14.0	B		0.0			45.7	D	
Intersection Delay, s/veh / LOS	23.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.1	B	3.7	D	3.4	C
Bicycle LOS Score / LOS	1.0	A	1.1	A			1.4	A

## HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK			Duration, h	0.25		
Analyst	ken Howell	Analysis Date	Dec 30, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	PM Pk Hr	PHF	0.92		
Intersection	59th Avenue NB	Analysis Year	2030	Analysis Period	1> 7:00		
File Name	Van Buren South Mountain Fwy TI PM.xus						
Project Description	2030 Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	8	815			1599	110	72	1207	264			

Signal Information																								
Cycle, s	110.0	Reference Phase	2	Green	61.2	1.4	32.4	0.0	0.0	0.0	Yellow	4.0	4.0	4.0	0.0	0.0	0.0	Red	1.0	1.0	1.0	0.0	0.0	0.0
Offset, s	110	Reference Point	End																					
Uncoordinated	No	Simult. Gap E/W	On																					
Force Mode	Fixed	Simult. Gap N/S	On																					

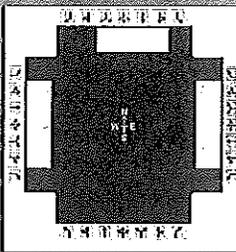
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		8		
Case Number	2.0	4.0		7.3		9.0		
Phase Duration, s	6.4	72.6		66.2		37.4		
Change Period, (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Allow Headway (MAH), s	3.1	0.0		0.0		3.1		
Queue Clearance Time (gs), s	2.4					30.1		
Green Extension Time (ge), s	1.1	0.0		0.0		2.3		
Phase Call Probability	0.28			1.00				
Max Out Probability	1.00			0.68				

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16	3	8	18			
Adjusted Flow Rate (v), veh/h	11	1110			1738	109	78	1312	222			
Adjusted Saturation Flow Rate (s), veh/h/ln	1673	1643			1643	1533	1673	1643	1533			
Queue Service Time (gs), s	0.4	16.5			11.6	2.2	1.9	28.1	13.1			
Cycle Queue Clearance Time (gc), s	0.4	16.5			11.6	2.2	1.9	28.1	13.1			
Capacity (c), veh/h	43	3028			3654	853	986	1453	452			
Volume-to-Capacity Ratio (X)	0.253	0.366			0.476	0.127	0.079	0.903	0.491			
Available Capacity (Ca), veh/h	152	3028			3654	853	1065	1568	488			
Back of Queue (Q), veh/ln (95th percentile)	0.3	10.7			5.8	1.4	1.3	17.6	8.4			
Overflow Queue (Q3), veh/ln	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Queue Storage Ratio (RQ) (95th percentile)	0.02	0.00			0.00	0.00	0.09	0.00	0.00			
Uniform Delay (d1), s/veh	53.2	16.4			7.8	6.6	28.0	37.3	32.0			
Incremental Delay (d2), s/veh	1.0	0.3			0.4	0.3	0.0	7.0	0.3			
Initial Queue Delay (d3), s/veh	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Control Delay (d), s/veh	54.3	16.7			8.3	6.9	28.0	44.2	32.3			
Level of Service (LOS)	D	B			A	A	C	D	C			
Approach Delay, s/veh / LOS	17.1	B		8.2	A		41.8	D	0.0			
Intersection Delay, s/veh / LOS	22.2						C					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.5	B		2.9	C		3.4	C		3.7	D	
Bicycle LOS Score / LOS	1.0	A		1.2	A		1.4	A				

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK			Duration, h	0.25		
Analyst	ken Howell	Analysis Date	Dec 30, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	PM Pk Hr	PHF	0.92		
Intersection	59th Avenue, SB	Analysis Year	2030	Analysis Period	1> 7:00		
File Name	Van Buren South Mountain Fwy TI PM.xus						
Project Description	2030 Build						



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h		804	166	509	1212					227	1323	29

Signal Information				Signal Timing (s)						Signal Phases							
Cycle, s	110.0	Reference Phase	2	Green	20.5	39.5	35.0	0.0	0.0	0.0	Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Offset, s	0	Reference Point	End	Red	1.0	1.0	1.0	0.0	0.0	0.0							
Uncoordinated	No	Simult. Gap E/W	On														
Force Mode	Fixed	Simult. Gap N/S	On														

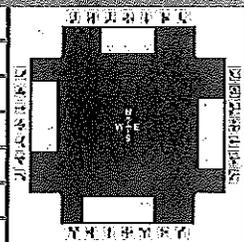
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6				4
Case Number		7.3	2.0	4.0				9.0
Phase Duration, s		44.5	25.5	70.0				40.0
Change Period, (Y+Rc), s		5.0	5.0	5.0				5.0
Max Allow Headway (MAH), s		0.0	3.1	0.0				3.0
Queue Clearance Time (gs), s			19.3					37.0
Green Extension Time (ge), s		0.0	1.2	0.0				0.0
Phase Call Probability			1.00					1.00
Max Out Probability			0.00					1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6					7	4	14
Adjusted Flow Rate (v), veh/h		874	170	537	1279					247	1438	32
Adjusted Saturation Flow Rate (s), veh/h/ln		1643	1533	1673	1643					1723	1723	1533
Queue Service Time (gs), s		9.3	7.4	17.3	8.7					12.5	35.0	1.6
Cycle Queue Clearance Time (gc), s		9.3	7.4	17.3	8.7					12.5	35.0	1.6
Capacity (c), veh/h		2361	551	623	2913					548	1096	488
Volume-to-Capacity Ratio (X)		0.370	0.308	0.862	0.439					0.450	1.312	0.065
Available Capacity (ca), veh/h		2361	551	1065	2913					548	1096	488
Back of Queue (Q), veh/ln (95th percentile)		6.0	4.9	11.6	4.2					8.8	54.4	1.0
Overflow Queue (Q3), veh/ln		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)		0.00	0.00	0.76	0.00					0.58	0.00	0.00
Uniform Delay (d1), s/veh		20.8	20.3	45.9	5.3					29.8	37.5	26.1
Incremental Delay (d2), s/veh		0.4	1.4	1.4	0.4					0.2	146.9	0.0
Initial Queue Delay (d3), s/veh		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Control Delay (d), s/veh		21.2	21.7	47.2	5.7					30.1	184.4	26.1
Level of Service (LOS)		C	C	D	A					C	F	C
Approach Delay, s/veh / LOS	21.3	C		18.0	B		0.0			159.3	F	
Intersection Delay, s/veh / LOS	71.8						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.1	B	3.7	D	3.4	C
Bicycle LOS Score / LOS	0.9	A	1.5	A			1.9	A

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 31, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	AM Pk Hr	PHF	0.92		
Intersection	Van Buren St/51st Avenue	Analysis Year	2030	Analysis Period	1> 7:00		
File Name	VB51 AM .xus						
Project Description	2030 Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	99	1360	134	54	1002	139	5	926	146	76	685	107

Signal Information															
Cycle, s	100.0	Reference Phase	2												
Offset, s	0	Reference Point	End	Green	4.0	1.0	47.3	0.7	4.0	27.0					
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.0	0.0	3.0	3.0	0.0	3.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	0.0	1.0	1.0	0.0	1.0					

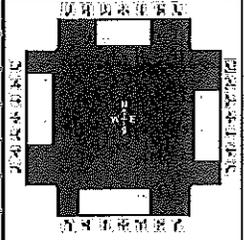
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	9.0	52.3	8.0	51.3	4.7	31.0	8.7	35.0
Change Period, (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (qs), s	5.1		3.7		2.2	22.0	5.1	23.2
Green Extension Time (ge), s	0.2	0.0	0.1	0.0	0.0	5.0	0.1	5.1
Phase Call Probability	0.95		0.80		0.14	1.00	0.90	1.00
Max Out Probability	0.00		0.00		0.00	0.04	0.00	0.02

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	108	1478	146	59	845	396	5	795	370	83	441	420
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1723	1610	1723	1810	1693	1723	1810	1680	1723	1810	1724
Queue Service Time (qs), s	3.1	35.7	3.7	1.7	12.5	12.6	0.2	19.9	20.0	3.1	21.2	21.2
Cycle Queue Clearance Time (qc), s	3.1	35.7	3.7	1.7	12.5	12.6	0.2	19.9	20.0	3.1	21.2	21.2
Capacity (c), veh/h	309	1663	777	179	1710	800	145	978	454	186	561	534
Volume-to-Capacity Ratio (X)	0.348	0.889	0.187	0.328	0.494	0.494	0.037	0.813	0.816	0.445	0.786	0.786
Available Capacity (ca), veh/h	848	1663	777	735	1710	800	409	1712	795	381	928	884
Back of Queue (Q), veh/ln (95th percentile)	2.0	17.3	2.4	1.2	7.7	7.7	0.2	12.3	11.8	2.2	12.8	12.3
Overflow Queue (Qo), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.26	0.00	0.00	0.15	0.00	0.00	0.02	0.00	0.00	0.29	0.00	0.00
Uniform Delay (d1), s/veh	12.6	15.6	9.9	19.5	12.1	12.1	27.6	29.7	29.7	24.1	26.4	26.5
Incremental Delay (d2), s/veh	0.2	7.5	0.5	0.4	1.0	2.2	0.0	0.6	1.4	0.6	0.9	1.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	12.9	23.1	10.4	19.9	13.1	14.3	27.7	30.4	31.1	24.7	27.4	27.4
Level of Service (LOS)	B	C	B	B	B	B	C	C	C	C	C	C
Approach Delay, s/veh / LOS	21.4	C		13.8	B		30.6	C		27.2	C	
Intersection Delay, s/veh / LOS	22.6						C					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.9	C		3.1	C		3.0	C		3.3	C	
Bicycle LOS Score / LOS	1.9	A		1.2	A		1.1	A		1.3	A	

## HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 31, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	PM Pk Hr	PHF	0.92		
Intersection	Van Buren St/51st Avenue	Analysis Year	2030	Analysis Period	1 > 7:00		
File Name	VB51 PM .xus						
Project Description	2030 Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	127	1072	67	70	1581	184	23	637	111	107	1071	153

Signal Information													
Cycle, s	100.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	4.4	2.2	38.9	2.5	3.5	32.5			
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.0	0.0	3.0	3.0	0.0	3.0			
Force Mode	Float	Simult. Gap N/S	On	Red	1.0	0.0	1.0	1.0	0.0	1.0			

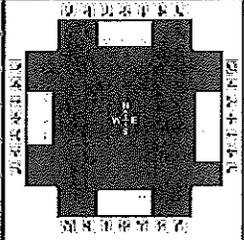
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.6	45.1	8.4	42.9	6.5	36.5	10.0	40.0
Change Period, (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (qs), s	6.6		4.6		3.0	13.1	6.1	38.0
Green Extension Time (ge), s	0.1	0.0	0.1	0.0	0.0	5.4	0.1	0.0
Phase Call Probability	0.98		0.88		0.50	1.00	0.96	1.00
Max Out Probability	0.00		0.00		0.00	0.08	0.00	1.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	138	1165	73	76	1301	618	25	554	259	116	678	652
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1723	1610	1723	1810	1710	1723	1810	1670	1723	1810	1730
Queue Service Time (gs), s	4.6	27.8	2.2	2.6	33.2	33.5	1.0	10.9	11.1	4.1	36.0	36.0
Cycle Queue Clearance Time (gc), s	4.6	27.8	2.2	2.6	33.2	33.5	1.0	10.9	11.1	4.1	36.0	36.0
Capacity (c), veh/h	197	1416	662	205	1409	666	123	1177	543	314	651	623
Volume-to-Capacity Ratio (X)	0.700	0.823	0.110	0.371	0.923	0.928	0.203	0.470	0.478	0.370	1.041	1.047
Available Capacity (ca), veh/h	360	1416	662	405	1409	666	356	1303	601	487	651	623
Back of Queue (Q), veh/ln (95th percentile)	3.2	15.2	1.5	1.8	19.8	21.2	0.7	7.5	7.1	2.8	29.6	29.2
Overflow Queue (Qs), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.41	0.00	0.00	0.24	0.00	0.00	0.09	0.00	0.00	0.36	0.00	0.00
Uniform Delay (d1), s/veh	22.5	19.6	13.8	20.5	22.7	22.8	26.2	22.2	22.2	18.3	26.0	26.0
Incremental Delay (d2), s/veh	1.7	5.5	0.3	0.4	11.5	21.1	0.3	0.1	0.2	0.3	46.4	49.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	24.2	25.1	14.1	20.9	34.2	43.9	26.5	22.3	22.5	18.6	72.4	75.0
Level of Service (LOS)	C	C	B	C	C	D	C	C	C	B	F	F
Approach Delay, s/veh / LOS	24.5	C		36.7	D		22.5	C		69.2	E	
Intersection Delay, s/veh / LOS	39.9						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	3.2	C	2.9	C	3.3	C
Bicycle LOS Score / LOS	1.6	A	1.6	A	0.9	A	1.7	A

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 31, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	AM Pk Hr	PHF	0.92		
Intersection	Van Buren St/67th Avenue	Analysis Year	2030	Analysis Period	1 > 7:00		
File Name	VB67 AM .xus						
Project Description	2030 Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	73	959	15	11	712	188	5	891	146	158	659	8

Signal Information															
Cycle, s	100.0	Reference Phase	2												
Offset, s	0	Reference Point	End	Green	1.4	0.5	35.1	0.7	2.9	35.5					
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.0	3.0	3.0	3.0	3.0	3.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0	1.0	1.0	1.0	1.0					

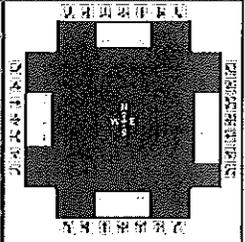
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	2.0	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	9.9	43.6	5.4	39.1	4.7	39.5	11.6	46.3
Change Period, (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (qs), s	6.5		2.4		2.2	31.4	7.4	13.9
Green Extension Time (ge), s	0.1	0.0	0.0	0.0	0.0	4.1	0.3	4.1
Phase Call Probability	0.89		0.28		0.14	1.00	0.99	1.00
Max Out Probability	0.00		0.00		0.00	0.01	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	79	531	528	12	674	304	5	578	550	172	363	362
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1810	1800	1723	1810	1614	1723	1810	1720	1723	1810	1802
Queue Service Time (qs), s	4.5	22.8	22.8	0.4	13.2	13.4	0.2	29.3	29.4	5.4	11.9	11.9
Cycle Queue Clearance Time (qc), s	4.5	22.8	22.8	0.4	13.2	13.4	0.2	29.3	29.4	5.4	11.9	11.9
Capacity (c), veh/h	102	716	712	183	1269	566	298	642	610	232	766	763
Volume-to-Capacity Ratio (X)	0.779	0.742	0.742	0.065	0.531	0.538	0.018	0.900	0.901	0.740	0.474	0.474
Available Capacity (ca), veh/h	620	716	712	778	1269	566	976	1130	1074	515	1254	1249
Back of Queue (Q), veh/ln (95th percentile)	3.6	14.1	14.1	0.3	8.9	8.6	0.1	16.4	15.8	3.6	7.6	7.6
Overflow Queue (Qs), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.47	0.00	0.00	0.04	0.00	0.00	0.02	0.00	0.00	0.47	0.00	0.00
Uniform Delay (d1), s/veh	45.4	19.7	19.7	21.9	20.8	20.9	20.5	24.7	24.7	21.5	15.2	15.2
Incremental Delay (d2), s/veh	4.8	6.8	6.9	0.1	1.6	3.6	0.0	2.4	2.6	1.7	0.2	0.2
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	50.2	26.5	26.5	22.0	22.4	24.5	20.5	27.1	27.3	23.3	15.3	15.3
Level of Service (LOS)	D	C	C	C	C	C	C	C	C	C	B	B
Approach Delay, s/veh / LOS	28.2	C		23.0	C		27.2	C		16.9	B	
Intersection Delay, s/veh / LOS	24.2						C					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.8	C		2.8	C		2.9	C		3.2	C	
Bicycle LOS Score / LOS	1.4	A		1.0	A		1.4	A		1.2	A	

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 31, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	PM Pk Hr	PHF	0.92		
Intersection	Van Buren St/67th Avenue	Analysis Year	2030	Analysis Period	1> 7:00		
File Name	VB67 PM .xus						
Project Description	2030 Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	10	681	7	6	1062	208	5	806	127	196	845	181

Signal Information				Signal Timing (s)						Signal Phases			
Cycle, s	100.0	Reference Phase	2	Green	45.7	0.7	4.4	33.2	0.0	0.0	Left	Thru	Right
Offset, s	0	Reference Point	End	Yellow	3.0	3.0	3.0	3.0	0.0	0.0	Left	Thru	Right
Uncoordinated	No	Simult. Gap E/W	On	Red	1.0	1.0	1.0	1.0	0.0	0.0	Left	Thru	Right
Force Mode	Fixed	Simult. Gap N/S	On										

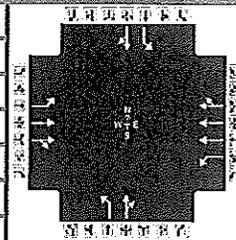
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		6.0		6.0	1.1	4.0	1.1	4.0
Phase Duration, s		49.7		49.7	4.7	37.2	13.1	45.6
Change Period, (Y+Rc), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	3.1	3.1	3.1	3.1
Queue Clearance Time (qs), s					2.2	28.0	8.8	26.6
Green Extension Time (ge), s		0.0		0.0	0.0	5.2	0.4	5.2
Phase Call Probability					0.14	1.00	1.00	1.00
Max Out Probability					0.00	0.01	0.00	0.00

Movement Group Results	EB			WB			NB			SB			
	L	T	R	L	T	R	L	T	R	L	T	R	
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14	
Adjusted Flow Rate (v), veh/h	11	375	373	7	947	433	5	519	495	213	575	540	
Adjusted Saturation Flow Rate (s), veh/h/ln	380	1810	1803	690	1810	1654	1723	1810	1723	1723	1810	1698	
Queue Service Time (gs), s	1.5	11.2	11.2	0.5	15.7	15.7	0.2	26.0	26.0	6.8	24.6	24.6	
Cycle Queue Clearance Time (gc), s	17.5	11.2	11.2	11.7	15.7	15.7	0.2	26.0	26.0	6.8	24.6	24.6	
Capacity (c), veh/h	186	828	825	311	1655	756	167	600	571	268	752	706	
Volume-to-Capacity Ratio (X)	0.058	0.453	0.453	0.021	0.572	0.573	0.033	0.866	0.866	0.796	0.764	0.765	
Available Capacity (ca), veh/h	186	828	825	311	1655	756	965	1319	1256	645	1471	1381	
Back of Queue (Q), veh/ln (95th percentile)	0.3	7.6	7.5	0.1	9.1	9.0	0.2	14.9	14.4	4.5	13.1	12.5	
Overflow Queue (Qs), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Queue Storage Ratio (RQ) (95th percentile)	0.04	0.00	0.00	0.02	0.00	0.00	0.02	0.00	0.00	0.58	0.00	0.00	
Uniform Delay (d1), s/veh	18.9	12.8	12.8	15.9	13.6	13.7	23.2	25.9	25.9	20.9	18.5	18.5	
Incremental Delay (d2), s/veh	0.6	1.8	1.8	0.1	1.4	3.1	0.0	1.5	1.6	2.1	0.6	0.7	
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh	19.5	14.6	14.6	16.0	15.1	16.8	23.3	27.4	27.5	22.9	19.1	19.2	
Level of Service (LOS)	B	B	B	B	B	B	C	C	C	C	B	B	
Approach Delay, s/veh / LOS	14.6	B		15.6	B		27.4	C			19.8	B	
Intersection Delay, s/veh / LOS	19.4						B						

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.8	C	2.9	C	3.2	C
Bicycle LOS Score / LOS	1.1	A	1.3	A	1.3	A	1.6	A

## HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 31, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	AM Pk Hr	PHF	0.92		
Intersection	Van Buren St/61st Avenue	Analysis Year	2030	Analysis Period	1> 7:00		
File Name	VB61 AM .xus						
Project Description	2030 Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	42	951	60	5	748	81	12	0	13	43	0	6

Signal Information				Signal Phases												
Cycle, s	100.0	Reference Phase	2	[Signal Diagrams]												
Offset, s	0	Reference Point	End	[Signal Diagrams]												
Uncoordinated	No	Simult. Gap E/W	On	Green	0.7	2.9	73.7	1.5	2.1	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
				Red	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

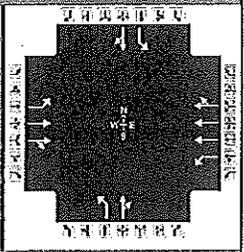
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase	5	2	1	6	3	8	7	4				
Case Number	2.0	4.0	1.1	4.0	1.1	4.0	1.1	4.0				
Phase Duration, s	7.6	80.6	4.7	77.7	5.5	7.0	7.6	9.2				
Change Period, (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.4	3.1	3.4				
Queue Clearance Time (qs), s	4.7		2.1		2.7	2.9	4.7	2.4				
Green Extension Time (ge), s	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Phase Call Probability	0.72		0.14		0.30		0.61		0.73		0.85	
Max Out Probability	0.00		0.00		0.00		0.00		0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	46	555	544	5	610	291	13	14		47	7	
Adjusted Saturation Flow Rate (s), veh/h/ln	1645	1810	1771	1723	1810	1716	1723	1533		1645	1464	
Queue Service Time (gs), s	2.7	0.0	0.0	0.1	0.4	0.4	0.7	0.9		2.7	0.4	
Cycle Queue Clearance Time (gc), s	2.7	0.0	0.0	0.1	0.4	0.4	0.7	0.9		2.7	0.4	
Capacity (c), veh/h	59	1386	1357	450	2668	1265	140	47		160	75	
Volume-to-Capacity Ratio (X)	0.772	0.400	0.401	0.012	0.229	0.230	0.093	0.303		0.293	0.086	
Available Capacity (ca), veh/h	1009	1386	1357	1495	2668	1265	389	742		363	739	
Back of Queue (Q), veh/ln (95th percentile)	2.2	0.6	0.6	0.0	0.3	0.4	0.6	0.6		1.9	0.3	
Overflow Queue (Qs), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio (RQ) (95th percentile)	0.30	0.00	0.00	0.01	0.00	0.00	0.15	0.00		0.35	0.00	
Uniform Delay (d1), s/veh	47.2	0.0	0.0	3.3	0.2	0.2	45.9	47.4		42.8	45.2	
Incremental Delay (d2), s/veh	7.7	0.9	0.9	0.0	0.2	0.4	0.1	1.3		0.4	0.2	
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	54.9	0.9	0.9	3.3	0.4	0.7	46.0	48.8		43.1	45.4	
Level of Service (LOS)	D	A	A	A	A	A	D	D		D	D	
Approach Delay, s/veh / LOS	3.0	A		0.5	A		47.4	D		43.4	D	
Intersection Delay, s/veh / LOS	3.5						A					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.2	B		2.2	B		3.0	C		3.2	C	
Bicycle LOS Score / LOS	1.4	A		1.0	A		0.5	A		0.6	A	

## HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Dec 31, 2012	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	PM Pk Hr	PHF	0.92		
Intersection	Van Buren St/61st Avenue	Analysis Year	2030	Analysis Period	1 > 7:00		
File Name	VB61 PM .xus						
Project Description	2030 Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	16	736	60	10	1326	28	13	0	16	165	0	27

Signal Information				Signal Phases						Signal Diagrams			
Cycle, s	100.0	Reference Phase	2	Green	72.9	1.6	5.4	4.1	0.0	0.0			
Offset, s	0	Reference Point	End	Yellow	3.0	3.0	3.0	3.0	0.0	0.0			
Uncoordinated	No	Simult. Gap E/W	On	Red	1.0	1.0	1.0	1.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On										

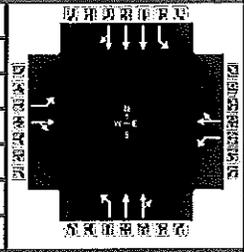
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6	3	8	7	4
Case Number		6.0		6.0	1.1	4.0	1.1	4.0
Phase Duration, s		76.9		76.9	5.6	8.1	15.0	17.5
Change Period, (Y+Rc), s		4.0		4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s		0.0		0.0	3.1	3.4	3.1	3.4
Queue Clearance Time (qs), s					2.8	3.1	11.0	3.8
Green Extension Time (ge), s		0.0		0.0	0.0	0.1	0.1	0.1
Phase Call Probability					0.32	0.82	0.99	1.00
Max Out Probability					0.00	0.00	0.14	0.00

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	17	438	427	11	985	487	14	17		179	29	
Adjusted Saturation Flow Rate (s), veh/h/ln	332	1810	1761	619	1810	1789	1723	1533		1645	1464	
Queue Service Time (gs), s	0.2	1.0	1.0	0.1	1.2	1.2	0.8	1.1		9.0	1.8	
Cycle Queue Clearance Time (gc), s	1.5	1.0	1.0	1.1	1.2	1.2	0.8	1.1		9.0	1.8	
Capacity (c), veh/h	310	1319	1283	516	2637	1304	154	63		292	198	
Volume-to-Capacity Ratio (X)	0.056	0.332	0.333	0.021	0.373	0.373	0.091	0.278		0.614	0.148	
Available Capacity (ca), veh/h	310	1319	1283	516	2637	1304	282	628		374	737	
Back of Queue (Q), veh/ln (95th percentile)	0.1	0.8	0.8	0.0	0.7	1.0	0.6	0.8		6.4	1.1	
Overflow Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Queue Storage Ratio (RQ) (95th percentile)	0.01	0.00	0.00	0.00	0.00	0.00	0.16	0.00		0.86	0.00	
Uniform Delay (d1), s/veh	0.4	0.4	0.4	0.4	0.4	0.4	44.8	46.5		31.2	38.2	
Incremental Delay (d2), s/veh	0.3	0.7	0.7	0.1	0.4	0.8	0.1	0.9		0.8	0.1	
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	0.8	1.1	1.1	0.5	0.8	1.2	44.9	47.4		32.0	38.3	
Level of Service (LOS)	A	A	A	A	A	A	D	D		C	D	
Approach Delay, s/veh / LOS	1.1	A		0.9	A		46.3	D		32.9	C	
Intersection Delay, s/veh / LOS	4.1						A					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.2	B		2.2	B		3.0	C		3.2	C	
Bicycle LOS Score / LOS	1.2	A		1.3	A		0.5	A		0.8	A	

# HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Jan 28, 2013	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	AM Pk Hr	PHF	0.92		
Intersection	59th Avenue/Roosevelt St	Analysis Year	2030	Analysis Period	1 > 7:00		
File Name	59 Roo AM .xus						
Project Description	2030 Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	154	76	94	68	28	88	74	1265	106	91	964	16

Signal Information													
Cycle, s	100.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	4.6	0.1	24.6	4.5	0.3	45.9			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.0	3.0	3.0	3.0	0.0	3.0			
				Red	1.0	1.0	1.0	1.0	0.0	1.0			

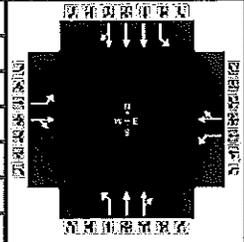
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	12.7	32.7	8.6	28.6	8.5	49.9	8.8	50.2
Change Period, (Y+R <sub>c</sub> ), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.0	3.1	3.0
Queue Clearance Time (g <sub>s</sub> ), s	8.5		5.2		4.4	38.8	5.0	12.2
Green Extension Time (g <sub>e</sub> ), s	0.3	0.0	0.1	0.0	0.1	7.1	0.1	7.5
Phase Call Probability	0.99		0.87		0.89	1.00	0.94	1.00
Max Out Probability	0.00		0.00		0.00	0.12	0.00	0.01

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	167	185		74	126		80	753	738	99	712	353
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1646		1723	1592		1723	1810	1760	1723	1810	1794
Queue Service Time (g <sub>s</sub> ), s	6.5	9.0		3.2	6.5		2.4	36.2	36.8	3.0	10.2	10.2
Cycle Queue Clearance Time (g <sub>c</sub> ), s	6.5	9.0		3.2	6.5		2.4	36.2	36.8	3.0	10.2	10.2
Capacity (c), veh/h	443	472		379	391		333	831	808	186	1674	829
Volume-to-Capacity Ratio (X)	0.378	0.391		0.195	0.322		0.241	0.906	0.913	0.533	0.425	0.426
Available Capacity (c <sub>a</sub> ), veh/h	781	472		788	391		946	1180	1148	517	2372	1175
Back of Queue (Q), veh/ln (95th percentile)	4.6	6.8		2.3	4.8		1.6	18.4	18.4	2.0	6.3	6.3
Overflow Queue (Q <sub>3</sub> ), veh/ln	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.60	0.00		0.30	0.00		0.21	0.00	0.00	0.26	0.00	0.00
Uniform Delay (d <sub>1</sub> ), s/veh	21.3	28.6		26.3	30.9		13.3	17.5	17.6	21.6	12.3	12.3
Incremental Delay (d <sub>2</sub> ), s/veh	0.2	2.4		0.1	2.2		0.1	6.1	6.8	0.9	0.1	0.1
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	21.5	31.1		26.4	33.1		13.4	23.6	24.5	22.5	12.3	12.4
Level of Service (LOS)	C	C		C	C		B	C	C	C	B	B
Approach Delay, s/veh / LOS	26.5		C	30.6		C	23.5		C	13.2		B
Intersection Delay, s/veh / LOS	20.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.2	C	3.0	C	2.3	B	2.3	B
Bicycle LOS Score / LOS	1.1	A	0.8	A	1.8	A	1.1	A

## HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TASK Engineering			Duration, h	0.25		
Analyst	Ken Howell	Analysis Date	Jan 28, 2013	Area Type	Other		
Jurisdiction	City of Phoenix	Time Period	PM Pk Hr	PHF	0.92		
Intersection	59th Avenue/Roosevelt St	Analysis Year	2030	Analysis Period	1> 7:00		
File Name	59 Roo PM .xus						
Project Description	2030 Build						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	44	33	58	148	45	121	67	1068	75	87	1562	63

Signal Information													
Cycle, s	100.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	3.7	0.2	30.4	4.3	0.6	40.8			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.0	3.0	3.0	3.0	0.0	3.0			
				Red	1.0	1.0	1.0	1.0	0.0	1.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	7.7	34.4	11.9	38.6	8.3	44.8	8.9	45.4
Change Period, (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Allow Headway (MAH), s	3.1	0.0	3.1	0.0	3.1	3.0	3.1	3.0
Queue Clearance Time (gs), s	3.9		7.7		4.4	31.5	5.1	28.1
Green Extension Time (ge), s	0.1	0.0	0.3	0.0	0.1	9.3	0.2	9.6
Phase Call Probability	0.74		0.99		0.87	1.00	0.93	1.00
Max Out Probability	0.00		0.00		0.00	0.21	0.00	0.16

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	48	99		161	180		73	628	614	95	1185	581
Adjusted Saturation Flow Rate (s), veh/h/ln	1723	1623		1723	1600		1723	1810	1767	1723	1810	1772
Queue Service Time (gs), s	1.9	4.5		5.7	8.3		2.4	29.5	29.5	3.1	26.1	26.1
Cycle Queue Clearance Time (gc), s	1.9	4.5		5.7	8.3		2.4	29.5	29.5	3.1	26.1	26.1
Capacity (c), veh/h	441	494		532	554		187	738	721	205	1497	733
Volume-to-Capacity Ratio (X)	0.108	0.200		0.302	0.326		0.390	0.851	0.852	0.461	0.792	0.792
Available Capacity (ca), veh/h	952	494		901	554		732	1051	1027	913	2123	1039
Back of Queue (Q), veh/ln (95th percentile)	1.4	3.3		3.9	5.9		1.7	16.0	15.8	2.1	13.8	13.8
Overflow Queue (Q3), veh/ln	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Queue Storage Ratio (RQ) (95th percentile)	0.18	0.00		0.51	0.00		0.22	0.00	0.00	0.28	0.00	0.00
Uniform Delay (dt), s/veh	22.4	25.8		17.6	24.1		19.9	20.2	20.2	20.7	19.0	19.0
Incremental Delay (d2), s/veh	0.0	0.9		0.1	1.6		0.5	3.4	3.6	0.6	0.9	1.7
Initial Queue Delay (d3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	22.5	26.7		17.8	25.7		20.4	23.6	23.8	21.3	19.8	20.7
Level of Service (LOS)	C	C		B	C		C	C	C	C	B	C
Approach Delay, s/veh / LOS	25.3		C	21.9		C	23.5		C	20.2		C
Intersection Delay, s/veh / LOS	21.8						C					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	3.2		C	2.9		C	2.3		B	2.3		B
Bicycle LOS Score / LOS	0.7		A	1.1		A	1.6		A	1.5		A

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>59th Avenue/Access A</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/30/2012</i>	Analysis Year	<i>2030</i>
Analysis Time Period	<i>AM Pk Hr</i>		

Project Description <i>2030 Build</i>	
East/West Street: <i>Access A</i>	North/South Street: <i>59th Avenue</i>
Intersection Orientation: <i>North-South</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)					1049	23
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	0	1140	24
Percent Heavy Vehicles	5	--	--	0	--	--
Median Type	<i>Two Way Left Turn Lane</i>					
RT Channelized			0			0
Lanes	0	0	0	0	2	1
Configuration					T	R
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)			5			
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	0	5	0	0	0
Percent Heavy Vehicles	5	0	10	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	1	0	0	0
Configuration			R			

### Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								R
v (veh/h)								5
C (m) (veh/h)								506
v/c								0.01
95% queue length								0.03
Control Delay (s/veh)								12.2
LOS								B
Approach Delay (s/veh)	--	--				12.2		
Approach LOS	--	--				B		

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>59th Avenue/Access A</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/30/2012</i>	Analysis Year	<i>2030</i>
Analysis Time Period	<i>PM Pk Hr</i>		

Project Description <i>2030 Build</i>	
East/West Street: <i>Access A</i>	North/South Street: <i>59th Avenue</i>
Intersection Orientation: <i>North-South</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)					1534	8
Peak-Hour Factor, PHF	0.92	0.92	0.92	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	0	1667	8
Percent Heavy Vehicles	5	--	--	0	--	--
Median Type	<i>Two Way Left Turn Lane</i>					
RT Channelized			0			0
Lanes	0	0	0	0	2	1
Configuration					T	R
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)			18			
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	0	19	0	0	0
Percent Heavy Vehicles	5	0	10	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	1	0	0	0
Configuration			R			

### Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								R
v (veh/h)								19
C (m) (veh/h)								356
v/c								0.05
95% queue length								0.17
Control Delay (s/veh)								15.7
LOS								C
Approach Delay (s/veh)	--	--					15.7	
Approach LOS	--	--					C	

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>59th Avenue/Access B</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/30/2012</i>	Analysis Year	<i>2030</i>
Analysis Time Period	<i>AM Pk Hr</i>		

Project Description <i>2030 Build</i>	
East/West Street: <i>Access B</i>	North/South Street: <i>59th Avenue</i>
Intersection Orientation: <i>North-South</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)					1036	13
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	0	1126	14
Percent Heavy Vehicles	5	--	--	0	--	--
Median Type	<i>Undivided</i>					
RT Channelized			0			0
Lanes	0	0	0	0	2	1
Configuration					T	R
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)			9			
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	0	9	0	0	0
Percent Heavy Vehicles	5	0	5	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	1	0	0	0
Configuration			R			

### Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								R
v (veh/h)								9
C (m) (veh/h)								520
v/c								0.02
95% queue length								0.05
Control Delay (s/veh)								12.0
LOS								B
Approach Delay (s/veh)	--	--					12.0	
Approach LOS	--	--					B	

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>59th Avenue/Access B</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/30/2012</i>	Analysis Year	<i>2030</i>
Analysis Time Period	<i>PM Pk Hr</i>		

Project Description <i>2030 Build</i>	
East/West Street: <i>Access B</i>	North/South Street: <i>59th Avenue</i>
Intersection Orientation: <i>North-South</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)					1548	4
Peak-Hour Factor, PHF	0.92	0.92	0.92	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	0	1682	4
Percent Heavy Vehicles	5	--	--	0	--	--
Median Type	<i>Undivided</i>					
RT Channelized			0			0
Lanes	0	0	0	0	2	1
Configuration					T	R
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)			31			
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	0	33	0	0	0
Percent Heavy Vehicles	5	0	10	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	1	0	0	0
Configuration			R			

### Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								R
v (veh/h)								33
C (m) (veh/h)								353
v/c								0.09
95% queue length								0.31
Control Delay (s/veh)								16.2
LOS								C
Approach Delay (s/veh)	--	--				16.2		
Approach LOS	--	--				C		

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>59th Avenue/Fillmore Street</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>1/28/2013</i>	Analysis Year	<i>2030</i>
Analysis Time Period	<i>AM Pk Hr</i>		

Project Description <i>2030 Build</i>	
East/West Street: <i>Fillmore Street</i>	North/South Street: <i>59th Avenue</i>
Intersection Orientation: <i>North-South</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)					1077	13
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	0	1170	14
Percent Heavy Vehicles	5	--	--	0	--	--
Median Type	<i>Two Way Left Turn Lane</i>					
RT Channelized			0			0
Lanes	0	0	0	0	2	1
Configuration					T	R
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0		25			
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	0	27	0	0	0
Percent Heavy Vehicles	5	0	5	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

### Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration							LR	
v (veh/h)							27	
C (m) (veh/h)							505	
v/c							0.05	
95% queue length							0.17	
Control Delay (s/veh)							12.5	
LOS							B	
Approach Delay (s/veh)	--	--				12.5		
Approach LOS	--	--				B		

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>59th Avenue/Fillmore Street</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>1/28/2013</i>	Analysis Year	<i>2030</i>
Analysis Time Period	<i>PM Pk Hr</i>		

Project Description <i>2030 Build</i>	
East/West Street: <i>Fillmore Street</i>	North/South Street: <i>59th Avenue</i>
Intersection Orientation: <i>North-South</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)					1703	50
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	0	1851	54
Percent Heavy Vehicles	5	--	--	0	--	--
Median Type	<i>Two Way Left Turn Lane</i>					
RT Channelized			0			0
Lanes	0	0	0	0	2	1
Configuration					T	R
Upstream Signal		1			1	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)			22			
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	0	23	0	0	0
Percent Heavy Vehicles	5	0	5	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	1	0	0	0
Configuration			R			

### Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								R
v (veh/h)								23
C (m) (veh/h)								322
v/c								0.07
95% queue length								0.23
Control Delay (s/veh)								17.0
LOS								C
Approach Delay (s/veh)	--	--				17.0		
Approach LOS	--	--				C		

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>Van Buren Street/Access C</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/31/2012</i>	Analysis Year	<i>2030</i>
Analysis Time Period	<i>AM Pk Hr</i>		

Project Description <i>2030 Build</i>	
East/West Street: <i>Van Buren Street</i>	North/South Street: <i>Access C</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		1126			829	22
Peak-Hour Factor, PHF	0.92	0.92	0.92	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	1223	0	0	901	23
Percent Heavy Vehicles	5	--	--	0	--	--
Median Type	<i>Two Way Left Turn Lane</i>					
RT Channelized			0			0
Lanes	0	2	0	0	2	1
Configuration		T			T	R
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						2
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	0	0	2
Percent Heavy Vehicles	5	5	0	0	5	5
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	1
Configuration						R

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								R
v (veh/h)								2
C (m) (veh/h)								598
v/c								0.00
95% queue length								0.01
Control Delay (s/veh)								11.0
LOS								B
Approach Delay (s/veh)	--	--				11.0		
Approach LOS	--	--				B		

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>Van Buren Street/Access C</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/31/2012</i>	Analysis Year	<i>2030</i>
Analysis Time Period	<i>PM Pk Hr</i>		

Project Description <i>2030 Build</i>	
East/West Street: <i>Van Buren Street</i>	North/South Street: <i>Access C</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		970			1191	8
Peak-Hour Factor, PHF	0.92	0.92	0.92	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	1054	0	0	1294	8
Percent Heavy Vehicles	5	--	--	0	--	--
Median Type	<i>Two Way Left Turn Lane</i>					
RT Channelized			0			0
Lanes	0	2	0	0	2	1
Configuration		T			T	R
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						8
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	0	0	8
Percent Heavy Vehicles	5	5	0	0	5	5
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	1
Configuration						R

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								R
v (veh/h)								8
C (m) (veh/h)								461
v/c								0.02
95% queue length								0.05
Control Delay (s/veh)								12.9
LOS								B
Approach Delay (s/veh)	--	--				12.9		
Approach LOS	--	--				B		

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>Van Buren Street/Access E</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/28/2012</i>	Analysis Year	<i>2030</i>
Analysis Time Period	<i>AM Pk Hr</i>		

Project Description <i>2030 Build</i>	
East/West Street: <i>Van Buren Street</i>	North/South Street: <i>Access E</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

Vehicle Volumes and Adjustments						
Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		1046			829	40
Peak-Hour Factor, PHF	0.92	0.92	0.92	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	1136	0	0	901	43
Percent Heavy Vehicles	5	--	--	0	--	--
Median Type	<i>Two Way Left Turn Lane</i>					
RT Channelized			0			0
Lanes	0	2	0	0	2	1
Configuration		T			T	R
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						2
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	0	0	2
Percent Heavy Vehicles	5	5	0	0	5	5
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	1
Configuration						R

Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								R
v (veh/h)								2
C (m) (veh/h)								598
v/c								0.00
95% queue length								0.01
Control Delay (s/veh)								11.0
LOS								B
Approach Delay (s/veh)	--	--				11.0		
Approach LOS	--	--				B		

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>Van Buren Street/Access E</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/31/2012</i>	Analysis Year	<i>2030</i>
Analysis Time Period	<i>PM Pk Hr</i>		

Project Description <i>2030 Build</i>	
East/West Street: <i>Van Buren Street</i>	North/South Street: <i>Access E</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

### Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		809			1297	13
Peak-Hour Factor, PHF	0.92	0.92	0.92	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	879	0	0	1409	14
Percent Heavy Vehicles	5	--	--	0	--	--
Median Type	<i>Two Way Left Turn Lane</i>					
RT Channelized			0			0
Lanes	0	2	0	0	2	1
Configuration		T			T	R
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						10
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	0	0	10
Percent Heavy Vehicles	5	5	0	0	5	10
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	1
Configuration						R

### Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								R
v (veh/h)								10
C (m) (veh/h)								415
v/c								0.02
95% queue length								0.07
Control Delay (s/veh)								13.9
LOS								B
Approach Delay (s/veh)	--	--				13.9		
Approach LOS	--	--				B		

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>Van Buren Street/Access F</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/31/2012</i>	Analysis Year	<i>2030</i>
Analysis Time Period	<i>AM Pk Hr</i>		

Project Description <i>2030 Build</i>	
East/West Street: <i>Van Buren Street</i>	North/South Street: <i>Access F</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

Vehicle Volumes and Adjustments						
Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	15	1203	68	4	792	37
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	16	1307	73	4	860	40
Percent Heavy Vehicles	5	--	--	5	--	--
Median Type	<i>Two Way Left Turn Lane</i>					
RT Channelized			0			0
Lanes	1	2	0	1	2	1
Configuration	L	T	TR	L	T	R
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	12	0	13	3	0	2
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	13	0	14	3	0	2
Percent Heavy Vehicles	10	10	10	10	10	10
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	1	0	1	1	0
Configuration	L		TR	L		TR

Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	L		TR	L		TR
v (veh/h)	16	4	13		14	3		2
C (m) (veh/h)	732	477	113		423	178		600
v/c	0.02	0.01	0.12		0.03	0.02		0.00
95% queue length	0.07	0.03	0.38		0.10	0.05		0.01
Control Delay (s/veh)	10.0	12.6	41.0		13.8	25.6		11.0
LOS	B	B	E		B	D		B
Approach Delay (s/veh)	--	--	26.9			19.8		
Approach LOS	--	--	D			C		

## TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	<i>kmh</i>	Intersection	<i>Van Buren Street/Access F</i>
Agency/Co.	<i>TASK</i>	Jurisdiction	<i>City of Phoenix</i>
Date Performed	<i>12/31/2012</i>	Analysis Year	<i>2030</i>
Analysis Time Period	<i>PM Pk Hr</i>		

Project Description <i>2030 Build</i>	
East/West Street: <i>Van Buren Street</i>	North/South Street: <i>Access F</i>
Intersection Orientation: <i>East-West</i>	Study Period (hrs): <i>0.25</i>

Vehicle Volumes and Adjustments						
Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	9	890	63	7	1334	18
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	9	967	68	7	1449	19
Percent Heavy Vehicles	5	--	--	5	--	--
Median Type	<i>Two Way Left Turn Lane</i>					
RT Channelized			0			0
Lanes	1	2	0	1	2	1
Configuration	L	T	TR	L	T	R
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	16	0	16	10	0	11
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	17	0	17	10	0	11
Percent Heavy Vehicles	10	10	10	10	10	10
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	1	0	1	1	0
Configuration	L		TR	L		TR

Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	L		TR	L		TR
v (veh/h)	9	7	17		17	10		11
C (m) (veh/h)	441	650	147		533	99		404
v/c	0.02	0.01	0.12		0.03	0.10		0.03
95% queue length	0.06	0.03	0.38		0.10	0.33		0.08
Control Delay (s/veh)	13.3	10.6	32.7		12.0	45.4		14.2
LOS	B	B	D		B	E		B
Approach Delay (s/veh)	--	--	22.3			29.0		
Approach LOS	--	--	C			D		

## **APPENDIX B**

### **TRAFFIC COUNTS**

United Civil Group  
 2803 N. 7th Avenue  
 Phoenix, AZ 85007

Street : 59th Avenue  
 Location : N. of Van Buren Street

Site: TC12066  
 12/6/2012  
 Thursday

24 Hour Volume, per Channel

Interval Start		Interval Start		Interval Start	
NB					
11:00	162	645	23:00	46	181
11:15	154		23:15	61	
11:30	171		23:30	34	
11:45	158		23:45	40	
12:00	174	676	00:00	41	144
12:15	156		00:15	40	
12:30	200		00:30	30	
12:45	146		00:45	33	
13:00	162	752	01:00	32	113
13:15	178		01:15	11	
13:30	206		01:30	40	
13:45	206		01:45	30	
14:00	242	954	02:00	38	162
14:15	207		02:15	52	
14:30	269		02:30	36	
14:45	236		02:45	36	
15:00	230	971	03:00	36	154
15:15	214		03:15	34	
15:30	301		03:30	45	
15:45	226		03:45	39	
16:00	273	1011	04:00	33	190
16:15	222		04:15	48	
16:30	277		04:30	47	
16:45	239		04:45	62	
17:00	290	980	05:00	98	420
17:15	234		05:15	80	
17:30	242		05:30	106	
17:45	214		05:45	136	
18:00	224	749	06:00	145	679
18:15	201		06:15	170	
18:30	170		06:30	177	
18:45	154		06:45	187	
19:00	126	460	07:00	183	709
19:15	134		07:15	166	
19:30	116		07:30	174	
19:45	84		07:45	186	
20:00	92	293	08:00	154	633
20:15	75		08:15	154	
20:30	64		08:30	176	
20:45	62		08:45	149	
21:00	74	297	09:00	136	591
21:15	76		09:15	152	
21:30	71		09:30	143	
21:45	76		09:45	160	
22:00	60	210	10:00	136	615
22:15	54		10:15	156	
22:30	44		10:30	168	
22:45	52		10:45	155	

24 Hour Total  
 12589

00:00 - 12:00  
 12 Hour Count 5055  
 Peak Hour 06:15  
 Peak Volume 717  
 Factor 0.96

12:00 - 00:00  
 12 Hour Count 7534  
 Peak Hour 16:30  
 Peak Volume 1040  
 Factor 0.90



United Civil Group  
 2803 N. 7th Avenue  
 Phoenix, AZ 85007

Street : 59th Avenue  
 Location : S. of Van Buren Street

Site: TC12066  
 12/18/2012  
 Tuesday

24 Hour Volume, per Channel (Volume factor 0.500)

Interval Start		Interval Start	
		NB	
10:00	142	22:00	32
10:15	144	22:15	50
10:30	164	22:30	28
10:45	154	22:45	34
11:00	169	23:00	40
11:15	185	23:15	24
11:30	173	23:30	22
11:45	155	23:45	18
12:00	176	00:00	24
12:15	194	00:15	25
12:30	181	00:30	38
12:45	202	00:45	22
13:00	209	01:00	32
13:15	158	01:15	23
13:30	218	01:30	34
13:45	226	01:45	22
14:00	204	02:00	53
14:15	180	02:15	32
14:30	230	02:30	58
14:45	256	02:45	47
15:00	254	03:00	36
15:15	201	03:15	61
15:30	241	03:30	52
15:45	201	03:45	75
16:00	204	04:00	54
16:15	166	04:15	101
16:30	148	04:30	78
16:45	152	04:45	105
17:00	138	05:00	128
17:15	185	05:15	139
17:30	152	05:30	147
17:45	134	05:45	175
18:00	103	06:00	180
18:15	120	06:15	186
18:30	98	06:30	178
18:45	90	06:45	146
19:00	72	07:00	126
19:15	54	07:15	138
19:30	42	07:30	116
19:45	61	07:45	122
20:00	39	08:00	110
20:15	46	08:15	115
20:30	56	08:30	112
20:45	40	08:45	126
21:00	46	09:00	123
21:15	34	09:15	134
21:30	42	09:30	134
21:45	38	09:45	134
<b>24 Hour Total</b>		<b>24 Hour Total</b>	
604		10866	
682		<u>00:00 - 12:00</u>	
753		12 Hour Count 5027	
811		Peak Hour 05:45	
870		Peak Volume 719	
897		Factor 0.97	
670		<u>12:00 - 00:00</u>	
609		12 Hour Count 5839	
411		Peak Hour 14:45	
229		Peak Volume 952	
181		Factor 0.93	
160			

**United Civil Group**  
 2803 N. 7th Avenue  
 Phoenix, AZ 85007

Street : 59th Avenue  
 Location : S. of Van Buren Street

Site: TC12066  
 12/18/2012  
 Tuesday

24 Hour Volume, per Channel (Volume factor 0.500)

Interval Start		Interval Start	
		SB	
11:00	108	23:00	28
11:15	155	23:15	27
11:30	118	23:30	44
11:45	124	23:45	44
12:00	124	00:00	39
12:15	143	00:15	28
12:30	144	00:30	26
12:45	142	00:45	22
13:00	158	01:00	18
13:15	155	01:15	16
13:30	170	01:30	21
13:45	161	01:45	22
14:00	142	02:00	52
14:15	150	02:15	40
14:30	126	02:30	32
14:45	197	02:45	42
15:00	162	03:00	32
15:15	145	03:15	31
15:30	160	03:30	58
15:45	138	03:45	86
16:00	158	04:00	50
16:15	162	04:15	71
16:30	171	04:30	116
16:45	135	04:45	176
17:00	121	05:00	100
17:15	156	05:15	110
17:30	146	05:30	228
17:45	141	05:45	250
18:00	98	06:00	146
18:15	161	06:15	179
18:30	148	06:30	199
18:45	148	06:45	244
19:00	120	07:00	152
19:15	108	07:15	152
19:30	80	07:30	154
19:45	74	07:45	192
20:00	70	08:00	166
20:15	58	08:15	149
20:30	78	08:30	150
20:45	72	08:45	122
21:00	67	09:00	96
21:15	48	09:15	88
21:30	56	09:30	128
21:45	58	09:45	139
22:00	46	10:00	118
22:15	48	10:15	114
22:30	44	10:30	138
22:45	42	10:45	121

**24 Hour Total**  
10492

**00:00 - 12:00**  
 12 Hour Count 5118  
 Peak Hour 05:30  
 Peak Volume 803  
 Factor 0.80

**12:00 - 00:00**  
 12 Hour Count 5374  
 Peak Hour 14:45  
 Peak Volume 664  
 Factor 0.84

United Civil Group  
 2803 N. 7th Avenue  
 Phoenix, AZ 85007

Street : 63rd Avenue  
 Location : S. of Van Buren Street

Site: TC12066  
 12/6/2012  
 Thursday

24 Hour Volume

Interval Start	NB	SB	Combined	Interval Start	NB	SB	Combined
11:00	0	5	10	23:00	0	0	0
11:15	4	6	10	23:15	0	0	0
11:30	1	2	3	23:30	0	0	0
11:45	0	2	2	23:45	0	0	0
12:00	0	3	14	00:00	0	0	0
12:15	0	2	2	00:15	0	0	0
12:30	1	1	2	00:30	0	0	0
12:45	2	11	13	00:45	0	0	0
13:00	6	6	6	01:00	0	0	0
13:15	0	0	0	01:15	0	0	0
13:30	0	0	0	01:30	0	0	0
13:45	0	0	0	01:45	0	0	0
14:00	0	4	17	02:00	0	0	0
14:15	3	4	7	02:15	0	0	0
14:30	1	6	7	02:30	0	0	0
14:45	0	2	2	02:45	0	0	0
15:00	0	20	25	03:00	0	0	0
15:15	0	0	4	03:15	0	0	0
15:30	19	5	24	03:30	0	0	0
15:45	1	16	17	03:45	0	0	0
16:00	4	13	35	04:00	0	2	4
16:15	0	11	11	04:15	0	0	0
16:30	7	8	15	04:30	0	0	0
16:45	2	7	9	04:45	2	2	4
17:00	0	0	4	05:00	0	5	20
17:15	0	2	2	05:15	0	2	2
17:30	0	0	0	05:30	3	5	8
17:45	0	0	0	05:45	2	8	10
18:00	3	5	8	06:00	0	15	35
18:15	0	2	2	06:15	8	12	20
18:30	2	2	4	06:30	4	6	10
18:45	0	2	2	06:45	3	17	20
19:00	0	3	3	07:00	0	0	0
19:15	0	3	3	07:15	0	0	0
19:30	3	0	3	07:30	0	0	0
19:45	0	0	0	07:45	0	0	0
20:00	0	3	3	08:00	1	14	26
20:15	2	0	2	08:15	0	0	0
20:30	0	2	2	08:30	10	14	24
20:45	1	0	1	08:45	3	10	13
21:00	0	0	0	09:00	2	12	15
21:15	0	0	0	09:15	4	4	8
21:30	0	0	0	09:30	4	5	9
21:45	0	0	0	09:45	2	6	8
22:00	0	0	0	10:00	0	9	26
22:15	0	0	0	10:15	1	6	7
22:30	0	0	0	10:30	2	14	16
22:45	0	0	0	10:45	6	6	12

Volume Totals	NB	SB	Combined
00:00 - 12:00	62 (32.3%)	130 (67.7%)	192
12:00 - 00:00	57 (34.3%)	109 (65.7%)	166
24 Hours	119 (33.2%)	239 (66.8%)	358

Peak Hours	NB	SB	Combined
00:00 - 12:00	19	35	50
12:00 - 00:00	0.48	0.51	0.63

Volume Totals	NB	SB	Combined
00:00 - 12:00	15:15	15:45	15:30
12:00 - 00:00	24	44	65
24 Hours	0.32	0.69	0.68

Started	NB	SB	Combined
08:30	19	35	50
06:00	0.48	0.51	0.63

Started	NB	SB	Combined
15:15	15:15	15:45	15:30
15:15	24	44	65
0.32	0.69	0.68	

United Civil Group  
 2803 N. 7th Avenue  
 Phoenix, AZ 85007

Street : 67th Avenue  
 Location : N. of Van Buren Street

Site: TC12066  
 12/6/2012  
 Thursday

24 Hour Volume, per Channel

Interval Start		Interval Start	
		NB	
10:00	118	22:00	74
10:15	161	22:15	66
10:30	168	22:30	74
10:45	190	22:45	76
11:00	169	23:00	56
11:15	189	23:15	58
11:30	180	23:30	62
11:45	193	23:45	50
12:00	176	00:00	47
12:15	194	00:15	32
12:30	187	00:30	40
12:45	232	00:45	35
13:00	206	01:00	25
13:15	186	01:15	35
13:30	198	01:30	17
13:45	236	01:45	26
14:00	205	02:00	23
14:15	238	02:15	24
14:30	258	02:30	16
14:45	350	02:45	40
15:00	257	03:00	29
15:15	256	03:15	50
15:30	250	03:30	42
15:45	308	03:45	64
16:00	288	04:00	38
16:15	340	04:15	44
16:30	314	04:30	50
16:45	296	04:45	108
17:00	302	05:00	86
17:15	360	05:15	127
17:30	296	05:30	160
17:45	349	05:45	174
18:00	272	06:00	158
18:15	329	06:15	210
18:30	300	06:30	230
18:45	254	06:45	226
19:00	194	07:00	230
19:15	166	07:15	258
19:30	137	07:30	243
19:45	168	07:45	283
20:00	134	08:00	225
20:15	108	08:15	181
20:30	126	08:30	221
20:45	112	08:45	227
21:00	110	09:00	188
21:15	107	09:15	162
21:30	98	09:30	192
21:45	87	09:45	192
		<b>24 Hour Total</b>	
		<b>15626</b>	
		<b>00:00 - 12:00</b>	
		12 Hour Count 6126	
		Peak Hour 07:00	
		Peak Volume 1014	
		Factor 0.90	
		<b>12:00 - 00:00</b>	
		12 Hour Count 9500	
		Peak Hour 17:00	
		Peak Volume 1307	
		Factor 0.91	



United Civil Group  
 2803 N. 7th Avenue  
 Phoenix, AZ 85007

Street : Filmore Street  
 Location : W. of 59th Avenue

Site: TC12066  
 12/6/2012  
 Thursday

24 Hour Volume

Interval Start	EB	WB	Combined	Interval Start	EB	WB	Combined
10:00	7	20	4	9	11	29	
10:15	7	0	7				
10:30	2	2	4				
10:45	4	3	7				
11:00	4	12	4	14	8	26	
11:15	2	5	7				
11:30	4	1	5				
11:45	2	4	6				
12:00	5	17	6	23	11	40	
12:15	5	5	10				
12:30	3	6	9				
12:45	4	6	10				
13:00	6	24	5	26	11	50	
13:15	6	8	14				
13:30	4	9	13				
13:45	8	4	12				
14:00	2	28	3	16	5	44	
14:15	8	4	12				
14:30	10	7	17				
14:45	8	2	10				
15:00	5	16	12	38	17	54	
15:15	6	6	12				
15:30	3	10	13				
15:45	2	10	12				
16:00	2	14	10	48	12	62	
16:15	5	17	22				
16:30	3	7	10				
16:45	4	14	18				
17:00	8	32	17	45	25	77	
17:15	8	10	18				
17:30	11	12	23				
17:45	5	6	11				
18:00	3	20	14	39	17	59	
18:15	7	10	17				
18:30	6	7	13				
18:45	4	8	12				
19:00	4	13	2	14	6	27	
19:15	3	2	5				
19:30	5	6	11				
19:45	1	4	5				
20:00	1	8	2	13	3	21	
20:15	4	4	8				
20:30	3	4	7				
20:45	0	3	3				
21:00	2	7	3	12	5	19	
21:15	2	2	4				
21:30	2	5	7				
21:45	1	2	3				

Interval Start	EB	WB	Combined
22:00	3	6	4
22:15	1	1	2
22:30	2	3	5
22:45	0	1	1
23:00	1	4	1
23:15	2	2	4
23:30	1	3	4
23:45	0	1	1
00:00	0	2	2
00:15	2	0	2
00:30	0	0	0
00:45	0	2	2
01:00	0	2	0
01:15	1	0	1
01:30	0	0	0
01:45	1	2	3
02:00	0	0	0
02:15	0	0	0
02:30	0	0	0
02:45	0	1	1
03:00	0	4	1
03:15	1	0	1
03:30	0	0	0
03:45	3	1	4
04:00	2	10	2
04:15	2	0	2
04:30	4	0	4
04:45	2	2	4
05:00	1	27	1
05:15	7	0	7
05:30	10	1	11
05:45	9	0	9
06:00	4	28	4
06:15	10	2	12
06:30	7	1	8
06:45	7	0	7
07:00	8	54	3
07:15	10	1	9
07:30	19	0	19
07:45	17	1	18
08:00	12	30	14
08:15	5	3	8
08:30	7	4	11
08:45	6	9	15
09:00	8	18	7
09:15	2	6	8
09:30	4	2	6
09:45	4	3	7

Volume Totals	EB	WB	Combined
00:00 - 12:00	207 (73.1%)	76 (26.9%)	283
12:00 - 00:00	189 (39.8%)	286 (60.2%)	475
24 Hours	396 (52.2%)	362 (47.8%)	758

Peak Hours	EB	WB	Combined
00:00 - 12:00			
Started	07:15	08:30	07:15
Volume	58	26	62
Factor	0.76	0.72	0.82

Volume Totals	EB	WB	Combined
12:00 - 00:00			
Started	17:00	16:15	16:45
Volume	32	55	84
Factor	0.73	0.81	0.84

United Civil Group  
2803 N. 7th Avenue  
Phoenix, AZ 85007

Street : Roosevelt Street  
Location : W. of 59th Avenue

Site: TC12066  
12/6/2012  
Thursday

24 Hour Volume

Interval Start	EB	WB	Combined	Interval Start	EB	WB	Combined	Volume Totals	EB	WB	Combined
10:00	22	16	38	22:00	10	23	33	00:00 - 12:00	927 (75.4%)	302 (24.6%)	1229
10:15	18	11	29	22:15	4	4	8	12:00 - 00:00	855 (48.1%)	923 (51.9%)	1778
10:30	15	18	33	22:30	8	4	12	24 Hours	1782 (59.3%)	1225 (40.7%)	3007
10:45	10	22	32	22:45	1	4	5				
11:00	24	92	116	23:00	3	12	15				
11:15	22	14	36	23:15	6	4	10				
11:30	26	22	48	23:30	2	0	2				
11:45	20	27	47	23:45	1	4	5				
12:00	16	58	74	12/7/2012 00:00	2	11	13				
12:15	14	14	28	00:15	4	3	7				
12:30	18	18	36	00:30	1	5	6				
12:45	10	18	28	00:45	4	1	5				
13:00	16	84	100	01:00	1	4	5				
13:15	26	21	47	01:15	1	0	1				
13:30	20	23	43	01:30	2	0	2				
13:45	22	16	38	01:45	0	0	0				
14:00	15	98	113	02:00	0	5	5				
14:15	22	19	41	02:15	1	2	3				
14:30	30	20	50	02:30	2	4	6				
14:45	30	24	54	02:45	2	2	4				
15:00	15	96	111	03:00	1	9	10				
15:15	17	34	51	03:15	2	4	6				
15:30	24	34	58	03:30	3	0	3				
15:45	40	36	76	03:45	3	0	3				
16:00	33	110	143	04:00	1	25	26				
16:15	23	26	49	04:15	6	2	8				
16:30	31	20	51	04:30	8	0	8				
16:45	23	30	53	04:45	10	4	14				
17:00	33	119	152	05:00	10	64	74				
17:15	22	44	66	05:15	15	4	19				
17:30	24	32	56	05:30	19	0	19				
17:45	40	26	66	05:45	20	2	22				
18:00	27	86	113	06:00	42	171	213				
18:15	19	35	54	06:15	26	7	33				
18:30	18	26	44	06:30	42	1	43				
18:45	22	22	44	06:45	61	2	63				
19:00	24	64	88	07:00	52	286	338				
19:15	12	18	30	07:15	64	0	64				
19:30	18	24	42	07:30	82	14	96				
19:45	10	18	28	07:45	88	10	98				
20:00	22	66	88	08:00	64	119	183				
20:15	18	10	28	08:15	22	9	31				
20:30	12	16	28	08:30	14	10	24				
20:45	14	14	28	08:45	19	10	29				
21:00	12	39	51	09:00	27	76	103				
21:15	13	5	18	09:15	25	4	29				
21:30	4	15	19	09:30	8	14	22				
21:45	10	12	22	09:45	16	14	30				

Peak Hours

00:00 - 12:00

12:00 - 00:00

07:15

11:00

15:15

07:15

15:15

07:15

11:00

07:15

15:15

07:15

11:00

07:15

15:15



United Civil Group  
 2803 N. 7th Avenue  
 Phoenix, AZ 85007

Street : Van Buren Street  
 Location : W. of 59th Avenue

Site: TC12066  
 12/6/2012  
 Thursday

24 Hour Volume, per Channel

Interval Start	Interval Start	EB
10:00	22:00	18
10:15	22:15	12
10:30	22:30	21
10:45	22:45	14
11:00	23:00	10
11:15	23:15	16
11:30	23:30	16
11:45	23:45	8
12:00	12/7/2012 00:00	13
12:15	00:15	13
12:30	00:30	11
12:45	00:45	10
13:00	01:00	9
13:15	01:15	4
13:30	01:30	8
13:45	01:45	11
14:00	02:00	10
14:15	02:15	14
14:30	02:30	4
14:45	02:45	6
15:00	03:00	14
15:15	03:15	10
15:30	03:30	14
15:45	03:45	16
16:00	04:00	24
16:15	04:15	23
16:30	04:30	30
16:45	04:45	48
17:00	05:00	50
17:15	05:15	52
17:30	05:30	94
17:45	05:45	199
18:00	06:00	226
18:15	06:15	301
18:30	06:30	364
18:45	06:45	443
19:00	07:00	408
19:15	07:15	442
19:30	07:30	402
19:45	07:45	376
20:00	08:00	375
20:15	08:15	224
20:30	08:30	172
20:45	08:45	146
21:00	09:00	92
21:15	09:15	68
21:30	09:30	61
21:45	09:45	73
287	65	
316	50	
319	47	
378	32	
383	34	
357	54	
339	125	
317	395	
264	1334	
169	1628	
116	917	
105	294	

24 Hour Total  
 8325

00:00 - 12:00  
 12 Hour Count 5463  
 Peak Hour 06:45  
 Peak Volume 1695  
 Factor 0.96

12:00 - 00:00  
 12 Hour Count 2862  
 Peak Hour 13:30  
 Peak Volume 387  
 Factor 0.91

United Civil Group  
 2803 N. 7th Avenue  
 Phoenix, AZ 85007

Street : Van Buren Street  
 Location : W. of 59th Avenue

Site: TC12066  
 12/6/2012  
 Thursday

24 Hour Volume, per Channel

Interval Start	WB	Interval Start	WB
10:00	48	22:00	26
10:15	82	22:15	25
10:30	74	22:30	27
10:45	78	22:45	18
11:00	88	23:00	19
11:15	82	23:15	18
11:30	66	23:30	16
11:45	78	23:45	26
12:00	80	00:00	10
12:15	71	00:15	10
12:30	80	00:30	18
12:45	94	00:45	14
13:00	105	01:00	6
13:15	84	01:15	11
13:30	106	01:30	15
13:45	104	01:45	12
14:00	91	02:00	6
14:15	107	02:15	7
14:30	133	02:30	7
14:45	136	02:45	9
15:00	144	03:00	14
15:15	168	03:15	17
15:30	174	03:30	10
15:45	212	03:45	12
16:00	213	04:00	18
16:15	276	04:15	11
16:30	268	04:30	22
16:45	334	04:45	36
17:00	294	05:00	34
17:15	330	05:15	38
17:30	370	05:30	39
17:45	328	05:45	42
18:00	284	06:00	52
18:15	224	06:15	50
18:30	163	06:30	44
18:45	130	06:45	70
19:00	82	07:00	50
19:15	90	07:15	54
19:30	60	07:30	77
19:45	54	07:45	74
20:00	40	08:00	58
20:15	38	08:15	78
20:30	38	08:30	73
20:45	36	08:45	63
21:00	46	09:00	67
21:15	34	09:15	64
21:30	38	09:30	76
21:45	38	09:45	72

24 Hour Total  
 7908

00:00 - 12:00

12 Hour Count 2036  
 Peak Hour 10:15  
 Peak Volume 322  
 Factor 0.91

12:00 - 00:00

12 Hour Count 5872  
 Peak Hour 16:45  
 Peak Volume 1328  
 Factor 0.90

United Civil Group  
 2803 N. 7th Avenue  
 Phoenix, AZ 85007

Street : Van Buren Street  
 Location : E. of 59th Avenue

Site: TC12066  
 12/12/2012  
 Wednesday

24 Hour Volume, per Channel (Volume factor 0.500)

Interval Start	Interval Start	WB	Interval Start	Interval Start
11:00	11:00	131	23:00	16
11:15	11:15	86	23:15	16
11:30	11:30	124	23:30	30
11:45	11:45	111	23:45	24
12:00	12:00	118	00:00	15
12:15	12:15	92	00:15	17
12:30	12:30	101	00:30	11
12:45	12:45	118	00:45	20
13:00	13:00	146	01:00	11
13:15	13:15	95	01:15	18
13:30	13:30	134	01:30	28
13:45	13:45	130	01:45	6
14:00	14:00	110	02:00	18
14:15	14:15	158	02:15	9
14:30	14:30	180	02:30	8
14:45	14:45	178	02:45	20
15:00	15:00	224	03:00	16
15:15	15:15	198	03:15	22
15:30	15:30	329	03:30	19
15:45	15:45	289	03:45	18
16:00	16:00	298	04:00	37
16:15	16:15	347	04:15	20
16:30	16:30	430	04:30	26
16:45	16:45	413	04:45	46
17:00	17:00	454	05:00	36
17:15	17:15	481	05:15	31
17:30	17:30	466	05:30	56
17:45	17:45	374	05:45	56
18:00	18:00	277	06:00	51
18:15	18:15	197	06:15	60
18:30	18:30	138	06:30	52
18:45	18:45	72	06:45	60
19:00	19:00	78	07:00	66
19:15	19:15	82	07:15	96
19:30	19:30	46	07:30	78
19:45	19:45	44	07:45	78
20:00	20:00	44	08:00	106
20:15	20:15	28	08:15	90
20:30	20:30	40	08:30	103
20:45	20:45	52	08:45	76
21:00	21:00	38	09:00	80
21:15	21:15	44	09:15	90
21:30	21:30	28	09:30	76
21:45	21:45	44	09:45	81
22:00	22:00	30	10:00	84
22:15	22:15	41	10:15	74
22:30	22:30	25	10:30	68
22:45	22:45	34	10:45	90

24 Hour Total  
 9906

00:00 - 12:00  
 12 Hour Count 2575  
 Peak Hour 11:00  
 Peak Volume 452  
 Factor 0.86

12:00 - 00:00  
 12 Hour Count 7331  
 Peak Hour 16:45  
 Peak Volume 1814  
 Factor 0.94



## Transportation Data Management System

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List View | All DIRs | [Graphs/Rpts](#) | [Build Search](#)

Record	<input type="button" value="⏪"/> <input type="button" value="⏩"/> <input type="button" value="⏴"/> <input type="button" value="⏵"/>	1	of 1	Goto Record	<input type="text" value="go"/>
Location ID	33551	MPO ID			
Type	LINK	HPMS ID			
On NHS	No	On HPMS	No		
LRS ID		LRS Loc Pt.			
SF Group	-	Route Type			
AF Group	-	Route			
Funct'l Class	Arterial				
Located On	Van Buren St				
From Road	47th Ave				
To Road	43rd Ave				
County Code					
County	Maricopa				
Community	Phoenix	Lanes			
Jurisdiction	City of Phoenix	Surface Type			
Screenline IDs		Category			
Perm Station	No	Latitude	33.451240		
WIM Station	No	Longitude	-112.155480		
Active	Yes	Speed Limit			

### STATION DATA

Directions:  2-WAY  EB  WB

### AADT

Year    AADT    DHV-30    K %    D %    PA    BC    Src

Travel Demand Model										
Model Year	Model AADT	AM PHV	AM PPV	MD PHV	MD PPV	PM PHV	PM PPV	NT PHV	NT PPV	

VOLUME COUNT			
	Date	Int	Total
	Mon 9/12/2011	-	20,826

VOLUME TREND	
Year	Annual Growth

SPEED				
Date	Int	Pace	85th	Total
No Data				

CLASSIFICATION			
Date	Int	Total	
No Data			

WEIGH-IN-MOTION			
Date	Axles	Avg GWV	Total
No Data			

PER VEHICLE				
Date	Axles	85th	Total	
No Data				

GAP		
Date	Int	Total
No Data		



### Transportation Data Management System

This report and/or data was funded in part through grant[s] from the Federal Highway Administration and/or Federal Transit Administration, U.S. Department of Transportation. ... more

List View | All DIRs | Graphs/Rpts | Build Search

Record	1	of 2	Goto Record	go
Location ID	3146	MPO ID		
Type	LINK	HPMS ID		
On NHS	No	On HPMS	No	
LRS ID		LRS Loc Pt.		
SF Group	6	Route Type		
AF Group	-	Route		
Fnct'l Class				
Located On	51st Ave			
From Road	Van Buren St			
To Road	I-10 Fwy			
County Code				
County	Maricopa			
Community	Phoenix	Lanes		
Jurisdiction	MAG	Surface Type		
Screenline IDs	I-10S (I101 to I-17)	Category	HPMS	
Perm Station	No	Latitude	33.456500	
WIM Station	No	Longitude	-112.169280	
Active	Yes	Speed Limit		

#### STATION DATA

Directions: **2WAY** | NB | SB

AADT

Year	AADT	DHV-30	K %	D %	PA	BC	Src
2011	54,167	3,099	6	53			
2007	49,056						
2003	34,014						
1998	42,852						

Model Year	Model AADT	AM PHV	AM PPV	MD PHV	MD PPV	PM PHV	PM PPV	NT PHV	NT PPV

VOLUME COUNT		Graphs/Rpts	
Date	Int	Total	
Mon 2/7/2011	15	49,128	
Sun 2/6/2011	15	48,936	
Thu 1/11/2007	15	49,986	
Wed 1/10/2007	15	49,552	
Tue 1/14/2003	15	34,383	

VOLUME TREND	
Year	Annual Growth
2011	3%
2007	10%
2003	-5%

SPEED				
Date	Int	Pace	85th	Total
No Data				

CLASSIFICATION		Graphs/Rpts	
Date	Int	Total	
Mon 2/7/2011	15	49,128	
Sun 2/6/2011	15	48,936	

WEIGH-IN-MOTION			
Date	Axles	Avg GVW	Total
No Data			

PER VEHICLE			
Date	Axles	85th	Total
No Data			

GAP



# Volume Count Report

LOCATION INFO	
Location ID	3146
Type	LINK
Funct'l Class	3
Located On	51st Ave
From Road	Van Buren St
To Road	I-10 Fwy
Direction	2-WAY
Community	Phoenix
MPO ID	
HPMS ID	
Agency	MAG

COUNT DATA INFO	
Start Date	Mon 2/7/2011
End Date	Tue 2/8/2011
Start Time	12:00:00 AM
End Time	12:00:00 AM
Direction	
Notes	
Count Source	Between
Filename	129v.xls
Weather	
Study	
Speed Limit	
Description	
Sensor Type	
Owner	mag

INTERVAL:15-MIN					
Time	15-min Interval				Hourly Count
	1st	2nd	3rd	4th	
0:00-1:00	179	187	140	120	626
1:00-2:00	145	138	157	111	551
2:00-3:00	138	131	148	166	583
3:00-4:00	171	171	216	198	756
4:00-5:00	217	322	431	476	1,446
5:00-6:00	420	529	661	761	2,371
6:00-7:00	673	619	599	715	2,606
7:00-8:00	661	721	703	771	2,856
8:00-9:00	709	621	718	661	2,709
9:00-10:00	543	607	615	609	2,374
10:00-11:00	550	619	594	627	2,390
11:00-12:00	635	693	713	747	2,788
12:00-13:00	755	710	770	703	2,938
13:00-14:00	697	753	742	750	2,942
14:00-15:00	736	725	753	714	2,928
15:00-16:00	694	731	712	756	2,893
16:00-17:00	697	685	773	721	2,876
17:00-18:00	772	818	782	727	3,099
18:00-19:00	714	608	535	549	2,406
19:00-20:00	544	490	464	408	1,906
20:00-21:00	411	365	362	376	1,514
21:00-22:00	386	318	385	344	1,433
22:00-23:00	280	356	339	243	1,218
23:00-24:00	238	242	244	195	919
<b>Total</b>					<b>49,128</b>
<b>AM Peak</b>					<b>11:45-12:45 2,982</b>
<b>PM Peak</b>					<b>17:00-18:00 3,099</b>



# Volume Count Report

LOCATION INFO	
Location ID	3143_NB
Type	LINK
Funct'l Class	-
Located On	59th Ave
From Road	Van Buren St
To Road	I-10 Fwy
Direction	NB
Community	Phoenix
MPO ID	
HPMS ID	
Agency	MAG

COUNT DATA INFO	
Start Date	Wed 3/30/2011
End Date	Thu 3/31/2011
Start Time	12:00:00 AM
End Time	12:00:00 AM
Direction	
Notes	
Count Source	Enter Location
Filename	128v.xls
Weather	
Study	
Speed Limit	
Description	
Sensor Type	
Owner	mag

INTERVAL:15-MIN					
Time	15-min Interval				Hourly Count
	1st	2nd	3rd	4th	
▶ 0:00-1:00	34	26	31	16	107
1:00-2:00	21	20	17	23	81
2:00-3:00	33	33	17	15	98
3:00-4:00	25	26	29	41	121
4:00-5:00	40	36	77	80	233
5:00-6:00	64	93	101	84	342
6:00-7:00	89	117	119	150	475
7:00-8:00	182	185	200	181	748
8:00-9:00	174	152	138	145	609
9:00-10:00	126	130	162	128	546
10:00-11:00	128	128	138	126	520
11:00-12:00	157	133	153	155	598
12:00-13:00	186	151	194	149	680
13:00-14:00	154	151	206	191	702
14:00-15:00	230	188	292	240	950
15:00-16:00	243	202	356	265	1,066
16:00-17:00	256	233	290	243	1,022
17:00-18:00	292	241	225	202	960
18:00-19:00	197	187	182	165	731
19:00-20:00	138	115	105	104	462
20:00-21:00	98	95	60	85	338
21:00-22:00	57	65	85	51	258
22:00-23:00	64	63	40	63	230
23:00-24:00 ◀	47	27	39	28	141
<b>Total</b>					12,018
<b>AADT</b>					11,177
<b>AM Peak</b>					07:00-08:00 748
<b>PM Peak</b>					15:30-16:30 1,110



# Volume Count Report

LOCATION INFO	
Location ID	3143_SB
Type	LINK
Funct'l Class	-
Located On	59th Ave
From Road	Van Buren St
To Road	I-10 Fwy
Direction	SB
Community	Phoenix
MPO ID	
HPMS ID	
Agency	MAG

COUNT DATA INFO	
Start Date	Wed 3/30/2011
End Date	Thu 3/31/2011
Start Time	12:00:00 AM
End Time	12:00:00 AM
Direction	
Notes	
Count Source	Enter Location
Filename	128v.xls
Weather	
Study	
Speed Limit	
Description	
Sensor Type	
Owner	mag

INTERVAL:15-MIN					
Time	15-min Interval				Hourly Count
	1st	2nd	3rd	4th	
0:00-1:00	53	69	41	50	213
1:00-2:00	31	48	42	52	173
2:00-3:00	39	42	45	51	177
3:00-4:00	46	69	91	102	308
4:00-5:00	74	132	226	264	696
5:00-6:00	162	253	366	426	1,207
6:00-7:00	266	247	313	409	1,235
7:00-8:00	337	313	347	398	1,395
8:00-9:00	303	243	222	259	1,027
9:00-10:00	223	195	227	219	864
10:00-11:00	195	187	185	200	767
11:00-12:00	191	230	218	279	918
12:00-13:00	250	239	240	221	950
13:00-14:00	245	208	208	242	903
14:00-15:00	245	257	243	287	1,032
15:00-16:00	245	246	266	258	1,015
16:00-17:00	242	260	263	240	1,005
17:00-18:00	237	318	342	296	1,193
18:00-19:00	276	241	229	220	966
19:00-20:00	222	221	162	173	778
20:00-21:00	151	145	178	151	625
21:00-22:00	168	149	134	123	574
22:00-23:00	133	103	83	77	396
23:00-24:00	63	77	72	71	283
<b>Total</b>					18,700
<b>AADT</b>					17,391
<b>AM Peak</b>					06:45-07:45 1,406
<b>PM Peak</b>					17:15-18:15 1,232

Peak Hour Data for Intersection

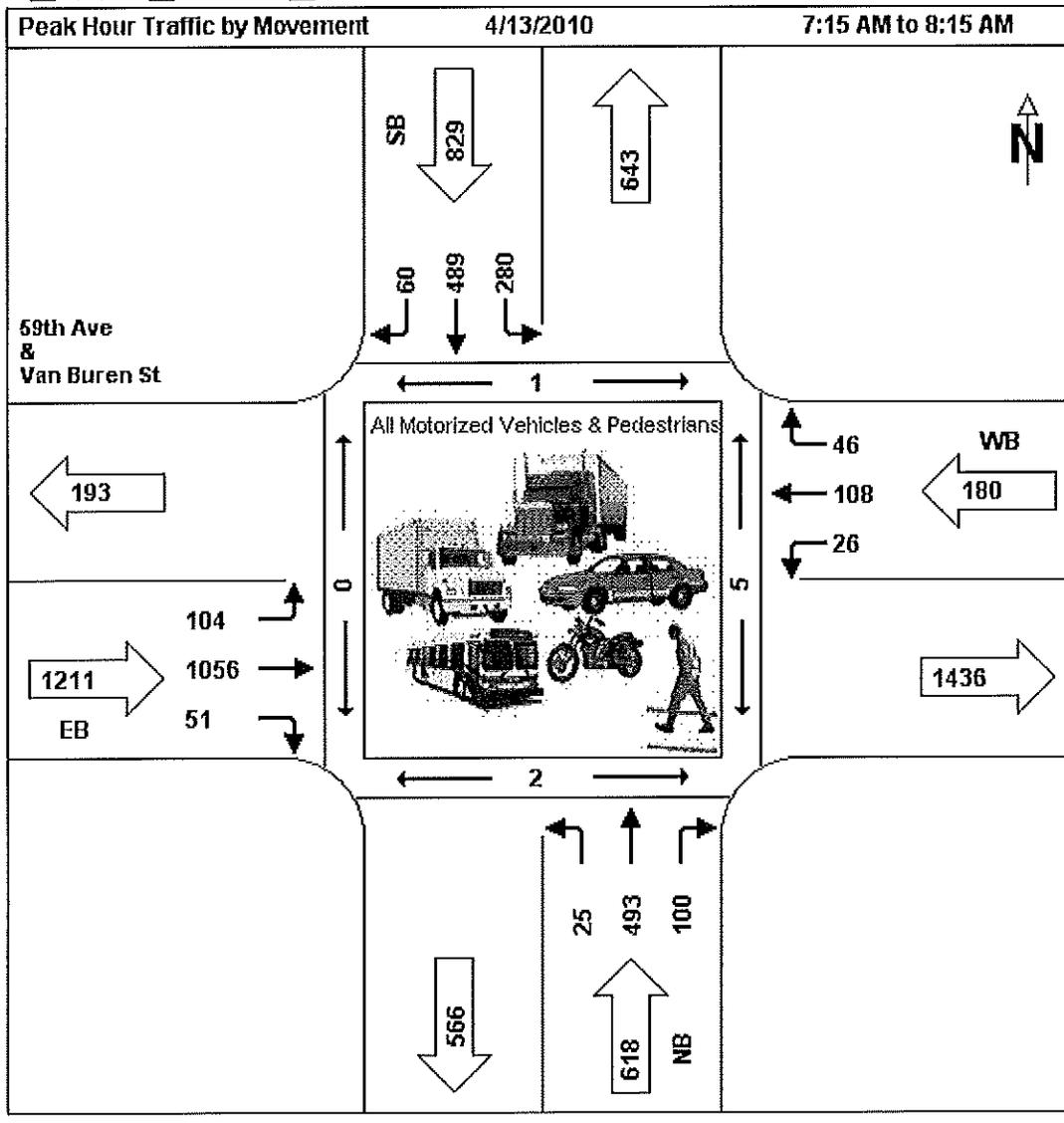
Int ID: 191  
 Road 1: 59th Ave  
 Road 2: Van Buren St

Corridor:  
 Community: Phoenix

AM Peak Hour  
 04/13/2010

Start Time	NB					EB					SB					WB					
	Left	Thru	Right	Ped	App Total	Left	Thru	Right	Ped	App Total	Left	Thru	Right	Ped	App Total	Left	Thru	Right	Ped	App Total	Int Total
7:15 AM	10	111	27	1	148	23	269	10	0	302	71	119	10	0	200	3	28	11	0	42	692
7:30 AM	2	117	25	1	144	28	300	14	1	342	70	127	17	0	214	7	23	7	1	37	737
7:45 AM	8	130	23	3	161	23	288	15	1	326	76	130	21	0	227	7	27	11	0	45	759
8:00 AM	5	135	25	0	165	30	199	12	0	241	63	113	12	0	188	9	30	17	0	56	650
Total	25	493	100	5	618	104	1056	51	2	1211	280	489	60	0	829	26	108	46	1	180	2838
PHF	0.63	0.91	0.93		0.94	0.87	0.88	0.85		0.89	0.92	0.94	0.71		0.91	0.72	0.90	0.68		0.80	
HV%	24	16	15			10	6	6			4	7	15			35	14	30			

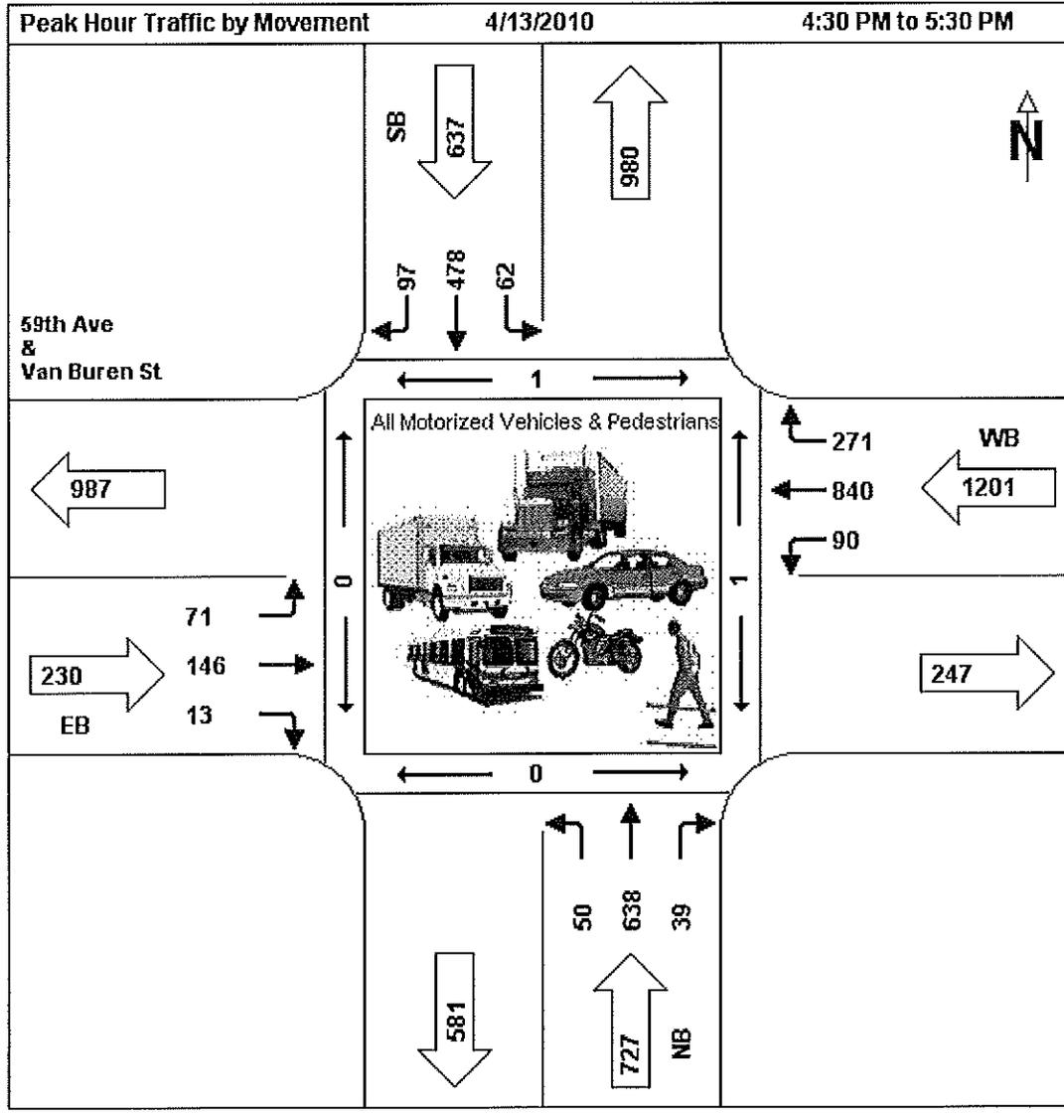
Cars  Trucks  Pedestrians



**PM Peak Hour  
04/13/2010**

Start Time	NB				App Total	EB				App Total	SB				App Total	WB				App Total	Int Total
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		
4:30 PM	16	191	10	0	217	23	31	6	0	60	16	125	21	0	162	19	211	71	0	301	740
4:45 PM	11	154	9	1	174	16	35	1	0	52	17	116	14	0	147	30	167	52	1	249	622
5:00 PM	18	157	10	0	185	13	40	3	0	56	17	106	33	0	156	19	215	68	0	302	699
5:15 PM	5	136	10	0	151	19	40	3	0	62	12	131	29	0	172	22	247	80	0	349	734
<b>Total</b>	<b>50</b>	<b>638</b>	<b>39</b>	<b>1</b>	<b>727</b>	<b>71</b>	<b>146</b>	<b>13</b>	<b>0</b>	<b>230</b>	<b>62</b>	<b>478</b>	<b>97</b>	<b>0</b>	<b>637</b>	<b>90</b>	<b>840</b>	<b>271</b>	<b>1</b>	<b>1201</b>	<b>2795</b>
PHF	0.69	0.84	0.98		0.84	0.77	0.91	0.54		0.93	0.91	0.91	0.73		0.93	0.75	0.85	0.85		0.86	
HV%	10	3	54			3	10	0		11	11	5			8	3	3				

Cars    Trucks    Pedestrians



Peak Hour Data for Intersection

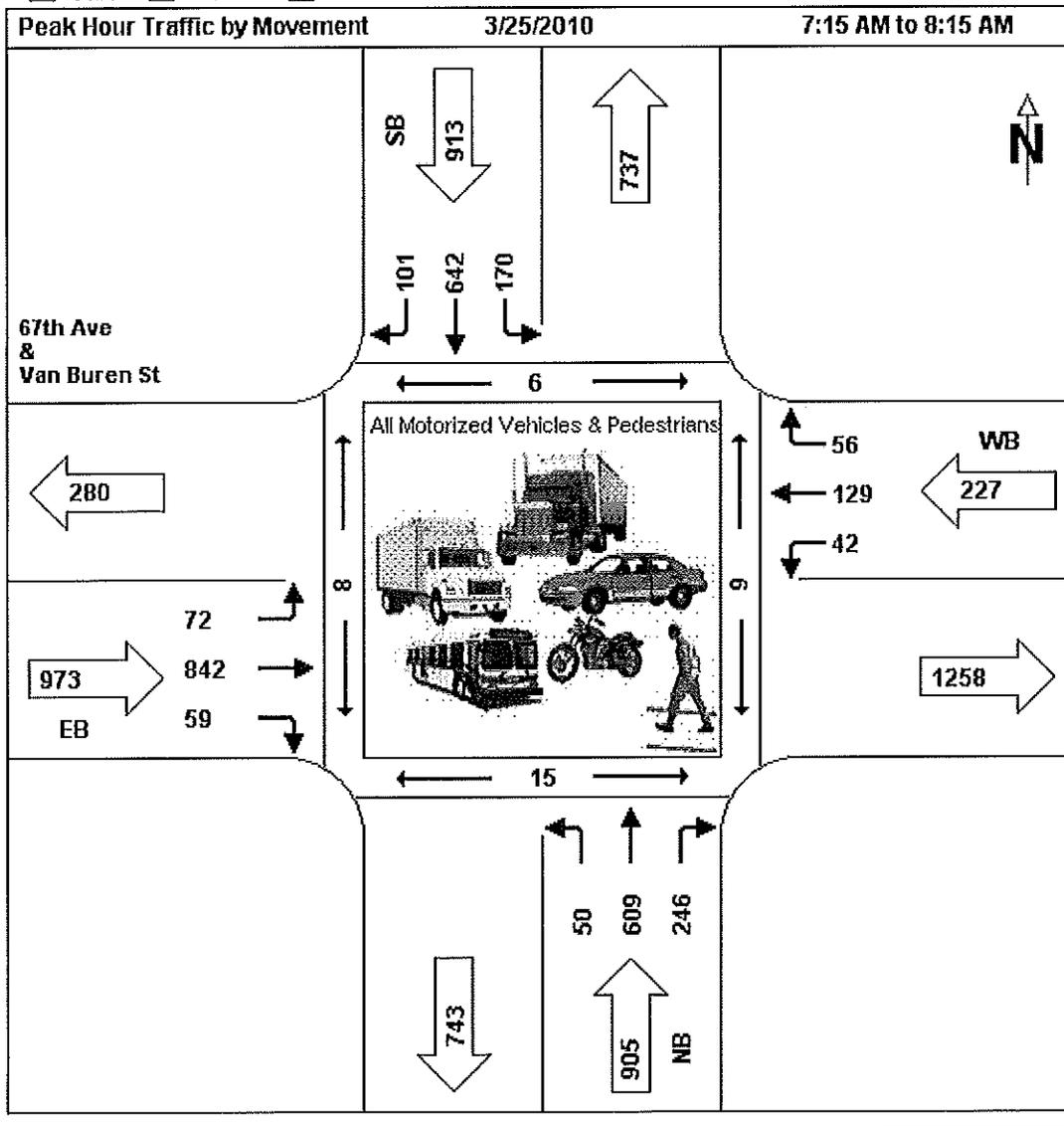
Int ID: 190  
 Road 1: 67th Ave  
 Road 2: Van Buren St

Corridor:  
 Community: Phoenix

AM Peak Hour  
 03/25/2010

Start Time	NB				App Total	EB				App Total	SB				App Total	WB				App Total	Int Total
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		
7:15 AM	15	129	44	0	188	17	198	17	6	232	52	152	31	0	235	12	27	13	0	52	707
7:30 AM	12	149	81	3	242	20	211	11	2	242	34	147	26	1	207	12	38	17	1	67	758
7:45 AM	10	168	80	5	258	26	231	17	5	274	39	176	26	5	241	11	35	15	1	61	834
8:00 AM	13	163	41	1	217	9	202	14	2	225	45	167	18	2	230	7	29	11	4	47	719
<b>Total</b>	50	609	246	9	905	72	842	59	15	973	170	642	101	8	913	42	129	56	6	227	3018
PHF	0.83	0.91	0.76		0.88	0.69	0.91	0.87		0.89	0.82	0.91	0.81		0.95	0.88	0.85	0.82		0.85	
HV%	14	8	8			17	5	17			8	6	10			12	12	16			

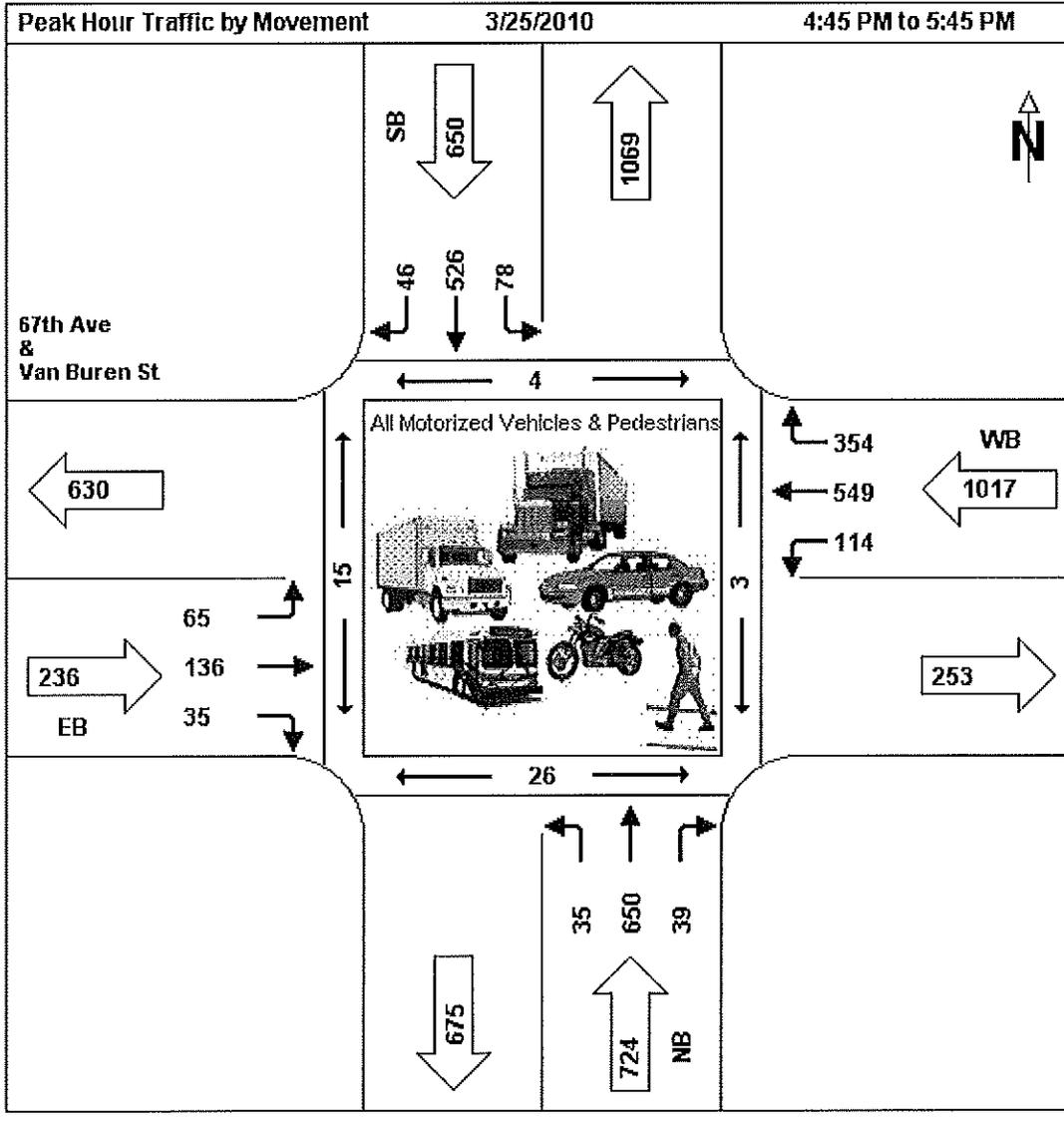
Cars  Trucks  Pedestrians



**PM Peak Hour  
03/25/2010**

Start Time	NB				App Total	EB				App Total	SB				App Total	WB				App Total	Int Total	
	Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped		Left	Thru	Right	Ped			
4:45 PM	6	156	7	3	169	25	36	11	8	72	24	103	13	1	140	18	120	81	2	219	600	
5:00 PM	12	172	8	0	192	11	42	5	6	58	13	139	16	6	168	27	133	84	2	244	662	
5:15 PM	8	132	14	0	154	16	37	9	3	62	19	149	9	2	177	36	155	87	0	278	671	
5:30 PM	9	190	10	0	209	13	21	10	9	44	22	135	8	6	165	33	141	102	0	276	694	
<b>Total</b>	<b>35</b>	<b>650</b>	<b>39</b>	<b>3</b>	<b>724</b>	<b>65</b>	<b>136</b>	<b>35</b>	<b>26</b>	<b>236</b>	<b>78</b>	<b>526</b>	<b>46</b>	<b>15</b>	<b>650</b>	<b>114</b>	<b>549</b>	<b>354</b>	<b>4</b>	<b>1017</b>	<b>2627</b>	
PHF	0.73	0.86	0.70		0.87	0.65	0.81	0.80		0.82	0.81	0.88	0.72		0.92	0.79	0.89	0.87		0.91		
HV %	9	4	26		6	6	9		6	4	7		1	3	1							

Cars    Trucks    Pedestrians



**APPENDIX C**

**SIGNAL WARRANTS**

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## 611 TRAFFIC SIGNAL NEEDS STUDIES

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The overall objective of traffic signal control is to provide an equitable balance of safe and efficient movements of traffic and pedestrian volumes through the intersection. Although most of the steps in conducting a traffic signal needs study are quantitative, the final determination of recommending whether traffic signal controls should be provided at a particular location involves a qualitative assessment which requires engineering judgment. If the particular location being studied satisfies one or more of the eleven MUTCD warrants, one of the most important qualitative assessments the traffic engineer should consider before justifying traffic signal control is a remedy that is less restrictive than signalizing the intersection.

Some of the less restrictive remedies that should be considered are:

- A. Geometric improvements such as the addition of turn lanes either by construction or by restriping the existing cross section;
- B. Sight obstruction removal to increase intersection sight distance;
- C. Street lighting if nighttime accidents are predominant; and
- D. Improved signing and pavement markings to better define the intersection and its operational characteristics.

**A traffic signal needs study shall be conducted to determine if a traffic signal should be provided at a particular location.** The signal needs study should include a comprehensive investigation of traffic conditions and the physical characteristics of the location. The following data and/or analyses may be included in the study as appropriate to the specific situation:

- A. A signal warrant analysis (required).
- B. A 24-hour turning movement count which includes all entering traffic volumes and movement direction, AM and PM peak hour traffic volumes and movement direction, and pedestrian volumes; the percentage of trucks and buses should be considered where appropriate. A 24-hour turning movement count should be obtained by applying factors of 1.35 and 1.20 to 12 or 16 hours, respectively, of turning movement count data collected in the field.
- C. A traffic collision study including a summary by type and severity with a collision diagram
- D. A condition diagram which includes roadway geometrics, parking, driveways, sidewalks, signing, pavement markings, development of intersection quadrants, and any other features pertinent to the study
- E. A peak hour delay study
- F. A conflict analysis

- G. Approach speed limits and/or approach speeds
- H. Analysis of the existing progression in a coordinated system
- I. A capacity analysis
- J. Traffic volume projections for new roadways (see Figure 611-A)
- K. Traffic signal priority evaluation (see Figure 611-B)
- L. Other data which are desirable for a more precise understanding of the operation of the intersection

On new roadways scheduled for construction, it is occasionally necessary to project signal warrants to determine whether signals should be considered for inclusion in the initial construction project. There is a simple approach to projecting signal volume warrants. The following steps provide a solid, although theoretical, basis for deciding whether or not signals should be incorporated in the design:

- A. Obtain a traffic projection from the Transportation Planning Group, Travel and Facilities Section, or from any other reliable source of data, for three years beyond the anticipated completion of construction.
- B. Determine whether full warrants or 70 percent warrants are appropriate for the location.
- C. Multiply the projected AADT by 5.72 percent.<sup>1</sup> The resultant volumes are reasonable approximations of the eighth highest hourly volumes; thus, if the calculated volumes exceed the warrant values, the location could technically be considered for signalization.
- D. To fill in a "Projected Volumes" warrant sheet, multiply the projected AADT by the following factors:

<u>High Hour</u>	<u>Hourly Adjustment Factor</u> <sup>2</sup>
1	.0771
4	.0656
8	.0572

<sup>1</sup> Pignataro, Louis J., Traffic Engineering, (Prentice-Hall, Englewood Cliffs), 1973, page 158.

<sup>2</sup> Ibid.

FIGURE 611-A  
 TRAFFIC VOLUME PROJECTIONS FOR NEW ROADWAYS

## CHAPTER 4C. TRAFFIC CONTROL SIGNAL NEEDS STUDIES

### Section 4C.01 Studies and Factors for Justifying Traffic Control Signals

#### Standard:

- 01 An engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location.
- 02 The investigation of the need for a traffic control signal shall include an analysis of factors related to the existing operation and safety at the study location and the potential to improve these conditions, and the applicable factors contained in the following traffic signal warrants:
- Warrant 1, Eight-Hour Vehicular Volume
  - Warrant 2, Four-Hour Vehicular Volume
  - Warrant 3, Peak Hour
  - Warrant 4, Pedestrian Volume
  - Warrant 5, School Crossing
  - Warrant 6, Coordinated Signal System
  - Warrant 7, Crash Experience
  - Warrant 8, Roadway Network
  - Warrant 9, Intersection Near a Grade Crossing
- 03 The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

#### Support:

- 04 Sections 8C.09 and 8C.10 contain information regarding the use of traffic control signals instead of gates and/or flashing-light signals at highway-rail grade crossings and highway-light rail transit grade crossings, respectively.

#### Guidance:

- 05 *A traffic control signal should not be installed unless one or more of the factors described in this Chapter are met.*
- 06 *A traffic control signal should not be installed unless an engineering study indicates that installing a traffic control signal will improve the overall safety and/or operation of the intersection.*
- 07 *A traffic control signal should not be installed if it will seriously disrupt progressive traffic flow.*
- 08 *The study should consider the effects of the right-turn vehicles from the minor-street approaches. Engineering judgment should be used to determine what, if any, portion of the right-turn traffic is subtracted from the minor-street traffic count when evaluating the count against the signal warrants listed in Paragraph 2.*
- 09 *Engineering judgment should also be used in applying various traffic signal warrants to cases where approaches consist of one lane plus one left-turn or right-turn lane. The site-specific traffic characteristics should dictate whether an approach is considered as one lane or two lanes. For example, for an approach with one lane for through and right-turning traffic plus a left-turn lane, if engineering judgment indicates that it should be considered a one-lane approach because the traffic using the left-turn lane is minor, the total traffic volume approaching the intersection should be applied against the signal warrants as a one-lane approach. The approach should be considered two lanes if approximately half of the traffic on the approach turns left and the left-turn lane is of sufficient length to accommodate all left-turn vehicles.*
- 10 *Similar engineering judgment and rationale should be applied to a street approach with one through/left-turn lane plus a right-turn lane. In this case, the degree of conflict of minor-street right-turn traffic with traffic on the major street should be considered. Thus, right-turn traffic should not be included in the minor-street volume if the movement enters the major street with minimal conflict. The approach should be evaluated as a one-lane approach with only the traffic volume in the through/left-turn lane considered.*
- 11 *At a location that is under development or construction and where it is not possible to obtain a traffic count that would represent future traffic conditions, hourly volumes should be estimated as part of an engineering study for comparison with traffic signal warrants. Except for locations where the engineering study uses the satisfaction of Warrant 8 to justify a signal, a traffic control signal installed under projected conditions should have an engineering study done within 1 year of putting the signal into stop-and-go operation to determine if the signal is justified. If not justified, the signal should be taken out of stop-and-go operation or removed.*
- 12 *For signal warrant analysis, a location with a wide median, even if the median width is greater than 30 feet, should be considered as one intersection.*

## Option:

- 13 At an intersection with a high volume of left-turn traffic from the major street, the signal warrant analysis may be performed in a manner that considers the higher of the major-street left-turn volumes as the “minor-street” volume and the corresponding single direction of opposing traffic on the major street as the “major-street” volume.
- 14 For signal warrants requiring conditions to be present for a certain number of hours in order to be satisfied, any four sequential 15-minute periods may be considered as 1 hour if the separate 1-hour periods used in the warrant analysis do not overlap each other and both the major-street volume and the minor-street volume are for the same specific one-hour periods.
- 15 For signal warrant analysis, bicyclists may be counted as either vehicles or pedestrians.

## Support:

- 16 When performing a signal warrant analysis, bicyclists riding in the street with other vehicular traffic are usually counted as vehicles and bicyclists who are clearly using pedestrian facilities are usually counted as pedestrians.

## Option:

- 17 Engineering study data may include the following:
- A. The number of vehicles entering the intersection in each hour from each approach during 12 hours of an average day. It is desirable that the hours selected contain the greatest percentage of the 24-hour traffic volume.
  - B. Vehicular volumes for each traffic movement from each approach, classified by vehicle type (heavy trucks, passenger cars and light trucks, public-transit vehicles, and, in some locations, bicycles), during each 15-minute period of the 2 hours in the morning and 2 hours in the afternoon during which total traffic entering the intersection is greatest.
  - C. Pedestrian volume counts on each crosswalk during the same periods as the vehicular counts in Item B and during hours of highest pedestrian volume. Where young, elderly, and/or persons with physical or visual disabilities need special consideration, the pedestrians and their crossing times may be classified by general observation.
  - D. Information about nearby facilities and activity centers that serve the young, elderly, and/or persons with disabilities, including requests from persons with disabilities for accessible crossing improvements at the location under study. These persons might not be adequately reflected in the pedestrian volume count if the absence of a signal restrains their mobility.
  - E. The posted or statutory speed limit or the 85<sup>th</sup>-percentile speed on the uncontrolled approaches to the location.
  - F. A condition diagram showing details of the physical layout, including such features as intersection geometrics, channelization, grades, sight-distance restrictions, transit stops and routes, parking conditions, pavement markings, roadway lighting, driveways, nearby railroad crossings, distance to nearest traffic control signals, utility poles and fixtures, and adjacent land use.
  - G. A collision diagram showing crash experience by type, location, direction of movement, severity, weather, time of day, date, and day of week for at least 1 year.
- 18 The following data, which are desirable for a more precise understanding of the operation of the intersection, may be obtained during the periods described in Item B of Paragraph 17:
- A. Vehicle-hours of stopped time delay determined separately for each approach.
  - B. The number and distribution of acceptable gaps in vehicular traffic on the major street for entrance from the minor street.
  - C. The posted or statutory speed limit or the 85<sup>th</sup>-percentile speed on controlled approaches at a point near to the intersection but unaffected by the control.
  - D. Pedestrian delay time for at least two 30-minute peak pedestrian delay periods of an average weekday or like periods of a Saturday or Sunday.
  - E. Queue length on stop-controlled approaches.

**Section 4C.02 Warrant 1, Eight-Hour Vehicular Volume**

## Support:

- 01 The Minimum Vehicular Volume, Condition A, is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.
- 02 The Interruption of Continuous Traffic, Condition B, is intended for application at locations where Condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.
- 03 It is intended that Warrant 1 be treated as a single warrant. If Condition A is satisfied, then Warrant 1 is satisfied and analyses of Condition B and the combination of Conditions A and B are not needed. Similarly, if Condition B is satisfied, then Warrant 1 is satisfied and an analysis of the combination of Conditions A and B is not needed.

**Standard:**

04 The need for a traffic control signal shall be considered if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:

- A. The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; or
- B. The vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

In applying each condition the major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of these 8 hours.

**Option:**

05 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 70 percent columns in Table 4C-1 may be used in place of the 100 percent columns.

**Guidance:**

06 The combination of Conditions A and B is intended for application at locations where Condition A is not satisfied and Condition B is not satisfied and should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.

**Standard:**

07 The need for a traffic control signal shall be considered if an engineering study finds that both of the following conditions exist for each of any 8 hours of an average day:

- A. The vehicles per hour given in both of the 80 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; and
- B. The vehicles per hour given in both of the 80 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

These major-street and minor-street volumes shall be for the same 8 hours for each condition; however, the 8 hours satisfied in Condition A shall not be required to be the same 8 hours satisfied in Condition B. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

**Table 4C-1. Warrant 1, Eight-Hour Vehicular Volume**

**Condition A—Minimum Vehicular Volume**

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

**Condition B—Interruption of Continuous Traffic**

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

<sup>a</sup> Basic minimum hourly volume

<sup>b</sup> Used for combination of Conditions A and B after adequate trial of other remedial measures

<sup>c</sup> May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

<sup>d</sup> May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

**Option:**

- 08 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

**Section 4C.03 Warrant 2, Four-Hour Vehicular Volume****Support:**

- 01 The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

**Standard:**

- 02 The need for a traffic control signal shall be considered if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) all fall above the applicable curve in Figure 4C-1 for the existing combination of approach lanes. On the minor street, the higher volume shall not be required to be on the same approach during each of these 4 hours.

**Option:**

- 03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-2 may be used in place of Figure 4C-1.

**Section 4C.04 Warrant 3, Peak Hour****Support:**

- 01 The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.

**Standard:**

- 02 This signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.
- 03 The need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:
- A. If all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:
    1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach; and
    2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes; and
    3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.
  - B. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.

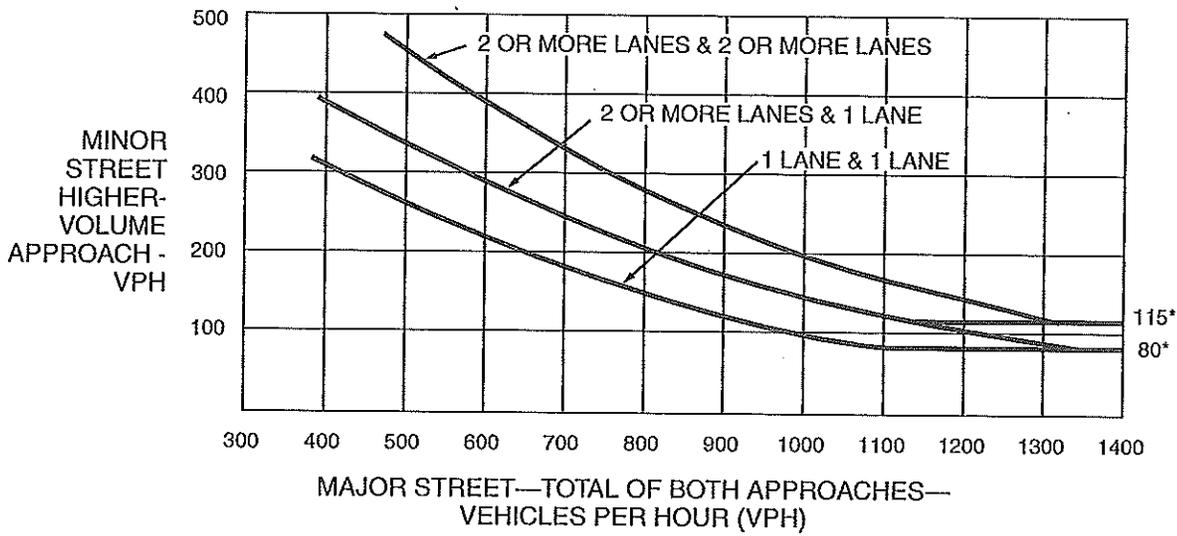
**Option:**

- 04 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-4 may be used in place of Figure 4C-3 to evaluate the criteria in the second category of the Standard.
- 05 If this warrant is the only warrant met and a traffic control signal is justified by an engineering study, the traffic control signal may be operated in the flashing mode during the hours that the volume criteria of this warrant are not met.

**Guidance:**

- 06 *If this warrant is the only warrant met and a traffic control signal is justified by an engineering study, the traffic control signal should be traffic-actuated.*

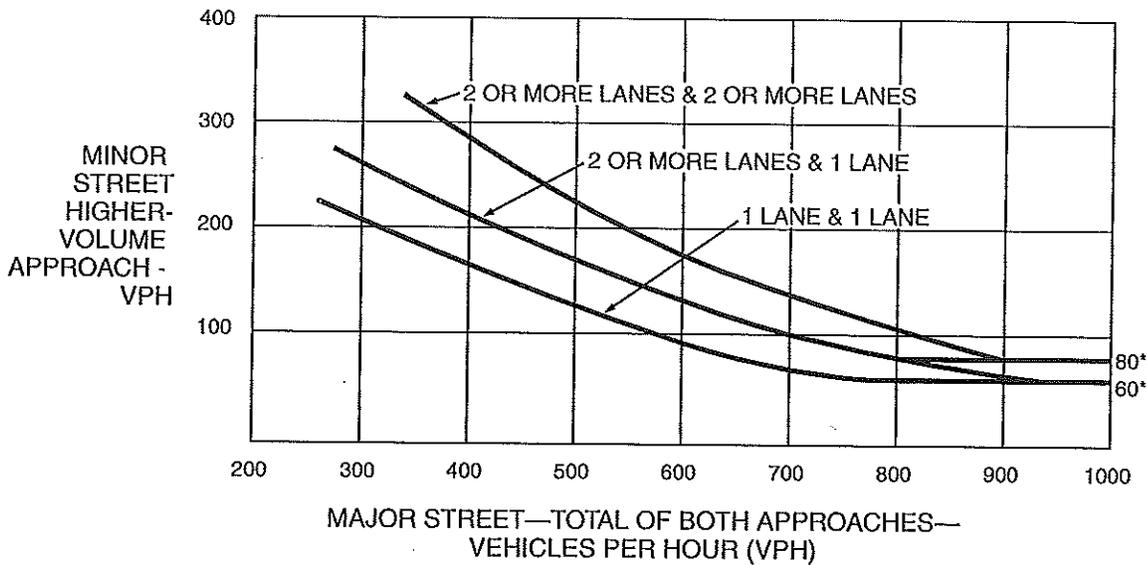
**Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume**



\*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

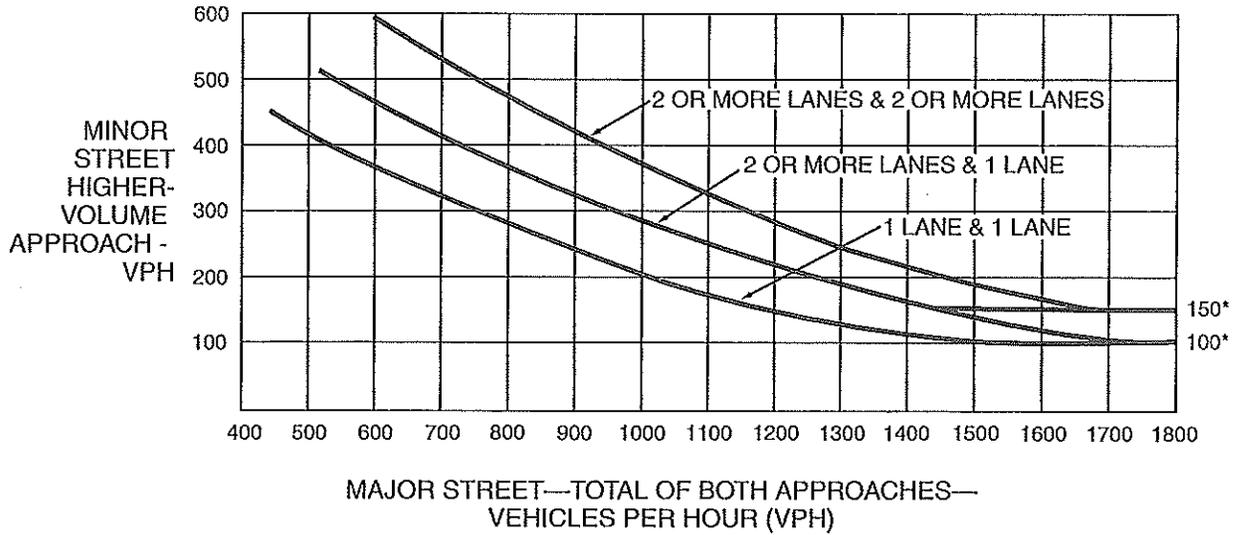
**Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)**

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



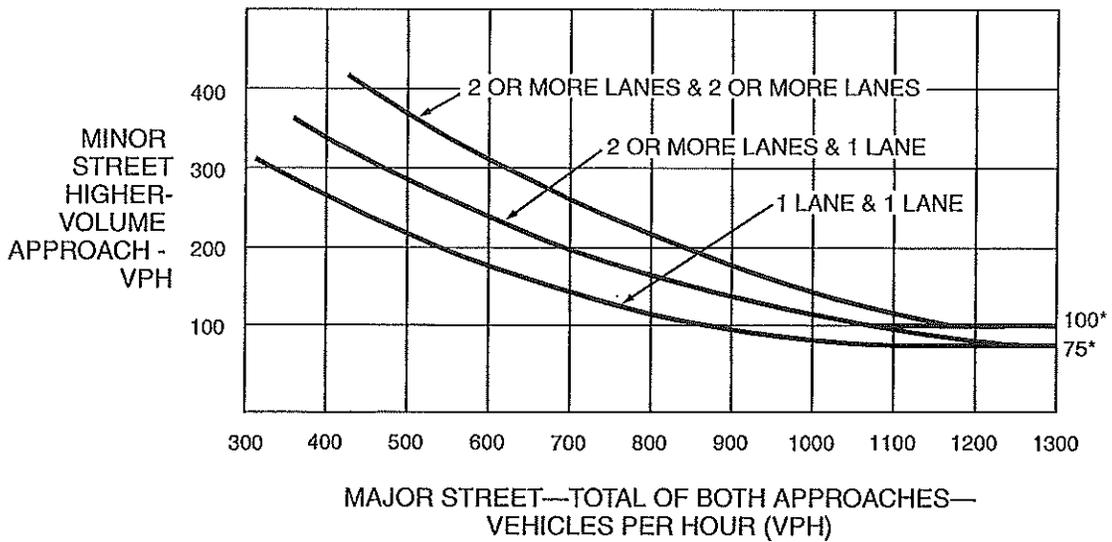
\*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Figure 4C-3. Warrant 3, Peak Hour**



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

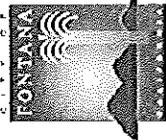
**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

## **APPENDIX D**

### **TRIP DISTRIBUTION**



Truck Trip Generation Study

SUMMARY OF RECOMMENDED TRIP GENERATION RATES AND EQUATIONS (Cont'd)

Classification: Heavy Warehouse

Period	NO. OF EMPLOYEES			GROSS BUILDING AREA (KSF)			ACRES		
	Weighted Average Trips	Linear Regression	Logarithmic Regression	Weighted Average Trips	Linear Regression	Logarithmic Regression	Weighted Average Trips	Linear Regression	Logarithmic Regression
Daily									
Total Vehicles	4.657*X	n.a.	n.a.	3.547*X	n.a.	n.a.	69.959*X	n.a.	n.a.
AM Street									
Total Vehicles	0.091*X	Marginal	n.a.	0.070*X	0.032*X+21.235	Marginal	1.373*X	0.589*X+22.708	Marginal
Trucks	0.034*X	0.021*X+6.025	8.090*1.001^X	0.026*X	0.016*X+5.638	7.929*1.001^X	0.518*X	0.301*X+6.291	8.220*1.017^X
PM Street									
Total Vehicles	0.095*X	0.054*X+17.889	22.051*1.001^X	0.073*X	0.042*X+17.592	Marginal	1.433*X	0.771*X+19.178	Marginal
Trucks	0.034*X	Marginal	n.a.	0.026*X	0.023*X+1.584	Marginal	0.509*X	0.419*X+2.609	Marginal
AM Site									
Total Vehicles	0.309*X	0.268*X+17.625	50.347*1.002^X	0.235*X	0.215*X+11.213	48.177*1.001^X	4.637*X	3.951*X+19.862	50.856*1.025^X
Trucks	0.040*X	n.a.	n.a.	0.030*X	n.a.	n.a.	0.596*X	n.a.	n.a.
PM Site									
Total Vehicles	0.417*X	0.390*X+11.980	Marginal	0.318*X	0.323*X+2.803	49.975*1.002^X	6.268*X	5.902*X+10.616	50.560*1.030^X
Trucks	0.044*X	0.021*X+9.850	Marginal	0.033*X	0.016*X+10.004	Marginal	0.656*X	0.291*X+10.585	Marginal

Note: All symbols are per Microsoft Excel (+, -, \*, and ^) add, subtract, multiply and raise to a power. "X" is the independent variable.

# TRUCK TRIP GENERATION STUDY

## CITY OFFICIALS

Honorable Mark Nuaimi, Mayor  
Honorable Janice Rutherford, Mayor Pro Tem  
Honorable John B. Roberts, Council Member  
Honorable Josie Gonzales, Council Member  
Honorable Acquanetta Warren, Council Member  
Kenneth R. Hunt, City Manager



## PROJECT MANAGERS

Raymond Bragg, Director of Redevelopment & Special Projects  
Paul Balbach, Strategic Transportation Engineering Manager  
William G. Bryant, P.E., Project Manager DMJM+Harris

## PREPARED BY

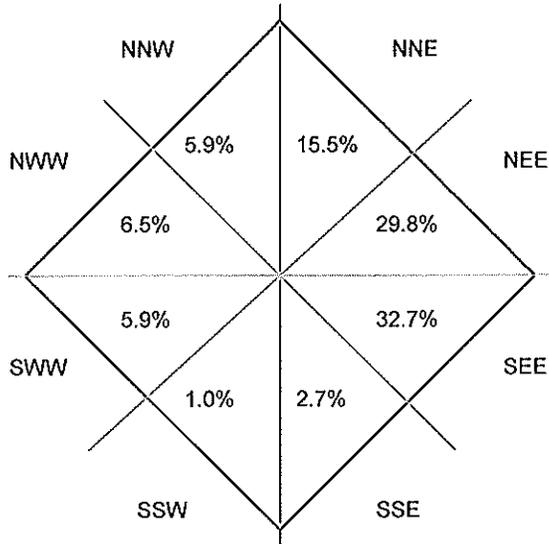
Transportation Engineering and Planning, Inc.  
Craig Neustaedter, P.E., AICP  
Nathan Neustaedter  
Christine Gamatero, E.I.T.  
Linda Fuller, Linda Fuller Communications

## Traffic Counts by

Counts Unlimited  
Barbara Sackett, President

Project Name: NWC 59th Avenue/Van Buren Street  
Project Location: NWC 59th Avenue/Van Buren Street  
Analyst: kmh

Location of Site: TAZ 734  
Development Type being Analyzed: Residential  
Forecast Year: 2015  
Distance Out from Site (miles): 10



Bearing	% of Trips
NNE	15.5%
NEE	29.8%
SEE	32.7%
SSE	2.7%
SSW	1.0%
SWW	5.9%
NWW	6.5%
NNW	5.9%

## **APPENDIX E**

### **LONG RANGE PROJECTIONS**

emmg/2

LINKS:  
!vdf=15,55,10  
COL-IND: @lane

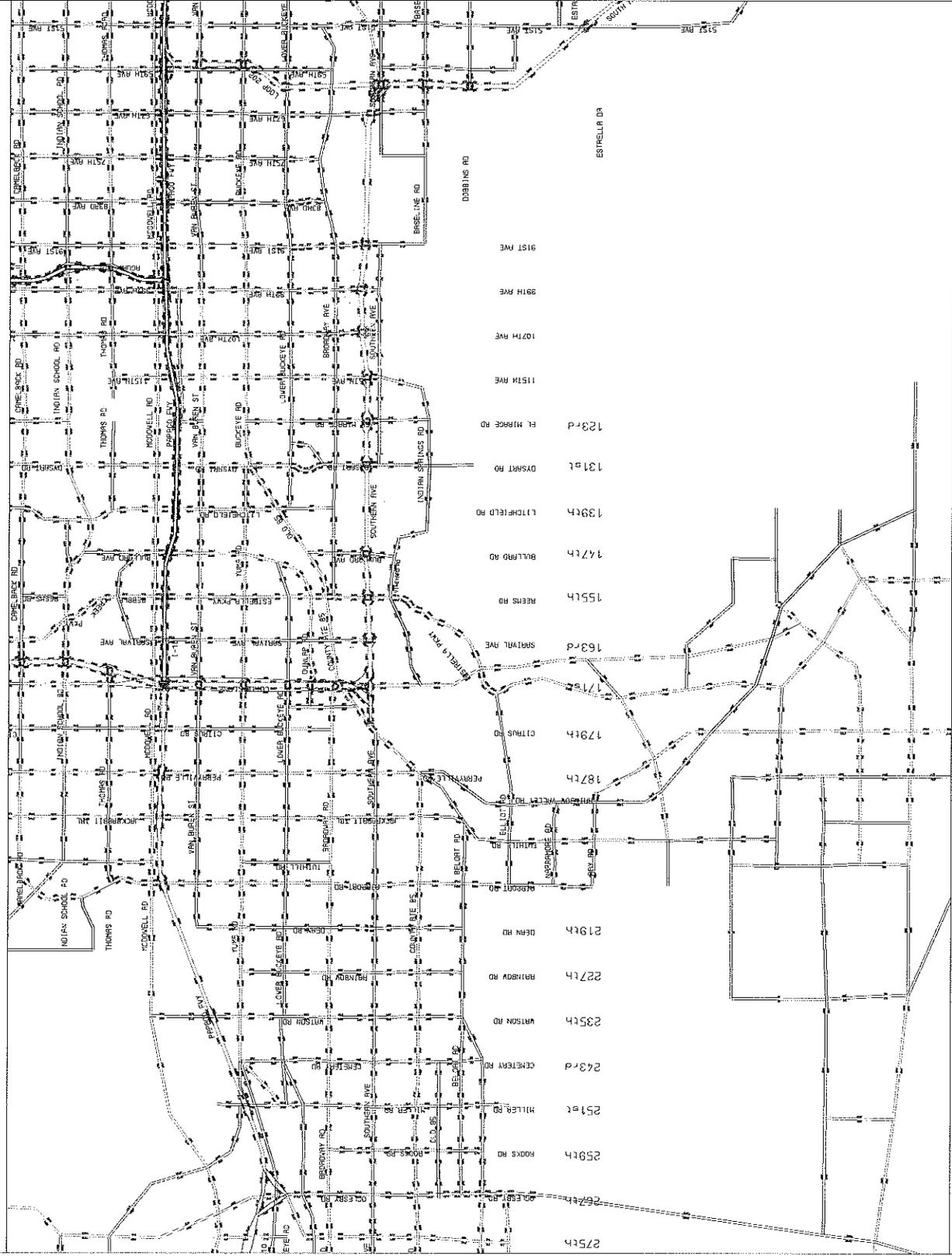
LEGEND

NUMBER OF LANES

- ONE-LANE
- TWO-LANES
- THREE-LANES
- FOUR-LANES
- FIVE-LANES
- SIX-LANES

WINDOW:  
476690 / 802301  
625921 / 914224

08-01-18 10:56  
MODULE: 6.12  
MAG.....IT



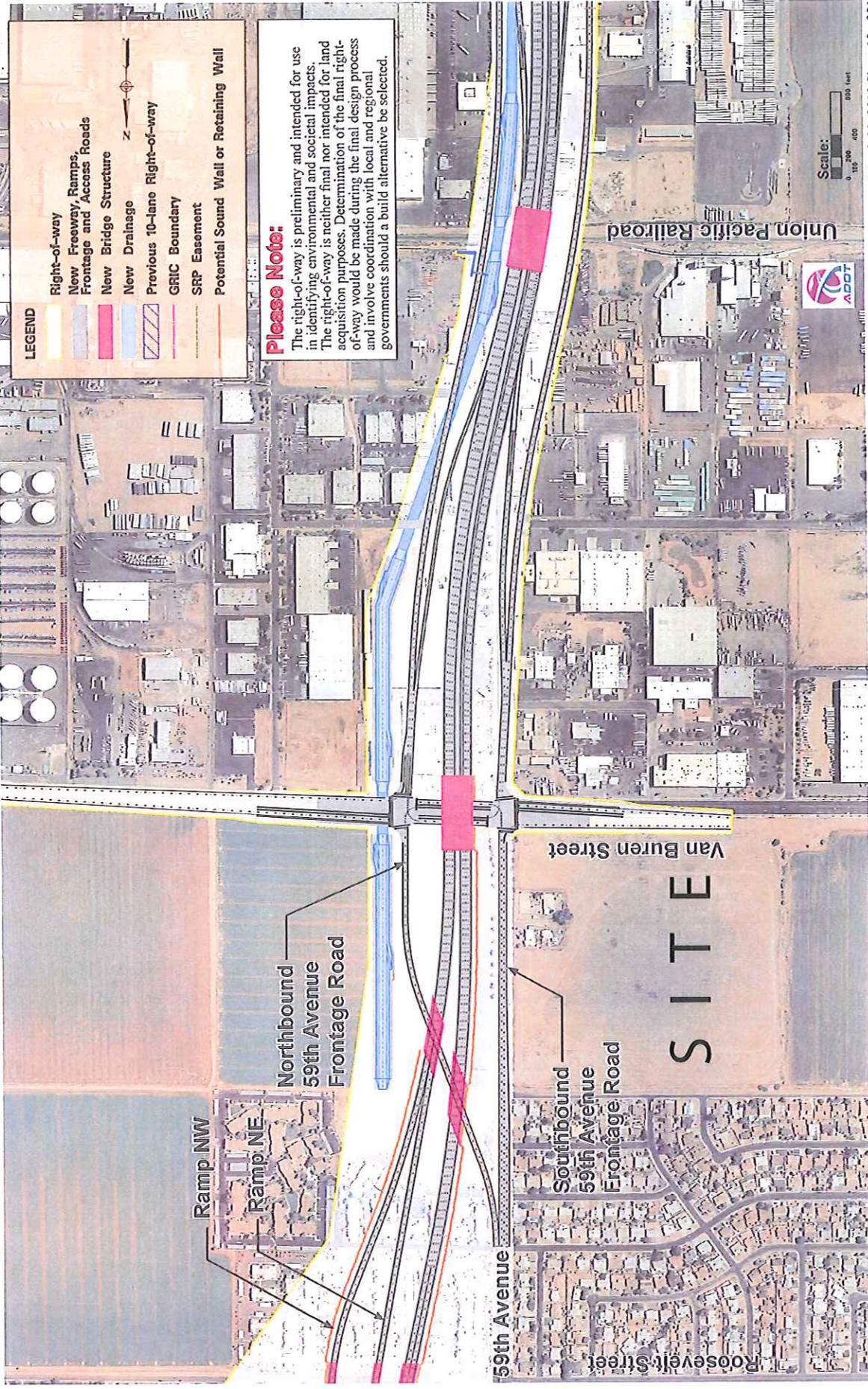
EMME/2 PROJECT: 2028CDA 28 Scen For Luke A Req0066RR2008/15/0110:06 AM  
SCENARIO 70: Copy of 7

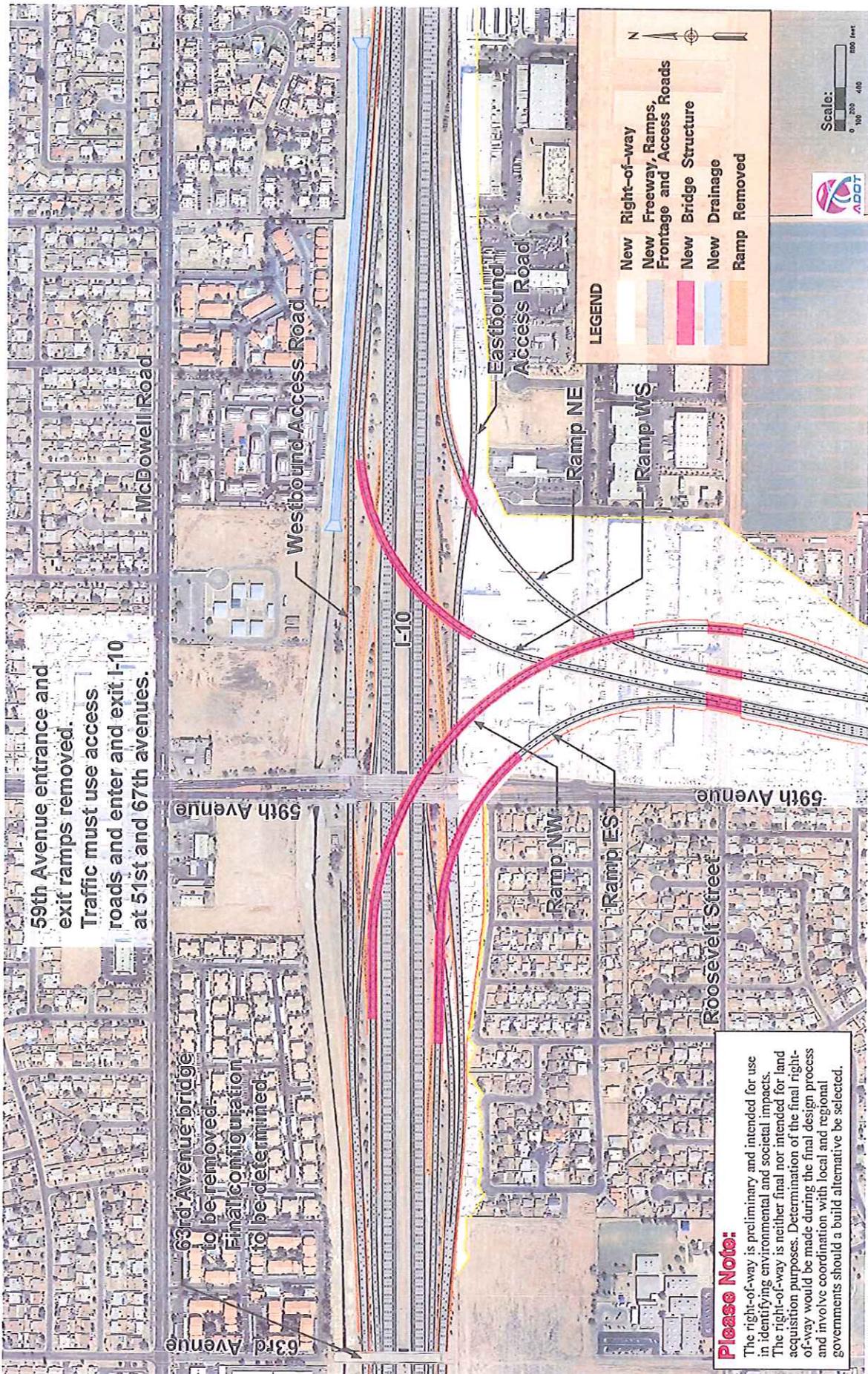


## **APPENDIX F**

### **PRELIMINARY DESIGN OF SOUTH MOUNTAIN FREEWAY**

South Mountain Transportation Corridor Study Map 18: Van Buren Street





**Please Note:**  
The right-of-way is preliminary and intended for use in identifying environmental and societal impacts. The right-of-way is neither final nor intended for land acquisition purposes. Determination of the final right-of-way would be made during the final design process and involve coordination with local and regional governments should a build alternative be selected.

**Appendix C: Reserved – Phoenix City Council Meeting Hearing  
Minutes**

**Appendix D: Reserved – PUD – Conditions of Zoning Approval**