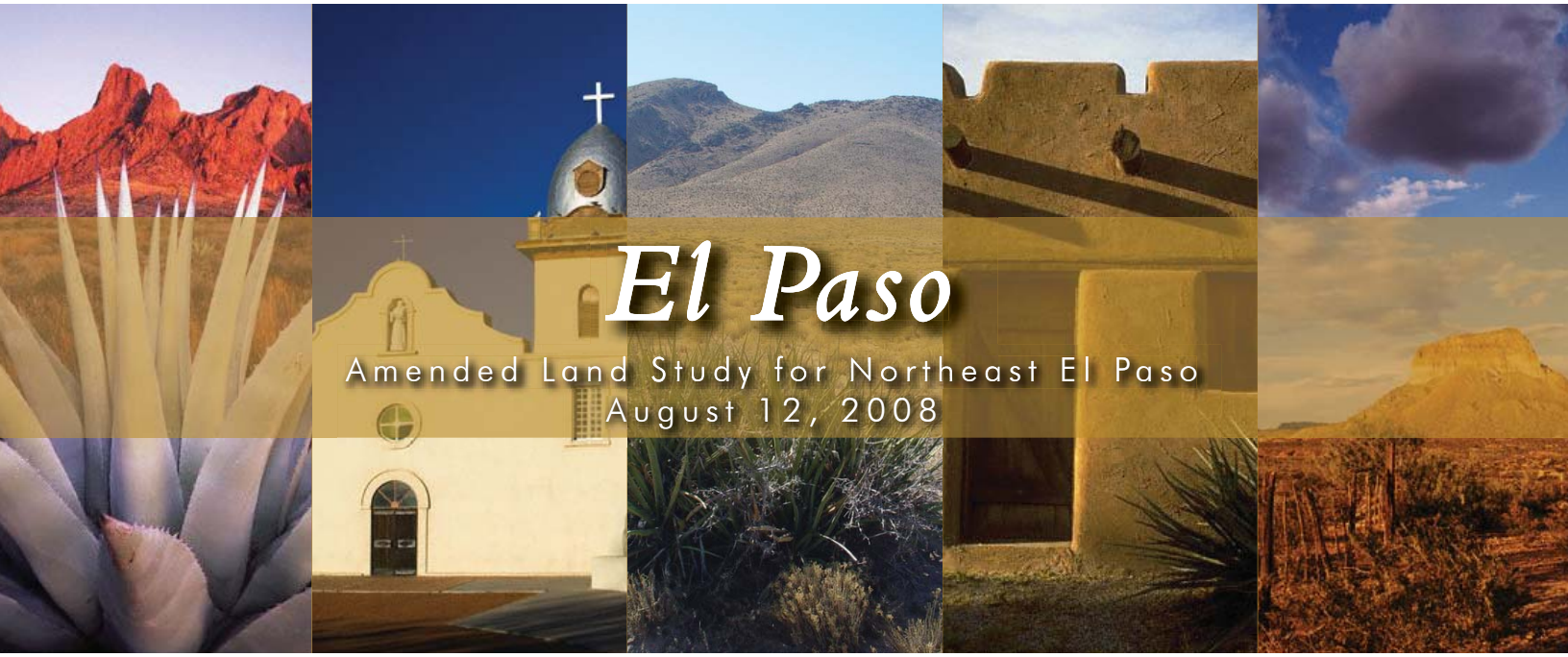

El Paso

Amended Land Study for Northeast El Paso

August 12, 2008

Kimley-Horn
and Associates, Inc.

AMENDED LAND STUDY

NORTHEAST MASTER PLAN

August 12, 2008

El Paso, Texas

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1. GENERAL PURPOSE AND INTENT

The purpose of this land study is to amend the *Northeast Land Study* dated October 2006, submitted by the El Paso Water Utilities-Public Service Board (EPWU-PSB), prepared by URS Corporation, and approved on January 9th, 2007. The intent of this land study amendment request is to provide the necessary information for the City Planning Commission (CPC) to approve the amendment request. This amendment request is based on the requirements established per the *City of El Paso, Texas, Title 19 Subdivision Regulations,* Section 19.2.

Additionally, this land study amendment submittal intends to provide additional guidelines for development of the approximately 4,835-acre tract and provide the means for the developer to follow the *Smart Growth Plan for the Northeast*.

2. OVERVIEW

Site Location

The site is approximately 4,835 acres located in the Northeast district of the City of El Paso, north of U.S. Highway 54 (Patriot Freeway) and east of the Franklin Mountains, within El Paso city limits. Reference Exhibit 1 for site location details.

Site Description

The project site is a portion of the approximately 16,000 acres of vacant land currently owned by the El Paso Water Utilities-Public Service Board (EPWU-PSB). The site is mostly vegetated by native desert vegetation and no endangered species have been found according to the *Geologic Investigation* report prepared by Mark Peterson and Associates, dated March 2007. The terrain is part of the alluvial fan from the Franklin Mountains which drains towards the east of the property. Although the effective Flood Emergency Management Agency (FEMA) map shows three flow paths within the project site, no defined channels or arroyos are found within the project site (see *Master Drainage Plan* attached). The average east-west slope of the terrain is 2%, while the north-south slope is generally flat. Two major roads exist within the project site, Martin Luther King Jr. Boulevard and McCombs Road. Both of these roads are under the jurisdiction of the Texas Department of Transportation (TxDOT). The Painted Dunes Golf Course is situated within the project site but is not included in the acreage described for the project. EPWU-PSB water wells and water reservoirs exist within the project site.

Existing Conditions

The project site is within El Paso city limits. The current zoning is R-F (Ranch-Farm). The adjacent properties to the south are zoned R3 and R3A. The area west of the project site is within the PMD zone and is mostly state park under the jurisdiction of Texas Parks and Wild Life.

Existing Future Land Use Plan

The projected land use plan for the project site is found on the current City of El Paso comprehensive plan (*Plan for El Paso*) illustrated in Exhibit 2. The *Existing Future Land Use Plan* is based on the land study submitted by the EWPU-PSB as prepared by URS Corporation and approved on January 9th, 2007.

Existing Thoroughfare Plan

The *Existing Future Land Use Plan* is based on the land study approved on January 9th, 2007 referenced above. This land study did not include a traffic study that justified the requirements to amend the thoroughfare plan in the current *Plan for El Paso*. The *Existing Thoroughfare Plan* is based on a land use map that has been amended. Therefore, no relationship exists between land uses and thoroughfares in the current *Plan for El Paso*. Exhibit 3 depicts the existing thoroughfare plan which this amendment request intends to modify. Existing traffic and thoroughfare conditions are discussed in more detail in the attached *Traffic Impact Analysis*.

Existing Infrastructure

The project site is vacant. Infrastructure capable of satisfying the minimum requirements for development is not available. There are future plans by the PSB to extend the facilities to the site to support the development as part of the agreement between the Buyer, the Seller, and the PSB to purchase the property. Three major infrastructure categories are described in this study: traffic, drainage and utilities (water and sanitary sewer).

- Traffic

  Martin Luther King Jr. Boulevard is a TxDOT road with two lanes on its current condition and six lanes divided on its ultimate condition. The road was recently expanded through the North-Hills subdivision and transitioned to its current two lanes just north of the subdivision. McCombs Road is a two lane road on its current condition and possible six lanes divided in its ultimate condition. As part of the purchasing agreement, the PSB will expand the existing road to four lanes to the northern extent of the 4,835 acre site. McCombs Road runs on a north-south direction through the site adjacent to the Painted Dunes Golf Course. Detailed existing conditions and future road extension and additions are discussed in the *Traffic Impact Analysis* (TIA) attached.

- Drainage
  According to the current effective FEMA maps, there are 4 defined flow paths within the subject site. Three flow paths flow in the east-west direction. All flow paths combine at the downstream end (southeast of the site), forming one flow path which ultimately discharges into the regional levee system located south of U.S. Highway 54. Based on detailed inspections of the flow paths and on-site observations, it is determined that arroyos do not exist within the project site. The only defined arroyos can be found west of the property within the Franklin Mountain State Park. Detailed information regarding the existing conditions is included as part of the *Northeast Master Drainage Plan* presented with this amendment request.

- Utilities (Water and Sanitary Sewer)
  According to record drawings and information provided by the EPWU-PSB, the site does not have the necessary infrastructure required to provide water and wastewater services to the projected development. A 16" water main exists west of McCombs Road that serves the Painted Dunes Golf Course. The nearest wastewater point of discharge is a sewer main extension through the development south of the project site. It is understood this sewer main extension is under construction at the time of this report.

  A 16-inch reclaimed water main (purple water) exists within the project site. The purpose of this water main is to provide water to the existing El Paso Electric Company power plant located north of the project site. This purple water main runs in the east-west direction starting at the "Fred Harvey" treatment plant and turning north along the future extension of Sean Haggerty Road.

3. PROPOSED LAND USE PLAN

The proposed land use plan is presented in Exhibit 4.

The development is organized as a community consisting of neighborhood centers and town centers serving pedestrian-friendly neighborhoods. Mixed use areas are used to anchor residential uses and provide goods and services within walking distance of residential neighborhoods. Single use commercial zones may exist within mixed-use areas. Development intensity generally increases toward neighborhood and town centers and decreases toward the perimeter of the development, thus providing for a gradient of lessening development from mixed-use and non-residential core areas.

The *Master Land Use Plan* shows four categories of residential development intensity, each expressed as an average density and range of housing types. Neighborhoods are arranged to support walkability and minimize pedestrian/vehicular conflicts wherever practical.

A regional town center is located to prevent isolation from the perimeter of the development and the City, increase the support of the region by providing access to more people, and discourage offsite traffic from passing through residential neighborhoods.

Open space within the project site provides for a pedestrian linkage system, thus uniting rather than dividing the community. The open space provided in the land use plan is in addition to the required open space that will be required per the *City of El Paso, Texas, Title 19 Subdivision Regulations*.

Proposed Land Uses

Open Space. Open space is distributed throughout the District in a manner intended to unite the community. Homes and neighborhoods, the more personal parts of the district, are linked to gathering places (e.g., schools, parks, retail/office) through the pedestrian circulation system, itself being a space for social interaction.

Schools. Four elementary schools, one middle school and one high school have been reserved throughout the project site. Final location of the elementary school and the middle school will be negotiated between developer and EPISD. The location of the high school tract has been negotiated between EPISD and property owner.

Low Density Residential (3.5 du/ac). This residential type includes single-family detached homes and two-family homes, distributed in a manner that follows the intent of Section 1.3.3 and does not exceed 3.5 dwelling units per gross acre (du/ac) within the acreage allocated to it within its Subdistrict, as shown on the *Master Land Use Plan*. Four-family homes may be included at the edges of these areas in order to blend with adjacent higher-density areas, provided the density maximum is not exceeded.

Low Density Residential (5.5 du/ac). This residential type consists primarily of single-family detached homes and two- and four-family homes, distributed in a manner that follows the intent of Section 1.3.3 and does not exceed 5.5 dwelling units per gross acre (du/ac) within the acreage allocated to it within its Subdistrict, as shown on the *Master Land Use Plan*. Townhomes may be included at the edges of these areas in order to blend with adjacent higher-density areas, provided the density maximum is not exceeded.

Medium Density Residential (7.2 du/ac). This residential type consists primarily of multifamily housing, with single-family detached homes, two- and four-family homes, and townhomes, distributed in a manner that follows the intent of Section 1.3.3 and does not exceed 7.2 dwelling units per gross acre (du/ac) within the acreage allocated to it within its Subdistrict, as shown on the *Master Land Use Plan*.

Medium Density Residential (12.0 du/ac). This residential type consists primarily of multifamily development, with four-family homes, townhomes, and apartment buildings, distributed in a manner that follows the intent of Section 1.3.3 and does not exceed 12.0 dwelling units per gross acre (du/ac) within the acreage allocated to it within its Subdistrict, as shown on the *Master Land Use Plan*. Two-family homes may be included at the edges of these areas in order to blend with adjacent lower-density areas.

Mixed-Use Low Intensity. This land use type consists of neighborhood-serving retail and/or commercial uses, providing goods and services for the day-to-day needs of the nearby neighborhoods and/or multi-family dwellings. Single-use retail, commercial and residential development is allowed in mixed-use, low intensity areas.

Mixed-Use High Intensity. This land use type consists of community-serving retail and/or commercial uses, providing goods and services for several neighborhoods and/or multi-family dwellings. Single-use retail, commercial and residential development is allowed in mixed-use, high intensity areas.

Regional Retail. Regional retail consists of high-intensity retail development that is intended to serve the northeast El Paso region and beyond.

Demographics

The projected land uses are not determined based on income or projected type of housing (luxury, medium income, etc). The objective of the land use plan presented is to achieve a mix of residential densities and types. The population projections are based on the calculated average per-house density from the El Paso census data obtained from the 2006 El Paso Development Services database. Table 1 below provides the population projection per the maximum densities allowed per this land study.

Demographic Summary

Residential Use	Phase One: Years 1 to 4			Phase Two: Years 5 to 8			Phase Three Years 9 to 12			Total		
	Acres	Projected Units	Projected Population	Acres	Projected Units	Projected Population	Acres	Projected Units	Projected Population	Acres	Projected Units	Projected Population
Low Density Residential	0	0	0	247.68	867	2514	482.26	1688	4895	729.94	2555	7409
Medium Density Residential	511.40	2813	8157	709.93	3905	11323	535.11	2943	8535	1756.44	9660	28015
Medium/High Density Residential	123.90	892	2587	103.65	746	2164	173.04	1246	3613	400.59	2884	8364
High Density Residential	134.17	1610	4669	118.81	1426	4135	38.41	461	1337	291.39	3497	10140
Mixed Use Low Intensity	34.56	207	601	96.00	576	1670	97.28	584	1693	227.84	1367	3964
Mixed Use High Intensity	66.37	239	693	77.70	280	811	12.10	44	126	156.17	562	1630
Subtotal	870.40	5761	16707	1353.77	7799	22618	1338.20	6965	20199	3562.37	20525	59524

Table 1. Northeast Master Plan Demographic Projections.

4. PROPOSED THOROUGHFARE PLAN

The thoroughfare plan is developed with the objective of distributing projected trips in an orderly and organized fashion. The trip generation depends on the land use distribution and projected attraction and generation zones. Although the objective of the land use distribution and the overall master plan is to provide a pedestrian friendly community and additional alternatives for transportation, the developer is required to provide the road infrastructure necessary to satisfy the level of service (LOS) required by the city ordinance.

The proposed thoroughfare plan will utilize three typical road cross-sections, Major Arterial Street, Minor Arterial Street and Minor Arterial Street with Bike/Hike. The sections are standards represented on pages 3-1,2 of the *City of El Paso, Texas, Title 19-Subdivision Ordinance Design Standards for Construction* (DSC). The minor arterials contain four lanes while the major arterial consists of six lanes. Furthermore, the bike/hike arterial calls for a ten foot hike and bike trail on either side of the roadway as opposed to the sidewalk that is utilized in the regular arterials. See Figure 1 for the cross-section schematic.

A *Traffic Impact Analysis* has been developed as part of this amendment request. Reference the *Northeast Master Plan Traffic Impact Analysis* attached with this land study for specific details on existing conditions, demographic projections, modeling assumptions and results.

FIGURE 1: TYPICAL THOROUGHFARE CROSS-SECTIONS

5. PROPOSED MASTER DRAINAGE PLAN

A master drainage plan has been developed as part of this amendment request. Reference the *Northeast Master Drainage Plan* attached with this land study for specific details on existing conditions, modeling methodology, assumptions and proposed conditions model, and results.

6. PROPOSED DEVELOPMENT PLAN

The objective of the developer is to complete development of the approximately 4,835 acres based on a projected twelve year phasing schedule. The development is divided into three major phases. Each major phase is projected to be developed in four year intervals. Yearly development areas will vary depending on market conditions, housing demand and availability of infrastructure such as water, sewer and drainage.

The retail use area located at the intersection of McCombs and U.S. Hwy 54 is projected to be the initial development area along with residential use areas near the retail area and near existing/available infrastructure along Loma Real and Sean Haggerty. It is projected that the bulk of the last area to develop will be residential use area located in the north and northwest portion of the subject site. Market conditions at the time of development will dictate the speed of development and the ultimate schedule. Table 2 depicts the development plan per major phase.

Land Use Development Plan

Land Use	Phase One: Years 1 to 4 (Acres)	Phase Two: Years 5 to 8 (Acres)	Phase Three Years 9 to 12 (Acres)	Total (Acres)
Low Density Residential	0.00	247.68	482.26	729.94
Medium Density Residential	511.40	709.93	535.11	1756.44
Medium/High Density Residential	123.90	103.65	173.04	400.59
High Density Residential	134.17	118.81	38.41	291.39
Regional Retail	86.17	0.00	0.00	84.86
Mixed Use Low Intensity	34.56	96.00	97.28	227.84
Mixed Use High Intensity	66.37	77.70	12.10	156.16
Open Space	88.95	342.28	411.48	842.71
Park	25.01	0.00	0.00	25.01
School	15.00	39.99	30.00	84.99
R.O.W.	81.01	76.85	76.26	234.12
Subtotal	1166.57	1815.13	1855.94	4835.35

Table 2. Northeast Master Plan Development Phasing Schedule.
(50.69-acre high school not included in this table)

7. PROPOSED ZONING

A re-zoning request is being submitted simultaneously with this amendment request. The zoning proposed for the project site is General Mixed-Use (GMU). The zoning request will be in conformance with the *City of El Paso, Texas, Title 20 Zoning*.

8. UTILITIES

The project site is vacant land; therefore, infrastructure capable of satisfying the minimum projected demand is not available. The EPWU-PSB plan to satisfy the minimum demand was presented in the original land study prepared by URS Corp., submitted by the EPWU-PSB. Generally, the plan is to extend existing water transmission lines to a total of 3 reservoirs located within the project site, which in turn distribute water to the project site through major distribution lines (12, 16, 18 and 24 inch). Sanitary sewer mains will be extended as necessary to serve the project site. It is understood the EPWU-PSB will be required to upgrade their lift stations. Although a purple water main is available to the site, plans for the extension of this system are not projected at the time of this amendment request.

9. PROPOSED ALTERNATIVE SUBDIVISION IMPROVEMENT DESIGN GUIDELINES

Purpose and Applicability

The purpose of the alternative subdivision improvements design guidelines presented in this land study is to provide alternative design parameters that will allow the developer to achieve specific goals as established by the proposed *Master Zoning Plan*, the *Request for Bidders* as prepared by the EPWU-PSB, and the *Smart Growth Plan for the Northeast Master Plan*.

Approval of the alternative subdivision improvements presented herein shall grant the developer the right to utilize such guidelines throughout the proposed development.

9.1 STREET STANDARDS

In addition to the regulations of Section 19.15 the following regulations shall apply:

Residential Lots Fronting Arterial Streets. Where a single family lot fronts an arterial street, it shall be required to provide a 20' drive (slip road) parallel to the adjacent arterial to provide direct access to the single family lot. Access to slip roads shall meet the minimum driveway standards per the DSC. The separation between curb openings for slip roads shall follow the minimum driveway guidelines per the DSC, Section 6-15 and minimum street offsets per Section 19.15.12.

Construction of Streets. Intersection of major arterials only shall be constructed with concrete in accordance with the Figure 2.

Street Grades and Horizontal Curves. Minimum and maximum street grades shall conform to the standards set forth in the DSC. Horizontal curves shall be calculated based on the AASHTO design manual applying design speed limit applicable to the road classification per Section 3-40 of the DSC. The design speed limit for minor residential access shall be 25 mph under the criteria established in Section 3-41 of the DSC.

FIGURE 2: INTERSECTION PAVING GUIDELINES

9.2 STREET LIGHTING

In addition to the regulations of Section 19.16 the following regulations shall apply:

Exceptions. In addition to the exceptions referenced in Section 19.16.1-d, street light spacing requirements for local streets may be authorized by the City Plan Commission at the request of the developer at the time of plat approval on all streets within the *Northeast Master Plan*.

Custom lighting. The City of El Paso and the developer shall agree on a type of custom lighting that will be incorporated as part of the standard street lighting throughout the development. Thus, Section 19.16.3 shall not apply to the *Northeast Master Plan*. The custom lighting has to comply with the lumen level required in the DSC and meet or exceed the coverage requirements. A Private Improvement District shall not be required. Due to the number of acres that will be developed under one street lighting standard, the cost of maintenance shall not be perpetually conveyed to the developer or any Public Improvement District.

9.3 STORM WATER MANAGEMENT REQUIREMENTS

In addition to the regulations of section 19.19 the following regulations shall apply:

Applicability. The developer shall have the option to apply the engineering methods and standards proposed herein. The City will apply the *Drainage Design Manual* (DDM) standards, methods, criteria and administrative policies and procedures except for instances for which an alternative design standard is presented herein.

Time of Concentration. Alternatively to Section 4.3.1.3 of the DDM, the developer shall use the methodology described in the *Natural Resource Conservation Service Technical Release 55* (NRCS, 1986) for time of concentration calculations in developed areas. This methodology calculates time of concentration based on three flow regimes – overland flow, shallow concentrated flow, and channelized flow. The same methodology shall be applicable to future iterations of the master drainage plan and drainage design for this project.

Energy Losses. Alternatively to Section 6.1.3 of the DDM, the developer may utilize Table 3 for the calculation of minor head loses. The values of K shown in the table shall be used in the design of storm sewer systems. The head losses which occur at the points of turbulence shall be computed and reflected in the profile of the hydraulic gradient.

TABLE 3.1: MINOR LOSS COEFFICIENTS

TABLE 3.2: MINOR LOSS COEFFICIENTS

TABLE 3.3: MINOR LOSS COEFFICIENTS

Pipe Materials. In addition to section 6.2.8 of the DDM, the developer shall have the right to utilize thermoplastic HDPE smooth interior wall pipe for storm drain applications. The developer shall provide technical specifications and fabricator's certification that the type of HDPE pipe proposed can withstand soil corrosion and design loading.

Drop Inlet Design Discharge. Alternatively to Section 7.6 of the DDM, the design discharge for a drop inlet should be determined based on the Rational Method.

Inlet Depth Calculations. Alternatively to Section 7.6.3 of the DDM, a standard pre-fabricated concrete box with a minimum depth of 4.5 feet, measured from the interior bottom of the box to the top of curb, shall be allowed throughout this development. The hydraulic gradient shall not be less than 1.5 feet below the top of curb profile.

Open Channel Maximum Velocity. Alternatively to Section 8.2.4 of the DDM, the maximum permissible velocity shall be determined by a geotechnical study that determines the maximum velocities the soils in the channel can sustain without creating hazardous erosion condition. In no instance shall the velocities exceed 8 feet per second.

Open Channel Freeboard. Alternatively to Section 8.2.5 of the DDM, the freeboard on a subcritical flow condition shall be a minimum of 1 foot above the 100-year water surface elevation (WSEL). For supercritical conditions, the minimum freeboard shall be 2 feet above the 100-yr WSEL. For levees the minimum freeboard shall be 3 feet above the 100-yr WSEL.

Open Channel Safety. In addition to Section 8.2.9 of the DDM, a fence shall not be required for the channels adjacent to linear parks or for channels that provide a hike and bike trail within the 100-yr WSEL. In no instance shall the hike and bike trail be at an elevation lower than the 50–yr WSEL.

Detention Facilities. Alternatively to Section 11.4.1.2 of the DDM, the basin is to be designed utilizing engineering practices and accepted methods whereby 100% of the runoff volume is to be properly managed through the use of channels and basins. Note: HEC-1 and other computer methods generally accepted by industry standards shall be approved for use in the detention basin design.

Detention/Retention Standards. Ponds with side slopes of 5 horizontal to 1 vertical or lesser slope will not require a fence. An access ramp will not be necessary since the slopes are suitable for vehicle use. A vehicular access (for maintenance) route shall be designated meeting compaction of 90% per ASTM D-1557.

Detention/Retention Fence. When a fence is required a combination of stone wall and wrought iron fence shall be allowed. The fence shall meet the minimum dimensions as established in the *City of El Paso, Texas, Title 19-Subdivision Ordinance Design Standards for Construction*.

9.4 PARK DESIGN AND CONSTRUCTION STANDARDS

For trails located within the ±843 acre open space area:

Trail Structure. The trail shall be of any width that contains a minimum of 8-feet of pavement surface with two 6”x12”concrete header curbs. Decomposed granite compacted shall be allowed for pavement surface. Header concrete curbs shall meet the concrete specifications per the *City of El Paso, Texas, Park Design and Construction Standards* (PDCS). The open space areas adjacent to the paved surface may be left in a natural state or may be landscaped under the Parks Facility Standards, referenced in Section 19.20.5.

Trail Landscaping. For the area immediately adjacent to the pavement surface, the developer shall have the option to leave in a natural state or landscape with natural non-irrigated landscape treatment under the Parks Facility Standards referenced in Section 19.20.5. Shrubs shall not be required. A minimum of one park bench shall be provided, spaced at a minimum distance of 1,350 feet (±1/4 mile). A cluster of no less than 5 shade trees and 3 ornamental trees shall be located at intervals of 1,350 feet. They shall have a drip irrigation system provided as specified in PDCS.

Trail Access and Signage. Trails adjacent to street right-of-way shall comply with the standard street section and the minimum sidewalk width shall be increased to 8 feet. Sidewalk depth shall be 4” thick concrete, minimum 3,000 psi strength, with 6”x6” wire mesh. Sub-grade is to meet minimum standards per PDCS. Trail signage shall be consistent in theme and form throughout the development.

Park Trail Lighting Standards. Because the intent of the development is to have a natural-like hike and bike trail system, the lighting standards shall not apply to the development. Standard illuminated bollards shall be installed at trail/street intersections, underpasses and tunnels. The developer may choose to provide additional lighting along the trails in a manner the developer considers to be necessary.

Trail Heads Standards. The trail heads may have a minimum of the following:

- 10 parking spaces
- 1 van accessible parking space meeting minimum ADA standards.
- A perimeter sidewalk meeting the Trail abutting right-of-way standards
- Information kiosk
- One or more points of access to state park or hike and bike trails
- A landscaped area of no less than 100 square feet.
- A cluster of no less than 2 shade trees
- Information signs required for traffic management and warning notices

Traffic Impact Analysis

Northeast Master Plan
El Paso, Texas

Prepared for:
Hunt Communities LLC

July 2008

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Traffic Impact Analysis

Northeast Master Plan
El Paso, Texas

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EXECUTIVE SUMMARY

This report documents a traffic impact analysis performed for the proposed Northeast Master Plan mixed use development, located generally north of US 54 (Patriot Freeway), between Martin Luther King, Jr. Boulevard and McCombs Street in the City of El Paso, Texas. Based on information provided by Hunt Communities LLC, the Northeast Master Plan will ultimately consist of approximately 6,615,000 square feet of shopping center / retail land use, 953,000 square feet of office land use, 16,373 single-family homes, apartments with 2,397 dwelling units, 1,398 townhomes, 4 elementary schools, a middle school, and a high school.

This traffic impact analysis was performed as a planning exercise, to determine the feasibility of developing the parcel and to size the internal thoroughfare network. As the site is developed, more detailed traffic impact analyses will need to be performed for each phase to ensure the proper mitigation measures and capacity improvements are provided with each proposed phase.

The traffic evaluation was comprised of three (3) scenarios for which both AM and PM peak hour level of service analyses were performed. For both signalized and unsignalized intersections, analysis was accomplished via the *Synchro 6*™ software. The scenarios are detailed in the table below.

Analysis Scenario Summary			
Scenario	**Roadway Conditions**	**Development Assumptions**	**Traffic Volumes**
Existing	Existing	Existing	Existing
Build Out Background (2035)	Existing	Development intensity modeled by El Paso MPO in 2035	Volumes modeled by El Paso MPO + Existing Background Traffic
Build Out (2035)	Patriot Freeway expansion + Haggerty Dr. extension + MLK Blvd. expansion + McCombs St. expansion + Loma Real Ave. extension/ expansion + Ring Rd. construction + Painted Dunes Dr. construction	Existing + Build Out of Northeast Master Plan	Background volumes based on projected El Paso MPO 2035 volumes + Build Out of Northeast Master Plan

Based on the analyses performed during this traffic impact study, we offer the following conclusions and recommendations:

Existing Conditions (2008):

Based on the analysis of existing conditions, all study area intersections currently operate at an acceptable level of service during the AM and PM peak hours.

Build Out Background (2035):

Based on the analysis of the 2035 background scenario conditions, all study area intersections are projected to operate at an acceptable level of service during the AM and PM peak hours.

Build Out Year (2035) Recommendations:

- Martin Luther King, Jr. Boulevard is recommended to be expanded to a six (6) lane divided arterial both through the site and between Loma Real Avenue and Patriot Freeway. While this requires a change to the *City of El Paso Master Thoroughfare Plan* (this roadway was previously listed as a super arterial – 8 lanes); a major arterial should adequately serve the study area.

- McCombs Street is recommended to be expanded to a six (6) lane divided arterial through the site. While this requires a change to the *City of El Paso Master Thoroughfare Plan* (this roadway was previously listed as a super arterial – 8 lanes); a major arterial should adequately serve the study area.

- Sean Haggerty Drive is recommended to be extended through the site as a four (4) lane divided minor arterial, as per the *City of El Paso Master Thoroughfare Plan*.

- Painted Dunes Road is recommended to be constructed as a four (4) lane divided connector.

- Loma Real Avenue is recommended to be constructed as a four (4) lane undivided connector.

- Ring Road is recommended to be constructed as a four (4) lane undivided connector.

- Ring Road is recommended to intersect McCombs Street, south of Painted Dunes Road and north of Loma Real Avenue.

- All major intersections (those analyzed in the report) are projected to require signalization (or some other treatment to increase capacity) by 2035. During each phase of development, the study area's intersections will be further analyzed to determine during which phase the capacity improvement is needed.

- Left and right-turn lanes are recommended at each intersection in the study. This recommendation is based on upon projected traffic volumes at the intersections. **Exhibit 14** shows the recommended lane uses and traffic control devices. It is recommended that the length of these turn lanes be designed in accordance with TxDOT and City of El Paso standards, respectively.

- Turn lanes on Martin Luther King, Jr. Boulevard through the site are recommended to be designed to with the same criteria as the existing turn lanes on Martin Luther King, Jr. Boulevard from US 54 to Loma Real Avenue.

- Dual left turn lanes are recommended at the intersections of:
  - McCombs Street and Painted Dunes Road (northbound only)
  - McCombs Street and Ring Road South (northbound only)
  - Martin Luther King, Jr. Boulevard and Loma Real Avenue (northbound and southbound)
  - Sean Haggerty Drive and Loma Real Avenue (northbound and southbound)
  - Painted Dunes Road and Patriot Freeway Westbound Frontage Road (westbound)
- At the intersection of Patriot Freeway Westbound Frontage Road and Martin Luther King, Jr. Boulevard, the lane configuration under the bridge could be modified to increase the capacity at this intersection. Due to the unbalanced volumes anticipated at this interchange, we recommend three northbound lanes with an additional dedicated northbound left lane and one dedicated southbound thru lane and one shared-left southbound lane.
- We recommend restriping the Patriot Freeway Eastbound Frontage Road at both McCombs Street and Sean Haggerty Drive to include dual lefts as indicated in **Exhibit 14**.

Exhibit 14 (next page) displays the recommendations made, based on the intersection level of service and link capacity analysis results.

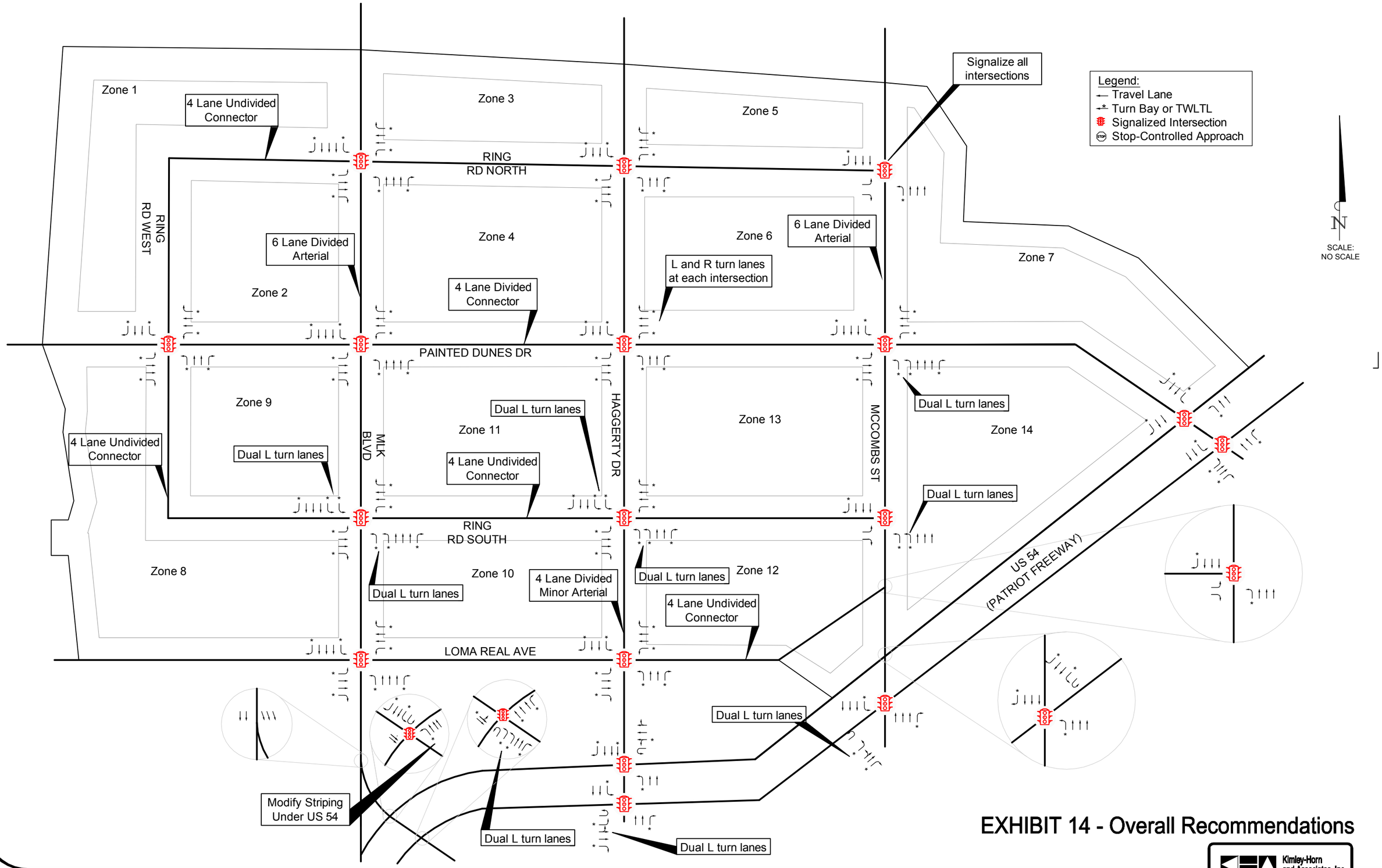


EXHIBIT 14 - Overall Recommendations

Kimley-Horn and Associates, Inc.

I. INTRODUCTION

A. PURPOSE

Kimley-Horn and Associates, Inc. was retained by Hunt Communities LLC to perform a traffic impact analysis as part of an amended land study for the proposed mixed use development, the Northeast Master Plan, located generally north of US 54 (Patriot Freeway), between Martin Luther King, Jr. Boulevard and McCombs Street in the City of El Paso, Texas.

The purpose of this study is to address the traffic and transportation impacts of the proposed development on surrounding streets and intersections, and to determine the necessary sizing of the network inside the development boundaries. This traffic impact study was prepared based on criteria set forth by the City of El Paso. The specific objectives of this study are to perform both mid-block and intersection capacity analyses, and to recommend any amendments or modifications to the City of El Paso Master Thoroughfare Plan within the study area to accommodate build out of the proposed development.

This traffic impact analysis was performed as a planning exercise, to determine the feasibility of developing the parcel and to size the internal thoroughfare network. As the site is developed, more detailed traffic impact analyses will need to be performed for each phase to ensure the proper mitigation measures and capacity improvements are provided with each proposed phase.

B. METHODOLOGY

The traffic evaluation was comprised of the existing traffic conditions, background conditions in the build out year of 2035, and the build out scenario for which both AM and PM weekday peak hour level of service analyses were performed. For both signalized and unsignalized intersections, analysis was accomplished via the *Synchro 6*™ software. **Table 1** provides a summary of the assumptions used in each scenario.

Table 1 - Analysis Scenarios			
Scenario	**Roadway Conditions**	**Development Assumptions**	**Traffic Volumes**
Existing	Existing	Existing	Existing
Build Out Background (2035)	Existing	Development intensity modeled by El Paso MPO in 2035	Volumes modeled by El Paso MPO + Existing Background Traffic
Build Out (2035)	Patriot Freeway expansion + Haggerty Dr. extension + MLK Blvd. expansion + McCombs St. expansion + Loma Real Ave. extension/ expansion + Ring Rd. construction + Painted Dunes Dr. construction	Existing + Build Out of Northeast Master Plan	Background volumes based on projected El Paso MPO 2035 volumes + Build Out of Northeast Master Plan

A list of the intersections analyzed within the study area and their existing and proposed traffic control can be seen below.

Existing (2008) Conditions:

Existing Unsignalized Intersections (not analyzed):

- Martin Luther King, Jr. Boulevard & Loma Real Avenue
- McCombs Street & Painted Dunes Golf Course

Existing Signalized Intersections:

- Patriot Freeway WBFR & Martin Luther King, Jr. Boulevard
- Patriot Freeway EBFR & Kenworthy Street
- Patriot Freeway WBFR & Sean Haggerty Drive
- Patriot Freeway EBFR & Sean Haggerty Drive
- Patriot Freeway WBFR & McCombs Street
- Patriot Freeway EBFR & McCombs Street

Build Out (2035) Conditions:

This scenario includes the intersections in the existing traffic scenario, plus the following proposed intersections:

Proposed Signalized Intersections:

- Martin Luther King, Jr. Boulevard & Ring Road North
- Martin Luther King, Jr. Boulevard & Painted Dunes Road
- Martin Luther King, Jr. Boulevard & Ring Road South
- Martin Luther King, Jr. Boulevard & Loma Real Avenue
- Ring Road West & Painted Dunes Road
- Sean Haggerty Drive & Ring Road North
- Sean Haggerty Drive Boulevard & Painted Dunes Road
- Sean Haggerty Drive & Ring Road South
- Sean Haggerty Drive & Loma Real Avenue
- McCombs Street & Ring Road North
- McCombs Street & Painted Dunes Road
- McCombs Street & Ring Road South
- McCombs Street & Loma Real Avenue
- Painted Dunes Road & Patriot Freeway WBFR
- Painted Dunes Road & Patriot Freeway EBFR

II. EXISTING AND PROPOSED LAND USE

A. SITE LOCATION / STUDY AREA

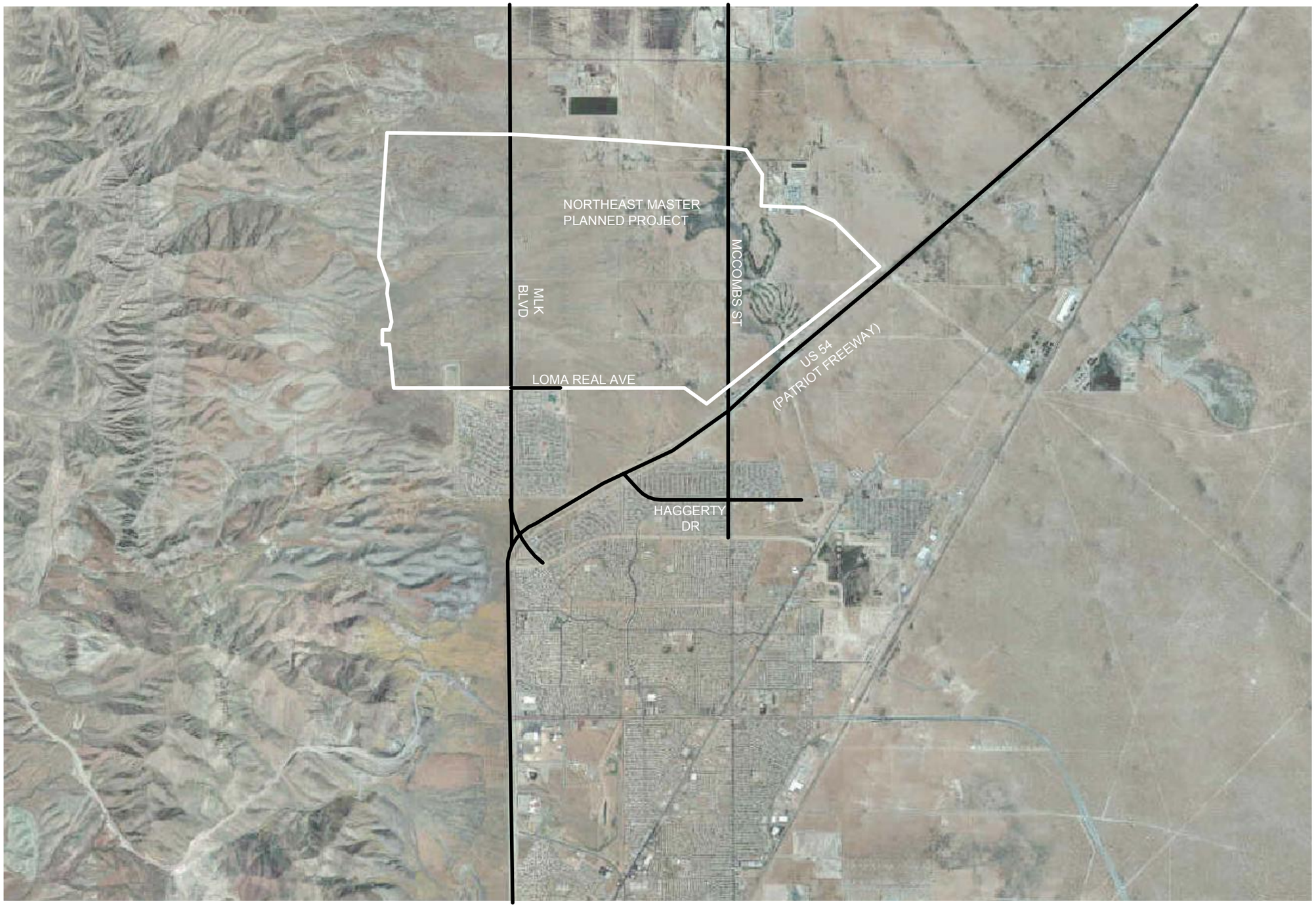
The proposed development is located generally north of US 54 (Patriot Freeway), between Martin Luther King, Jr. Boulevard and McCombs Street in the City of El Paso, Texas. A vicinity map can be seen in **Exhibit 1**.

B. EXISTING DEVELOPMENT

Currently, the only development within the site is the Painted Dunes Desert Golf Course. The focus of this study was the Amended Land Study and the ultimate build out of the proposed site; therefore, the impact of any development proposed to be in place by 2035 was considered through the background volumes obtained from the El Paso MPO's 2035 TransBorder projections.

C. PROPOSED DEVELOPMENT

Based on information provided by Hunt Communities LLC, the Northeast Master Plan will ultimately consist of approximately 6,615,000 square feet of shopping center / retail land use, 953,000 square feet of office land use, 16,373 single-family homes, apartments with 2,397 dwelling units, 1,398 townhomes, 4 elementary schools, a middle school, and a high school. The current site plan can be seen in **Exhibit 2.**

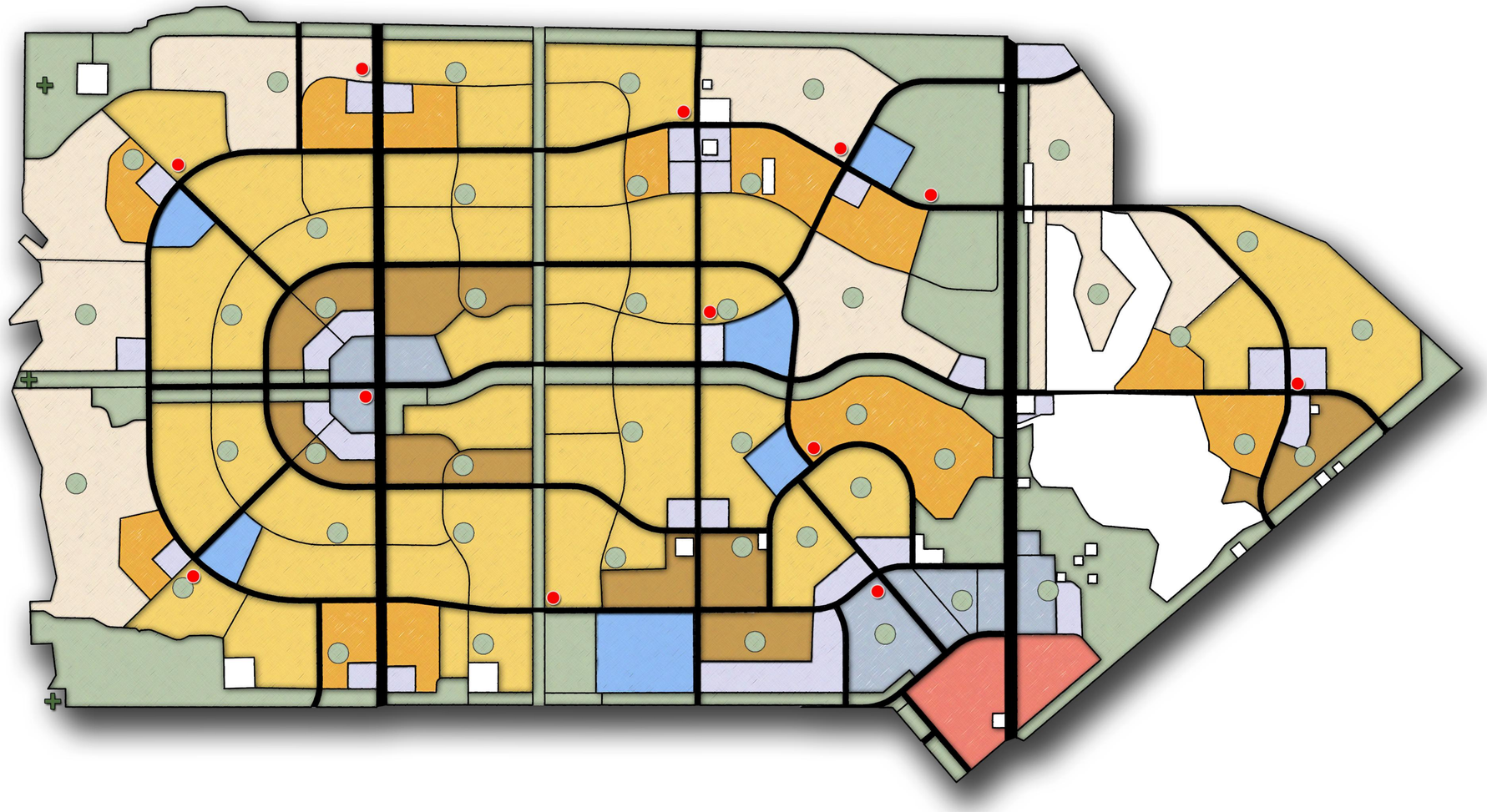


N

SCALE:
NO SCALE

EXHIBIT 1 - Vicinity Map

Kimley-Horn
and Associates, Inc.



LEGEND

- LOW DENSITY RESIDENTIAL 3.5
- LOW DENSITY RESIDENTIAL 5.5
- MEDIUM DENSITY RESIDENTIAL 7.2
- MEDIUM DENSITY RESIDENTIAL 12.0
- MIXED USE LOW INTENSITY
- MIXED USE HIGH INTENSITY
- SCHOOLS
- REGIONAL RETAIL
- OPEN SPACE
- POTENTIAL LOCATIONS OF MUNICIPAL SITES (POLICE, FIRE, GOVERNMENTAL, TRANSPORTATION; 2-3 TOTAL)
- TRAIL HEAD (APPROXIMATE LOCATIONS)

N

GRAPHIC SCALE

1000 0 500 1000 2000

(IN FEET)
1 inch = 1000 ft.

Master Land Use Plan

El Paso, Texas

EL PASO WATER UTILITIES PUBLIC SERVICE BOARD

Kimley-Horn and Associates, Inc.

III. EXISTING (2008) ROADWAY SYSTEM

A. THOROUGHFARE SYSTEM

The existing roadway network within the study area consists of Martin Luther King, Jr. Boulevard, Sean Haggerty Drive, McCombs Street, Loma Real Avenue, and Patriot Freeway. This network composes six (6) signalized intersections and two (2) unsignalized intersections. **Exhibit 3** displays the existing thoroughfares, lane assignments, and traffic control devices within the study area. The following is a general description of the major thoroughfares within the study area as they exist today, along with their planned cross-sections and alignments.

US 54 (Patriot Freeway) Frontage Roads are adjacent to the US 54 main lanes, which end at Sean Haggerty Drive. The existing posted speed on the frontage roads is 45 mph. US 54 runs generally north-south through El Paso, connecting Alamogordo, New Mexico to the north and Ciudad Juarez, Chihuahua, Mexico to the south. The frontage roads are typically two (2) lanes in each direction, with dedicated turn lanes at intersections.

Martin Luther King, Jr. Boulevard is a two (2) lane divided arterial running generally in a north-south direction with a posted speed of 65 mph through the site. A direct connection allows southbound motorists to access to Patriot Freeway. South of the study area, at the intersection with Patriot Freeway, Martin Luther King, Jr. Boulevard becomes Kenworthy Street. Martin Luther King, Jr. Boulevard extends north through the study area, eventually becoming State Highway 213 north of the state line between Texas and New Mexico. In the study area, Martin Luther King, Jr. Boulevard is a TxDOT facility, designated as FM 3255. The *City of El Paso Master Thoroughfare Plan* identifies Martin Luther King, Jr. Boulevard as ultimately becoming a six (6) lane divided arterial facility. Both left and right turn lanes are provided at every intersection within the study area.

McCombs Street is a six (6) lane north-south arterial facility south of Patriot Freeway, and a two (2) lane facility north of the frontage roads. The posted speed is 55 mph. McCombs Street extends through the study area into New Mexico. In the study area, McCombs Street is also a TxDOT facility, designated FM 2529. Like Martin Luther King, Jr. Boulevard, the *Master Thoroughfare Plan* identifies McCombs Street as a future six (6) lane divided arterial facility.

Sean Haggerty Drive is currently a four (4) lane north-south minor arterial terminating at the southbound Patriot Freeway frontage road. The posted speed limit is 35 miles per hour. The *City of El Paso Master Thoroughfare Plan* identifies Sean Haggerty Drive as ultimately becoming a minor arterial street.

Loma Real Avenue is a two (2) lane residential collector with a 30 mph posted speed limit. Loma Real Avenue begins at Martin Luther King, Jr. Boulevard and terminates approximately one half mile to the east. The *City of El Paso Master Thoroughfare Plan* identifies Loma Real Avenue as a proposed collector.

B. EXISTING TRAFFIC VOLUMES

Exhibit 4 presents the existing AM and PM peak hour traffic volumes collected on Thursday, May 15, 2008 at the intersections listed below. In addition, 24-hour bi-directional recording machine counts were collected on Martin Luther King, Jr. Boulevard (north of the direct connector to US 54) and McCombs Street (north of US 54). The raw count sheets are provided in the **Appendix**.

Turning Movement Count Locations:

- US 54 WBFR & Martin Luther King, Jr. Boulevard
- US 54 EBFR & Kenworthy Street
- US 54 WBFR & Sean Haggerty Drive
- US 54 EBFR & Sean Haggerty Drive
- US 54 WBFR & McCombs Street
- US 54 EBFR & McCombs Street

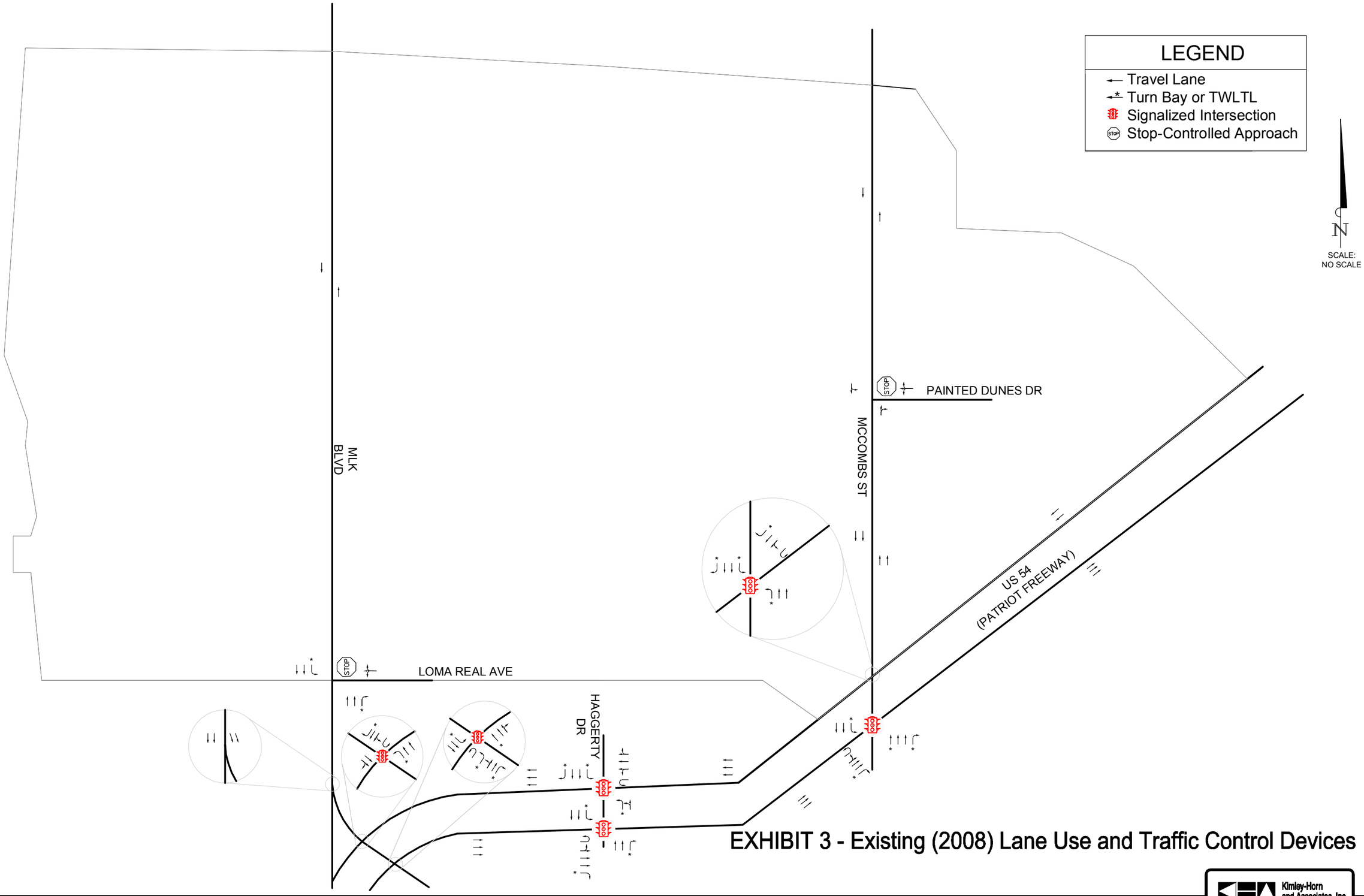


EXHIBIT 3 - Existing (2008) Lane Use and Traffic Control Devices

Kimley-Horn and Associates, Inc.

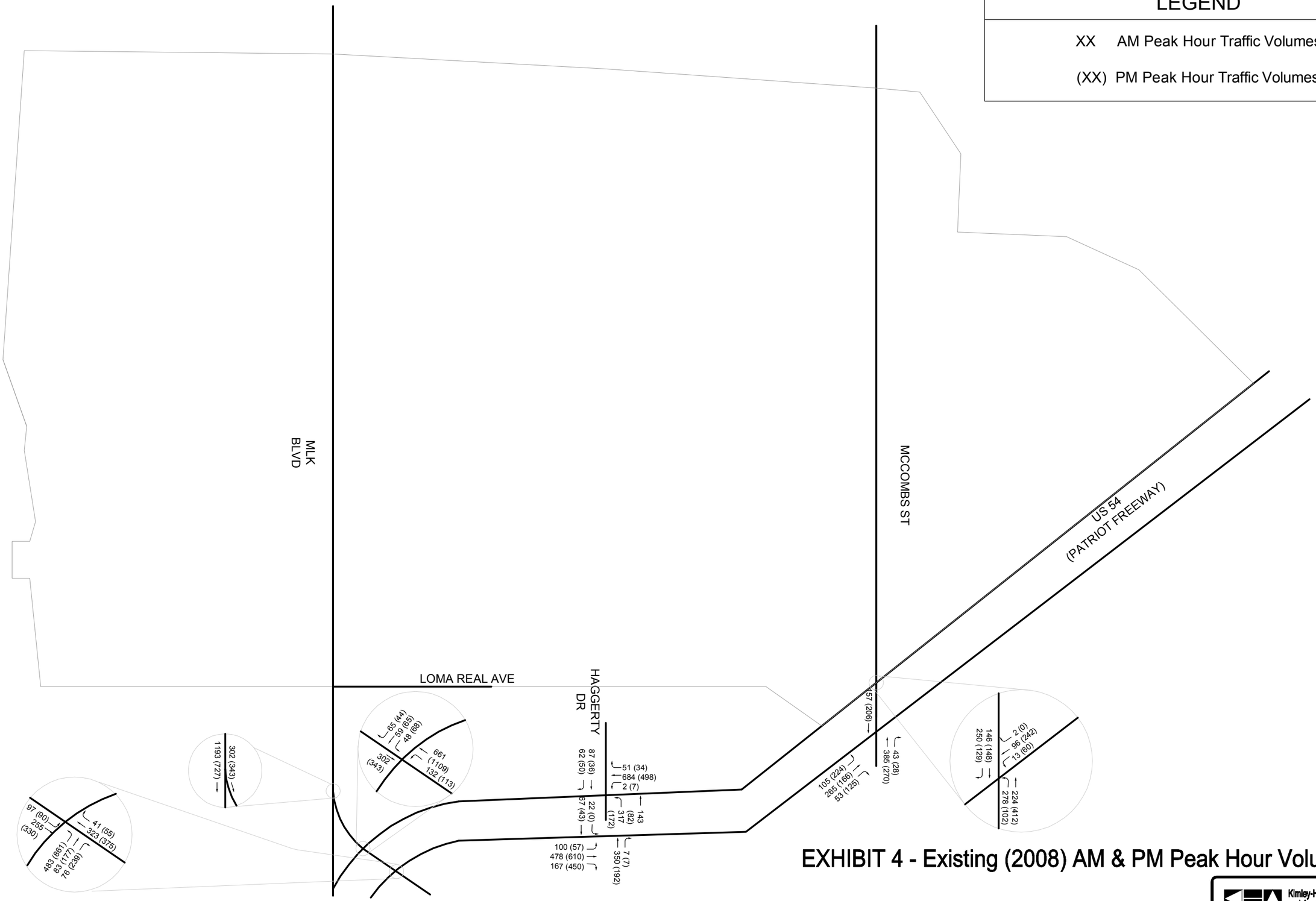


EXHIBIT 4 - Existing (2008) AM & PM Peak Hour Volumes

Kimley-Horn and Associates, Inc.

IV. EXISTING CONDITIONS (2008) TRAFFIC ANALYSIS

A. LEVEL OF SERVICE EVALUATIONS

The evaluation of the existing roadway system was comprised of both AM and PM peak hour level of service analyses. For both the signalized intersections, analysis was accomplished via the *Synchro 6*™ software. The previously referenced **Exhibit 3** details the lane assignments and traffic control devices for the existing roadway network that were used for analysis. The purpose of this analysis was to determine if any deficiencies exist within the network and to establish a baseline condition.

Capacity defines the volume of traffic that can be accommodated by a roadway at a specified "level-of-service." Capacity is affected by various geometric factors including roadway type (e.g. divided or undivided), number of lanes, lane widths, and grades. Level-of-service (LOS), which is a measure of the degree of congestion, ranges from LOS A (free flowing) to LOS F (a congested, forced flow condition). LOS C is considered to be the minimum acceptable level of service for design and evaluation purposes, while LOS D is considered acceptable for long-term planning due to the uncertainty of study assumptions. Due to increasing congestion in many cities, LOS D is gaining acceptance as a level of service for design and evaluation. LOS E is commonly being accepted for long term planning due to the uncertainty of assumptions in many long term projects. A description of each operational state for signalized intersections is presented in **Table 2**.

Table 2 – Definition of Level of Service for Signalized Intersections

Level of Service	Average Control Delay per Vehicle (sec/veh)	Description
A and B	≤ 10 (A) > 10 and ≤ 20 (B)	No delays at intersections with continuous flow traffic. Uncongested operations; high frequency of long gaps available for all left and right-turning traffic; no observable queues.
C	> 20 and ≤ 35	Moderate delays at intersections with satisfactory to good traffic flow. Light congestion; infrequent backups on critical approaches.
D	> 35 and ≤ 55	Increased probability of delays along every approach. Significant congestion on critical approaches, but intersection functional. No long standing lines formed.
E	> 55 and ≤ 80	Heavy traffic flow condition. Heavy delays probable. No available gaps for cross-street traffic or main street turning traffic. Limit of stable flow.
F	> 80	Unstable traffic flow. Heavy congestion. Traffic moves in forced flow condition. Average delays greater than one minute highly probable. Total breakdown.

The following tables detail the results of the analysis for the study area. **Table 3** compiles the results of the controlled movements at the signalized intersections. *Synchro 6*™ output sheets are provided in the **Appendix**.

Based on the analysis of existing conditions, all study area intersections currently operate at an acceptable level of service during the AM and PM peak hours.

Table 3 - Existing (2008) Signalized Intersection Analysis

Intersection	AM Peak		PM Peak	
	Existing		Existing	
	Delay[1]	LOS	Delay[1]	LOS
McCombs @ Patriot Freeway WBFR	14.9	B	13.8	B
McCombs @ Patriot Freeway EBFR	19.3	B	18.8	B
MLK @ Patriot Freeway WBFR	7.5	A	7.2	A
MLK @ Patriot Freeway EBFR	17.4	B	16.7	B
Haggerty @ Patriot Freeway WBFR	16.4	B	15.7	B
Haggerty @ Patriot Freeway EBFR	18.2	B	21.0	C

[1]Delay is reported as HCM delay in sec/veh

V. BUILD OUT (2035) BACKGROUND TRAFFIC

A. BUILD OUT BACKGROUND THOROUGHFARE ROADWAY SYSTEM

The background thoroughfare roadway system used in the analysis was based on the proposed amended land study. **Exhibit 5** shows the thoroughfare roadway system for the background build out scenario.

B. BACKGROUND TRAFFIC VOLUMES

In order to determine the projected background traffic volumes, projected 2035 weekday traffic volumes along the study area thoroughfare facilities were obtained from thoroughfare planning work conducted by the El Paso Metropolitan Planning Organization. Based upon characteristics of the model, the volumes provided by the El Paso MPO were adjusted to reflect the differences between the modeled land uses and the land uses proposed by Hunt Communities LLC. The traffic generated by the site in the model was removed from the background volumes, since this volume would be accounted for through trip generation of the proposed land uses. The resulting projected 2035 daily traffic volumes from the El Paso MPO's TransBorder 2035 plan are summarized below.

Projected 2035 Background Daily Traffic Volumes:

- McCombs Street: **10,395 vpd**
- Martin Luther King, Jr. Boulevard **20,681 vpd**

El Paso MPO's model volumes were used to calculate the north and southbound background traffic on Martin Luther King, Jr. Boulevard, Sean Haggerty Drive, McCombs Street, and at their existing intersections along US 54. The volumes generated by the MPO model are presented as total daily volumes. These daily volumes were translated into AM and PM peak period trips by analyzing the existing daily traffic counts (see **Appendix**). Below is an example of the PM Peak background volume calculation.

Example Calculation: McCombs Street PM Peak Background Calculation.

Projected Daily Volume from TransBorder 2035:	10,395 vehicles per day
PM Peak as a percentage of daily traffic:	8.77% of the daily volume.
Total PM Peak Hour Volume	912 vehicles
Directional Split	~60 % (NB) / ~40% (SB)
Resulting Background PM Peak Volumes:	546 (NB) / 366 (SB)

A similar methodology was applied to Martin Luther King, Jr. Boulevard; however some of the background traffic (30%) was shifted to Sean Haggerty Drive through the site due to the fact that Sean Haggerty was not included in the MPO's model. At existing intersections, the model trips were distributed among each movement, based on percentages determined from the existing count volumes. It should be noted that the MPO's model assumes the construction of the Patriot Freeway mainlines between MLK and McCombs to occur by 2015; therefore the lack of inclusion of these main lanes in this analysis results in a conservative estimate of the level of service.

Exhibit 6 displays the projected build out year (2035) background traffic volumes, which combines the background traffic projected by the El Paso MPO's 2035 model and the existing turning movement counts.

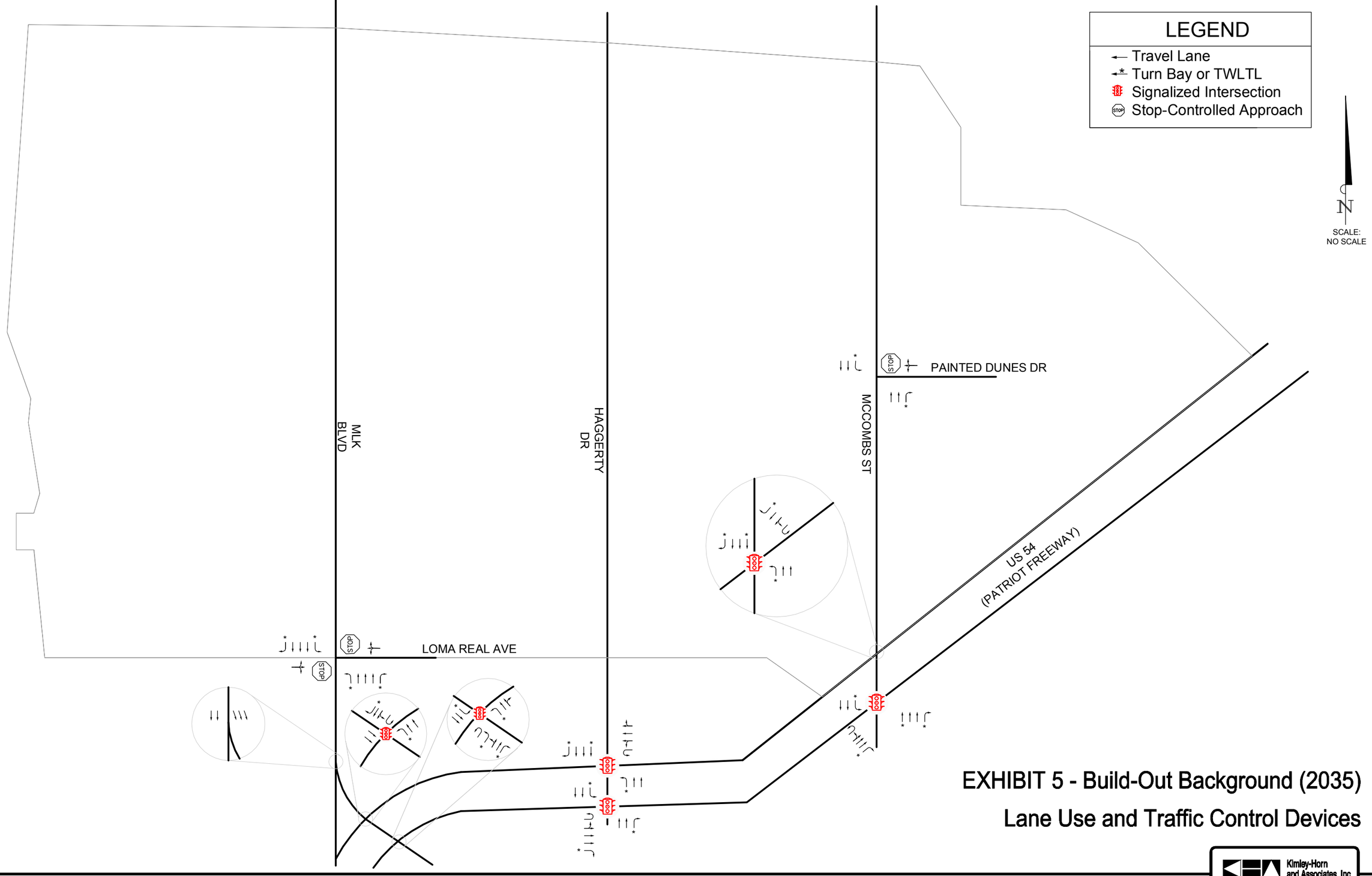


EXHIBIT 5 - Build-Out Background (2035)

Lane Use and Traffic Control Devices

Kimley-Horn and Associates, Inc.

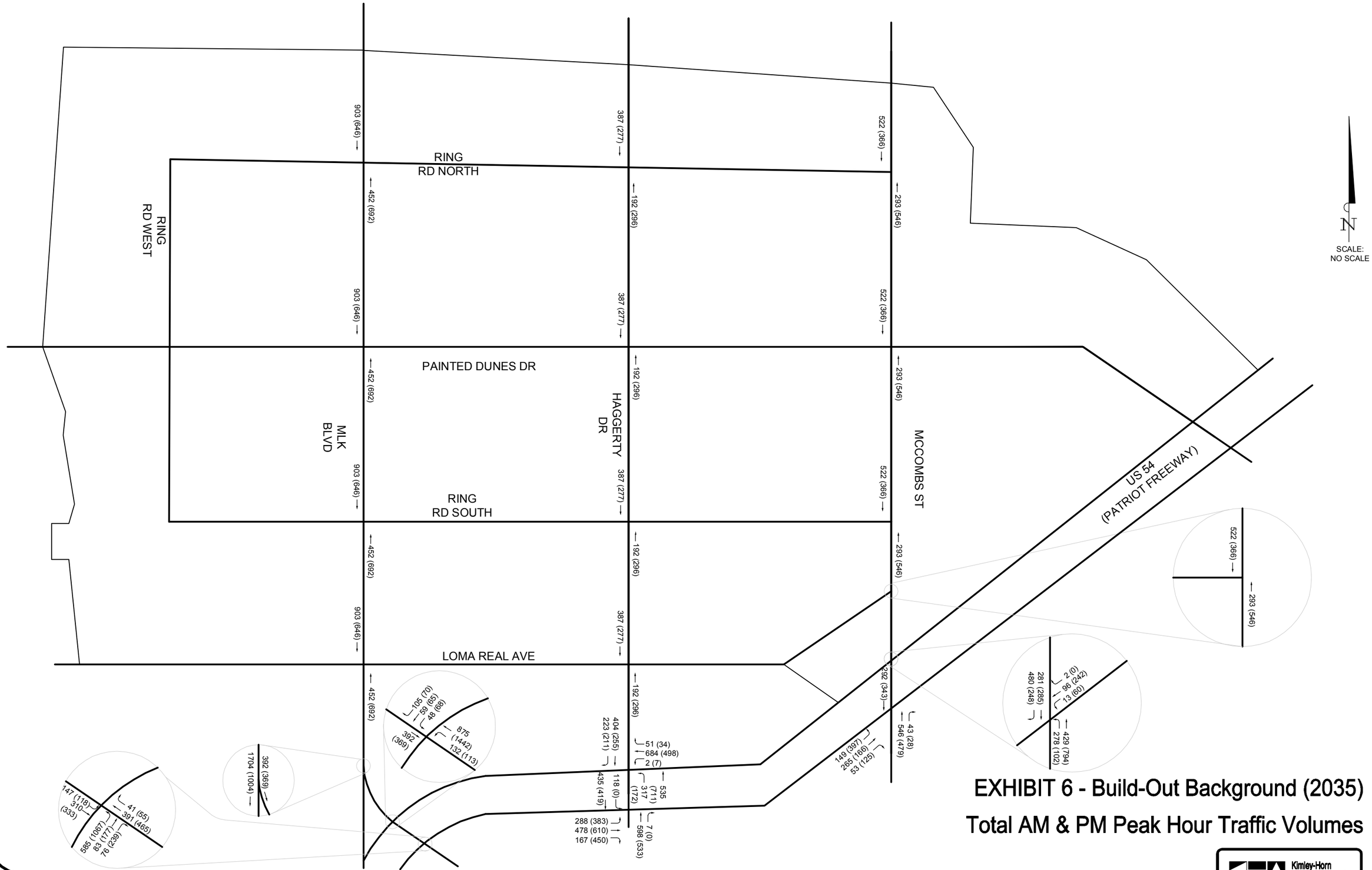


EXHIBIT 6 - Build-Out Background (2035)

Total AM & PM Peak Hour Traffic Volumes

Kimley-Horn and Associates, Inc.

VI. BUILD OUT BACKGROUND (2035) TRAFFIC ANALYSIS

A. LEVEL OF SERVICE EVALUATIONS

The evaluation of the build out background roadway system was comprised of both AM and PM peak hour level of service analyses. For the signalized intersections, analysis was accomplished via the *Synchro 6*™ software. The previously referenced **Exhibit 5** details the lane assignments and traffic control devices for the build out background roadway network that were used for analysis. The purpose of this analysis was to determine if any deficiencies exist within the network and to establish a baseline condition.

The following tables detail the results of the analysis for the study area. **Table 4** compiles the results of the controlled movements at the signalized intersections. *Synchro 6*™ output sheets are provided in the **Appendix**.

Based on the analysis of build out background conditions, all of the existing intersections are expected to operate at an acceptable level of service under background conditions in the 2035 build out year.

Table 4 - Build Out Background (2035) Signalized Intersection Analysis

Intersection	Controlled Approach	AM Peak		PM Peak	
		2035 Background		2035 Background	
		Delay[1]	LOS	Delay[1]	LOS
McCombs @ Patriot Freeway WBFR	Intersection	16.5	B	14.1	B
McCombs @ Patriot Freeway EBFR	Intersection	19.6	B	20.2	C
MLK @ Patriot Freeway WBFR	Intersection	8.7	A	10.0	A
MLK @ Patriot Freeway EBFR	Intersection	17.2	B	20.2	C
Haggerty @ Patriot Freeway WBFR	Intersection	12.5	B	11.0	B
Haggerty @ Patriot Freeway EBFR	Intersection	16.8	B	18.4	B

[1]Delay is reported as HCM delay in sec/veh

VII. BUILD OUT (2035) TRAFFIC CHARACTERISTICS

A. PROPOSED SITE TRIP GENERATION

Traffic projections were prepared for the proposed development based on the trip generation rates found in the *Institute of Transportation Engineers* (ITE) publication entitled *Trip Generation,* 7th Edition. This recognized standard for trip generation is based on actual surveys (traffic counts) of existing types of development.

Based on information provided by Hunt Communities LLC, the Northeast Master Plan will ultimately consist of approximately 6,615,000 square feet of shopping center / retail land use, 953,000 square feet of office land use, 16,373 single-family homes, apartments with 2,397 dwelling units, 1,398 townhomes, 4 elementary schools, a middle school, and a high school. The site was split into fourteen (14) separate traffic generation zones, each with a unique trip generation and distribution, as shown in **Exhibit 7**. The land use characteristics of the site are shown in **Table 5**, and the land uses in each traffic generation zone are shown in **Table 6**.

The ITE trip generation rates assumed for the proposed development are given in **Table 7**. The calculated number of trips from these rates represents vehicle trips. **Table 8** summarizes the net total number of trips that are expected to be generated by the proposed development during the AM and PM peak periods and on a daily basis. Due to the large amount of retail and office space, the fitted curve equation was used for trip generation after a certain square-footage threshold was exceeded (300,000 square feet of office, 400,000 square feet of retail). Extrapolating the linear rates past this threshold produced an excessive number of trips. The fitted curve equations offer a more realistic prediction for high intensity land uses.
The calculated results from these rates and equations are the predicted vehicle trips. The number of trips generated represents the number of vehicles entering and exiting the proposed development to and from the adjacent street system.

Appropriate internal capture rates were applied to each trip generation zone, based on the methodology illustrated in the *ITE Trip Generation Handbook* **(See Appendix)**. This internal capture rate was applied to those trips generated within each zone that would remain within the zone, and not access the site's internal thoroughfare network. In addition, a 40% adjustment was applied to the residential trips for to account for trips that entered the internal thoroughfare network, yet never left the boundaries of the Northeast Master Plan. Based on the size and characteristics of the development within the site, 40% of the trips generated by residential traffic were assumed to be generated by the retail space within the development. In order to avoid counting these trips twice (once as a residential trip and once as a retail trip), the 40% reduction was applied. No adjustments were made to the non-residential trips, or for pass-by trips.

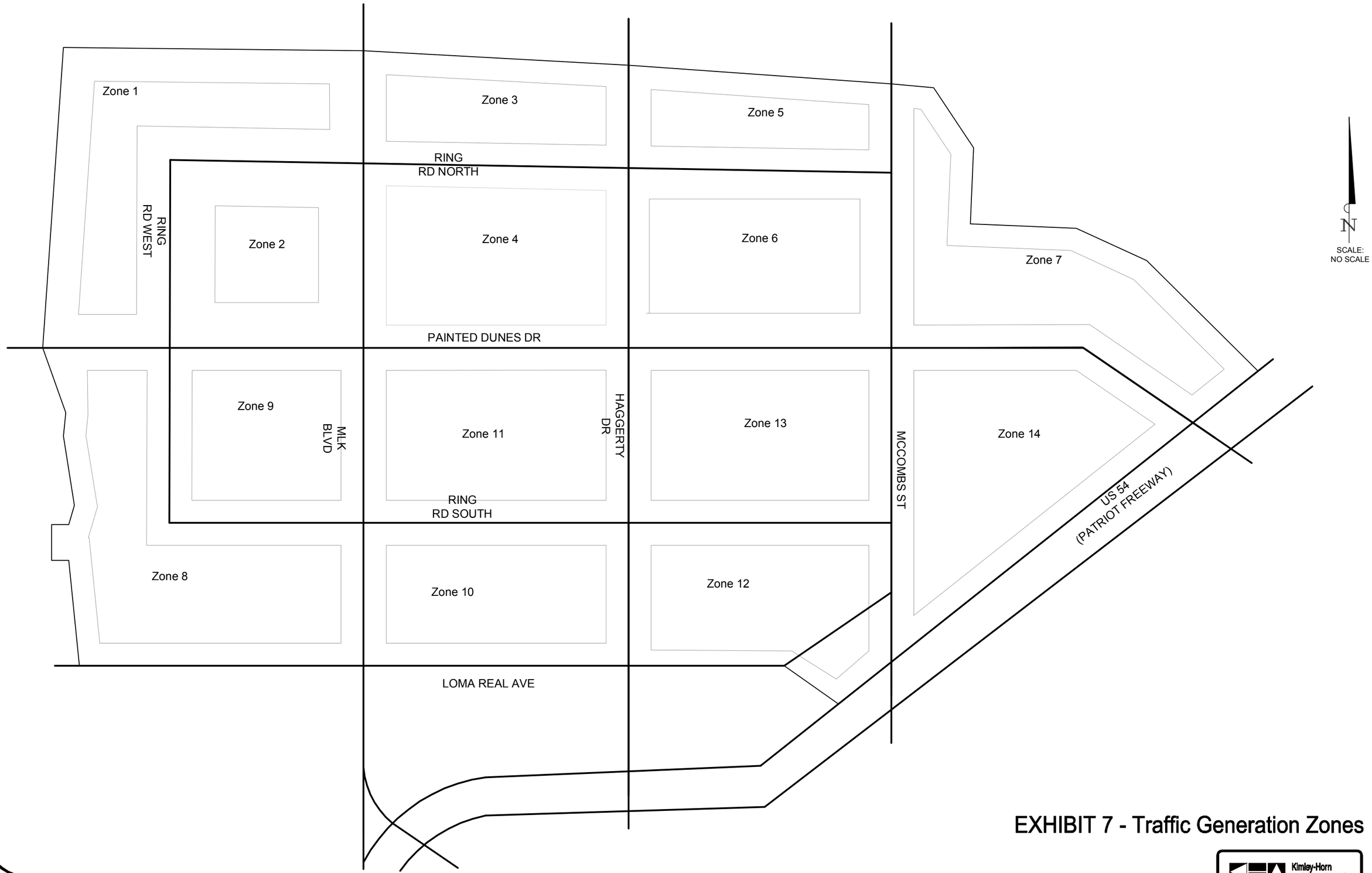


EXHIBIT 7 - Traffic Generation Zones

Kimley-Horn and Associates, Inc.

Table 5 - Land Use for Entire Northeast Master Plan

Land Use Description	Intensity	Units	ITE Land Use Code
Single Family-Detached Housing	16,373	DU	210
Apartment	2,397	DU	220
Residential Condominium/Townhouse	1,398	DU	230
Elementary School	3,200	Students	520
Middle School/Junior High	1,200	Students	522
High School	2,500	Students	530
General Office Building	953	1000 SF	710
Shopping Center/Retail	6,615	1000 SF	820

Table 6 - Land Use by Trip Generation Zone

TGZ Number	Land Use Description	Intensity	Units	ITE Land Use Code
1	Single Family-Detached Housing	1,516	DU	210
	General Office Building	45	1000 SF	710
	Shopping Center/Retail	409	1000 SF	820
2	Single Family-Detached Housing	1,187	DU	210
	Apartment	432	DU	220
	Residential Condominium/Townhouse	132	DU	230
	Elementary School	800	Students	520
	General Office Building	63	1000 SF	710
	Shopping Center/Retail	150	1000 SF	820
3	Single Family-Detached Housing	1,075	DU	210
	General Office Building	15	1000 SF	710
	Shopping Center/Retail	134	1000 SF	820
4	Single Family-Detached Housing	2,214	DU	210
	Apartment	300	DU	220
	Residential Condominium/Townhouse	65	DU	230
	General Office Building	96	1000 SF	710
	Shopping Center/Retail	534	1000 SF	820
5	Single Family-Detached Housing	329	DU	210
	Elementary School	800	Students	520
6	Single Family-Detached Housing	1,310	DU	210
	Middle School/Junior High	1,200	Students	522
	General Office Building	76	1000 SF	710
	Shopping Center/Retail	682	1000 SF	820
7	Single Family-Detached Housing	1,646	DU	210
	Apartment	146	DU	220
	Residential Condominium/Townhouse	230	DU	230
	General Office Building	50	1000 SF	710
	Shopping Center/Retail	451	1000 SF	820
8	Single Family-Detached Housing	1,259	DU	210
	General Office Building	26	1000 SF	710
	Shopping Center/Retail	237	1000 SF	820
9	Single Family-Detached Housing	1,019	DU	210
	Apartment	284	DU	220
	Residential Condominium/Townhouse	133	DU	230
	Elementary School	800	Students	520
	General Office Building	63	1000 SF	710
	Shopping Center/Retail	348	1000 SF	820
10	Single Family-Detached Housing	409	DU	210
	High School	2,500	Students	530
	General Office Building	13	1000 SF	710
	Shopping Center/Retail	116	1000 SF	820
11	Single Family-Detached Housing	1,963	DU	210
	Apartment	635	DU	220
	General Office Building	14	1000 SF	710
	Shopping Center/Retail	126	1000 SF	820
12	Single Family-Detached Housing	62	DU	210
	Apartment	300	DU	220
	Residential Condominium/Townhouse	495	DU	230
	General Office Building	354	1000 SF	710
	Shopping Center/Retail	2,000	1000 SF	820
13	Single Family-Detached Housing	1,631	DU	210
	Apartment	300	DU	220
	Residential Condominium/Townhouse	153	DU	230
	Elementary School	800	Students	520
	General Office Building	48	1000 SF	710
	Shopping Center/Retail	428	1000 SF	820
14	Single Family-Detached Housing	753	DU	210
	Residential Condominium/Townhouse	190	DU	230
	General Office Building	90	1000 SF	710
	Shopping Center/Retail	1,000	1000 SF	820

Table 7 - Estimated Trip Generation Rates

Land Use Description	ITE Code	Weekday		AM Peak Hour		PM Peak Hour	
		Rate	In/Out Split (%)	Rate	In/Out Split (%)	Rate	In/Out Split (%)
Single Family-Detached Housing	210	9.57 (X)	50:50	0.75 (X)	25:75	1.01 (X)	63:37
Apartment	220	6.72 (X)	50:50	0.51 (X)	20:80	0.62 (X)	65:35
Residential Condominium/Townhouse	230	5.86 (X)	50:50	0.44 (X)	17:83	0.52 (X)	67:33
Elementary School	520	1.29 (Y)	50:50	0.42 (Y)	55:45	0.28(Y)	45:55
Middle School/Junior High	522	1.62 (Y)	50:50	0.53 (Y)	55:45	0.15 (Y)	52:48
High School	530	1.71 (Y)	50:50	0.41 (Y)	69:31	0.14 (Y)	47:53
General Office Building	710	11.01 (Z)	50:50	1.55 (Z)	88:12	1.49 (Z)	17:83
Shopping Center/Retail	820	42.94 (Z)	50:50	1.03 (Z)	61:39	3.75 (Z)	48:52
Number of Trips Generated = Trip Rate (Development Unit)							
X = Number of Dwelling Units (ITE Codes 210, 220, 230), Y = Number of Students (ITE Codes 520, 522, 530), Z = 1000 sq. ft. of Gross Leasable Floor Area (ITE Codes 710, 820)							
For ITE Code 710, if Z>300, equation Ln(T) = 0.77 Ln (Z) + 3.65 used for Weekday trip generation (where T = Trips Generated)							
For ITE Code 820, if Z>400, equation Ln(T) = 0.65 Ln (Z) + 5.83 used for Weekday trip generation (where T = Trips Generated)							
For ITE Code 710, if Z>300, equation Ln(T) = 0.80 Ln (Z) + 1.55 used for AM Peak trip generation (where T = Trips Generated)							
For ITE Code 820, if Z>400, equation Ln(T) = 0.60 Ln (Z) + 2.29 used for AM Peak trip generation (where T = Trips Generated)							
For ITE Code 710, if Z>300, equation T = 1.12 (Z) + 78.81 used for PM Peak trip generation (where T = Trips Generated)							
For ITE Code 820, if Z>400, equation Ln(T) = 0.66 Ln (Z) + 3.40 used for PM Peak trip generation (where T = Trips Generated)							

Table 8 - Total Estimated Trip Generation

Land Use	*Intensity*	*Unit*	*ITE Code*	*Daily Total*	AM Peak			PM Peak		
					In	*Out*	*Total*	*In*	*Out*	*Total*
Single Family-Detached Housing	16,373	DU	210	156,691	3,072	9,209	12,281	10,417	6,120	16,537
Apartment	2,397	DU	220	16,107	246	976	1,222	966	521	1,487
Residential Condominium/ Townhouse	1,398	DU	230	8,193	104	512	616	487	241	728
Total Residential Trips				**180,991**	**3,422**	**10,697**	**14,119**	**11,870**	**6,882**	**18,752**
Internally Captured Residential Trips				*18,280*	*345*	*1,085*	*1,431*	*1,202*	*695*	*1,897*
Internally Assigned Residential Trips				*65,084*	*1,231*	*3,845*	*5,075*	*4,267*	*2,475*	*6,742*
Net External Residential Trips				**97,627**	**1,846**	**5,767**	**7,613**	**6,401**	**3,712**	**10,113**
Elementary School	3,200	Students	520	4,128	740	604	1,344	404	492	896
Middle School/Junior High	1,200	Students	522	1,944	350	286	636	94	86	180
High School	2,500	Students	530	4,275	707	318	1,025	165	185	350
General Office Building	953	1000 SF	710	10,126	1,272	174	1,446	233	1,135	1,368
Shopping Center/Retail	6,615	1000 SF	820	221,986	2,902	1,856	4,758	9,876	10,701	20,577
Total Non-Residential Trips				**242,459**	**5,971**	**3,238**	**9,209**	**10,772**	**12,599**	**23,371**
Internally Captured Non-Residential Trips				*26,913*	*2,260*	*1,433*	*3,693*	*1,786*	*2,079*	*3,865*
Net External Non-Residential Trips				**215,546**	**3,711**	**1,805**	**5,516**	**8,986**	**10,520**	**19,506**
Net Total External Site Generated Trips				***313,173***	***5,557***	***7,572***	***13,129***	***15,387***	***14,232***	***29,619***

B. NET CHANGE IN TRIP GENERATION

The existing, vacant property generates no traffic on the study area roadway network, which has not yet been constructed. The only existing development in the study area is the Painted Dunes Golf Course. The course does not generate a significant amount of traffic in the peak periods; therefore, it was excluded from this study.

C. TRIP DISTRIBUTION AND TRAFFIC ASSIGNMENT

The distribution and assignment of the build out site-generated traffic to the study area roadway network was performed to reflect the anticipated local traffic patterns. The distribution and assignment was determined based upon anticipated future land use and existing traffic characteristics. Based on the proposed land use plan, a majority of the retail sites are located at the intersections of McCombs Street and Patriot Freeway, in the southeast corner of the site, and Painted Dunes Drive and Martin Luther King, Jr. Boulevard, in the western part of the development. These two locations were designated as internal attractors for trip distribution purposes.

Due to the distinct trip patterns of residential and non-residential land uses, two trip distributions were established**.** Separate residential and non-residential trip distributions were developed for each traffic generation zone. Individual distributions were necessary to provide the level of detail needed to size the internal roadways. In each residential distribution, 40% of the generated traffic was assigned to the internal network, specifically toward the internal attractors (Zones 2, 9, 12, and 14, where retail space was concentrated within the development). Trips leaving the boundaries of the site were assigned as follows:

- 45% to/from the South
- 5% to/from the East
- 10% to/from the North.

These distributions were based on the traffic characteristics derived from the MPO's model. For each non-residential trip distribution, 60% of the traffic was assigned to the internal network. External trips were assigned with:

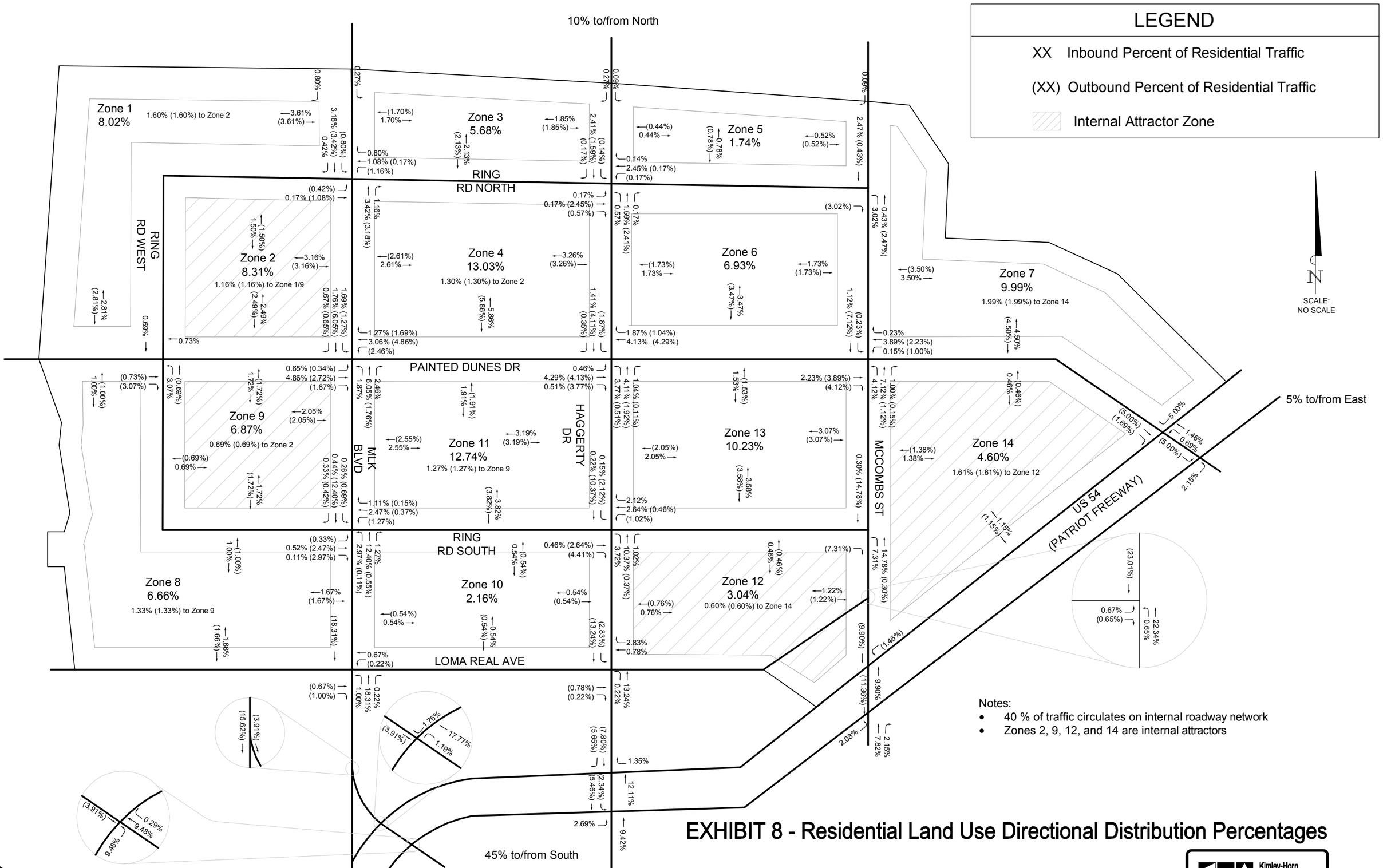
- 30% to/from the South
- 5% to/from the East
- 5% to/from the North.

The fourteen (14) residential distributions were then aggregated into an overall residential trip distribution. Traffic was assigned to the network by applying this aggregated residential trip distribution to the net total residential trips generated by the site. The non-residential trip distribution and assignment were performed in the same manner. To determine the total number of trips on the network, the residential, non-residential, and background trips were combined.

Exhibit 8 presents the inbound and outbound directional distributions for build out of residential developments. These trips were distributed within the development, in order to size the internal road network, based on capacity values provided by the El Paso MPO. **Exhibit 9** presents the projected AM and PM weekday peak hour site trips for the residential developments.

Exhibit 10 presents the inbound and outbound directional distributions for build out of the proposed non-residential development. **Exhibit 11** presents the projected AM and PM weekday peak hour site trips for non-residential development.

These volumes for each of the land uses were computed based on the trip generation information and directional distribution assumptions.



Notes:

- 40 % of traffic circulates on internal roadway network
- Zones 2, 9, 12, and 14 are internal attractors

EXHIBIT 8 - Residential Land Use Directional Distribution Percentages

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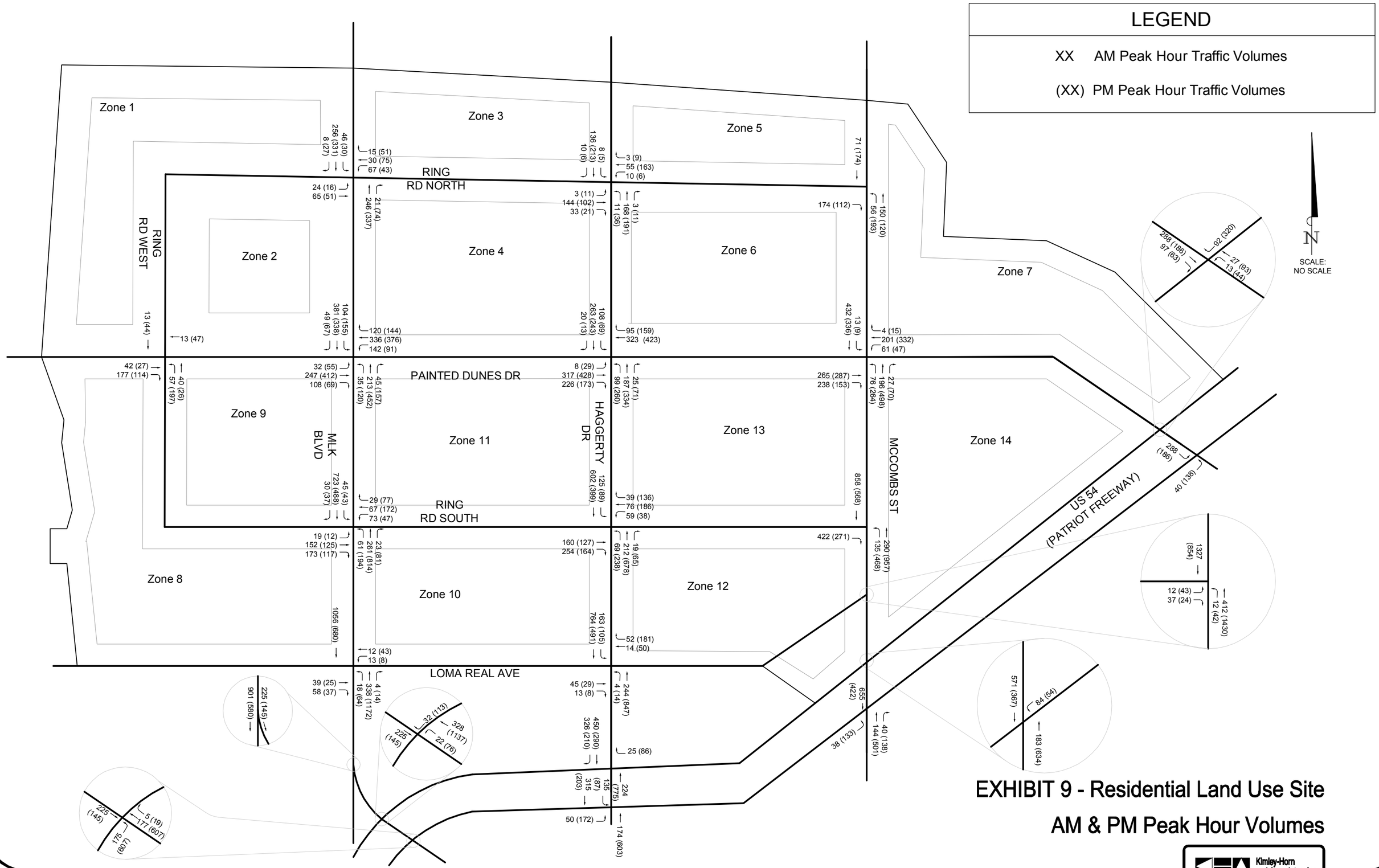
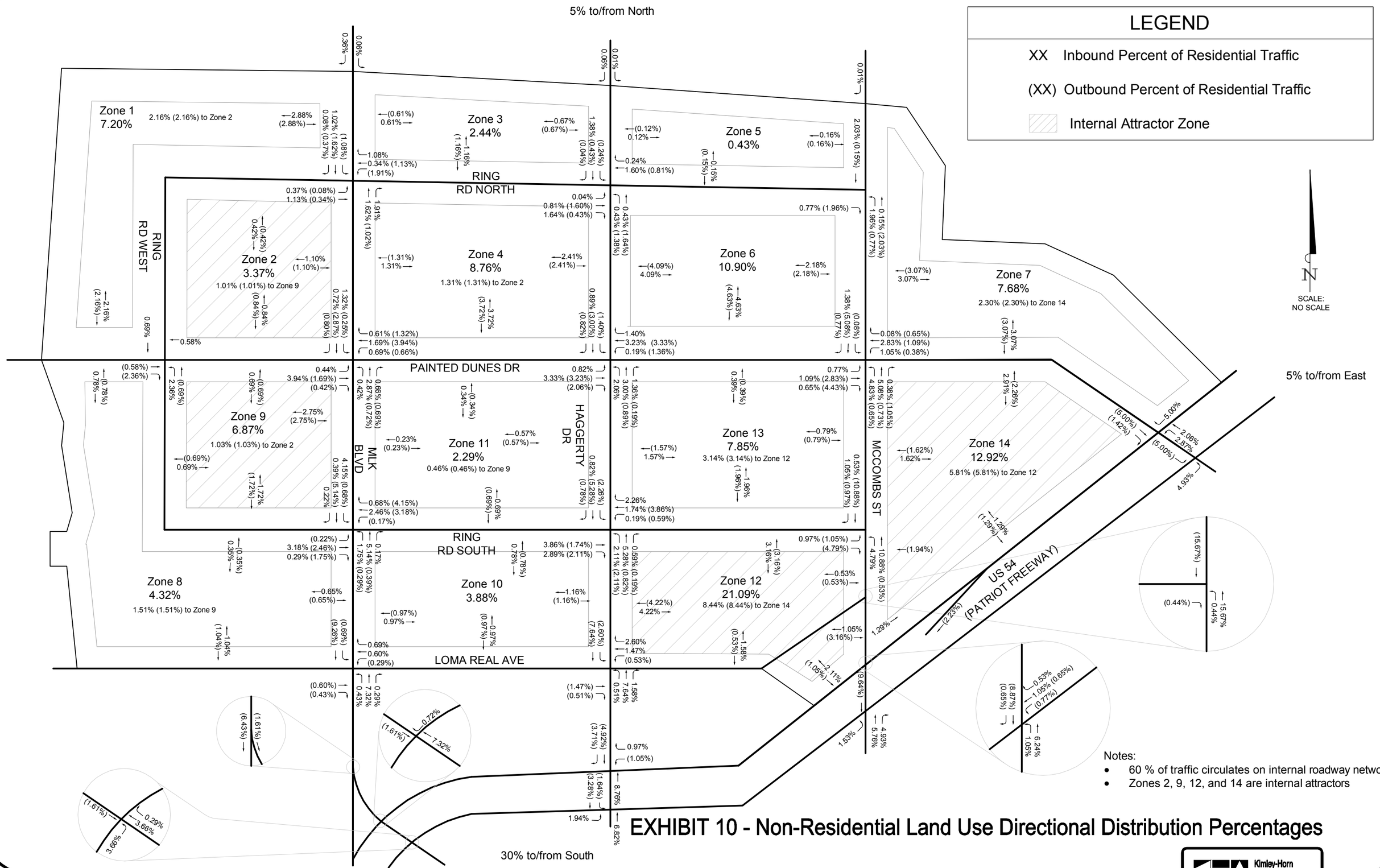


EXHIBIT 9 - Residential Land Use Site

AM & PM Peak Hour Volumes

Kimley-Horn and Associates, Inc.



Notes:

- 60 % of traffic circulates on internal roadway network
- Zones 2, 9, 12, and 14 are internal attractors

EXHIBIT 10 - Non-Residential Land Use Directional Distribution Percentages

Kimley-Horn and Associates, Inc.

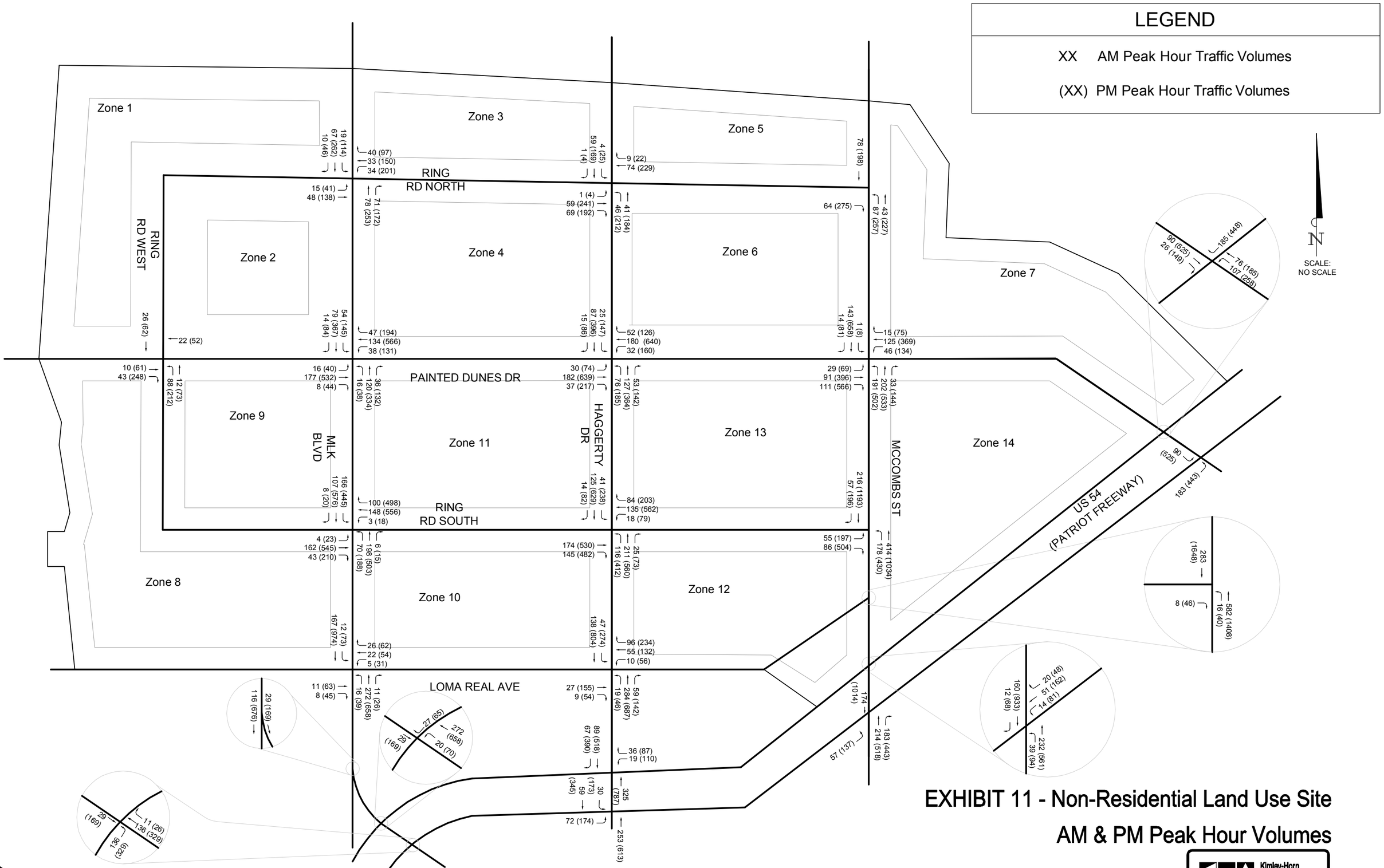


EXHIBIT 11 - Non-Residential Land Use Site
AM & PM Peak Hour Volumes

Kimley-Horn and Associates, Inc.

VIII. BUILD OUT (2035) ROADWAY SYSTEM

A. PROGRAMMED IMPROVEMENTS

This TIA will make recommendations to the types of facilities that are ultimately necessary to support the development. As part of the El Paso MPO TransBorder 2035 plan, they make assumptions regarding the timing and sizing of various improvements. Based on a review of this 2035 plan, the following improvements were indicated:

2015 Model:

Martin Luther King Jr. Boulevard:	Four (4) lanes from US 54 to Loma Real Avenue Two (2) lanes north of Loma Real Avenue
Sean Haggerty Drive:	Six (6) lanes from US 54 to Painted Dunes Drive
McCombs Street:	Four (4) lanes from US 54 to North of Property
Painted Dunes Drive	Two (2) lanes from MLK to McCombs Street
US 54 Main Lanes:	Main Lanes built to just east of McCombs

2025 Model:

Martin Luther King Jr. Boulevard:	Four (4) lanes from US 54 to Stan Roberts
Sean Haggerty Drive:	Same as 2015
McCombs Street:	Same as 2015
Painted Dunes Drive	Four (4) lanes from MLK to McCombs Street
US 54 Main Lanes:	Same as 2015

2035 Model:

Martin Luther King Jr. Boulevard:	Same as 2025
Sean Haggerty Drive:	Same as 2025, however roadway is not shown north of Painted Dunes in the model
McCombs Street:	Same as 2025
Painted Dunes Drive	Same as 2025
US 54 Main Lanes:	Main Lanes built to just west of proposed NE Pkwy

The 2025 and 2035 model indicates Martin Luther King Jr. Boulevard and McCombs Street are four (4) lane facilities; however both are indicated in the model as a having a severe level of service (LOS F). It should be noted that the 2015 model indicates Martin Luther King Jr. Boulevard as a severe level of service while McCombs is tolerable (e.g. LOS D or better) level of service.

B. TOTAL TRAFFIC VOLUMES

Exhibit 12 presents the total traffic volumes for the site, which combine background, residential, and non-residential traffic projections. These total volumes were used to analyze intersection and link capacities. The total build out traffic volumes presented in **Exhibit 13** combines the build out background traffic (**Exhibit 6**) with the residential (**Exhibit 9**), and non-residential traffic (**Exhibit 11**).

C. BUILD OUT THOROUGHFARE CAPACITY ANALYSIS

The roadways in the site network were sized according to the agreement between Hunt and KHA, as well as the *City of El Paso Master Thoroughfare Plan*. Martin Luther King, Jr. Boulevard and McCombs Street were analyzed as six (6) lane divided arterials. Sean Haggerty Drive was analyzed as a four (4) lane divided minor arterial. Painted Dunes Drive as analyzed as a four (4) lane divided collector. The other roadways (Ring Road and Loma Real Avenue) were analyzed as four (4) lane undivided collectors. The capacity values given by the El Paso MPO are shown below in **Table 9**.

Table 9 - Capacity Values Used for Analysis

Roadway	Lane Capacity
Martin Luther King, Jr. Boulevard	900 vph
Sean Haggerty Drive	715 vph
McCombs Street	900 vph
Ring Road	715 vph
Painted Dunes Drive	715 vph
Loma Real Avenue	625 vph

The *TransBorder 2035 Metropolitan Transportation Plan* examines regionally significant projects based on the volume-to-capacity ratio, an operating condition they define as level of mobility (LOM). An "Acceptable" operating condition means the facility is underutilized, while a "Severe" operating condition indicates the carrying capacity has been met. **Table 10** illustrates the level of mobility criteria.

Table 10 - Level of Mobility Criteria

Level of Mobility	V/C Ratio
Tolerable	< 0.85
Moderate	>= 0.85 < 1.00
Serious	>= 1.00 < 1.25
Severe	>= 1.25

The mid-block capacity analysis for the internal thoroughfare network is shown in **Table 11**. Based on the capacity analysis, some of the facilities show an unacceptable level of service ("Severe") during the PM peak hour. It should be noted that the intersections in the study area still operate at an acceptable level of service (as shown in the following section). The intersections have a far larger influence on the operations of the traffic network. In addition, the network used in the analysis was somewhat simplified in that only the major thoroughfare roadways in the development were analyzed. In the actual build out scenario (as shown in **Exhibit 2**), more facilities will be available to shift some of the excess demand predicted in this analysis, further improving operations.

Table 11 - Mid-Block Capacity Analysis

Martin Luther King, Jr. Boulevard

Scenario	Road	Segment	Dir	# of lanes	AM			PM		
					V	V/C	LOM	V	V/C	LOM
Build Out (2035)	MLK	N of Ring Rd N	NB	3	870	0.32	Tolerable	1487	0.55	Tolerable
			SB	3	1309	0.48	Tolerable	1456	0.54	Tolerable
Build Out (2035)	MLK	Between Ring Rd N and Painted Dunes Dr	NB	3	868	0.32	Tolerable	1528	0.57	Tolerable
			SB	3	1584	0.59	Tolerable	1802	0.67	Tolerable
Build Out (2035)	MLK	Between Painted Dunes Dr and Ring Rd S	NB	3	917	0.34	Tolerable	1925	0.71	Tolerable
			SB	3	1982	0.73	Tolerable	2255	0.84	Tolerable
Build Out (2035)	MLK	Between Ring Rd S and Loma Real Ave	NB	3	1071	0.40	Tolerable	2487	0.92	Moderate
			SB	3	2138	0.79	Tolerable	2373	0.88	Moderate
Build Out (2035)	MLK	Between Loma Real Ave and Patriot Frwy	NB	3	1111	0.41	Tolerable	2665	0.99	Moderate
			SB	3	646	0.24	Tolerable	683	0.25	Tolerable

Sean Haggerty Drive

Scenario	Road	Segment	Dir	# of lanes	AM			PM		
					V	V/C	LOM	V	V/C	LOM
Build Out (2035)	Haggerty	N of Ring Rd N	NB	2	419	0.29	Tolerable	717	0.50	Tolerable
			SB	2	605	0.42	Tolerable	699	0.49	Tolerable
Build Out (2035)	Haggerty	Between Ring Rd N and Painted Dunes Dr	NB	2	463	0.26	Tolerable	930	0.65	Tolerable
			SB	2	905	0.50	Tolerable	1231	0.86	Moderate
Build Out (2035)	Haggerty	Between Painted Dunes Dr and Ring Rd S	NB	2	761	0.42	Tolerable	1652	1.16	Serious
			SB	2	1294	0.72	Tolerable	1714	1.20	Serious
Build Out (2035)	Haggerty	Between Ring Rd S and Loma Real Ave	NB	2	846	0.47	Tolerable	2322	1.62	Severe
			SB	2	1499	0.83	Tolerable	1951	1.36	Severe
Build Out (2035)	Haggerty	Between Loma Real Ave and Patriot Frwy	NB	2	804	0.45	Tolerable	2032	1.42	Severe
			SB	2	1559	0.87	Moderate	1874	1.31	Severe

McCombs Street

Scenario	Road	Segment	Dir	# of lanes	AM			PM		
					V	V/C	LOM	V	V/C	LOM
Build Out (2035)	McCombs	N of Ring Rd N	NB	3	398	0.15	Tolerable	729	0.27	Tolerable
			SB	3	514	0.19	Tolerable	628	0.23	Tolerable
Build Out (2035)	McCombs	Between Ring Rd N and Painted Dunes Dr	NB	3	541	0.20	Tolerable	1179	0.44	Tolerable
			SB	3	968	0.36	Tolerable	1348	0.50	Tolerable
Build Out (2035)	McCombs	Between Painted Dunes Dr and Ring Rd S	NB	3	930	0.34	Tolerable	2393	0.89	Moderate
			SB	3	1496	0.55	Tolerable	2213	0.82	Tolerable
Build Out (2035)	McCombs	Between Ring Rd S and Loma Real Ave	NB	3	1222	0.45	Tolerable	3271	1.21	Serious
			SB	3	1975	0.73	Tolerable	2758	1.02	Serious
Build Out (2035)	McCombs	Between Loma Real Ave and Patriot Frwy	NB	3	1227	0.45	Tolerable	3302	1.22	Serious
			SB	3	1504	0.56	Tolerable	1901	0.70	Tolerable

Ring Road North

Scenario	Road	Segment	Dir	# of lanes	AM			PM		
					V	V/C	LOM	V	V/C	LOM
Build Out (2035)	Ring Rd N	W of MLK	EB	2	152	0.11	Tolerable	246	0.17	Tolerable
			WB	2	81	0.06	Tolerable	298	0.21	Tolerable
Build Out (2035)	Ring Rd N	Between MLK and Haggerty	EB	2	309	0.22	Tolerable	571	0.40	Tolerable
			WB	2	219	0.15	Tolerable	617	0.43	Tolerable
Build Out (2035)	Ring Rd N	Between Haggerty and McCombs	EB	2	238	0.17	Tolerable	387	0.27	Tolerable
			WB	2	151	0.11	Tolerable	429	0.30	Tolerable

Painted Dunes Drive

Scenario	Road	Segment	Dir	# of lanes	AM			PM		
					V	V/C	LOM	V	V/C	LOM
Build Out (2035)	Painted Dunes	W of Ring Rd W	EB	2	272	0.19	Tolerable	450	0.31	Tolerable
			WB	2	180	0.13	Tolerable	508	0.28	Tolerable
Build Out (2035)	Painted Dunes	Between Ring Rd W and MLK	EB	2	588	0.41	Tolerable	1152	0.81	Tolerable
			WB	2	35	0.02	Tolerable	99	0.06	Tolerable
Build Out (2035)	Painted Dunes	Between MLK and Haggerty	EB	2	800	0.56	Tolerable	1560	1.09	Serious
			WB	2	817	0.57	Tolerable	1502	0.83	Tolerable
Build Out (2035)	Painted Dunes	Between Haggerty and McCombs	EB	2	734	0.51	Tolerable	1471	1.03	Serious
			WB	2	682	0.48	Tolerable	1508	0.84	Tolerable
Build Out (2035)	Painted Dunes	Between McCombs and Patriot Frwy	EB	2	501	0.35	Tolerable	923	0.65	Tolerable
			WB	2	452	0.32	Tolerable	972	0.54	Tolerable

Ring Road South

Scenario	Road	Segment	Dir	# of lanes	AM			PM		
					V	V/C	LOM	V	V/C	LOM
Build Out (2035)	Ring Rd S	W of MLK	EB	2	553	0.39	Tolerable	1032	0.72	Tolerable
			WB	2	384	0.27	Tolerable	1167	0.82	Tolerable
Build Out (2035)	Ring Rd S	Between MLK and Haggerty	EB	2	733	0.51	Tolerable	1303	0.91	Moderate
			WB	2	420	0.29	Tolerable	1368	0.96	Moderate
Build Out (2035)	Ring Rd S	Between Haggerty and McCombs	EB	2	563	0.39	Tolerable	972	0.68	Tolerable
			WB	2	411	0.29	Tolerable	1204	0.84	Tolerable

Loma Real Avenue

Scenario	Road	Segment	Dir	# of lanes	AM			PM		
					V	V/C	LOM	V	V/C	LOM
Build Out (2035)	Loma Real	W of MLK	EB	2	116	0.09	Tolerable	170	0.14	Tolerable
			WB	2	68	0.05	Tolerable	200	0.16	Tolerable
Build Out (2035)	Loma Real	Between MLK and Haggerty	EB	2	94	0.08	Tolerable	246	0.20	Tolerable
			WB	2	78	0.06	Tolerable	198	0.16	Tolerable
Build Out (2035)	Loma Real	Between Haggerty and McCombs	EB	2	57	0.05	Tolerable	113	0.09	Tolerable
			WB	2	227	0.18	Tolerable	653	0.52	Tolerable

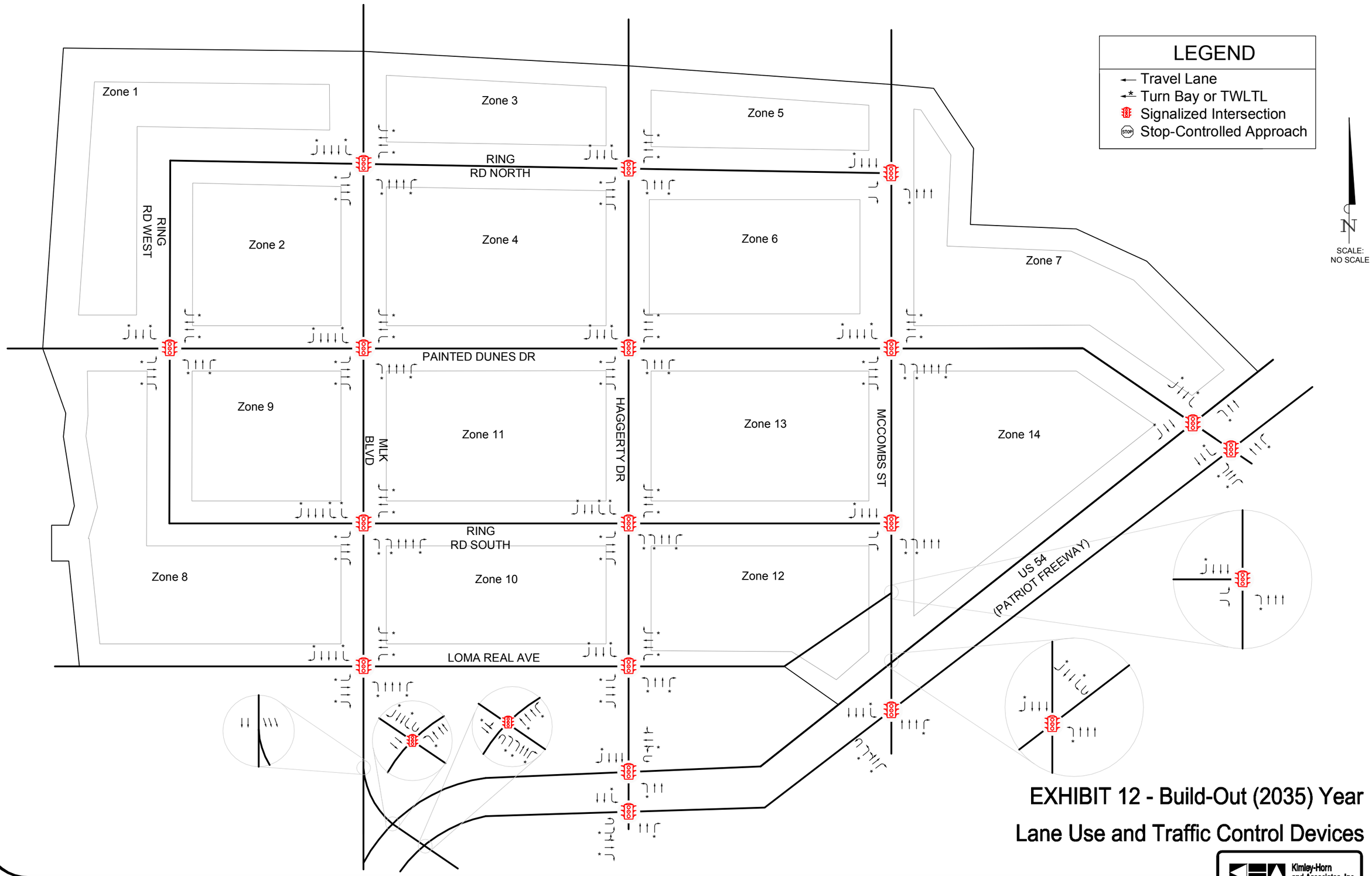


EXHIBIT 12 - Build-Out (2035) Year

Lane Use and Traffic Control Devices

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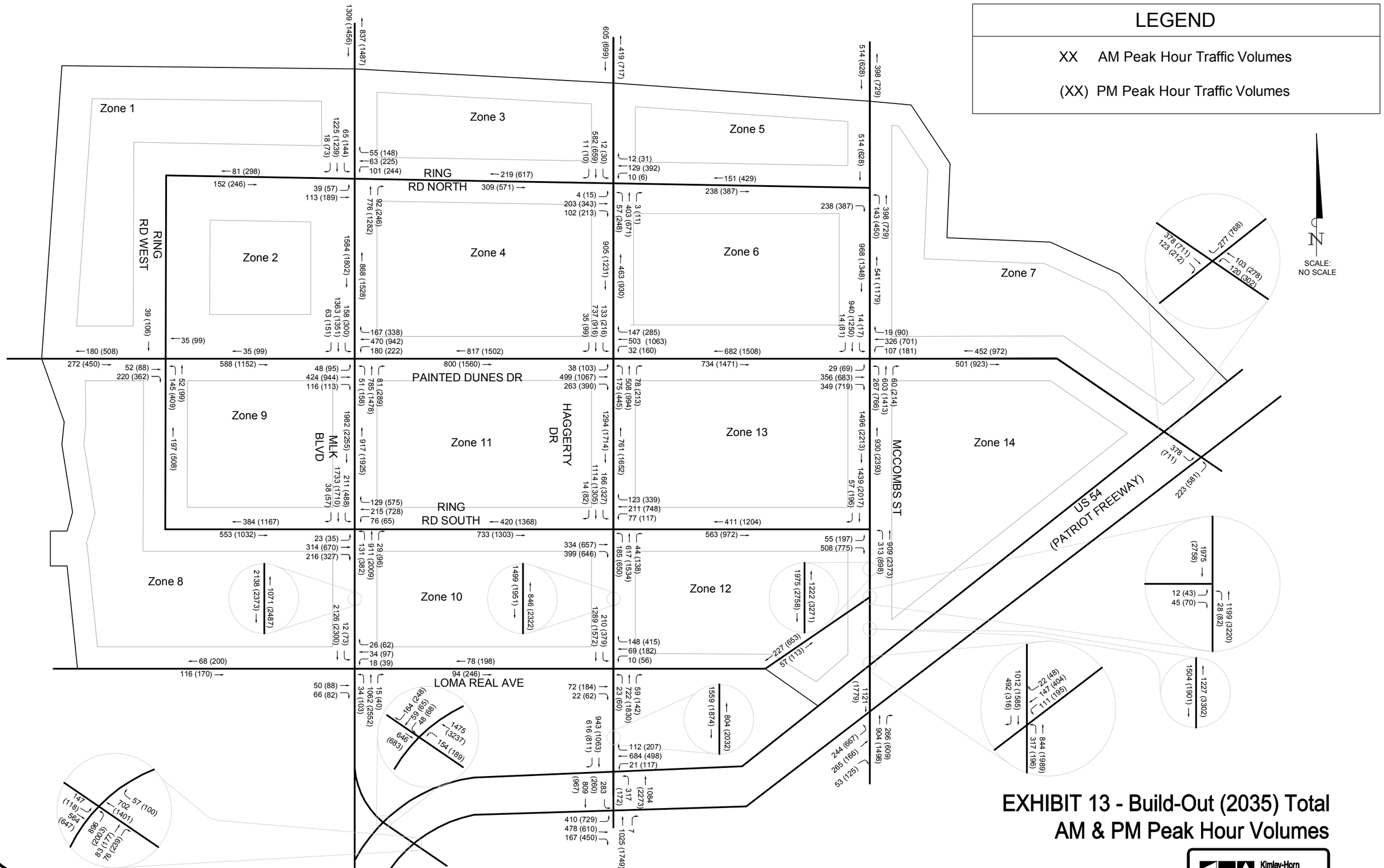


EXHIBIT 13 - Build-Out (2035) Total AM & PM Peak Hour Volumes

Kimley-Horn and Associates, Inc.

IX. BUILD OUT (2035) TOTAL TRAFFIC ANALYSIS

A. LEVEL OF SERVICE EVALUATIONS

The evaluation of the build out year system was comprised of both AM and PM peak hour level of service analyses. **Exhibit 12** details the lane assignments and traffic control devices for the proposed roadway network that were utilized in the analysis. The purpose of this analysis was to identify any deficiencies within the network as a result of the traffic generated by the proposed development.

The following tables detail the results of the analysis for the study area. **Table 12** compiles the results of the controlled movements at the signalized intersections. *Synchro6*™ output sheets are provided in the **Appendix**.

Table 12 - Build Out (2035) Intersection Capacity Analysis

Intersection	Controlled Approach	AM Peak		PM Peak	
		2035 Total		2035 Total	
		Delay[1]	LOS	Delay[1]	LOS
MLK @ Ring Rd North	Intersection	10.4	B	23.8	C
Haggerty @ Ring Rd North	Intersection	22.9	C	34.1	C
McCombs @ Ring Rd North	Intersection	14.0	B	17.1	B
Ring Rd West @ Painted Dunes	Intersection	23.2	C	16.7	B
MLK @ Painted Dunes	Intersection	31.3	C	69.9	***E***
Haggerty@ Painted Dunes	Intersection	29.1	C	72.5	***E***
McCombs @ Painted Dunes	Intersection	40.0	D	56.9	***E***
Patriot Freeway WBFR @ Painted Dunes	Intersection	16.7	B	30.2	C
Patriot Freeway EBFR @ Painted Dunes	Intersection	18.4	B	16.9	B
MLK @ Ring Rd South	Intersection	21.3	C	52.4	D
Haggerty @ Ring Rd South	Intersection	20.1	C	53.4	D
McCombs @ Ring Rd South	Intersection	25.2	C	54.7	D
MLK @ Loma Real	Intersection	11.6	B	17.3	B
Haggerty @ Loma Real	Intersection	18.4	B	26.5	C
McCombs @ Loma Real	Intersection	3.2	A	10.6	B
McCombs @ Patriot Freeway WBFR	Intersection	17.9	B	41.4	D
McCombs @ Patriot Freeway EBFR	Intersection	24.8	C	48.9	D
MLK @ Patriot Freeway WBFR	Intersection	12.2	B	80.0	***E***
MLK @ Patriot Freeway EBFR	Intersection	24.7	C	78.7	***E***
Haggerty @ Patriot Freeway WBFR	Intersection	18.4	B	48.0	D
Haggerty @ Patriot Freeway EBFR	Intersection	23.9	C	75.8	***E***

[1]Delay is reported as HCM delay in sec/veh

Based on the analysis of build out conditions, all of the intersections in the study area will operate at an acceptable level of service in the AM peak hour, provided the recommended lane configurations are utilized. Some of the intersections operate at LOS E during the PM peak hour. While this LOS is not desirable for actual operations, LOS E is may be considered acceptable for long-term planning. This analysis is also very conservative, because all of the traffic generated by the site was distributed through the major thoroughfare facilities and their intersections. The intersections showing LOS E will likely operate at a higher level of service, due to the diversion of traffic to other roadways within the overall network.

The Northeast Master Plan's internal thoroughfare network was analyzed using the following assumptions:

- Martin Luther King, Jr. Boulevard and McCombs Street were 6 lane divided major arterials.
- Sean Haggerty Drive was a 4 lane divided minor arterial.
- Painted Dunes Drive was a 4 lane divided collector.
- Loma Real Avenue and Ring Road were 4 lane undivided connectors.
- All intersections were signalized.
- Every approach had both left turn lanes and right turn lanes.
- All left-turn movements within the site were assumed to be protected-only (with the exception being the intersection of Painted Dunes Drive with the Ring Road on the far western edge of the site).
- Dual left turns were assumed at the following intersections:
    - McCombs Street and Painted Dunes Road (northbound only).
    - McCombs Street and Ring Road South (northbound only).
    - Martin Luther King, Jr. Boulevard and Loma Real Avenue (northbound and southbound).
    - Sean Haggerty Drive and Loma Real Avenue (northbound and southbound).
    - Painted Dunes Road and Patriot Freeway Westbound Frontage Road (westbound).

Using these assumptions, the levels of service shown in **Table 12** were achieved. **Exhibit 14** displays the recommendations made, based on the intersection LOS and capacity analyses.

It should also be noted that there may be opportunities for alternative, higher capacity improvements to be installed at future intersections of the major arterials (MLK and McCombs) at their intersections with Patriot Freeway. For example, a significant volume is projected to exit NB Patriot Freeway and proceed NB on MLK. All of this traffic is forced through the signalized intersection. The installation of a direct connection (as is present for SB traffic) at this interchange (which may be needed near build out of the development) is something that should be considered by the City, MPO, and TxDOT.

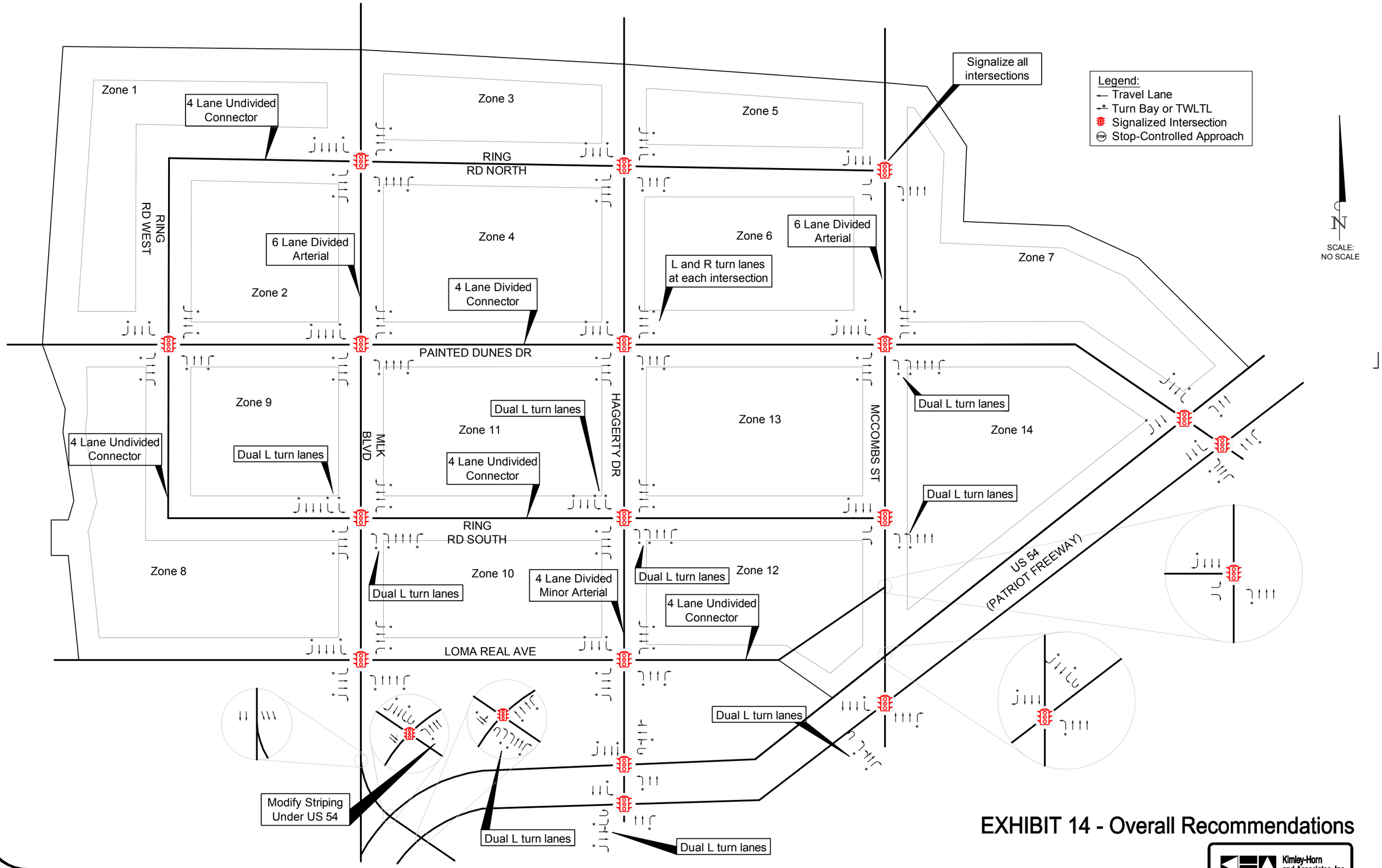


EXHIBIT 14 - Overall Recommendations

Kimley-Horn and Associates, Inc.

X. CONCLUSIONS AND RECOMMENDATIONS

Based on the analyses performed during this traffic impact study, we offer the following conclusions and recommendations:

Existing Conditions (2008):

Based on the analysis of existing conditions, all study area intersections currently operate at an acceptable level of service during the AM and PM peak hours.

Build Out Background (2035):

Based on the analysis of the 2035 background scenario conditions, all study area intersections are projected to operate at an acceptable level of service during the AM and PM peak hours.

Build Out Year (2035) Recommendations:

- Martin Luther King, Jr. Boulevard is recommended to be expanded to a six (6) lane divided arterial both through the site and between Loma Real Avenue and Patriot Freeway. While this requires a change to the *City of El Paso Master Thoroughfare Plan* (this roadway was previously listed as a super arterial – 8 lanes); a major arterial should adequately serve the study area.

- McCombs Street is recommended to be expanded to a six (6) lane divided arterial through the site. While this requires a change to the *City of El Paso Master Thoroughfare Plan* (this roadway was previously listed as a super arterial – 8 lanes); a major arterial should adequately serve the study area.

- Sean Haggerty Drive is recommended to be extended through the site as a four (4) lane divided minor arterial, as per the *City of El Paso Master Thoroughfare Plan*.

- Painted Dunes Road is recommended to be constructed as a four (4) lane divided connector.

- Loma Real Avenue is recommended to be constructed as a four (4) lane undivided connector.

- Ring Road is recommended to be constructed as a four (4) lane undivided connector.

- Ring Road is recommended to intersect McCombs Street, south of Painted Dunes Road and north of Loma Real Avenue.

- All major intersections (those analyzed in the report) are projected to require signalization (or some other treatment to increase capacity) by 2035. During each phase of development, the study area's intersections will be further analyzed to determine during which phase the capacity improvement is needed.

- Left and right-turn lanes are recommended at each intersection in the study. This recommendation is based on upon projected traffic volumes at the intersections. **Exhibit 14** shows the recommended lane uses and traffic control devices. It is recommended that the length of these turn lanes be designed in accordance with TxDOT and City of El Paso standards, respectively.

- Turn lanes on Martin Luther King, Jr. Boulevard through the site are recommended to be designed to with the same criteria as the existing turn lanes on Martin Luther King, Jr. Boulevard from US 54 to Loma Real Avenue.

- Dual left turn lanes are recommended at the intersections of:

  - McCombs Street and Painted Dunes Road (northbound only)

  - McCombs Street and Ring Road South (northbound only)

  - Martin Luther King, Jr. Boulevard and Loma Real Avenue (northbound and southbound)

  - Sean Haggerty Drive and Loma Real Avenue (northbound and southbound)

  - Painted Dunes Road and Patriot Freeway Westbound Frontage Road (westbound)

- At the intersection of Patriot Freeway Westbound Frontage Road and Martin Luther King, Jr. Boulevard, the lane configuration under the bridge could be modified to increase the capacity at this intersection. Due to the unbalanced volumes anticipated at this interchange, we recommend three northbound lanes with an additional dedicated northbound left lane and one dedicated southbound thru lane and one shared-left southbound lane.

- We recommend restriping the Patriot Freeway Eastbound Frontage Road at both McCombs Street and Sean Haggerty Drive to include dual lefts as indicated in **Exhibit 14**.

Appendix Sections

1 Raw Traffic Count Sheets

2 Existing (2008) Traffic Peak Hour Analysis

3 Build Out (2035) Year Background Traffic Analysis

4 Build Out (2035) Year Total Traffic Analysis

5 Internal Capture Worksheet

1. Raw Traffic Count Sheets

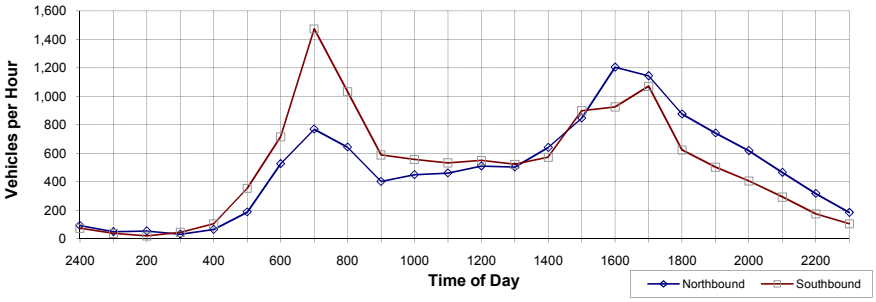
Kimley-Horn and Associates, Inc.

Automatic Traffic Counts
Average Daily Traffic (24-Hour Count)

Project No. : 68200.010
Station No. :
Counter No. :

Location: MLK North of US 54
City/State: El Paso, TX
Date: May 15, 2008
Day of Week: Thursday

Site: El Paso 4,900 Acre Site



Time	Peak	Northbound		Southbound		Time	Peak	Northbound		Southbound	
24:00						12:00					
0:15		28		24		12:15		135		115	
0:30		28		26		12:30		125		144	
0:45		18		11		12:45		117		155	
1:00		19	93	12	73	13:00		134	511	135	549
1:15		14		15		13:15		113		133	
1:30		14		9		13:30		132		154	
1:45		12		9		13:45		128		123	
2:00		10	50	4	37	14:00		131	504	112	522
2:15		9		10		14:15		132		143	
2:30		20		3		14:30		138		147	
2:45		12		5		14:45		163		126	
3:00		13	54	2	20	15:00		208	641	156	572
3:15		5		13		15:15		223		193	
3:30		5		7		15:30		177		215	
3:45		12		10		15:45		187		257	
4:00		10	32	15	45	16:00		261	848	234	899
4:15		14		15		16:15		317		205	
4:30		10		19		16:30		308		245	
4:45		14		35		16:45		281		240	
5:00		27	65	36	105	17:00		299	1,205	236	926
5:15		25		54		17:15	*	284		272	
5:30		36		80		17:30	*	281		240	
5:45		53		112		17:45	*	310		254	
6:00		74	188	109	355	18:00	*	270	1,145	304	1,070
6:15		111		114		18:15		249		213	
6:30		112		156		18:30		248		155	
6:45		133		231		18:45		190		133	
7:00		171	527	215	716	19:00		189	876	123	624
7:15		173		288		19:15		192		111	
7:30	*	197		378		19:30		168		130	
7:45	*	221		443		19:45		184		141	
8:00	*	179	770	364	1,473	20:00		199	743	121	503
8:15	*	151	748	310	1,495	20:15		159		118	
8:30		149		310		20:30		146		121	
8:45		174		251		20:45		159		84	
9:00		170	644	162	1,033	21:00		155	619	83	406
9:15		110		136		21:15		138		93	
9:30		121		132		21:30		114		73	
9:45		76		141		21:45		108		64	
10:00		95	402	180	589	22:00		106	466	63	293
10:15		115		170		22:15		98		52	
10:30		104		112		22:30		74		46	
10:45		124		144		22:45		74		39	
11:00		107	450	130	556	23:00		72	318	38	175
11:15		110		120		23:15		57		33	
11:30		127		138		23:30		45		27	
11:45		86		152		23:45		44		26	
12:00		139	462	123	533	24:00		38	184	19	105

AM Peak Hour	7:15-8:15	Directional Volumes	11,797	12,179
% of ADT	9.4%	**24-Hour Volume**	23,976	
PM Peak Hour	17:00-18:00			
% of ADT	9.2%			

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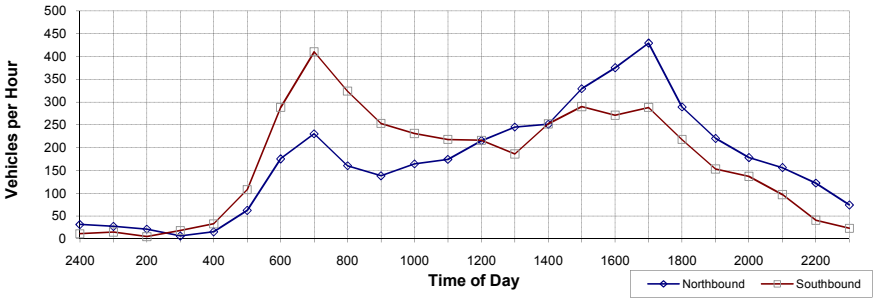
Kimley-Horn and Associates, Inc.

Automatic Traffic Counts
Average Daily Traffic (24-Hour Count)

Project No. : 68200.010
Station No. :
Counter No. :

Location: McCombs North of US 54
City/State: El Paso, TX
Date: May 15, 2008
Day of Week: Thursday

Site: El Paso 4,900 Acre Site



Time	Peak	Northbound		Southbound		Time	Peak	Northbound		Southbound	
24:00						12:00					
0:15		10		5		12:15		42		57	
0:30		5		1		12:30		56		56	
0:45		9		3		12:45		66		54	
1:00		7	31	2	11	13:00		51	215	49	216
1:15		9		3		13:15		53		41	
1:30		5		5		13:30		71		50	
1:45		9		1		13:45		46		50	
2:00		4	27	6	15	14:00		75	245	45	186
2:15		4		0		14:15		68		46	
2:30		4		2		14:30		60		60	
2:45		5		2		14:45		59		74	
3:00		8	21	1	5	15:00		64	251	72	252
3:15		3		2		15:15		79		60	
3:30		2		2		15:30		57		77	
3:45		0		5		15:45		95		89	
4:00		1	6	9	18	16:00		98	329	64	290
4:15		2		4		16:15		100		59	
4:30		4		5		16:30		86		80	
4:45		3		13		16:45		96		80	
5:00		6	15	11	33	17:00		93	375	52	271
5:15		3		15		17:15	*	117		60	
5:30		17		32		17:30	*	119		84	
5:45		16		25		17:45	*	94		77	
6:00		26	62	36	108	18:00	*	99	429	67	288
6:15		23		47		18:15		77		55	
6:30		37		69		18:30		83		61	
6:45		46		82		18:45		70		53	
7:00		69	175	90	288	19:00		59	289	49	218
7:15	*	64		83		19:15		59		48	
7:30	*	61		93		19:30		67		44	
7:45	*	54		123		19:45		51		31	
8:00	*	51	230	111	410	20:00		43	220	30	153
8:15		48		90		20:15		56		49	
8:30		33		81		20:30		39		30	
8:45		36		86		20:45		41		29	
9:00		43	160	67	324	21:00		42	178	29	137
9:15		32		75		21:15		45		30	
9:30		36		58		21:30		38		18	
9:45		32		60		21:45		41		20	
10:00		38	138	60	253	22:00		32	156	29	97
10:15		44		56		22:15		39		13	
10:30		37		62		22:30		29		14	
10:45		48		60		22:45		29		6	
11:00		35	164	53	231	23:00		25	122	8	41
11:15		33		49		23:15		20		9	
11:30		53		48		23:30		15		5	
11:45		44		54		23:45		21		4	
12:00		44	174	67	218	24:00		18	74	5	23

AM Peak Hour	7:00-8:00	Directional Volumes	4,086	4,086
% of ADT	7.8%	**24-Hour Volume**	8,172	
PM Peak Hour	17:00-18:00			
% of ADT	8.8%			

DRAFT

Location:	El Paso 4,900 Acre Site
Project #:	68200.010
North-South street:	MLK
East-West street:	US 54 EBFR
Time Period:	1 7:00 - 9:00 AM
Date recorded:	Thursday May 15, 2008
Traffic Count Sub	GRAM
Comments:	

Kimley-Horn and Associates, Inc.

Kimley-Horn and Associates, Inc.
801 Cherry Street, Unit 11, Suite 950
Fort Worth, Texas 76012

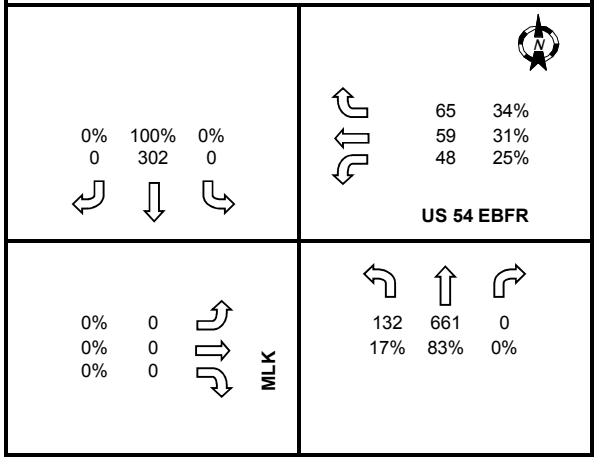
22

Time	Northbound						Southbound						Eastbound						Westbound					
Movement	left		thru		right		left		thru		right		left		thru		right		left		thru		right	
Vehicle Type	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	U-Turn	C	T	C	T
7:00 AM 7:15 AM	38		157						49		0								11	4	12		13	
7:15 AM 7:30 AM	35		180						50		0								10	2	14		17	
7:30 AM 7:45 AM	35		194						72		0								15	3	16		24	
7:45 AM 8:00 AM	31		160						99		0								10	5	14		14	
8:00 AM 8:15 AM	31		127						81		0								13	11	15		10	
8:15 AM 8:30 AM	35		135						70		0								10	7	20		9	
8:30 AM 8:45 AM	23		175						61		0								14	6	9		4	
8:45 AM 9:00 AM	25		149						30		0								10	8	11		9	
Total	253	0	1277	0					512	0	0	0							93	46	111	0	100	0
Peak Total	132	0	661	0					302	0	0	0							48	21	59	0	65	0
Peak Movement Total	132		661						302		0								48		59		65	
Peak Turn Percent	17%		83%						100%		0%								25%		31%		34%	
Peak Approach Total	793						302						0						193					
Peak Hour Factor (PHF)	0.94		0.85				0.00		0.76		0.00								0.72		0.92		0.68	

Peak Hour 7:15 AM - 8:15 AM
Peak Interchange

Time	U-Turns			
Approach:				
Vehicle Type	C	T	C	T
7:00 AM 7:15 AM				
7:15 AM 7:30 AM				
7:30 AM 7:45 AM				
7:45 AM 8:00 AM				
8:00 AM 8:15 AM				
8:15 AM 8:30 AM				
8:30 AM 8:45 AM				
8:45 AM 9:00 AM				
Total	0	0	0	0
Peak Total	0	0	0	0
Peak Movement Total	0		0	
Peak Turn Percent	0%		0%	

Peak Hour Approach Traffic Volume and Percentage



DRAFT

Location:	El Paso 4,900 Acre Site
Project #:	68200.010
North-South street:	MLK
East-West street:	US 54 EBFR
Time Period:	3 4:00 - 6:00 PM
Date recorded:	Thursday May 15, 2008
Traffic Count Sub	GRAM
Comments:	

Kimley-Horn and Associates, Inc.

Kimley-Horn and Associates, Inc.
801 Cherry Street, Unit 11, Suite 950
Fort Worth, Texas 76012

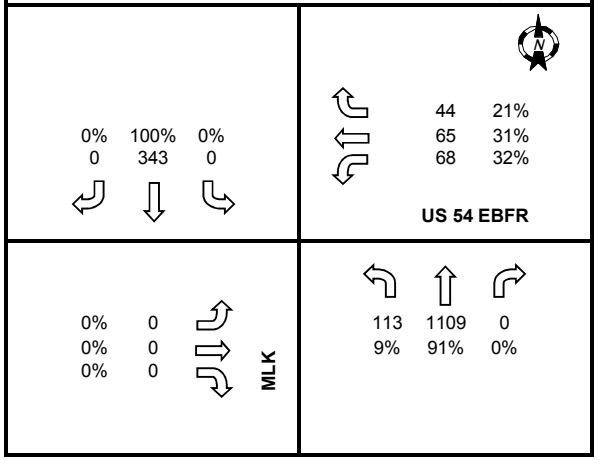
22

Time	Northbound						Southbound						Eastbound						Westbound					
Movement	left		thru		right		left		thru		right		left		thru		right		left		thru		right	
Vehicle Type	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	U-Turn	C	T	C	T
4:00 PM 4:15 PM	16		287						59		0								10	4	22		10	
4:15 PM 4:30 PM	22		278						73		0								13	8	27		18	
4:30 PM 4:45 PM	23		263						77		0								13	9	29		13	
4:45 PM 5:00 PM	32		284						65		0								16	5	12		20	
5:00 PM 5:15 PM	24		263						80		0								11	7	15		17	
5:15 PM 5:30 PM	25		273						80		0								27	9	18		9	
5:30 PM 5:45 PM	30		309						81		0								16	10	11		7	
5:45 PM 6:00 PM	34		264						102		0								14	9	21		11	
Total	206	0	2221	0					617	0	0	0							120	61	155	0	105	0
Peak Total	113	0	1109	0					343	0	0	0							68	35	65	0	44	0
Peak Movement Total	113		1109						343		0								68		65		44	
Peak Turn Percent	9%		91%						100%		0%								32%		31%		21%	
Peak Approach Total	1222						343						0						212					
Peak Hour Factor (PHF)	0.83		0.90				0.00		0.84		0.00								0.72		0.77		0.65	

Peak Hour 5:00 PM - 6:00 PM
Peak Interchange

Time	U-Turns			
Approach:				
Vehicle Type	C	T	C	T
4:00 PM 4:15 PM				
4:15 PM 4:30 PM				
4:30 PM 4:45 PM				
4:45 PM 5:00 PM				
5:00 PM 5:15 PM				
5:15 PM 5:30 PM				
5:30 PM 5:45 PM				
5:45 PM 6:00 PM				
Total	0	0	0	0
Peak Total	0	0	0	0
Peak Movement Total	0		0	
Peak Turn Percent	0%		0%	

Peak Hour Approach Traffic Volume and Percentage



DRAFT

Location:	El Paso 4,900 Acre Site
Project #:	68200.010
North-South street:	Kentworth
East-West street:	US 54 EBFR
Time Period:	1 7:00 - 9:00 AM
Date recorded:	Thursday May 15, 2008
Traffic Count Sub	GRAM
Comments:	

Kimley-Horn and Associates, Inc.

Kimley-Horn and Associates, Inc.
801 Cherry Street, Unit 11, Suite 950
Fort Worth, Texas 76012

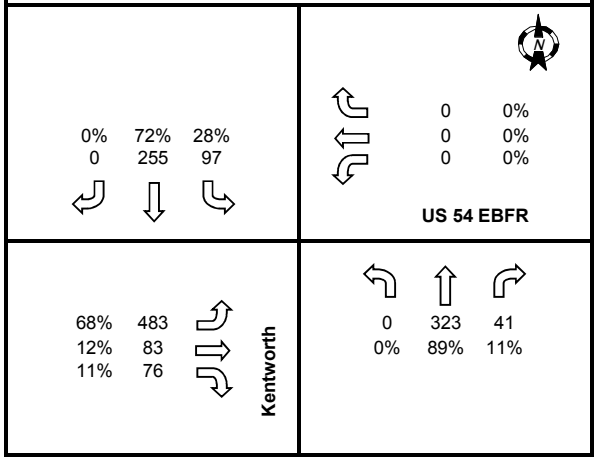
22

Time		Northbound						Southbound						Eastbound						Westbound					
Movement		left		thru		right		left		thru		right		left		thru		right		left		thru		right	
Vehicle Type		C	T	C	T	C	T	C	T	C	T	C	T	C	U-turn	C	T	C	T	C	T	C	T	C	T
7:00 AM	7:15 AM			76		8		18		39				118	24	19		12							
7:15 AM	7:30 AM			85		9		21		40				141	22	16		20							
7:30 AM	7:45 AM			96		7		22		65				130	21	21		15							
7:45 AM	8:00 AM			74		14		38		72				118	14	21		27							
8:00 AM	8:15 AM			68		11		16		78				94	7	25		14							
8:15 AM	8:30 AM			57		9		19		69				105	13	17		14							
8:30 AM	8:45 AM			59		7		11		55				138	10	23		15							
8:45 AM	9:00 AM			47		8		11		29				127	11	17		23							
Total				562	0	73	0	156	0	447	0			971	122	159	0	140	0						
Peak Total				323	0	41	0	97		255	0			483	64	83	0	76	0						
Peak Movement Total				323		41		97		255				483		83		76							
Peak Turn Percent				89%		11%		28%		72%				68%		12%		11%							
Peak Approach Total		364						352						706						0					
Peak Hour Factor (PHF)				0.84		0.73		0.00		0.82		0.00		0.84		0.83		0.70							

Peak Hour 7:15 AM - 8:15 AM
Peak Interchange

Time		U-Turns			
Approach:					
Vehicle Type		C	T	C	T
7:00 AM	7:15 AM				
7:15 AM	7:30 AM				
7:30 AM	7:45 AM				
7:45 AM	8:00 AM				
8:00 AM	8:15 AM				
8:15 AM	8:30 AM				
8:30 AM	8:45 AM				
8:45 AM	9:00 AM				
Total		0	0	0	0
Peak Total		0	0	0	0
Peak Movement Total		0		0	
Peak Turn Percent		0%		0%	

Peak Hour Approach Traffic Volume and Percentage



DRAFT

Location:	El Paso 4,900 Acre Site
Project #:	68200.010
North-South street:	Kentworth
East-West street:	US 54 EBFR
Time Period:	3 4:00 - 6:00 PM
Date recorded:	Thursday May 15, 2008
Traffic Count Sub	GRAM
Comments:	

Kimley-Horn and Associates, Inc.

Kimley-Horn and Associates, Inc.
801 Cherry Street, Unit 11, Suite 950
Fort Worth, Texas 76012

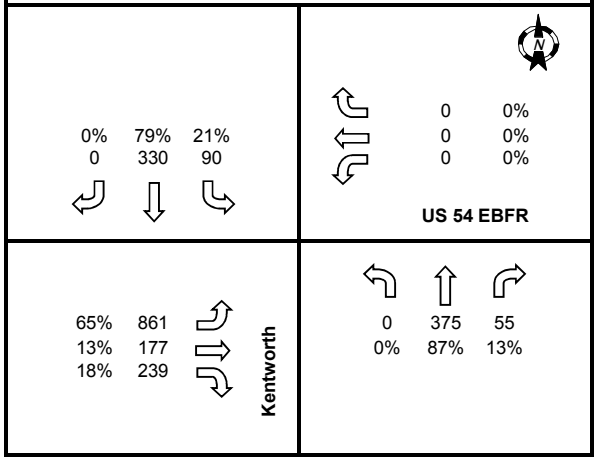
22

Time		Northbound						Southbound						Eastbound						Westbound					
Movement		left		thru		right		left		thru		right		left		thru		right		left		thru		right	
Vehicle Type		C	T	C	T	C	T	C	T	C	T	C	T	C	U-turn	C	T	C	T	C	T	C	T	C	T
4:00 PM	4:15 PM			101		22		24		47				212	2	39		43							
4:15 PM	4:30 PM			74		13		23		59				214	5	52		35							
4:30 PM	4:45 PM			86		16		28		59				214	7	36		41							
4:45 PM	5:00 PM			89		8		17		66				213	16	45		54							
5:00 PM	5:15 PM			81		12		27		73				206	11	45		59							
5:15 PM	5:30 PM			81		13		27		73				228	14	50		63							
5:30 PM	5:45 PM			112		16		22		81				234	4	33		57							
5:45 PM	6:00 PM			101		14		14		103				193	12	49		60							
Total				725	0	114	0	182	0	561	0			1714	71	349	0	412	0						
Peak Total				375	0	55	0	90		330	0			861	41	177	0	239	0						
Peak Movement Total				375		55		90		330				861		177		239							
Peak Turn Percent				87%		13%		21%		79%				65%		13%		18%							
Peak Approach Total		430						420						1318						0					
Peak Hour Factor (PHF)		0.84				0.86		0.00		0.80		0.00		0.93		0.89		0.95							

Peak Hour 5:00 PM - 6:00 PM
Peak Interchange

Time		U-Turns			
Approach:					
Vehicle Type		C	T	C	T
4:00 PM	4:15 PM				
4:15 PM	4:30 PM				
4:30 PM	4:45 PM				
4:45 PM	5:00 PM				
5:00 PM	5:15 PM				
5:15 PM	5:30 PM				
5:30 PM	5:45 PM				
5:45 PM	6:00 PM				
Total		0	0	0	0
Peak Total		0	0	0	0
Peak Movement Total		0		0	
Peak Turn Percent		0%		0%	

Peak Hour Approach Traffic Volume and Percentage



DRAFT

Location:	El Paso 4,900 Acre Site		
Project #:	68200.010		
North-South street:	Sean Haggerty		
East-West street:	US 54 WBFR		
Time Period:		1	7:00 - 9:00 AM
Date recorded:	Thursday	May 15, 2008	
Traffic Count Sub	GRAM		
Comments:			

Kimley-Horn and Associates, Inc.

Kimley-Horn and Associates, Inc.
801 Cherry Street, Unit 11, Suite 950
Fort Worth, Texas 76012

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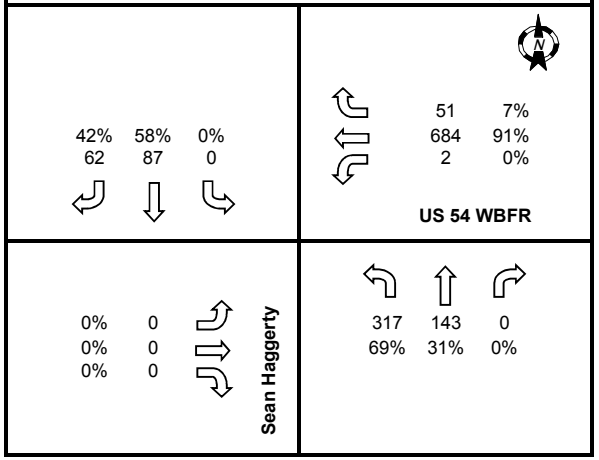
Time		Northbound						Southbound						Eastbound						Westbound					
Movement		left		thru		right		left		thru		right		left		thru		right		left		thru		right	
Vehicle Type		C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	U-Turn	C	T	C	T
7:00 AM	7:15 AM	62		41						11		12								1	0	146		6	
7:15 AM	7:30 AM	79		39						23		23								0	1	159		14	
7:30 AM	7:45 AM	96		37						33		14								0	3	226		20	
7:45 AM	8:00 AM	80		26						20		13								1	11	153		11	
8:00 AM	8:15 AM	68		23						8		24								1	11	117		10	
8:15 AM	8:30 AM	78		22						11		10								2	6	126		14	
8:30 AM	8:45 AM	57		18						10		14								0	3	132		5	
8:45 AM	9:00 AM	40		21						4		19								1	4	107		3	
Total		560	0	227	0					120	0	129	0							6	39	1166	0	83	0
Peak Total		317	0	143	0					87	0	62	0							2	15	684	0	51	0
Peak Movement Total		317		143						87		62								2		684		51	
Peak Turn Percent		69%		31%						58%		42%								0%		91%		7%	
Peak Approach Total		460						149						0						752					
Peak Hour Factor (PHF)		0.83		0.87				0.00		0.66		0.00								0.35		0.76		0.64	

Peak Hour 7:00 AM - 8:00 AM
Peak Interchange

Time		U-Turns			
Approach:					
Vehicle Type		C	T	C	T
7:00 AM	7:15 AM				
7:15 AM	7:30 AM				
7:30 AM	7:45 AM				
7:45 AM	8:00 AM				
8:00 AM	8:15 AM				
8:15 AM	8:30 AM				
8:30 AM	8:45 AM				
8:45 AM	9:00 AM				
Total		0	0	0	0
Peak Total		0	0	0	0
Peak Movement Total		0		0	
Peak Turn Percent		0%		0%	

Peak Hour Approach Traffic Volume and Percentage



DRAFT

Location:	El Paso 4,900 Acre Site
Project #:	68200.010
North-South street:	Sean Haggerty
East-West street:	US 54 WBFR
Time Period:	3 4:00 - 7:00 PM
Date recorded:	Thursday May 15, 2008
Traffic Count Sub	GRAM
Comments:	

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Kimley-Horn and Associates, Inc.

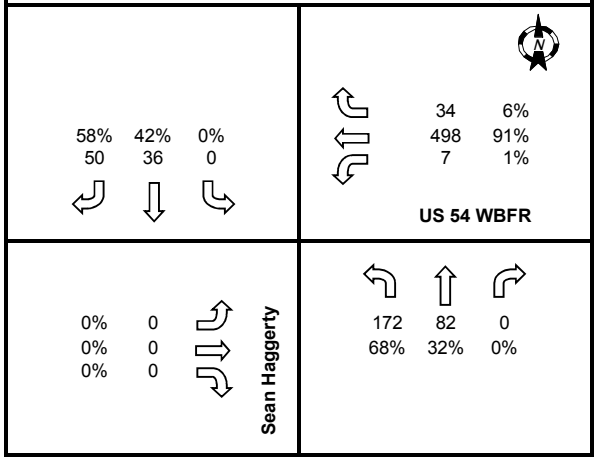
Kimley-Horn and Associates, Inc.
801 Cherry Street, Unit 11, Suite 950
Fort Worth, Texas 76012

Time		Northbound						Southbound						Eastbound						Westbound					
Movement		left		thru		right		left		thru		right		left		thru		right		left		thru		right	
Vehicle Type		C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	U-Turn	C	T	C	T
4:00 PM	4:15 PM	34		10						16		23								5	5	106		10	
4:15 PM	4:30 PM	44		20						7		24								1	3	137		9	
4:30 PM	4:45 PM	40		21						18		17								2	3	120		6	
4:45 PM	5:00 PM	45		19						12		12								2	1	118		13	
5:00 PM	5:15 PM	33		28						8		16								4	4	148		8	
5:15 PM	5:30 PM	48		15						9		14								0	4	137		12	
5:30 PM	5:45 PM	45		14						10		10								1	1	115		8	
5:45 PM	6:00 PM	46		25						9		10								2	1	98		6	
Total		335	0	152	0					89	0	126	0							17	22	979	0	72	0
Peak Total		172	0	82	0					36	0	50	0							7	10	498	0	34	0
Peak Movement Total		172		82						36		50								7		498		34	
Peak Turn Percent		68%		32%						42%		58%								1%		91%		6%	
Peak Approach Total		254						86						0						549					
Peak Hour Factor (PHF)		0.90		0.73				0.00		0.90		0.00								0.53		0.84		0.71	

Peak Hour 5:00 PM - 6:00 PM
Peak Interchange

Time		U-Turns			
Approach:					
Vehicle Type		C	T	C	T
4:00 PM	4:15 PM				
4:15 PM	4:30 PM				
4:30 PM	4:45 PM				
4:45 PM	5:00 PM				
5:00 PM	5:15 PM				
5:15 PM	5:30 PM				
5:30 PM	5:45 PM				
5:45 PM	6:00 PM				
Total		0	0	0	0
Peak Total		0	0	0	0
Peak Movement Total		0		0	
Peak Turn Percent		0%		0%	

Peak Hour Approach Traffic Volume and Percentage



DRAFT

Location:	El Paso 4,900 Acre Site
Project #:	68200.010
North-South street:	Sean Haggerty
East-West street:	US 54 EBFR
Time Period:	1 7:00 - 9:00 AM
Date recorded:	Thursday May 15, 2008
Traffic Count Sub	GRAM
Comments:	

Kimley-Horn and Associates, Inc.

Kimley-Horn and Associates, Inc.
801 Cherry Street, Unit 11, Suite 950
Fort Worth, Texas 76012

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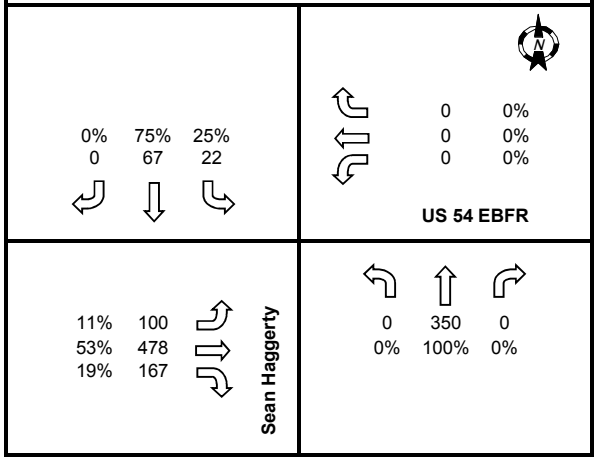
Time	Northbound						Southbound						Eastbound						Westbound					
Movement	left		thru		right		left		thru		right		left		thru		right		left		thru		right	
Vehicle Type	C	T	C	T	C	T	C	T	C	T	C	T	C	U-turn	C	T	C	T	C	T	C	T	C	T
7:00 AM 7:15 AM			69		0		1		11				26	30	103		46							
7:15 AM 7:30 AM			86		0		10		13				30	47	142		58							
7:30 AM 7:45 AM			110		0		8		25				24	38	122		56							
7:45 AM 8:00 AM			85		0		3		18				20	36	111		7							
8:00 AM 8:15 AM			91		0		0		10				12	41	82		63							
8:15 AM 8:30 AM			75		0		0		13				15	22	110		46							
8:30 AM 8:45 AM			64		0		0		10				15	14	82		45							
8:45 AM 9:00 AM			41		0		0		5				17	23	83		33							
Total			621	0	0	0	22	0	105	0			159	251	835	0	354	0						
Peak Total			350	0	0	0	22		67	0			100	151	478	0	167	0						
Peak Movement Total			350		0		22		67				100		478		167							
Peak Turn Percent			100%		0%		25%		75%				11%		53%		19%							
Peak Approach Total	350						89						896						0					
Peak Hour Factor (PHF)			0.80		#DIV/0!		0.00		0.67		0.00		0.81		0.84		0.72							

Peak Hour 7:00 AM - 8:00 AM
Peak Interchange

Time	U-Turns			
Approach:				
Vehicle Type	C	T	C	T
7:00 AM 7:15 AM				
7:15 AM 7:30 AM				
7:30 AM 7:45 AM				
7:45 AM 8:00 AM				
8:00 AM 8:15 AM				
8:15 AM 8:30 AM				
8:30 AM 8:45 AM				
8:45 AM 9:00 AM				
Total	0	0	0	0
Peak Total	0	0	0	0
Peak Movement Total	0		0	
Peak Turn Percent	0%		0%	

Peak Hour Approach Traffic Volume and Percentage



DRAFT

Location:	El Paso 4,900 Acre Site
Project #:	68200.010
North-South street:	Sean Haggerty
East-West street:	US 54 EBFR
Time Period:	3 4:00 - 7:00 PM
Date recorded:	Thursday May 15, 2008
Traffic Count Sub	GRAM
Comments:	

Kimley-Horn and Associates, Inc.

Kimley-Horn and Associates, Inc.
801 Cherry Street, Unit 11, Suite 950
Fort Worth, Texas 76012

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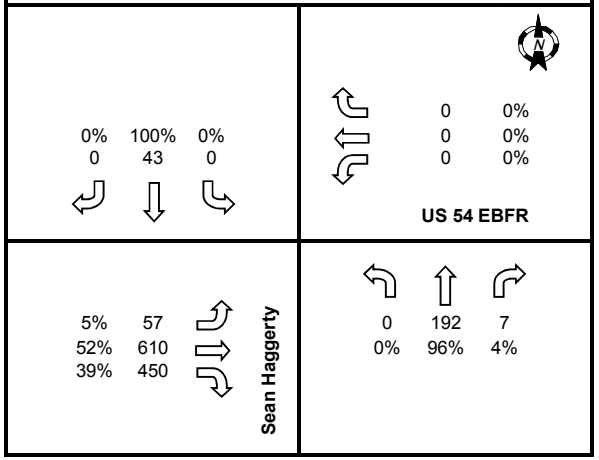
Time	Northbound						Southbound						Eastbound						Westbound					
Movement	left		thru		right		left		thru		right		left		thru		right		left		thru		right	
Vehicle Type	C	T	C	T	C	T	C	T	C	T	C	T	C	U-turn	C	T	C	T	C	T	C	T	C	T
4:00 PM 4:15 PM			36		0		0		20				6	14	130		93							
4:15 PM 4:30 PM			54		0		0		9				12	17	127		94							
4:30 PM 4:45 PM			49		1		0		20				14	12	132		87							
4:45 PM 5:00 PM			49		0		0		15				12	5	135		85							
5:00 PM 5:15 PM			40		2		0		12				20	8	165		111							
5:15 PM 5:30 PM			49		2		0		8				13	11	144		121							
5:30 PM 5:45 PM			50		1		0		12				9	14	157		106							
5:45 PM 6:00 PM			53		2		0		11				15	17	144		112							
Total			380	0	8	0	0	0	107	0			101	98	1134	0	809	0						
Peak Total			192	0	7	0	0		43	0			57	50	610	0	450	0						
Peak Movement Total			192		7		0		43				57		610		450							
Peak Turn Percent			96%		4%		0%		100%				5%		52%		39%							
Peak Approach Total	199						43						1167						0					
Peak Hour Factor (PHF)			0.91		0.88		0.00		0.90		0.00		0.84		0.92		0.93							

Peak Hour 5:00 PM - 6:00 PM
Peak Interchange

Time	U-Turns			
Approach:				
Vehicle Type	C	T	C	T
4:00 PM 4:15 PM				
4:15 PM 4:30 PM				
4:30 PM 4:45 PM				
4:45 PM 5:00 PM				
5:00 PM 5:15 PM				
5:15 PM 5:30 PM				
5:30 PM 5:45 PM				
5:45 PM 6:00 PM				
Total	0	0	0	0
Peak Total	0	0	0	0
Peak Movement Total	0		0	
Peak Turn Percent	0%		0%	

Peak Hour Approach Traffic Volume and Percentage



DRAFT

Location:	El Paso 4,900 Acre Site
Project #:	68200.010
North-South street:	McCombs
East-West street:	US 54 WBFR
Time Period:	1 7:00 - 9:00 AM
Date recorded:	Thursday May 15, 2008
Traffic Count Sub	GRAM
Comments:	

Kimley-Horn and Associates, Inc.

Kimley-Horn and Associates, Inc.
801 Cherry Street, Unit 11, Suite 950
Fort Worth, Texas 76012

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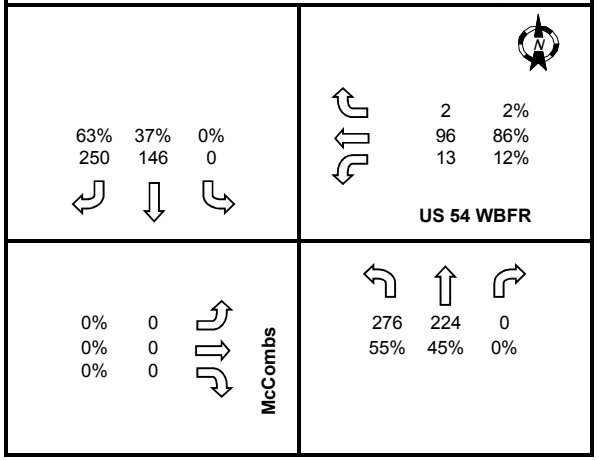
Time	Northbound						Southbound						Eastbound						Westbound					
Movement	left		thru		right		left		thru		right		left		thru		right		left		thru		right	
Vehicle Type	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	U-Turn	C	T	C	T
7:00 AM 7:15 AM	70		64						24		49								6	0	24		1	
7:15 AM 7:30 AM	71		57						42		48								2	0	24		1	
7:30 AM 7:45 AM	95		54						42		82								2	0	27		0	
7:45 AM 8:00 AM	40		49						38		71								3	0	21		0	
8:00 AM 8:15 AM	46		43						35		56								6	0	21		0	
8:15 AM 8:30 AM	47		29						30		49								5	0	32		0	
8:30 AM 8:45 AM	30		41						35		50								5	0	34		0	
8:45 AM 9:00 AM	29		35						28		34								2	0	35		1	
Total	428	0	372	0					274	0	439	0							31	0	218	0	3	0
Peak Total	276	0	224	0					146	0	250	0							13	0	96	0	2	0
Peak Movement Total	276		224						146		250								13		96		2	
Peak Turn Percent	55%		45%						37%		63%								12%		86%		2%	
Peak Approach Total	500						396						0						111					
Peak Hour Factor (PHF)	0.73		0.88				0.00		0.87		0.00								0.54		0.89		0.50	

Peak Hour 7:00 AM - 8:00 AM
Peak Interchange

Time	U-Turns			
Approach:				
Vehicle Type	C	T	C	T
7:00 AM 7:15 AM				
7:15 AM 7:30 AM				
7:30 AM 7:45 AM				
7:45 AM 8:00 AM				
8:00 AM 8:15 AM				
8:15 AM 8:30 AM				
8:30 AM 8:45 AM				
8:45 AM 9:00 AM				
Total	0	0	0	0
Peak Total	0	0	0	0
Peak Movement Total	0		0	
Peak Turn Percent	0%		0%	

Peak Hour Approach Traffic Volume and Percentage



DRAFT

Location:	El Paso 4,900 Acre Site		
Project #:	68200.010		
North-South street:	McCombs		
East-West street:	US 54 WBFR		
Time Period:		3	4:00 - 7:00 PM
Date recorded:	Thursday	May 15, 2008	
Traffic Count Sub	GRAM		
Comments:			

Kimley-Horn and Associates, Inc.

Kimley-Horn and Associates, Inc.
801 Cherry Street, Unit 11, Suite 950
Fort Worth, Texas 76012

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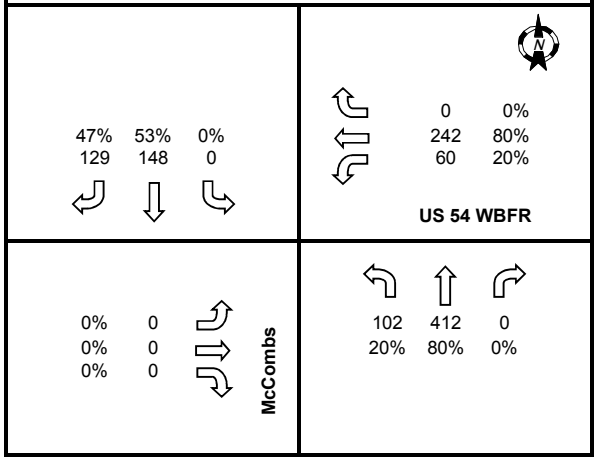
Time		Northbound						Southbound						Eastbound						Westbound					
Movement		left		thru		right		left		thru		right		left		thru		right		left		thru		right	
Vehicle Type		C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	T	C	U-Turn	C	T	C	T
4:00 PM	4:15 PM	18		82						32		26								11	0	49		0	
4:15 PM	4:30 PM	18		83						40		37								13	1	68		1	
4:30 PM	4:45 PM	29		92						41		32								5	0	51		0	
4:45 PM	5:00 PM	26		98						32		20								10	0	65		0	
5:00 PM	5:15 PM	26		103						35		26								22	0	108		0	
5:15 PM	5:30 PM	30		106						39		40								19	0	42		0	
5:30 PM	5:45 PM	26		98						39		34								12	0	49		0	
5:45 PM	6:00 PM	20		105						35		29								7	0	43		0	
Total		193	0	767	0					293	0	244	0							99	1	475	0	1	0
Peak Total		102	0	412	0					148	0	129	0							60	0	242	0	0	0
Peak Movement Total		102		412						148		129								60		242		0	
Peak Turn Percent		20%		80%						53%		47%								20%		80%		0%	
Peak Approach Total		514						277						0						302					
Peak Hour Factor (PHF)		0.85		0.97				0.00		0.95		0.00								0.68		0.56			

Peak Hour 5:00 PM - 6:00 PM
Peak Interchange

Time		U-Turns			
Approach:					
Vehicle Type		C	T	C	T
4:00 PM	4:15 PM				
4:15 PM	4:30 PM				
4:30 PM	4:45 PM				
4:45 PM	5:00 PM				
5:00 PM	5:15 PM				
5:15 PM	5:30 PM				
5:30 PM	5:45 PM				
5:45 PM	6:00 PM				
Total		0	0	0	0
Peak Total		0	0	0	0
Peak Movement Total		0		0	
Peak Turn Percent		0%		0%	

Peak Hour Approach Traffic Volume and Percentage



DRAFT

Location:	El Paso 4,900 Acre Site
Project #:	68200.010
North-South street:	McCombs
East-West street:	US 54 EBFR
Time Period:	1 7:00 - 9:00 AM
Date recorded:	Thursday May 15, 2008
Traffic Count Sub	GRAM
Comments:	

Kimley-Horn and Associates, Inc.

Kimley-Horn and Associates, Inc.
801 Cherry Street, Unit 11, Suite 950
Fort Worth, Texas 76012

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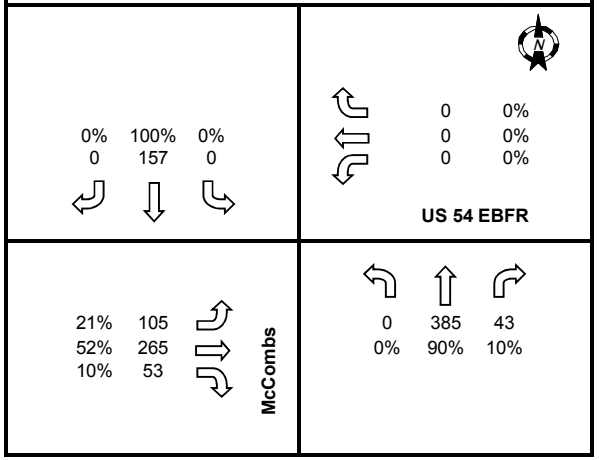
Time	Northbound						Southbound						Eastbound						Westbound					
Movement	left		thru		right		left		thru		right		left		thru		right		left		thru		right	
Vehicle Type	C	T	C	T	C	T	C	T	C	T	C	T	C	U-turn	C	T	C	T	C	T	C	T	C	T
7:00 AM 7:15 AM			97		6		0		22				32	24	69		5							
7:15 AM 7:30 AM			116		16		0		42				29	26	88		13							
7:30 AM 7:45 AM			102		13		0		52				24	21	74		22							
7:45 AM 8:00 AM			70		8		0		41				20	11	34		13							
8:00 AM 8:15 AM			61		7		0		39				18	12	46		10							
8:15 AM 8:30 AM			57		3		0		35				23	15	84		5							
8:30 AM 8:45 AM			51		5		0		39				21	12	57		8							
8:45 AM 9:00 AM			52		8		3		26				13	10	54		13							
Total			606	0	66	0	3	0	296	0			180	131	506	0	89	0						
Peak Total			385	0	43	0	0		157	0			105	82	265	0	53	0						
Peak Movement Total			385		43		0		157				105		265		53							
Peak Turn Percent			90%		10%		0%		100%				21%		52%		10%							
Peak Approach Total	428						157						505						0					
Peak Hour Factor (PHF)			0.83		0.67		0.00		0.75		0.00		0.83		0.75		0.60							

Peak Hour 7:00 AM - 8:00 AM
Peak Interchange

Time	U-Turns			
Approach:				
Vehicle Type	C	T	C	T
7:00 AM 7:15 AM				
7:15 AM 7:30 AM				
7:30 AM 7:45 AM				
7:45 AM 8:00 AM				
8:00 AM 8:15 AM				
8:15 AM 8:30 AM				
8:30 AM 8:45 AM				
8:45 AM 9:00 AM				
Total	0	0	0	0
Peak Total	0	0	0	0
Peak Movement Total	0		0	
Peak Turn Percent	0%		0%	

Peak Hour Approach Traffic Volume and Percentage



DRAFT

Location:	El Paso 4,900 Acre Site
Project #:	68200.010
North-South street:	McCombs
East-West street:	US 54 EBFR
Time Period:	3 4:00 - 6:00 PM
Date recorded:	Thursday May 15, 2008
Traffic Count Sub	GRAM
Comments:	

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Kimley-Horn and Associates, Inc.

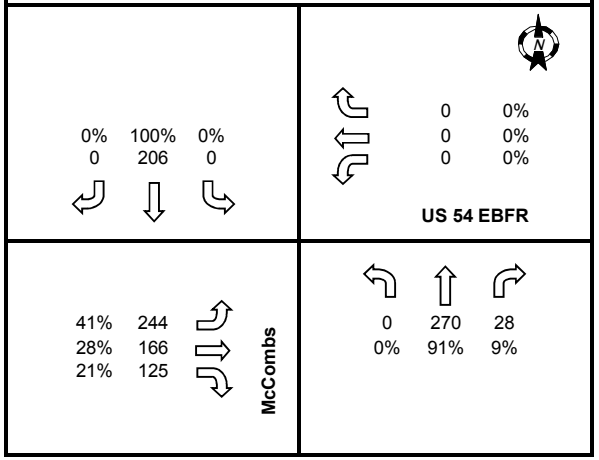
Kimley-Horn and Associates, Inc.
801 Cherry Street, Unit 11, Suite 950
Fort Worth, Texas 76012

Time	Northbound						Southbound						Eastbound						Westbound					
Movement	left		thru		right		left		thru		right		left		thru		right		left		thru		right	
Vehicle Type	C	T	C	T	C	T	C	T	C	T	C	T	C	U-turn	C	T	C	T	C	T	C	T	C	T
4:00 PM 4:15 PM			41		3		0		46				69	14	44		12							
4:15 PM 4:30 PM			48		8		0		51				52	8	37		20							
4:30 PM 4:45 PM			66		4		0		44				58	7	32		27							
4:45 PM 5:00 PM			58		1		0		44				62	9	31		24							
5:00 PM 5:15 PM			68		8		0		67				68	19	48		30							
5:15 PM 5:30 PM			59		9		0		52				75	12	39		25							
5:30 PM 5:45 PM			67		7		0		49				56	12	36		39							
5:45 PM 6:00 PM			76		4		0		38				45	11	43		31							
Total			483	0	44	0	0	0	391	0			485	92	310	0	208	0						
Peak Total			270	0	28	0	0		206	0			244	54	166	0	125	0						
Peak Movement Total			270		28		0		206				244		166		125							
Peak Turn Percent			91%		9%		0%		100%				41%		28%		21%							
Peak Approach Total	298						206						589						0					
Peak Hour Factor (PHF)			0.89		0.78		0.00		0.77		0.00		0.86		0.86		0.80							

Peak Hour 5:00 PM - 6:00 PM
Peak Interchange

Time	U-Turns			
Approach:				
Vehicle Type	C	T	C	T
4:00 PM 4:15 PM				
4:15 PM 4:30 PM				
4:30 PM 4:45 PM				
4:45 PM 5:00 PM				
5:00 PM 5:15 PM				
5:15 PM 5:30 PM				
5:30 PM 5:45 PM				
5:45 PM 6:00 PM				
Total	0	0	0	0
Peak Total	0	0	0	0
Peak Movement Total	0		0	
Peak Turn Percent	0%		0%	

Peak Hour Approach Traffic Volume and Percentage



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2. Existing (2008) Peak Hour Traffic Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.97	0.95	1.00	1.00	0.91			0.91	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				3433	3539	1583	1770	5085			5085	1583
Flt Permitted				0.95	1.00	1.00	0.65	1.00			1.00	1.00
Satd. Flow (perm)				3433	3539	1583	1211	5085			5085	1583
Volume (vph)	0	0	0	13	96	2	276	224	0	0	146	250
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	14	101	2	291	236	0	0	154	263
RTOR Reduction (vph)	0	0	0	0	0	2	0	0	0	0	0	194
Lane Group Flow (vph)	0	0	0	14	101	0	291	236	0	0	154	69
Turn Type				custom		Perm	pm+pt					Perm
Protected Phases				8 16	8 16		5	5 6			6	
Permitted Phases				8 16		8 16	5 6	5 6				6
Actuated Green, G (s)				15.8	15.8	15.8	54.2	59.2			21.4	21.4
Effective Green, g (s)				16.8	16.8	16.8	56.2	60.2			22.4	22.4
Actuated g/C Ratio				0.20	0.20	0.20	0.66	0.71			0.26	0.26
Clearance Time (s)							5.0				5.0	5.0
Vehicle Extension (s)							3.0				3.0	3.0
Lane Grp Cap (vph)				679	699	313	1023	3601			1340	417
v/s Ratio Prot				0.00	c0.03		c0.11	0.05			0.03	
v/s Ratio Perm						0.00	c0.07					0.04
v/c Ratio				0.02	0.14	0.00	0.28	0.07			0.11	0.17
Uniform Delay, d1				27.5	28.2	27.4	5.8	3.8			23.8	24.1
Progression Factor				1.00	1.00	1.00	0.99	0.60			1.00	1.00
Incremental Delay, d2				0.0	0.1	0.0	0.2	0.0			0.2	0.9
Delay (s)				27.5	28.3	27.4	5.9	2.3			23.9	25.0
Level of Service				C	C	C	A	A			C	C
Approach Delay (s)		0.0			28.2			4.3			24.6	
Approach LOS		A			C			A			C	

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97	0.95	1.00					0.91	1.00		0.91	
Frt	1.00	1.00	0.85					1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)	3433	3539	1583					5085	1583		5085	
Flt Permitted	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)	3433	3539	1583					5085	1583		5085	
Volume (vph)	105	265	53	0	0	0	0	385	43	0	157	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	111	279	56	0	0	0	0	405	45	0	165	0
RTOR Reduction (vph)	0	0	38	0	0	0	0	0	31	0	0	0
Lane Group Flow (vph)	111	279	18	0	0	0	0	405	14	0	165	0
Turn Type	Split		Perm						Perm	pm+pt		
Protected Phases	4 12	4 12						2		1	1 2	
Permitted Phases			4 12						2	1 2	1 2	
Actuated Green, G (s)	26.4	26.4	26.4					25.7	25.7		48.6	
Effective Green, g (s)	27.4	27.4	27.4					26.7	26.7		49.6	
Actuated g/C Ratio	0.32	0.32	0.32					0.31	0.31		0.58	
Clearance Time (s)								5.0	5.0			
Vehicle Extension (s)								3.0	3.0			
Lane Grp Cap (vph)	1107	1141	510					1597	497		2967	
v/s Ratio Prot	0.03	c0.08						c0.08			c0.03	
v/s Ratio Perm			0.01						0.01			
v/c Ratio	0.10	0.24	0.04					0.25	0.03		0.06	
Uniform Delay, d1	20.2	21.2	19.7					21.7	20.2		7.6	
Progression Factor	1.00	1.00	1.00					1.00	1.00		1.07	
Incremental Delay, d2	0.0	0.1	0.0					0.4	0.1		0.0	
Delay (s)	20.2	21.3	19.8					22.1	20.3		8.2	
Level of Service	C	C	B					C	C		A	
Approach Delay (s)		20.8			0.0			21.9			8.2	
Approach LOS		C			A			C			A	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.20		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor				1.00	0.95	1.00	1.00	0.91			0.91	
Frt				1.00	1.00	0.85	1.00	1.00			1.00	
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1770	3539	1583	1770	5085			5085	
Flt Permitted				0.95	1.00	1.00	0.55	1.00			1.00	
Satd. Flow (perm)				1770	3539	1583	1027	5085			5085	
Volume (vph)	0	0	0	48	59	65	132	661	0	0	302	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	51	62	68	139	696	0	0	318	0
RTOR Reduction (vph)	0	0	0	0	0	54	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	51	62	14	139	696	0	0	318	0
Turn Type				Perm		Perm	pm+pt					
Protected Phases					8 16		5	5 6			6	
Permitted Phases				8 16		8 16	5 6	5 6				
Actuated Green, G (s)				14.9	14.9	14.9	50.1	55.1			32.0	
Effective Green, g (s)				15.9	15.9	15.9	52.1	56.1			33.0	
Actuated g/C Ratio				0.20	0.20	0.20	0.65	0.70			0.41	
Clearance Time (s)							5.0				5.0	
Vehicle Extension (s)							1.0				2.0	
Lane Grp Cap (vph)				352	703	315	846	3566			2098	
v/s Ratio Prot					0.02		0.04	c0.14			0.06	
v/s Ratio Perm				c0.03		0.01	0.07					
v/c Ratio				0.14	0.09	0.04	0.16	0.20			0.15	
Uniform Delay, d1				26.4	26.1	25.9	5.3	4.1			14.7	
Progression Factor				1.00	1.00	1.00	0.16	0.14			1.00	
Incremental Delay, d2				0.1	0.0	0.0	0.0	0.0			0.2	
Delay (s)				26.5	26.2	25.9	0.9	0.6			14.9	
Level of Service				C	C	C	A	A			B	
Approach Delay (s)		0.0			26.2			0.6			14.9	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.18		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	35.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	0.95	1.00					0.91	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3539	1583					5085	1583	1770	3539	
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.47	1.00	
Satd. Flow (perm)	3433	3539	1583					5085	1583	884	3539	
Volume (vph)	483	83	76	0	0	0	0	323	41	97	255	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	508	87	80	0	0	0	0	340	43	102	268	0
RTOR Reduction (vph)	0	0	43	0	0	0	0	0	38	0	0	0
Lane Group Flow (vph)	508	87	38	0	0	0	0	340	5	102	268	0
Turn Type	Split		Perm						Perm	pm+pt		
Protected Phases	4 12	4 12						2		1	1 2	
Permitted Phases			4 12						2	1 2	1 2	
Actuated Green, G (s)	36.5	36.5	36.5					9.0	9.0	28.5	33.5	
Effective Green, g (s)	37.5	37.5	37.5					10.0	10.0	30.5	34.5	
Actuated g/C Ratio	0.47	0.47	0.47					0.12	0.12	0.38	0.43	
Clearance Time (s)								5.0	5.0	5.0		
Vehicle Extension (s)								2.0	2.0	1.0		
Lane Grp Cap (vph)	1609	1659	742					636	198	564	1526	
v/s Ratio Prot	c0.15	0.02						c0.07		c0.05	c0.08	
v/s Ratio Perm			0.02						0.00	0.02		
v/c Ratio	0.32	0.05	0.05					0.53	0.03	0.18	0.18	
Uniform Delay, d1	13.3	11.6	11.6					32.8	30.7	16.3	14.0	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.60	0.65	
Incremental Delay, d2	0.0	0.0	0.0					0.4	0.0	0.1	0.0	
Delay (s)	13.3	11.6	11.6					33.3	30.7	9.9	9.2	
Level of Service	B	B	B					C	C	A	A	
Approach Delay (s)		12.9			0.0			33.0			9.4	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	35.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				1.00	0.95	1.00	1.00	0.95			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1770	3539	1583	1770	3539			3539	1583
Flt Permitted				0.95	1.00	1.00	0.69	1.00			1.00	1.00
Satd. Flow (perm)				1770	3539	1583	1293	3539			3539	1583
Volume (vph)	0	0	0	2	684	51	317	143	0	0	87	62
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	2	720	54	334	151	0	0	92	65
RTOR Reduction (vph)	0	0	0	0	0	39	0	0	0	0	0	34
Lane Group Flow (vph)	0	0	0	2	720	15	334	151	0	0	92	31
Turn Type				pm+pt		Perm	pm+pt					Perm
Protected Phases				3	7		5	5 6			6	
Permitted Phases				7		7	5 6	5 6				6
Actuated Green, G (s)				18.5	18.5	18.5	36.5	41.5			32.5	32.5
Effective Green, g (s)				19.5	19.5	19.5	38.5	42.5			33.5	33.5
Actuated g/C Ratio				0.28	0.28	0.28	0.55	0.61			0.48	0.48
Clearance Time (s)				5.0	5.0	5.0	5.0				5.0	5.0
Vehicle Extension (s)				2.0	2.0	2.0	1.0				2.0	2.0
Lane Grp Cap (vph)				493	986	441	745	2149			1694	758
v/s Ratio Prot				0.00	c0.20		c0.03	0.04			0.03	
v/s Ratio Perm						0.01	c0.21					0.02
v/c Ratio				0.00	0.73	0.03	0.45	0.07			0.05	0.04
Uniform Delay, d1				18.2	22.9	18.4	9.6	5.6			9.8	9.7
Progression Factor				1.00	1.00	1.00	0.65	0.50			1.00	1.00
Incremental Delay, d2				0.0	2.4	0.0	0.2	0.0			0.1	0.1
Delay (s)				18.2	25.3	18.4	6.3	2.8			9.8	9.8
Level of Service				B	C	B	A	A			A	A
Approach Delay (s)		0.0			24.8			5.2			9.8	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00					0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583					3539	1583	1770	3539	
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.50	1.00	
Satd. Flow (perm)	1770	3539	1583					3539	1583	924	3539	
Volume (vph)	100	478	167	0	0	0	0	350	7	22	67	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	503	176	0	0	0	0	368	7	23	71	0
RTOR Reduction (vph)	0	0	127	0	0	0	0	0	5	0	0	0
Lane Group Flow (vph)	105	503	49	0	0	0	0	368	2	23	71	0
Turn Type	Perm		Perm						Perm	pm+pt		
Protected Phases		3						2		1	1 2	
Permitted Phases	3		3						2	1 2		
Actuated Green, G (s)	18.5	18.5	18.5					22.5	22.5	36.5	41.5	
Effective Green, g (s)	19.5	19.5	19.5					23.5	23.5	38.5	42.5	
Actuated g/C Ratio	0.28	0.28	0.28					0.34	0.34	0.55	0.61	
Clearance Time (s)	5.0	5.0	5.0					5.0	5.0	5.0		
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0	1.0		
Lane Grp Cap (vph)	493	986	441					1188	531	689	2149	
v/s Ratio Prot		c0.14						c0.10		c0.01	c0.02	
v/s Ratio Perm	0.06		0.03						0.00	0.01		
v/c Ratio	0.21	0.51	0.11					0.31	0.00	0.03	0.03	
Uniform Delay, d1	19.4	21.2	18.8					17.2	15.5	8.0	5.5	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.08	0.04	
Incremental Delay, d2	0.1	0.2	0.0					0.7	0.0	0.0	0.0	
Delay (s)	19.4	21.4	18.8					17.9	15.5	0.6	0.2	
Level of Service	B	C	B					B	B	A	A	
Approach Delay (s)		20.6			0.0			17.9			0.3	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor				0.97	0.95		1.00	0.91			0.91	1.00
Frt				1.00	1.00		1.00	1.00			1.00	0.85
Flt Protected				0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)				3433	3539		1770	5085			5085	1583
Flt Permitted				0.95	1.00		0.65	1.00			1.00	1.00
Satd. Flow (perm)				3433	3539		1209	5085			5085	1583
Volume (vph)	0	0	0	60	242	0	102	412	0	0	148	129
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	63	255	0	107	434	0	0	156	136
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	97
Lane Group Flow (vph)	0	0	0	63	255	0	107	434	0	0	156	39
Turn Type				custom		Perm	pm+pt					Perm
Protected Phases				8 16	8 16		5	5 6			6	
Permitted Phases				8 16		8 16	5 6	5 6				6
Actuated Green, G (s)				21.2	21.2		48.8	53.8			23.4	23.4
Effective Green, g (s)				22.2	22.2		50.8	54.8			24.4	24.4
Actuated g/C Ratio				0.26	0.26		0.60	0.64			0.29	0.29
Clearance Time (s)							5.0				5.0	5.0
Vehicle Extension (s)							3.0				3.0	3.0
Lane Grp Cap (vph)				897	924		897	3278			1460	454
v/s Ratio Prot				0.02	c0.07		0.04	c0.09			0.03	
v/s Ratio Perm							0.03					0.02
v/c Ratio				0.07	0.28		0.12	0.13			0.11	0.09
Uniform Delay, d1				23.6	25.0		7.3	5.9			22.3	22.1
Progression Factor				1.00	1.00		0.38	0.41			1.00	1.00
Incremental Delay, d2				0.0	0.2		0.1	0.0			0.1	0.4
Delay (s)				23.7	25.2		2.9	2.4			22.4	22.5
Level of Service				C	C		A	A			C	C
Approach Delay (s)		0.0			24.9			2.5			22.5	
Approach LOS		A			C			A			C	

Intersection Summary			
HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.17		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	30.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97	0.95	1.00					0.91	1.00		0.91	
Frt	1.00	1.00	0.85					1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)	3433	3539	1583					5085	1583		5085	
Flt Permitted	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)	3433	3539	1583					5085	1583		5085	
Volume (vph)	244	166	125	0	0	0	0	270	28	0	206	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	257	175	132	0	0	0	0	284	29	0	217	0
RTOR Reduction (vph)	0	0	87	0	0	0	0	0	22	0	0	0
Lane Group Flow (vph)	257	175	45	0	0	0	0	284	7	0	217	0
Turn Type	Split		Perm						Perm	pm+pt		
Protected Phases	4 12	4 12						2		1	1 2	
Permitted Phases			4 12						2	1 2	1 2	
Actuated Green, G (s)	27.7	27.7	27.7					20.6	20.6		47.3	
Effective Green, g (s)	28.7	28.7	28.7					21.6	21.6		48.3	
Actuated g/C Ratio	0.34	0.34	0.34					0.25	0.25		0.57	
Clearance Time (s)								5.0	5.0			
Vehicle Extension (s)								3.0	3.0			
Lane Grp Cap (vph)	1159	1195	534					1292	402		2889	
v/s Ratio Prot	c0.07	0.05						c0.06			c0.04	
v/s Ratio Perm			0.03						0.00			
v/c Ratio	0.22	0.15	0.08					0.22	0.02		0.08	
Uniform Delay, d1	20.2	19.6	19.2					25.0	23.8		8.3	
Progression Factor	1.00	1.00	1.00					1.00	1.00		0.84	
Incremental Delay, d2	0.1	0.1	0.1					0.4	0.1		0.0	
Delay (s)	20.3	19.7	19.3					25.4	23.8		7.0	
Level of Service	C	B	B					C	C		A	
Approach Delay (s)		19.8			0.0			25.3			7.0	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.18		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	30.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor				1.00	0.95	1.00	1.00	0.91			0.91	
Frt				1.00	1.00	0.85	1.00	1.00			1.00	
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1770	3539	1583	1770	5085			5085	
Flt Permitted				0.95	1.00	1.00	0.52	1.00			1.00	
Satd. Flow (perm)				1770	3539	1583	964	5085			5085	
Volume (vph)	0	0	0	68	65	44	113	1109	0	0	343	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	72	68	46	119	1167	0	0	361	0
RTOR Reduction (vph)	0	0	0	0	0	37	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	72	68	9	119	1167	0	0	361	0
Turn Type				Perm		Perm	pm+pt					
Protected Phases					8 16		5	5 6			6	
Permitted Phases				8 16		8 16	5 6	5 6				
Actuated Green, G (s)				15.4	15.4	15.4	49.6	54.6			22.7	
Effective Green, g (s)				16.4	16.4	16.4	51.6	55.6			23.7	
Actuated g/C Ratio				0.20	0.20	0.20	0.64	0.70			0.30	
Clearance Time (s)							5.0				5.0	
Vehicle Extension (s)							1.0				2.0	
Lane Grp Cap (vph)				363	725	325	903	3534			1506	
v/s Ratio Prot					0.02		0.05	c0.23			0.07	
v/s Ratio Perm				c0.04		0.01	0.04					
v/c Ratio				0.20	0.09	0.03	0.13	0.33			0.24	
Uniform Delay, d1				26.4	25.8	25.4	5.4	4.8			21.3	
Progression Factor				1.00	1.00	1.00	0.08	0.09			1.00	
Incremental Delay, d2				0.1	0.0	0.0	0.0	0.0			0.4	
Delay (s)				26.5	25.8	25.4	0.5	0.5			21.7	
Level of Service				C	C	C	A	A			C	
Approach Delay (s)		0.0			26.0			0.5			21.7	
Approach LOS		A			C			A			C	

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	0.95	1.00					0.91	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3539	1583					5085	1583	1770	3539	
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.41	1.00	
Satd. Flow (perm)	3433	3539	1583					5085	1583	770	3539	
Volume (vph)	861	177	239	0	0	0	0	375	55	90	330	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	906	186	252	0	0	0	0	395	58	95	347	0
RTOR Reduction (vph)	0	0	138	0	0	0	0	0	50	0	0	0
Lane Group Flow (vph)	906	186	114	0	0	0	0	395	8	95	347	0
Turn Type	Split		Perm						Perm	pm+pt		
Protected Phases	4 12	4 12						2		1	1 2	
Permitted Phases			4 12						2	1 2	1 2	
Actuated Green, G (s)	35.2	35.2	35.2					9.8	9.8	29.8	34.8	
Effective Green, g (s)	36.2	36.2	36.2					10.8	10.8	31.8	35.8	
Actuated g/C Ratio	0.45	0.45	0.45					0.14	0.14	0.40	0.45	
Clearance Time (s)								5.0	5.0	5.0		
Vehicle Extension (s)								2.0	2.0	1.0		
Lane Grp Cap (vph)	1553	1601	716					686	214	569	1584	
v/s Ratio Prot	c0.26	0.05						c0.08		0.04	c0.10	
v/s Ratio Perm			0.07						0.00	0.02		
v/c Ratio	0.58	0.12	0.16					0.58	0.04	0.17	0.22	
Uniform Delay, d1	16.3	12.7	12.9					32.5	30.1	15.4	13.5	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.20	0.33	
Incremental Delay, d2	0.4	0.0	0.0					0.7	0.0	0.1	0.0	
Delay (s)	16.7	12.7	13.0					33.2	30.1	3.2	4.5	
Level of Service	B	B	B					C	C	A	A	
Approach Delay (s)		15.4			0.0			32.8			4.2	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM Average Control Delay	16.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				1.00	0.95	1.00	1.00	0.95			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1770	3539	1583	1770	3539			3539	1583
Flt Permitted				0.95	1.00	1.00	0.73	1.00			1.00	1.00
Satd. Flow (perm)				1770	3539	1583	1362	3539			3539	1583
Volume (vph)	0	0	0	7	498	34	172	82	0	0	36	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	7	524	36	181	86	0	0	38	53
RTOR Reduction (vph)	0	0	0	0	0	26	0	0	0	0	0	27
Lane Group Flow (vph)	0	0	0	7	524	10	181	86	0	0	38	26
Turn Type				pm+pt		Perm	pm+pt					Perm
Protected Phases				3	7		5	5 6			6	
Permitted Phases				7		7	5 6	5 6				6
Actuated Green, G (s)				17.8	17.8	17.8	37.2	42.2			33.2	33.2
Effective Green, g (s)				18.8	18.8	18.8	39.2	43.2			34.2	34.2
Actuated g/C Ratio				0.27	0.27	0.27	0.56	0.62			0.49	0.49
Clearance Time (s)				5.0	5.0	5.0	5.0				5.0	5.0
Vehicle Extension (s)				2.0	2.0	2.0	1.0				2.0	2.0
Lane Grp Cap (vph)				475	950	425	792	2184			1729	773
v/s Ratio Prot				0.00	c0.15		c0.02	0.02			0.01	
v/s Ratio Perm						0.01	c0.11					0.02
v/c Ratio				0.01	0.55	0.02	0.23	0.04			0.02	0.03
Uniform Delay, d1				18.8	22.0	18.8	7.8	5.3			9.3	9.3
Progression Factor				1.00	1.00	1.00	0.60	0.53			1.00	1.00
Incremental Delay, d2				0.0	0.4	0.0	0.1	0.0			0.0	0.1
Delay (s)				18.8	22.4	18.8	4.7	2.8			9.3	9.4
Level of Service				B	C	B	A	A			A	A
Approach Delay (s)		0.0			22.1			4.1			9.3	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	15.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00					0.95	1.00		0.95	
Frt	1.00	1.00	0.85					1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)	1770	3539	1583					3539	1583		3539	
Flt Permitted	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)	1770	3539	1583					3539	1583		3539	
Volume (vph)	57	610	450	0	0	0	0	192	7	0	43	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	60	642	474	0	0	0	0	202	7	0	45	0
RTOR Reduction (vph)	0	0	347	0	0	0	0	0	5	0	0	0
Lane Group Flow (vph)	60	642	127	0	0	0	0	202	2	0	45	0
Turn Type	Perm		Perm						Perm	pm+pt		
Protected Phases		3						2		1	1 2	
Permitted Phases	3		3						2	1 2		
Actuated Green, G (s)	17.8	17.8	17.8					23.2	23.2		42.2	
Effective Green, g (s)	18.8	18.8	18.8					24.2	24.2		43.2	
Actuated g/C Ratio	0.27	0.27	0.27					0.35	0.35		0.62	
Clearance Time (s)	5.0	5.0	5.0					5.0	5.0			
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0			
Lane Grp Cap (vph)	475	950	425					1223	547		2184	
v/s Ratio Prot		c0.18						c0.06			c0.01	
v/s Ratio Perm	0.03		0.08						0.00			
v/c Ratio	0.13	0.68	0.30					0.17	0.00		0.02	
Uniform Delay, d1	19.4	22.9	20.4					15.9	15.0		5.2	
Progression Factor	1.00	1.00	1.00					1.00	1.00		0.35	
Incremental Delay, d2	0.0	1.5	0.1					0.3	0.0		0.0	
Delay (s)	19.4	24.4	20.5					16.2	15.0		1.8	
Level of Service	B	C	C					B	B		A	
Approach Delay (s)		22.6			0.0			16.1			1.8	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

3. Build Out (2035) Year Background Traffic Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.97	0.95	1.00	1.00	0.91			0.91	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				3433	3539	1583	1770	5085			5085	1583
Flt Permitted				0.95	1.00	1.00	0.56	1.00			1.00	1.00
Satd. Flow (perm)				3433	3539	1583	1050	5085			5085	1583
Volume (vph)	0	0	0	13	96	2	278	429	0	0	281	480
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	14	101	2	293	452	0	0	296	505
RTOR Reduction (vph)	0	0	0	0	0	2	0	0	0	0	0	372
Lane Group Flow (vph)	0	0	0	14	101	0	293	452	0	0	296	133
Turn Type				custom		Perm	pm+pt					Perm
Protected Phases				8 16	8 16		5	5 6			6	
Permitted Phases				8 16		8 16	5 6	5 6				6
Actuated Green, G (s)				15.8	15.8	15.8	54.2	59.2			21.4	21.4
Effective Green, g (s)				16.8	16.8	16.8	56.2	60.2			22.4	22.4
Actuated g/C Ratio				0.20	0.20	0.20	0.66	0.71			0.26	0.26
Clearance Time (s)							5.0				5.0	5.0
Vehicle Extension (s)							3.0				3.0	3.0
Lane Grp Cap (vph)				679	699	313	981	3601			1340	417
v/s Ratio Prot				0.00	c0.03		c0.12	0.09			0.06	
v/s Ratio Perm						0.00	0.08					c0.08
v/c Ratio				0.02	0.14	0.00	0.30	0.13			0.22	0.32
Uniform Delay, d1				27.5	28.2	27.4	5.8	4.0			24.5	25.2
Progression Factor				1.00	1.00	1.00	0.85	0.59			1.00	1.00
Incremental Delay, d2				0.0	0.1	0.0	0.2	0.0			0.4	2.0
Delay (s)				27.5	28.3	27.4	5.2	2.3			24.9	27.2
Level of Service				C	C	C	A	A			C	C
Approach Delay (s)		0.0			28.2			3.5			26.3	
Approach LOS		A			C			A			C	

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97	0.95	1.00					0.91	1.00		0.91	
Frt	1.00	1.00	0.85					1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (prot)	3433	3539	1583					5085	1583		5085	
Flt Permitted	0.95	1.00	1.00					1.00	1.00		1.00	
Satd. Flow (perm)	3433	3539	1583					5085	1583		5085	
Volume (vph)	149	265	53	0	0	0	0	546	43	0	292	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	157	279	56	0	0	0	0	575	45	0	307	0
RTOR Reduction (vph)	0	0	38	0	0	0	0	0	31	0	0	0
Lane Group Flow (vph)	157	279	18	0	0	0	0	575	14	0	307	0
Turn Type	Split		Perm						Perm	pm+pt		
Protected Phases	4 12	4 12						2		1	1 2	
Permitted Phases			4 12						2	1 2	1 2	
Actuated Green, G (s)	26.6	26.6	26.6					25.6	25.6		48.4	
Effective Green, g (s)	27.6	27.6	27.6					26.6	26.6		49.4	
Actuated g/C Ratio	0.32	0.32	0.32					0.31	0.31		0.58	
Clearance Time (s)								5.0	5.0			
Vehicle Extension (s)								3.0	3.0			
Lane Grp Cap (vph)	1115	1149	514					1591	495		2955	
v/s Ratio Prot	0.05	c0.08						c0.11			c0.06	
v/s Ratio Perm			0.01						0.01			
v/c Ratio	0.14	0.24	0.04					0.36	0.03		0.10	
Uniform Delay, d1	20.3	21.0	19.6					22.6	20.2		7.9	
Progression Factor	1.00	1.00	1.00					1.00	1.00		1.12	
Incremental Delay, d2	0.1	0.1	0.0					0.6	0.1		0.0	
Delay (s)	20.4	21.2	19.6					23.3	20.3		8.9	
Level of Service	C	C	B					C	C		A	
Approach Delay (s)		20.7			0.0			23.0			8.9	
Approach LOS		C			A			C			A	

Intersection Summary			
HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor				1.00	0.95	1.00	1.00	0.95			0.91	
Frt				1.00	1.00	0.85	1.00	1.00			1.00	
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1770	3539	1583	1770	3539			5085	
Flt Permitted				0.95	1.00	1.00	0.49	1.00			1.00	
Satd. Flow (perm)				1770	3539	1583	916	3539			5085	
Volume (vph)	0	0	0	48	59	105	132	875	0	0	392	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	51	62	111	139	921	0	0	413	0
RTOR Reduction (vph)	0	0	0	0	0	89	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	51	62	22	139	921	0	0	413	0
Turn Type				Perm		Perm	pm+pt					
Protected Phases					8 16		5	5 6			6	
Permitted Phases				8 16		8 16	5 6	5 6				
Actuated Green, G (s)				15.0	15.0	15.0	50.0	55.0			29.3	
Effective Green, g (s)				16.0	16.0	16.0	52.0	56.0			30.3	
Actuated g/C Ratio				0.20	0.20	0.20	0.65	0.70			0.38	
Clearance Time (s)							5.0				5.0	
Vehicle Extension (s)							1.0				2.0	
Lane Grp Cap (vph)				354	708	317	827	2477			1926	
v/s Ratio Prot					0.02		0.05	c0.26			0.08	
v/s Ratio Perm				c0.03		0.01	0.06					
v/c Ratio				0.14	0.09	0.07	0.17	0.37			0.21	
Uniform Delay, d1				26.4	26.1	26.0	5.3	4.9			16.8	
Progression Factor				1.00	1.00	1.00	0.16	0.25			1.00	
Incremental Delay, d2				0.1	0.0	0.0	0.0	0.0			0.3	
Delay (s)				26.4	26.1	26.0	0.9	1.2			17.1	
Level of Service				C	C	C	A	A			B	
Approach Delay (s)		0.0			26.1			1.2			17.1	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM Average Control Delay	8.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	0.95	1.00					0.91	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3539	1583					5085	1583	1770	3539	
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.40	1.00	
Satd. Flow (perm)	3433	3539	1583					5085	1583	738	3539	
Volume (vph)	585	83	76	0	0	0	0	391	41	147	310	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	616	87	80	0	0	0	0	412	43	155	326	0
RTOR Reduction (vph)	0	0	44	0	0	0	0	0	37	0	0	0
Lane Group Flow (vph)	616	87	37	0	0	0	0	412	6	155	326	0
Turn Type	Split		Perm						Perm	pm+pt		
Protected Phases	4 12	4 12						2		1	1 2	
Permitted Phases			4 12						2	1 2	1 2	
Actuated Green, G (s)	35.5	35.5	35.5					10.0	10.0	29.5	34.5	
Effective Green, g (s)	36.5	36.5	36.5					11.0	11.0	31.5	35.5	
Actuated g/C Ratio	0.46	0.46	0.46					0.14	0.14	0.39	0.44	
Clearance Time (s)								5.0	5.0	5.0		
Vehicle Extension (s)								2.0	2.0	1.0		
Lane Grp Cap (vph)	1566	1615	722					699	218	555	1570	
v/s Ratio Prot	c0.18	0.02						c0.08		c0.07	0.09	
v/s Ratio Perm			0.02						0.00	0.04		
v/c Ratio	0.39	0.05	0.05					0.59	0.03	0.28	0.21	
Uniform Delay, d1	14.4	12.1	12.1					32.4	29.9	16.2	13.6	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.56	0.58	
Incremental Delay, d2	0.1	0.0	0.0					0.8	0.0	0.1	0.0	
Delay (s)	14.5	12.1	12.1					33.2	29.9	9.1	8.0	
Level of Service	B	B	B					C	C	A	A	
Approach Delay (s)		14.0			0.0			32.9			8.3	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				1.00	0.95	1.00	1.00	0.95			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1770	3539	1583	1770	3539			3539	1583
Flt Permitted				0.95	1.00	1.00	0.49	1.00			1.00	1.00
Satd. Flow (perm)				1770	3539	1583	906	3539			3539	1583
Volume (vph)	0	0	0	7	684	2	317	535	0	0	404	223
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	7	720	2	334	563	0	0	425	235
RTOR Reduction (vph)	0	0	0	0	0	1	0	0	0	0	0	67
Lane Group Flow (vph)	0	0	0	7	720	1	334	563	0	0	425	168
Turn Type				pm+pt		Perm	pm+pt					Perm
Protected Phases				3	7		5	5 6			6	
Permitted Phases				7		7	5 6	5 6				6
Actuated Green, G (s)				17.6	17.6	17.6	37.4	42.4			32.5	32.5
Effective Green, g (s)				18.6	18.6	18.6	39.4	43.4			33.5	33.5
Actuated g/C Ratio				0.27	0.27	0.27	0.56	0.62			0.48	0.48
Clearance Time (s)				5.0	5.0	5.0	5.0				5.0	5.0
Vehicle Extension (s)				2.0	2.0	2.0	1.0				2.0	2.0
Lane Grp Cap (vph)				470	940	421	583	2194			1694	758
v/s Ratio Prot				0.00	c0.20		c0.05	0.16			0.12	
v/s Ratio Perm						0.00	c0.27					0.11
v/c Ratio				0.01	0.77	0.00	0.57	0.26			0.25	0.22
Uniform Delay, d1				18.9	23.7	18.9	11.2	6.0			10.8	10.6
Progression Factor				1.00	1.00	1.00	0.87	0.57			1.00	1.00
Incremental Delay, d2				0.0	3.4	0.0	0.7	0.0			0.4	0.7
Delay (s)				19.0	27.1	18.9	10.5	3.5			11.2	11.3
Level of Service				B	C	B	B	A			B	B
Approach Delay (s)		0.0			27.0			6.1			11.2	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00					0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583					3539	1583	1770	3539	
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.30	1.00	
Satd. Flow (perm)	1770	3539	1583					3539	1583	558	3539	
Volume (vph)	288	478	167	0	0	0	0	598	7	118	435	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	303	503	176	0	0	0	0	629	7	124	458	0
RTOR Reduction (vph)	0	0	129	0	0	0	0	0	5	0	0	0
Lane Group Flow (vph)	303	503	47	0	0	0	0	629	2	124	458	0
Turn Type	Perm		Perm						Perm	pm+pt		
Protected Phases		3						2		1	1 2	
Permitted Phases	3		3						2	1 2		
Actuated Green, G (s)	17.6	17.6	17.6					22.5	22.5	37.4	42.4	
Effective Green, g (s)	18.6	18.6	18.6					23.5	23.5	39.4	43.4	
Actuated g/C Ratio	0.27	0.27	0.27					0.34	0.34	0.56	0.62	
Clearance Time (s)	5.0	5.0	5.0					5.0	5.0	5.0		
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0	1.0		
Lane Grp Cap (vph)	470	940	421					1188	531	589	2194	
v/s Ratio Prot		0.14						c0.18		c0.05	c0.13	
v/s Ratio Perm	c0.17		0.03						0.00	0.07		
v/c Ratio	0.64	0.54	0.11					0.53	0.00	0.21	0.21	
Uniform Delay, d1	22.8	22.0	19.4					18.8	15.5	11.7	5.8	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.43	0.25	
Incremental Delay, d2	2.3	0.3	0.0					1.7	0.0	0.1	0.0	
Delay (s)	25.0	22.3	19.5					20.5	15.5	5.1	1.5	
Level of Service	C	C	B					C	B	A	A	
Approach Delay (s)		22.6			0.0			20.4			2.3	
Approach LOS		C			A			C			A	

Intersection Summary			
HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				0.97	0.95	1.00	1.00	0.95			0.91	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				3433	3539	1583	1770	3539			5085	1583
Flt Permitted				0.95	1.00	1.00	0.56	1.00			1.00	1.00
Satd. Flow (perm)				3433	3539	1583	1049	3539			5085	1583
Volume (vph)	0	0	0	13	96	2	278	429	0	0	281	480
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	14	101	2	293	452	0	0	296	505
RTOR Reduction (vph)	0	0	0	0	0	2	0	0	0	0	0	373
Lane Group Flow (vph)	0	0	0	14	101	0	293	452	0	0	296	132
Turn Type				custom		Perm	pm+pt					Perm
Protected Phases				8 16	8 16		5	5 6			6	
Permitted Phases				8 16		8 16	5 6	5 6				6
Actuated Green, G (s)				15.8	15.8	15.8	54.2	59.2			21.2	21.2
Effective Green, g (s)				16.8	16.8	16.8	56.2	60.2			22.2	22.2
Actuated g/C Ratio				0.20	0.20	0.20	0.66	0.71			0.26	0.26
Clearance Time (s)							5.0				5.0	5.0
Vehicle Extension (s)							3.0				3.0	3.0
Lane Grp Cap (vph)				679	699	313	982	2506			1328	413
v/s Ratio Prot				0.00	c0.03		c0.12	0.13			0.06	
v/s Ratio Perm						0.00	0.08					c0.08
v/c Ratio				0.02	0.14	0.00	0.30	0.18			0.22	0.32
Uniform Delay, d1				27.5	28.2	27.4	5.8	4.1			24.6	25.3
Progression Factor				1.00	1.00	1.00	0.85	0.72			1.00	1.00
Incremental Delay, d2				0.0	0.1	0.0	0.2	0.0			0.4	2.0
Delay (s)				27.5	28.3	27.4	5.2	3.0			25.0	27.3
Level of Service				C	C	C	A	A			C	C
Approach Delay (s)		0.0			28.2			3.9			26.5	
Approach LOS		A			C			A			C	

Intersection Summary			
HCM Average Control Delay	16.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0					4.0	4.0		4.0	
Lane Util. Factor		0.91	1.00					0.91	1.00		0.95	
Frt		1.00	0.85					1.00	0.85		1.00	
Flt Protected		0.98	1.00					1.00	1.00		1.00	
Satd. Flow (prot)		4995	1583					5085	1583		3539	
Flt Permitted		0.98	1.00					1.00	1.00		1.00	
Satd. Flow (perm)		4995	1583					5085	1583		3539	
Volume (vph)	149	265	53	0	0	0	0	546	43	0	292	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	157	279	56	0	0	0	0	575	45	0	307	0
RTOR Reduction (vph)	0	0	38	0	0	0	0	0	31	0	0	0
Lane Group Flow (vph)	0	436	18	0	0	0	0	575	14	0	307	0
Turn Type	Split		Perm						Perm	pm+pt		
Protected Phases	4 12	4 12						2		1	1 2	
Permitted Phases			4 12						2	1 2	1 2	
Actuated Green, G (s)		26.4	26.4					25.4	25.4		48.6	
Effective Green, g (s)		27.4	27.4					26.4	26.4		49.6	
Actuated g/C Ratio		0.32	0.32					0.31	0.31		0.58	
Clearance Time (s)								5.0	5.0			
Vehicle Extension (s)								3.0	3.0			
Lane Grp Cap (vph)		1610	510					1579	492		2065	
v/s Ratio Prot		c0.09						c0.11			c0.09	
v/s Ratio Perm			0.01						0.01			
v/c Ratio		0.27	0.04					0.36	0.03		0.15	
Uniform Delay, d1		21.4	19.7					22.8	20.4		8.1	
Progression Factor		1.00	1.00					1.00	1.00		1.17	
Incremental Delay, d2		0.1	0.0					0.7	0.1		0.0	
Delay (s)		21.5	19.8					23.4	20.5		9.5	
Level of Service		C	B					C	C		A	
Approach Delay (s)		21.3			0.0			23.2			9.5	
Approach LOS		C			A			C			A	

Intersection Summary			
HCM Average Control Delay	19.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	1.00	1.00	0.95			0.95	
Frt					1.00	0.85	1.00	1.00			1.00	
Flt Protected					0.98	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					3461	1583	1770	3539			3539	
Flt Permitted					0.98	1.00	0.46	1.00			1.00	
Satd. Flow (perm)					3461	1583	851	3539			3539	
Volume (vph)	0	0	0	48	59	105	132	875	0	0	392	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	51	62	111	139	921	0	0	413	0
RTOR Reduction (vph)	0	0	0	0	0	86	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	113	25	139	921	0	0	413	0
Turn Type				Perm		Perm	pm+pt					
Protected Phases					8 16		5	5 6			6	
Permitted Phases				8 16		8 16	5 6	5 6				
Actuated Green, G (s)					17.2	17.2	47.8	52.8			27.9	
Effective Green, g (s)					18.2	18.2	49.8	53.8			28.9	
Actuated g/C Ratio					0.23	0.23	0.62	0.67			0.36	
Clearance Time (s)							5.0				5.0	
Vehicle Extension (s)							1.0				2.0	
Lane Grp Cap (vph)					787	360	770	2380			1278	
v/s Ratio Prot							0.05	c0.26			0.12	
v/s Ratio Perm					0.03	0.02	0.07					
v/c Ratio					0.14	0.07	0.18	0.39			0.32	
Uniform Delay, d1					24.7	24.3	6.3	5.8			18.5	
Progression Factor					1.00	1.00	0.14	0.24			1.00	
Incremental Delay, d2					0.0	0.0	0.0	0.0			0.7	
Delay (s)					24.7	24.3	0.9	1.4			19.1	
Level of Service					C	C	A	A			B	
Approach Delay (s)		0.0			24.5			1.4			19.1	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
Lane Util. Factor	0.91	0.91	1.00					0.91		1.00	0.95	
Frt	1.00	1.00	0.85					0.99		1.00	1.00	
Flt Protected	0.95	0.96	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1610	3263	1583					5013		1770	3539	
Flt Permitted	0.95	0.96	1.00					1.00		0.36	1.00	
Satd. Flow (perm)	1610	3263	1583					5013		662	3539	
Volume (vph)	585	83	76	0	0	0	0	391	41	147	310	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	616	87	80	0	0	0	0	412	43	155	326	0
RTOR Reduction (vph)	0	0	45	0	0	0	0	18	0	0	0	0
Lane Group Flow (vph)	308	395	35	0	0	0	0	437	0	155	326	0
Turn Type	Split		Perm							pm+pt		
Protected Phases	4 12	4 12						2		1	1 2	
Permitted Phases			4 12							1 2	1 2	
Actuated Green, G (s)	33.9	33.9	33.9					10.5		31.1	36.1	
Effective Green, g (s)	34.9	34.9	34.9					11.5		33.1	37.1	
Actuated g/C Ratio	0.44	0.44	0.44					0.14		0.41	0.46	
Clearance Time (s)								5.0		5.0		
Vehicle Extension (s)								2.0		1.0		
Lane Grp Cap (vph)	702	1423	691					721		573	1641	
v/s Ratio Prot	c0.19	0.12						c0.09		c0.07	0.09	
v/s Ratio Perm			0.02							0.04		
v/c Ratio	0.44	0.28	0.05					0.61		0.27	0.20	
Uniform Delay, d1	15.7	14.5	13.0					32.1		15.1	12.7	
Progression Factor	1.00	1.00	1.00					1.00		0.42	0.45	
Incremental Delay, d2	0.2	0.0	0.0					1.0		0.1	0.0	
Delay (s)	15.9	14.5	13.0					33.1		6.5	5.7	
Level of Service	B	B	B					C		A	A	
Approach Delay (s)		14.9			0.0			33.1			6.0	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0		4.0	4.0			4.0	4.0
Lane Util. Factor					0.91		1.00	0.95			0.91	1.00
Frt					1.00		1.00	1.00			1.00	0.85
Flt Protected					1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)					5081		1770	3539			5085	1583
Flt Permitted					1.00		0.49	1.00			1.00	1.00
Satd. Flow (perm)					5081		922	3539			5085	1583
Volume (vph)	0	0	0	7	684	2	317	535	0	0	404	223
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	7	720	2	334	563	0	0	425	235
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	0	65
Lane Group Flow (vph)	0	0	0	0	728	0	334	563	0	0	425	170
Turn Type				pm+pt			pm+pt					Perm
Protected Phases				3	7		5	5 6			6	
Permitted Phases				7			5 6	5 6				6
Actuated Green, G (s)					15.9		39.1	44.1			34.4	34.4
Effective Green, g (s)					16.9		41.1	45.1			35.4	35.4
Actuated g/C Ratio					0.24		0.59	0.64			0.51	0.51
Clearance Time (s)					5.0		5.0				5.0	5.0
Vehicle Extension (s)					2.0		1.0				2.0	2.0
Lane Grp Cap (vph)					1227		610	2280			2572	801
v/s Ratio Prot					c0.14		c0.04	0.16			0.08	
v/s Ratio Perm							c0.28					0.11
v/c Ratio					0.59		0.55	0.25			0.17	0.21
Uniform Delay, d1					23.5		9.4	5.3			9.3	9.6
Progression Factor					1.00		0.89	0.59			1.00	1.00
Incremental Delay, d2					0.5		0.5	0.0			0.1	0.6
Delay (s)					24.0		8.8	3.1			9.5	10.2
Level of Service					C		A	A			A	B
Approach Delay (s)		0.0			24.0			5.3			9.7	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	12.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor		0.91	1.00					0.95	1.00	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4991	1583					3539	1583	1770	3539	
Flt Permitted		0.98	1.00					1.00	1.00	0.31	1.00	
Satd. Flow (perm)		4991	1583					3539	1583	586	3539	
Volume (vph)	288	478	167	0	0	0	0	598	7	118	435	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	303	503	176	0	0	0	0	629	7	124	458	0
RTOR Reduction (vph)	0	0	134	0	0	0	0	0	4	0	0	0
Lane Group Flow (vph)	0	806	42	0	0	0	0	629	3	124	458	0
Turn Type	Perm		Perm						Perm	pm+pt		
Protected Phases		3						2		1	1 2	
Permitted Phases	3		3						2	1 2		
Actuated Green, G (s)		15.9	15.9					24.4	24.4	39.1	44.1	
Effective Green, g (s)		16.9	16.9					25.4	25.4	41.1	45.1	
Actuated g/C Ratio		0.24	0.24					0.36	0.36	0.59	0.64	
Clearance Time (s)		5.0	5.0					5.0	5.0	5.0		
Vehicle Extension (s)		2.0	2.0					2.0	2.0	1.0		
Lane Grp Cap (vph)		1205	382					1284	574	610	2280	
v/s Ratio Prot								c0.18		c0.05	c0.13	
v/s Ratio Perm		0.16	0.03						0.00	0.07		
v/c Ratio		0.67	0.11					0.49	0.00	0.20	0.20	
Uniform Delay, d1		24.0	20.7					17.3	14.2	10.4	5.1	
Progression Factor		1.00	1.00					1.00	1.00	0.48	0.28	
Incremental Delay, d2		1.1	0.0					1.3	0.0	0.1	0.0	
Delay (s)		25.1	20.7					18.6	14.2	5.1	1.4	
Level of Service		C	C					B	B	A	A	
Approach Delay (s)		24.3			0.0			18.6			2.2	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

4. Build Out (2035) Year Total Traffic Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539		1770	3539	1583		5085	1583	1770	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539		1770	3539	1583		5085	1583	1770	5085	1583
Volume (vph)	39	113	0	101	63	55	0	776	92	65	1225	18
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	41	119	0	106	66	58	0	817	97	68	1289	19
RTOR Reduction (vph)	0	0	0	0	0	51	0	0	45	0	0	6
Lane Group Flow (vph)	41	119	0	106	66	7	0	817	52	68	1289	13
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.1	9.3		10.0	11.2	11.2		52.8	52.8	7.9	65.7	65.7
Effective Green, g (s)	9.1	10.3		11.0	12.2	12.2		53.8	53.8	8.9	66.7	66.7
Actuated g/C Ratio	0.09	0.10		0.11	0.12	0.12		0.54	0.54	0.09	0.67	0.67
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	161	365		195	432	193		2736	852	158	3392	1056
v/s Ratio Prot	0.02	c0.03		c0.06	0.02			0.16		0.04	c0.25	
v/s Ratio Perm						0.00			0.03			0.01
v/c Ratio	0.25	0.33		0.54	0.15	0.04		0.30	0.06	0.43	0.38	0.01
Uniform Delay, d1	42.3	41.6		42.1	39.3	38.7		12.7	11.0	43.1	7.4	5.6
Progression Factor	1.14	1.12		0.49	0.43	0.68		0.17	0.02	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.5		3.0	0.2	0.1		0.2	0.1	1.9	0.3	0.0
Delay (s)	49.1	47.3		23.7	17.1	26.4		2.4	0.3	45.0	7.8	5.6
Level of Service	D	D		C	B	C		A	A	D	A	A
Approach Delay (s)		47.8			22.5			2.1			9.6	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	4	203	102	10	129	12	57	403	3	12	582	11
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	4	214	107	11	136	13	60	424	3	13	613	12
RTOR Reduction (vph)	0	0	93	0	0	11	0	0	1	0	0	6
Lane Group Flow (vph)	4	214	14	11	136	2	60	424	2	13	613	6
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	1.5	12.4	12.4	1.5	12.4	12.4	17.4	64.6	64.6	1.5	48.7	48.7
Effective Green, g (s)	2.5	13.4	13.4	2.5	13.4	13.4	18.4	65.6	65.6	2.5	49.7	49.7
Actuated g/C Ratio	0.02	0.13	0.13	0.02	0.13	0.13	0.18	0.66	0.66	0.02	0.50	0.50
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	44	474	212	44	474	212	326	2322	1038	44	1759	787
v/s Ratio Prot	0.00	c0.06		c0.01	0.04		0.03	c0.12		0.01	c0.17	
v/s Ratio Perm			0.01			0.00			0.00			0.00
v/c Ratio	0.09	0.45	0.07	0.25	0.29	0.01	0.18	0.18	0.00	0.30	0.35	0.01
Uniform Delay, d1	47.6	39.9	37.8	47.8	39.0	37.5	34.5	6.7	5.9	47.9	15.3	12.7
Progression Factor	0.99	1.04	1.91	0.49	1.05	2.24	0.64	0.33	0.31	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.7	0.1	2.7	0.3	0.0	0.3	0.2	0.0	3.7	0.5	0.0
Delay (s)	47.8	42.0	72.6	26.2	41.1	84.0	22.3	2.4	1.8	51.6	15.8	12.7
Level of Service	D	D	E	C	D	F	C	A	A	D	B	B
Approach Delay (s)		52.2			43.5			4.8			16.5	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	37.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00	0.91	0.91	
Frt		0.85	1.00	1.00	1.00	
Flt Protected		1.00	0.95	1.00	1.00	
Satd. Flow (prot)		1583	1770	5085	5085	
Flt Permitted		1.00	0.95	1.00	1.00	
Satd. Flow (perm)		1583	1770	5085	5085	
Volume (vph)	0	238	143	398	514	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	251	151	419	541	0
RTOR Reduction (vph)	0	226	0	0	0	0
Lane Group Flow (vph)	0	25	151	419	541	0
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)		8.9	18.1	81.1	58.0	
Effective Green, g (s)		9.9	19.1	82.1	59.0	
Actuated g/C Ratio		0.10	0.19	0.82	0.59	
Clearance Time (s)		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		157	338	4175	3000	
v/s Ratio Prot			c0.09	0.08	c0.11	
v/s Ratio Perm		c0.02				
v/c Ratio		0.16	0.45	0.10	0.18	
Uniform Delay, d1		41.2	35.8	1.7	9.4	
Progression Factor		1.00	0.55	0.36	1.00	
Incremental Delay, d2		0.4	0.9	0.0	0.1	
Delay (s)		41.7	20.6	0.7	9.5	
Level of Service		D	C	A	A	
Approach Delay (s)	41.7			6.0	9.5	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	14.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	31.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0			4.0	
Lane Util. Factor		0.95	1.00		0.95		1.00	0.95			0.95	
Frt		1.00	0.85		1.00		1.00	1.00			1.00	
Flt Protected		1.00	1.00		1.00		0.95	1.00			1.00	
Satd. Flow (prot)		3539	1583		3539		1770	3539			3539	
Flt Permitted		1.00	1.00		1.00		0.73	1.00			1.00	
Satd. Flow (perm)		3539	1583		3539		1358	3539			3539	
Volume (vph)	0	52	220	0	35	0	145	52	0	0	39	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	55	232	0	37	0	153	55	0	0	41	0
RTOR Reduction (vph)	0	0	211	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	55	21	0	37	0	153	55	0	0	41	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)		8.1	8.1		8.1		81.9	81.9			71.4	
Effective Green, g (s)		9.1	9.1		9.1		82.9	82.9			72.4	
Actuated g/C Ratio		0.09	0.09		0.09		0.83	0.83			0.72	
Clearance Time (s)		5.0	5.0		5.0		5.0	5.0			5.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		322	144		322		1153	2934			2562	
v/s Ratio Prot		c0.02			0.01		c0.01	0.02			0.01	
v/s Ratio Perm			0.01				c0.10					
v/c Ratio		0.17	0.15		0.11		0.13	0.02			0.02	
Uniform Delay, d1		42.0	41.9		41.8		1.6	1.5			3.9	
Progression Factor		1.00	1.00		0.41		1.52	1.19			0.31	
Incremental Delay, d2		0.3	0.5		0.1		0.1	0.0			0.0	
Delay (s)		42.2	42.3		17.2		2.6	1.8			1.2	
Level of Service		D	D		B		A	A			A	
Approach Delay (s)		42.3			17.2			2.4			1.2	
Approach LOS		D			B			A			A	

Intersection Summary			
HCM Average Control Delay	23.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.14		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	24.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	5085	1583	1770	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	5085	1583	1770	5085	1583
Volume (vph)	48	424	116	180	470	167	51	785	81	158	1363	63
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	51	446	122	189	495	176	54	826	85	166	1435	66
RTOR Reduction (vph)	0	0	98	0	0	134	0	0	61	0	0	39
Lane Group Flow (vph)	51	446	24	189	495	42	54	826	24	166	1435	27
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	10.4	18.3	18.3	14.9	22.8	22.8	6.8	27.8	27.8	19.0	40.0	40.0
Effective Green, g (s)	11.4	19.3	19.3	15.9	23.8	23.8	7.8	28.8	28.8	20.0	41.0	41.0
Actuated g/C Ratio	0.11	0.19	0.19	0.16	0.24	0.24	0.08	0.29	0.29	0.20	0.41	0.41
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	202	683	306	281	842	377	138	1464	456	354	2085	649
v/s Ratio Prot	0.03	c0.13		c0.11	c0.14		0.03	c0.16		0.09	c0.28	
v/s Ratio Perm			0.01			0.03			0.02			0.02
v/c Ratio	0.25	0.65	0.08	0.67	0.59	0.11	0.39	0.56	0.05	0.47	0.69	0.04
Uniform Delay, d1	40.4	37.3	33.1	39.6	33.8	29.8	43.8	30.3	25.7	35.3	24.2	17.7
Progression Factor	0.95	0.95	0.84	1.19	1.35	3.79	0.56	0.48	0.58	0.86	0.83	0.89
Incremental Delay, d2	0.7	2.2	0.1	5.5	0.9	0.1	1.7	1.5	0.2	0.9	1.8	0.1
Delay (s)	38.9	37.7	28.0	52.7	46.5	113.1	26.1	16.0	15.1	31.2	21.9	15.9
Level of Service	D	D	C	D	D	F	C	B	B	C	C	B
Approach Delay (s)		35.9			61.5			16.5			22.6	
Approach LOS		D			E			B			C	

Intersection Summary			
HCM Average Control Delay	31.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	38	499	263	32	503	147	175	508	78	133	737	35
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	40	525	277	34	529	155	184	535	82	140	776	37
RTOR Reduction (vph)	0	0	207	0	0	120	0	0	50	0	0	26
Lane Group Flow (vph)	40	525	70	34	529	35	184	535	32	140	776	11
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	7.4	24.2	24.2	5.1	21.9	21.9	23.0	38.2	38.2	12.5	27.7	27.7
Effective Green, g (s)	8.4	25.2	25.2	6.1	22.9	22.9	24.0	39.2	39.2	13.5	28.7	28.7
Actuated g/C Ratio	0.08	0.25	0.25	0.06	0.23	0.23	0.24	0.39	0.39	0.14	0.29	0.29
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	149	892	399	108	810	363	425	1387	621	239	1016	454
v/s Ratio Prot	0.02	c0.15		0.02	c0.15		c0.10	0.15		0.08	c0.22	
v/s Ratio Perm			0.04			0.02			0.02			0.01
v/c Ratio	0.27	0.59	0.17	0.31	0.65	0.10	0.43	0.39	0.05	0.59	0.76	0.02
Uniform Delay, d1	42.9	32.8	29.3	44.9	34.9	30.4	32.2	21.8	18.9	40.6	32.6	25.6
Progression Factor	0.63	0.83	1.00	1.41	0.93	1.76	0.47	0.39	0.21	1.10	0.93	1.25
Incremental Delay, d2	0.9	0.9	0.2	1.6	1.8	0.1	0.7	0.8	0.1	3.6	5.4	0.1
Delay (s)	27.7	28.0	29.5	64.9	34.4	53.6	15.8	9.4	4.1	48.1	35.7	32.0
Level of Service	C	C	C	E	C	D	B	A	A	D	D	C
Approach Delay (s)		28.5			40.0			10.3			37.3	
Approach LOS		C			D			B			D	

Intersection Summary			
HCM Average Control Delay	29.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	5085	1583	1770	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	3433	5085	1583	1770	5085	1583
Volume (vph)	29	356	349	107	326	19	267	603	60	14	940	14
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	31	375	367	113	343	20	281	635	63	15	989	15
RTOR Reduction (vph)	0	0	294	0	0	14	0	0	36	0	0	10
Lane Group Flow (vph)	31	375	73	113	343	6	281	635	27	15	989	5
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	4.6	19.0	19.0	13.1	27.5	27.5	12.8	42.3	42.3	5.6	35.1	35.1
Effective Green, g (s)	5.6	20.0	20.0	14.1	28.5	28.5	13.8	43.3	43.3	6.6	36.1	36.1
Actuated g/C Ratio	0.06	0.20	0.20	0.14	0.28	0.28	0.14	0.43	0.43	0.07	0.36	0.36
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	99	708	317	250	1009	451	474	2202	685	117	1836	571
v/s Ratio Prot	0.02	c0.11		c0.06	0.10		c0.08	0.12		0.01	c0.19	
v/s Ratio Perm			0.05			0.00			0.02			0.00
v/c Ratio	0.31	0.53	0.23	0.45	0.34	0.01	0.59	0.29	0.04	0.13	0.54	0.01
Uniform Delay, d1	45.4	35.8	33.6	39.4	28.3	25.7	40.5	18.4	16.4	44.0	25.3	20.5
Progression Factor	0.69	0.80	4.54	1.00	1.00	1.00	1.15	0.99	1.48	0.76	0.72	0.60
Incremental Delay, d2	1.6	0.6	0.3	1.3	0.2	0.0	1.9	0.3	0.1	0.5	1.1	0.0
Delay (s)	32.9	29.1	152.6	40.7	28.5	25.7	48.5	18.6	24.3	34.0	19.5	12.3
Level of Service	C	C	F	D	C	C	D	B	C	C	B	B
Approach Delay (s)		87.9			31.3			27.5			19.6	
Approach LOS		F			C			C			B	

Intersection Summary			
HCM Average Control Delay	40.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	0.95						0.95	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						1.00	1.00
Satd. Flow (prot)		3539	1583	1770	3539						3539	1583
Flt Permitted		1.00	1.00	0.48	1.00						1.00	1.00
Satd. Flow (perm)		3539	1583	890	3539						3539	1583
Volume (vph)	0	378	123	120	103	0	0	0	0	0	37	277
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	398	129	126	108	0	0	0	0	0	39	292
RTOR Reduction (vph)	0	0	77	0	0	0	0	0	0	0	0	225
Lane Group Flow (vph)	0	398	52	126	108	0	0	0	0	0	39	67
Turn Type			Perm	pm+pt						Split		Perm
Protected Phases		6		5	5 6					8 16	8 16	
Permitted Phases		6	6	5 6	5 6							8 16
Actuated Green, G (s)		33.5	33.5	51.5	56.5						18.5	18.5
Effective Green, g (s)		34.5	34.5	53.5	57.5						19.5	19.5
Actuated g/C Ratio		0.41	0.41	0.63	0.68						0.23	0.23
Clearance Time (s)		5.0	5.0	5.0								
Vehicle Extension (s)		3.0	3.0	3.0								
Lane Grp Cap (vph)		1436	643	757	2394						812	363
v/s Ratio Prot		c0.11		c0.04	0.03						0.01	
v/s Ratio Perm			0.03	0.07								c0.04
v/c Ratio		0.28	0.08	0.17	0.05						0.05	0.18
Uniform Delay, d1		16.9	15.5	6.3	4.6						25.5	26.4
Progression Factor		1.00	1.00	0.38	0.31						1.00	1.00
Incremental Delay, d2		0.5	0.2	0.1	0.0						0.0	0.2
Delay (s)		17.4	15.8	2.5	1.4						25.5	26.6
Level of Service		B	B	A	A						C	C
Approach Delay (s)		17.0			2.0			0.0			26.5	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM Average Control Delay	16.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0				
Lane Util. Factor		0.95			0.95		1.00	0.95				
Frt		1.00			1.00		1.00	1.00				
Flt Protected		1.00			1.00		0.95	1.00				
Satd. Flow (prot)		3539			3539		1770	3539				
Flt Permitted		1.00			1.00		0.95	1.00				
Satd. Flow (perm)		3539			3539		1770	3539				
Volume (vph)	0	378	0	0	223	0	223	308	0	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	398	0	0	235	0	235	324	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	398	0	0	235	0	235	324	0	0	0	0
Turn Type	pm+pt					Perm	Split					
Protected Phases	1	1 2			2		4 12	4 12				
Permitted Phases	1 2	1 2				2						
Actuated Green, G (s)		32.4			10.6		42.6	42.6				
Effective Green, g (s)		33.4			11.6		43.6	43.6				
Actuated g/C Ratio		0.39			0.14		0.51	0.51				
Clearance Time (s)					5.0							
Vehicle Extension (s)					3.0							
Lane Grp Cap (vph)		1391			483		908	1815				
v/s Ratio Prot		c0.11			c0.07		c0.13	0.09				
v/s Ratio Perm												
v/c Ratio		0.29			0.49		0.26	0.18				
Uniform Delay, d1		17.6			33.9		11.6	11.1				
Progression Factor		1.05			1.00		1.00	1.00				
Incremental Delay, d2		0.1			0.8		0.2	0.0				
Delay (s)		18.6			34.7		11.8	11.1				
Level of Service		B			C		B	B				
Approach Delay (s)		18.6			34.7			11.4			0.0	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM Average Control Delay	18.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	23	314	216	76	215	129	131	911	29	211	1733	38
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	24	331	227	80	226	136	138	959	31	222	1824	40
RTOR Reduction (vph)	0	0	192	0	0	105	0	0	17	0	0	21
Lane Group Flow (vph)	24	331	35	80	226	31	138	959	14	222	1824	19
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	2.8	14.2	14.2	10.6	22.0	22.0	8.9	43.3	43.3	11.9	46.3	46.3
Effective Green, g (s)	3.8	15.2	15.2	11.6	23.0	23.0	9.9	44.3	44.3	12.9	47.3	47.3
Actuated g/C Ratio	0.04	0.15	0.15	0.12	0.23	0.23	0.10	0.44	0.44	0.13	0.47	0.47
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	67	538	241	205	814	364	340	2253	701	443	2405	749
v/s Ratio Prot	0.01	c0.09		c0.05	0.06		0.04	0.19		c0.06	c0.36	
v/s Ratio Perm			0.02			0.02			0.01			0.01
v/c Ratio	0.36	0.62	0.14	0.39	0.28	0.09	0.41	0.43	0.02	0.50	0.76	0.03
Uniform Delay, d1	46.9	39.7	36.8	40.9	31.7	30.2	42.3	19.1	15.6	40.6	21.7	14.1
Progression Factor	1.07	0.96	0.80	0.77	0.86	1.82	1.00	1.00	1.00	0.74	0.42	0.11
Incremental Delay, d2	3.2	2.0	0.3	1.2	0.2	0.1	0.8	0.6	0.1	0.8	2.0	0.1
Delay (s)	53.6	40.1	29.7	32.8	27.4	55.2	43.1	19.7	15.7	30.7	11.1	1.5
Level of Service	D	D	C	C	C	E	D	B	B	C	B	A
Approach Delay (s)		36.6			37.0			22.5			13.0	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3539	1583	1770	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		3539	1583	1770	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	0	334	399	77	211	123	185	617	44	166	1114	14
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	352	420	81	222	129	195	649	46	175	1173	15
RTOR Reduction (vph)	0	0	280	0	0	84	0	0	27	0	0	9
Lane Group Flow (vph)	0	352	140	81	222	45	195	649	19	175	1173	6
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)		20.9	20.9	8.0	33.9	33.9	10.4	41.1	41.1	10.0	40.7	40.7
Effective Green, g (s)		21.9	21.9	9.0	34.9	34.9	11.4	42.1	42.1	11.0	41.7	41.7
Actuated g/C Ratio		0.22	0.22	0.09	0.35	0.35	0.11	0.42	0.42	0.11	0.42	0.42
Clearance Time (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		775	347	159	1235	552	391	1490	666	378	1476	660
v/s Ratio Prot		c0.10		c0.05	0.06		c0.06	0.18		0.05	c0.33	
v/s Ratio Perm			0.09			0.03			0.01			0.00
v/c Ratio		0.45	0.40	0.51	0.18	0.08	0.50	0.44	0.03	0.46	0.79	0.01
Uniform Delay, d1		33.9	33.5	43.4	22.6	21.8	41.6	20.5	17.0	41.7	25.4	17.1
Progression Factor		0.62	1.43	0.26	0.34	0.52	1.13	0.54	0.69	0.53	0.37	0.08
Incremental Delay, d2		0.4	0.7	2.3	0.1	0.1	0.9	0.9	0.1	0.8	4.0	0.0
Delay (s)		21.4	48.6	13.5	7.8	11.5	47.8	11.9	11.8	22.9	13.3	1.4
Level of Service		C	D	B	A	B	D	B	B	C	B	A
Approach Delay (s)		36.2			9.9			19.7			14.4	
Approach LOS		D			A			B			B	

Intersection Summary			
HCM Average Control Delay	20.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.97	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	3433	5085	5085	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	3433	5085	5085	1583
Volume (vph)	55	508	313	909	1439	57
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	58	535	329	957	1515	60
RTOR Reduction (vph)	0	246	0	0	0	31
Lane Group Flow (vph)	58	289	329	957	1515	29
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	22.7	22.7	15.0	67.3	47.3	47.3
Effective Green, g (s)	23.7	23.7	16.0	68.3	48.3	48.3
Actuated g/C Ratio	0.24	0.24	0.16	0.68	0.48	0.48
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	419	375	549	3473	2456	765
v/s Ratio Prot	0.03		c0.10	0.19	c0.30	
v/s Ratio Perm		c0.18				0.02
v/c Ratio	0.14	0.77	0.60	0.28	0.62	0.04
Uniform Delay, d1	30.1	35.6	39.0	6.2	19.0	13.6
Progression Factor	1.46	2.46	0.76	1.06	0.51	0.26
Incremental Delay, d2	0.1	8.6	1.7	0.2	1.0	0.1
Delay (s)	44.2	96.1	31.3	6.8	10.7	3.6
Level of Service	D	F	C	A	B	A
Approach Delay (s)	91.1			13.1	10.4	
Approach LOS	F			B	B	

Intersection Summary			
HCM Average Control Delay	25.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3539	1583	1770	3539	1583	1770	5085	1583	1770	5085	
Flt Permitted		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		3539	1583	1770	3539	1583	1770	5085	1583	1770	5085	
Volume (vph)	0	50	66	18	34	26	34	1062	15	12	2126	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	53	69	19	36	27	36	1118	16	13	2238	0
RTOR Reduction (vph)	0	0	64	0	0	23	0	0	5	0	0	0
Lane Group Flow (vph)	0	53	5	19	36	4	36	1118	11	13	2238	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)		6.0	6.0	3.1	14.1	14.1	5.6	72.3	72.3	1.6	68.3	
Effective Green, g (s)		7.0	7.0	4.1	15.1	15.1	6.6	73.3	73.3	2.6	69.3	
Actuated g/C Ratio		0.07	0.07	0.04	0.15	0.15	0.06	0.71	0.71	0.03	0.67	
Clearance Time (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		241	108	70	519	232	113	3619	1127	45	3421	
v/s Ratio Prot		c0.01		c0.01	0.01		0.02	c0.22		0.01	c0.44	
v/s Ratio Perm			0.00			0.00			0.01			
v/c Ratio		0.22	0.04	0.27	0.07	0.02	0.32	0.31	0.01	0.29	0.65	
Uniform Delay, d1		45.4	44.9	48.0	37.9	37.6	46.1	5.5	4.3	49.3	9.8	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.5	0.2	2.1	0.1	0.0	1.6	0.2	0.0	3.5	1.0	
Delay (s)		45.9	45.0	50.1	37.9	37.6	47.7	5.7	4.3	52.8	10.8	
Level of Service		D	D	D	D	D	D	A	A	D	B	
Approach Delay (s)		45.4			40.7			7.0			11.1	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	
Flt Permitted		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	
Volume (vph)	0	72	22	10	69	148	23	722	59	210	1289	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	76	23	11	73	156	24	760	62	221	1357	0
RTOR Reduction (vph)	0	0	21	0	0	133	0	0	28	0	0	0
Lane Group Flow (vph)	0	76	2	11	73	23	24	760	34	221	1357	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)		7.4	7.4	1.5	13.9	13.9	3.3	54.5	54.5	16.6	67.8	
Effective Green, g (s)		8.4	8.4	2.5	14.9	14.9	4.3	55.5	55.5	17.6	68.8	
Actuated g/C Ratio		0.08	0.08	0.02	0.15	0.15	0.04	0.56	0.56	0.18	0.69	
Clearance Time (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		297	133	44	527	236	76	1964	879	312	2435	
v/s Ratio Prot		c0.02		0.01	c0.02		0.01	0.21		c0.12	c0.38	
v/s Ratio Perm			0.00			0.01			0.02			
v/c Ratio		0.26	0.01	0.25	0.14	0.10	0.32	0.39	0.04	0.71	0.56	
Uniform Delay, d1		42.9	42.0	47.8	37.0	36.7	46.4	12.6	10.1	38.8	7.9	
Progression Factor		1.00	1.00	0.92	1.04	1.23	0.59	1.33	2.69	0.88	1.05	
Incremental Delay, d2		0.5	0.0	3.0	0.1	0.2	2.2	0.5	0.1	4.8	0.6	
Delay (s)		43.3	42.0	46.8	38.5	45.3	29.5	17.4	27.3	38.9	8.9	
Level of Service		D	D	D	D	D	C	B	C	D	A	
Approach Delay (s)		43.0			43.3			18.4			13.1	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	18.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	
Frt	1.00	0.85	1.00	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	5085	5085	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1583	1770	5085	5085	
Volume (vph)	12	45	28	1199	1975	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	13	47	29	1262	2079	0
RTOR Reduction (vph)	0	44	0	0	0	0
Lane Group Flow (vph)	13	3	29	1262	2079	0
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	4.6	4.6	6.6	85.4	73.8	
Effective Green, g (s)	5.6	5.6	7.6	86.4	74.8	
Actuated g/C Ratio	0.06	0.06	0.08	0.86	0.75	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	99	89	135	4393	3804	
v/s Ratio Prot	c0.01		0.02	c0.25	c0.41	
v/s Ratio Perm		0.00				
v/c Ratio	0.13	0.03	0.21	0.29	0.55	
Uniform Delay, d1	44.9	44.6	43.4	1.2	5.4	
Progression Factor	1.22	2.09	1.06	0.30	0.26	
Incremental Delay, d2	0.5	0.1	0.8	0.2	0.4	
Delay (s)	55.4	93.2	46.9	0.5	1.8	
Level of Service	E	F	D	A	A	
Approach Delay (s)	85.0			1.6	1.8	
Approach LOS	F			A	A	

Intersection Summary			
HCM Average Control Delay	3.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				1.00	0.95	1.00	1.00	0.91			0.91	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1770	3539	1583	1770	5085			5085	1583
Flt Permitted				0.95	1.00	1.00	0.15	1.00			1.00	1.00
Satd. Flow (perm)				1770	3539	1583	272	5085			5085	1583
Volume (vph)	0	0	0	111	147	22	317	846	0	0	1012	429
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	117	155	23	334	891	0	0	1065	452
RTOR Reduction (vph)	0	0	0	0	0	20	0	0	0	0	0	309
Lane Group Flow (vph)	0	0	0	117	155	3	334	891	0	0	1065	143
Turn Type				pm+pt		Perm	pm+pt					Perm
Protected Phases				12!	8		5	5 6!			6!	
Permitted Phases				8		8	5 6!	5 6!				6
Actuated Green, G (s)				19.9	14.0	14.0	71.0	76.0			26.4	26.4
Effective Green, g (s)				21.9	15.0	15.0	73.0	77.0			27.4	27.4
Actuated g/C Ratio				0.22	0.15	0.15	0.73	0.77			0.27	0.27
Clearance Time (s)				5.0	5.0	5.0	5.0				5.0	5.0
Vehicle Extension (s)				3.0	3.0	3.0	3.0				3.0	3.0
Lane Grp Cap (vph)				388	531	237	882	3915			1393	434
v/s Ratio Prot				c0.02	0.04		c0.17	0.18			c0.21	
v/s Ratio Perm				0.05		0.00	0.10					0.09
v/c Ratio				0.30	0.29	0.01	0.38	0.23			0.76	0.33
Uniform Delay, d1				32.7	37.8	36.2	8.7	3.2			33.3	29.0
Progression Factor				1.00	1.00	1.00	0.01	0.01			0.74	0.98
Incremental Delay, d2				0.4	0.3	0.0	0.2	0.0			3.6	1.8
Delay (s)				33.1	38.1	36.2	0.3	0.1			28.1	30.3
Level of Service				C	D	D	A	A			C	C
Approach Delay (s)		0.0			36.0			0.1			28.7	
Approach LOS		A			D			A			C	

Intersection Summary			
HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0		4.0	
Lane Util. Factor	0.91	0.91	1.00					0.91	1.00		0.91	
Frt	1.00	1.00	0.85					1.00	0.85		1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00		1.00	
Satd. Flow (prot)	1610	3351	1583					5085	1583		5085	
Flt Permitted	0.95	0.99	1.00					1.00	1.00		1.00	
Satd. Flow (perm)	1610	3351	1583					5085	1583		5085	
Volume (vph)	244	265	53	0	0	0	0	904	266	0	1121	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	257	279	56	0	0	0	0	952	280	0	1180	0
RTOR Reduction (vph)	0	0	47	0	0	0	0	0	210	0	0	0
Lane Group Flow (vph)	173	363	9	0	0	0	0	952	70	0	1180	0
Turn Type	Perm		Perm						Perm	pm+pt		
Protected Phases		4						2		1	1 2	
Permitted Phases	4		4						2	1 2	1 2	
Actuated Green, G (s)	15.6	15.6	15.6					24.0	24.0		63.5	
Effective Green, g (s)	16.6	16.6	16.6					25.0	25.0		64.5	
Actuated g/C Ratio	0.17	0.17	0.17					0.25	0.25		0.64	
Clearance Time (s)	5.0	5.0	5.0					5.0	5.0			
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0			
Lane Grp Cap (vph)	267	556	263					1271	396		3280	
v/s Ratio Prot								c0.19			c0.23	
v/s Ratio Perm	0.11	0.11	0.01						0.04			
v/c Ratio	0.65	0.65	0.04					0.75	0.18		0.36	
Uniform Delay, d1	39.0	39.0	35.0					34.6	29.4		8.2	
Progression Factor	0.77	0.78	0.95					1.00	1.00		0.98	
Incremental Delay, d2	4.0	2.1	0.0					4.1	1.0		0.0	
Delay (s)	34.2	32.4	33.2					38.7	30.4		8.1	
Level of Service	C	C	C					D	C		A	
Approach Delay (s)		33.0			0.0			36.8			8.1	
Approach LOS		C			A			D			A	

Intersection Summary			
HCM Average Control Delay	24.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	22.9
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor				1.00	0.95	1.00	1.00	0.91			0.95	
Frt				1.00	1.00	0.85	1.00	1.00			1.00	
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1770	3539	1583	1770	5085			3539	
Flt Permitted				0.95	1.00	1.00	0.22	1.00			1.00	
Satd. Flow (perm)				1770	3539	1583	413	5085			3539	
Volume (vph)	0	0	0	48	59	164	154	1475	0	0	646	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	51	62	173	162	1553	0	0	680	0
RTOR Reduction (vph)	0	0	0	0	0	49	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	51	62	124	162	1553	0	0	680	0
Turn Type				Split		Perm	pm+pt					
Protected Phases				8 16	8 16		5	5 6			6	
Permitted Phases						8 16	5 6	5 6				
Actuated Green, G (s)				18.5	18.5	18.5	66.5	71.5			29.4	
Effective Green, g (s)				19.5	19.5	19.5	68.5	72.5			30.4	
Actuated g/C Ratio				0.20	0.20	0.20	0.68	0.72			0.30	
Clearance Time (s)							5.0				5.0	
Vehicle Extension (s)							1.0				2.0	
Lane Grp Cap (vph)				345	690	309	800	3687			1076	
v/s Ratio Prot				0.03	0.02		0.08	c0.31			c0.19	
v/s Ratio Perm						c0.08	0.06					
v/c Ratio				0.15	0.09	0.40	0.20	0.42			0.63	
Uniform Delay, d1				33.4	33.0	35.1	6.6	5.4			30.0	
Progression Factor				0.93	0.93	0.91	0.19	0.14			1.00	
Incremental Delay, d2				0.0	0.0	0.2	0.0	0.0			2.8	
Delay (s)				31.2	30.7	32.2	1.3	0.8			32.8	
Level of Service				C	C	C	A	A			C	
Approach Delay (s)		0.0			31.7			0.8			32.8	
Approach LOS		A			C			A			C	

Intersection Summary			
HCM Average Control Delay	12.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97	0.95	1.00					0.91	1.00		0.95	
Frt	1.00	1.00	0.85					1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00		0.99	
Satd. Flow (prot)	3433	3539	1583					5085	1583		3503	
Flt Permitted	0.95	1.00	1.00					1.00	1.00		0.55	
Satd. Flow (perm)	3433	3539	1583					5085	1583		1947	
Volume (vph)	896	83	76	0	0	0	0	702	57	147	564	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	943	87	80	0	0	0	0	739	60	155	594	0
RTOR Reduction (vph)	0	0	47	0	0	0	0	0	49	0	0	0
Lane Group Flow (vph)	943	87	33	0	0	0	0	739	11	0	749	0
Turn Type	Split		Perm						Perm	pm+pt		
Protected Phases	4 12	4 12						2		1	1 2	
Permitted Phases			4 12						2	1 2	1 2	
Actuated Green, G (s)	40.2	40.2	40.2					17.6	17.6		44.8	
Effective Green, g (s)	41.2	41.2	41.2					18.6	18.6		46.8	
Actuated g/C Ratio	0.41	0.41	0.41					0.19	0.19		0.47	
Clearance Time (s)								5.0	5.0			
Vehicle Extension (s)								2.0	2.0			
Lane Grp Cap (vph)	1414	1458	652					946	294		1350	
v/s Ratio Prot	c0.27	0.02						c0.15			c0.16	
v/s Ratio Perm			0.02						0.01		0.10	
v/c Ratio	0.67	0.06	0.05					0.78	0.04		0.55	
Uniform Delay, d1	23.8	17.7	17.7					38.8	33.4		19.1	
Progression Factor	1.00	1.00	1.00					1.00	1.00		0.39	
Incremental Delay, d2	0.9	0.0	0.0					3.9	0.0		0.2	
Delay (s)	24.8	17.7	17.7					42.7	33.4		7.6	
Level of Service	C	B	B					D	C		A	
Approach Delay (s)		23.7			0.0			42.0			7.6	
Approach LOS		C			A			D			A	

Intersection Summary			
HCM Average Control Delay	24.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor					0.95	1.00	1.00	0.95			0.91	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					3534	1583	1770	3539			5085	1583
Flt Permitted					1.00	1.00	0.22	1.00			1.00	1.00
Satd. Flow (perm)					3534	1583	415	3539			5085	1583
Volume (vph)	0	0	0	21	684	112	317	1084	0	0	943	616
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	22	720	118	334	1141	0	0	993	648
RTOR Reduction (vph)	0	0	0	0	0	57	0	0	0	0	0	54
Lane Group Flow (vph)	0	0	0	0	742	61	334	1141	0	0	993	594
Turn Type				pm+pt		Perm	pm+pt					Perm
Protected Phases				3	7		5	5 6			6	
Permitted Phases				7		7	5 6	5 6				6
Actuated Green, G (s)					24.5	24.5	60.5	65.5			46.7	46.7
Effective Green, g (s)					25.5	25.5	62.5	66.5			47.7	47.7
Actuated g/C Ratio					0.26	0.26	0.62	0.66			0.48	0.48
Clearance Time (s)					5.0	5.0	5.0				5.0	5.0
Vehicle Extension (s)					2.0	2.0	1.0				2.0	2.0
Lane Grp Cap (vph)					901	404	460	2353			2426	755
v/s Ratio Prot					c0.21		c0.11	0.32			0.20	
v/s Ratio Perm						0.04	0.35					c0.37
v/c Ratio					0.82	0.15	0.73	0.48			0.41	0.79
Uniform Delay, d1					35.1	28.9	20.9	8.3			17.0	21.9
Progression Factor					0.91	0.82	1.12	0.68			0.72	0.69
Incremental Delay, d2					5.3	0.1	2.9	0.0			0.5	7.5
Delay (s)					37.2	23.9	26.2	5.6			12.8	22.7
Level of Service					D	C	C	A			B	C
Approach Delay (s)		0.0			35.4			10.3			16.7	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM Average Control Delay	18.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	104.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.91	0.91	1.00					0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1610	3356	1583					3539	1583	1770	3539	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.11	1.00	
Satd. Flow (perm)	1610	3356	1583					3539	1583	198	3539	
Volume (vph)	410	478	167	0	0	0	0	1025	7	283	809	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	432	503	176	0	0	0	0	1079	7	298	852	0
RTOR Reduction (vph)	0	0	114	0	0	0	0	0	3	0	0	0
Lane Group Flow (vph)	301	634	62	0	0	0	0	1079	4	298	852	0
Turn Type	Split		Perm						Perm	pm+pt		
Protected Phases	3	3						2		1	1 2	
Permitted Phases			3						2	1 2		
Actuated Green, G (s)	24.5	24.5	24.5					36.7	36.7	60.5	65.5	
Effective Green, g (s)	25.5	25.5	25.5					37.7	37.7	62.5	66.5	
Actuated g/C Ratio	0.26	0.26	0.26					0.38	0.38	0.62	0.66	
Clearance Time (s)	5.0	5.0	5.0					5.0	5.0	5.0		
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0	1.0		
Lane Grp Cap (vph)	411	856	404					1334	597	514	2353	
v/s Ratio Prot	0.19	c0.19						c0.30		c0.14	0.24	
v/s Ratio Perm			0.04						0.00	0.22		
v/c Ratio	0.73	0.74	0.15					0.81	0.01	0.58	0.36	
Uniform Delay, d1	34.1	34.2	28.9					27.9	19.5	26.0	7.4	
Progression Factor	0.92	0.92	0.79					1.00	1.00	0.73	0.15	
Incremental Delay, d2	5.7	3.0	0.1					5.4	0.0	0.9	0.0	
Delay (s)	37.0	34.4	22.9					33.3	19.5	20.0	1.2	
Level of Service	D	C	C					C	B	C	A	
Approach Delay (s)		33.3			0.0			33.2			6.0	
Approach LOS		C			A			C			A	

Intersection Summary			
HCM Average Control Delay	23.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	104.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539		1770	3539	1583		5085	1583	1770	5085	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539		1770	3539	1583		5085	1583	1770	5085	1583
Volume (vph)	57	189	0	244	225	148	0	1282	246	144	1239	73
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	60	199	0	257	237	156	0	1349	259	152	1304	77
RTOR Reduction (vph)	0	0	0	0	0	121	0	0	131	0	0	28
Lane Group Flow (vph)	60	199	0	257	237	35	0	1349	128	152	1304	49
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	7.9	14.4		25.7	32.2	32.2		73.3	73.3	16.6	94.9	94.9
Effective Green, g (s)	8.9	15.4		26.7	33.2	33.2		74.3	74.3	17.6	95.9	95.9
Actuated g/C Ratio	0.06	0.10		0.18	0.22	0.22		0.50	0.50	0.12	0.64	0.64
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	105	363		315	783	350		2519	784	208	3251	1012
v/s Ratio Prot	0.03	c0.06		c0.15	0.07			c0.27		c0.09	0.26	
v/s Ratio Perm						0.02			0.08			0.03
v/c Ratio	0.57	0.55		0.82	0.30	0.10		0.54	0.16	0.73	0.40	0.05
Uniform Delay, d1	68.7	64.0		59.3	48.7	46.5		26.0	20.8	63.9	13.1	10.1
Progression Factor	1.04	0.82		1.00	1.00	1.00		0.32	0.18	1.00	1.00	1.00
Incremental Delay, d2	7.3	1.7		14.9	0.2	0.1		0.5	0.3	12.4	0.4	0.1
Delay (s)	78.5	53.9		74.2	49.0	46.6		8.9	4.1	76.3	13.5	10.2
Level of Service	E	D		E	D	D		A	A	E	B	B
Approach Delay (s)		59.6			58.4			8.1			19.6	
Approach LOS		E			E			A			B	

Intersection Summary			
HCM Average Control Delay	23.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	15	343	213	6	392	31	248	671	11	30	659	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	361	224	6	413	33	261	706	12	32	694	11
RTOR Reduction (vph)	0	0	182	0	0	27	0	0	5	0	0	6
Lane Group Flow (vph)	16	361	42	6	413	6	261	706	7	32	694	5
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	3.1	21.7	21.7	1.4	20.0	20.0	22.4	70.9	70.9	6.0	54.5	54.5
Effective Green, g (s)	4.1	22.7	22.7	2.4	21.0	21.0	23.4	71.9	71.9	7.0	55.5	55.5
Actuated g/C Ratio	0.03	0.19	0.19	0.02	0.18	0.18	0.19	0.60	0.60	0.06	0.46	0.46
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	60	669	299	35	619	277	345	2120	948	103	1637	732
v/s Ratio Prot	c0.01	0.10		0.00	c0.12		c0.15	0.20		0.02	c0.20	
v/s Ratio Perm			0.03			0.00			0.00			0.00
v/c Ratio	0.27	0.54	0.14	0.17	0.67	0.02	0.76	0.33	0.01	0.31	0.42	0.01
Uniform Delay, d1	56.5	43.9	40.5	57.8	46.2	41.0	45.6	12.0	9.7	54.2	21.6	17.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.09	1.64	2.44	1.00	1.00	1.00
Incremental Delay, d2	2.4	0.8	0.2	2.3	2.7	0.0	5.6	0.3	0.0	1.7	0.8	0.0
Delay (s)	58.9	44.8	40.8	60.1	49.0	41.0	55.5	20.0	23.7	55.9	22.4	17.4
Level of Service	E	D	D	E	D	D	E	B	C	E	C	B
Approach Delay (s)		43.6			48.5			29.5			23.8	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	34.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00	0.91	0.91	
Frt		0.85	1.00	1.00	1.00	
Flt Protected		1.00	0.95	1.00	1.00	
Satd. Flow (prot)		1583	1770	5085	5085	
Flt Permitted		1.00	0.95	1.00	1.00	
Satd. Flow (perm)		1583	1770	5085	5085	
Volume (vph)	0	387	450	729	628	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	407	474	767	661	0
RTOR Reduction (vph)	0	29	0	0	0	0
Lane Group Flow (vph)	0	378	474	767	661	0
Turn Type		pm+ov	Prot			pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Actuated Green, G (s)		54.4	54.4	150.0	85.6	
Effective Green, g (s)		55.4	55.4	150.0	86.6	
Actuated g/C Ratio		0.37	0.37	1.00	0.58	
Clearance Time (s)		5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		585	654	5085	2936	
v/s Ratio Prot		0.24	c0.27	0.15	c0.13	
v/s Ratio Perm						
v/c Ratio		0.65	0.72	0.15	0.23	
Uniform Delay, d1		39.2	40.7	0.0	15.4	
Progression Factor		1.00	0.55	1.00	1.00	
Incremental Delay, d2		2.5	3.4	0.1	0.2	
Delay (s)		41.6	25.8	0.1	15.6	
Level of Service		D	C	A	B	
Approach Delay (s)	41.6			9.9	15.6	
Approach LOS	D			A	B	

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0			4.0	
Lane Util. Factor		0.95	1.00		0.95		1.00	0.95			0.95	
Frt		1.00	0.85		1.00		1.00	1.00			1.00	
Flt Protected		1.00	1.00		1.00		0.95	1.00			1.00	
Satd. Flow (prot)		3539	1583		3539		1770	3539			3539	
Flt Permitted		1.00	1.00		1.00		0.62	1.00			1.00	
Satd. Flow (perm)		3539	1583		3539		1153	3539			3539	
Volume (vph)	0	88	362	0	99	0	409	99	0	0	106	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	93	381	0	104	0	431	104	0	0	112	0
RTOR Reduction (vph)	0	0	328	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	93	53	0	104	0	431	104	0	0	112	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)		9.5	9.5		9.5		55.5	55.5			38.7	
Effective Green, g (s)		10.5	10.5		10.5		56.5	56.5			39.7	
Actuated g/C Ratio		0.14	0.14		0.14		0.75	0.75			0.53	
Clearance Time (s)		5.0	5.0		5.0		5.0	5.0			5.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		495	222		495		974	2666			1873	
v/s Ratio Prot		0.03			0.03		c0.08	0.03			0.03	
v/s Ratio Perm			c0.03				c0.26					
v/c Ratio		0.19	0.24		0.21		0.44	0.04			0.06	
Uniform Delay, d1		28.5	28.7		28.6		3.2	2.4			8.6	
Progression Factor		1.00	1.00		0.76		2.58	1.47			0.39	
Incremental Delay, d2		0.2	0.6		0.1		0.2	0.0			0.1	
Delay (s)		28.7	29.3		21.7		8.4	3.5			3.4	
Level of Service		C	C		C		A	A			A	
Approach Delay (s)		29.1			21.7			7.4			3.4	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	16.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	5085	1583	1770	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	5085	1583	1770	5085	1583
Volume (vph)	95	944	113	222	942	338	158	1478	289	300	1351	151
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	994	119	234	992	356	166	1556	304	316	1422	159
RTOR Reduction (vph)	0	0	89	0	0	218	0	0	162	0	0	92
Lane Group Flow (vph)	100	994	30	234	992	138	166	1556	142	316	1422	67
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.3	37.0	37.0	15.0	43.7	43.7	16.0	56.0	56.0	22.0	62.0	62.0
Effective Green, g (s)	9.3	38.0	38.0	16.0	44.7	44.7	17.0	57.0	57.0	23.0	63.0	63.0
Actuated g/C Ratio	0.06	0.25	0.25	0.11	0.30	0.30	0.11	0.38	0.38	0.15	0.42	0.42
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	110	897	401	189	1055	472	201	1932	602	271	2136	665
v/s Ratio Prot	0.06	c0.28		c0.13	0.28		0.09	c0.31		c0.18	0.28	
v/s Ratio Perm			0.02			0.09			0.09			0.04
v/c Ratio	0.91	1.11	0.08	1.24	0.94	0.29	0.83	0.81	0.24	1.17	0.67	0.10
Uniform Delay, d1	69.9	56.0	42.6	67.0	51.3	40.5	65.1	41.5	31.7	63.5	35.0	26.3
Progression Factor	0.97	0.96	0.94	1.00	1.00	1.00	0.93	0.91	1.50	0.94	1.04	2.56
Incremental Delay, d2	57.3	64.2	0.1	144.0	15.4	0.3	11.4	1.6	0.4	105.7	1.6	0.3
Delay (s)	125.0	118.1	40.3	211.0	66.8	40.8	71.9	39.4	47.8	165.7	37.8	67.6
Level of Service	F	F	D	F	E	D	E	D	D	F	D	E
Approach Delay (s)		111.0			82.3			43.3			61.6	
Approach LOS		F			F			D			E	

Intersection Summary			
HCM Average Control Delay	69.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	103	1067	390	160	1063	285	445	994	213	216	916	99
Peak-hour factor, PHF	0.95	0.96	0.95	0.95	0.96	0.95	0.95	0.96	0.95	0.95	0.96	0.95
Adj. Flow (vph)	108	1111	411	168	1107	300	468	1035	224	227	954	104
RTOR Reduction (vph)	0	0	295	0	0	208	0	0	124	0	0	78
Lane Group Flow (vph)	108	1111	116	168	1107	93	468	1035	100	227	954	26
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	7.0	33.0	33.0	10.0	36.0	36.0	28.0	39.0	39.0	18.0	29.0	29.0
Effective Green, g (s)	8.0	34.0	34.0	11.0	37.0	37.0	29.0	40.0	40.0	19.0	30.0	30.0
Actuated g/C Ratio	0.07	0.28	0.28	0.09	0.31	0.31	0.24	0.33	0.33	0.16	0.25	0.25
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	118	1003	449	162	1091	488	428	1180	528	280	885	396
v/s Ratio Prot	0.06	c0.31		c0.09	c0.31		c0.26	0.29		0.13	c0.27	
v/s Ratio Perm			0.07			0.06			0.06			0.02
v/c Ratio	0.92	1.11	0.26	1.04	1.01	0.19	1.09	0.88	0.19	0.81	1.08	0.07
Uniform Delay, d1	55.7	43.0	33.3	54.5	41.5	30.5	45.5	37.7	28.5	48.8	45.0	34.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.58	0.60	0.59	1.10	1.14	1.92
Incremental Delay, d2	56.7	62.7	0.3	80.8	30.9	0.2	59.7	5.1	0.4	15.7	53.1	0.3
Delay (s)	112.4	105.7	33.6	135.3	72.4	30.7	86.1	27.7	17.2	69.4	104.6	66.2
Level of Service	F	F	C	F	E	C	F	C	B	E	F	E
Approach Delay (s)		88.0			71.2			42.2			95.2	
Approach LOS		F			E			D			F	

Intersection Summary			
HCM Average Control Delay	72.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	101.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	5085	1583	1770	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	3433	5085	1583	1770	5085	1583
Volume (vph)	69	683	719	181	701	90	766	1413	214	17	1250	81
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	73	719	757	191	738	95	806	1487	225	18	1316	85
RTOR Reduction (vph)	0	0	341	0	0	67	0	0	112	0	0	62
Lane Group Flow (vph)	73	719	416	191	738	28	806	1487	113	18	1316	23
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	9.9	38.0	38.0	15.0	43.1	43.1	37.1	74.6	74.6	2.4	39.9	39.9
Effective Green, g (s)	10.9	39.0	39.0	16.0	44.1	44.1	38.1	75.6	75.6	3.4	40.9	40.9
Actuated g/C Ratio	0.07	0.26	0.26	0.11	0.29	0.29	0.25	0.50	0.50	0.02	0.27	0.27
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	129	920	412	189	1040	465	872	2563	798	40	1387	432
v/s Ratio Prot	0.04	0.20		c0.11	0.21		c0.23	0.29		0.01	c0.26	
v/s Ratio Perm			c0.26			0.02			0.07			0.01
v/c Ratio	0.57	0.78	1.01	1.01	0.71	0.06	0.92	0.58	0.14	0.45	0.95	0.05
Uniform Delay, d1	67.3	51.5	55.5	67.0	47.2	38.1	54.5	26.1	19.9	72.4	53.5	40.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.93	0.90	0.98	0.88	0.97	0.76
Incremental Delay, d2	5.6	4.4	46.7	68.2	2.2	0.1	11.7	0.7	0.3	7.6	14.4	0.2
Delay (s)	72.8	55.9	102.2	135.2	49.5	38.1	62.6	24.2	19.8	71.6	66.1	30.7
Level of Service	E	E	F	F	D	D	E	C	B	E	E	C
Approach Delay (s)		79.3			64.4			36.1			64.1	
Approach LOS		E			E			D			E	

Intersection Summary			
HCM Average Control Delay	56.9	HCM Level of Service	E
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	0.95						0.95	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						1.00	1.00
Satd. Flow (prot)		3539	1583	1770	3539						3539	1583
Flt Permitted		1.00	1.00	0.18	1.00						1.00	1.00
Satd. Flow (perm)		3539	1583	339	3539						3539	1583
Volume (vph)	0	711	212	302	278	0	0	0	0	0	133	768
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	748	223	318	293	0	0	0	0	0	140	808
RTOR Reduction (vph)	0	0	168	0	0	0	0	0	0	0	0	387
Lane Group Flow (vph)	0	748	55	318	293	0	0	0	0	0	140	421
Turn Type			Perm	pm+pt						Split		Perm
Protected Phases		6		5	5 6					8 16	8 16	
Permitted Phases		6	6	5 6	5 6							8 16
Actuated Green, G (s)		21.0	21.0	47.1	52.1						27.9	27.9
Effective Green, g (s)		22.0	22.0	49.1	53.1						28.9	28.9
Actuated g/C Ratio		0.24	0.24	0.55	0.59						0.32	0.32
Clearance Time (s)		5.0	5.0	5.0								
Vehicle Extension (s)		3.0	3.0	3.0								
Lane Grp Cap (vph)		865	387	616	2088						1136	508
v/s Ratio Prot		c0.21		c0.16	0.08						0.04	
v/s Ratio Perm			0.03	0.13								c0.27
v/c Ratio		0.86	0.14	0.52	0.14						0.12	0.83
Uniform Delay, d1		32.6	26.6	13.1	8.2						21.6	28.3
Progression Factor		1.00	1.00	0.67	0.02						1.00	1.00
Incremental Delay, d2		11.2	0.8	0.4	0.0						0.0	10.7
Delay (s)		43.8	27.4	9.2	0.2						21.6	39.0
Level of Service		D	C	A	A						C	D
Approach Delay (s)		40.0			4.9			0.0			36.4	
Approach LOS		D			A			A			D	

Intersection Summary			
HCM Average Control Delay	30.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	106.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0				
Lane Util. Factor		0.95			0.95		1.00	0.95				
Frt		1.00			1.00		1.00	1.00				
Flt Protected		1.00			1.00		0.95	1.00				
Satd. Flow (prot)		3539			3539		1770	3539				
Flt Permitted		1.00			1.00		0.95	1.00				
Satd. Flow (perm)		3539			3539		1770	3539				
Volume (vph)	0	711	0	0	19	0	561	214	0	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	748	0	0	20	0	591	225	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	748	0	0	20	0	591	225	0	0	0	0
Turn Type	pm+pt					Perm	Split					
Protected Phases	1	1 2			2		4 12	4 12				
Permitted Phases	1 2					2						
Actuated Green, G (s)		44.1			6.0		35.9	35.9				
Effective Green, g (s)		45.1			7.0		36.9	36.9				
Actuated g/C Ratio		0.50			0.08		0.41	0.41				
Clearance Time (s)					5.0							
Vehicle Extension (s)					3.0							
Lane Grp Cap (vph)		1773			275		726	1451				
v/s Ratio Prot		c0.21			0.01		c0.33	0.06				
v/s Ratio Perm												
v/c Ratio		0.42			0.07		0.81	0.16				
Uniform Delay, d1		14.2			38.5		23.5	16.7				
Progression Factor		0.38			1.00		1.00	1.00				
Incremental Delay, d2		0.1			0.1		7.0	0.1				
Delay (s)		5.5			38.6		30.5	16.8				
Level of Service		A			D		C	B				
Approach Delay (s)		5.5			38.6			26.7			0.0	
Approach LOS		A			D			C			A	

Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	106.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	35	670	327	65	728	575	382	2009	96	488	1710	57
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	705	344	68	766	605	402	2115	101	514	1800	60
RTOR Reduction (vph)	0	0	182	0	0	182	0	0	52	0	0	31
Lane Group Flow (vph)	37	705	162	68	766	423	402	2115	49	514	1800	29
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	3.2	32.5	32.5	5.0	34.3	34.3	20.0	72.5	72.5	20.0	72.5	72.5
Effective Green, g (s)	4.2	33.5	33.5	6.0	35.3	35.3	21.0	73.5	73.5	21.0	73.5	73.5
Actuated g/C Ratio	0.03	0.22	0.22	0.04	0.24	0.24	0.14	0.49	0.49	0.14	0.49	0.49
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	50	790	354	71	833	373	481	2492	776	481	2492	776
v/s Ratio Prot	0.02	c0.20		0.04	0.22		0.12	c0.42		c0.15	0.35	
v/s Ratio Perm			0.10			c0.27			0.03			0.02
v/c Ratio	0.74	0.89	0.46	0.96	0.92	1.13	0.84	0.85	0.06	1.07	0.72	0.04
Uniform Delay, d1	72.4	56.5	50.4	71.9	56.0	57.4	62.8	33.4	20.1	64.5	30.2	19.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.79	0.70	1.04	0.84	0.52	0.24
Incremental Delay, d2	42.8	12.2	0.9	91.2	15.0	88.2	8.5	2.7	0.1	57.6	1.6	0.1
Delay (s)	114.8	68.5	51.6	163.1	70.9	145.6	58.2	26.2	21.0	111.6	17.4	4.8
Level of Service	F	E	D	F	E	F	E	C	C	F	B	A
Approach Delay (s)		64.7			106.7			30.9			37.5	
Approach LOS		E			F			C			D	

Intersection Summary			
HCM Average Control Delay	52.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3539	1583	1770	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		3539	1583	1770	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	0	657	646	117	748	339	650	1534	138	327	1305	82
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	692	680	123	787	357	684	1615	145	344	1374	86
RTOR Reduction (vph)	0	0	12	0	0	82	0	0	74	0	0	52
Lane Group Flow (vph)	0	692	668	123	787	275	684	1615	71	344	1374	34
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		Perm	Prot		Perm
Protected Phases	7	4	5	3	8	1	5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)		23.0	47.0	7.0	35.0	47.0	24.0	58.0	58.0	12.0	46.0	46.0
Effective Green, g (s)		24.0	49.0	8.0	36.0	49.0	25.0	59.0	59.0	13.0	47.0	47.0
Actuated g/C Ratio		0.20	0.41	0.07	0.30	0.41	0.21	0.49	0.49	0.11	0.39	0.39
Clearance Time (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		708	646	118	1062	699	715	1740	778	372	1386	620
v/s Ratio Prot		0.20	c0.22	c0.07	0.22	0.04	0.20	0.46		0.10	c0.39	
v/s Ratio Perm			0.21			0.13			0.05			0.02
v/c Ratio		0.98	1.03	1.04	0.74	0.39	0.96	0.93	0.09	0.92	0.99	0.05
Uniform Delay, d1		47.7	35.5	56.0	37.8	25.0	47.0	28.5	16.2	53.0	36.3	22.7
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.47	0.41	0.23	0.69	1.29	2.86
Incremental Delay, d2		27.9	44.6	94.7	2.8	0.4	17.1	6.9	0.1	19.3	16.5	0.1
Delay (s)		75.7	80.1	150.7	40.6	25.4	86.0	18.7	3.8	55.7	63.5	64.9
Level of Service		E	F	F	D	C	F	B	A	E	E	E
Approach Delay (s)		77.8			47.0			36.6			62.1	
Approach LOS		E			D			D			E	

Intersection Summary			
HCM Average Control Delay	53.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	92.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.97	0.91	0.91	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	3433	5085	5085	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	3433	5085	5085	1583
Volume (vph)	197	775	898	2373	2017	196
Peak-hour factor, PHF	0.95	0.95	0.98	0.95	0.95	0.95
Adj. Flow (vph)	207	816	916	2498	2123	206
RTOR Reduction (vph)	0	333	0	0	0	108
Lane Group Flow (vph)	207	483	916	2498	2123	98
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	37.0	37.0	40.0	103.0	58.0	58.0
Effective Green, g (s)	38.0	38.0	41.0	104.0	59.0	59.0
Actuated g/C Ratio	0.25	0.25	0.27	0.69	0.39	0.39
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	448	401	938	3526	2000	623
v/s Ratio Prot	0.12		c0.27	0.49	c0.42	
v/s Ratio Perm		c0.31				0.06
v/c Ratio	0.46	1.20	0.98	0.71	1.06	0.16
Uniform Delay, d1	47.4	56.0	54.0	13.9	45.5	29.4
Progression Factor	1.00	1.00	1.29	0.94	0.39	0.12
Incremental Delay, d2	0.8	113.5	16.8	0.7	32.6	0.2
Delay (s)	48.1	169.5	86.5	13.8	50.5	3.6
Level of Service	D	F	F	B	D	A
Approach Delay (s)	144.9			33.3	46.4	
Approach LOS	F			C	D	

Intersection Summary			
HCM Average Control Delay	54.7	HCM Level of Service	D
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3539	1583	1770	3539	1583	1770	5085	1583	1770	5085	
Flt Permitted		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		3539	1583	1770	3539	1583	1770	5085	1583	1770	5085	
Volume (vph)	0	88	82	39	97	62	103	2552	40	73	2300	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	93	86	41	102	65	108	2686	42	77	2421	0
RTOR Reduction (vph)	0	0	80	0	0	55	0	0	12	0	0	0
Lane Group Flow (vph)	0	93	6	41	102	10	108	2686	30	77	2421	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)		9.3	9.3	7.7	22.0	22.0	15.0	107.0	107.0	6.0	98.0	
Effective Green, g (s)		10.3	10.3	8.7	23.0	23.0	16.0	108.0	108.0	7.0	99.0	
Actuated g/C Ratio		0.07	0.07	0.06	0.15	0.15	0.11	0.72	0.72	0.05	0.66	
Clearance Time (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		243	109	103	543	243	189	3661	1140	83	3356	
v/s Ratio Prot		c0.03		c0.02	0.03		0.06	c0.53		0.04	c0.48	
v/s Ratio Perm			0.00			0.01			0.02			
v/c Ratio		0.38	0.05	0.40	0.19	0.04	0.57	0.73	0.03	0.93	0.72	
Uniform Delay, d1		66.8	65.3	68.1	55.4	54.1	63.7	12.5	6.0	71.2	16.5	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.72	0.50	
Incremental Delay, d2		1.0	0.2	2.5	0.2	0.1	3.0	1.0	0.0	63.6	1.1	
Delay (s)		67.8	65.5	70.6	55.5	54.2	66.8	13.4	6.0	115.0	9.3	
Level of Service		E	E	E	E	D	E	B	A	F	A	
Approach Delay (s)		66.7			58.1			15.4			12.5	
Approach LOS		E			E			B			B	

Intersection Summary			
HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	
Flt Permitted		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	
Volume (vph)	0	184	62	56	182	415	60	1534	142	379	1295	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	194	65	59	192	437	63	1615	149	399	1363	0
RTOR Reduction (vph)	0	0	58	0	0	316	0	0	79	0	0	0
Lane Group Flow (vph)	0	194	7	59	192	121	63	1615	70	399	1363	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)		11.7	11.7	5.9	22.6	22.6	4.0	55.0	55.0	27.4	78.4	
Effective Green, g (s)		12.7	12.7	6.9	23.6	23.6	5.0	56.0	56.0	28.4	79.4	
Actuated g/C Ratio		0.11	0.11	0.06	0.20	0.20	0.04	0.47	0.47	0.24	0.66	
Clearance Time (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		375	168	102	696	311	74	1652	739	419	2342	
v/s Ratio Prot		c0.05		c0.03	0.05		0.04	c0.46		c0.23	0.39	
v/s Ratio Perm			0.00			0.08			0.04			
v/c Ratio		0.52	0.04	0.58	0.28	0.39	0.85	0.98	0.09	0.95	0.58	
Uniform Delay, d1		50.8	48.2	55.1	40.9	41.9	57.1	31.4	17.9	45.1	11.2	
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.77	0.59	0.43	1.14	0.94	
Incremental Delay, d2		1.2	0.1	7.7	0.2	0.8	8.5	3.2	0.0	5.6	0.1	
Delay (s)		52.0	48.3	62.9	41.2	42.7	52.6	21.8	7.8	57.1	10.6	
Level of Service		D	D	E	D	D	D	C	A	E	B	
Approach Delay (s)		51.0			44.0			21.7			21.1	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	26.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	
Frt	1.00	0.85	1.00	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	5085	5085	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1583	1770	5085	5085	
Volume (vph)	43	70	82	3427	2911	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	45	74	86	3607	3064	0
RTOR Reduction (vph)	0	69	0	0	0	0
Lane Group Flow (vph)	45	5	86	3607	3064	0
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	9.1	9.1	12.6	130.9	113.3	
Effective Green, g (s)	10.1	10.1	13.6	131.9	114.3	
Actuated g/C Ratio	0.07	0.07	0.09	0.88	0.76	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	119	107	160	4471	3875	
v/s Ratio Prot	c0.03		0.05	c0.71	0.60	
v/s Ratio Perm		0.00				
v/c Ratio	0.38	0.05	0.54	0.81	0.79	
Uniform Delay, d1	66.9	65.4	65.2	3.8	10.7	
Progression Factor	1.00	1.00	1.33	1.54	0.92	
Incremental Delay, d2	2.0	0.2	3.2	1.6	0.2	
Delay (s)	69.0	65.6	89.9	7.3	10.0	
Level of Service	E	E	F	A	A	
Approach Delay (s)	66.9			9.2	10.0	
Approach LOS	E			A	A	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor				1.00	0.95	1.00	1.00	0.91			0.91	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1770	3539	1583	1770	5085			5085	1583
Flt Permitted				0.95	1.00	1.00	0.08	1.00			1.00	1.00
Satd. Flow (perm)				1770	3539	1583	146	5085			5085	1583
Volume (vph)	0	0	0	195	404	48	196	2196	0	0	1667	387
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	205	425	51	206	2312	0	0	1755	407
RTOR Reduction (vph)	0	0	0	0	0	9	0	0	0	0	0	197
Lane Group Flow (vph)	0	0	0	205	425	42	206	2312	0	0	1755	210
Turn Type				custom		Perm	pm+pt					Perm
Protected Phases				8 16	8 16		5	5 6			6	
Permitted Phases				8 16		8 16	5 6	5 6				6
Actuated Green, G (s)				28.8	28.8	28.8	106.2	111.2			50.0	50.0
Effective Green, g (s)				29.8	29.8	29.8	108.2	112.2			51.0	51.0
Actuated g/C Ratio				0.20	0.20	0.20	0.72	0.75			0.34	0.34
Clearance Time (s)							5.0				5.0	5.0
Vehicle Extension (s)							3.0				3.0	3.0
Lane Grp Cap (vph)				352	703	314	725	3804			1729	538
v/s Ratio Prot				0.12	c0.12		0.11	c0.45			c0.35	
v/s Ratio Perm						0.03	0.10					0.13
v/c Ratio				0.58	0.60	0.13	0.28	0.61			1.02	0.39
Uniform Delay, d1				54.5	54.7	49.5	20.0	8.7			49.5	37.7
Progression Factor				1.00	1.00	1.00	0.29	0.68			1.19	1.89
Incremental Delay, d2				2.4	1.5	0.2	0.1	0.1			20.6	1.3
Delay (s)				56.9	56.2	49.7	5.8	6.0			79.5	72.4
Level of Service				E	E	D	A	A			E	E
Approach Delay (s)		0.0			55.9			6.0			78.2	
Approach LOS		A			E			A			E	

Intersection Summary			
HCM Average Control Delay	41.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0		4.0	
Lane Util. Factor	0.91	0.91	1.00					0.91	1.00		0.91	
Frt	1.00	1.00	0.85					1.00	0.85		1.00	
Flt Protected	0.95	0.97	1.00					1.00	1.00		1.00	
Satd. Flow (prot)	1610	3276	1583					5085	1583		5085	
Flt Permitted	0.95	0.97	1.00					1.00	1.00		1.00	
Satd. Flow (perm)	1610	3276	1583					5085	1583		5085	
Volume (vph)	761	166	125	0	0	0	0	1611	609	0	1861	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	801	175	132	0	0	0	0	1696	641	0	1959	0
RTOR Reduction (vph)	0	0	17	0	0	0	0	0	432	0	0	0
Lane Group Flow (vph)	401	575	115	0	0	0	0	1696	209	0	1959	0
Turn Type	Split		Perm						Perm	pm+pt		
Protected Phases	4 12	4 12						2		1	1 2	
Permitted Phases			4 12						2	1 2	1 2	
Actuated Green, G (s)	38.0	38.0	38.0					48.0	48.0		102.0	
Effective Green, g (s)	39.0	39.0	39.0					49.0	49.0		103.0	
Actuated g/C Ratio	0.26	0.26	0.26					0.33	0.33		0.69	
Clearance Time (s)								5.0	5.0			
Vehicle Extension (s)								3.0	3.0			
Lane Grp Cap (vph)	419	852	412					1661	517		3492	
v/s Ratio Prot	c0.25	0.18						c0.33			c0.39	
v/s Ratio Perm			0.07						0.13			
v/c Ratio	0.96	0.92dl	0.28					1.02	0.41		0.56	
Uniform Delay, d1	54.7	49.8	44.3					50.5	39.2		12.0	
Progression Factor	1.00	1.00	1.00					1.00	1.00		1.47	
Incremental Delay, d2	32.7	2.1	0.4					27.6	2.3		0.1	
Delay (s)	87.4	51.9	44.7					78.1	41.5		17.7	
Level of Service	F	D	D					E	D		B	
Approach Delay (s)		63.9			0.0			68.0			17.7	
Approach LOS		E			A			E			B	

Intersection Summary			
HCM Average Control Delay	48.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor				1.00	0.95	1.00	1.00	0.91			0.95	
Frt				1.00	1.00	0.85	1.00	1.00			1.00	
Flt Protected				0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)				1770	3539	1583	1770	5085			3539	
Flt Permitted				0.95	1.00	1.00	0.22	1.00			1.00	
Satd. Flow (perm)				1770	3539	1583	414	5085			3539	
Volume (vph)	0	0	0	68	65	248	189	3237	0	0	683	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	72	68	261	199	3407	0	0	719	0
RTOR Reduction (vph)	0	0	0	0	0	2	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	72	68	259	199	3407	0	0	719	0
Turn Type				Perm		Perm	pm+pt					
Protected Phases					8 16		5	5 6			6	
Permitted Phases				8 16		8 16	5 6	5 6				
Actuated Green, G (s)				30.8	30.8	30.8	114.2	119.2			17.0	
Effective Green, g (s)				31.8	31.8	31.8	116.2	120.2			18.0	
Actuated g/C Ratio				0.20	0.20	0.20	0.73	0.75			0.11	
Clearance Time (s)							5.0				5.0	
Vehicle Extension (s)							1.0				2.0	
Lane Grp Cap (vph)				352	703	315	1133	3820			398	
v/s Ratio Prot					0.02		0.11	c0.67			c0.20	
v/s Ratio Perm				0.04		c0.16	0.02					
v/c Ratio				0.20	0.10	0.82	0.18	0.89			1.81	
Uniform Delay, d1				53.5	52.4	61.4	13.4	15.0			71.0	
Progression Factor				1.00	1.00	1.00	0.34	0.57			1.00	
Incremental Delay, d2				0.1	0.0	15.1	0.0	0.3			372.8	
Delay (s)				53.6	52.4	76.5	4.5	8.9			443.8	
Level of Service				D	D	E	A	A			F	
Approach Delay (s)		0.0			68.3			8.7			443.8	
Approach LOS		A			E			A			F	

Intersection Summary			
HCM Average Control Delay	80.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97	0.95	1.00					0.91	1.00		0.95	
Frt	1.00	1.00	0.85					1.00	0.85		1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00		0.99	
Satd. Flow (prot)	3433	3539	1583					5085	1583		3512	
Flt Permitted	0.95	1.00	1.00					1.00	1.00		0.51	
Satd. Flow (perm)	3433	3539	1583					5085	1583		1802	
Volume (vph)	2003	177	239	0	0	0	0	1401	100	118	647	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	2108	186	252	0	0	0	0	1475	105	124	681	0
RTOR Reduction (vph)	0	0	71	0	0	0	0	0	73	0	0	0
Lane Group Flow (vph)	2108	186	181	0	0	0	0	1475	32	0	805	0
Turn Type	Split		Perm						Perm	pm+pt		
Protected Phases	4 12	4 12						2		1	1 2	
Permitted Phases			4 12						2	1 2	1 2	
Actuated Green, G (s)	83.0	83.0	83.0					48.0	48.0		62.0	
Effective Green, g (s)	84.0	84.0	84.0					49.0	49.0		64.0	
Actuated g/C Ratio	0.52	0.52	0.52					0.31	0.31		0.40	
Clearance Time (s)								5.0	5.0			
Vehicle Extension (s)								2.0	2.0			
Lane Grp Cap (vph)	1802	1858	831					1557	485		881	
v/s Ratio Prot	c0.61	0.05						c0.29			c0.09	
v/s Ratio Perm			0.11						0.02		0.28	
v/c Ratio	1.17	0.10	0.22					0.95	0.07		0.91	
Uniform Delay, d1	38.0	19.1	20.4					54.2	39.3		45.4	
Progression Factor	1.00	1.00	1.00					1.00	1.00		0.54	
Incremental Delay, d2	82.8	0.0	0.0					13.3	0.3		1.6	
Delay (s)	120.8	19.1	20.4					67.6	39.6		26.1	
Level of Service	F	B	C					E	D		C	
Approach Delay (s)		103.4			0.0			65.7			26.1	
Approach LOS		F			A			E			C	

Intersection Summary			
HCM Average Control Delay	78.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	115.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0		4.0	4.0			4.0	4.0
Lane Util. Factor					0.91		1.00	0.95			0.91	1.00
Frt					0.96		1.00	1.00			1.00	0.85
Flt Protected					0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)					4859		1770	3539			5085	1583
Flt Permitted					0.99		0.17	1.00			1.00	1.00
Satd. Flow (perm)					4859		326	3539			5085	1583
Volume (vph)	0	0	0	117	498	207	172	2273	0	0	1063	811
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	123	524	218	181	2393	0	0	1119	854
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	105
Lane Group Flow (vph)	0	0	0	0	862	0	181	2393	0	0	1119	749
Turn Type				pm+pt			pm+pt					Perm
Protected Phases				3	7		5	5 6			6	
Permitted Phases				7			5 6	5 6				6
Actuated Green, G (s)					36.2		68.8	73.8			53.8	53.8
Effective Green, g (s)					37.2		70.8	74.8			54.8	54.8
Actuated g/C Ratio					0.31		0.59	0.62			0.46	0.46
Clearance Time (s)					5.0		5.0				5.0	5.0
Vehicle Extension (s)					2.0		1.0				2.0	2.0
Lane Grp Cap (vph)					1506		385	2206			2322	723
v/s Ratio Prot					c0.18		0.06	c0.68			0.22	
v/s Ratio Perm							0.21					0.47
v/c Ratio					0.57		0.47	1.08			0.48	1.04
Uniform Delay, d1					34.7		28.1	22.6			22.7	32.6
Progression Factor					1.00		0.82	0.88			0.95	0.85
Incremental Delay, d2					0.3		0.0	39.1			0.7	41.9
Delay (s)					35.1		23.0	58.8			22.1	69.6
Level of Service					D		C	E			C	E
Approach Delay (s)		0.0			35.1			56.3			42.7	
Approach LOS		A			D			E			D	

Intersection Summary			
HCM Average Control Delay	48.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	145.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.91	0.91	1.00					0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1610	3336	1583					3539	1583	1770	3539	
Flt Permitted	0.95	0.98	1.00					1.00	1.00	0.08	1.00	
Satd. Flow (perm)	1610	3336	1583					3539	1583	147	3539	
Volume (vph)	729	610	450	0	0	0	0	1749	7	260	967	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	767	642	474	0	0	0	0	1841	7	274	1018	0
RTOR Reduction (vph)	0	0	85	0	0	0	0	0	2	0	0	0
Lane Group Flow (vph)	454	955	389	0	0	0	0	1841	5	274	1018	0
Turn Type	Perm		Perm						Perm	pm+pt		
Protected Phases		3						2		1	1 2	
Permitted Phases	3		3						2	1 2		
Actuated Green, G (s)	36.2	36.2	36.2					49.8	49.8	68.8	73.8	
Effective Green, g (s)	37.2	37.2	37.2					50.8	50.8	70.8	74.8	
Actuated g/C Ratio	0.31	0.31	0.31					0.42	0.42	0.59	0.62	
Clearance Time (s)	5.0	5.0	5.0					5.0	5.0	5.0		
Vehicle Extension (s)	2.0	2.0	2.0					2.0	2.0	1.0		
Lane Grp Cap (vph)	499	1034	491					1498	670	357	2206	
v/s Ratio Prot								c0.52		c0.13	c0.29	
v/s Ratio Perm	0.28	0.29	0.25						0.00	0.33		
v/c Ratio	0.91	0.92	0.79					1.23	0.01	0.77	0.46	
Uniform Delay, d1	39.8	40.0	37.9					34.6	20.0	49.3	12.0	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.81	0.27	
Incremental Delay, d2	20.0	13.1	8.0					109.1	0.0	7.8	0.1	
Delay (s)	59.8	53.1	45.9					143.7	20.0	47.7	3.2	
Level of Service	E	D	D					F	C	D	A	
Approach Delay (s)		52.9			0.0			143.3			12.7	
Approach LOS		D			A			F			B	

Intersection Summary			
HCM Average Control Delay	75.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	145.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

5. Internal Capture Worksheet

ITE MULTI-USE PROJECT INTERNAL CAPTURE WORKSHEET

(Source: Chapter 7, ITE *Trip Generation Handbook*, June 2004)

Project Number: 068200009
Project Name: Hunt Communities LLC TIA
Scenario: TGZ 1
Analysis Period: Daily
Analyst: TWH

Land Use A: Residential

ITE Land Use Code 210
Size:

	Total	Internal	External
Enter	7,254	938	6,316
Exit	7,254	763	6,491
Total	14,508	1,701	12,807
%	100%	**11.7%**	88.3%

Enter from External: 6,316
Exit to External: 6,491

Land Use B: Office

ITE Land Use Code 710
Size:

	Total	Internal	External
Enter	248	37	211
Exit	248	60	188
Total	496	97	399
%	100%	**19.6%**	80.4%

Enter from External: 211
Exit to External: 188

Land Use C: Retail

ITE Land Use Code 820
Size:

	Total	Internal	External
Enter	8483	818	7665
Exit	8483	970	7513
Total	16966	1788	15178
%	100%	**10.5%**	89.5%

Enter from External: 7,665
Exit to External: 7,513

Land Use D: Residential

ITE Land Use Code
Size:

	Total	Internal	External
Enter	0	0	0
Exit	0	0	0
Total	0	0	0
%			

Enter from External: 0
Exit to External: 0

Demand	0.0%	0	
Balanced	0		
Demand	0.0%	0	
	3.0%	218	Demand
	5	Balanced	
	2.0%	5	Demand
Demand	3.0%	0	
	0	Balanced	
	2.0%	5	Demand
	15.0%	37	Demand
	37	Balanced	
	3.0%	254	Demand
Demand	22.0%	55	
Balanced	55		
Demand	4.0%	339	
Demand	38.0%	2757	
Balanced	763		
Demand	9.0%	763	
Demand	33.0%	2394	
Balanced	933		
Demand	11.0%	933	Demand
	0.0%	0	Demand
	0	Balanced	
	0.0%	0	Demand
Demand	0.0%	0	
Balanced	0		
Demand	0.0%	0	
Demand	0.0%	0	
Balanced	0		
Demand	0.0%	0	
Demand	38.0%	0	
Balanced	0		
Demand	9.0%	763	
	33.0%	0	Demand
	0	Balanced	
	11.0%	933	Demand

NET EXTERNAL TRIPS FOR MULTI-USE DEVELOPMENT

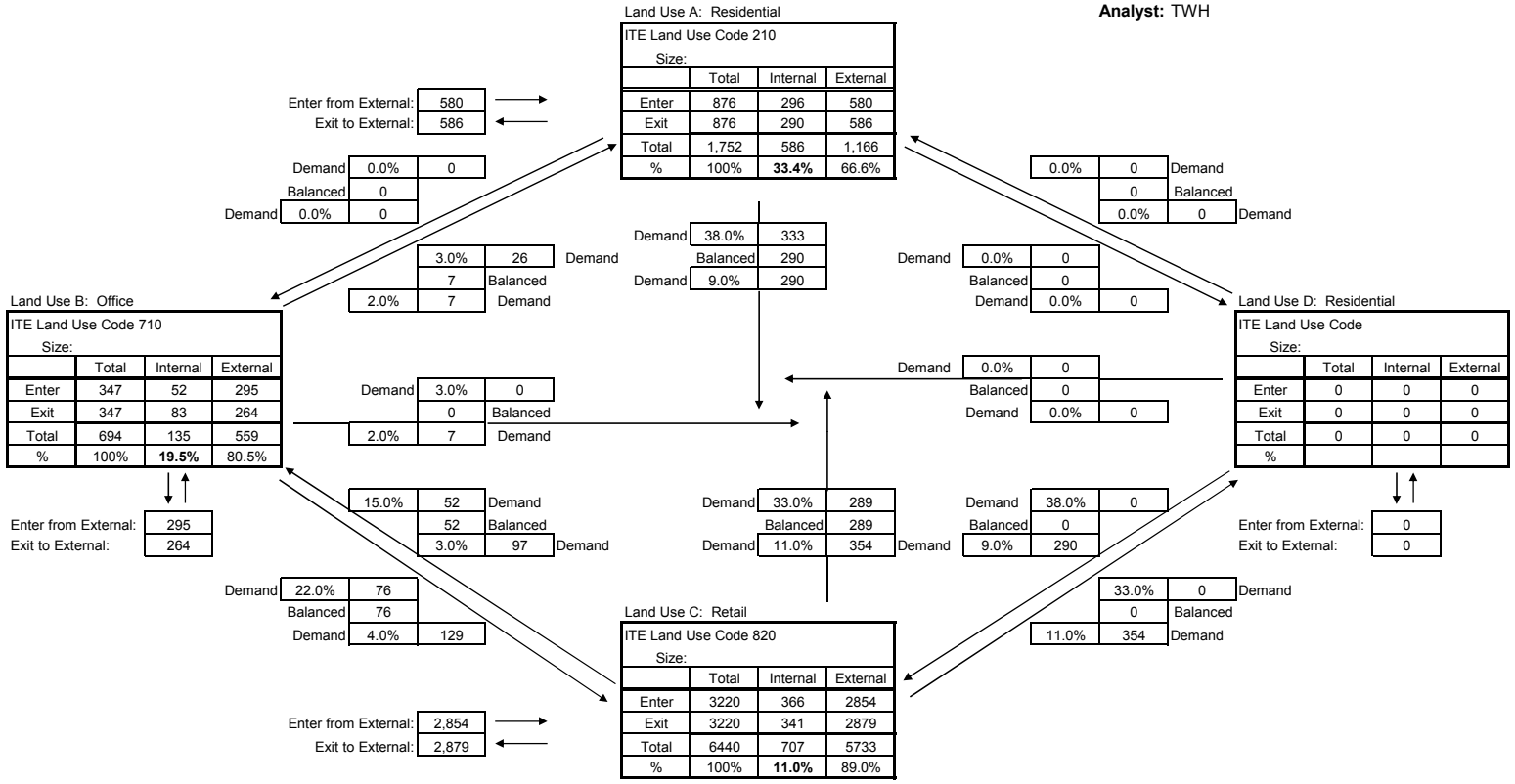
Category	Land Use A	Land Use B	Land Use C	Land Use D	Total
Enter	6,316	211	7,665	0	14,192
Exit	6,491	188	7,513	0	14,192
Total	12,807	399	15,178	0	**28,384**
Single Use Trip Gen Estimate	14,508	496	16,966	0	**31,970**

Overall Internal Capture = **11.22%**

ITE MULTI-USE PROJECT INTERNAL CAPTURE WORKSHEET

(Source: Chapter 7, ITE *Trip Generation Handbook*, June 2004)

Project Number: 068200009
Project Name: Hunt Communities LLC TIA
Scenario: TGZ 2
Analysis Period: Daily
Analyst: TWH



NET EXTERNAL TRIPS FOR MULTI-USE DEVELOPMENT

Category	Land Use A	Land Use B	Land Use C	Land Use D	Total
Enter	580	295	2,854	0	3,729
Exit	586	264	2,879	0	3,729
Total	1,166	559	5,733	0	**7,458**
Single Use Trip Gen Estimate	1,752	694	6,440	0	**8,886**

Overall Internal Capture = 16.07%

ITE MULTI-USE PROJECT INTERNAL CAPTURE WORKSHEET

(Source: Chapter 7, ITE *Trip Generation Handbook*, June 2004)

Project Number: 068200009
Project Name: Hunt Communities LLC TIA
Scenario: TGZ 3
Analysis Period: Daily
Analyst: TWH

Land Use A: Residential

ITE Land Use Code 210
Size:

	Total	Internal	External
Enter	5,144	317	4,827
Exit	5,144	259	4,885
Total	10,288	576	9,712
%	100%	**5.6%**	94.4%

Enter from External: 4,827
Exit to External: 4,885

Land Use B: Office

ITE Land Use Code 710
Size:

	Total	Internal	External
Enter	68	10	58
Exit	68	16	52
Total	136	26	110
%	100%	**19.1%**	80.9%

Enter from External: 58
Exit to External: 52

Land Use C: Retail

ITE Land Use Code 820
Size:

	Total	Internal	External
Enter	2877	274	2603
Exit	2877	326	2551
Total	5754	600	5154
%	100%	**10.4%**	89.6%

Enter from External: 2,603
Exit to External: 2,551

Land Use D: Residential

ITE Land Use Code
Size:

	Total	Internal	External
Enter	0	0	0
Exit	0	0	0
Total	0	0	0
%			

Enter from External: 0
Exit to External: 0

Demand	0.0%	0	
Balanced	0		
Demand	0.0%	0	
	3.0%	154	Demand
	1		Balanced
	2.0%	1	Demand
Demand	3.0%	0	
	0		Balanced
	2.0%	1	Demand
	15.0%	10	Demand
	10		Balanced
	3.0%	86	Demand
Demand	22.0%	15	
Balanced	15		
Demand	4.0%	115	
Demand	38.0%	1955	
Balanced	259		
Demand	9.0%	259	
Demand	33.0%	1698	
Balanced	316		
Demand	11.0%	316	Demand
Demand	0.0%	0	
Balanced	0		
Demand	0.0%	0	
Demand	0.0%	0	
Balanced	0		
Demand	0.0%	0	
Demand	0.0%	0	
Balanced	0		
Demand	0.0%	0	
Demand	38.0%	0	
Balanced	0		
Demand	9.0%	259	
	33.0%	0	Demand
	0		Balanced
	11.0%	316	Demand

NET EXTERNAL TRIPS FOR MULTI-USE DEVELOPMENT

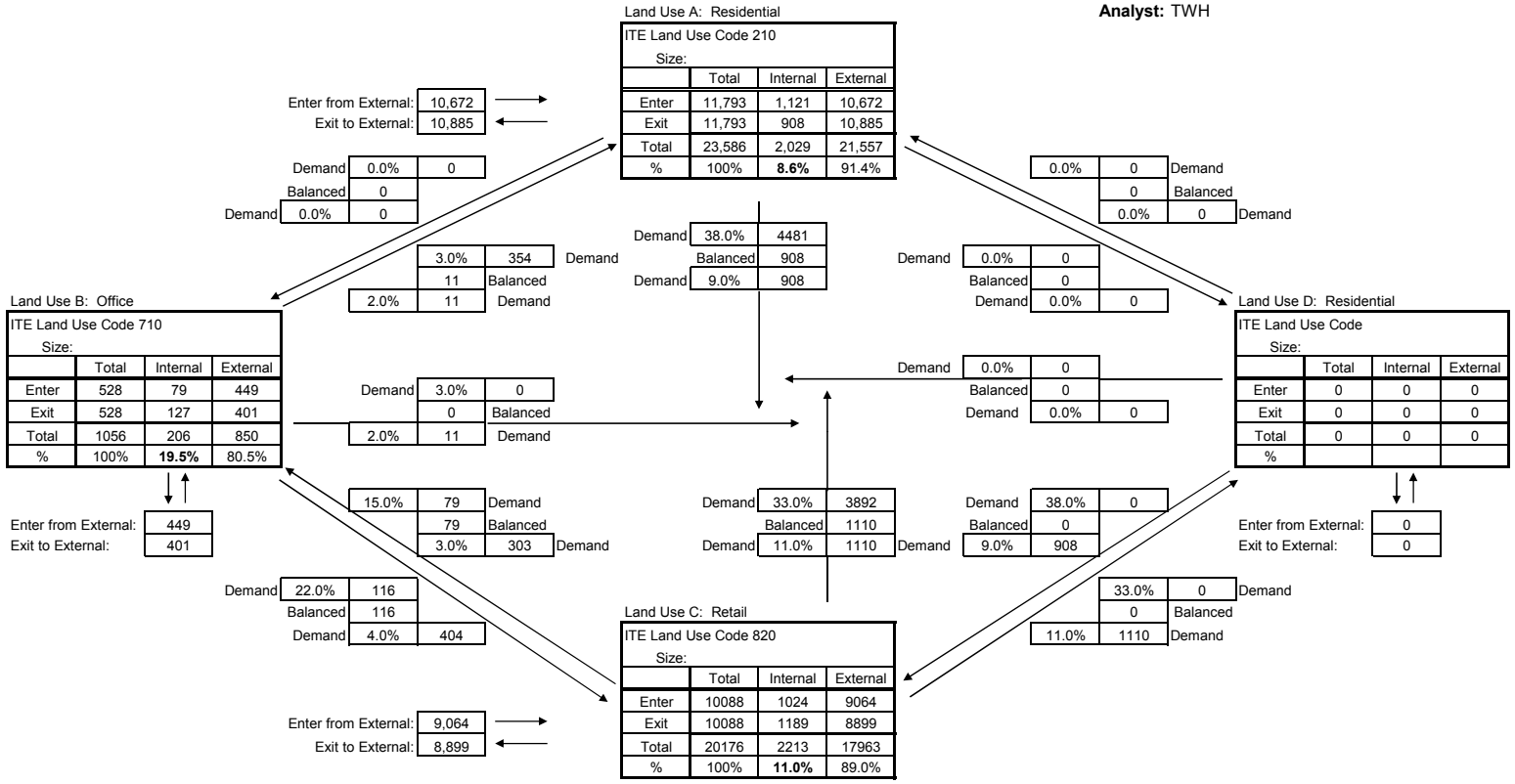
Category	Land Use A	Land Use B	Land Use C	Land Use D	Total
Enter	4,827	58	2,603	0	7,488
Exit	4,885	52	2,551	0	7,488
Total	9,712	110	5,154	0	**14,976**
Single Use Trip Gen Estimate	10,288	136	5,754	0	**16,178**

Overall Internal Capture = **7.43%**

ITE MULTI-USE PROJECT INTERNAL CAPTURE WORKSHEET

(Source: Chapter 7, ITE *Trip Generation Handbook*, June 2004)

Project Number: 068200009
Project Name: Hunt Communities LLC TIA
Scenario: TGZ 4
Analysis Period: Daily
Analyst: TWH



NET EXTERNAL TRIPS FOR MULTI-USE DEVELOPMENT

Category	Land Use A	Land Use B	Land Use C	Land Use D	Total
Enter	10,672	449	9,064	0	20,185
Exit	10,885	401	8,899	0	20,185
Total	21,557	850	17,963	0	**40,370**
Single Use Trip Gen Estimate	23,586	1,056	20,176	0	**44,818**

Overall Internal Capture = 9.92%

ITE MULTI-USE PROJECT INTERNAL CAPTURE WORKSHEET

(Source: Chapter 7, ITE *Trip Generation Handbook*, June 2004)

Project Number: 068200009
Project Name: Hunt Communities LLC TIA
Scenario: TGZ 6
Analysis Period: Daily
Analyst: TWH

Land Use A: Residential

ITE Land Use Code 210
Size:

	Total	Internal	External
Enter	6,269	1,309	4,960
Exit	6,269	1,064	5,205
Total	12,538	2,373	10,165
%	100%	**18.9%**	81.1%

Enter from External: 4,960
Exit to External: 5,205

Land Use B: Office

ITE Land Use Code 710
Size:

	Total	Internal	External
Enter	418	63	355
Exit	418	100	318
Total	836	163	673
%	100%	**19.5%**	80.5%

Enter from External: 355
Exit to External: 318

Land Use C: Retail

ITE Land Use Code 820
Size:

	Total	Internal	External
Enter	11827	1156	10671
Exit	11827	1364	10463
Total	23654	2520	21134
%	100%	**10.7%**	89.3%

Enter from External: 10,671
Exit to External: 10,463

Land Use D: Residential

ITE Land Use Code
Size:

	Total	Internal	External
Enter	0	0	0
Exit	0	0	0
Total	0	0	0
%			

Enter from External: 0
Exit to External: 0

Demand	0.0%	0	
Balanced	0		
Demand	0.0%	0	
	3.0%	188	Demand
	8		Balanced
	2.0%	8	Demand
Demand	38.0%	2382	
Balanced	1064		
Demand	9.0%	1064	
Demand	0.0%	0	
Balanced	0		
Demand	0.0%	0	
0.0%	0	Demand	
0	Balanced		
0.0%	0	Demand	
Demand	3.0%	0	
	0	Balanced	
	2.0%	8	Demand
Demand	0.0%	0	
Balanced	0		
Demand	0.0%	0	
	15.0%	63	Demand
	63	Balanced	
	3.0%	355	Demand
Demand	33.0%	2069	
Balanced	1301		
Demand	11.0%	1301	Demand
Demand	38.0%	0	
Balanced	0		
Demand	9.0%	1064	
Demand	22.0%	92	
Balanced	92		
Demand	4.0%	473	
33.0%	0	Demand	
0	Balanced		
11.0%	1301	Demand	

NET EXTERNAL TRIPS FOR MULTI-USE DEVELOPMENT

Category	Land Use A	Land Use B	Land Use C	Land Use D	Total
Enter	4,960	355	10,671	0	15,986
Exit	5,205	318	10,463	0	15,986
Total	10,165	673	21,134	0	**31,972**
Single Use Trip Gen Estimate	12,538	836	23,654	0	**37,028**

Overall Internal Capture = **13.65%**

ITE MULTI-USE PROJECT INTERNAL CAPTURE WORKSHEET

(Source: Chapter 7, ITE *Trip Generation Handbook*, June 2004)

Project Number: 068200009
Project Name: Hunt Communities LLC TIA
Scenario: TGZ 7
Analysis Period: Daily
Analyst: TWH

Land Use A: Residential

ITE Land Use Code 210
Size:

	Total	Internal	External
Enter	9,040	1,000	8,040
Exit	9,040	814	8,226
Total	18,080	1,814	16,266
%	100%	**10.0%**	90.0%

Enter from External: 8,040
Exit to External: 8,226

Land Use B: Office

ITE Land Use Code 710
Size:

	Total	Internal	External
Enter	275	41	234
Exit	275	67	208
Total	550	108	442
%	100%	**19.6%**	80.4%

Enter from External: 234
Exit to External: 208

Land Use C: Retail

ITE Land Use Code 820
Size:

	Total	Internal	External
Enter	9040	875	8165
Exit	9040	1035	8005
Total	18080	1910	16170
%	100%	**10.6%**	89.4%

Enter from External: 8,165
Exit to External: 8,005

Land Use D: Residential

ITE Land Use Code
Size:

	Total	Internal	External
Enter	0	0	0
Exit	0	0	0
Total	0	0	0
%			

Enter from External: 0
Exit to External: 0

Demand	0.0%	0	
Balanced	0		
Demand	0.0%	0	
	3.0%	271	Demand
	6		Balanced
	2.0%	6	Demand
Demand	3.0%	0	
	0		Balanced
	2.0%	6	Demand
	15.0%	41	Demand
	41		Balanced
	3.0%	271	Demand
Demand	22.0%	61	
Balanced	61		
Demand	4.0%	362	
Demand	38.0%	3435	
Balanced	814		
Demand	9.0%	814	
Demand	33.0%	2983	
Balanced	994		
Demand	11.0%	994	Demand
	0.0%	0	Demand
	0		Balanced
	0.0%	0	Demand
Demand	0.0%	0	
Balanced	0		
Demand	0.0%	0	
Demand	0.0%	0	
Balanced	0		
Demand	0.0%	0	
Demand	38.0%	0	
Balanced	0		
Demand	9.0%	814	
	33.0%	0	Demand
	0		Balanced
	11.0%	994	Demand

NET EXTERNAL TRIPS FOR MULTI-USE DEVELOPMENT

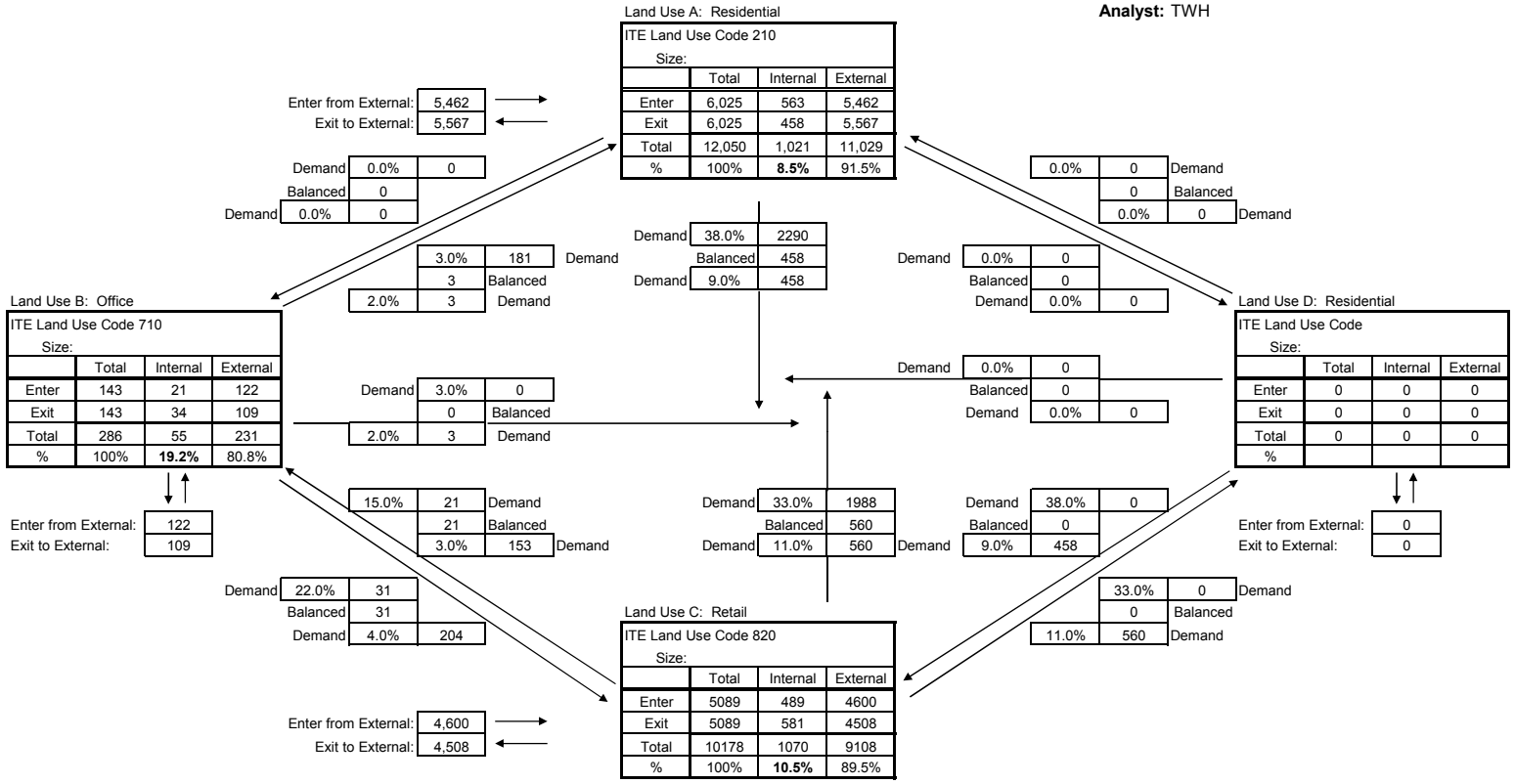
Category	Land Use A	Land Use B	Land Use C	Land Use D	Total
Enter	8,040	234	8,165	0	16,439
Exit	8,226	208	8,005	0	16,439
Total	16,266	442	16,170	0	**32,878**
Single Use Trip Gen Estimate	18,080	550	18,080	0	**36,710**

Overall Internal Capture = **10.44%**

ITE MULTI-USE PROJECT INTERNAL CAPTURE WORKSHEET

(Source: Chapter 7, ITE *Trip Generation Handbook*, June 2004)

Project Number: 068200009
Project Name: Hunt Communities LLC TIA
Scenario: TGZ 8
Analysis Period: Daily
Analyst: TWH



NET EXTERNAL TRIPS FOR MULTI-USE DEVELOPMENT

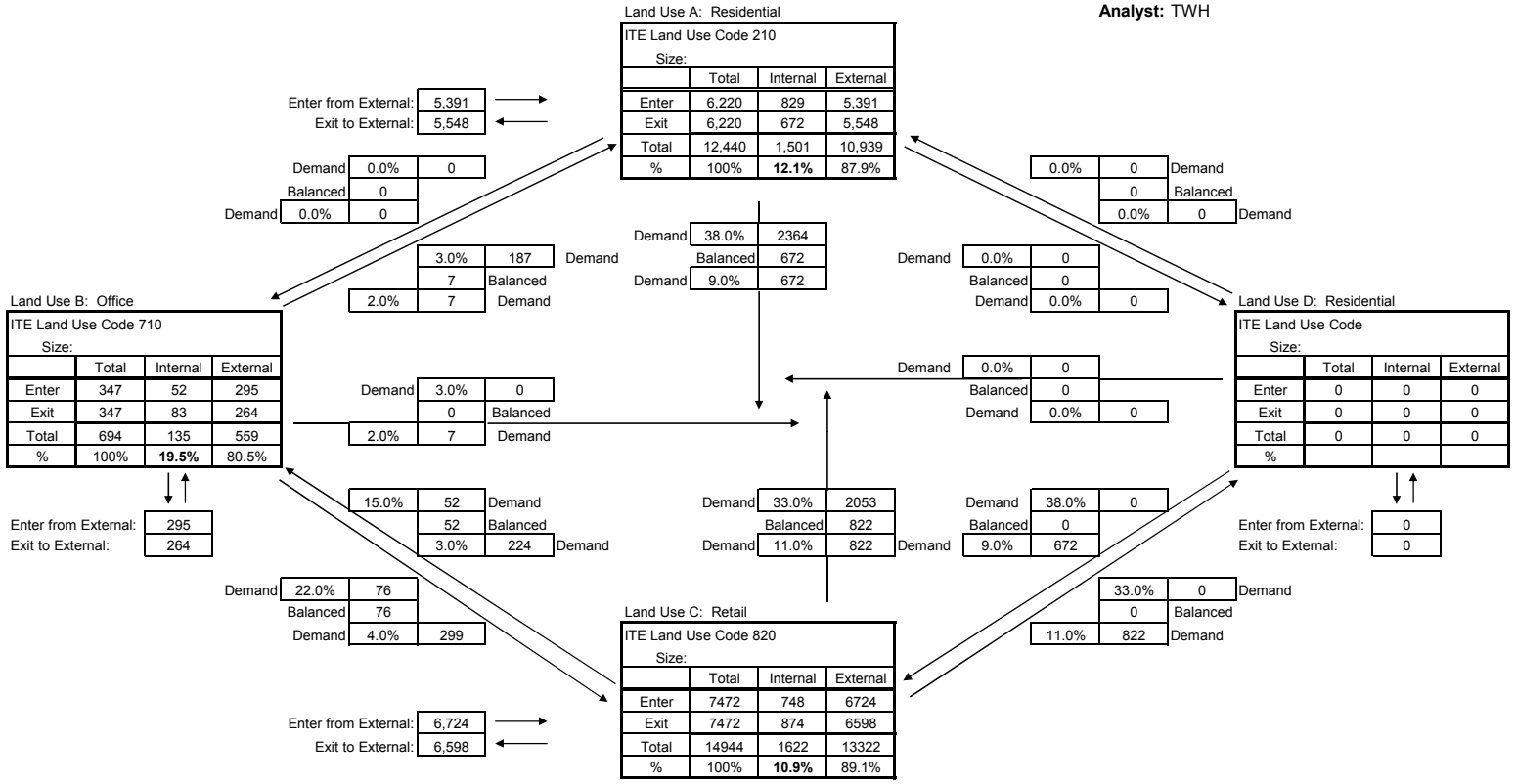
Category	Land Use A	Land Use B	Land Use C	Land Use D	Total
Enter	5,462	122	4,600	0	10,184
Exit	5,567	109	4,508	0	10,184
Total	11,029	231	9,108	0	**20,368**
Single Use Trip Gen Estimate	12,050	286	10,178	0	**22,514**

Overall Internal Capture = **9.53%**

ITE MULTI-USE PROJECT INTERNAL CAPTURE WORKSHEET

(Source: Chapter 7, ITE *Trip Generation Handbook*, June 2004)

Project Number: 068200009
Project Name: Hunt Communities LLC TIA
Scenario: TGZ 9
Analysis Period: Daily
Analyst: TWH



NET EXTERNAL TRIPS FOR MULTI-USE DEVELOPMENT

Category	Land Use A	Land Use B	Land Use C	Land Use D	Total
Enter	5,391	295	6,724	0	12,410
Exit	5,548	264	6,598	0	12,410
Total	10,939	559	13,322	0	**24,820**
Single Use Trip Gen Estimate	12,440	694	14,944	0	**28,078**

Overall Internal Capture = 11.60%

ITE MULTI-USE PROJECT INTERNAL CAPTURE WORKSHEET

(Source: Chapter 7, ITE *Trip Generation Handbook*, June 2004)

Project Number: 068200009
Project Name: Hunt Communities LLC TIA
Scenario: TGZ 10
Analysis Period: Daily
Analyst: TWH

Land Use A: Residential

ITE Land Use Code 210
Size:

	Total	Internal	External
Enter	1,957	275	1,682
Exit	1,957	224	1,733
Total	3,914	499	3,415
%	100%	**12.7%**	87.3%

Enter from External: 1,682
Exit to External: 1,733

Land Use B: Office

ITE Land Use Code 710
Size:

	Total	Internal	External
Enter	72	11	61
Exit	72	17	55
Total	144	28	116
%	100%	**19.4%**	80.6%

Enter from External: 61
Exit to External: 55

Land Use C: Retail

ITE Land Use Code 820
Size:

	Total	Internal	External
Enter	2491	240	2251
Exit	2491	285	2206
Total	4982	525	4457
%	100%	**10.5%**	89.5%

Enter from External: 2,251
Exit to External: 2,206

Land Use D: Residential

ITE Land Use Code
Size:

	Total	Internal	External
Enter	0	0	0
Exit	0	0	0
Total	0	0	0
%			

Enter from External: 0
Exit to External: 0

Demand	0.0%	0	
Balanced	0		
Demand	0.0%	0	
	3.0%	59	Demand
	1	Balanced	
	2.0%	1	Demand
Demand	3.0%	0	
	0	Balanced	
	2.0%	1	Demand
	15.0%	11	Demand
	11	Balanced	
	3.0%	75	Demand
Demand	22.0%	16	
Balanced	16		
Demand	4.0%	100	
Demand	38.0%	744	
Balanced	224		
Demand	9.0%	224	
Demand	33.0%	646	
Balanced	274		
Demand	11.0%	274	Demand
0.0%	0	Demand	
0	Balanced		
0.0%	0	Demand	
Demand	0.0%	0	
Balanced	0		
Demand	0.0%	0	
Demand	0.0%	0	
Balanced	0		
Demand	0.0%	0	
Demand	38.0%	0	
Balanced	0		
Demand	9.0%	224	
33.0%	0	Demand	
0	Balanced		
11.0%	274	Demand	

NET EXTERNAL TRIPS FOR MULTI-USE DEVELOPMENT

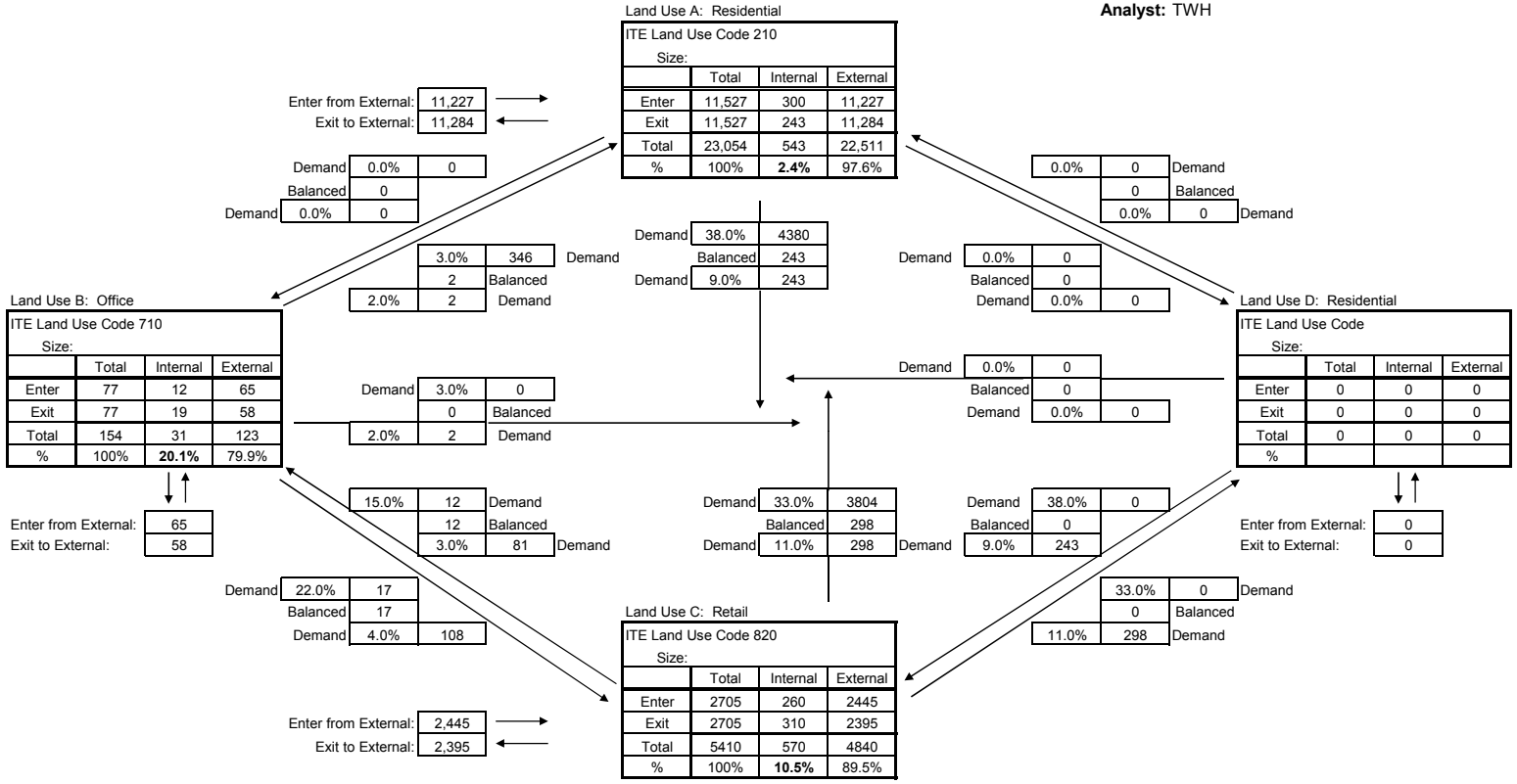
Category	Land Use A	Land Use B	Land Use C	Land Use D	Total
Enter	1,682	61	2,251	0	3,994
Exit	1,733	55	2,206	0	3,994
Total	3,415	116	4,457	0	**7,988**
Single Use Trip Gen Estimate	3,914	144	4,982	0	**9,040**

Overall Internal Capture = **11.64%**

ITE MULTI-USE PROJECT INTERNAL CAPTURE WORKSHEET

(Source: Chapter 7, ITE *Trip Generation Handbook*, June 2004)

Project Number: 068200009
Project Name: Hunt Communities LLC TIA
Scenario: TGZ 11
Analysis Period: Daily
Analyst: TWH



NET EXTERNAL TRIPS FOR MULTI-USE DEVELOPMENT

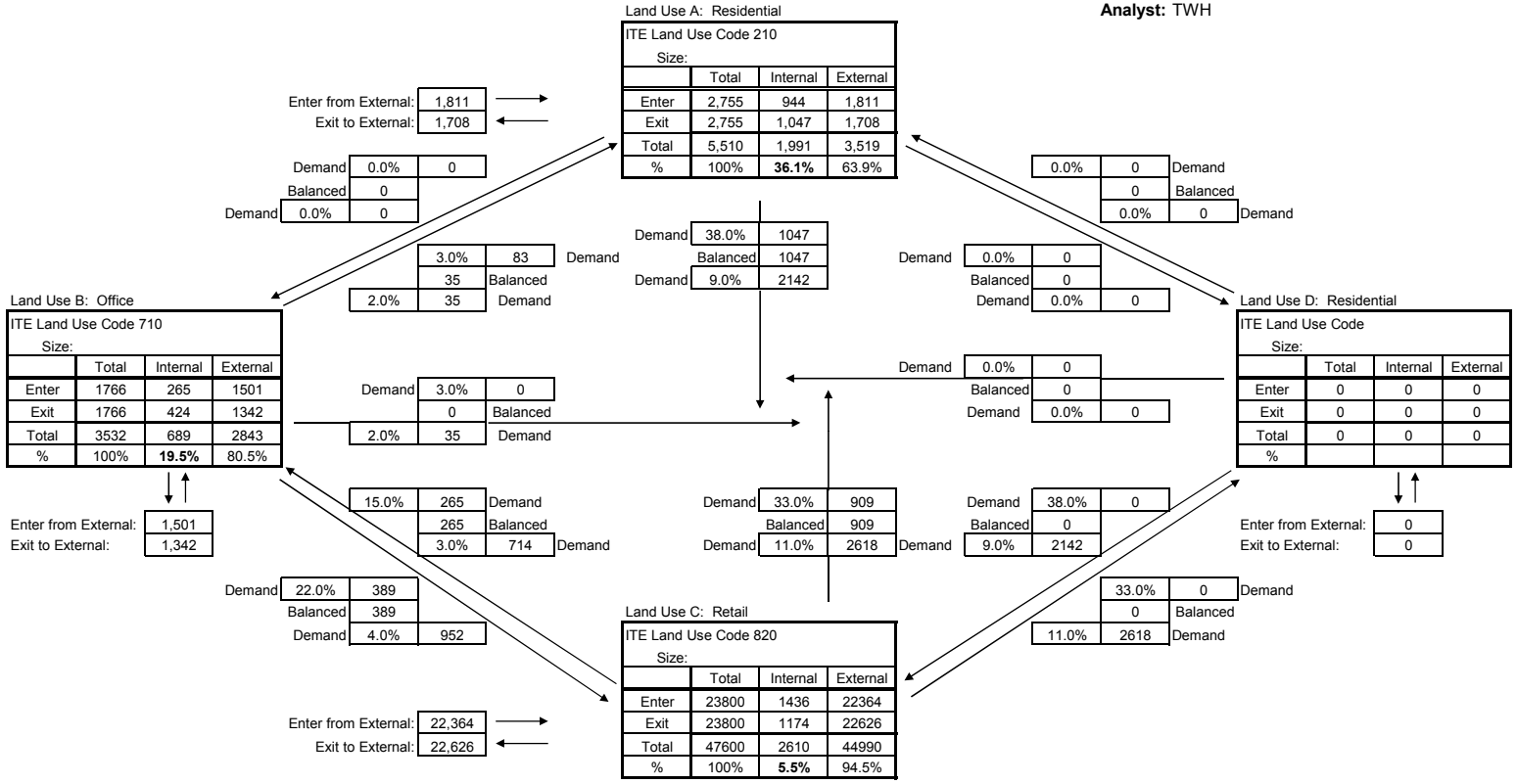
Category	Land Use A	Land Use B	Land Use C	Land Use D	Total
Enter	11,227	65	2,445	0	13,737
Exit	11,284	58	2,395	0	13,737
Total	22,511	123	4,840	0	**27,474**
Single Use Trip Gen Estimate	23,054	154	5,410	0	**28,618**

Overall Internal Capture = 4.00%

ITE MULTI-USE PROJECT INTERNAL CAPTURE WORKSHEET

(Source: Chapter 7, ITE *Trip Generation Handbook*, June 2004)

Project Number: 068200009
Project Name: Hunt Communities LLC TIA
Scenario: TGZ 12
Analysis Period: Daily
Analyst: TWH



NET EXTERNAL TRIPS FOR MULTI-USE DEVELOPMENT

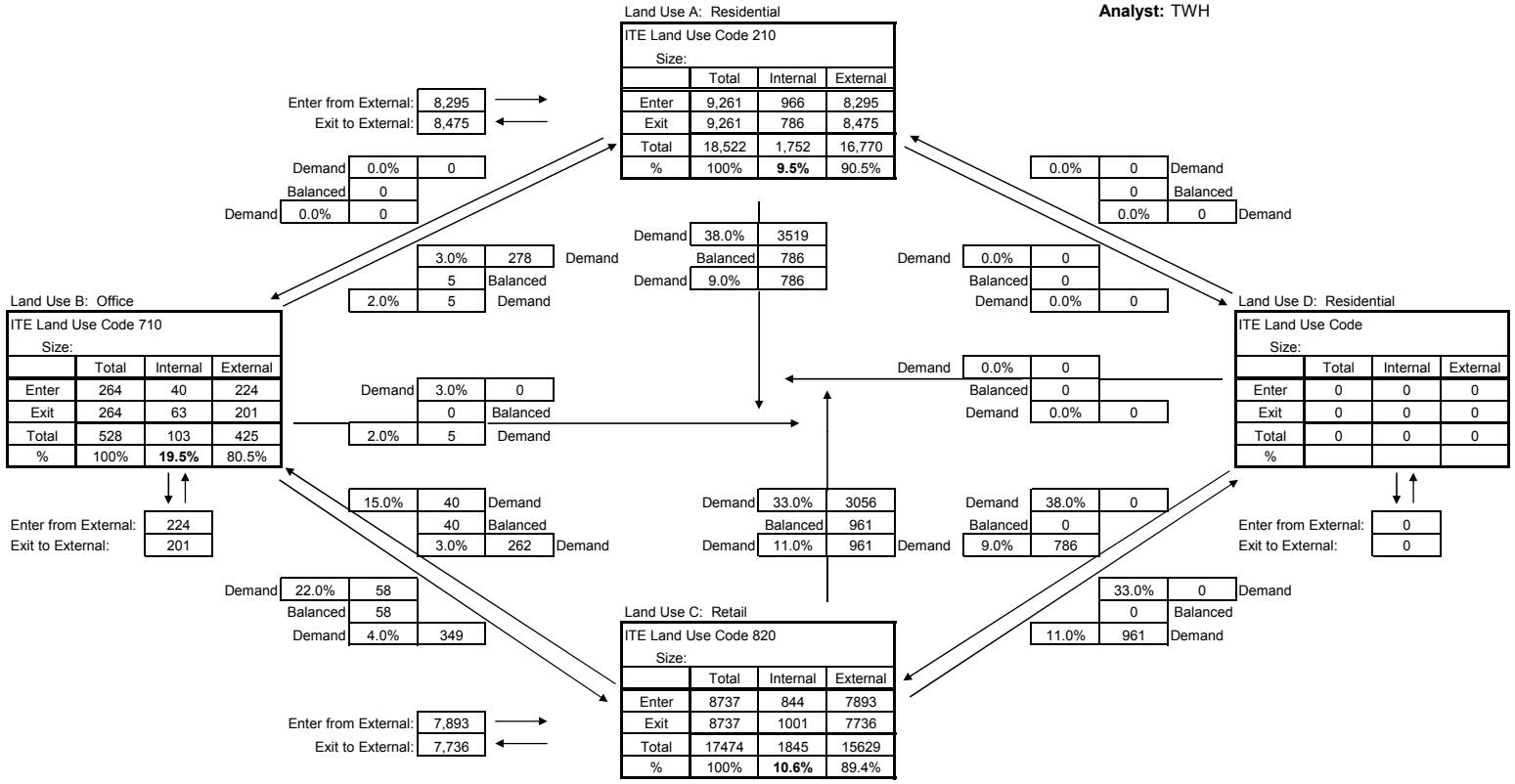
Category	Land Use A	Land Use B	Land Use C	Land Use D	Total
Enter	1,811	1,501	22,364	0	25,676
Exit	1,708	1,342	22,626	0	25,676
Total	3,519	2,843	44,990	0	**51,352**
Single Use Trip Gen Estimate	5,510	3,532	47,600	0	**56,642**

Overall Internal Capture = 9.34%

ITE MULTI-USE PROJECT INTERNAL CAPTURE WORKSHEET

(Source: Chapter 7, ITE *Trip Generation Handbook*, June 2004)

Project Number: 068200009
Project Name: Hunt Communities LLC TIA
Scenario: TGZ 13
Analysis Period: Daily
Analyst: TWH



NET EXTERNAL TRIPS FOR MULTI-USE DEVELOPMENT

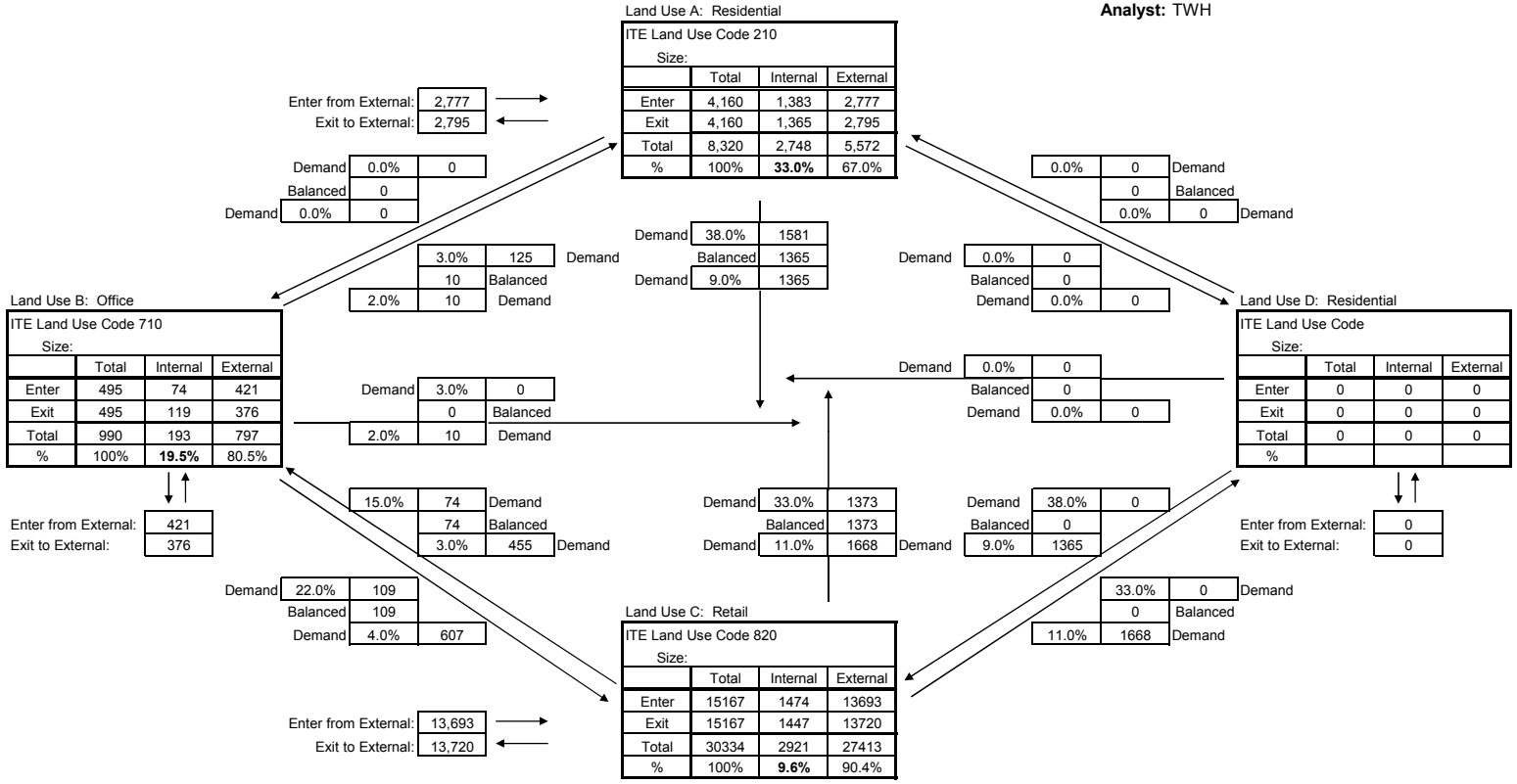
Category	Land Use A	Land Use B	Land Use C	Land Use D	Total
Enter	8,295	224	7,893	0	16,412
Exit	8,475	201	7,736	0	16,412
Total	16,770	425	15,629	0	**32,824**
Single Use Trip Gen Estimate	18,522	528	17,474	0	**36,524**

Overall Internal Capture = 10.13%

ITE MULTI-USE PROJECT INTERNAL CAPTURE WORKSHEET

(Source: Chapter 7, ITE *Trip Generation Handbook*, June 2004)

Project Number: 068200009
Project Name: Hunt Communities LLC TIA
Scenario: TGZ 14
Analysis Period: Daily
Analyst: TWH



NET EXTERNAL TRIPS FOR MULTI-USE DEVELOPMENT

Category	Land Use A	Land Use B	Land Use C	Land Use D	Total
Enter	2,777	421	13,693	0	16,891
Exit	2,795	376	13,720	0	16,891
Total	5,572	797	27,413	0	**33,782**
Single Use Trip Gen Estimate	8,320	990	30,334	0	**39,644**

Overall Internal Capture = 14.79%

CONCEPTUAL DRAINAGE PLAN

FOR ±4,900 ACRE MASTER PLAN COMMUNITY

City of El Paso, Texas

Prepared for:
Hunt Communities GP, LLC
4401 North Mesa
El Paso, Texas 79902-1107

Prepared by:
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and Associates, Inc.

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4.0 PROPOSED DRAINAGE DESIGN....3
5.0 RESULTS....6
6.0 CONCLUSION....7

Kimley-Horn and Associates, Inc.

Appendices

Appendix A **Hydrologic Parameters**

Existing Condition
Proposed Condition

Appendix B **Hydrologic Results**

Existing Condition
Proposed Condition

Appendix C **Workmaps**

11x17 Workmaps
Existing Drainage Area Map
Existing Hydrologic Results
Proposed Drainage Area Map
Proposed Hydrologic Results
Conceptual Infrastructure Exhibit

Full-Size Workmaps
Existing Drainage Area Map
Existing Hydrologic Results
Proposed Drainage Area Map
Proposed Hydrologic Results
Conceptual Infrastructure Exhibit

Appendix D **Digital Models and Results**

1. Introduction

Kimley-Horn and Associates, Inc. (KHA) has prepared a Conceptual Drainage Plan for Hunt Communities GP, LLC (Hunt) Master Plan Community (Development). The subject tract encompasses approximately 4,900 acres in northeast El Paso, Texas. The subject tract is bound on the west by the Franklin Mountains, on the south by the North Hills and Sandstone Ranch subdivisions, on the southeast by the Patriot Freeway, and on the north and east by undeveloped land owned by the Public Service Board (PSB).

Typical drainage patterns route flow in a southeasterly manner. Runoff from the Franklin Mountains crosses the western property boundary and travels southeast across the property. Runoff from northern offsite areas flows across the northern property boundary where it combines with the runoff from the Franklin Mountains. Runoff from offsite areas located to the south and east of the property flow through the Western and Eastern Freeway Channels to the outfall of the subject tract. The outfall of the subject tract is located at the Patriot Freeway approximately 2,800 feet northeast of the Patriot Freeway intersection with McCombs Street. The outfall is the upstream extent of the Greenbelt Levee System (GLS).

An existing condition analysis of the subject tract and the surrounding watershed was prepared by CEA Engineering Group in October 2006. KHA reviewed the available information and was unable to verify the watershed mapping, modeling assumptions, and hydrologic parameters in the CEA study. In addition, the City of El Paso has established new drainage criteria for the region. Therefore, KHA performed a new existing condition drainage analysis.

The purpose of this study is to propose a conceptual drainage plan for the Development. The proposed improvements meet the criteria set in the City of El Paso Drainage Design Manual (DDM), dated June 2008, and additional criteria established specifically for this site. The improvements have been designed to not increase the 100-year peak flow and volume at the GLS from its existing condition.

2. Methodology

Two Drainage Area Maps were created for the watershed draining to the GLS: an existing condition map and a proposed condition map. The watershed was delineated using 1-foot aerial topography of the subject tract and USGS topography for offsite areas. The available topography was supplemented with construction plans for the Sandstone Ranch subdivision, Eastern Freeway Channel, and Western Freeway Channel to create a drainage area map for the entire watershed. The proposed drainage area boundaries have been modified from the existing condition based on the location of proposed land uses, roadways, and improvements. The proposed boundaries are conceptual and assume a full build-out of the subject tract.

Hydrologic modeling was performed using PondPack v. 10.0 (Bentley Systems, Inc.). PondPack was selected in anticipation of interconnected ponds in the proposed condition. Peak flows were calculated using TR-55 methodology developed by the Natural Resources Conservation Service (NRCS). Soil types within the watershed were evaluated based on the NRCS Web Soil Survey and were found to consist of Type B, Type C, and Type D soils. Curve Number (CN) values for existing land uses were based on field observations and aerial photography. CN values for proposed land uses are based on maximum amount of allowable impervious cover for each land use. All CN values have been calculated using methodology described in the DDM. CN values for the drainage areas included in this study are shown in Appendix A of this report.

The times of concentration for undeveloped basins were calculated using the Kirpich Method in accordance with the DDM. The Kirpich Method is recommended for mountainous areas (Maidment, 1993) and for determining times of concentration for areas in which flow regimes are difficult to classify. The Kirpich formula is used for perennial, intermittent, and disappearing streams as described in the DDM.
Methodology described in TR-55 was used to calculate the time of concentration for developed areas within the watershed. The development of property in this watershed significantly aligns the characteristics of runoff across the property. The TR-55 methodology breaks the time of concentration into three flow regimes: overland flow, shallow concentrated flow, and concentrated flow. Based on these flow regimes, the TR-55 methodology provides additional precision for time of concentration calculations. Times of concentration for each drainage area are shown in Appendix A of this report.

Open channels and flow paths were modeled in the hydrologic model using the Muskingum method. Physical parameters of existing channels and flow paths were established based on field observations and aerial topography. Physical parameters of proposed channels were established based on conceptual channel design.

Existing and proposed condition peak flows and runoff volumes were evaluated for the 100-year storm event. An NRCS Type II-75 rainfall distribution and 24-hour rainfall depth of 3.34 inches were used as required by the DDM. Existing and proposed condition peak flows for the 100-year storm event for drainage areas and hydrologic model junction points included in the study are shown on sheet two of the drainage area maps in Appendix C. Hydrologic parameters used for the hydrologic models are included in Appendix A.

3. Existing Drainage Patterns

The Franklin Mountains are located immediately west of the subject tract. Runoff from the mountains is concentrated in well defined channels and flows towards the western property boundary. In the vicinity of the western property boundary the channels lose definition and runoff spreads across an alluvial fan before it is concentrated in several small defined flow paths. The flow paths convey flow across the site in an easterly direction towards Martin Luther King, Jr. Boulevard (MLK). Fourteen sets of existing box culverts route flow across MLK on the subject property.

Downstream of the MLK culverts, runoff continues to flow in an easterly direction towards McCombs Street. The defined flow paths dissipate through the middle of the site. At McCombs Street, five existing corrugated metal pipe culverts convey flow across the road. Historical evidence indicates that McCombs Street overtops during large storm events.

Runoff from areas north of the subject tract and west of McCombs Street enters the subject tract at various locations along the northern property boundary. This offsite runoff is routed through the subject tract to McCombs Street by flow paths near the northern property boundary.

Runoff from areas north of the subject tract and east of McCombs Street enters the subject tract at various locations along the northeast property boundary. This offsite runoff is conveyed through the Painted Dunes Golf Course to the GLS. A portion of the offsite runoff is also conveyed through the Eastern Freeway Channel.

No offsite runoff from areas south of the subject tract enters the property. Runoff from the North Hills and Sandstone Ranch subdivisions is routed to the Western Freeway Channel.

Runoff generally flows in a southerly direction downstream of McCombs Street. Runoff from the subject tract and the Eastern and Western Freeway Channels combine at the GLS.
Portions of the Federal Emergency Management Agency (FEMA) floodplains for Flow Paths 11, 11b, 12, 53, and 54 are located within the property. Flow Paths 11, 54, and 53 travel from west to east across the northern, central, and southern portions of the subject tract respectively. Flow Path 11 turns south at McCombs Street and combines with Flow Path 54 before it turns east and continues to the GLS. Flow Path 53 travels along the southern property boundary and combines with the Western Freeway Channel west of McCombs Street. Flow Path 53 continues east through the Western Freeway Channel to the GLS. Flow Path 12 crosses the northeastern property boundary and flows south to the Eastern Freeway Channel where it continues on to the GLS. Flow Path 11b travels from north to south through the Painted Dunes golf course until it combines with Flow Path 11 north of the GLS.

4. Proposed Drainage Design

The conceptual drainage plan is proposed to meet several objectives:

- Reduce proposed 100-year peak flow and runoff volume at the GLS to its existing condition
- Reduce proposed 100-year peak flow at the McCombs Street crossing of the Western Freeway Channel to its existing condition
- Control debris entering the Development from the Franklin Mountains
- Convey runoff across the site as concentrated flow
- Capture offsite runoff and convey it to the GLS

The following conceptual infrastructure will accomplish the above objectives.

<u>Detention and Retention Ponds</u>
Proposed condition 100-year peak flow and runoff volume at the outfall of the site must be less than or equal to existing condition 100-year peak flow and runoff volume to meet the requirements in the DDM. Detention ponds have been proposed to decrease the peak flow rate and retention areas have been proposed to facilitate infiltration and decrease the runoff volume. A composite detention/retention pond concept was used for the conceptual drainage design for the Development. See the Conceptual Infrastructure Exhibit in Appendix C for a figure illustrating the detention/retention pond concept.

Preliminary geotechnical information shows the soils within the Development west of MLK have an infiltration rate range of 1-15 inches per hour and soils east of MLK have an infiltration rate range of 2-15 inches per hour. For conceptual design purposes, minimum infiltration rates were used in designing retention areas for the site. To meet the criteria in the DDM, detention and retention ponds must drain within 72 hours. Based on the minimum infiltration rates provided in the geotechnical information, retention depths can reach a maximum of 6 feet in areas west of MLK and 12 feet throughout the remainder of the Development. More detailed geotechnical information is anticipated for final design.

Table 1 shows the conceptual storage volumes throughout the Development. Final pond locations and sizes will be determined during final design.

Table 1: 100-Year Detention and Retention Conceptual Storage Volumes

General Location	Retention Storage (ac-ft)	Detention Storage (ac-ft)
Western Property Boundary to MLK	4.9	63.0
MLK to Sean Haggarty	9.1	54.8
Sean Haggarty to McCombs	229.5	357.1

Dams

Two dams are proposed to be located west of the subject tract to capture runoff from the Franklin Mountains. The dams will serve the following purposes:

- Capture debris from the mountains to protect onsite drainage infrastructure
- Concentrate runoff from the mountains into two onsite channels
- Provide detention for the Development to reduce proposed peak flow

The conceptual primary spillway locations of the dams are set at the proposed channel locations. Conceptual emergency spillway locations of the dams are located adjacent to proposed open space areas. Conceptual dam sizes assume 3:1 side slopes and a top of dam elevation equal to approximately 10 feet above the adjacent downstream existing ground. The conceptual design assumptions will be verified during final design of the structures.

Table 2 shows conceptual sizing information for the proposed dams.

Table 2: Conceptual Dam Design

Dam Name	Provided Storage (ac-ft)	Peak 100-Year Inflow (cfs)	Peak 100-Year Outflow (cfs)
Dam 1	314	4,130	130
Dam 2	410	5,805	150

The conceptual dams will be designed to meet the Texas Commission on Environmental Quality (TCEQ) design criteria. The dams will need to be sized for a Probable Maximum Precipitation (PMP) storm event. A PMP analysis has not yet been performed. The conceptual dam storage shown above is approximately double the storage required to convey the 100-year storm event. Additional storage will be provided if a PMP analysis shows it is required.

Due to the proposed dams' proximity to residential development and a potential loss of life and property during a dam breach, the dams will be classified as high hazard dams by TCEQ. The dams will require a dam breach analysis and an Emergency Action Plan (EAP) per TCEQ requirements for high hazard dams.

Channels

Four main channels are proposed to convey flow across the Development. Conceptual channel locations are shown on the proposed Infrastructure Exhibit. The North, Central, and South Channels will convey flow across the Development from west to east. The McCombs Channel will convey flow from north to south parallel to McCombs Street. The North Channel will convey the outflow of Dam 2, offsite runoff entering the site from the north, and onsite runoff from the northern portion of the Development. The Central Channel will convey the outflow of Dam 1 and onsite runoff from the central portion of the Development. The South Channel will convey onsite runoff from the southern portion of the Development. The North and Central Channels will convey flow to the McCombs Channel. The South Channel will convey runoff to the existing Western Freeway Channel. Onsite flow on the eastern portion of the Development will be routed to the existing Eastern Freeway Channel. The McCombs Channel, Western Freeway Channel, and Eastern Freeway Channel all converge at the outfall of the Development at the Greenbelt Levee System.

Conceptual channel cross sectional geometry is designed to allow the 10-year storm flows to pass through the main channel. The 50- and 100-year flows will inundate channel shelves sloped towards the main channel. The channel shelves will be open to the public as park areas. Typical cross sections were designed using Bentley's Flowmaster computer program. Flowmaster output can be seen as electronic PDF documents on the CD with this report. Typical cross sections of the proposed channels can be seen on the Conceptual Infrastructure Exhibit in Appendix C. The conceptual channels are proposed to be naturally lined where feasible. The final channels will be designed in conjunction with a geotechnical study to determine a channel geometry and slope stabilization design that is appropriate for the soil conditions within the Development.

Existing ground slopes range from approximately 0.5% to approximately 3.0% within the development. Drop structures are anticipated to be placed at intervals along the length of the conceptual channels to maintain channel slopes and velocities appropriate for natural channels. The exact locations and dimensions of the drop structures will be determined during final design of the channels.

FEMA Flow Paths 11, 11b, 54, 53, and 12 will be impacted by the Development. Flow Paths 11, 54, and 53 will be associated with the North, Central, and South Channels respectively. Flow Paths 11b and 12 are not associated with a specific proposed channel. Per currently published City criteria, FEMA approval of Conditional Letter of Map Revision (CLOMR) applications for each of these FEMA flow paths will be required before construction can occur within the effective floodplain boundary. Letter of Map Revision (LOMR) applications for the affected flow paths will need to be approved by FEMA before final approval by the City of El Paso is granted for building occupancy.

Crossings

Culvert and bridge crossings will be required for all vehicle and pedestrian crossings over open channels. Conceptual crossing sizes for anticipated roadway crossings over main channels have been designed using the 100-year storm. Bentley's PondPack and Culvertmaster computer programs were used to determine culvert sizes. Table 3 shows crossing sizes and locations of the conceptually designed crossings.

Table 3: Conceptual Crossing Sizes

Crossing Name	Conceptual Size	Anticipated 100-Year Peak Flow (cfs)
Crossing 1	3-7'x6' RBC	1,350
Crossing 2	3-8'x8' RBC	1,705
Crossing 3	1-24" RCP	40
Crossing 4	7-8'x8' RBC	4,035
Crossing 5	4-8'x8' RBC	2,700
Crossing 6	1-7'x6' RBC	510
Crossing 7	3-6'x3' RBC	755
Crossing 8	11-8'x8' RBC	6,380
Crossing 9	13-8'x8' RBC	6,195
Crossing 10	10-8'x8' RBC	6,545
Crossing 11	5-6'x6' RBC	1,375
Crossing 12	4-48" RCP	295
Crossing 13	3-6'x3' RBC	755
Crossing 14	3-6'x3' RBC	755

Sizes of additional crossings are anticipated to be similar to the crossings listed above. See the Conceptual Infrastructure Exhibit in Appendix C for locations of the proposed crossings.

5. Results

The 100-year existing and proposed condition peak flow and runoff volume for the channels combining at the GLS are shown in Table 4.

Table 4: 100-Year Peak Flow and Volume

Existing Condition			Proposed Condition			Notes
Hydrologic Modeling Point	Peak Flow (cfs)	Runoff Volume (ac-ft)	Hydrologic Modeling Point	Peak Flow (cfs)	Runoff Volume (ac-ft)	
J-E19	5,193	1,159	J-H12c	5,157	1,231	Western Freeway Channel
J-F5	9,742	2,123	J-H15a	6,534	1,980	FEMA Flow Path #11 (McCombs Channel)
J-G2	760	83	J-H15d	1,282	123	Eastern Freeway Channel
GLS	**10,223**	**3,365**	**GLS**	**9,077**	**3,359**	Greenbelt Levee System; outfall of Development

Preliminary results indicate an increase in peak flow for the Eastern Freeway Channel as seen in Table 4. Preliminary FlowMaster calculations show the Eastern Freeway Channel has capacity to convey the increased flow.

6. Conclusion

The conceptual drainage improvements reduce the proposed condition peak flow and runoff volume at the outfall of the site to less than existing condition. A combination of dams, channels and culvert crossings, and detention/retention ponds are proposed to meet the requirements of the DDM. The final location and design of the conceptual drainage infrastructure will be determined during the final design of the Development.

This Conceptual Drainage Plan is being submitted as part of an Amended Land Study. Due to the preliminary nature of this study, there is potential that the design presented in this study will change during final design and construction.

Upon approval of this Conceptual Drainage Plan, KHA will start work on a construction phasing plan to ensure that the requirements detailed in this report are maintained throughout the construction of the development, detailed dam design, and CLOMR submittals to FEMA.

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Kimley-Horn and Associates, Inc.

Appendix A:

Hydrologic Parameters

Existing Condition

Proposed Condition

Existing Condition

Curve Number Table			
EXISTING WATERSHED CONDITIONS			
CN Description	Soil Type B	Soil Type C	Soil Type D
Desert Shrub - Poor Condition	77	85	88
Paved parking lots, roofs, driveways, etc.	98	98	98
Natural Desert Landscaping	77	85	88
Industrial	92	94	95
Open Space (Good Condition)	61	74	80
Existing Single Family	90	93	94
Commercial	92	94	95
Mountainous Terrain	92	94	95

Notes:

1. Curve Numbers for areas designated as industrial were computed using 72% impervious area and 28% desert shrub in poor condition.
2. Curve Numbers for areas designated as existing single family were computed using 60% impervious area and 40% natural desert landscaping.
3. Per currently published City of El Paso Drainage Criteria, Rational Method "c" factors for Mountainous Terrain and Commercial land uses are generally consistent. KHA assumes that Curve Numbers for Mountainous Terrain and Commercial land uses will also be consistent.
4. Curve Numbers were obtained from Tables 2-2a through 2-2d of Technical Resource 55 (TR-55) by the National Resource Conservation Service (NRCS).

WATERSHED PHYSICAL CONDITIONS: AREA AND CURVE NUMBER				
EXISTING WATERSHED CONDITIONS				
Basin	Area	Soil Group %	Weighted CN	CN Description
	Acres			
A1	2879	100% D	95	99% Mountainous Terrain 1% Streets and Roads
A2	759	85% D + 15% B	93	85% Mountainous Terrain 14% Desert Shrub - Poor Condition 1% Streets and Roads
A3	55	100% D	95	Mountainous Terrain
A4	20	100% D	95	Mountainous Terrain
A5	4	100% D	95	Mountainous Terrain
A6	194	95% D + 5% C	89	10% Mountainous Terrain 89% Desert Shrub - Poor Condition 1% Streets and Roads
A7	56	65% D + 35% B	85	5% Mountainous Terrain 94% Desert Shrub - Poor Condition 1% Streets and Roads
A8	96	35% D + 65% B	84	35% Mountainous Terrain 62% Desert Shrub - Poor Condition 3% Streets and Roads
A9	181	60% D +40% B	88	60% Mountainous Terrain 39% Desert Shrub - Poor Condition 1% Streets and Roads
A10	121	35% D + 65% B	84	35% Mountainous Terrain 63% Desert Shrub - Poor Condition 2% Streets and Roads
A11	303	15% D + 85% B	79	99% Desert Shrub - Poor Condition 1% Streets and Roads
A12	27	100% B	77	99% Desert Shrub - Poor Condition 1% Streets and Roads
A13	143	5% D + 95% B	78	99% Desert Shrub - Poor Condition 1% Streets and Roads
A14	528	15% D + 85% B	83	71% Desert Shrub - Poor Condition 19% Industrial 9% Ponded Water Surface 1% Streets and Roads
A15	147	100% B	77	Desert Shrub - Poor Condition
A16	241	5% C + 95% B	78	99% Desert Shrub - Poor Condition 1% Streets and Roads
A17	165	100% B	77	100% Desert Shrub - Poor Condition
A18	33	100% B	77	100% Desert Shrub - Poor Condition
A19	81	100% B	78	97% Desert Shrub - Poor Condition 3% Streets and Roads
A20	126	100% B	77	98% Desert Shrub - Poor Condition 2% Streets and Roads

Notes:

1. Areas designated as streets and roads reflect the impervious cover of MLK, McCombs, and Stan Roberts Sr.

WATERSHED PHYSICAL CONDITIONS: AREA AND CURVE NUMBER				
EXISTING WATERSHED CONDITIONS				
Basin	Area	Soil Group %	Weighted CN	CN Description
	Acres			
B1	1085	100% D	95	Mountainous Terrain
B2	11	100% D	95	Mountainous Terrain
B3	79	100% D	95	Mountainous Terrain
B4	35	100% D	95	Mountainous Terrain
B5	345	100% D	95	Mountainous Terrain
B6	23	60% D + 40% B	88	60% Mountainous Terrain 40% Desert Shrub - Poor Condition
B7	86	70% D + 30% B	90	70% Mountainous Terrain 30% Desert Shrub - Poor Condition
B8	95	65% D + 35% B	89	65% Mountainous Terrain 35% Desert Shrub - Poor Condition
B9	75	35% D + 65% B	84	35% Mountainous Terrain 61% Desert Shrub - Poor Condition 4% Streets and Roads
B10	71	100% D	95	Mountainous Terrain
B11	83	10% D + 90% B	80	10% Mountainous Terrain 86% Desert Shrub - Poor Condition 4% Streets and Roads
B12	72	75% D + 25% B	91	75% Mountainous Terrain 25% Desert Shrub - Poor Condition
B13	7	25% D + 75% B	82	25% Mountainous Terrain 75% Desert Shrub - Poor Condition
B14	107	5% D + 95% B	79	5% Mountainous Terrain 92% Desert Shrub - Poor Condition 3% Streets and Roads
B15	132	5% D + 95% B	78	5% Mountainous Terrain 94% Desert Shrub - Poor Condition 1% Streets and Roads
B16	277	100% B	77	100% Desert Shrub - Poor Condition
B17	173	100% B	77	100% Desert Shrub - Poor Condition
B18	193	100% B	77	100% Desert Shrub - Poor Condition
B19	249	100% B	77	99% Desert Shrub - Poor Condition 1% Streets and Roads
C1	290	100% B	77	98% Desert Shrub - Poor Condition 2% Streets and Roads
C2	12	100% B	80	85% Desert Shrub - Poor Condition 15% Streets and Roads
C3	137	100% B	77	100% Desert Shrub - Poor Condition
C4	209	100% B	77	98% Desert Shrub - Poor Condition 2% Streets and Roads
D1	83	100% B	77	98% Desert Shrub - Poor Condition 2% Streets and Roads
D2	74	100% B	77	100% Desert Shrub - Poor Condition
D3	161	100% B	78	97% Desert Shrub - Poor Condition 3% Streets and Roads
D4	275	100% B	78	97% Desert Shrub - Poor Condition 3% Streets and Roads

Notes:

1. Areas designated as streets and roads reflect the impervious cover of MLK, McCombs, and Stan Roberts Sr.

WATERSHED PHYSICAL CONDITIONS: AREA AND CURVE NUMBER				
EXISTING WATERSHED CONDITIONS				
Basin	Area	Soil Group %	Weighted CN	CN Description
	Acres			
E1	1470	85% D + 15% B	92	85% Mountainous Terrain 15% Desert Shrub - Poor Condition
E2	875	80% D + 20% B	91	80% Mountainous Terrain 20% Desert Shrub - Poor Condition
E3	912	100% D	95	Mountainous Terrain
E4	228	80% D + 20% B	91	80% Mountainous Terrain 20% Desert Shrub - Poor Condition
E5	382	85% D + 15% B	93	85% Mountainous Terrain 14% Desert Shrub - Poor Condition 1% Streets and Roads
E6	67	100% B	77	98% Desert Shrub - Poor Condition 2% Streets and Roads
E7	59	100% B	77	98% Desert Shrub - Poor Condition 2% Streets and Roads
E8	42	100% B	77	98% Desert Shrub - Poor Condition 2% Streets and Roads
E9	23	100% B	77	99% Desert Shrub - Poor Condition 1% Streets and Roads
E10	7	100% B	78	93% Desert Shrub - Poor Condition 7% Streets and Roads
E11	9	100% B	79	90% Desert Shrub - Poor Condition 10% Streets and Roads
E12	143	100% B	90	95% Existing Single Family 3% Ponded Water Surface 2% Streets and Roads
E13	183	5% D + 95% B	89	87% Existing Single Family 6% Open Space - Good Condition 4% Ponded Water Surface 3% Streets and Roads
E14	103	100% B	77	100% Desert Shrub - Poor Condition
E15	50	100% B	77	100% Desert Shrub - Poor Condition
E16	104	100% B	77	100% Desert Shrub - Poor Condition
E17	98	100% B	77	Desert Shrub - Poor Condition
E18	116	100% B	77	Desert Shrub - Poor Condition
E19	186	100% B	77	98% Desert Shrub - Poor Condition 2% Ponded Water Surface
E20	302	100% B	90	Existing Single Family
E21	76	100% B	78	94% Desert Shrub - Poor Condition 4% Commercial 2% Streets and Roads
E22	71	100% B	90	Existing Single Family
E23	137	100% B	90	96% Existing Single Family 4% Ponded Water Surface
E24	86	100% B	91	87% Existing Single Family 13% Ponded Water Surface
E25	93	100% B	90	91% Existing Single Family 9% Ponded Water Surface
E26	52	100% B	90	91% Existing Single Family 9% Ponded Water Surface
E27	84	100% B	90	93% Existing Single Family 7% Ponded Water Surface
E28	11	100% B	91	82% Existing Single Family 18% Ponded Water Surface
E29	34	100% B	90	94% Existing Single Family 6% Ponded Water Surface
NHB1	22	100% B	98	Ponded Water Surface
NHB2	29	10% D + 90% B	98	Ponded Water Surface

Notes:

1. Areas designated as streets and roads reflect the impervious cover of MLK, McCombs, and Stan Roberts Sr.

WATERSHED PHYSICAL CONDITIONS: AREA AND CURVE NUMBER				
EXISTING WATERSHED CONDITIONS				
Basin	Area	Soil Group %	Weighted CN	CN Description
	Acres			
F1	812	5% C + 95% B	78	96% Desert Shrub - Poor Condition 3% Industrial 1% Streets and Roads
F2	26	100% B	78	91% Desert Shrub - Poor Condition 8% Industrial 1% Streets and Roads
F3	167	100% B	75	74% Desert Shrub - Poor Condition 18% Open Space - Good Condition 7% Industrial 1% Streets and Roads
F4	427	100% B	77	85% Desert Shrub - Poor Condition 9% Open Space - Good Condition 5% Industrial 1% Streets and Roads
F5	122	100% B	77	98% Desert Shrub - Poor Condition 1% Open Space - Good Condition 1% Streets and Roads
F6	466	100% B	79	85% Desert Shrub - Poor Condition 14% Industrial 1% Streets and Roads
G1	310	100% B	77	99% Desert Shrub - Poor Condition 1% Streets and Roads
G2	109	100% B	77	93% Desert Shrub - Poor Condition 4% Ponded Water Surface 3% Open Space - Good Condition
G3	56	100% B	78	95% Desert Shrub - Poor Condition 5% Ponded Water Surface
G4	42	100% B	78	95% Desert Shrub - Poor Condition 5% Ponded Water Surface
G5	123	100% B	77	98% Desert Shrub - Poor Condition 2% Ponded Water Surface
G6	118	100% B	77	Desert Shrub - Poor Condition

Notes:

1. Areas designated as streets and roads reflect the impervious cover of MLK, McCombs, and Stan Roberts Sr.
2. Areas F3, F4, F5, and G2 include an existing golf course with sections considered grass cover in good condition.

HYDROLOGIC MODEL ROUTES						
Route ID	Upstream Junction	Downstream Junction	Length	V_{avg}	K	X
			(ft)	(fps)	(hr)	
REACH A1	J-A1	J-A11	6472	3.0	0.61	0.1
REACH A2	J-A2	J-A13	4697	2.9	0.45	0.1
REACH A3	J-A3	J-A8	5373	4.3	0.35	0.2
REACH A4	J-A4	J-A9	6245	2.7	0.64	0.2
REACH A5	J-A5	J-A10	5387	4.2	0.36	0.2
REACH A6	J-A6	J-A14	7837	3.0	0.73	0.1
REACH A7	J-A7	J-A13	5093	2.9	0.49	0.1
REACH A8	J-A8	J-A12	1858	2.6	0.20	0.1
REACH A10a	J-A10a	J-A17	6610	3.0	0.62	0.1
REACH A11	J-A11	J-A14	5451	3.0	0.51	0.1
REACH A12	J-A12	J-A17	4822	3.0	0.45	0.1
REACH A13	J-A13	J-A17	2290	3.0	0.22	0.1
REACH A14	J-A14	J-A18	982	2.1	0.13	0.1
REACH A15	J-A15	J-A16	2597	2.7	0.27	0.1
REACH A16	J-A16	J-A19	1004	2.0	0.14	0.1
REACH A17	J-A17	J-A18	768	2.1	0.10	0.1
REACH A18	J-A18	J-A19	3188	2.0	0.44	0.1
REACH A19	J-A19	J-A20	1161	2.1	0.15	0.1
REACH A20	J-A20	J-F1a	482	2.7	0.05	0.1
REACH B1	J-B1	J-B10	2502	3.9	0.18	0.2
REACH B2	J-B2	J-B9	5642	4.1	0.38	0.2
REACH B3	J-B3	J-B10	2683	3.9	0.19	0.2
REACH B5a	J-B5a	J-B12	2971	3.5	0.24	0.2
REACH B6	J-B6	J-B13	766	1.7	0.13	0.2
REACH B7	J-B7	J-B13	852	1.7	0.14	0.2
REACH B8	J-B8	J-B15	5648	3.8	0.41	0.2
REACH B9	J-B9	J-B16	8343	3.0	0.77	0.1
REACH B10	J-B10	J-B11	3003	3.4	0.24	0.2
REACH B11	J-B11	J-B17	5381	3.1	0.49	0.1
REACH B12	J-B12	J-B14	2697	3.7	0.20	0.2
REACH B13	J-B13	J-B12	2465	3.5	0.20	0.2
REACH B14	J-B14	J-B17	5355	3.1	0.49	0.1
REACH B15	J-B15	J-B18	6441	3.2	0.56	0.1
REACH B16	J-B16	J-B19	3073	5.0	0.17	0.1
REACH B17	J-B17	J-B18	849	3.2	0.07	0.1
REACH B18	J-B18	J-B16	1680	3.0	0.16	0.1
REACH C1	J-C1	J-C3	5565	3.1	0.49	0.1
REACH C2	J-C2	J-C3	5447	3.1	0.48	0.1
REACH C3	J-C3	J-C4	5588	2.8	0.55	0.1

Notes:

1. Open channel flow was modeled using Muskingum methodology. The "K" parameter represents the travel time within the channel based on a measured channel length and an assumed channel velocity determined in time of concentration calculations. The "X" parameter represents the level of attenuation experienced in the reach on a scale of 0.1 to 0.5 with 0.5 having little to no attenuation and 0.1 having a large amount of attenuation.
2. Enclosed storm sewer flow was modeled using a standard lag methodology that does not account for attenuation.

HYDROLOGIC MODEL ROUTES						
Route ID	Upstream Junction	Downstream Junction	Length	V_{avg}	K	X
			(ft)	(fps)	(hr)	
REACH D1	J-D1	J-D2	3831	2.9	0.36	0.1
REACH D2	J-D2	J-D3	3573	2.9	0.35	0.1
REACH D3	J-D3	J-D4	3234	2.6	0.35	0.1
REACH D4	J-D4	J-F5	2621	2.1	0.34	0.1
REACH E5	J-E5	J-E20	2491	24.6	0.03	0.4
REACH E6	J-E6	J-E14	5126	3.2	0.45	0.1
REACH E7	J-E7	J-E15	2902	3.0	0.27	0.1
REACH E8a	J-E8a	J-E15	2973	3.0	0.28	0.1
REACH E9	J-E9	J-E12	2294	24.6	0.03	0.4
REACH E11	J-E11	J-E16	5329	3.4	0.44	0.1
REACH E12	J-E12	J-E13	2287	24.6	0.03	0.4
REACH E13	J-E13	J-E5	781	24.6	0.01	0.4
REACH E14	J-E14	J-E19	7347	2.8	0.73	0.1
REACH E15	J-E15	J-E16	2909	3.4	0.24	0.1
REACH E16	J-E16	J-E17	2854	3.2	0.25	0.1
REACH E17	J-E17	J-E18	1061	3.0	0.10	0.1
REACH E18	J-E18	J-E19	1558	2.8	0.15	0.1
REACH E19	J-E19	GLS	2982	1.9	0.44	0.1
REACH E20	J-E20	J-E21	432	5.5	0.02	0.4
REACH E21	J-E21	J-E24	1809	5.5	0.09	0.4
REACH E22	J-E22	J-E23	2364	5.5	0.12	0.1
REACH E23	J-E23	J-E25	1640	5.5	0.08	0.4
REACH E24	J-E24	J-E23	893	5.5	0.05	0.4
REACH E25	J-E25	J-E26	978	5.5	0.05	0.4
REACH E26	J-E26	J-E27	1282	5.5	0.06	0.4
REACH E27	J-E27	J-E28	479	5.5	0.02	0.4
REACH E28	J-E28	J-E29	633	5.5	0.03	0.4
REACH E29	J-E29	J-E19	1075	2.8	0.11	0.4
REACH NHB2	Basin NHB 2	J-E13	2844	36-inch RCP Culvert Pond Outfall		
REACH F1a	J-F1a	J-F2a	620	2.0	0.08	0.1
REACH F2a	J-F2a	J-F3	2786	2.2	0.35	0.1
REACH F3a	J-F3a	J-F4	4176	2.7	0.43	0.1
REACH F4	J-F4	J-F5	729	2.1	0.10	0.1
REACH F6	J-F6	J-F4	6734	2.7	0.70	0.1
REACH G1	J-G1	J-G5	2310	5.3	0.12	0.1
REACH G2	J-G2	GLS	407	1.9	0.06	0.4
REACH G3	J-G3	J-G2	2359	5.3	0.12	0.4
REACH G4	J-G4	J-G3	1193	5.3	0.06	0.4
REACH G5	J-G5	J-G4	1403	5.3	0.07	0.4
REACH G6	J-G6	J-G5	931	5.3	0.05	0.4

Notes:

1. Open channel flow was modeled using Muskingum methodology. The "K" parameter represents the travel time within the channel based on a measured channel length and an assumed channel velocity determined in time of concentration calculations. The "X" parameter represents the level of attenuation experienced in the reach on a scale of 0.1 to 0.5 with 0.5 having little to no attenuation and 0.1 having a large amount of attenuation.
2. Enclosed storm sewer flow was modeled using a standard lag methodology that does not account for attenuation.

Existing Basin Time of Concentrations						
Basin	Methodology	Upstream Elevation	Downstream Elevation	Length	Slope	Time Of Concentration
				(ft)	(ft/ft)	(min)
A1	Kirpich	5377	4135	26861	0.046	66
A2	Kirpich	4820	4110	13001	0.055	35
A3	Kirpich	4720	4285	3935	0.111	11
A4	Kirpich	4372	4268	1696	0.061	10
A5	Kirpich	4320	4280	891	0.045	10
A6	Kirpich	4362	4112	7292	0.034	27
A7	Kirpich	4315	4112	5565	0.036	21
A8	Kirpich	4300	4105	5786	0.034	23
A9	Kirpich	4277	4097	6416	0.028	26
A10	Kirpich	4277	4095	5422	0.034	22
A11	Kirpich	4135	4050	6820	0.012	38
A12	Kirpich	4110	4072	2064	0.018	13
A13	Kirpich	4110	4040	5490	0.013	31
A14	Kirpich	4130	4035	9258	0.010	52
A15	Kirpich	4055	4021	6256	0.005	50
A16	Kirpich	4062	4003	5969	0.010	37
A17	Kirpich	4101	4024	6676	0.012	38
A18	Kirpich	4040	4016	2968	0.008	24
A19	Kirpich	4025	4002	4008	0.006	33
A20	Kirpich	4029	4000	5212	0.006	41
B1	Kirpich	6927	4251	16176	0.165	27
B2	Kirpich	4316	4272	908	0.048	10
B3	Kirpich	4800	4248	6271	0.088	17
B4	Kirpich	4490	4250	3467	0.069	12
B5	Kirpich	5700	4256	8482	0.170	16
B6	Kirpich	4399	4245	2018	0.076	10
B7	Kirpich	4580	4250	5048	0.065	16
B8	Kirpich	4700	4253	6659	0.067	19
B9	Kirpich	4281	4099	5601	0.032	23
B10	Kirpich	4281	4164	2758	0.042	12
B11	Kirpich	4200	4103	4117	0.024	20
B12	Kirpich	4255	4162	3207	0.029	15
B13	Kirpich	4254	4225	994	0.029	10
B14	Kirpich	4234	4110	4781	0.026	22
B15	Kirpich	4256	4114	5759	0.025	25
B16	Kirpich	4104	4008	8353	0.011	46
B17	Kirpich	4115	4033	5626	0.015	31
B18	Kirpich	4120	4023	6633	0.015	34
B19	Kirpich	4083	3999	9072	0.009	53
C1	Kirpich	4485	4122	9458	0.038	32
C2	Kirpich	4155	4119	1797	0.020	10
C3	Kirpich	4122	4038	5290	0.016	28
C4	Kirpich	4059	3990	7304	0.009	45

Existing Basin Time of Concentrations						
Basin	Methodology	Upstream Elevation	Downstream Elevation	Length	Slope	Time Of Concentration
				(ft)	(ft/ft)	(min)
D1	Kirpich	4333	4123	6967	0.030	27
D2	Kirpich	4123	4059	3907	0.016	22
D3	Kirpich	4080	4013	5174	0.013	30
D4	Kirpich	4036	3982	5897	0.009	38
E1	Kirpich	6927	4212	16255	0.167	27
E2	Kirpich	6440	4204	17717	0.126	32
E3	Kirpich	6200	4200	18681	0.107	36
E4	Kirpich	4650	4220	8094	0.053	25
E5	Kirpich	4900	4100	14235	0.056	37
E6	Kirpich	4272	4121	5241	0.029	22
E7	Kirpich	4277	4128	5390	0.028	23
E8	Kirpich	4224	4130	3270	0.029	15
E9	Kirpich	4224	4133	2976	0.031	14
E10	Kirpich	4173	4130	1391	0.031	10
E11	Kirpich	4159	4133	1015	0.026	10
E12	TR-55	See Times of Concentration for Developed Areas				24
E13	TR-55	See Times of Concentration for Developed Areas				26
E14	Kirpich	4128	4040	5148	0.017	27
E15	Kirpich	4128	4068	2975	0.020	17
E16	Kirpich	4131	4025	5430	0.020	26
E17	Kirpich	4101	4000	7426	0.014	39
E18	Kirpich	4074	3989	6952	0.012	39
E19	Kirpich	4040	3966	7475	0.010	44
E20	TR-55	See Times of Concentration for Developed Areas				32
E21	Kirpich	4088	4020	3320	0.020	18
E22	TR-55	See Times of Concentration for Developed Areas				22
E23	TR-55	See Times of Concentration for Developed Areas				27
E24	TR-55	See Times of Concentration for Developed Areas				19
E25	TR-55	See Times of Concentration for Developed Areas				25
E26	TR-55	See Times of Concentration for Developed Areas				20
E27	TR-55	See Times of Concentration for Developed Areas				20
E28	TR-55	See Times of Concentration for Developed Areas				15
E29	TR-55	See Times of Concentration for Developed Areas				17
NHB 1	Kirpich	4227	4198	1883	0.015	13
NHB 2	Kirpich	4225	4175	3114	0.016	19

Existing Basin Time of Concentrations						
Basin	Methodology	Upstream Elevation	Downstream Elevation	Length	Slope	Time Of Concentration
				(ft)	(ft/ft)	(min)
F1	Kirpich	4075	4000	11274	0.007	69
F2	Kirpich	4022	3999	3186	0.007	26
F3	Kirpich	4022	3986	5557	0.006	43
F4	Kirpich	4037	3967	9078	0.008	56
F5	Kirpich	3983	3964	3084	0.006	27
F6	Kirpich	4075	4010	10711	0.006	71
G1	Kirpich	4075	4007	10502	0.006	70
G2	Kirpich	4022	3965	8157	0.007	54
G3	Kirpich	4016	3969	4999	0.009	34
G4	Kirpich	4016	3980	4176	0.009	29
G5	Kirpich	4021	3994	4683	0.006	37
G6	Kirpich	4037	3999	4057	0.009	29

BASIN INFORMATION:		SHEET FLOW:					SHALLOW CONCENTRATED FLOW:					OPEN CHANNEL FLOW:								TOTAL
		$Tc = (0.007(nL)^{0.8})/(P2^{0.5})(s^{0.4})$ Slope = 1.0% assumed for overland flow					Slope = 1.0% assumed for overland flow V_{avg} = 16.1345*sqrt(Slope) [unpaved] V_{avg} = 20.3282*sqrt(Slope) [paved] T_c = L / 60*V					Hydraulic Radius = Cross-Sectional / Wetted Perimeter Slope = 1.0% assumed for flow within street $V = 1.49R^{2/3}S^{1/2} / n$ Tc = L / 60*V								$T_{cTOTAL} = T_{c1} + T_{c2} + T_{c3}$
Basin	**Condition**	**Length** (ft)	**Slope** (ft/ft)	**2-year/24-hr Rainfall Depth TP-40** (in)	**Manning's "n"** (Table 3-1)	T_{c1} (min)	**Length** (ft)	**Slope** (ft/ft)	**Condition** TR-55 (Fig. 3-1)	V_{avg} (fps) (Fig. 3-1)	T_{c2} (min)	**Cross Sectional Flow Area** (ft^2)	**Wetted Perimeter** (ft)	**Hydraulic Radius** (ft)	**Length** (ft)	**Slope** (ft/ft)	**Manning's "n"**	**V** (fps)	T_{c3} (min)	T_{cTOTAL} (min)
E 12	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	4707.0	0.010	0.016	5.8	13.61	23.66
E 13	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	5443.0	0.010	0.016	5.8	15.73	25.79
E 20	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	7548.0	0.010	0.016	5.8	21.82	31.87
E 22	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	4004.0	0.010	0.016	5.8	11.57	21.63
E 23	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	5733.0	0.010	0.016	5.8	16.57	26.63
E 24	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	3128.0	0.010	0.016	5.8	9.04	19.10
E 25	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	5320.0	0.010	0.016	5.8	15.38	25.43
E 26	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	3448.0	0.010	0.016	5.8	9.97	20.02
E 27	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	3330.0	0.010	0.016	5.8	9.63	19.68
E 28	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	1656.0	0.010	0.016	5.8	4.79	14.84
E 29	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	2381.0	0.010	0.016	5.8	6.88	16.94

Note:

1. An average length of 135 feet was measured from back of lot to street frontage in existing single family developments. 40 of these 135 feet are assumed to convey runoff in sheet flow with the rest in shallow concentrated flow. The remaining length of the time of concentration path in roadways and storm facilities is considered open channel flow.

Proposed Condition

Curve Number Table			
PROPOSED WATERSHED CONDITIONS			
CN Description	Soil Type B	Soil Type C	Soil Type D
Desert Shrub - Poor Condition	77	85	88
Paved parking lots, roofs, driveways, etc.	98	98	98
Natural Desert Landscaping	77	85	88
Industrial	92	94	95
Open Space (Good Condition)	61	74	80
Existing Single Family	90	93	94
Mixed Use/Retail	92	94	95
Paved; open ditches (including right-of-way)	89	92	93
Mountainous Terrain	95	95	95
School	89	93	94
Proposed Open Space	78	86	89
Wells	77	85	88
Type A Residential (3.5 lots per acre)	84	89	91
Type B Residential (5.5 lots per acre)	87	91	93
Type C Residential (7.2 lots per acre)	89	93	94
Type D Residential (12.0 lots per acre)	92	94	95

Notes:

1. Curve Numbers for areas designated as industrial were computed using 72% impervious area and 28% desert shrub in poor condition.
2. Curve Numbers for areas designated as existing single family were computed using 60% impervious area and 40% natural desert landscaping.
3. Curve Numbers for areas designated as Residential Types A, B, C, and D were computed using densities of 3.5, 5.5, 7.2, and 12.0 units per acre respectively. Each density corresponds to ratio of natural desert landscaping to impervious area for a specific land use. There is potential for these densities to change during final design.
4. Curve Numbers for proposed areas designated as open space assume 5% impervious area to account for potential ponded water in channels and ponds.
5. Land cover for existing wells is similar to Desert Shrub-Poor Condition; therefore, Curve Numbers for the existing wells are set equal to Curve Numbers for Desert Shrub-Poor Condition.
6. Land uses designated as Retail and all densites of Mixed Use have Curve Numbers set equal to Commercial land uses as specified in TR-55.
7. Curve Numbers were obtained from Tables 2-2a through 2-2d of Technical Resource 55 (TR-55) by the National Resource Conservation Service (NRCS).

WATERSHED PHYSICAL CONDITIONS: AREA AND CURVE NUMBER				
PROPOSED WATERSHED CONDITIONS				
Basin	Area	Soil Group %	Weighted CN	CN Description
	Acres			
A1	2879	100% D	95	99% Mountainous Terrain 1% Streets and Roads
A2	759	85% D + 15% B	93	85% Mountainous Terrain 14% Desert Shrub - Poor Condition 1% Streets and Roads
A3	44	100% D	95	Mountainous Terrain
A6	194	95% D + 5% C	89	10% Mountainous Terrain 89% Desert Shrub - Poor Condition 1% Streets and Roads
A7	56	65% D + 35% B	85	5% Mountainous Terrain 94% Desert Shrub - Poor Condition 1% Streets and Roads
A8	90	40% D + 60% B	84	40% Mountainous Terrain 59% Desert Shrub - Poor Condition 1% Streets and Roads
A9	49	80% D +20% B	92	80% Mountainous Terrain 19% Desert Shrub - Poor Condition 1% Streets and Roads
A11	303	15% D + 85% B	79	99% Desert Shrub - Poor Condition 1% Streets and Roads
A12	27	100% B	77	99% Desert Shrub - Poor Condition 1% Streets and Roads
A13	143	5% D + 95% B	78	99% Desert Shrub - Poor Condition 1% Streets and Roads
A14	528	15% D + 85% B	83	71% Desert Shrub - Poor Condition 19% Industrial 9% Ponded Water Surface 1% Streets and Roads
A15	147	100% B	77	Desert Shrub - Poor Condition
A16	241	5% C + 95% B	78	99% Desert Shrub - Poor Condition 1% Streets and Roads
B1	1039	100% D	95	Mountainous Terrain
B3	72	100% D	95	Mountainous Terrain
B4	26	100% D	95	Mountainous Terrain
B5	328	100% D	95	Mountainous Terrain
B7	69	85% D + 15% B	92	85% Mountainous Terrain 15% Desert Shrub - Poor Condition
B8	84	75% D + 25% B	91	75% Mountainous Terrain 25% Desert Shrub - Poor Condition
DAM 1	25	45% D + 55% B	98	Ponded Water Surface
DAM 2	24	100% D	98	Ponded Water Surface
C1	65	5% D + 95% B	78	Desert Shrub - Poor Condition

Notes:

1. Areas designated as streets and roads reflect the impervious cover of MLK, McCombs, and Stan Roberts Sr.

WATERSHED PHYSICAL CONDITIONS: AREA AND CURVE NUMBER				
PROPOSED WATERSHED CONDITIONS				
Basin	Area	Soil Group %	Weighted CN	CN Description
	Acres			
E1	1470	85% D + 15% B	92	85% Mountainous Terrain 15% Desert Shrub - Poor Condition
E2	875	80% D + 20% B	91	80% Mountainous Terrain 20% Desert Shrub - Poor Condition
E3	912	100% D	95	Mountainous Terrain
E4	228	80% D + 20% B	91	80% Mountainous Terrain 20% Desert Shrub - Poor Condition
E5	382	85% D + 15% B	93	85% Mountainous Terrain 14% Desert Shrub - Poor Condition 1% Streets and Roads
E12	143	100% B	90	95% Existing Single Family 3% Ponded Water Surface 2% Streets and Roads
E13	183	5% D + 95% B	89	87% Existing Single Family 6% Open Space - Good Condition 4% Ponded Water Surface 3% Streets and Roads
E20	302	100% B	90	Existing Single Family
E21	76	100% B	78	94% Desert Shrub - Poor Condition 4% Commercial 2% Streets and Roads
E22	71	100% B	90	Existing Single Family
E23	137	100% B	90	96% Existing Single Family 4% Ponded Water Surface
E24	86	100% B	91	87% Existing Single Family 13% Ponded Water Surface
E25	93	100% B	90	91% Existing Single Family 9% Ponded Water Surface
E26	52	100% B	90	91% Existing Single Family 9% Ponded Water Surface
E27	84	100% B	90	93% Existing Single Family 7% Ponded Water Surface
E28	11	100% B	91	82% Existing Single Family 18% Ponded Water Surface
E29	34	100% B	90	94% Existing Single Family 6% Ponded Water Surface
NHB1	22	100% B	98	Ponded Water Surface
NHB2	29	10% D + 90% B	98	Ponded Water Surface
F1	739	5% C + 95% B	78	95% Desert Shrub - Poor Condition 4% Industrial 1% Streets and Roads
F6	527	100% B	80	81% Desert Shrub - Poor Condition 18% Industrial 1% Streets and Roads
G1	352	100% B	77	99% Desert Shrub - Poor Condition 1% Streets and Roads
G6	110	100% B	77	Desert Shrub - Poor Condition

Notes:

1. Areas designated as streets and roads reflect the impervious cover of MLK, McCombs, and Stan Roberts Sr.

WATERSHED PHYSICAL CONDITIONS: AREA AND CURVE NUMBER				
PROPOSED WATERSHED CONDITIONS				
Basin	Area	Soil Group %	Weighted CN	CN Description
	Acres			
H1	103	85% D + 15% B	87	91% Open Space - Poor Condition 6% Wells 1% Road and ROW 2% Desert Shrub - Poor Condition
H2a	367	35% D + 65% B	88	5% Mixed Use 9% Open Space - Poor Condition 39% Type A Residential 26% Type B Residential 7% Type C Residential 5% Type D Residential 3% Road and ROW 4% School 2% Desert Shrub - Poor Condition
H2b	328	100% B	85	3% Mixed Use 9% Open Space - Poor Condition 42% Type A Residential 29% Type B Residential 6% Type C Residential 3% Type D Residential 6% Road and ROW 2% Desert Shrub - Poor Condition
H3	270	35% D + 65% B	88	2% Mixed Use 36% Type A Residential 46% Type B Residential 10% Type C Residential 6% Road and ROW
H4a	88	100% B	89	22% Mixed Use 44% Type B Residential 24% Type D Residential 10% Road and ROW
H4b	91	100% B	89	24% Mixed Use 50% Type B Residential 15% Type D Residential 11% Road and ROW
H5	216	100% B	86	2% Mixed Use 13% Open Space - Poor Condition 56% Type B Residential 12% Type C Residential 7% Road and ROW 7% School 3% Wells
H6	365	100% B	86	5% Mixed Use 12% Open Space - Poor Condition 66% Type B Residential 12% Type C Residential 5% Road and ROW

Notes:

1. Internal roads are encompassed in the zoning designations.

WATERSHED PHYSICAL CONDITIONS: AREA AND CURVE NUMBER				
PROPOSED WATERSHED CONDITIONS				
Basin	Area	Soil Group %	Weighted CN	CN Description
	Acres			
H7a	345	100% B	88	5% Mixed Use 3% Open Space - Poor Condition 69% Type B Residential 15% Type D Residential 8% Road and ROW
H7b	341	100% B	86	2% Mixed Use 15% Open Space - Poor Condition 66% Type B Residential 12% Type D Residential 5% Road and ROW
H8	355	100% B	86	1% Mixed Use 22% Open Space - Poor Condition 40% Type B Residential 7% Type C Residential 8% Type D Residential 6% Road and ROW 14% School 2% Wells
H9	379	100% B	84	4% Mixed Use 37% Open Space - Poor Condition 25% Type A Residential 21% Type C Residential 6% Road and ROW 4% School 3% Wells
H10	305	100% B	84	4% Mixed Use 29% Open Space - Poor Condition 29% Type A Residential 22% Type B Residential 8% Road and ROW 8% School
H11a	172	100% B	86	3% Mixed Use 22% Open Space - Poor Condition 33% Type B Residential 29% Type C Residential 4% Road and ROW 9% School
H11b	164	100% B	85	5% Mixed Use 26% Open Space - Poor Condition 28% Type B Residential 30% Type C Residential 8% Road and ROW 3% Wells

Notes:

1. Internal roads are encompassed in the zoning designations.

WATERSHED PHYSICAL CONDITIONS: AREA AND CURVE NUMBER				
PROPOSED WATERSHED CONDITIONS				
Basin	Area	Soil Group %	Weighted CN	CN Description
	Acres			
H12a	309	100% B	90	45% Mixed Use 8% Open Space - Poor Condition 14.% Type B Residential 22% Type D Residential 10% Road and ROW 1% Wells
H12b	74	100% B	89	74% Retail 15% Open Space - Poor Condition 9% Road and ROW 2% Wells
H13	98	100% B	85	12% Mixed Use 10% Open Space - Poor Condition 67% Type A Residential 11% Road and ROW
H14a	43	100% B	83	32% Open Space - Poor Condition 48% Type A Residential 20% Road and ROW
H14b	121	100% B	74	36% Open Space - Good Condition 33% Open Space - Poor Condition 28% Type A Residential 3% Road and ROW
H15a	104	100% B	83	33% Mixed Use 4% Open Space - Good Condition 50% Open Space - Poor Condition 9% Road and ROW 4% Wells
H15b	44	100% B	89	72% Retail 18% Open Space - Poor Condition 10% Road and ROW
H15c	193	100% B	72	1% Mixed Use 38% Open Space - Good Condition 60% Open Space - Poor Condition 1% Wells
H15d	36	100% B	74	25% Open Space - Good Condition 72% Open Space - Poor Condition 3% Wells
H16	410	100% B	87	7% Mixed Use 9% Open Space - Poor Condition 11% Type A Residential 43% Type B Residential 14% Type C Residential 10% Type D Residential 5% Road and ROW 1% Wells

Notes:

1. Internal roads are encompassed in the zoning designations.
2. Areas H14b and H15 include an existing golf course with sections considered grass cover in good condition.

HYDROLOGIC MODEL ROUTES						
Route ID	Upstream Junction	Downstream Junction	Length	V_{avg}	K	X
			(ft)	(fps)	(hr)	
REACH A1	J-A1	J-A11	6472	3.0	0.60	0.1
REACH A2	J-A2	J-A13	4697	2.9	0.45	0.1
REACH A3	J-A3	J-A8	5373	4.2	0.35	0.2
REACH A6	J-A6	J-A14	7837	3.0	0.73	0.1
REACH A7	J-A7	J-A13	5093	2.9	0.49	0.1
REACH A8	J-A8	J-A12	1858	2.7	0.19	0.1
REACH A11	J-A11	J-A14	5451	3.0	0.51	0.1
REACH E5	J-E5	J-E20	2491	24.6	0.03	0.4
REACH E12	J-E12	J-E13	2287	24.6	0.03	0.4
REACH E13	J-E13	J-E5	781	24.6	0.01	0.4
REACH E20	J-E20	J-E21	432	5.5	0.02	0.4
REACH E21	J-E21	J-E24	1809	5.5	0.09	0.4
REACH E22	J-E22	J-E23	2364	5.5	0.12	0.1
REACH E23	J-E23	J-E25	1640	5.5	0.08	0.4
REACH E24	J-E24	J-E23	893	5.5	0.05	0.4
REACH E25	J-E25	J-E26	978	5.5	0.05	0.4
REACH E26	J-E26	J-E27	1282	5.5	0.06	0.4
REACH E27	J-E27	J-E28	479	5.5	0.02	0.4
REACH E28	J-E28	J-E29	633	5.5	0.03	0.4
REACH NHB2	Basin NHB 2	J-E13	2844	36-inch RCP Culvert Pond Outfall		

Notes:

1. Open channel flow was modeled using Muskingum methodology. The "K" parameter represents the travel time within the channel based on a measured channel length and an assumed channel velocity determined in time of concentration calculations. The "X" parameter represents the level of attenuation experienced in the reach on a scale of 0.1 to 0.5 with 0.5 having little to no attenuation and 0.1 having a large amount of attenuation.

HYDROLOGIC MODEL ROUTES						
Route ID	Upstream Junction	Downstream Junction	Length	V_{avg}	K	X
			(ft)	(fps)	(hr)	
NORTH REACH 1	DAM 1	J-H1a	5831	6.0	0.27	0.3
NORTH REACH 2	J-H1a	J-H1	1250	6.0	0.06	0.3
NORTH REACH 3	J-H1b	J-H6a	1779	6.0	0.08	0.3
NORTH REACH 4	J-H6a	J-H6b	2582	6.0	0.12	0.3
NORTH REACH 5	J-H6b	J-H6	1003	6.0	0.05	0.3
NORTH REACH 6	J-H6	J-H9a	1395	6.0	0.06	0.3
NORTH REACH 7	J-H9a	J-H9b	1160	6.0	0.05	0.3
NORTH REACH 8	J-H9b	J-H9	3921	6.0	0.18	0.3
NORTH REACH 9	J-A16	J-H9	2935	6.0	0.14	0.3
NORTH REACH 10	J-F1	J-H13	2751	6.0	0.13	0.3
NORTH REACH 11	J-F6	J-H13	2952	6.0	0.14	0.3
CENTRAL REACH 1	DAM 2	J-H2c	3143	6.0	0.15	---
CENTRAL REACH 2	J-H2c	J-H2	3821	6.0	0.18	0.3
CENTRAL REACH 3	J-H2	J-H4	837	6.0	0.04	0.3
CENTRAL REACH 4	J-H4	J-H7	5396	6.0	0.25	0.3
CENTRAL REACH 5	J-H7	J-H11a	5411	6.0	0.25	0.3
CENTRAL REACH 6	J-H14b	J-H14a	600	6.0	0.03	0.3
SOUTH REACH 1	J-H5	J-H8	5290	6.0	0.24	0.3
SOUTH REACH 2	J-H8	J-H12a	4187	6.0	0.19	0.3
SOUTH REACH 3	J-H12a	J-H12b	1027	6.0	0.05	0.3
MCCOMBS REACH 4	J-H11b	J-H15a	3232	6.0	0.15	0.1
EFC REACH 1	J-G6	J-H16	4200	5.3	0.22	0.4
EFC REACH 2	J-H16	J-H15d	2830	5.3	0.15	0.4
EFC REACH 3	J-G1	J-G6	1793	6.0	0.08	0.4
WFC REACH 1	J-E29	J-H12b	258	2.8	0.03	0.4
WFC REACH 2	J-H12b	J-H12c	817	2.8	0.08	0.4
WFC REACH 3	J-H12c	J-H15b	2207	2.8	0.22	0.4
WFC REACH 4	J-H15b	GLS	775	1.9	0.11	0.1

Notes:

1. Open channel flow was modeled using Muskingum methodology. The "K" parameter represents the travel time within the channel based on a measured channel length and an assumed channel velocity determined in time of concentration calculations. The "X" parameter represents the level of attenuation experienced in the reach on a scale of 0.1 to 0.5 with 0.5 having little to no attenuation and 0.1 having a large amount of attenuation.
2. Enclosed storm sewer flow was modeled using a standard lag methodology that does not account for attenuation.
3. McCombs Reaches 1-3 have are modeled as reservoirs in PondPack.

Proposed Basin Times of Concentration						
Basin	Methodology	Upstream Elevation	Downstream Elevation	Length	Slope	Time Of Concentration
				(ft)	(ft/ft)	(min)
A 1	Kirpich	5377	4135	26861	0.046	66
A 2	Kirpich	4820	4110	13001	0.055	35
A 3	Kirpich	4720	4285	3935	0.111	11
A 6	Kirpich	4362	4112	7292	0.034	27
A 7	Kirpich	4315	4112	5565	0.036	21
A 8	Kirpich	4300	4105	5786	0.034	23
A 9	Kirpich	4290	4124	4084	0.041	16
A 11	Kirpich	4135	4050	6820	0.012	38
A 12	Kirpich	4110	4072	2064	0.018	13
A 13	Kirpich	4110	4040	5490	0.013	31
A 14	Kirpich	4130	4035	9258	0.010	52
A 15	Kirpich	4055	4021	6256	0.005	50
A 16	Kirpich	4062	4003	5969	0.010	37
B 1	Kirpich	6927	4374	12591	0.203	21
B 3	Kirpich	4800	4282	5542	0.093	15
B 4	Kirpich	4490	4293	2411	0.082	10
B 5	Kirpich	5700	4311	7029	0.198	13
B 7	Kirpich	4580	4294	3847	0.074	12
B 8	Kirpich	4700	4306	5525	0.071	16
Dam 1	Kirpich	4313	4272	6180	0.007	44
Dam 2	Kirpich	4377	4296	2046	0.040	10
C 1	Kirpich	4485	4303	3039	0.060	11
E 1	Kirpich	6927	4212	16255	0.167	27
E 2	Kirpich	6440	4204	17717	0.126	32
E 3	Kirpich	6200	4200	18681	0.107	36
E 4	Kirpich	4650	4220	8094	0.053	25
E 5	Kirpich	4900	4100	14235	0.056	37
E 12	TR-55	See Times of Concentration for Developed Areas				24
E 13	TR-55	See Times of Concentration for Developed Areas				26
E 20	TR-55	See Times of Concentration for Developed Areas				32
E 21	Kirpich	4088	4020	3320	0.020	18
E 22	TR-55	See Times of Concentration for Developed Areas				22
E 23	TR-55	See Times of Concentration for Developed Areas				27
E 24	TR-55	See Times of Concentration for Developed Areas				19
E 25	TR-55	See Times of Concentration for Developed Areas				25
E 26	TR-55	See Times of Concentration for Developed Areas				20
E 27	TR-55	See Times of Concentration for Developed Areas				20
E 28	TR-55	See Times of Concentration for Developed Areas				15
E 29	TR-55	See Times of Concentration for Developed Areas				17
NHB 1	Kirpich	4227	4198	1883	0.015	13
NHB 2	Kirpich	4225	4175	3114	0.016	19

Proposed Basin Times of Concentration						
Basin	Methodology	Upstream Elevation	Downstream Elevation	Length	Slope	Time Of Concentration
				(ft)	(ft/ft)	(min)
F 1	Kirpich	4075	4003	8682	0.008	54
F 6	Kirpich	4075	4011	10693	0.006	71
G 1	Kirpich	4075	4006	10567	0.007	66
G 6	Kirpich	4037	4003	3259	0.010	23
H1	Kirpich	4301	4100	7254	0.028	29
H 2a	TR-55	See Times of Concentration for Developed Areas				30
H 2b	TR-55	See Times of Concentration for Developed Areas				28
H 3	TR-55	See Times of Concentration for Developed Areas				21
H 4a	TR-55	See Times of Concentration for Developed Areas				17
H 4b	TR-55	See Times of Concentration for Developed Areas				16
H 5	TR-55	See Times of Concentration for Developed Areas				24
H 6	TR-55	See Times of Concentration for Developed Areas				31
H 7a	TR-55	See Times of Concentration for Developed Areas				33
H 7b	TR-55	See Times of Concentration for Developed Areas				32
H 8	TR-55	See Times of Concentration for Developed Areas				32
H 9	TR-55	See Times of Concentration for Developed Areas				21
H 10	TR-55	See Times of Concentration for Developed Areas				33
H 11a	TR-55	See Times of Concentration for Developed Areas				21
H 11b	TR-55	See Times of Concentration for Developed Areas				21
H 12a	TR-55	See Times of Concentration for Developed Areas				29
H 12b	TR-55	See Times of Concentration for Developed Areas				11
H 13	TR-55	See Times of Concentration for Developed Areas				15
H 14a	TR-55	See Times of Concentration for Developed Areas				23
H 14b	Kirpich	4012	3986	3870	0.007	30
H15a	TR-55	See Times of Concentration for Developed Areas				19
H15b	TR-55	See Times of Concentration for Developed Areas				15
H15c	Kirpich	3990	3965	4203	0.006	34
H15d	Kirpich	3981	3965	2921	0.005	28
H16	TR-55	See Times of Concentration for Developed Areas				40

BASIN INFORMATION:		SHEET FLOW:					SHALLOW CONCENTRATED FLOW:					OPEN CHANNEL FLOW:								TOTAL
		$Tc = (0.007(nL)^{0.8})/(P2^{0.5})(s^{0.4})$ Slope = 1.0% assumed for overland flow					Slope = 1.0% assumed for overland flow V_{avg} = 16.1345*sqrt(Slope) [unpaved] V_{avg} = 20.3282*sqrt(Slope) [paved] T_c = L / 60*V					Hydraulic Radius = Cross-Sectional / Wetted Perimeter Slope = 1.0% assumed for flow within street $V = 1.49R^{2/3}S^{1/2} / n$ Tc = L / 60*V								$T_{cTOTAL} = T_{c1} + T_{c2} + T_{c3}$
Basin	Condition	Length (ft)	Slope (ft/ft)	2-year/24-hr Rainfall Depth TP-40 (in)	Manning's "n" (Table 3-1)	T_{c1} (min)	Length (ft)	Slope (ft/ft)	Condition TR-55 (Fig. 3-1)	V_{avg} (fps) (Fig. 3-1)	T_{c2} (min)	Cross Sectional Flow Area (ft^2)	Wetted Perimeter (ft)	Hydraulic Radius (ft)	Length (ft)	Slope (ft/ft)	Manning's "n"	V (fps)	T_{c3} (min)	T_{cTOTAL} (min)
E 12	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	4707.0	0.010	0.016	5.8	13.61	23.66
E 13	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	5443.0	0.010	0.016	5.8	15.73	25.79
E 20	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	7548.0	0.010	0.016	5.8	21.82	31.87
E 22	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	4004.0	0.010	0.016	5.8	11.57	21.63
E 23	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	5733.0	0.010	0.016	5.8	16.57	26.63
E 24	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	3128.0	0.010	0.016	5.8	9.04	19.10
E 25	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	5320.0	0.010	0.016	5.8	15.38	25.43
E 26	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	3448.0	0.010	0.016	5.8	9.97	20.02
E 27	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	3330.0	0.010	0.016	5.8	9.63	19.68
E 28	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	1656.0	0.010	0.016	5.8	4.79	14.84
E 29	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	19.0	39.0	0.5	2381.0	0.010	0.016	5.8	6.88	16.94
H 2a	Developed	40	0.030	1.50	0.150	5.85	95	0.030	Unpaved	2.79	0.57	----	----	----	8471.0	----	----	6.0	23.53	29.94
H 2b	Developed	40	0.030	1.50	0.150	5.85	95	0.030	Unpaved	2.79	0.57	----	----	----	7885.0	----	----	6.0	21.90	28.32
H 3	Developed	40	0.030	1.50	0.150	5.85	95	0.030	Unpaved	2.79	0.57	----	----	----	5253.0	----	----	6.0	14.59	21.00
H 4a	Developed	40	0.030	1.50	0.150	5.85	95	0.030	Unpaved	2.79	0.57	----	----	----	3737.0	----	----	6.0	10.38	16.79
H 4b	Developed	40	0.030	1.50	0.150	5.85	95	0.030	Unpaved	2.79	0.57	----	----	----	3345.0	----	----	6.0	9.29	15.70
H 5	Developed	40	0.030	1.50	0.150	5.85	95	0.030	Unpaved	2.79	0.57	----	----	----	6264.0	----	----	6.0	17.40	23.81
H 6	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	----	----	----	7512.0	----	----	6.0	20.87	30.92
H 7a	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	----	----	----	8415.0	----	----	6.0	23.38	33.43
H 7b	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	----	----	----	7860.0	----	----	6.0	21.83	31.89
H 8	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	----	----	----	7791.0	----	----	6.0	21.64	31.70
H 9	Developed	10	0.010	1.50	0.150	2.99	50	0.010	Paved	2.03	0.41	----	----	----	6510.0	----	----	6.0	18.08	21.49
H 10	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	----	----	----	8356.0	----	----	6.0	23.21	33.26
H 11a	Developed	10	0.010	1.50	0.150	2.99	50	0.010	Paved	2.03	0.41	----	----	----	6294.0	----	----	6.0	17.48	20.89
H 11b	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Unpaved	1.61	0.98	----	----	----	3993.0	----	----	6.0	11.09	21.15
H 12a	Developed	40	0.010	1.50	0.150	9.07	95	0.010	Paved	2.03	0.78	----	----	----	6768.0	----	----	6.0	18.80	28.65
H 12b	Developed	10	0.010	1.50	0.150	2.99	50	0.010	Paved	2.03	0.41	----	----	----	2646.0	----	----	6.0	7.35	10.75
H 13	Developed	10	0.005	1.50	0.150	3.95	50	0.005	Paved	1.44	0.58	----	----	----	3692.0	----	----	6.0	10.26	14.78
H 14a	Developed	40	0.005	1.50	0.150	11.97	95	0.005	Unpaved	1.14	1.39	----	----	----	3352.0	----	----	6.0	9.31	22.67
H 15a	Developed	10	0.005	1.50	0.150	3.95	50	0.005	Unpaved	1.44	0.58	----	----	----	5130.0	----	----	6.0	14.25	18.78
H 15b	Developed	10	0.005	1.50	0.150	3.95	50	0.005	Unpaved	1.44	0.58	----	----	----	3732.0	----	----	6.0	10.37	14.90
H 16	Developed	40	0.005	1.50	0.150	11.97	95	0.005	Unpaved	1.14	1.39	----	----	----	9557.0	----	----	6.0	26.55	39.91

Notes:

1. An average length of 135 feet was measured from back of lot to street frontage in existing single family developments. 40 of these 135 feet are assumed to convey runoff in sheet flow with the rest in shallow concentrated flow. The remaining length of the time of concentration path is considered open channel flow. Proposed single family developments are assumed to have similar time of concentration paths as existing single family developments.
2. Times of concentration for proposed retail and mixed use developments assume 10 feet of sheet flow and 40 feet of shallow concentrated flow. The remaining length of the time of concentration path is assumed to occur in enclosed storm sewer pipe and/or open channel flow with velocities equal to approximately 6 feet per second.
3. Open channel flow includes portions of the time of concentration path contained within enclosed storm sewer pipe as well as open channel flow. Velocities for open channel flow and enclosed storm sewer are set at 6 feet per second in proposed conditions.

Kimley-Horn and Associates, Inc.

Appendix B:

Hydrologic Results

Existing Condition

Proposed Condition

Existing Condition

MASTER DESIGN STORM SUMMARY

Network Storm Collection: Type II-75 - 24

Return Event	Total Depth in	Rainfall Type	RNF ID
Pre100	3.3400	Synthetic Curve	TypeII-75 24hr:

```
-------------------------------
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
A1	AREA	100	667.433	--	6.5500	6243.82		
A10	AREA	100	18.141		6.1500	409.77		
A11	AREA	100	36.417		6.3000	505.23		
A12	AREA	100	2.921		6.0500	87.69		
A13	AREA	100	16.374		6.2500	265.97		
A14	AREA	100	75.930		6.4500	832.82		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
A15	AREA	100	16.041		6.4500	173.12		
A16	AREA	100	27.679		6.3000	390.29		
A17	AREA	100	18.089		6.3000	249.86		
A18	AREA	100	3.656		6.1500	73.74		
A19	AREA	100	9.292		6.2500	142.78		
A2	AREA	100	163.260		6.2500	2639.76		
A20	AREA	100	13.744		6.3500	178.01		
A3	AREA	100	12.815		6.0000	406.52		
A4	AREA	100	4.645		6.0000	151.62		
A5	AREA	100	.816		6.0000	26.63		
A6	AREA	100	35.734		6.2000	700.83		
A7	AREA	100	8.826		6.1500	201.75		
A8	AREA	100	14.358		6.1500	314.08		
A9	AREA	100	31.990		6.2000	638.34		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
B1	AREA	100	251.560		6.1500	4882.17		
B10	AREA	100	16.451		6.0500	514.89		
B11	AREA	100	10.493		6.1500	245.60		
B12	AREA	100	14.408		6.0500	407.90		
B13	AREA	100	.918		6.0500	32.34		
B14	AREA	100	12.902		6.1500	284.95		
B15	AREA	100	15.199		6.2000	294.83		
B16	AREA	100	30.319		6.4000	351.11		
B17	AREA	100	18.888		6.2500	306.79		
B18	AREA	100	21.149		6.3000	309.06		
B19	AREA	100	27.273		6.5000	279.16		
B2	AREA	100	2.457		6.0000	80.20		
B3	AREA	100	18.366		6.0500	488.01		
B4	AREA	100	8.155		6.0500	253.33		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
B5	AREA	100	80.090		6.0500	2147.81		
B6	AREA	100	3.998		6.0500	137.01		
B7	AREA	100	16.466		6.1000	455.73		
B8	AREA	100	17.557		6.1000	436.65		
B9	AREA	100	11.205		6.1500	245.00		
C1	AREA	100	31.767		6.2500	510.88		
C2	AREA	100	1.506		6.0500	53.31		
C3	AREA	100	15.026		6.2000	264.67		
C4	AREA	100	22.815		6.4000	270.55		
D1	AREA	100	9.102		6.2000	167.45		
D2	AREA	100	8.128		6.1500	173.61		
D3	AREA	100	18.481		6.2500	310.64		
D4	AREA	100	31.597		6.3000	436.04		
E1	AREA	100	304.255		6.1500	5918.49		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
E10	AREA	100	.761		6.0500	27.03		
E11	AREA	100	1.097		6.0500	38.90		
E12	AREA	100	27.495		6.1500	602.62		
E13	AREA	100	33.647		6.1500	676.50		
E14	AREA	100	11.261		6.2000	206.99		
E15	AREA	100	5.484		6.1000	145.24		
E16	AREA	100	11.369		6.2000	207.28		
E17	AREA	100	10.670		6.3500	145.48		
E18	AREA	100	12.703		6.3500	169.81		
E19	AREA	100	20.311		6.4000	244.96		
E2	AREA	100	174.345		6.2500	2997.77		
E20	AREA	100	57.881		6.2500	994.80		
E21	AREA	100	8.666		6.1000	215.38		
E22	AREA	100	13.691		6.1500	315.32		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
E23	AREA	100	26.292		6.1500	518.91		
E24	AREA	100	17.020		6.1000	427.32		
E25	AREA	100	17.891		6.1500	368.03		
E26	AREA	100	10.002		6.1000	244.59		
E27	AREA	100	16.007		6.1000	393.56		
E28	AREA	100	2.229		6.0500	64.35		
E29	AREA	100	6.546		6.1000	176.32		
E3	AREA	100	211.498		6.2500	3305.41		
E4	AREA	100	45.592		6.1500	964.23		
E5	AREA	100	82.162		6.3000	1250.93		
E6	AREA	100	7.315		6.1500	156.47		
E7	AREA	100	6.481		6.1500	135.72		
E8	AREA	100	4.587		6.1000	126.98		
E9	AREA	100	2.565		6.1000	73.43		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
F1	AREA	100	93.154		6.6500	764.82		
F2	AREA	100	3.028		6.2000	57.32		
F3	AREA	100	16.559		6.3500	201.55		
F4	AREA	100	46.697		6.5000	455.09		
F5	AREA	100	13.385		6.2000	242.01		
F6	AREA	100	56.052		6.6500	451.68		
G1	AREA	100	33.864		6.6500	273.43		
G2	AREA	100	11.897		6.5000	121.68		
G3	AREA	100	6.401		6.3000	98.20		
G4	AREA	100	4.809		6.2000	83.36		
G5	AREA	100	13.464		6.3000	186.88		
G6	AREA	100	12.919		6.2000	225.02		
*GLS	JCT	100	3365.142		8.4000	10223.03		
J-A1	JCT	100	667.433		6.5500	6243.82		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
J-A10	JCT	100	18.956		6.1500	416.16		
J-A10A	JCT	100	55.585		6.1500	1053.24		
J-A11	JCT	100	703.849		7.1500	5850.06		
J-A12	JCT	100	30.093		6.4500	471.58		
J-A13	JCT	100	188.457		6.7000	2452.65		
J-A14	JCT	100	815.506		7.7000	5720.26		
J-A15	JCT	100	16.041		6.4500	173.12		
J-A16	JCT	100	43.720		6.3500	451.87		
J-A17	JCT	100	292.215		6.9000	3527.86		
J-A18	JCT	100	1111.372		7.7500	6183.74		
J-A19	JCT	100	1164.361		8.1500	6073.93		
J-A2	JCT	100	163.260		6.2500	2639.76		
J-A20	JCT	100	1178.089		8.3000	6045.92		
J-A3	JCT	100	12.815		6.0000	406.52		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
J-A4	JCT	100	4.645		6.0000	151.62		
J-A5	JCT	100	.816		6.0000	26.63		
J-A6	JCT	100	35.734		6.2000	700.83		
J-A7	JCT	100	8.826		6.1500	201.75		
J-A8	JCT	100	27.172		6.3000	496.06		
J-A9	JCT	100	36.629		6.2000	642.73		
J-B1	JCT	100	251.560		6.1500	4882.17		
J-B10	JCT	100	286.377		6.3500	4979.76		
J-B11	JCT	100	296.870		6.6000	4609.74		
J-B12	JCT	100	124.035		6.3000	2535.92		
J-B13	JCT	100	21.382		6.2000	529.00		
J-B14	JCT	100	136.932		6.5000	2381.83		
J-B15	JCT	100	32.756		6.5000	439.93		
J-B16	JCT	100	550.486		7.2500	6149.03		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
J-B17	JCT	100	452.623		7.0500	5857.84		
J-B18	JCT	100	506.518		7.1000	6187.43		
J-B19	JCT	100	577.759		7.4000	6006.99		
J-B2	JCT	100	2.457		6.0000	80.20		
J-B3	JCT	100	18.366		6.0500	488.01		
J-B4	JCT	100	8.155		6.0500	253.33		
J-B5	JCT	100	80.090		6.0500	2147.81		
J-B5A	JCT	100	88.245		6.0500	2401.14		
J-B6	JCT	100	3.998		6.0500	137.01		
J-B7	JCT	100	16.466		6.1000	455.73		
J-B8	JCT	100	17.557		6.1000	436.65		
J-B9	JCT	100	13.660		6.1500	260.99		
J-C1	JCT	100	31.767		6.2500	510.88		
J-C2	JCT	100	1.506		6.0500	53.31		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
J-C3	JCT	100	48.296		6.7500	475.89		
J-C4	JCT	100	71.100		7.2500	476.67		
J-D1	JCT	100	9.102		6.2000	167.45		
J-D2	JCT	100	17.230		6.2000	181.06		
J-D3	JCT	100	35.709		6.3000	359.73		
J-D4	JCT	100	67.304		6.5000	609.91		
J-E1	JCT	100	304.255		6.1500	5918.49		
J-E10	JCT	100	.761		6.0500	27.03		
J-E11	JCT	100	1.097		6.0500	38.90		
J-E12	JCT	100	30.060		6.1500	671.58		
J-E13	JCT	100	808.787		6.1500	1449.82		
J-E14	JCT	100	18.576		6.2500	213.84		
J-E15	JCT	100	17.312		6.3500	249.13		
J-E16	JCT	100	29.776		6.3500	333.98		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
J-E17	JCT	100	40.446		6.5500	411.67		
J-E18	JCT	100	53.148		6.5500	510.35		
J-E19	JCT	100	1159.166		6.7000	5192.57		
J-E2	JCT	100	174.345		6.2500	2997.77		
J-E20	JCT	100	948.828		6.2500	3615.37		
J-E21	JCT	100	957.494		6.2500	3741.16		
J-E22	JCT	100	13.691		6.1500	315.32		
J-E23	JCT	100	1014.488		6.3500	4364.90		
J-E24	JCT	100	974.508		6.3500	3845.86		
J-E25	JCT	100	1032.374		6.4500	4448.29		
J-E26	JCT	100	1042.373		6.5000	4468.02		
J-E27	JCT	100	1058.376		6.5500	4498.32		
J-E28	JCT	100	1060.604		6.5500	4500.71		
J-E29	JCT	100	1067.148		6.6000	4505.47		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
J-E3	JCT	100	211.498		6.2500	3305.41		
J-E4	JCT	100	45.592		6.1500	964.23		
J-E5	JCT	100	890.949		6.2000	2623.59		
J-E6	JCT	100	7.315		6.1500	156.47		
J-E7	JCT	100	6.481		6.1500	135.72		
J-E8	JCT	100	4.587		6.1000	126.98		
J-E8A	JCT	100	5.347		6.1000	147.80		
J-E9	JCT	100	2.565		6.1000	73.43		
J-F1	JCT	100	93.154		6.6500	764.82		
J-F1A	JCT	100	1271.235		8.3500	6113.20		
J-F2	JCT	100	3.028		6.2000	57.32		
J-F2A	JCT	100	1852.007		7.5000	10111.38		
J-F3	JCT	100	16.559		6.3500	201.55		
J-F3A	JCT	100	1939.575		7.8500	9915.09		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
J-F4	JCT	100	2042.042		8.3000	9757.44		
J-F5	JCT	100	2122.621		8.4000	9741.74		
J-F6	JCT	100	56.052		6.6500	451.68		
J-G1	JCT	100	33.864		6.6500	273.43		
J-G2	JCT	100	83.354		6.5500	759.56		
J-G3	JCT	100	71.456		6.4500	645.39		
J-G4	JCT	100	65.056		6.4000	574.04		
J-G5	JCT	100	60.247		6.3500	520.40		
J-G6	JCT	100	12.919		6.2000	225.02		
NHB 1	AREA	100	5.808		6.0500	167.37		
NHB 2	AREA	100	7.579		6.1000	184.77		
NHB1	POND	100	310.062		6.1500	6022.67		
NHB1	OUT POND	100	307.029		6.8000	84.10	4213.98	253.968
NHB2	POND	100	746.044		6.2500	7291.92		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
NHB2	OUT POND	100	745.079	--	15.6500	112.52	4201.59	389.679

Proposed Condition

MASTER DESIGN STORM SUMMARY

Network Storm Collection: Type II-75 - 24

Return Event	Total Depth in	Rainfall Type	RNF ID
Dev100	3.3400	Synthetic Curve	TypeII-75 24hr:

```
-------------------------------
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
A1	AREA	100	667.433	--	6.5500	6243.82		
A11	AREA	100	36.417		6.3000	505.23		
A12	AREA	100	2.921		6.0500	87.69		
A13	AREA	100	16.374		6.2500	265.97		
A14	AREA	100	75.930		6.4500	832.82		
A15	AREA	100	16.041		6.4500	173.12		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
A16	AREA	100	27.679		6.3000	390.29		
A2	AREA	100	163.260		6.2500	2639.76		
A3	AREA	100	10.141		6.0000	321.69		
A6	AREA	100	35.734		6.2000	700.83		
A7	AREA	100	8.826		6.1500	201.75		
A8	AREA	100	13.489		6.1500	295.08		
A9	AREA	100	10.148		6.0500	277.44		
B1	AREA	100	240.558		6.1000	5677.59		
B3	AREA	100	16.721		6.0500	475.84		
B4	AREA	100	5.952		6.0000	194.29		
B5	AREA	100	75.963		6.0500	2273.48		
B7	AREA	100	14.326		6.0500	451.17		
B8	AREA	100	16.680		6.1000	453.85		
C1	AREA	100	7.468		6.0500	253.88		

ICPM CALCULATION TOLERANCES

Target Convergence= .001 cfs +/-
Max. Iterations = 35 loops
ICPM Time Step = .0500 hrs
Output Time Step = .0500 hrs
ICPM Ending Time = 141.5000 hrs

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID		Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
DAM 1		JCT	100	143.303		6.8500	129.34		
DAM 1		AREA	100	6.451		6.3500	84.04		
DAM 1	IN	POND	100	143.560		6.0500	4130.69		
DAM 1	OUT	POND	100	143.303		6.8500	129.34	4294.71	109.368
DAM 2		AREA	100	6.108		6.0000	194.13		
DAM 2		JCT	100	244.573		7.1000	148.28		
DAM 2	IN	POND	100	246.666		6.1000	5804.02		
DAM 2	OUT	POND	100	244.573		7.1000	148.28	4309.49	195.648
E1		AREA	100	304.255		6.1500	5918.49		
E12		AREA	100	27.495		6.1500	602.62		
E13		AREA	100	33.647		6.1500	676.50		
E2		AREA	100	174.345		6.2500	2997.77		
E20		AREA	100	57.881		6.2500	994.80		
E21		AREA	100	8.666		6.1000	215.38		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
E22	AREA	100	13.691		6.1500	315.32		
E23	AREA	100	26.292		6.1500	518.91		
E24	AREA	100	17.020		6.1000	427.32		
E25	AREA	100	17.891		6.1500	368.03		
E26	AREA	100	10.002		6.1000	244.59		
E27	AREA	100	16.007		6.1000	393.56		
E28	AREA	100	2.229		6.0500	64.35		
E29	AREA	100	6.546		6.1000	176.32		
E3	AREA	100	211.498		6.2500	3305.41		
E4	AREA	100	45.592		6.1500	964.23		
E5	AREA	100	82.162		6.3000	1250.93		
F1	AREA	100	84.839		6.5000	868.14		
F6	AREA	100	66.393		6.6000	538.53		
G1	AREA	100	38.468		6.6000	327.38		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
G6	AREA	100	11.993		6.1500	247.78		
*GLS	JCT	100	3358.744		7.2000	9076.51		
H1	AREA	100	17.569		6.2000	325.70		
H10	AREA	100	45.823		6.2500	738.52		
H11A	AREA	100	27.922		6.1500	645.83		
H11B	AREA	100	25.730		6.1500	592.34		
H12A	AREA	100	59.232		6.2000	1107.43		
H12B	AREA	100	13.621		6.0500	456.13		
H13	AREA	100	15.340		6.0500	441.42		
H14A	AREA	100	6.237		6.1500	137.64		
H14B	AREA	100	11.402		6.2500	183.81		
H15A	AREA	100	14.991		6.1000	374.18		
H15B	AREA	100	8.110		6.0500	233.43		
H15C	AREA	100	16.400		6.3000	233.92		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
H15D	AREA	100	3.387		6.2000	58.22		
H16	AREA	100	69.648		6.3000	989.67		
H2A	AREA	100	64.936		6.2000	1170.20		
H2B	AREA	100	51.268		6.2000	944.71		
H3	AREA	100	47.770		6.1500	1103.80		
H4A	AREA	100	16.115		6.1000	434.02		
H4B	AREA	100	16.728		6.1000	464.63		
H5	AREA	100	35.216		6.1500	750.16		
H6	AREA	100	59.613		6.2500	1036.99		
H7A	AREA	100	61.036		6.2500	1010.73		
H7B	AREA	100	55.690		6.2500	944.58		
H8	AREA	100	57.927		6.2500	983.00		
H9	AREA	100	56.825		6.1500	1289.19		
J-A1	JCT	100	667.433		6.5500	6243.82		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
J-A11	JCT	100	703.849		7.1500	5850.06		
J-A16	JCT	100	27.679		6.3000	390.29		
J-A2	JCT	100	163.260		6.2500	2639.76		
J-A3	JCT	100	10.141		6.0000	321.69		
J-A6	JCT	100	35.734		6.2000	700.83		
J-A7	JCT	100	8.826		6.1500	201.75		
J-A8	JCT	100	23.629		6.2500	428.49		
J-E1	JCT	100	304.255		6.1500	5918.49		
J-E12	JCT	100	27.495		6.1500	602.62		
J-E13	JCT	100	806.225		6.2000	1376.02		
J-E2	JCT	100	174.345		6.2500	2997.77		
J-E20	JCT	100	946.266		6.2500	3555.10		
J-E21	JCT	100	954.933		6.2500	3674.48		
J-E22	JCT	100	13.691		6.1500	315.32		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
J-E23	JCT	100	1011.926		6.3500	4295.55		
J-E24	JCT	100	971.946		6.3500	3783.23		
J-E25	JCT	100	1029.812		6.4500	4383.84		
J-E26	JCT	100	1039.811		6.5000	4404.54		
J-E27	JCT	100	1055.814		6.5500	4435.25		
J-E28	JCT	100	1058.044		6.5500	4436.89		
J-E29	JCT	100	1064.587		6.6000	4442.71		
J-E3	JCT	100	211.498		6.2500	3305.41		
J-E4	JCT	100	45.592		6.1500	964.23		
J-E5	JCT	100	888.389		6.2000	2557.07		
J-F1	JCT	100	84.839		6.5000	868.14		
J-F6	JCT	100	66.393		6.6000	538.53		
J-G1	JCT	100	38.468		6.6000	327.38		
J-G6	JCT	100	50.461		6.6500	361.92		
J-G6	JCT	100	-.000		.0000	.00	(-Q)	

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
J-H1	JCT	100	272.266		6.1500	580.30		
J-H11A	JCT	100	424.235		6.8000	2706.08		
J-H11B	JCT	100	1965.239		7.6000	6543.27		
J-H12A	JCT	100	152.374		6.2500	1214.56		
J-H12B	JCT	100	1216.960		6.6000	5175.60		
J-H12C	JCT	100	1230.574		6.7000	5157.21		
J-H13	JCT	100	166.572		6.6500	1377.06		
J-H14A	JCT	100	17.639		6.2000	294.31		
J-H14B	JCT	100	11.402		6.2500	183.81		
J-H15A	JCT	100	1980.219		7.8000	6533.78		
J-H15B	JCT	100	1238.673		6.9000	5079.43		
J-H15C	JCT	100	16.400		6.3000	233.92		
J-H15D	JCT	100	123.495		6.5000	1282.36		
J-H16	JCT	100	120.108		6.4000	1269.74		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
J-H1A	JCT	100	254.701		6.0500	281.21		
J-H1B	JCT	100	318.825		6.2500	1351.21		
J-H2	JCT	100	259.505		6.2000	2126.14		
J-H2A	JCT	100	64.936		6.2000	1170.20		
J-H2B	JCT	100	51.268		6.2000	944.71		
J-H2C	JCT	100	143.303		7.0000	129.34		
J-H3	JCT	100	47.770		6.1500	1103.80		
J-H4	JCT	100	288.687		6.3500	1870.49		
J-H4A	JCT	100	16.115		6.1000	434.02		
J-H4B	JCT	100	16.728		6.1000	464.63		
J-H5	JCT	100	35.216		6.1500	750.16		
J-H6	JCT	100	593.446		6.6500	4036.37		
J-H6A	JCT	100	345.376		6.3500	1705.74		
J-H6B	JCT	100	533.834		6.6000	3758.91		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
J-H7	JCT	100	405.414		6.3500	3028.91		
J-H7A	JCT	100	61.036		6.2500	1010.73		
J-H7B	JCT	100	55.690		6.2500	944.58		
J-H8	JCT	100	93.142		6.2500	1001.87		
J-H9	JCT	100	1676.067		6.9500	6928.33		
J-H9A	JCT	100	1408.954		7.6500	6257.54		
J-H9B	JCT	100	1424.994		7.7000	6263.93		
NHB 1	AREA	100	5.808		6.0500	167.37		
NHB 2	AREA	100	7.579		6.1000	184.77		
NHB1	POND	100	310.062		6.1500	6022.67		
NHB1	OUT POND	100	307.029		6.8000	84.10	4213.98	253.968
NHB2	POND	100	746.044		6.2500	7291.92		
NHB2	OUT POND	100	745.083		15.6500	112.52	4201.59	389.679
POND 1	IN POND	100	320.035		6.1500	1684.10		

ICPM CALCULATION TOLERANCES

Target Convergence= .001 cfs +/-
Max. Iterations = 35 loops
ICPM Time Step = .0500 hrs
Output Time Step = .0500 hrs
ICPM Ending Time = 141.5000 hrs

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID		Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
POND 1	OUT	POND	100	318.825		6.2500	1351.21	4100.52	13.503
POND 2		JCT	100	255.845		6.3500	1706.96		
POND 2	IN	POND	100	259.505		6.2000	2126.14		
POND 2	OUT	POND	100	255.845		6.3500	1706.96	4129.63	26.743
POND 3		JCT	100	35.215		6.9500	41.25		
POND 3	IN	POND	100	35.216		6.1500	750.16		
POND 3	OUT	POND	100	35.215		6.9500	41.25	4134.92	24.686
POND 4		JCT	100	396.313		6.5500	2702.04		
POND 4	IN	POND	100	405.414		6.3500	3028.91		
POND 4	OUT	POND	100	396.313		6.5500	2702.04	4035.84	40.877
POND 5		JCT	100	93.142		6.5500	510.17		
POND 5	IN	POND	100	93.142		6.2500	1001.87		
POND 5	OUT	POND	100	93.142		6.5500	510.17	4025.54	20.598
POND 6		JCT	100	152.374		6.6500	755.71		

```
ICPM CALCULATION TOLERANCES
-------------------------------
Target Convergence=     .001 cfs +/-
Max. Iterations   =       35 loops
ICPM   Time Step  =    .0500 hrs
Output Time Step  =    .0500 hrs
ICPM Ending Time  = 141.5000 hrs
-------------------------------
```

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID		Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
POND 6	IN	POND	100	152.374		6.2500	1214.56		
POND 6	OUT	POND	100	152.374		6.6500	755.71	3985.60	22.409
POND 7		POND	100	1676.068		6.9500	6928.33		
POND 7	OUT	POND	100	1578.297		7.1000	6382.42	3998.74	193.975
POND 8		POND	100	1641.759		7.1000	6475.72		
POND 8	OUT	POND	100	1559.760		8.1500	6194.87	3988.67	196.115
POND 9		POND	100	2009.732		7.3000	7089.04		
POND 9	OUT	POND	100	1965.239		7.6000	6543.27	3982.58	156.492

Kimley-Horn and Associates, Inc.

Appendix C:

Workmaps

<u>11x17 Workmaps</u>

Existing Drainage Area Map

Existing Hydrologic Results

Proposed Drainage Area Map

Proposed Hydrologic Results

Conceptual Infrastructure Exhibit

<u>Full-Size Workmaps</u>

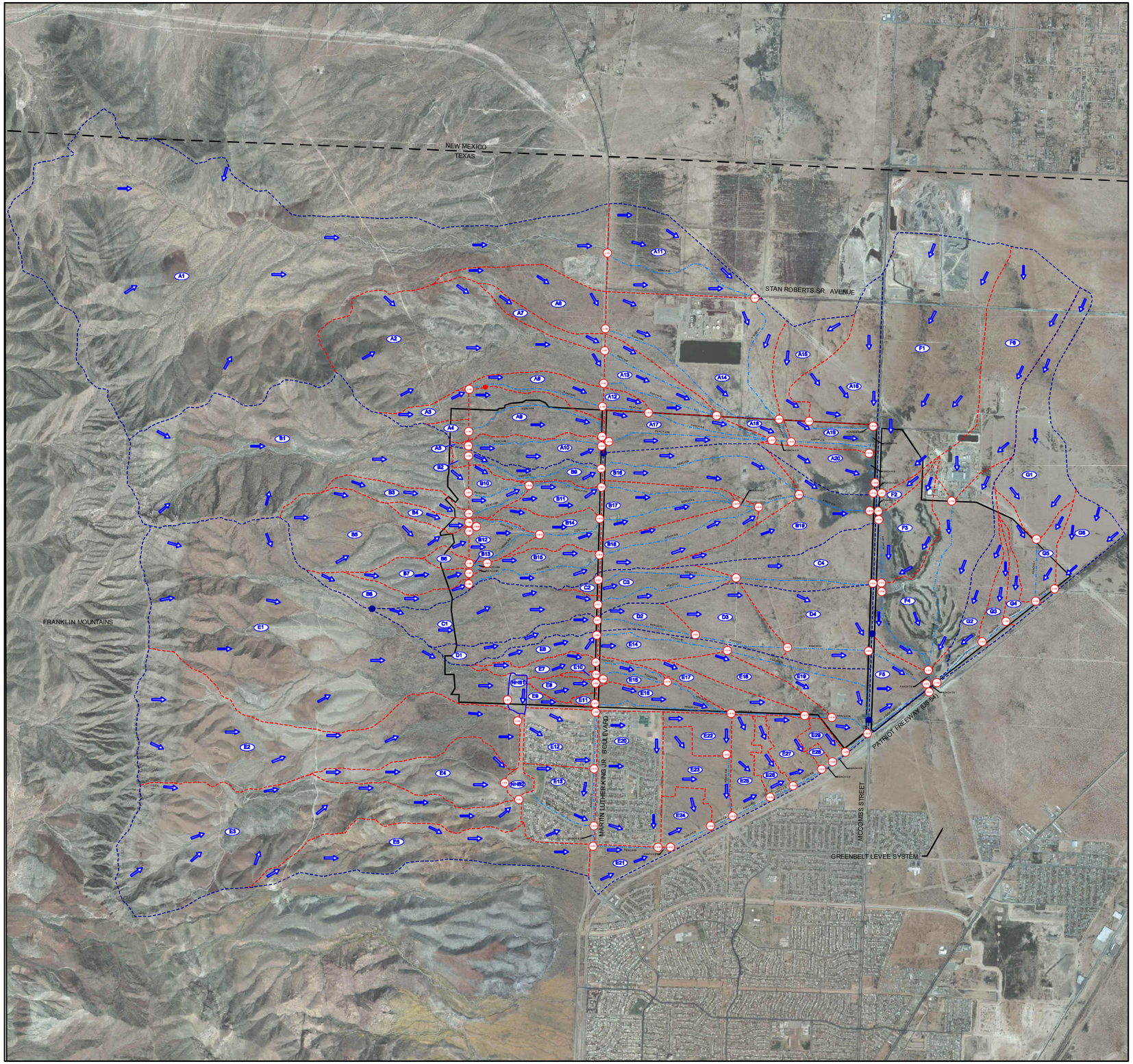
Existing Drainage Area Map

Existing Hydrologic Results

Proposed Drainage Area Map

Proposed Hydrologic Results

Conceptual Infrastructure Exhibit



N

0 2000 4000

1 inch = 4000 ft.

LEGEND

- MAJOR DRAINAGE AREA BOUNDARY
- MINOR DRAINAGE AREA BOUNDARY
- HYDROLOGIC MODELING ROUTE
- PROPERTY BOUNDARY
- DRAINAGE ARROW
- A1 DRAINAGE AREA LABEL
- MODELING JUNCTION POINT

Kimley-Horn and Associates, Inc.
12700 Park Central Drive, Suite 1800
Dallas, Texas 75251
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

HUNT COMMUNITIES GP, LLC
±4,900 ACRE TRACT
EL PASO, TEXAS

EXISTING DRAINAGE AREA MAP

Scale: AS SHOWN
Designed by: KAD
Drawn by: KAD
Checked by: SDC/BWP
Date: AUGUST 2008
Project No. 068200005

SHEET
1 OF 2

IMAGES: AERIAL-NEP'98 - Drainage Area Map - Sandstone/DAM1 - Sandstone/DAM2 -
XREFS: XREF x2-06 - XREF x-Topo-USGS - XREF x-Topo-LIDAR - XREF x-Aerial - XREF x structures-ex - XREF x2ofb - XREF X3ab - XREF SDG Sail - XREF x1117 - XREF xDamex - XREF xDamp2_AVH - XREF xDamp2
PLOTTED BY: Kevin Dwyer - Wednesday, August 27, 2008 - 8:39AM
DWG NAME: O:\CIVIL\68200005\DWG\XCDAMEX.DWG
LAST SAVED: 8/27/2008 8:39AM

DRAINAGE AREA	AREA (AC.)	WEIGHTED CN	Tc (MIN)	FLOW (CFS)
A1	2879	95	66	6244
A2	759	93	35	2640
A3	55	95	11	407
A4	20	95	10	152
A5	4	95	10	27
A6	194	89	27	701
A7	56	85	21	202
A8	96	84	23	314
A9	181	88	26	638
A10	121	84	22	410
A11	303	79	38	505
A12	27	77	13	88
A13	143	78	31	266
A14	528	83	52	833
A15	147	77	50	173
A16	241	78	37	390
A17	165	77	38	250
A18	33	77	24	74
A19	81	78	33	143
A20	126	77	41	178
B1	1085	95	27	4882
B2	11	95	10	80
B3	79	95	17	488
B4	35	95	12	253
B5	345	95	16	2148
B6	23	88	10	137
B7	86	90	16	456
B8	95	89	19	437
B9	75	84	23	245
B10	71	95	12	515
B11	83	80	20	246
B12	72	91	15	408
B13	7	82	10	32
B14	107	79	22	285
B15	132	78	25	295
B16	277	77	46	351
B17	173	77	31	307
B18	193	77	34	309
B19	249	77	53	279
C1	290	77	32	511
C2	12	80	10	53
C3	137	77	28	265
C4	209	77	45	271
D1	83	77	27	167
D2	74	77	22	174
D3	161	78	30	311
D4	275	78	38	436
E1	1470	92	27	5918
E2	875	91	32	2998
E3	912	95	36	3305
E4	228	91	25	964
E5	382	93	37	1251
E6	67	77	22	156
E7	59	77	23	136
E8	42	77	15	127
E9	23	77	14	73
E10	7	78	10	27
E11	9	79	10	39
E12	143	90	24	603
E13	183	89	26	677
E14	103	77	27	207
E15	50	77	17	145
E16	104	77	26	207
E17	98	77	39	145
E18	116	77	39	170
E19	186	77	44	245
E20	302	90	32	995
E21	76	78	18	215
E22	71	90	22	315
E23	137	90	27	519
E24	86	91	19	427
E25	93	90	25	368
E26	52	90	20	245
E27	84	90	20	394
E28	11	91	15	64
E29	34	90	17	176
NHB1	22	98	13	167
NHB2	29	98	19	185
F1	812	78	69	765
F2	26	78	26	57
F3	167	75	43	202
F4	427	77	56	455
F5	122	77	27	242
F6	466	79	71	452
G1	310	77	70	273
G2	109	77	54	122
G3	56	78	34	98
G4	42	78	29	83
G5	123	77	37	187
G6	118	77	29	225

MODELING JUNCTION POINT	FLOW (CFS)
J-A1	6244
J-A2	2640
J-A3	407
J-A4	152
J-A5	27
J-A6	701
J-A7	202
J-A8	496
J-A9	643
J-A10	416
J-A10a	1053
J-A11	5850
J-A12	472
J-A13	2453
J-A14	5720
J-A15	173
J-A16	452
J-A17	3528
J-A18	6184
J-A19	6074
J-A20	6046
J-B1	4882
J-B2	80
J-B3	488
J-B4	253
J-B5	2148
J-B5a	2401
J-B6	137
J-B7	456
J-B8	437
J-B9	261
J-B10	4980
J-B11	4610
J-B12	2536
J-B13	529
J-B14	2382
J-B15	440
J-B16	6149
J-B17	5858
J-B18	6187
J-B19	6007
J-C1	511
J-C2	53
J-C3	476
J-C4	477
J-D1	167
J-D2	181
J-D3	360
J-D4	610
J-E1	5918
J-E2	2998
J-E3	3305
J-E4	964
J-E5	2624
J-E6	156
J-E7	136
J-E8	127
J-E8a	148
J-E9	73
J-E10	27
J-E11	39
J-E12	672
J-E13	1450
J-E14	214
J-E15	249
J-E16	334
J-E17	412
J-E18	510
J-E19	5193
J-E20	3615
J-E21	3741
J-E22	315
J-E23	4365
J-E24	3846
J-E25	4448
J-E26	4468
J-E27	4498
J-E28	4501
J-E29	4505
J-F1	765
J-F1a	6113
J-F2	57
J-F2a	10111
J-F3	202
J-F3a	9915
J-F4	9757
J-F5	9742
J-F6	452
J-G1	273
J-G2	760
J-G3	645
J-G4	574
J-G5	520
J-G6	225
GLS	10223

- DRAINAGE AREAS FOR NORTH HILLS BASINS 1 AND 2 WERE DELINEATED USING USGS TOPOGRAPHY.
- ELEVATION-STORAGE INFORMATION FOR NORTH HILLS BASIN 1 WAS DETERMINED USING LIDAR TOPOGRAPHY OF THE BASIN.
- ELEVATION-STORAGE INFORMATION FOR NORTH HILLS BASIN 2 WAS OBTAINED FROM THE CONCEPTUAL DRAINAGE PLAN PERFORMED BY EL PASO WATER UTILITIES SERVICE BOARD IN OCTOBER 2006.
- MEASUREMENTS FOR THE OUTFALL STRUCTURES FOR NORTH HILLS BASINS 1 AND 2 WERE PERFORMED BY KHA DURING A SITE VISIT IN JANUARY 2008.
- ELEVATION-DISCHARGE INFORMATION FOR THE BASINS WAS COMPUTED USING PONDPACK'S OUTLET STRUCTURE MANAGER.

SAMPLE CURVE NUMBER CALCULATIONS:

INDUSTRIAL AREAS: 72% IMPERVIOUS (CN=98) AND 28% DESERT SHRUB IN POOR CONDITION (CN=77)

0.72*98 + 0.28*77 = 92.1

SINGLE FAMILY AREAS: 60% IMPERVIOUS (CN=98) AND 40% NATURAL DESERT LANDSCAPING (CN=77)

0.60*98 + 0.40*77 = 89.6

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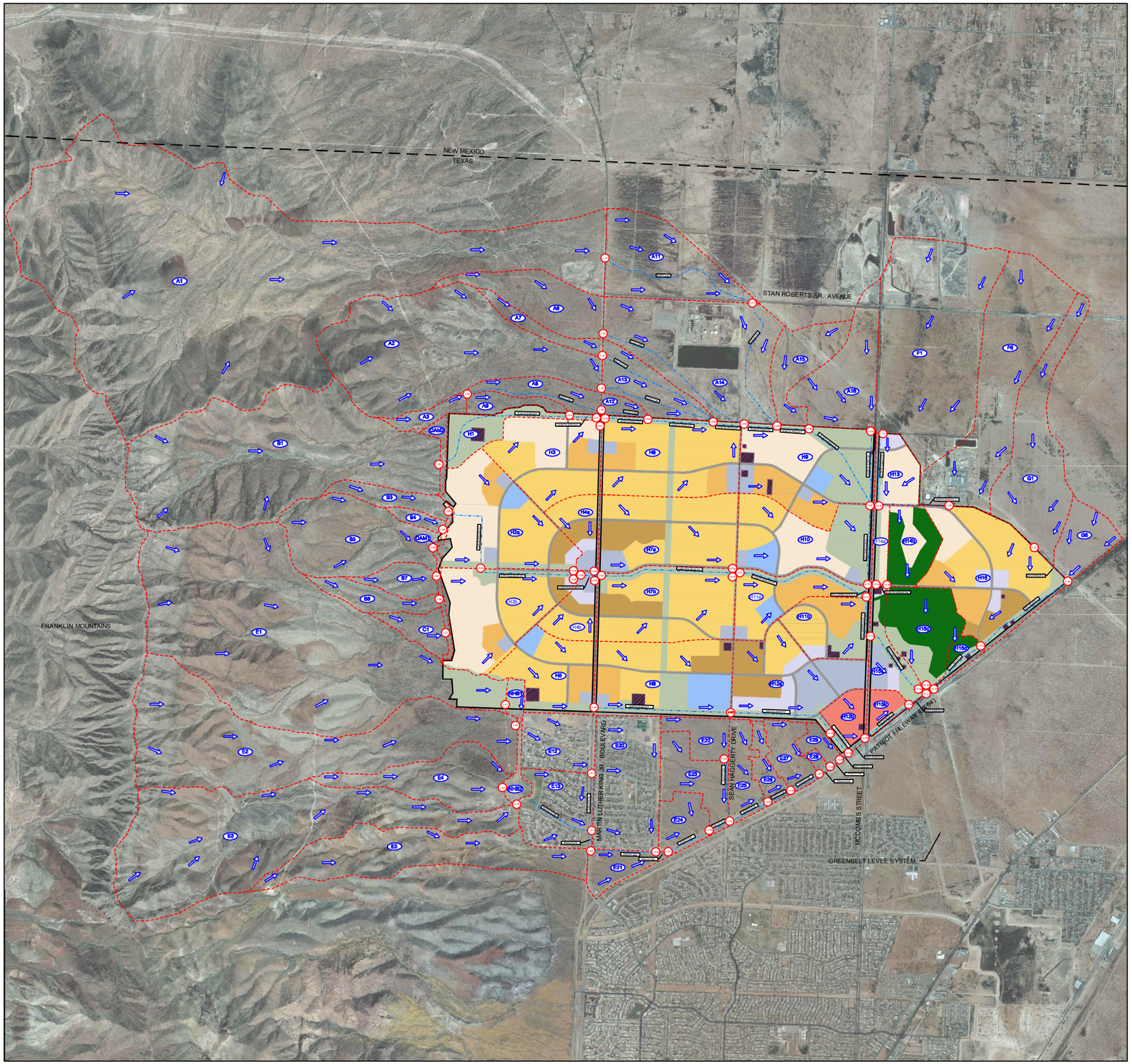
Fax No. (972) 239-3820

HUNT COMMUNITIES GP, LLC
±4,900 ACRE TRACT
EL PASO, TEXAS

EXISTING HYDROLOGIC RESULTS

Scale: AS SHOWN
Designed by: KAD
Drawn by: KAD
Checked by: SDGB,WP
Date: AUGUST 2008
Project No. 068200005

IMAGES: AERIAL-NEFSB - Drainage Area Map - Sandstone DAM1 - Sandstone DAM2-
XREFS: XREF z-240 - XREF xTopo-USGS - XREF xTopo-LIDAR - XREF x8-by - XREF xAerial - XREF xstructures-ex - XREF xSoils - XREF X3648 - XREF SDG Seal - XREF x1177 - XREF xDamex - XREF xDamgr_AWH - XREF xDamgr
PLOTTED BY: DONOVAN, WAYNE (KHA)
DWG NAME: G:\CIVIL\68200005\000\105\SDAMEX.DWG
LAST SAVED: 8/7/2008 8:39 AM



N

0 2000 4000

1 inch = 4000 ft.

LEGEND

- DRAINAGE AREA BOUNDARY
- EFC REACH 2 — HYDROLOGIC MODELING ROUTE
- PROPERTY BOUNDARY
- DRAINAGE ARROW
- A1 — DRAINAGE AREA LABEL
- J-A1 — MODELING JUNCTION POINT
- TYPE A RESIDENTIAL
- TYPE B RESIDENTIAL
- TYPE C RESIDENTIAL
- TYPE D RESIDENTIAL
- ROAD AND ROW
- MIXED USE LOW DENSITY
- MIXED USE HIGH DENSITY
- REGIONAL RETAIL
- SCHOOLS
- OPEN SPACE
- GOLF COURSE
- WELLS

NOTE: LAND USES OBTAINED FROM LAND USE MAP SUBMITTED WITH AMENDED LAND STUDY, AUGUST 2008.

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HUNT COMMUNITIES GP, LLC
±4,900 ACRE TRACT
EL PASO, TEXAS

PROPOSED DRAINAGE AREA MAP

Scale:	AS SHOWN
Designed by:	KAD
Drawn by:	KAD
Checked by:	SDG&WP
Date:	AUGUST 2008
Project No.	068200905

SHEET 1 OF 2

IMAGES: AERIAL.NEPSB;
XREF'S: XREF x2498 - XREF x Topo-USGS - XREF x Topo-LDAR - XREF xBoy - XREF xAerial - XREF xstructures-se - XREF xSoils - XREF X2648 - XREF xDamp - XREF x1117 - XREF SDG Seal - XREF xLanduse
PLOTTED BY: DORIA, ALEJANDRO
DWG NAME: G:\CIVIL\068200905\DWG\03\023AM\PRLDWG
LAST SAVED: 8/7/2008 8:39AM

DRAINAGE AREA	AREA (AC.)	WEIGHTED CN	Tc (MIN)	FLOW (CFS)
A1	2879	95	66	6244
A2	759	93	35	2640
A3	44	95	11	322
A6	194	89	27	701
A7	56	85	21	202
A8	90	84	23	295
A9	49	92	16	277
A11	303	79	38	505
A12	27	77	13	88
A13	143	78	31	266
A14	528	83	52	833
A15	147	77	50	173
A16	241	78	37	390
B1	1039	95	21	5678
B3	72	95	15	476
B4	26	95	10	194
B5	328	95	13	2273
B7	69	92	12	451
B8	84	91	16	454
DAM 1	25	98	44	84
DAM 2	24	98	10	194
C1	65	78	11	254
E1	1470	92	27	5918
E2	875	91	32	2998
E3	912	95	36	3305
E4	228	91	25	964
E5	382	93	37	1251
E12	143	90	24	603
E13	183	89	26	677
E20	302	90	32	995
E21	76	78	18	215
E22	71	90	22	315
E23	137	90	27	519
E24	86	91	19	427
E25	93	90	25	368
E26	52	90	20	245
E27	84	90	20	394
E28	11	91	15	64
E29	34	90	17	176
NHB1	22	98	13	167
NHB2	29	98	19	185
F1	739	78	54	868
F6	527	80	71	539
G1	352	77	66	327
G6	110	77	23	248
H1	103	87	29	326
H2a	367	88	30	1170
H2b	328	85	28	945
H3	270	88	21	1104
H4a	88	89	17	434
H4b	91	89	16	465
H5	216	86	24	750
H6	365	86	31	1037
H7a	345	88	33	1011
H7b	341	86	32	945
H8	355	86	32	983
H9	379	84	21	1289
H10	305	84	33	739
H11a	172	86	21	646
H11b	164	85	21	592
H12a	309	90	29	1107
H12b	74	89	11	456
H13	98	85	15	441
H14a	43	83	23	138
H14b	121	74	30	184
H15a	104	83	19	374
H15b	44	89	15	233
H15c	193	72	34	234
H15d	36	74	28	58
H16	410	87	40	990

MODELING JUNCTION POINT	FLOW (CFS)
J-A1	6244
J-A2	2640
J-A3	322
J-A6	701
J-A7	202
J-A8	428
J-A11	5850
J-A16	390
J-E1	5918
J-E2	2998
J-E3	3305
J-E4	964
J-E5	2557
J-E12	603
J-E13	1376
J-E20	3555
J-E21	3674
J-E22	315
J-E23	4296
J-E24	3783
J-E25	4384
J-E26	4405
J-E27	4435
J-E28	4437
J-E29	4443
J-F1	868
J-F6	539
J-G1	327
J-G6	362
J-H1	580
J-H1a	281
J-H1b	1351
J-H2	2126
J-H2a	1170
J-H2b	945
J-H2c	129
J-H3	1104
J-H4	1870
J-H4a	434
J-H4b	465
J-H5	41
J-H6	4036
J-H6a	1706
J-H6b	3759
J-H7	2702
J-H7a	1011
J-H7b	945
J-H8	510
J-H9	6382
J-H9a	6258
J-H9b	6264
J-H10	6195
J-H11a	2706
J-H11b	6543
J-H12a	756
J-H12b	5176
J-H12c	5157
J-H13	1377
J-H14a	294
J-H14b	184
J-H15a	6534
J-H15b	5079
J-H15c	234
J-H15d	1282
J-H16	1270
GLS	9077

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HUNT COMMUNITIES GP, LLC
±4,900 ACRE TRACT
EL PASO, TEXAS

PROPOSED HYDROLOGIC RESULTS

Scale: AS SHOWN
Designed by: KAD
Drawn by: KAD
Checked by: SDG/BWP
Date: AUGUST 2008
Project No. 068200005

SHEET
2 OF 2

IMAGES:
XREFS:
PLOTTED BY:
DWG NAME:
LAST SAVED:
AERIAL;NEPSB;
XREF x2496 - XREF x1bpo-USGS - XREF x1bpo-LIDAR - XREF x8-by - XREF xAerial - XREF xstructures-ex - XREF xSoils - XREF X0648 - XREF xDamp - XREF x1117 - XREF SDG Seal - XREF xLanduse
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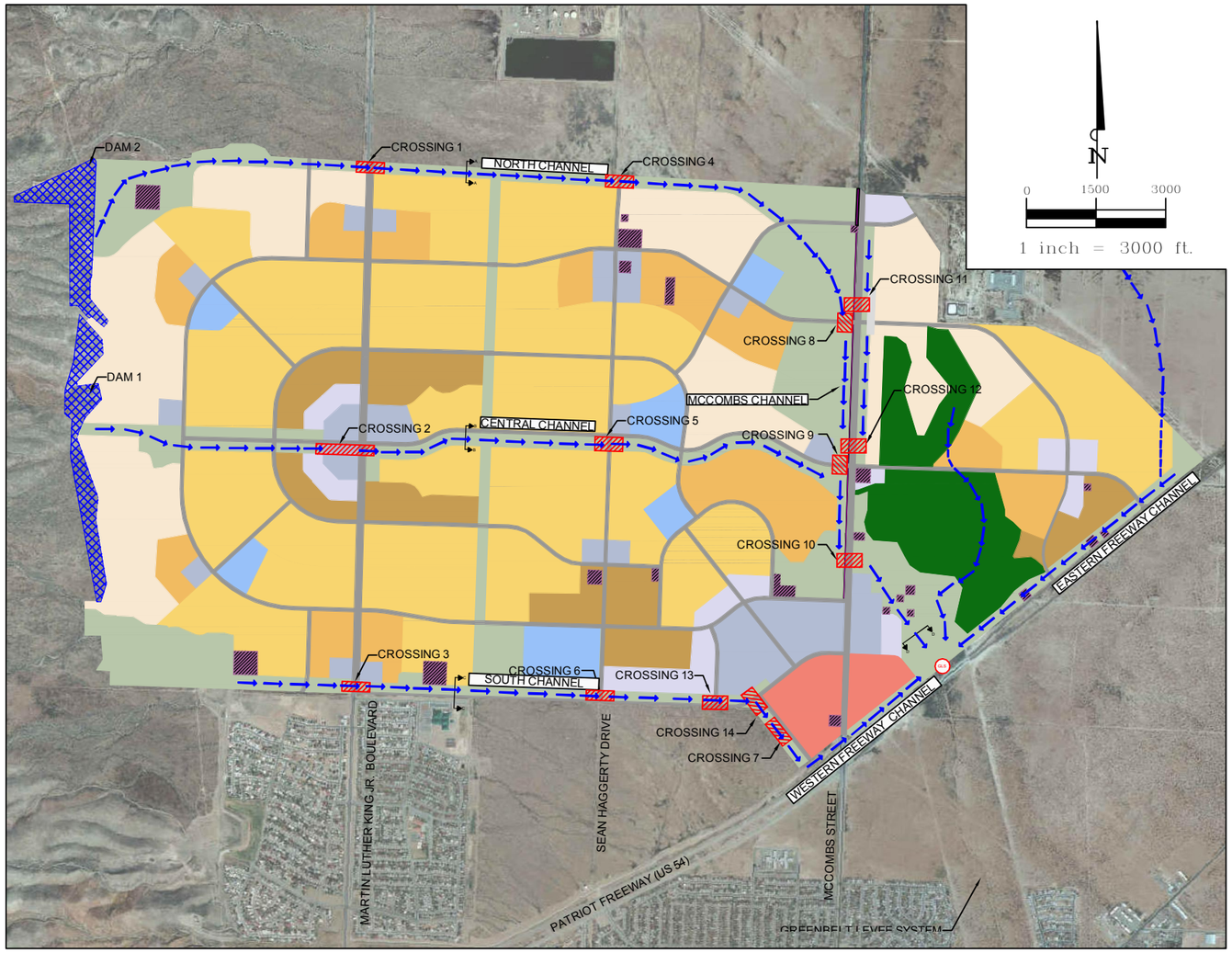
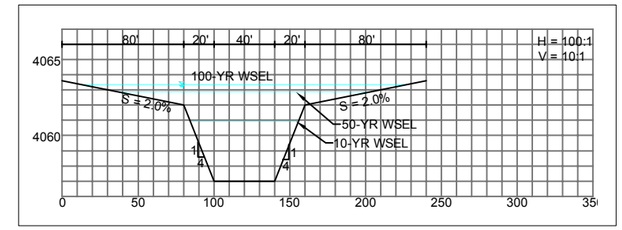
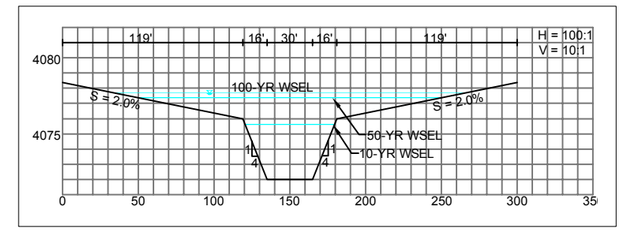


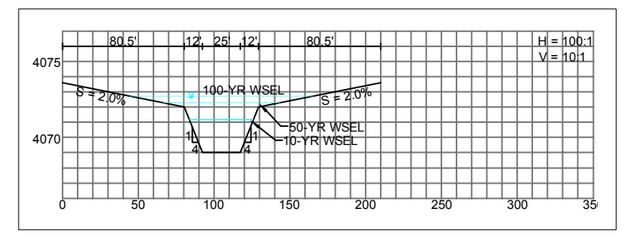
TYPICAL SECTION A-A



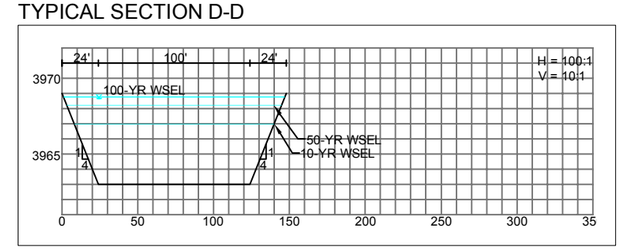
TYPICAL SECTION B-B



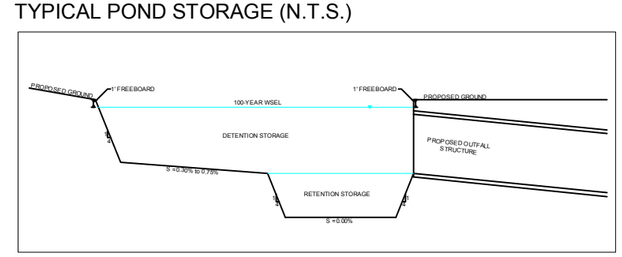
TYPICAL SECTION C-C



TYPICAL SECTION D-D



TYPICAL POND STORAGE (N.T.S.)



LAND USES

- TYPE A RESIDENTIAL
- TYPE B RESIDENTIAL
- TYPE C RESIDENTIAL
- TYPE D RESIDENTIAL
- ROAD AND ROW
- MIXED USE LOW DENSITY
- MIXED USE HIGH DENSITY
- REGIONAL RETAIL
- SCHOOLS
- OPEN SPACE
- GOLF COURSE
- WELLS

LEGEND

- TYPICAL CHANNEL CROSS SECTION LOCATION
- CENTRAL CHANNEL — PROPOSED CHANNEL LABELS
- PROPOSED DAM LOCATIONS
- PROPOSED CHANNEL LOCATIONS
- PROPOSED CROSSING LOCATIONS

CONCEPTUAL CROSSING SIZES

NAME	SIZE	100-YR FLOW (CFS)
CROSSING 1	3-7'x6' RBC	1,350
CROSSING 2	3-8'x8' RBC	1,705
CROSSING 3	1-24" RCP	40
CROSSING 4	7-8'x8' RBC	4,035
CROSSING 5	4-8'x8' RBC	2,700
CROSSING 6	1-7'X6' RBC	510
CROSSING 7	3-6'X3' RBC	755
CROSSING 8	11-8'x8' RBC	6,380
CROSSING 9	13-8'x8' RBC	6,195
CROSSING 10	10-8'x8' RBC	6,545
CROSSING 11	5-6'X6' RBC	1,375
CROSSING 12	4-48" RCP	295
CROSSING 13	3-6'X3' RBC	755
CROSSING 14	3-6'X3' RBC	755

NOTE: FLOWS PROVIDED ACCOUNT FOR CONCEPTUAL DETENTION.

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HUNT COMMUNITIES GP, LLC

±4,900 ACRE TRACT
EL PASO, TEXAS

CONCEPTUAL INFRASTRUCTURE EXHIBIT

Scale:	AS SHOWN
Designed by:	KAD
Drawn by:	KAD
Checked by:	SDG/BWP
Date:	AUGUST 2008
Project No.	068200005

SHEET
1 OF 1

IMAGES: AERIAL-NEPSR-
XREFS: XREF Aerial - XREF x2436 - XREF x2Dams - XREF x1117 - XREF X3648_Infrastructure - XREF SDG Seal - XREF xGrad - XREF xLanduse - XREF xConceptPlan
PLOTTED BY: CHRISTOPHER A. BOWMAN
DWG NAME: G:\CIVIL\068200005\DWG\01\CINFRASTRUCTURE EXHIBIT.DWG
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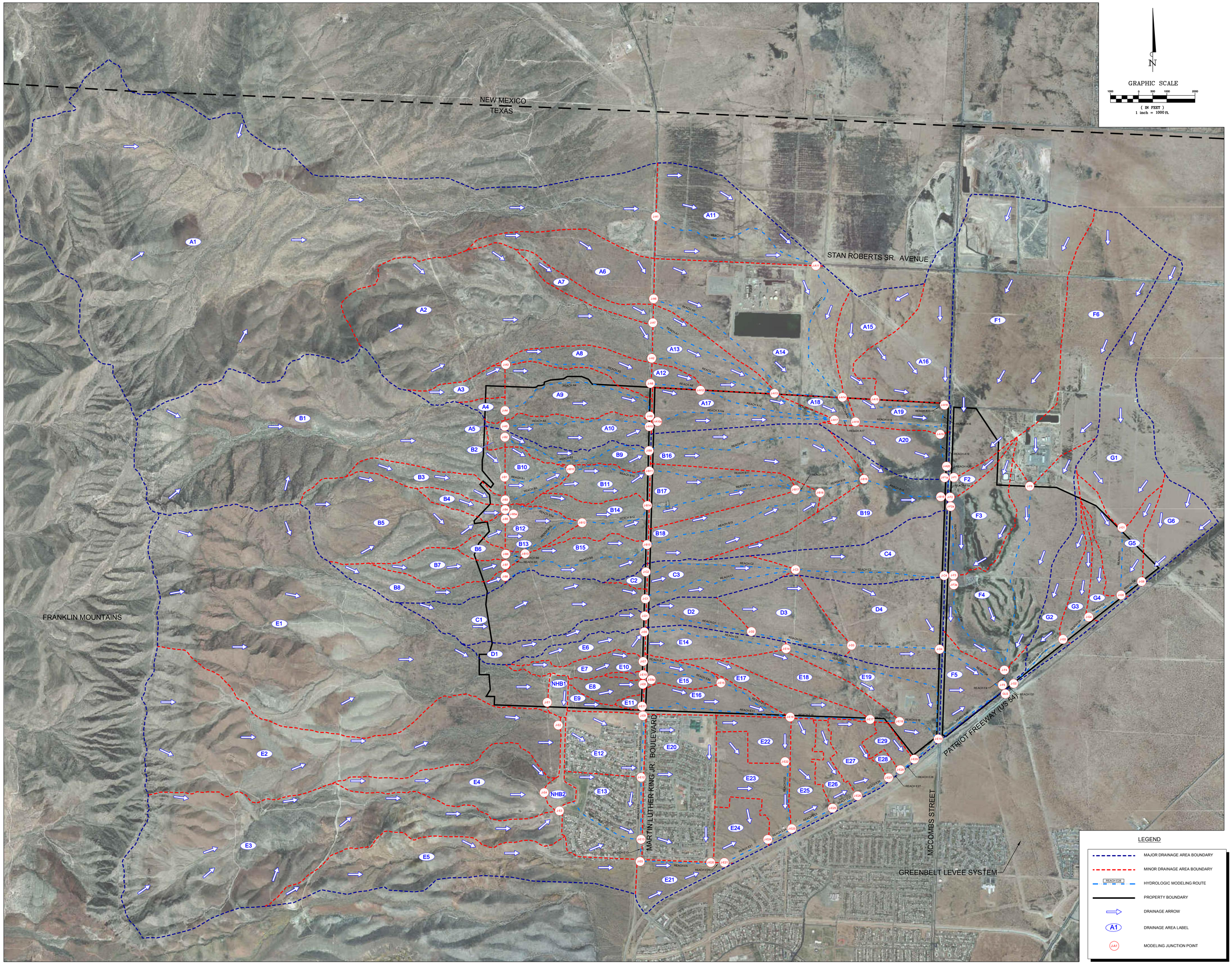

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HUNT COMMUNITIES GP, LLC

±4,900 ACRE TRACT
EL PASO, TEXAS

EXISTING DRAINAGE AREA MAP

Scale:	AS SHOWN
Designed by:	KAD
Drawn by:	KAD
Checked by:	SDG/BWP
Date:	AUGUST 2008
Project No.	068200005

SHEET

1 OF 2

DRAINAGE AREA	AREA (AC.)	WEIGHTED CN	Tc (MIN)	FLOW (CFS)
A1	2879	95	66	6244
A2	759	93	35	2640
A3	55	95	11	407
A4	20	95	10	152
A5	4	95	10	27
A6	194	89	27	701
A7	56	85	21	202
A8	96	84	23	314
A9	181	88	26	638
A10	121	84	22	410
A11	303	79	38	505
A12	27	77	13	88
A13	143	78	31	266
A14	528	83	52	833
A15	147	77	50	173
A16	241	78	37	390
A17	165	77	38	250
A18	33	77	24	74
A19	81	78	33	143
A20	126	77	41	178
B1	1085	95	27	4882
B2	11	95	10	80
B3	79	95	17	488
B4	35	95	12	253
B5	345	95	16	2148
B6	23	88	10	137
B7	86	90	16	456
B8	95	89	19	437
B9	75	84	23	245
B10	71	95	12	515
B11	83	80	20	246
B12	72	91	15	408
B13	7	82	10	32
B14	107	79	22	285
B15	132	78	25	295
B16	277	77	46	351
B17	173	77	31	307
B18	193	77	34	309
B19	249	77	53	279
C1	290	77	32	511
C2	12	80	10	53
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G5	123	77	37	187
G6	118	77	29	225

MODELING JUNCTION POINT	FLOW (CFS)
J-A1	6244
J-A2	2640
J-A3	407
J-A4	152
J-A5	27
J-A6	701
J-A7	202
J-A8	496
J-A9	643
J-A10	416
J-A10a	1053
J-A11	5850
J-A12	472
J-A13	2453
J-A14	5720
J-A15	173
J-A16	452
J-A17	3528
J-A18	6184
J-A19	6074
J-A20	6046
J-B1	4882
J-B2	80
J-B3	488
J-B4	253
J-B5	2148
J-B5a	2401
J-B6	137
J-B7	456
J-B8	437
J-B9	261
J-B10	4980
J-B11	4610
J-B12	2536
J-B13	529
J-B14	2382
J-B15	440
J-B16	6149
J-B17	5858
J-B18	6187
J-B19	6007
J-C1	511
J-C2	53
J-C3	476
J-C4	477
J-D1	167
J-D2	181
J-D3	360
J-D4	610
J-E1	5918
J-E2	2998
J-E3	3305
J-E4	964
J-E5	2624
J-E6	156
J-E7	136
J-E8	127
J-E8a	148
J-E9	73
J-E10	27
J-E11	39
J-E12	672
J-E13	1450
J-E14	214
J-E15	249
J-E16	334
J-E17	412
J-E18	510
J-E19	5193
J-E20	3615
J-E21	3741
J-E22	315
J-E23	4365
J-E24	3846
J-E25	4448
J-E26	4468
J-E27	4498
J-E28	4501
J-E29	4505
J-F1	765
J-F1a	6113
J-F2	57
J-F2a	10111
J-F3	202
J-F3a	9915
J-F4	9757
J-F5	9742
J-F6	452
J-G1	273
J-G2	760
J-G3	645
J-G4	574
J-G5	520
J-G6	225
GLS	10223

- DRAINAGE AREAS FOR NORTH HILLS BASINS 1 AND 2 WERE DELINEATED USING USGS TOPOGRAPHY.
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EL PASO, TEXAS

EXISTING HYDROLOGIC RESULTS

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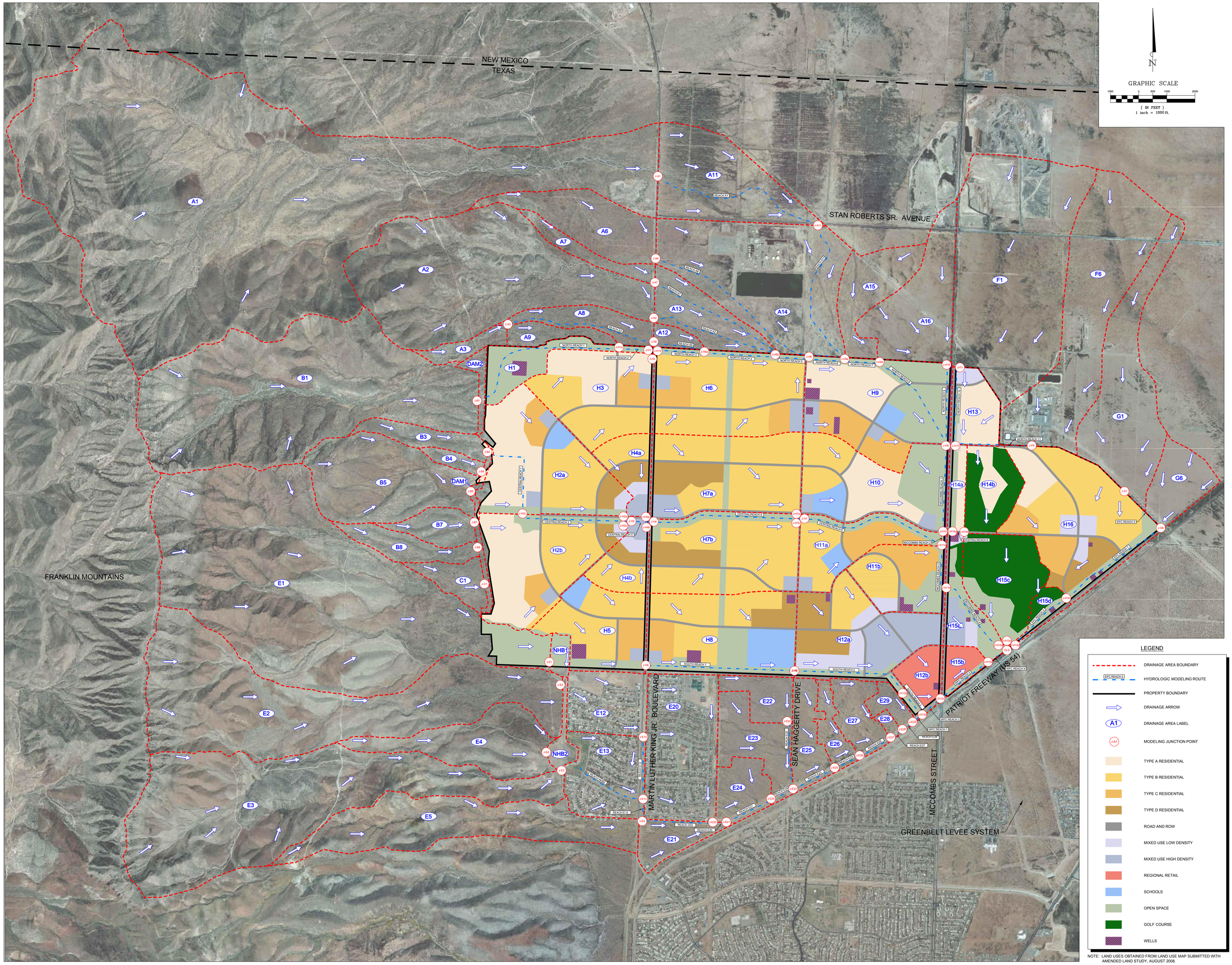
Date: AUGUST 2008
Project No. 068200005



NOTE: LAND USES OBTAINED FROM LAND USE MAP SUBMITTED WITH AMENDED LAND STUDY, AUGUST 2008.

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PROPOSED DRAINAGE AREA MAP

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Date:	AUGUST 2008
Project No.	068200005

SHEET 1 OF 2

DRAINAGE AREA	AREA (AC.)	WEIGHTED CN	Tc (MIN)	FLOW (CFS)
A1	2879	95	66	6244
A2	759	93	35	2640
A3	44	95	11	322
A6	194	89	27	701
A7	56	85	21	202
A8	90	84	23	295
A9	49	92	16	277
A11	303	79	38	505
A12	27	77	13	88
A13	143	78	31	266
A14	528	83	52	833
A15	147	77	50	173
A16	241	78	37	390
B1	1039	95	21	5678
B3	72	95	15	476
B4	26	95	10	194
B5	328	95	13	2273
B7	69	92	12	451
B8	84	91	16	454
DAM 1	25	98	44	84
DAM 2	24	98	10	194
C1	65	78	11	254
E1	1470	92	27	5918
E2	875	91	32	2998
E3	912	95	36	3305
E4	228	91	25	964
E5	382	93	37	1251
E12	143	90	24	603
E13	183	89	26	677
E20	302	90	32	995
E21	76	78	18	215
E22	71	90	22	315
E23	137	90	27	519
E24	86	91	19	427
E25	93	90	25	368
E26	52	90	20	245
E27	84	90	20	394
E28	11	91	15	64
E29	34	90	17	176
NHB1	22	98	13	167
NHB2	29	98	19	185
F1	739	78	54	868
F6	527	80	71	539
G1	352	77	66	327
G6	110	77	23	248
H1	103	87	29	326
H2a	367	88	30	1170
H2b	328	85	28	945
H3	270	88	21	1104
H4a	88	89	17	434
H4b	91	89	16	465
H5	216	86	24	750
H6	365	86	31	1037
H7a	345	88	33	1011
H7b	341	86	32	945
H8	355	86	32	983
H9	379	84	21	1289
H10	305	84	33	739
H11a	172	86	21	646
H11b	164	85	21	592
H12a	309	90	29	1107
H12b	74	89	11	456
H13	98	85	15	441
H14a	43	83	23	138
H14b	121	74	30	184
H15a	104	83	19	374
H15b	44	89	15	233
H15c	193	72	34	234
H15d	36	74	28	58
H16	410	87	40	990

MODELING JUNCTION POINT	FLOW (CFS)
J-A1	6244
J-A2	2640
J-A3	322
J-A6	701
J-A7	202
J-A8	428
J-A11	5850
J-A16	390
J-E1	5918
J-E2	2998
J-E3	3305
J-E4	964
J-E5	2557
J-E12	603
J-E13	1376
J-E20	3555
J-E21	3674
J-E22	315
J-E23	4296
J-E24	3783
J-E25	4384
J-E26	4405
J-E27	4435
J-E28	4437
J-E29	4443
J-F1	868
J-F6	539
J-G1	327
J-G6	362
J-H1	580
J-H1a	281
J-H1b	1351
J-H2	2126
J-H2a	1170
J-H2b	945
J-H2c	129
J-H3	1104
J-H4	1870
J-H4a	434
J-H4b	465
J-H5	41
J-H6	4036
J-H6a	1706
J-H6b	3759
J-H7	2702
J-H7a	1011
J-H7b	945
J-H8	510
J-H9	6382
J-H9a	6258
J-H9b	6264
J-H10	6195
J-H11a	2706
J-H11b	6543
J-H12a	756
J-H12b	5176
J-H12c	5157
J-H13	1377
J-H14a	294
J-H14b	184
J-H15a	6534
J-H15b	5079
J-H15c	234
J-H15d	1282
J-H16	1270
GLS	9077

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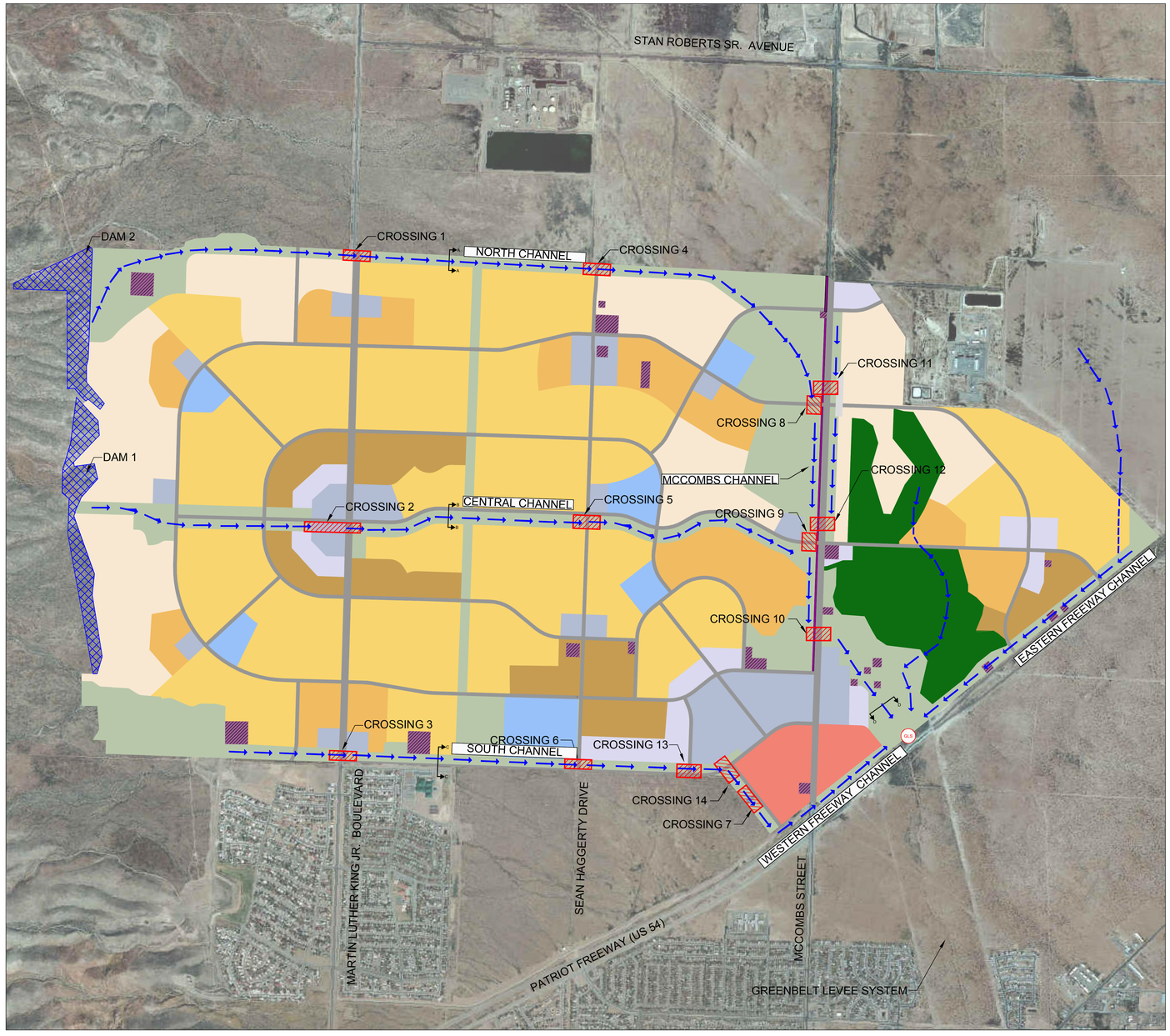
SHEET
2 OF 2



CONCEPTUAL CROSSING SIZES

NAME	SIZE	100-YR FLOW (CFS)
CROSSING 1	3-7'x6' RBC	1,350
CROSSING 2	3-8'x8' RBC	1,705
CROSSING 3	1-24" RCP	40
CROSSING 4	7-8'x8' RBC	4,035
CROSSING 5	4-8'x8' RBC	2,700
CROSSING 6	1-7'X6' RBC	510
CROSSING 7	3-6'X3' RBC	755
CROSSING 8	11-8'x8' RBC	6,380
CROSSING 9	13-8'x8' RBC	6,195
CROSSING 10	10-8'x8' RBC	6,545
CROSSING 11	5-6'X6' RBC	1,375
CROSSING 12	4-48" RCP	295
CROSSING 13	3-6'X3' RBC	755
CROSSING 14	3-6'X3' RBC	755

NOTE: FLOWS PROVIDED ACCOUNT FOR CONCEPTUAL DETENTION.

N

GRAPHIC SCALE

(IN FEET)
1 inch = 1000ft.

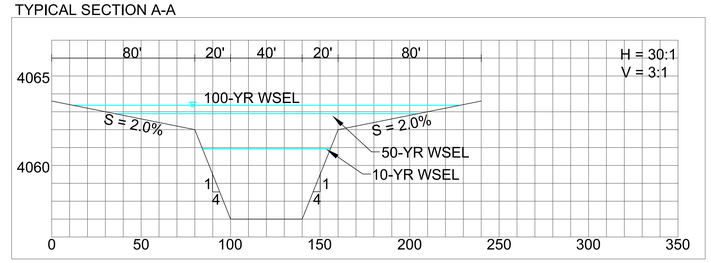
LEGEND

- TYPICAL CHANNEL CROSS SECTION LOCATION
- CENTRAL CHANNEL — PROPOSED CHANNEL LABELS
- PROPOSED DAM LOCATIONS
- PROPOSED CHANNEL LOCATIONS
- PROPOSED CROSSING LOCATIONS

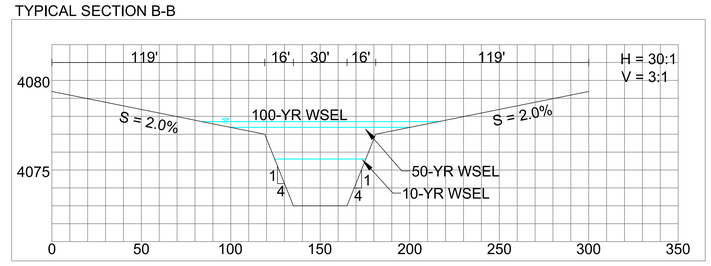
LAND USES

- TYPE A RESIDENTIAL
- TYPE B RESIDENTIAL
- TYPE C RESIDENTIAL
- TYPE D RESIDENTIAL
- ROAD AND ROW
- MIXED USE LOW DENSITY
- MIXED USE HIGH DENSITY
- REGIONAL RETAIL
- SCHOOLS
- OPEN SPACE
- GOLF COURSE
- WELLS

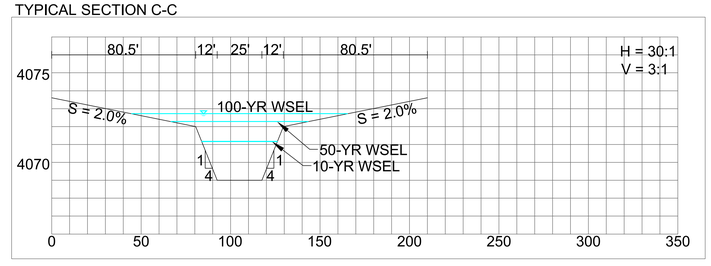
TYPICAL SECTION A-A



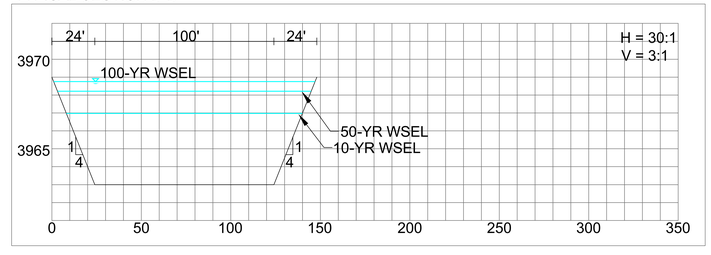
TYPICAL SECTION B-B



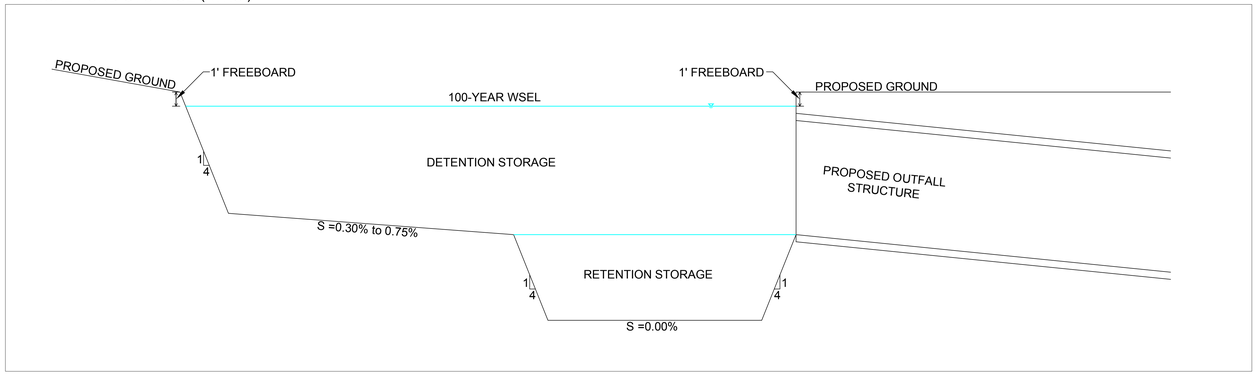
TYPICAL SECTION C-C



TYPICAL SECTION D-D



TYPICAL POND STORAGE (N.T.S.)



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CONCEPTUAL INFRASTRUCTURE EXHIBIT

Scale: AS SHOWN
Designed by: KAD
Drawn by: KAD
Checked by: SDG/BWP
Date: AUGUST 2008
Project No. 068200005

SHEET
1 OF 1

Master Zoning Plan for the Northeast Property in El Paso, Texas

Prepared for:

City of El Paso Texas

Prepared by:

Kimley-Horn and Associates, Inc.

Kimley-Horn and Associates, Inc.
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Approved August 2008

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Appendix 'G' – Allowable Land Uses
Appendix 'H' – General Park Service Areas
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Section 1: Introduction

This Master Zoning Plan (MZP) is a required component of the documentation necessary for development in a Mixed-Use Zoning District. The provisions for the preparation of this Plan are found under Title 20, Chapter 20.04, Section IV, which states: "For any use authorized in a Mixed-Use District (RMU, GMU, and IMU), a master zoning plan shall be required…." It is intended that the property that is the subject of this MZP be zoned as a General Mixed-Use District in coordination with the Land Study for the District (submitted concurrently) and to be subject to the requirements established herein.

1.1 Scope

The scope of this document is to describe the purpose, characteristics, components, and timing of the proposed mix of land use within the District. The District contemplated under this MZP is intended to develop into a unified, comprehensively planned community that conforms with, enhances and furthers the City's adopted Comprehensive Plan and Smart Growth Objectives.

1.2 Purpose and Intent

The purposes of this Master Zoning Plan are to provide details about the proposed land use and proposed structures to convey compatibility within the District and with adjacent properties. Some of the objectives of this development are to accomplish the following:

- Coordinate appropriate transportation corridors with specific land use patterns;
- Interconnect open space and parks within the GMU district via pedestrian and bicycle pathways;
- Provide for neighborhoods that are compact and pedestrian-friendly;
- Provide for streets that disperse and reduce the length of vehicular trips;
- Provide for a range of open spaces including pocket parks, squares and playgrounds distributed throughout a GMU district;
- Provide for street designs that reinforce safety;
- Provide for dual use park-pond opportunities; and
- Allow for the use of drainageways for open space amenities.

In some instances alternative design standards are warranted and are found in the Land Study submitted concurrently with this document.

1.3 General Guidelines

The Master Zoning Plan establishes the desired development form for this District. The components of this development form are buildings, streets, and spaces; the distribution of which is governed by this Master Zoning Plan and also described in the Amended Land Study. These documents provide standards for the distribution, placement and appearance of forms, linkages, and spaces within the District.

It is not the intent of these Guidelines to mandate or imply that a design reference to each item be included in each submittal; rather that when there is a practical opportunity for an item to be included as part of the development plan such item shall be considered.

1.3.1 The District

The intent of the design and function of the District as a whole is as follows:

- Development intensity generally increases toward mixed-use area(s) and generally adjusts as appropriate to integrate with adjacent development.
- The District and its Subdistricts and Neighborhoods are structured with respect to walkability and minimization of pedestrian/vehicular conflicts wherever practicable.
- The District is organized as a community incorporating mixed-use areas ("Neighborhood Centers", "Town Centers") serving, pedestrian-friendly neighborhoods.
- The District supports pedestrian and bicycle systems and is agreeable to a framework of future transit.
- Civic, institutional and commercial activity is integrated with residential areas.
- A range of open space types, such as trails, parks, squares, plazas and playgrounds are distributed within and throughout the District.
- Various land uses, housing types and densities are distributed throughout the District.

Commercial uses provide for the needs of the neighborhood.

1.3.2 The Subdistrict

The intent of the design and function of the Subdistricts that comprise the District is as follows:

- Subdistricts are regulated as to development type, character, and intensity.
- Appropriate building densities and land uses are provided within walking distance of transit stops in coordination with transit providers.

1.3.3 The Neighborhoods

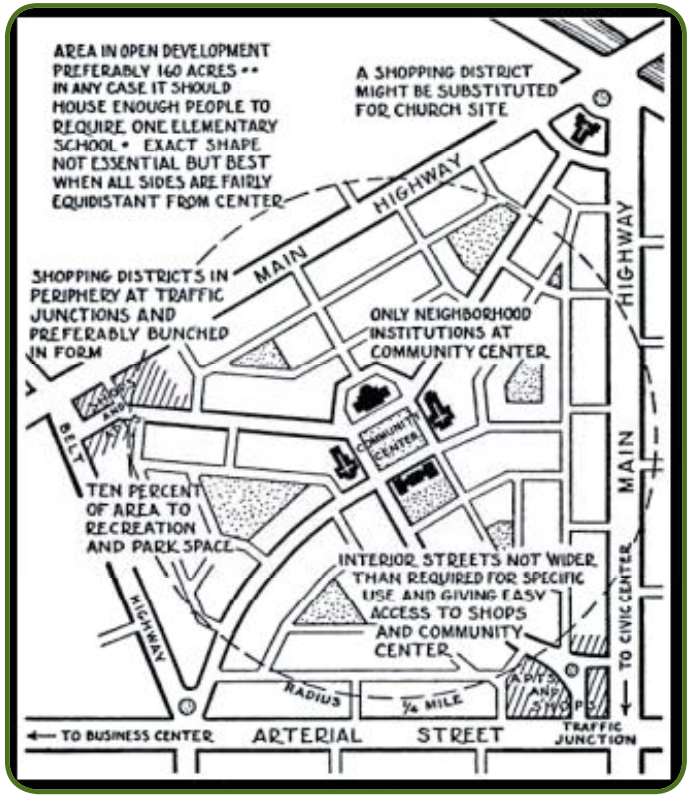
Neighborhoods are distinct areas where the residents and/or non-residential uses share a school, park, or community business center generally within walking distance of the homes or businesses; architecture; or other features; and/or having boundaries that may include roadways or natural features. The neighborhood character is deemed to be the prevailing character of the streets, structures, and open spaces. The intent of the general design and function of the Neighborhoods within the Subdistricts is as follows:

- Neighborhoods are compact, pedestrian-friendly, and composed of diverse housing types.
- There is opportunity to obtain goods and services and enjoy social interaction and recreation within walking distance of most dwellings.
- A one-quarter mile radius shall determine the approximate boundary and center of a Neighborhood.
- The classic model of a "Neighborhood Unit" is shown for illustrative purposes only.
- The relevant points are as described above.

1.3.4 Buildings and Open Spaces

The intent of buildings and open spaces within a Neighborhood is as follows:

- Well-configured squares, plazas, greens, streets, preserves, greenbelts, and parks are devoted to the collective social activity, recreation, and visual enjoyment of the Neighborhood.
- Buildings and landscaping contribute to the physical definition of streets as public places.
- Public gathering spaces are provided in a manner that reinforces community identity.
- Principal buildings and facades, where possible, relate to and are oriented toward the street to encourage a neighborhood-friendly environment.
- Buildings, open spaces, and other features act as landmarks, symbols, and focal points.

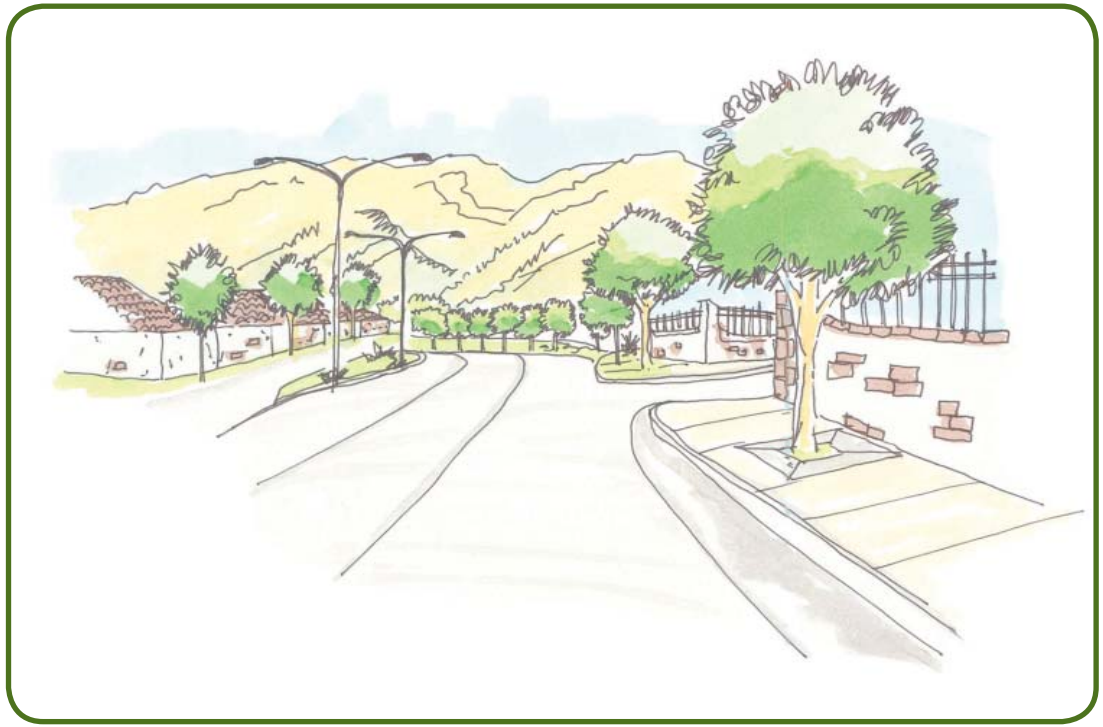


Prototypical "Neighborhood Unit" (Clarence Perry, 1929)

1.3.5 Circulation

The intent of the design and function of the circulation systems is as follows:

- Transportation corridors are planned and reserved in coordination with proposed land use patterns.
- Natural or man-made green corridors and open space areas are used to define and connect Neighborhoods to other facilities within the District.
- The street network offers multiple travel choices.



Structures and landscaping work together to frame views and define streets.

Section 2: Master Land Use Plan

The Master Zoning Plan for the District shall be as described herein and as depicted on the Master Land Use Plan. Key components of the Master Land Use Plan are described below.

2.1 Development Context

The District is bounded by the Franklin Mountains State Park to the west, US 54 and vacant land to the east, the EPECO power plant and El Paso natural gas facility and vacant land to the north, and single-family residential development to the south. The District is currently zoned as R-F (Ranch & Farm), M-2 (Heavy Manufacturing), and PMD (Planned Mountain Development) Districts, and is planned for residential and supporting non-residential and civic land uses.

2.2 Topography

The land comprising the District slopes gently downhill at an approximate 2% gradient eastward from the Franklin Mountains.

2.3 Proposed Land Use Types

Each of the following proposed land use types are shown distributed throughout the Master Land Use Plan and are described in Section 3.

2.3.1 Open Space

Open space that has been set aside to provide for site drainage and for the recreational needs of the community.

2.3.2 Community Uses

Community uses, including schools, public safety uses, governmental uses, and bus terminals.

2.3.3 Low Density Residential 3.5

Low Density Residential 3.5, consisting primarily of single-family detached dwellings and two-family dwellings composing an average density of no greater than 3.5 dwelling units per gross acre (du/ac).

2.3.4 Low Density Residential 5.5

Low Density Residential 5.5, consisting primarily of single-family detached dwellings, two-and four-family dwellings and townhouses composing an average density of no greater than 5.5 du/ac.

2.3.5 Medium Density Residential 7.2

Medium Density Residential 7.2, consisting primarily of multifamily dwellings, with single-family detached dwellings, two- and four-family dwellings and townhouses composing an average density of no greater than 7.2 du/ac.

2.3.6 Medium Density Residential 12.0

Medium Density Residential 12.0, consisting primarily of multifamily dwellings, with two- and four-family dwellings, townhouses and apartments composing an average density of no greater than 12.0 du/ac.

2.3.7 Mixed-Use Low Intensity

Mixed-Use Low Intensity, consisting of neighborhood-serving retail and/or commercial uses and/or multi-family dwellings.

2.3.8 Mixed-Use High Intensity

Mixed-Use High Intensity, consisting of community-serving retail and/or commercial uses and multi-family dwellings.

2.3.9 Regional Retail

Regional Retail, consisting of a high concentration of retail, commercial and entertainment opportunities serving the Northeast El Paso region.

2.4 Development Intensity

2.4.1 Organization

The development is organized as a community consisting of neighborhood centers and town centers serving pedestrian-friendly neighborhoods. Mixed-use, town center development is used to anchor residential areas and to provide goods and services within walking distance of housing. Single use commercial areas may be used in coordination with mixed-use development.

2.4.2 Intensity

Development intensity generally increases toward neighborhood centers and town centers and generally decreases toward the perimeter of the development thus providing for a gradient of lessening development from mixed-use and non-residential core areas.

2.4.3 Distribution

Land uses, housing types and densities are distributed throughout the development. Neighborhood commercial nodes provide for the ordinary needs of daily living of the residents of the adjacent neighborhoods.

2.5.4 Densities

Densities are capable of supporting mixed-use development. Per the recommendation of The Plan for El Paso, Low Density Residential shall contain less than seven dwelling units per acre (du/ac), Medium Density Residential shall contain 7.1-20 du/ac, High Density Residential shall contain greater than twenty du/ac. This Master Land Use Plan shows four categories of residential development intensity each expressed as an average density and a range of housing types.

2.4.5 Walkability

Neighborhoods are arranged to support walkability and to minimize pedestrian/vehicular conflicts wherever practicable. The Plan for El Paso encourages residential development to be located within "walking distance" (one-quarter mile) of retail and service centers, community facilities, medical facilities, and/or transportation facilities. Companion maps to the Master Land Use Plan show lines delimiting the area within one-quarter mile of the proposed retail, commercial and community facilities. (See **Appendices 'B'** and **'C'**.)

Mixed-use neighborhoods promote walkability.

2.4.6 Town Centers

Town Centers are located so as not to be isolated from the perimeter of the development and from the City; so as to increase the support of the region by providing access to more people; and to discourage offsite traffic from passing through residential neighborhoods. (See **Appendix 'A'**.)

2.5 Specific Land Use Provisions

2.5.1 Access

Residential neighborhoods are located so as to have access to goods and services, provide for a variety of dwelling types, and call for densities appropriate to the needs of the neighborhood and community retail that serve them.

2.5.2 Open Space

Open space within the District provides for a pedestrian linkage system, thus uniting rather than dividing the community.

2.5.3 Schools

School sites are well distributed and buffered as necessary. Final location of school sites will be coordinated with the El Paso Independent School District (EPISD) or Socorro Independent School District (SISD) at the appropriate time during the development process.

2.5.4 Coordination

The roadway network is coordinated with land use needs and includes concentric ring roads that capitalize on views westward to the mountains.

2.6 Roadways

Roadways vary depending on the proposed function, anticipated land uses, and anticipated traffic load. This District contains a variety of roadway types in anticipation of demand for a number of housing opportunities, each with distinct access needs. Details and explanatory text in the Land Study for this proposed District (submitted concurrently) describe the design and supposed function of each roadway not contemplated by the Design Standards for Construction.

In general, Martin Luther King, Jr. Boulevard, McCombs Street and proposed Sean Haggerty Drive are the major north-south thoroughfares. An inner loop and an outer loop are proposed as well as an east-west thoroughfare (Painted Dunes Avenue) in the center of the development. Various additional thoroughfares connect all corners of the development. (See **Appendix 'A'**.)

2.7 Phasing

Per the Development Agreement, the District is proposed to be developed as three Phase Parcels, within which are twelve development phases. Construction and development of Phase 1 is expected to begin in 2009, with twelve phases of development expected to be completed by 2020. The Phasing schedule is described below and is shown graphically on the Phasing Key Map in **Appendix 'D'**.

2.7.1 Phase Parcel 1

Phase Parcel 1 is approximately 1,167 net acres (4.94 du/ac) with four development phases.

2.7.1.1 Phase 1 (2009)

Phase 1 (2009) is approximately 301 acres within Subdistricts 14-16, and containing approximately 1,201 du (4.00 du/ac).

2.7.1.2 Phase 2 (2010)

Phase 2 (2010) is approximately 245 acres within Subdistricts 9 and 14, and containing approximately 1,161 du (4.73 du/ac).

2.7.1.3 Phase 3 (2011)

Phase 3 (2011) is approximately 256 acres within Subdistricts 13-15 and 19, and containing approximately 1,229 du (4.80 du/ac).

2.7.1.4 Phase 4 (2012)

Phase 4 (2012) is approximately 364 acres within Subdistricts 4-6, 9, 15 and 19, and containing approximately 2,170 du (5.96 du/ac).

2.7.2 Phase Parcel 2

Phase Parcel 2 is approximately 1,813 net acres (4.30 du/ac) with four development phases.

2.7.2.1 Phase 5 (2013)

Phase 5 (2013) is approximately 442 acres within Subdistricts 4, 8, 12 and 15, and containing approximately 1,903 du (4.30 du/ac).

2.7.2.2 Phase 6 (2014)

Phase 6 (2014) is approximately 491 acres within Subdistricts 3-7 and 15, and containing approximately 2,060 du (4.20 du/ac).

2.7.2.3 Phase 7 (2015)

Phase 7 (2015) is approximately 418 acres within Subdistricts 2, 4-7, 11, 18 and 19, and containing approximately 1,805 du (4.31 du/ac).

2.7.2.4 Phase 8 (2016)

Phase 8 (2016) is approximately 461 acres within Subdistricts 6, 15 and 18-21, and containing approximately 2,031 du (4.41 du/ac).

2.7.3 Phase Parcel 3

Phase Parcel 3 is approximately 1,856 net acres (3.75 du/ac) with four development phases.

2.7.3.1 Phase 9 (2017)

Phase 9 (2017) is approximately 615 acres within Subdistricts 2-4, 12, 18, 20 and 21, and containing approximately 2,344 du (3.81 du/ac).

2.7.3.2 Phase 10 (2018)

Phase 10 (2018) is approximately 561 acres within Subdistricts 3, 4, 7, 11 and 12, and containing approximately 1,954 du (3.48 du/ac).

2.7.3.3 Phase 11 (2019)

Phase 11 (2019) is approximately 563 acres within Subdistricts 1-3 and 17, and containing approximately 2,132 du (3.79 du/ac).

2.7.3.4 Phase 12 (2020)

Phase 12 (2020) is approximately 117 acres within Subdistricts 1, 2 and 17, and containing approximately 535 du (4.57 du/ac).

The total area of the three Phase Parcels, not including the high school, the golf course and utilities is 4,835 acres containing a maximum of 20,000 units. This equates to a maximum density of 4.14 du/ac.

The total area for the District per this Master Zoning Plan, which excludes the golf course and the TxDOT drainage easement (i.e., includes the high school site and the water well sites), is 4,943 acres according to the survey, with an maximum dwelling count of 20,000 units. This equates to a maximum density of 4.05 du/ac.

The total area for the District per the Comprehensive Plan amendment (including the high school, the golf course, utilities and open space) is 5,201 acres, with an maximum dwelling count of 20,000 units. This equates to a maximum density of 3.85 du/ac.

2.8 Relation to The Plan for El Paso

The Plan for El Paso puts forth Goals and Policies that define the desired form and function of the City: how El Paso looks and how it works. What is created through development in this District is balanced with what is conserved of the native environment. Land development provides homes, stores, offices and civic buildings to the citizens of El Paso; land that is not developed provides recreation space, habitat and floodwater conveyance. The appropriate utility of the native environment is achieved when its functional and aesthetic qualities are maximized in the service of land development needs. The appropriate development form is achieved when its functional and aesthetic qualities are maximized in the service of human needs. This Master Zoning Plan is in accordance with the goals and policies of The Plan for El Paso.

This Master Zoning Plan and the Land Study (submitted concurrently) provide specificity to the Goals and Policies of The Plan for El Paso. Primary points of agreement with these Goals and Policies are as follows:

Environment

- Policy: Emphasize infill and higher density developments located in areas served by public transit to reduce dependency on automobiles.
- Policy: Allow high-density land uses and cluster developments that protect ecologically sensitive areas.
- Reduce dependence on the automobile.

Transportation

- Policy: Increase bicycle, pedestrian and transit access in land development ordinances and conceptual plans.

Note: While some right-of-way widths allowed by Title 19 are greater than those suggested by The Plan for El Paso, a goal of this District is to provide a circulation system whereby the streets are as narrow as possible and no more than four travel lanes.

Community Facilities

- Policy: Expand park acreage and recreational facilities to meet the needs of the expanding population within the community through several methods including, but not limited to park / ponding facilities.
- Public and quasi-public facilities should be located in commercial or office zoning districts
- Facilities should be located on shared sites with other facilities.

Note: This District promotes locating community facilities on shared sites (see Master Land Use Plan) with mixed-use areas.

Land Use & City Form

- Goal: Develop a balanced and complete community that contains a mix of land uses and densities, housing types and styles, economic development, job opportunities, educational opportunities, and outlets for social and cultural expression.
- Policy: Community facilities should be equitably distributed to the extent feasible throughout the City.
- Goal: Encourage the provision of neighborhood commercial services that are compatible with a neighborhood's residential character.
- Policy: Promote mixed uses within designated neighborhoods.
- Policy: Locate neighborhood commercial centers within walking distance of residences and on mass transit routes.
- Policy: Community facilities should be equitably distributed to the extent feasible throughout the City.
- Policy: Encourage neighborhood amenities that include places for interaction among residents such as parks, community centers, schools, commercial areas, churches, and other gathering points throughout the City.
- Low Density Residential is primarily for single family dwellings ranging up to 7 du/ac.
- Medium Density Residential is intended for dwellings ranging from 7.1-20 du/ac, allowing for a mixture of housing types, including single-family, two-family, and multi-family dwellings.
- High Density Residential. is intended for very dense residential development of 20.1 or more units per acre, allowing for a mixture of housing types and intensity.
- Neighborhood Commercial contributes to neighborhood identity. Residential, office and light commercial uses are considered complementary uses.

Low-intensity mixed-use is designed to be in harmony with adjacent homes.

- Community Commercial permits miscellaneous commercial land uses serving several neighborhoods within a planning area.
- Regional Commercial serves the City and adjacent communities. Such land uses are high traffic generators, and are encouraged along major or higher order arterial streets.

Urban Design

- Linking different neighborhoods together through a quality spatial experience
- Consistency from one neighborhood to the next
- Master-planned communities

Section 3: Property Development Regulations of The Master Zoning Plan

3.1 General

3.1.1 Existing Zoning

The existing zoning for the property is Ranch-Farm (R-F), Heavy Manufacturing (M-2), and Planned Mountain Development (PMD). The existing zoning for the adjoining land is R-F, M-2 and Light Manufacturing (M-1) to the north; R-F to the east; PMD to the west; and Residential (R-1 and R-3A), Commercial (C-1 and C-2) to the south.

3.1.2 Proposed Zoning

The proposed zoning for the property is General Mixed-Use (GMU).

3.2 Purpose and Intent

The purpose of the Development regulations for the District is to provide for the housing, educational, recreational, shopping and business needs of the population of the District and to promote compatible buildings and uses that are appropriate in area, location and overall planning for this purpose. The proposed mix of land uses supports this purpose by offering a broad range of development possibilities to meet the needs of a variety of market sectors.

It is the intent of these Development regulations to support this purpose, offering development requirements that may be evaluated uniformly over time while at the same time being flexible enough to change with the needs of the dynamic population of El Paso, all within a physically, socially and economically unified master-planned community. El Paso's Smart Growth Objectives will play an important role in meeting this intent.

3.3 Land Use Types, Densities, and Dimensional Standards

3.3.1 The District

The intent of the design and function of the District shall be as described under Section 1.3.1 and regulated by the requirements of this Section. The distribution of these land use types is shown on the Master Land Use Plan in **Appendix 'A'**.

3.3.1.1 Proposed Mix of Land Use Types

3.3.1.1.1 Open Space

Open space is distributed throughout the District in a manner intended to unite the community. Homes and neighborhoods, the more personal parts of the District are linked to gathering places (e.g., schools, parks, retail/ office); the pedestrian circulation system itself being a space for social interaction as well.

3.3.1.1.2 Schools

3.3.1.1.2.1 Elementary School

Four elementary schools are shown, each in one of the quadrants of the District west of McCombs Street. The eventual locations of these institutions will be coordinated with the EPISD or SISD as appropriate. Access to elementary schools shall not be from a major arterial.

3.3.1.1.2.2 Middle School

One middle school site has been reserved. As this is the only middle school planned for the District it is likely that its location will change based on the desire to best serve the needs of the students. The eventual location of the middle school will be coordinated with the EPISD. Access to the middle school shall not be from a major arterial.

3.3.1.1.2.3 High School

One high school site has been reserved. This is the only high school planned for the District, the eventual location of which will be coordinated with the EPISD. Its location has taken the following criteria (provided by the EPISD) into account:

- street frontage and access;
- student capture (two-mile walking distance);
- site shape and potential for expansion;
- open space buffer adjacent to neighborhoods; and
- proximity to retail.

3.3.1.1.3 *Low Density Residential 3.5*

This residential type includes single-family detached homes and two-family homes, distributed in a manner that follows the intent of Section 1.3.3 and does not exceed 3.5 dwelling units per gross acre within the acreage allocated to it within its Subdistrict, as shown on the Master Land Use Plan. Duplexes may be included at the edges of these areas in order to articulate with adjacent higher-density areas, provided the density maximum is not exceeded.

3.3.1.1.4 *Low Density Residential 5.5*

This residential type includes single-family detached homes, two-family homes, and three- and four-family homes, distributed in a manner that follows the intent of Section 1.3.3 and does not exceed 5.5 dwelling units per gross acre within the acreage allocated to it within its Subdistrict, as shown on the Master Land Use Plan. Townhouses may be included at the edges of these areas in order to articulate with adjacent higher-density areas, provided the density maximum is not exceeded.

3.3.1.1.5 *Medium Density Residential 7.2*

This residential type includes single-family detached homes, two-family homes, three- and four-family homes, and residential cluster development, distributed in a manner that follows the intent of Section 1.3.3 and does not exceed 7.2 dwelling units per gross acre within the acreage allocated to it within

Cluster development is encouraged.

its Subdistrict, as shown on the Master Land Use Plan. Townhouses may be included at the edges of these areas in order to articulate with adjacent higher-density areas, provided the density maximum is not exceeded. Cluster development is encouraged.

3.3.1.1.6 *Medium Density Residential 12.0*

This residential type includes three- and four-family homes, residential cluster development, townhouses, and apartment buildings, distributed in a manner that follows the intent of Section 1.3.3 and does not exceed 12.0 dwelling units per gross acre within the acreage allocated to it within its Subdistrict, as shown on the Master Land Use Plan. Two-family homes may be included at the edges of these areas in order to articulate with adjacent lower-density areas, provided the density maximum is not exceeded. Cluster development is encouraged.

3.3.1.1.7 *Mixed-Use Low Intensity*

This land use type consists of neighborhood-serving retail and/or commercial uses, such uses providing goods and services for the day-to-day needs of the nearby neighborhoods, and/or multi-family dwellings. Single-use retail, commercial or residential development is allowed in Mixed-Use Low Intensity areas.

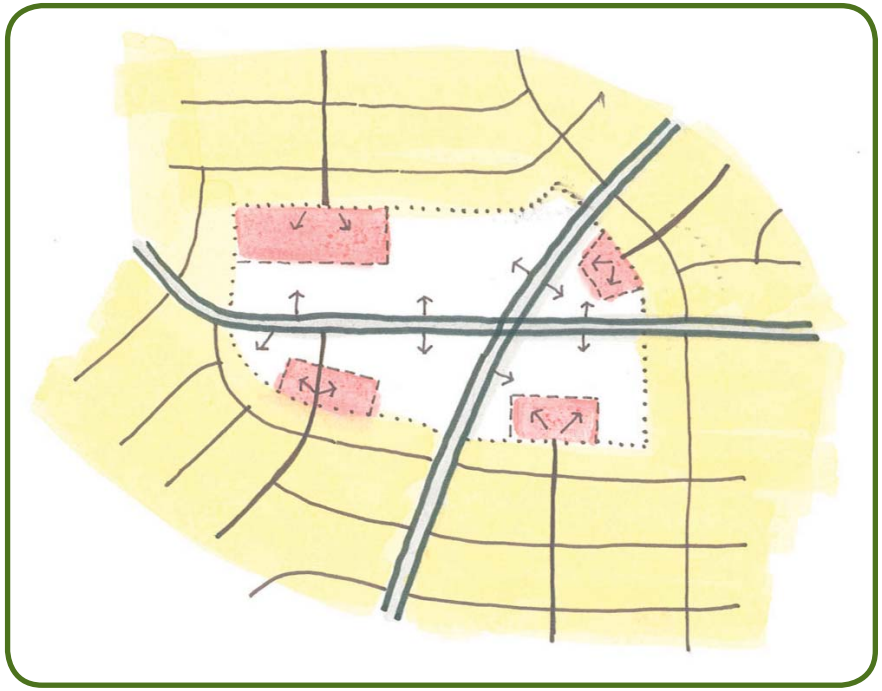
3.3.1.1.8 *Mixed-Use High Intensity*

This land use type consists of community-serving retail and/or commercial uses, such uses providing goods and services for several neighborhoods, and/or multi-family dwellings. Single-use retail, commercial or residential development is allowed in Mixed-Use High Intensity areas.

3.3.1.1.9 *Regional Retail*

Regional retail consists of a full-range of high concentration retail, commercial and entertainment opportunities serving the needs of the Northeast El Paso region and nearby communities. This component of the District benefits from the high visibility and access afforded it by its location at the intersection of two high-capacity arterials and thus should be designed and developed as a unit in a manner that maximizes its potential to act as a catalyst for development of the District. This planning of this area should be done in coordination with the adjoining mixed-use areas to produce an integrated development.

Development within this land use may consist of a single large anchor store or have multiple anchor retail tenants (e.g., department stores, supermarkets, home improvement stores, sporting goods stores, variety, or specialty), office tenants or entertainment uses (such as movie theatres), along with pad sites developed within the area. Secondary uses may include restaurants, banks and service stations; however, these uses must be integrated into the larger primary use. The Regional Retail area should have direct access to Patriot freeway and to McCombs Street and should allow access from the District in a manner that does not promote cut-through traffic from outside the District. Also, development within the Regional Retail land use category must adhere to specific design guidelines. (see Section 7).



Well-planned retail centers and lower-intensity retail uses can be integrated into the neighborhood fabric.

Stand-alone apartment buildings are allowed throughout the District, with the following restrictions, together with any other requirements described herein:

- Such development shall have an area of no greater than sixteen acres;
- Such development shall be adjacent to and access an arterial or collector street;
- Such development shall not directly access streets or alleys from which single-family detached homes are directly accessed.

3.3.1.2 *Proposed Density*

The gross residential density of the District shall be the sum of the dwelling units within each Subdistrict, as may be approved, divided by the gross area of the development. The number of dwelling units for the District shall not exceed 20,000 units, which equates to a gross density of 4.05 du/ac.

3.3.1.3 *Proposed Non-Residential Floor Area*

The maximum proposed total floor area for all non-residential land uses is 8,805,000 square feet, approximately 4% of the District.

3.3.1.4 *Property Development Regulations for Subdistricts*

3.3.1.4.1 *Maximum Building Heights*

Maximum building heights. (See **Appendix 'E'**.)

3.3.1.4.2 *Minimum Dimensions of Lots*

Minimum dimensions of lots. (See **Appendix 'E'**.)

3.3.1.4.3 *Yard Setbacks*

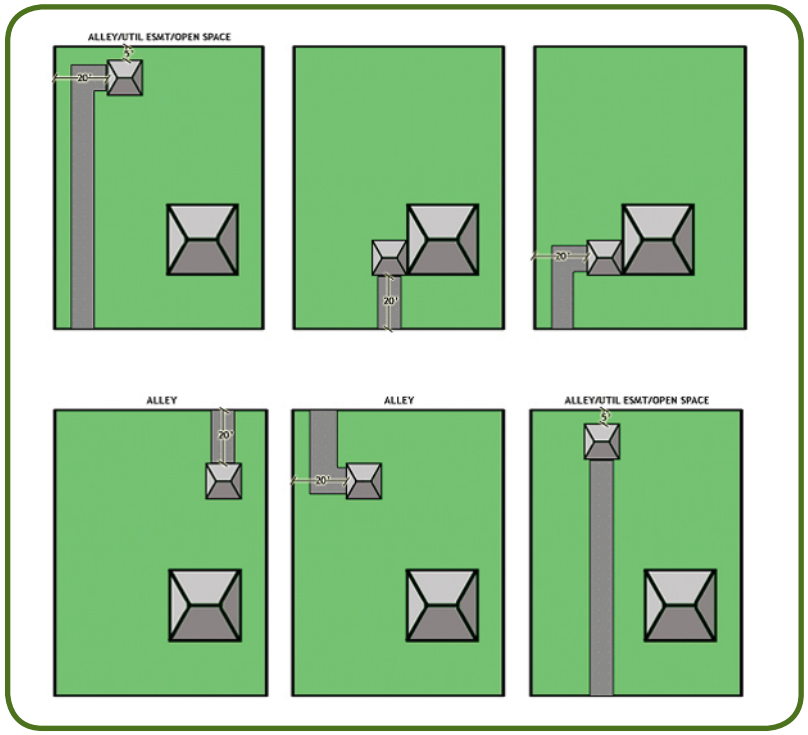
Yard setbacks are shown in **Appendix 'E'**. Properties within the District shall be allowed zero setbacks for all uses unless otherwise indicated.

3.3.1.5 *Buffers*

A side/rear yard buffer six feet wide (minimum) shall be maintained between parking areas and adjacent lots, regardless of site size. A buffer fifteen feet wide (minimum) shall be maintained between residential and non-residential uses.

3.3.1.6 *Garage Setbacks*

Garages that are accessed from a front property line shall maintain a minimum 20' front setback and a minimum 10' rear setback. The rear setback may be reduced to 5' where the rear property line is separated from an adjacent property line by a minimum of 10' via alley, utility right-of-way or other similar separation. Garages that are accessed from a rear property line via an alley shall maintain a minimum 20' rear setback. Representative examples of garage placement are shown below.



3.3.1.7 *Park Land Dedication*

Park land dedication within each Subdistrict shall be in accordance with the requirements of Title 19 Subdivisions and in accordance with the Land Study.

3.3.2 The Subdistricts

The intent of the design and function of Subdistricts shall be as described under Section 1.3.2 and further described in this section. The proposed mix of land uses for each Subdistrict, their relative locations and dimensional standards are included on the following pages. (The Subdistrict Key Map can be found in **Appendix 'F'**.)

3.3.2.1 Subdistrict 1

3.3.2.1.1 Characteristics

Subdistrict 1, which is in the far northwest corner of the District north of the outer loop road and bounded by the EPECO right-of-way and the northern property line of the District, is planned as residential with nodes of supporting mixed-use, as indicated in the figure below. The purpose of the Subdistrict is to provide for a range of housing opportunities including relatively large lots. Adjacency to the Franklin Mountains, open space and the outer loop will buffer this Subdistrict from adjacent development while providing a strong vehicular linkage via Martin Luther King Boulevard and strong pedestrian opportunities via the northern linear open space, including a trailhead to the Franklin Mountains.

3.3.2.1.2 Components and Timing

The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Open Space:	114 acres	-	-
Residential 3.5 du/ac:	103 acres	361	-
Residential 5.5 du/ac:	125 acres	688	-
Residential 7.2 du/ac:	79 acres	569	-
Mixed-Use Low Intensity:	17 acres	-	222,200
TOTAL	**438 acres**	**1,618**	**222,200**

The mixed-use areas are allowed residential units up to 12.0 du/ac as long as the total number of residential units for the Subdistrict does not exceed 1,618. The estimated number of units for Subdistrict 1 accounts for 8% of the estimated District units. Development of Subdistrict 1 is expected to occur within years eleven and twelve.

3.3.2.1.3 *Proposed Density*

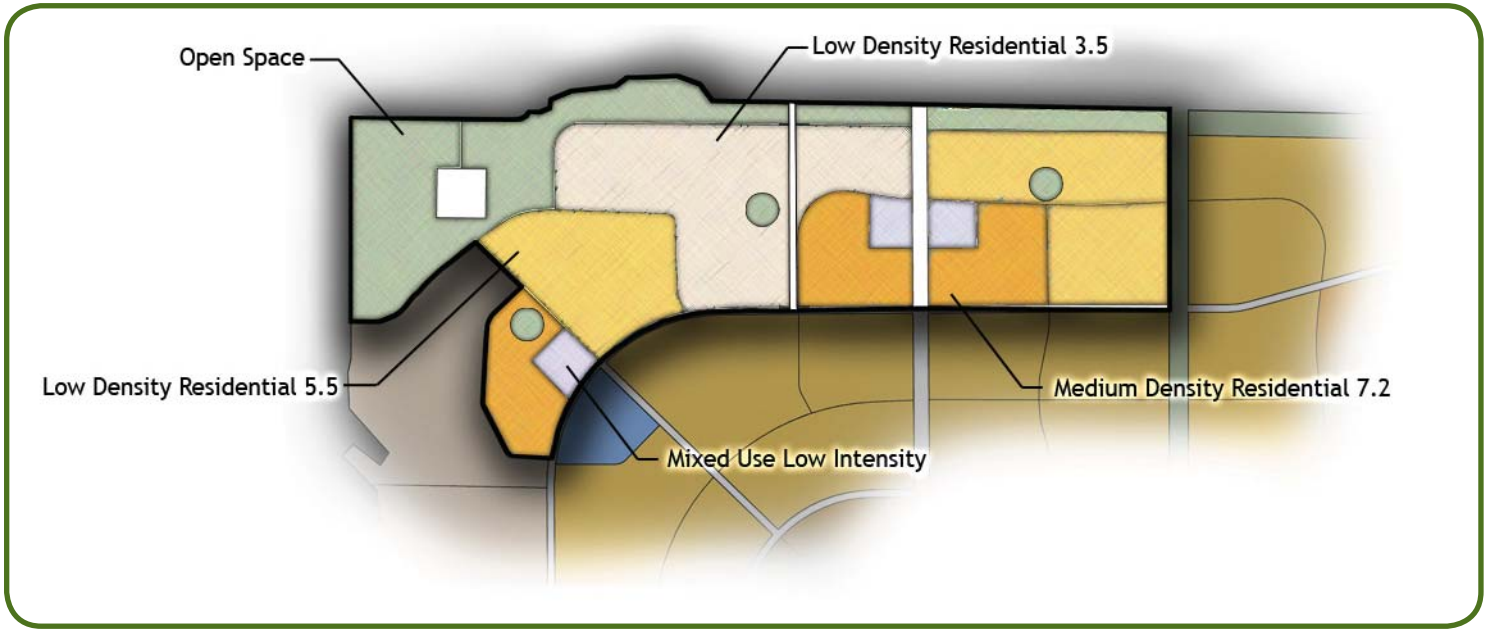
The maximum proposed residential density for the Subdistrict shall be 5.27 du/ac.

3.3.2.1.4 *Proposed Non-Residential Floor Area*

The maximum proposed total floor area for all non-residential land uses in the Subdistrict is 222,200 square feet.

3.3.2.1.5 *Proposed Intensity*

The gross non-residential intensity of the Subdistrict shall be the sum of the non-residential floor area divided by the sum of the land area of non-residential land uses, expressed as a floor to area ratio (FAR). The maximum proposed non-residential intensity for Subdistrict 1 shall be 0.3:1.



3.3.2.2 Subdistrict 2

3.3.2.2.1 Characteristics

Almost all of Subdistrict 2, which occupies the western edge of the District between the Franklin Mountains and the outer loop road, is low-density residential with one node of supporting mixed-use, as indicated in the table below. This area adjoins the three linear open spaces and will contain a trailhead to the Franklin Mountains State Park in conjunction with the central linear park. The purpose of the Subdistrict is to provide for a range of housing opportunities including relatively large lots. With access to a single thoroughfare, Subdistrict 2 provides for a housing segment that prefers relatively secluded neighborhoods.

3.3.2.2.2 Components and Timing

The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Open Space:	25 acres	-	-
Residential 3.5 du/ac:	290 acres	1,015	-
Mixed-Use Low Intensity:	7 acres	-	91,500
TOTAL	**322 acres**	**1,015**	**91,500**

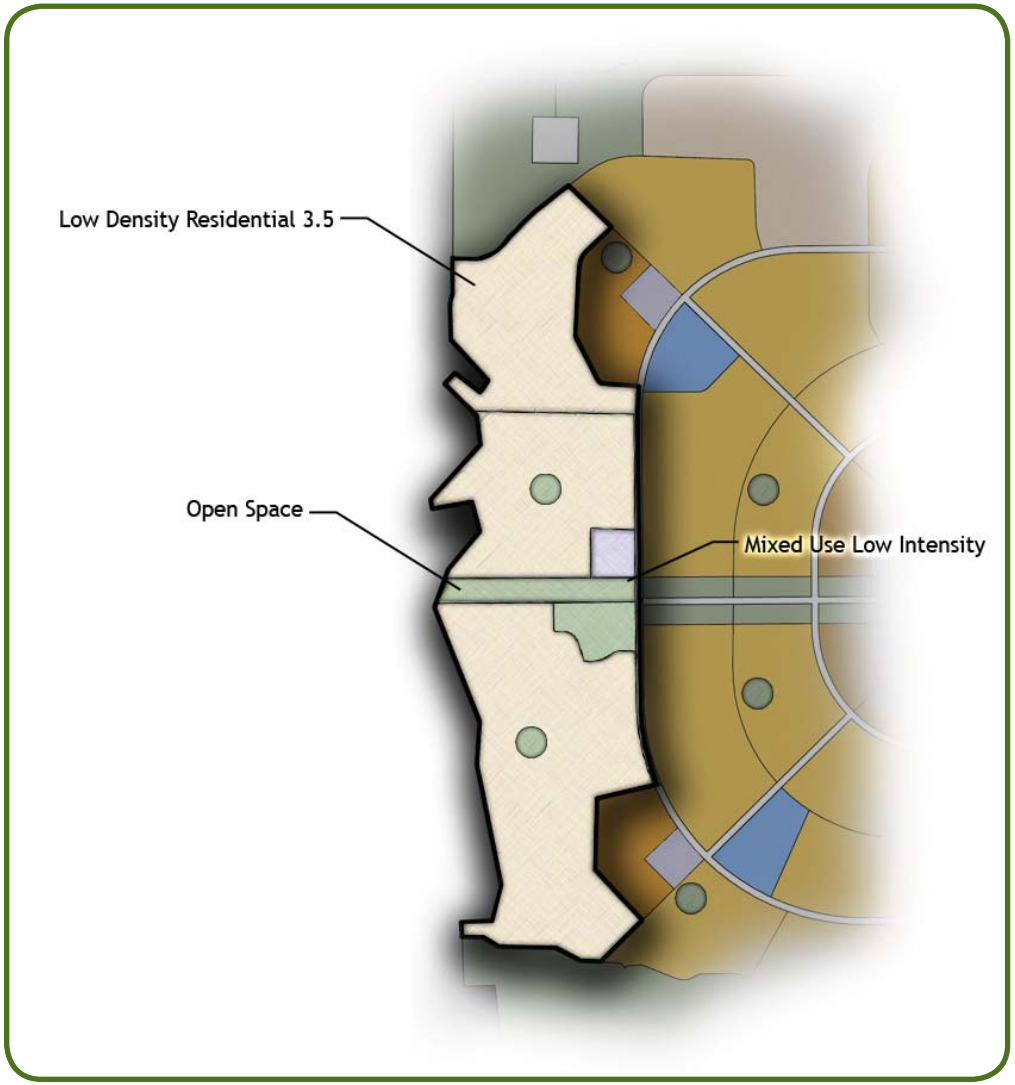
The mixed-use area is allowed residential units up to 12.0 du/ac as long as the total number of residential units for the Subdistrict does not exceed 1,015. The estimated number of units for Subdistrict 2 accounts for 5% of the estimated District units. Development of Subdistrict 2 is expected to occur in years seven, nine and twelve.

3.3.2.2.3 Proposed Density

The maximum proposed residential density for the Subdistrict shall be 3.50 du/ac.

3.3.2.2.4 Proposed Non-Residential Floor Area

The maximum proposed total floor area for all non-residential land uses in the Subdistrict is 91,500 square feet.



3.3.2.2.5 Proposed Intensity

The gross non-residential intensity of the Subdistrict shall be the sum of the non-residential floor area divided by the sum of the land area of non-residential land uses, expressed as a floor to area ratio (FAR). The maximum proposed non-residential intensity for Subdistrict 2 shall be 0.3:1.

3.3.2.3 Subdistrict 3

3.3.2.3.1 Characteristics

Subdistrict 3 in the northwest quadrant of the District, and bounded by the outer and inner loop roads, proposed Painted Dunes Avenue and the EPECO right-of-way, will function primarily as a residential area and contains an elementary school. As a buffer area, Subdistrict 3 serves to decrease the gradient of development intensity between the primarily residential Subdistricts 1 and 2 and the western Town Center in Subdistrict 4.

3.3.2.3.2 Components and Timing

The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Elementary School:	15 acres	-	-
Open Space:	10 acres	-	-
Residential 5.5 du/ac:	335 acres	1,843	-
TOTAL	**360 acres**	**1,843**	**-**

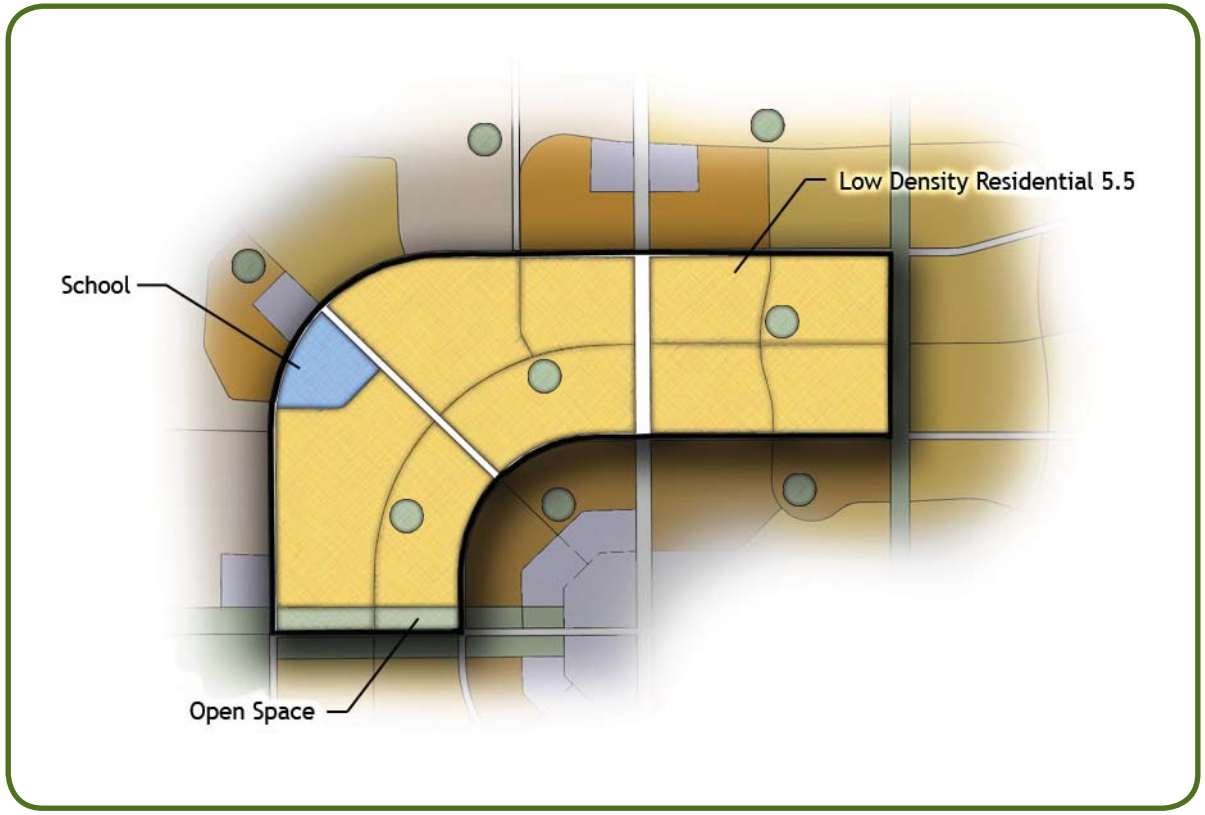
The estimated number of units for Subdistrict 3 accounts for 9% of the estimated District units. Development of Subdistrict 3 is expected to begin in year six with development continuing in years nine, ten and eleven.

3.3.2.3.3 Proposed Density

The maximum proposed residential density for the Subdistrict shall be 5.50 du/ac.

3.3.2.3.4 Mixed-Use Development

In order to meet potential market demand for additional mixed-use development within the District, up to ten acres of Mixed-Use Low Intensity uses shall be allowed within Subdistrict 3 east of Martin Luther King, Jr. Boulevard.


Low Density Residential 5.5
School
Open Space

3.3.2.4 Subdistrict 4

3.3.2.4.1 Characteristics

Subdistrict 4, bounded by the proposed inner loop road and the EPECO right-of-way, contains the western Town Center and the residential uses that surround it. The intent of this Subdistrict is to serve as a highly visible activity node at the western end of the linear park that also has strong links to the northeast and northwest corners of the District and to neighborhoods south of the District.

3.3.2.4.2 Components and Timing

The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Open Space:	19 acres	-	-
Residential 12.0 du/ac:	167 acres	2,004	-
Mixed-Use Low Intensity:	30 acres	-	392,000
Mixed-Use High Intensity:	45 acres	-	823,200
TOTAL	**261 acres**	**2,004**	**1,215,200**

The mixed-use areas are allowed residential units up to 12.0 du/ac and 24.0 du/ac respectively as long as the total number of residential units for the Subdistrict does not exceed 2,004. The estimated number of units for Subdistrict 4 accounts for 10% of the estimated District units. Development of Subdistrict 4 is expected to begin in year four with development continuing in years five, six, seven, nine and ten.

3.3.2.4.3 Proposed Density

The maximum proposed residential density for the Subdistrict shall be 12.0 du/ac.

3.3.2.4.4 Proposed Non-Residential Floor Area

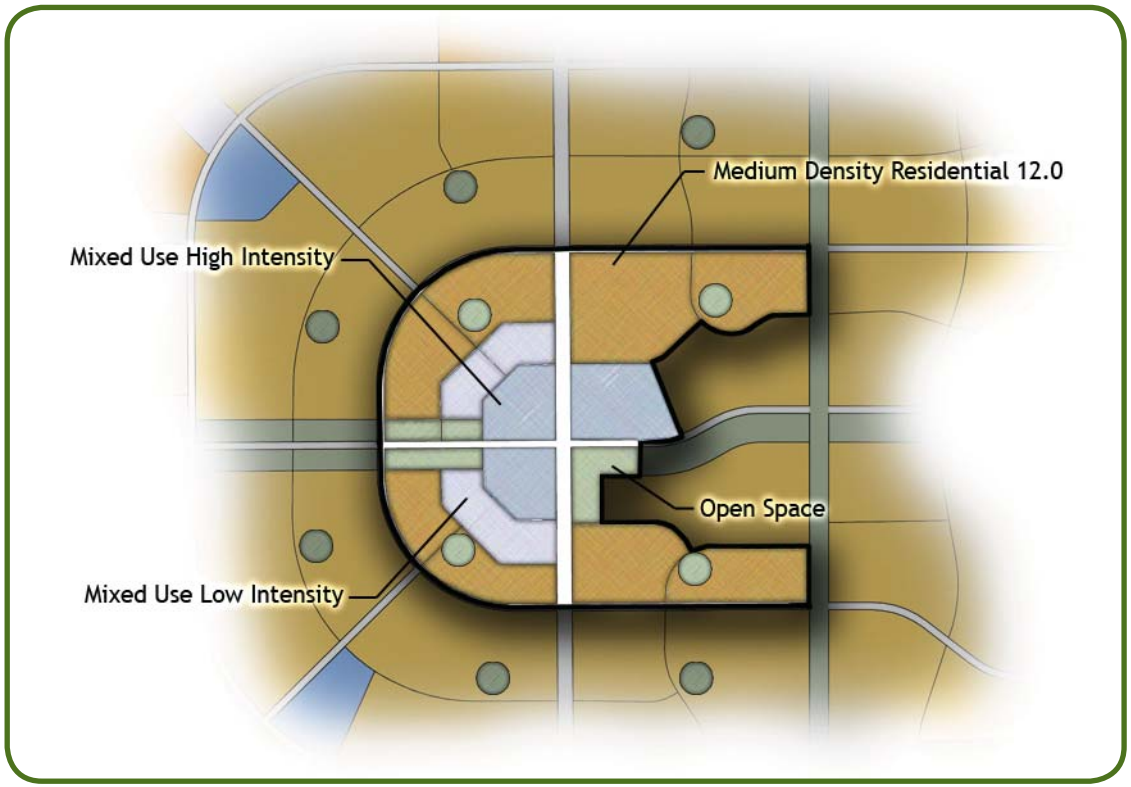
The maximum proposed total floor area for all non-residential land uses in the Subdistrict is 1,215,200 square feet.

3.3.2.4.5 *Proposed Intensity*

The gross non-residential intensity of the Subdistrict shall be the sum of the non-residential floor area divided by the sum of the land area of non-residential land uses, expressed as a floor to area ratio (FAR). The maximum proposed non-residential intensity for Subdistrict 4 shall be 0.37:1.

3.3.2.4.6 *Linear Park*

Pedestrian access via the Linear Park and view corridor shall be maintained through Subdistrict 4.



3.3.2.5 Subdistrict 5

3.3.2.5.1 Characteristics

Subdistrict 5 in the southwest quadrant of the District, and bounded by the outer and inner loop roads, proposed Painted Dunes Avenue and the EPECO right-of-way, will function primarily as a residential area containing an elementary school. As a buffer area, Subdistrict 5 serves to decrease the gradient of development intensity between the primarily residential Subdistricts 2 and 6 and the western Town Center in Subdistrict 4.

3.3.2.5.2 Components and Timing

The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Elementary School:	15 acres	-	
Open Space:	10 acres	-	-
Residential 5.5 du/ac:	308 acres	1,694	-
TOTAL	**333 acres**	**1,694**	**-**

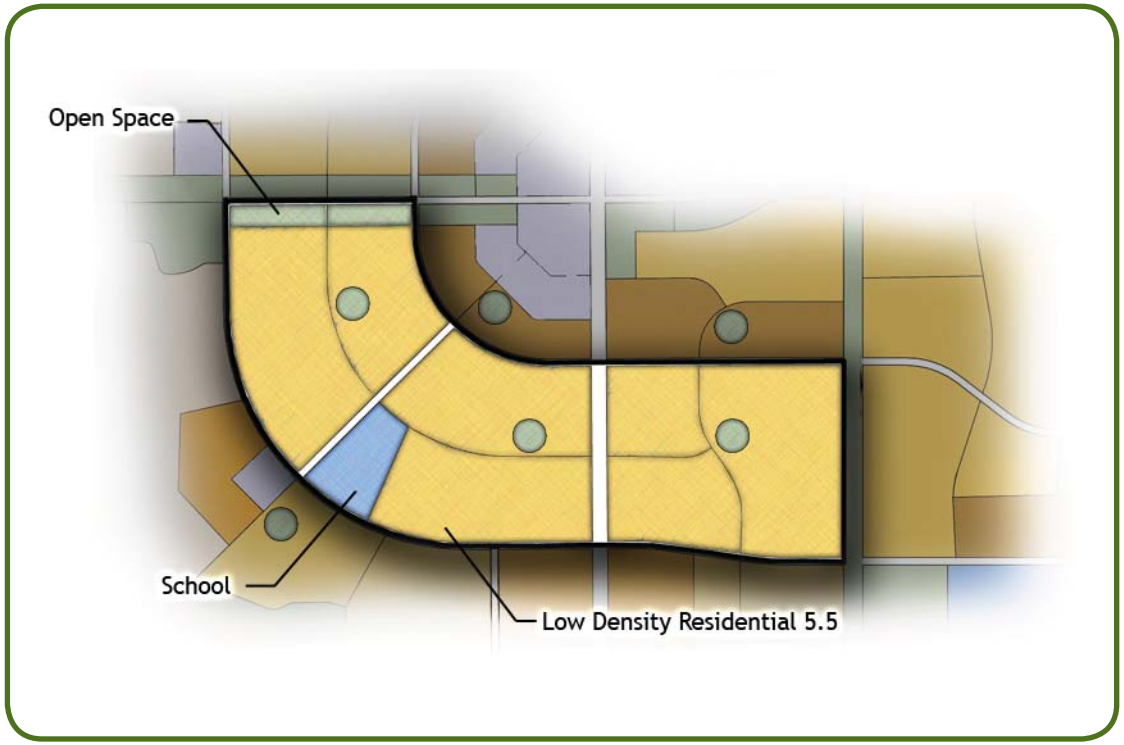
The estimated number of units for Subdistrict 5 accounts for 8% of the estimated District units. Development of Subdistrict 5 is expected to occur within years six and seven.

3.3.2.5.3 Proposed Density

The maximum proposed residential density for the Subdistrict shall be 5.50 du/ac.

3.3.2.5.4 Mixed-Use Development

In order to meet potential market demand for additional mixed-use development within the District, up to ten acres of Mixed-Use Low Intensity uses shall be allowed within Subdistrict 5 east of Martin Luther King, Jr. Boulevard.


Open Space
School
Low Density Residential 5.5

3.3.2.6 Subdistrict 6

3.3.2.6.1 Characteristics

Subdistrict 6, which is in the far southwest corner of the District south of the outer loop road and bounded by the EPECO right-of-way and the southern boundary line of the District, is planned as residential with nodes of supporting mixed-use, as indicated in the figure below. The purpose of the Subdistrict is to provide for a range of housing opportunities in keeping with adjacent development to the south. Open space and the outer loop will buffer this Subdistrict from adjacent development while providing a strong vehicular linkage via Martin Luther King Boulevard and strong pedestrian opportunities via the southern linear open space, including a trailhead to the Franklin Mountains.

3.3.2.6.2 Components and Timing

The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Open Space:	121 acres	-	-
Residential 5.5 du/ac:	137 acres	754	-
Residential 7.2 du/ac:	77 acres	555	-
Mixed-Use Low Intensity:	16 acres	-	209,100
TOTAL	**351 acres**	**1,309**	**209,100**

The mixed-use areas are allowed residential units up to 12.0 du/ac as long as the total number of residential units for the Subdistrict does not exceed 1,309. The estimated number of units for Subdistrict 6 accounts for 7% of the estimated District units. Development of Subdistrict 6 is expected to begin in year four with development continuing in years six, seven and eight.

3.3.2.6.3 Proposed Density

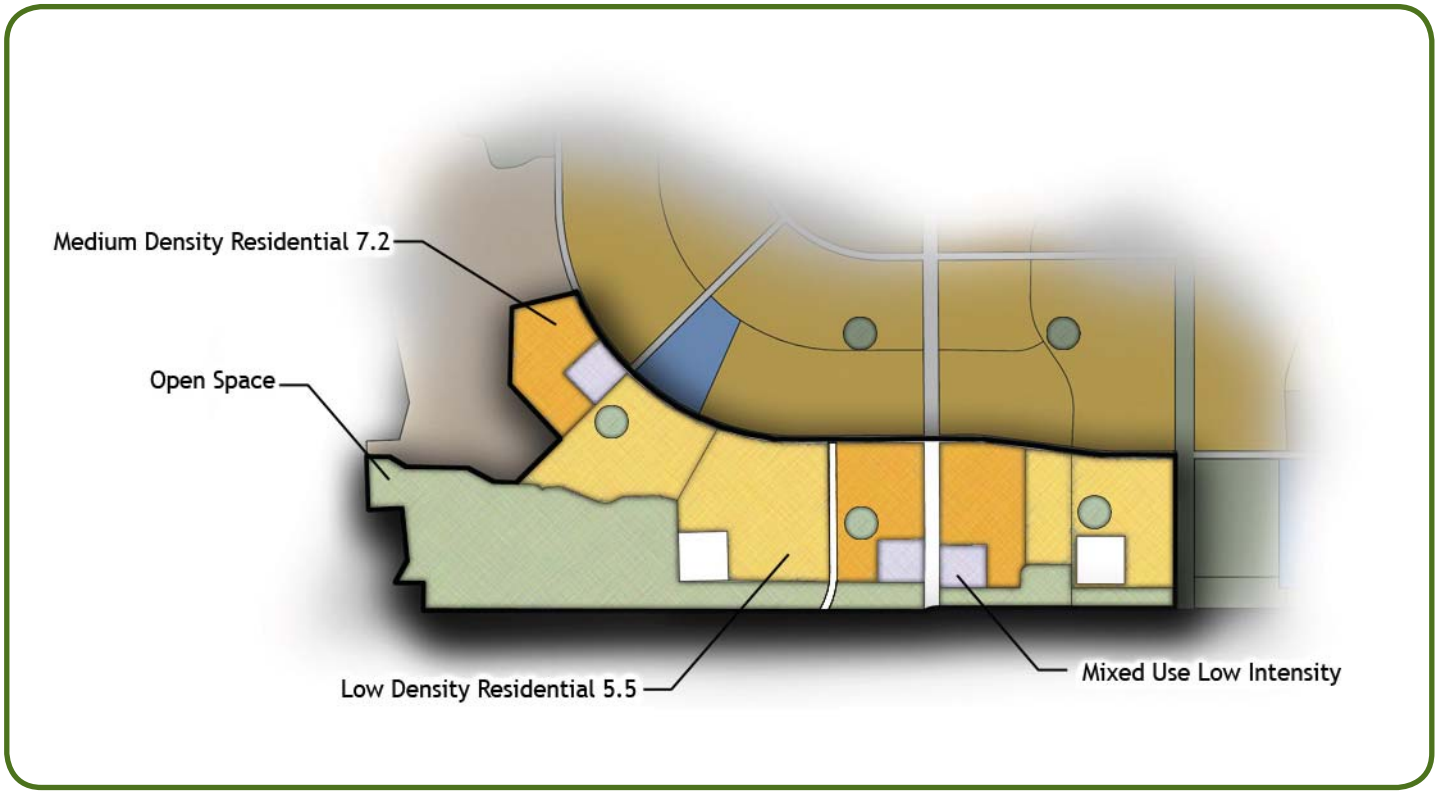
The maximum proposed residential density for the Subdistrict shall be 6.12 du/ac.

3.3.2.6.4 *Proposed Non-Residential Floor Area*

The maximum proposed total floor area for all non-residential land uses in the Subdistrict is 209,100 square feet.

3.3.2.6.5 *Proposed Intensity*

The gross non-residential intensity of the Subdistrict shall be the sum of the non-residential floor area divided by the sum of the land area of non-residential land uses, expressed as a floor to area ratio (FAR). The maximum proposed non-residential intensity for Subdistrict 6 shall be 0.3:1.



3.3.2.7 Subdistrict 7

3.3.2.7.1 Characteristics

Subdistrict 7 in the north central part of the District, bounded by the northern property line of the District, proposed Sean Haggerty Drive extension and the proposed outer loop road, is planned as a primarily residential subdistrict with supporting neighborhood commercial/retail uses. Adjacency to the northern linear open space and the EPECO right-of-way provides exceptional access to the community hike/bike circulation system.

3.3.2.7.2 Components and Timing

The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Open Space:	15 acres	-	-
Residential 5.5 du/ac:	184 acres	1,012	-
Residential 7.2 du/ac:	19 acres	137	-
Mixed-Use Low Intensity:	13 acres	-	169,900
TOTAL	**231 acres**	**1,149**	**169,900**

The mixed-use areas are allowed residential units up to 12.0 du/ac as long as the total number of residential units for the Subdistrict does not exceed 1,149. The estimated number of units for Subdistrict 7 accounts for 6% of the estimated District units. Development of Subdistrict 7 is expected to occur in years six, seven and ten.

3.3.2.7.3 Proposed Density

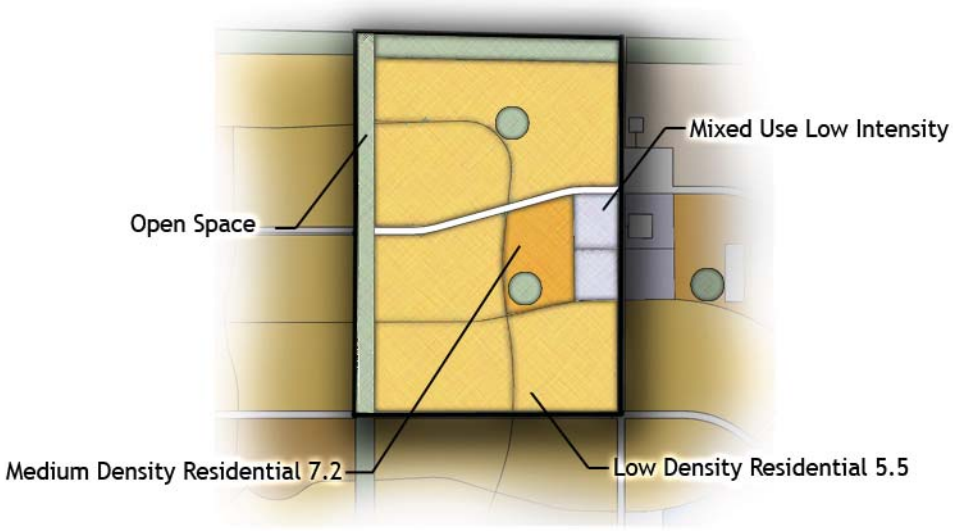
The maximum proposed residential density for the Subdistrict shall be 5.66 du/ac.

3.3.2.7.4 Proposed Non-Residential Floor Area

The maximum proposed total floor area for all non-residential land uses in the Subdistrict is 169,900 square feet.

3.3.2.7.5 *Proposed Intensity*

The gross non-residential intensity of the Subdistrict shall be the sum of the non-residential floor area divided by the sum of the land area of non-residential land uses, expressed as a floor to area ratio (FAR). The maximum proposed non-residential intensity for Subdistrict 7 shall be 0.3:1.



3.3.2.8 Subdistrict 8

3.3.2.8.1 Characteristics

Subdistrict 8, bounded by the proposed inner loop road and proposed Painted Dunes Avenue, is planned as a primarily residential subdistrict with supporting neighborhood commercial/retail uses. Adjacency to the central linear open space and the EPECO right-of-way provides exceptional access to the community hike/bike circulation system.

3.3.2.8.2 Components and Timing

The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Middle School:	25 acres	-	-
Residential 5.5 du/ac:	159 acres	875	-
Mixed-Use Low Intensity:	8 acres	-	104,500
TOTAL	**192 acres**	**875**	**104,500**

The mixed-use areas are allowed residential units up to 12.0 du/ac as long as the total number of residential units for the Subdistrict does not exceed 875. The estimated number of units for Subdistrict 8 accounts for 4% of the estimated District units. Development of Subdistrict 8 is expected to occur within years five and six.

3.3.2.8.3 Proposed Density

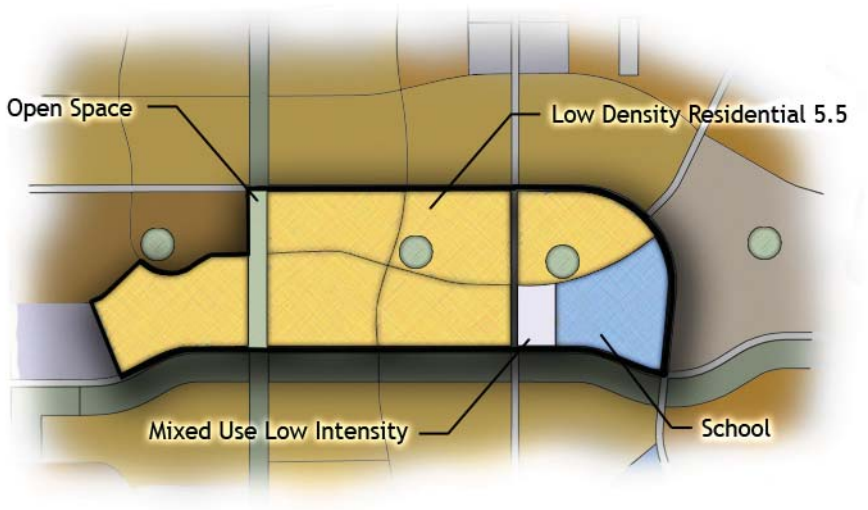
The maximum proposed residential density for the Subdistrict shall be 5.50 du/ac.

3.3.2.8.4 Proposed Non-Residential Floor Area

The maximum proposed total floor area for all non-residential land uses in the Subdistrict is 104,500 square feet.

3.3.2.8.5 *Proposed Intensity*

The gross non-residential intensity of the Subdistrict shall be the sum of the non-residential floor area divided by the sum of the land area of non-residential land uses, expressed as a floor to area ratio (FAR). The maximum proposed non-residential intensity for Subdistrict 8 shall be 0.3:1.



3.3.2.9 Subdistrict 9

3.3.2.9.1 Characteristics

Subdistrict 9, bounded by proposed Painted Dunes Avenue, proposed Sean Haggerty Drive, the proposed outer loop roar and the EPECO right-of-way, is planned as a primarily residential subdistrict with supporting neighborhood commercial/retail uses. Adjacency to the central linear open space and the EPECO right-of-way provides exceptional access to the community hike/bike circulation system.

3.3.2.9.2 Components and Timing

The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Open Space:	30 acres	-	-
Residential 5.5 du/ac:	227 acres	1,249	-
Mixed-Use Low Intensity:	6 acres	-	78,400
TOTAL	**263 acres**	**1,249**	**78,400**

The mixed-use areas are allowed residential units up to 12.0 du/ac as long as the total number of residential units for the Subdistrict does not exceed 1,249. The estimated number of units for Subdistrict 9 accounts for 6% of the estimated District units. Development of Subdistrict 9 is expected to occur in years two, three and four.

3.3.2.9.3 Proposed Density

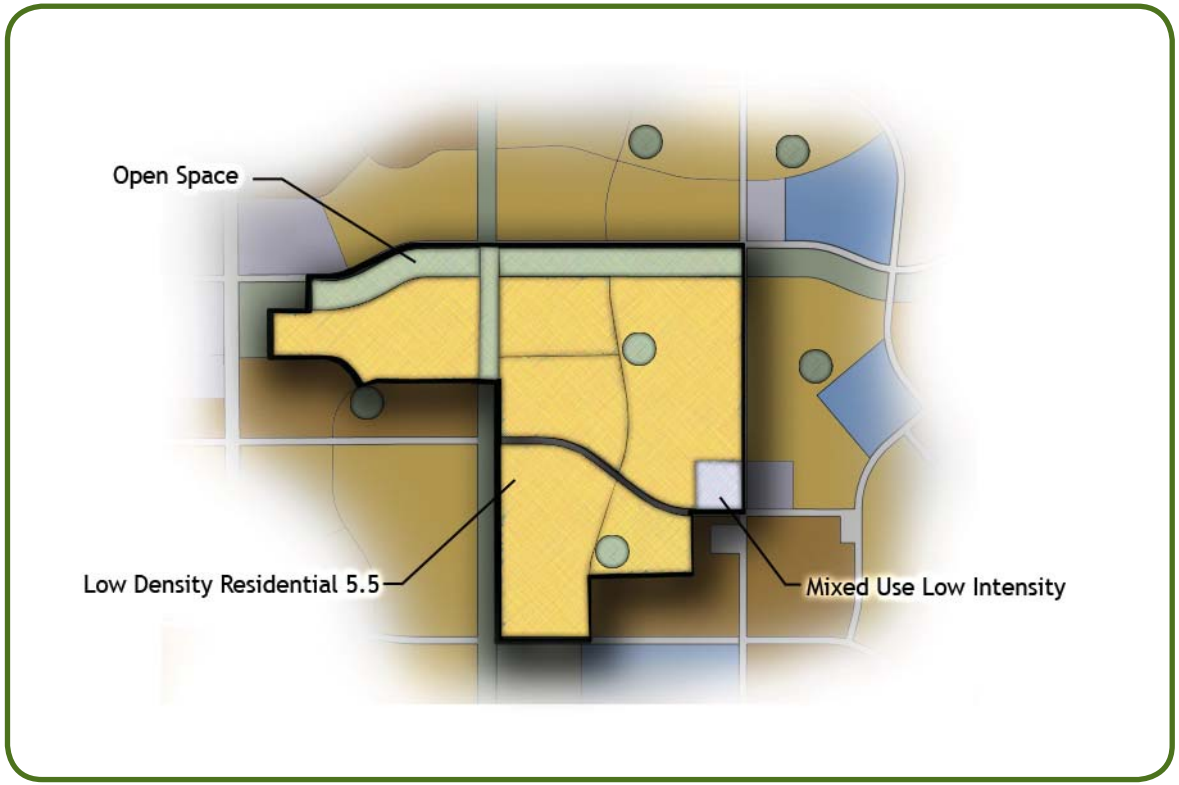
The maximum proposed residential density for the Subdistrict shall be 5.50 du/ac.

3.3.2.9.4 Proposed Non-Residential Floor Area

The maximum proposed total floor area for all non-residential land uses in the Subdistrict is 78,400 square feet.

3.3.2.9.5 *Proposed Intensity*

The gross non-residential intensity of the Subdistrict shall be the sum of the non-residential floor area divided by the sum of the land area of non-residential land uses, expressed as a floor to area ratio (FAR). The maximum proposed non-residential intensity for Subdistrict 9 shall be 0.3:1.



3.3.2.10 Subdistrict 10

3.3.2.10.1 Characteristics

Subdistrict 10, which consists of a 25-acre community park and a 50-acre high school site, is planned as a community service area for the District and for neighborhoods to the south. Sean Haggerty Drive, Lomo Real Avenue and the EPECO right-of-way provide excellent access for the District and for the neighborhoods to the south.

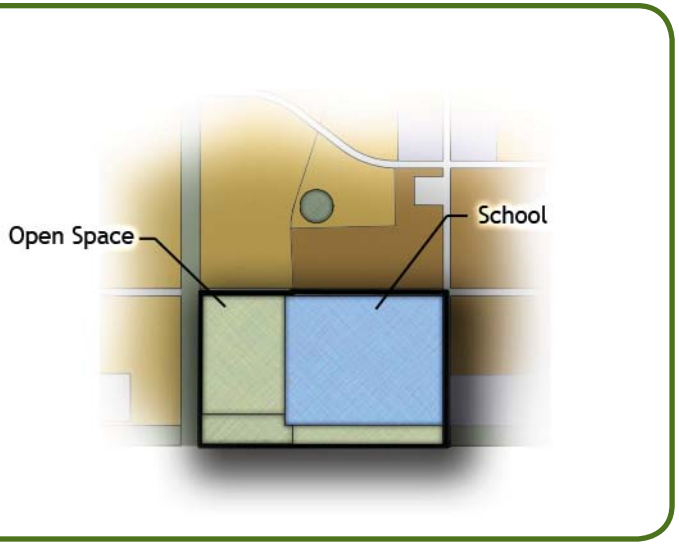
Subdistrict 10 is bounded by the proposed outer loop road to the north, proposed Sean Haggerty Drive to the east, the southern boundary of the District to the south and the EPECO right-of-way to the west.

3.3.2.10.2 Components and Timing

The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Open Space:	45 acres	-	-
High School:	51 acres	-	-
TOTAL	**96 acres**	**-**	**-**

Development of the Community Park is expected to begin in year one and to be completed no later than year three.


Open Space
School

3.3.2.11 Subdistrict 11

3.3.2.11.1 Characteristics

Subdistrict 11, bounded by the northern District boundary, proposed Sean Haggerty Drive and the proposed inner loop roar is planned as a primarily residential subdistrict with supporting neighborhood commercial/retail uses.

3.3.2.11.2 Components and Timing

The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Open Space:	55 acres	-	-
Residential 3.5 du/ac:	108 acres	378	-
Residential 5.5 du/ac:	48 acres	264	-
Residential 7.2 du/ac:	45 acres	324	-
Mixed-Use Low Intensity:	15 acres	-	196,000
TOTAL	**271 acres**	**966**	**196,000**

The mixed-use areas are allowed residential units up to 12.0 du/ac as long as the total number of residential units for the Subdistrict does not exceed 966. The estimated number of units for Subdistrict 11 accounts for 5% of the estimated District units. Development of Subdistrict 11 is expected to occur within years seven and ten.

3.3.2.11.3 Proposed Density

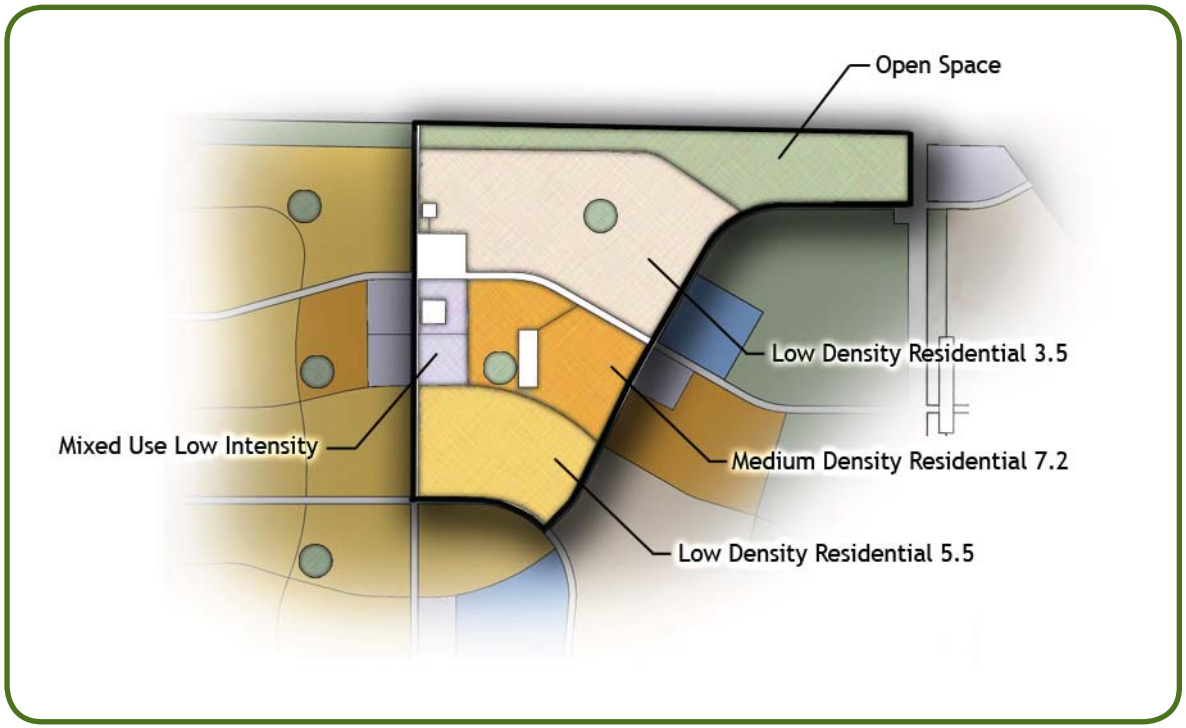
The maximum proposed residential density for the Subdistrict shall be 4.81 du/ac.

3.3.2.11.4 Proposed Non-Residential Floor Area

The maximum proposed total floor area for all non-residential land uses in the Subdistrict is 196,000 square feet.

3.3.2.11.5 *Proposed Intensity*

The gross non-residential intensity of the Subdistrict shall be the sum of the non-residential floor area divided by the sum of the land area of non-residential land uses, expressed as a floor to area ratio (FAR). The maximum proposed non-residential intensity for Subdistrict 11 shall be 0.3:1.



3.3.2.12 Subdistrict 12

3.3.2.12.1 Characteristics

Subdistrict 12 is bounded by McCombs Street, proposed Painted Dunes Avenue and the proposed inner loop road. Almost half of the Subdistrict is open space, which will serve a dual function of stormwater detention and recreational open space. One of the four proposed elementary schools is located in this Subdistrict.

3.3.2.12.2 Components and Timing

The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Open Space:	170 acres	-	-
Elementary School:	15 acres	-	-
Residential 3.5 du/ac:	95 acres	333	-
Residential 7.2 du/ac:	47 acres	338	-
Mixed-Use Low Intensity:	16 acres	-	209,100
TOTAL	**343 acres**	**671**	**209,100**

The mixed-use areas are allowed residential units up to 12.0 du/ac as long as the total number of residential units for the Subdistrict does not exceed 671. The estimated number of units for Subdistrict 12 accounts for 3% of the estimated District units. Development of Subdistrict 12 is expected to occur within years five and nine.

3.3.2.12.3 Proposed Density

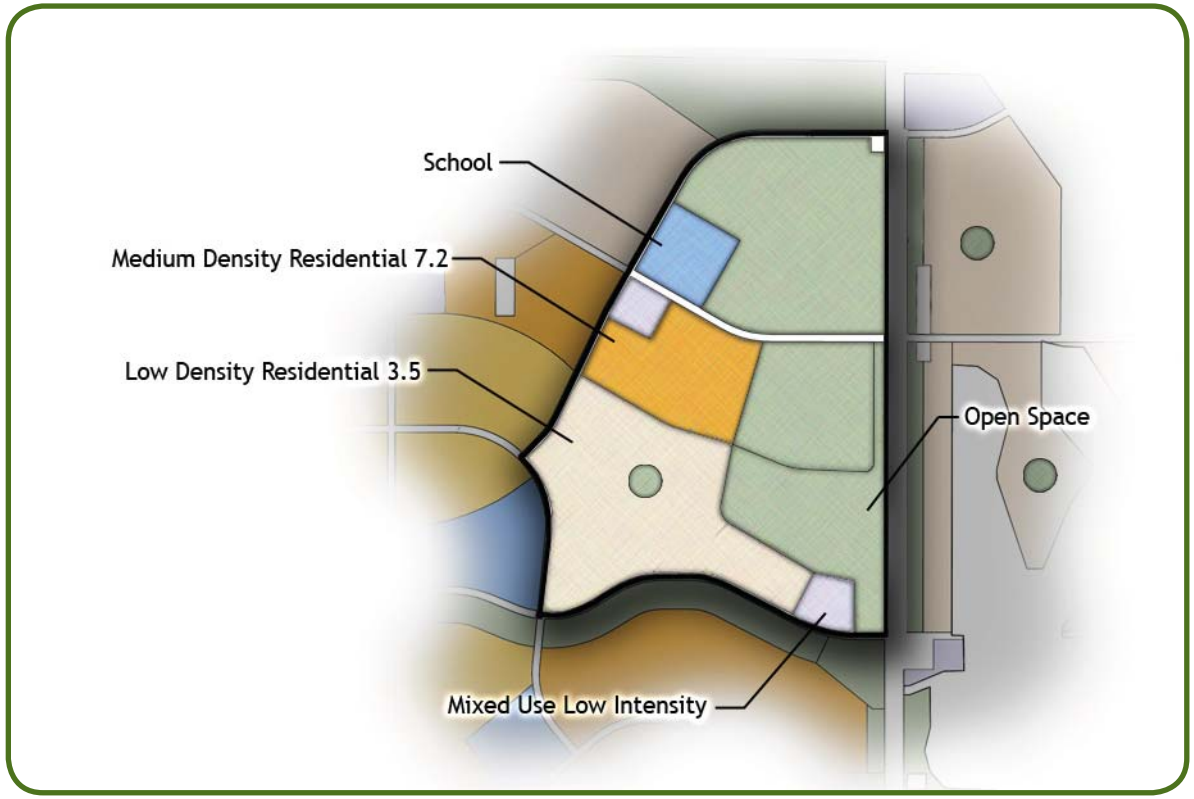
The maximum proposed residential density for the Subdistrict shall be 4.73 du/ac.

3.3.2.12.4 Proposed Non-Residential Floor Area

The maximum proposed total floor area for all non-residential land uses in the Subdistrict is 209,100 square feet.

3.3.2.12.5 *Proposed Intensity*

The gross non-residential intensity of the Subdistrict shall be the sum of the non-residential floor area divided by the sum of the land area of non-residential land uses, expressed as a floor to area ratio (FAR). The maximum proposed non-residential intensity for Subdistrict 12 shall be 0.3:1.



3.3.2.13 Subdistrict 13

3.3.2.13.1 Characteristics

Subdistrict 13 is uniquely situated to be en enclave development. It is bounded primarily by open space, which reduces the possibility of cut-through traffic. The pedestrian trail system and the southwestern Town Center are close by.

3.3.2.13.2 Components and Timing

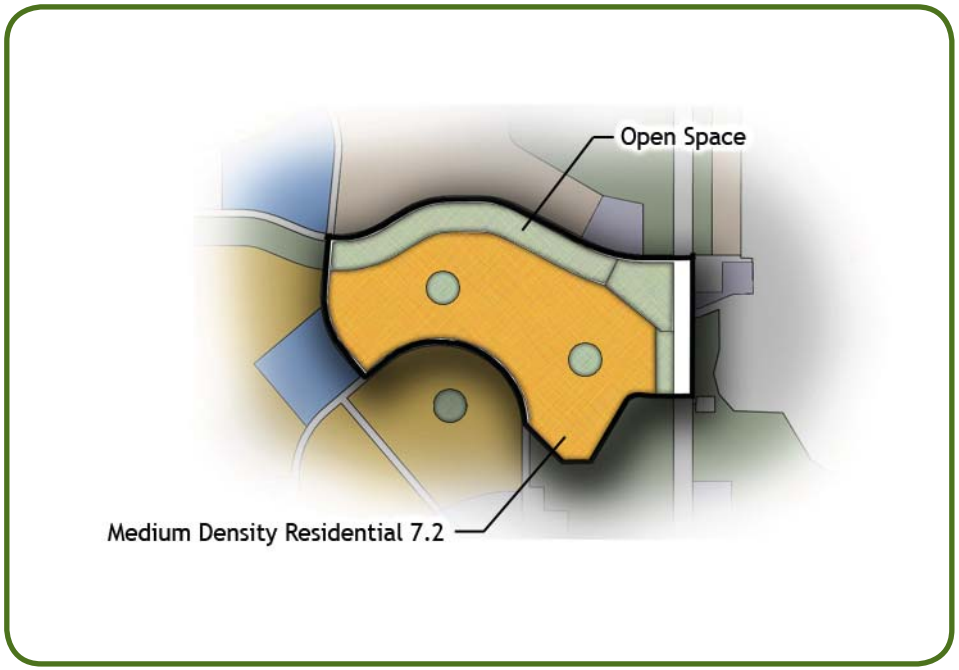
The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Open Space:	33 acres	-	-
Residential 7.2 du/ac:	107 acres	770	-
TOTAL	140 acres	770	-

The estimated number of units for Subdistrict 13 accounts for 4% of the estimated District units. Development of Subdistrict 13 is expected to occur in year three.

3.3.2.13.3 Proposed Density

The maximum proposed residential density for the Subdistrict shall be 7.20 du/ac.


Open Space
Medium Density Residential 7.2

3.3.2.14 Subdistrict 14

3.3.2.14.1 Characteristics

Subdistrict 14, bounded by proposed Sean Haggerty Drive, the proposed inner loop road and the proposed Painted Dunes Avenue, contains one of the four proposed elementary schools for the District; its location planned so as to serve as a strong terminus to the street connecting it to the southwestern Town Center.

3.3.2.14.2 Components and Timing

The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Open Space:	48 acres	-	-
Elementary School:	15 acres	-	-
Residential 5.5 du/ac:	163 acres	897	-
Mixed-Use Low Intensity:	8 acres	-	104,500
TOTAL	**234 acres**	**897**	**104,500**

The mixed-use areas are allowed residential units up to 12.0 du/ac as long as the total number of residential units for the Subdistrict does not exceed 897. The estimated number of units for Subdistrict 14 accounts for 5% of the estimated District units. Development of Subdistrict 14 is expected to occur in years one, two and three.

3.3.2.14.3 Proposed Density

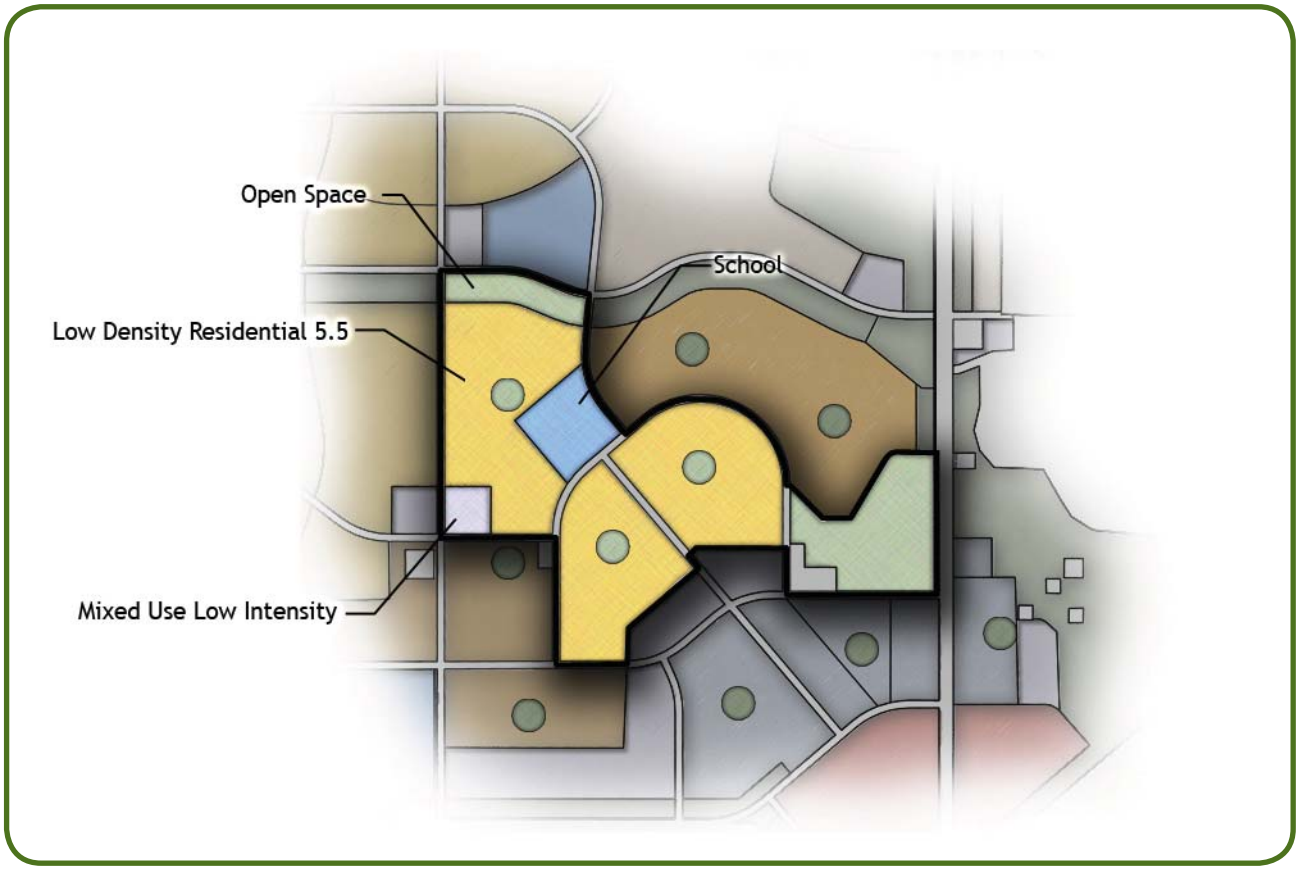
The maximum proposed residential density for the Subdistrict shall be 5.50 du/ac.

3.3.2.14.4 Proposed Non-Residential Floor Area

The maximum proposed total floor area for all non-residential land uses in the Subdistrict is 104,500 square feet.

3.3.2.14.5 *Proposed Intensity*

The gross non-residential intensity of the Subdistrict shall be the sum of the non-residential floor area divided by the sum of the land area of non-residential land uses, expressed as a floor to area ratio (FAR). The maximum proposed non-residential intensity for Subdistrict 14 shall be 0.3:1.



3.3.2.15 Subdistrict 15

3.3.2.15.1 Characteristics

Subdistrict 15 together with Subdistrict 16 shall serve as a strong mixed-use urban center for Northeast El Paso. Adjacent and internal residential units benefit from proximity to goods and services within walking distance, as well as adjacency to open space and the southern pedestrian trail system.

3.3.2.15.2 Components and Timing

The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Open Space:	18 acres	-	-
Residential 12.0 du/ac:	108 acres	1,296	-
Mixed-Use Low Intensity:	65 acres	-	849,400
Mixed-Use High Intensity:	101 acres	-	1,847,800
TOTAL	**292 acres**	**1,296**	**2,697,200**

The mixed-use areas are allowed residential units up to 12.0 du/ac and 24.0 du/ac respectively as long as the total number of residential units for the Subdistrict does not exceed 1,296. The estimated number of units for Subdistrict 15 accounts for 6% of the estimated District units. Development of Subdistrict 15 is expected to begin in year one with development continuing in years three, four, five, six, and eight.

3.3.2.15.3 Proposed Density

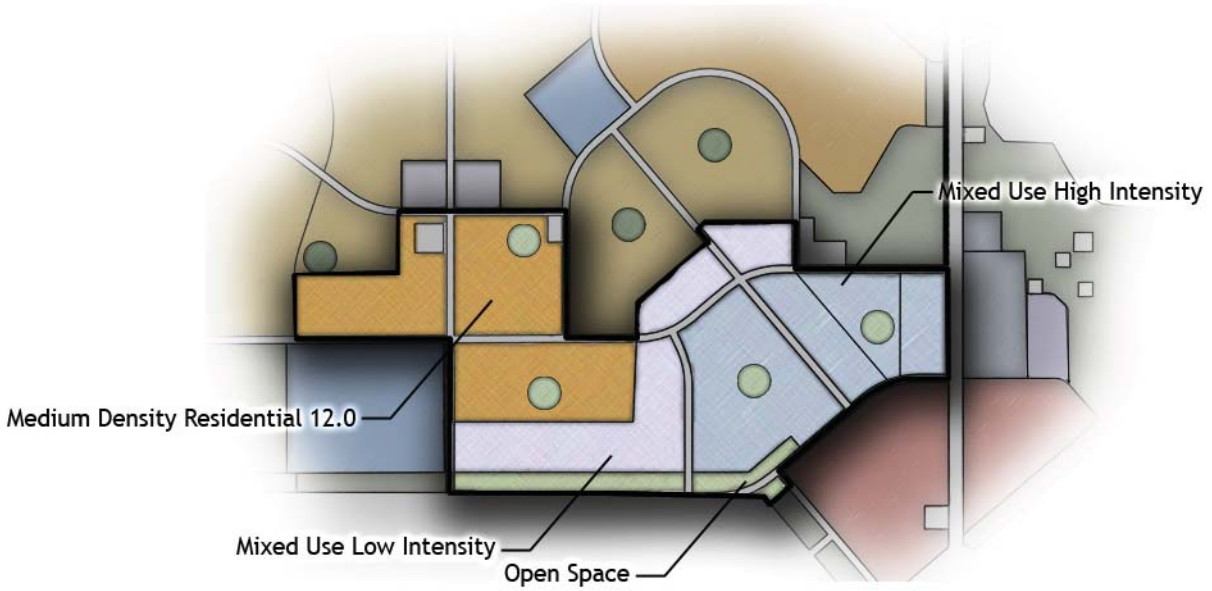
The maximum proposed residential density for the Subdistrict shall be 12.0 du/ac.

3.3.2.15.4 Proposed Non-Residential Floor Area

The maximum proposed total floor area for all non-residential land uses in the Subdistrict is 2,697,200 square feet.

3.3.2.15.5 *Proposed Intensity*

The gross non-residential intensity of the Subdistrict shall be the sum of the non-residential floor area divided by the sum of the land area of non-residential land uses, expressed as a floor to area ratio (FAR). The maximum proposed non-residential intensity for Subdistrict 15 shall be 0.37:1.



3.3.2.16 Subdistrict 16

3.3.2.16.1 Characteristics

Subdistrict 16, together with Subdistrict 15 shall serve as a strong mixed-use urban center for Northeast El Paso. The location of this Subdistrict (the intersection of a proposed six-lane thoroughfare and U.S. Highway 54) provides an ideal location for meeting the retail and commercial needs of the Northeast region as well as providing momentum for the development of the District as a whole.

3.3.2.16.2 Components and Timing

The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Open Space:	8 acres	-	-
Regional Retail:	93 acres	-	2,430,600
TOTAL	**101 acres**	**-**	**2,430,600**

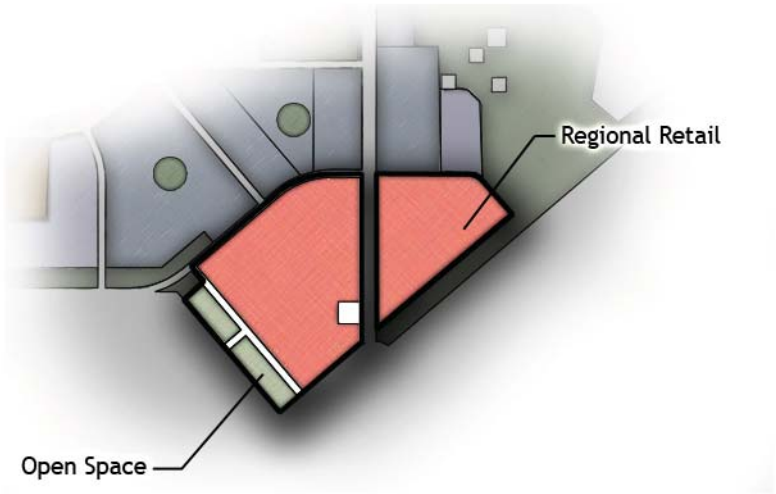
Development of Subdistrict 16 is expected to occur in year one.

3.3.2.16.3 Proposed Non-Residential Floor Area

The maximum proposed total floor area for all non-residential land uses in the Subdistrict is 2,430,600 square feet.

3.3.2.16.4 Proposed Intensity

The gross non-residential intensity of the Subdistrict shall be the sum of the non-residential floor area divided by the sum of the land area of non-residential land uses, expressed as a floor to area ratio (FAR). The maximum proposed non-residential intensity for Subdistrict 16 shall be 0.6:1.


Regional Retail
Open Space

3.3.2.17 Subdistrict 17

3.3.2.17.1 Characteristics

Subdistrict 17, together with the other Subdistricts east of McCombs Street, provides additional opportunities for enclave development. Enclosure by the District boundary and McCombs Street and proximity to the golf course offer amenity to an additional and specific market segment.

3.3.2.17.2 Components and Timing

The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Open Space:	8 acres	-	-
Residential 3.5 du/ac:	69 acres	242	-
Mixed-Use Low Intensity:	14 acres	-	183,000
TOTAL	**91 acres**	**242**	**183,000**

The mixed-use areas are allowed residential units up to 12.0 du/ac as long as the total number of residential units for the Subdistrict does not exceed 242. The estimated number of units for Subdistrict 17 accounts for 1% of the estimated District units. Development of Subdistrict 17 is expected to occur within years eleven and twelve.

3.3.2.17.3 Proposed Density

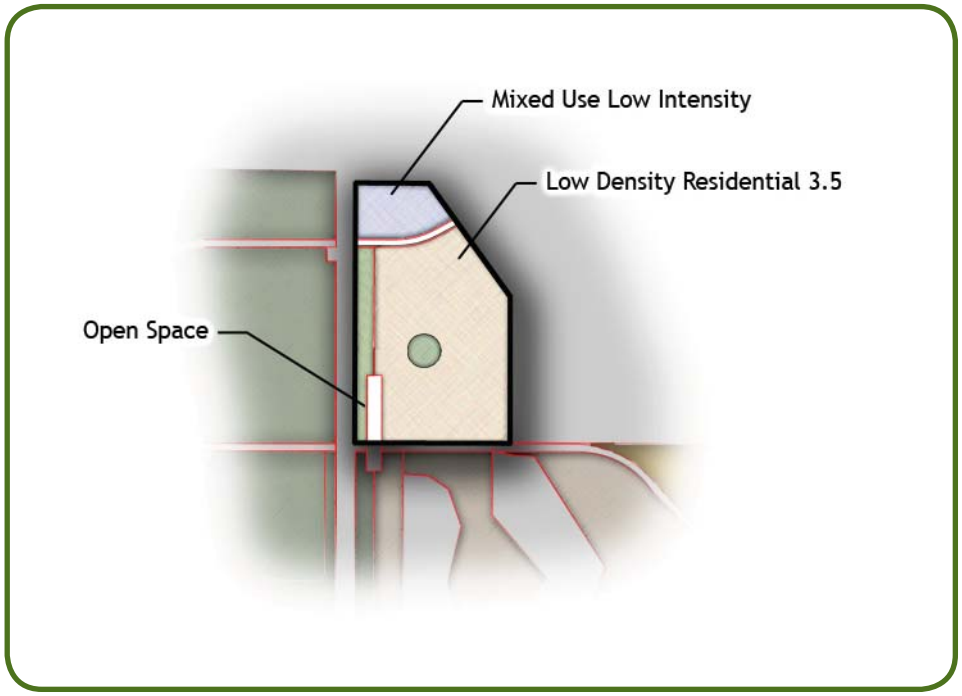
The maximum proposed residential density for the Subdistrict shall be 3.50 du/ac.

3.3.2.17.4 Proposed Non-Residential Floor Area

The maximum proposed total floor area for all non-residential land uses in the Subdistrict is 183,000 square feet.

3.3.2.17.5 *Proposed Intensity*

The gross non-residential intensity of the Subdistrict shall be the sum of the non-residential floor area divided by the sum of the land area of non-residential land uses, expressed as a floor to area ratio (FAR). The maximum proposed non-residential intensity for Subdistrict 17 shall be 0.3:1.



3.3.2.18 Subdistrict 18

3.3.2.18.1 Characteristics

Subdistrict 18 wraps around the northern end of Painted Dunes Golf Course providing an additional opportunity for enclave development with enclosure by the District boundary, the golf course boundary and McCombs Street, and little or no opportunity for cut-through traffic.

3.3.2.18.2 Components and Timing

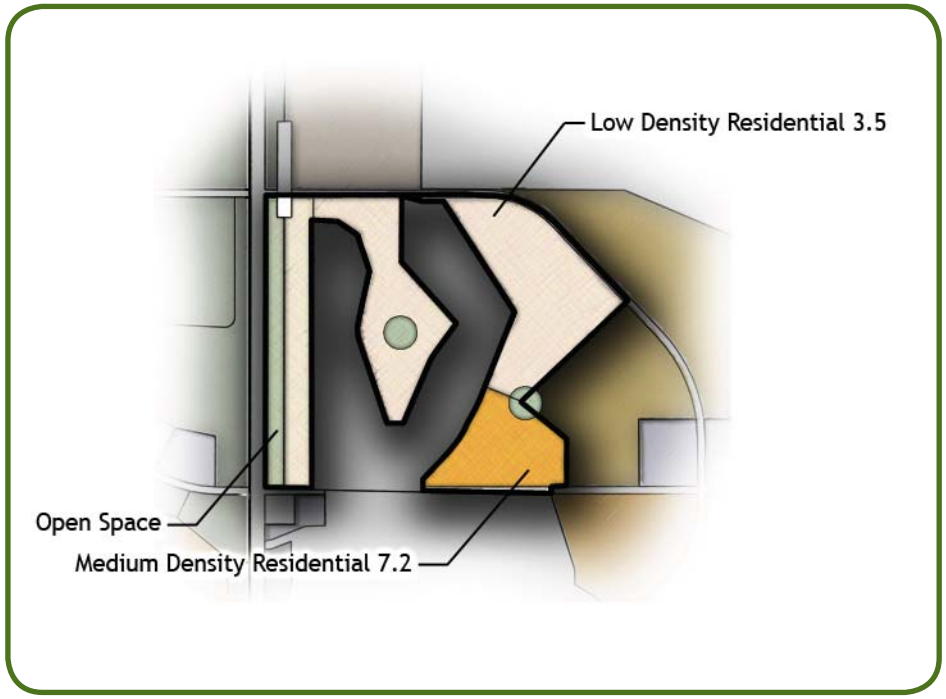
The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Open Space:	14 acres	-	-
Residential 3.5 du/ac:	103 acres	361	-
Residential 7.2 du/ac:	25 acres	180	
TOTAL	**142 acres**	**541**	**-**

The estimated number of units for Subdistrict 18 accounts for 2% of the estimated District units. Development of Subdistrict 18 is expected to occur within years seven and nine.

3.3.2.18.3 Proposed Density

The maximum proposed residential density for the Subdistrict shall be 4.22 du/ac.


Low Density Residential 3.5
Open Space
Medium Density Residential 7.2

3.3.2.19 Subdistrict 19

3.3.2.19.1 Characteristics

Subdistrict 19 consists of two mixed-use areas adjacent to McCombs Street and open space. The southern mixed-use area is adjacent to the regional retail area as well and is planned to be complementary to it. Pedestrian access to the regional park south of U.S. 54 is an amenity to the Subdistrict.

3.3.2.19.2 Components and Timing

The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Mixed-Use Low Intensity:	14 acres	-	183,000
Mixed-Use High Intensity:	24 acres	-	439,100
TOTAL	**38 acres**	**96**	**622,100**

The mixed-use areas are allowed residential units up to 12.0 du/ac and 24.0 du/ac respectively as long as the total number of residential units for the Subdistrict does not exceed 96. The estimated number of units for Subdistrict 19 accounts for 1% of the estimated District units. Development of Subdistrict 19 is expected to begin in year three with development continuing in years four, seven and eight.

3.3.2.19.3 Proposed Density

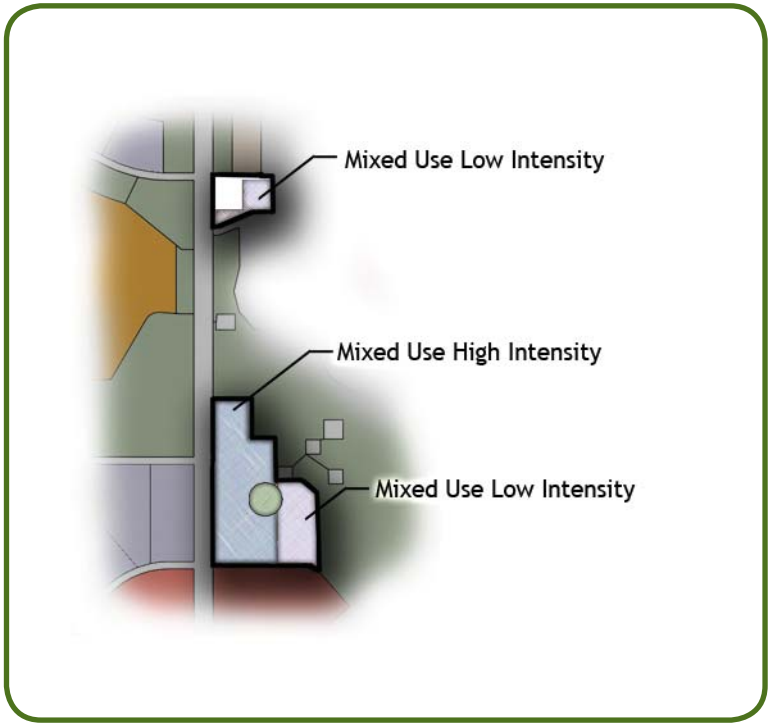
The maximum proposed residential density for the Subdistrict shall be 12.0 du/ac.

3.3.2.19.4 Proposed Non-Residential Floor Area

The maximum proposed total floor area for all non-residential land uses in the Subdistrict is 622,100 square feet.

3.3.2.19.5 *Proposed Intensity*

The gross non-residential intensity of the Subdistrict shall be the sum of the non-residential floor area divided by the sum of the land area of non-residential land uses, expressed as a floor to area ratio (FAR). The maximum proposed non-residential intensity for Subdistrict 19 shall be 0.4:1.



3.3.2.20 Subdistrict 20

3.3.2.20.1 Characteristics

Subdistrict 20 contains the eastern Town Center and the residential development planned to support it, contributing to a compact, walkable development. Adjacency to Painted Dunes Golf Course provides a unique amenity to the Subdistrict.

3.3.2.20.2 Components and Timing

The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Residential 5.5 du/ac:	44 acres	242	-
Residential 7.2 du/ac:	37 acres	266	-
Residential 12.0 du/ac:	45 acres	540	-
Mixed-Use Low Intensity:	31 acres	-	405,100
TOTAL	**157 acres**	**1,048**	**405,100**

The mixed-use areas are allowed residential units up to 12.0 du/ac as long as the total number of residential units for the Subdistrict does not exceed 1,048. The estimated number of units for Subdistrict 20 accounts for 6% of the estimated District units. Development of Subdistrict 20 is expected to occur within years eight and nine.

3.3.2.20.3 Proposed Density

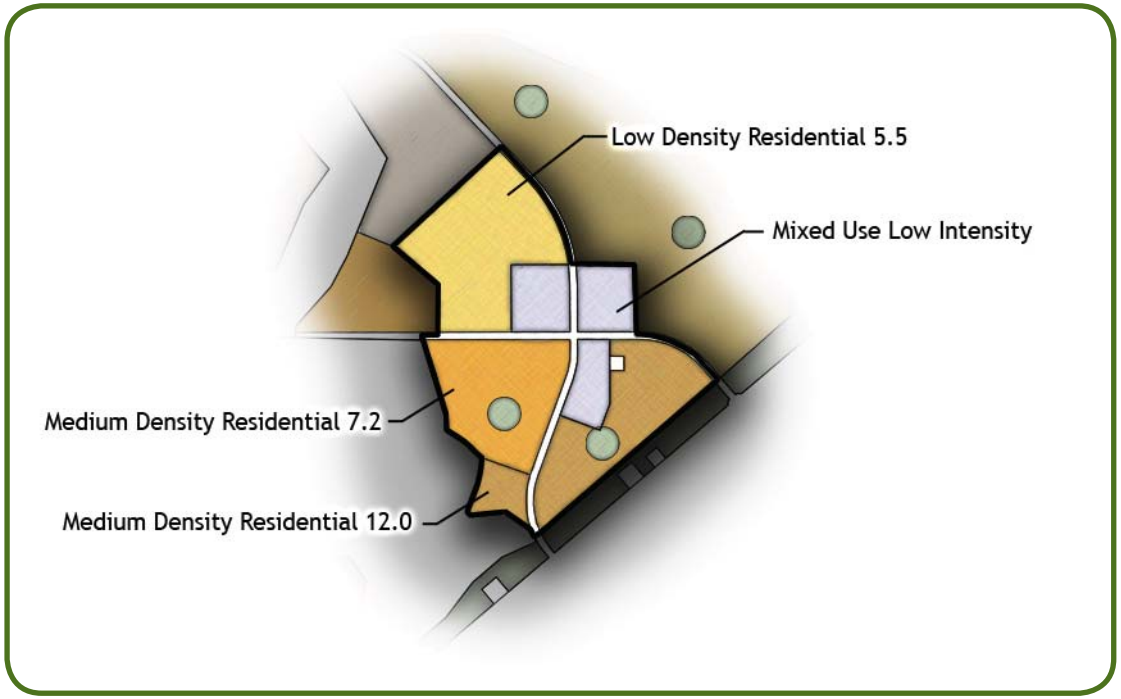
The maximum proposed residential density for the Subdistrict shall be 8.32 du/ac.

3.3.2.20.4 Proposed Non-Residential Floor Area

The maximum proposed total floor area for all non-residential land uses in the Subdistrict is 405,100 square feet.

3.3.2.20.5 *Proposed Intensity*

The gross non-residential intensity of the Subdistrict shall be the sum of the non-residential floor area divided by the sum of the land area of non-residential land uses, expressed as a floor to area ratio (FAR). The maximum proposed non-residential intensity for Subdistrict 20 shall be 0.3:1.



3.3.2.21 Subdistrict 21

3.3.2.21.1 Characteristics

Subdistrict 21 at the far eastern edge of the District is planned as a residential Subdistrict with adjacencies to the eastern Town Center and Painted Dunes Golf Course. The District boundary serves as the Subdistrict's eastern edge with U.S. 54 acting as the southern boundary. Pedestrian access to the regional park south of U.S. 54 is an amenity to the Subdistrict.

3.3.2.21.2 Components and Timing

The components of the Subdistrict and the timing of development are as follows:

Land Use	Approximate Acreage	Estimated Residential Dwelling Units	Estimated Non-Residential Floor Area (ft^2)
Open Space:	146 acres	-	-
Residential 5.5 du/ac:	140 acres	770	-
TOTAL	**286 acres**	**770**	

The estimated population for Subdistrict 21 accounts for 4% of the estimated District population. Development of Subdistrict 21 is expected to occur in year eight.

3.3.2.21.3 Proposed Density

The maximum proposed residential density for the Subdistrict shall be 5.50 du/ac.

Low Density Residential 5.5
Open Space

3.3.2.22 Summary

An acreage summary of the Subdistricts is shown below. All acreages are approximate and rounded to the nearest whole acre.

SUBD.	RES 3.5	RES 5.5	RES 7.2	RES 12.0	MU-LI	MU-HI	RR	OS	SCH	TOT
1	103	125	79		17			114		438
2	290				7			25		322
3		335						10	15	360
4				167	30	45		19		261
5		308						10	15	333
6		137	77		16			121		351
7		184	19		13			15		231
8		159			8				25	192
9		227			6			30		263
10								45	51	96
11	108	48	45		15			55		271
12	95		47		16			170	15	343
13			107					33		140
14		163			8			48	15	234
15				108	65	101		18		292
16							93	8		101
17	69				14			8		91
18	103		25					14		142
19					14	24				38
20		44	37	45	31					157
21		140						146		286
TOTAL	**768**	**1,870**	**436**	**320**	**260**	**170**	**93**	**889**	**136**	**4,942**

3.4 Allowable Land Uses

Appendix 'G' contains the table of allowable land uses for the District. The District supports the Smart Growth goal of providing a diverse mix of housing and is planned to include a variety of housing types within each phase of development. The District has been planned with a balanced mix of residential, commercial and public uses.

Section 4: Stormwater Management Plan

4.1 General

The location of the District at the foot of the Franklin Mountains ensures the need for a system capable of directing large volumes of stormwater in a safe and efficient manner. This system should be planned, designed and constructed in a manner that not only provides for the safe conveyance of stormwater but also serves the District as useable open space during dry times.

4.2 Relationship Between Stormwater Management and Recreational Open Space

4.2.1 Park-ponds

4.2.1.1 Strategy Envisioned for Detention Facilities

The strategy envisioned for the detention facilities is the use of park-ponds, which can be developed into parks or athletic fields.

4.2.1.2 Park Ponding Utilized

As part of a regional detention strategy, park-ponds should be utilized throughout the District to the extent practicable.

4.2.2 Linear Park and Perimeter Buffers

The linear park and perimeter buffers will serve not only as parks but as a significant part of the drainage and storm water infrastructure for the District, and therefore should be improved consistent with these dual functions, including landscaping and configuration.

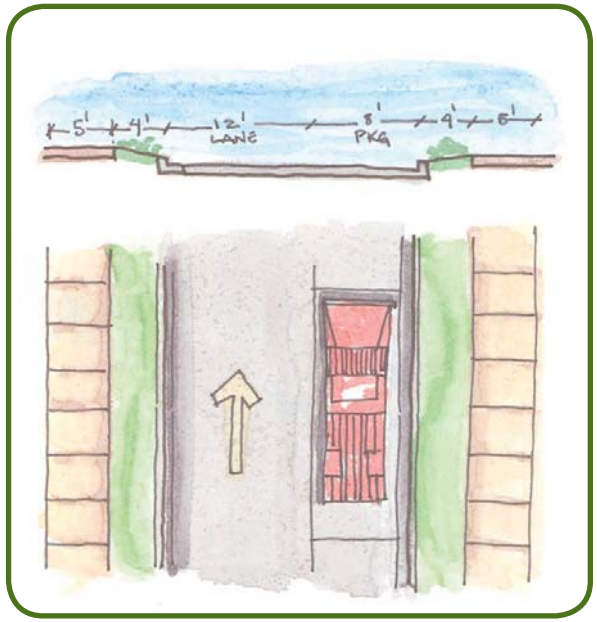
Linear parks offer dual-use opportunities.

Section 5: Circulation

5.1 General

Within the District — or any development — one of the most important elements affecting how it will look and how well it will work is the space between the façade of a building and the façade of another building across a street. Wide streets encourage drivers to speed, are less safe for pedestrians, cost more, increase runoff and decrease opportunities for social interaction. Narrower streets do the opposite.

The trail system within the District should be designed as a unifying element; thus it should connect as many uses and/or neighborhoods as practicable. The trail system may follow public right-of-way, may follow permanent open space, and/or may be placed within an easement across land owned by a Homeowner's Association (HOA).



Narrow streets slow traffic and promote pedestrian safety.

5.2 Relationship Between Circulation and Land Use

- Opportunity for goods and services should be within one-half mile of most dwellings.
- Distribute development densities so as to support potential future transit stops.
- Locate higher density developments within walking distance of town centers and transit nodes.

5.3 Roadway Design Intent and Principles

The intent of the design and function of the circulation systems shall be as described under Section 1.3.5 and further described as follows:

- The street network should be designed with multiple connections and direct routes.
- Thoroughfares should be spaced no more than one half-mile apart.
- Align streets to give buildings energy-efficient orientations.
- Provide networks for pedestrians and bicyclists.
- Provide alternatives to travel along high-volume streets.

5.4 Standards

Standards for streets and trails within the District correspond to the unique needs of neighborhoods; however, in all cases circulation patterns should be designed to encourage pedestrian movement and to limit vehicular through traffic. These street standards are proposed to coordinate with circulation needs and development intensities. Necessary street standards not included in the DSC are described in the Alternative Design Standards submitted with the Land Study for the District.

5.4.1 Transit

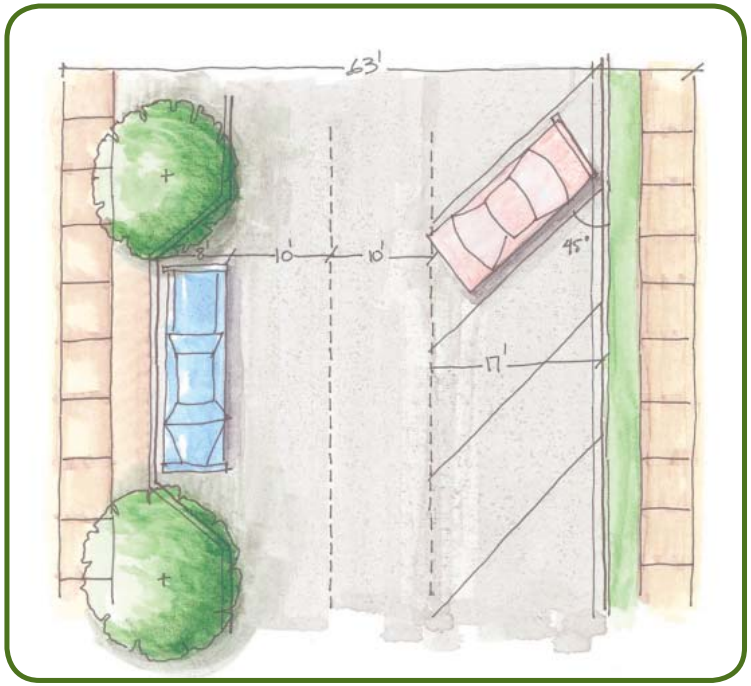
While the success of transit (e.g., light rail, bus rapid transit) within the District depends upon mass transit planning by others, transit-oriented design features should be included in town centers and transit nodes when and where appropriate. Transit-oriented design features may be provided in town centers and transit nodes; however, such land may be reallocated within such town centers and transit nodes from time to time should mass transit not become available to the area, and may be eliminated altogether within ten years after the submittal of a final plat should transit not become available to the area within that time.

5.4.2 Hike and Bike Trails

Hike and bike trails should consist of an eight-foot wide path with a minimum of four feet of native landscaping on each side, as described in the Alternative Design Standards. Paths of concrete, asphalt, decomposed granite or similar material, or natural material should be used depending on the user need. Landscaping with native vegetation reduces water requirement. Decomposed granite trails should require permanent edging. Park bench(es) should be installed at a minimum of one every ½ -mile along public trails, coordinated with shade trees as provided for in the Alternative Design Standards. The general location of hike and bike trails is shown on the General Park Service Areas Map in **Appendix 'H'**.

5.5 Alternative Design Standards

Reference the Alternative Design Standards in the Land Study submitted concurrently with this Master Zoning Plan for requirements relating to Circulation Standards.



The diversity of mixed-use development provides opportunities for unique street design.

Section 6: Parks and Open Space Plan

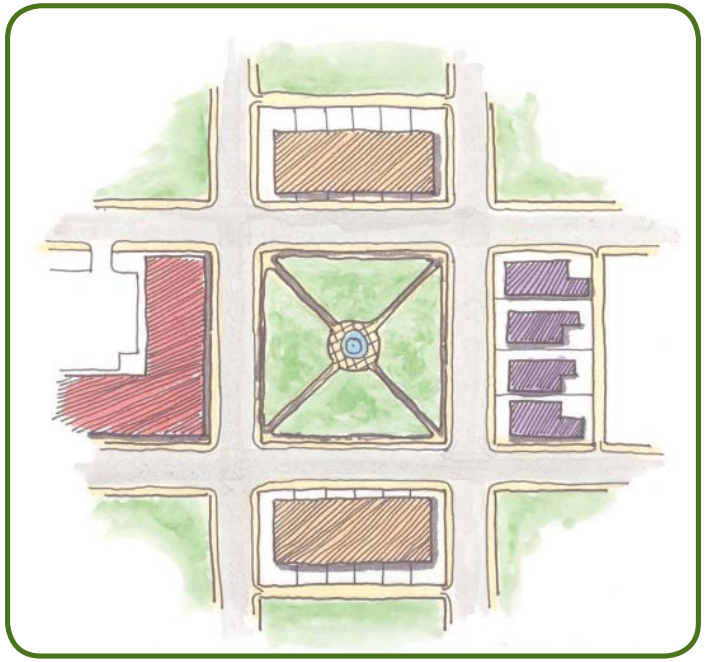
6.1 Purpose and Intent

The purpose of the Parks and Open Space Plan for the District is to provide for the health, safety, general welfare, and recreational and social needs of El Paso generally and the community specifically. It is the intent of this Plan to work in concert with El Paso's Open Space Plan ("Towards a Bright Future: A Green Infrastructure Plan for El Paso, Texas") to accomplish this purpose. Nothing herein shall permit parkland credit or bonus reductions to be granted for parkland, open space or amenities that are required as a condition of the sale of the land by EPWU and reflected in the bid documents.

6.2 General Principles

The following principles guide the placement and use of parks, open space and trail linkages within the District.

- Green corridors and open space define and interconnect neighborhoods, schools and other uses within the District.
- Public spaces establish focal points within neighborhoods and mixed-use areas.
- A variety of open space features distributed equally across the development, including parks, squares, plazas, landscaped streets, and greenbelts, and dedicate them for the collective social, visual and recreational use and enjoyment of the neighborhoods.
- Meet or exceed City requirements for park land dedication, currently as follows:
  - Mini-neighborhood parks of less than two acres
  - Neighborhood parks of two to ten acres
  - Community parks of greater than ten acres
- Proposed provision and configuration of park and open space facilities are adequate and meet City standards except as provided for herein.



Neighborhood gathering spaces contribute to shared identify and promote interaction.

Adjacencies

Where physically feasible, parks should be bounded by streets or by other public uses. Where residential lots must directly abut a park, lots should be oriented so as to side to and not back to the park. Residential lots should back to a park only when the site's physical character does not reasonably permit an alternative design.

Where a non-residential use must directly abut a park, the use shall be separated by a screening wall or fence and landscaping. Access points to the park may be permitted if a public benefit is established.

The elements described below are shown on the General Park Service Areas Map in **Appendix 'H'**.

6.3 Design Requirements

6.3.1 Community Open Space

6.3.1.1 Area

Approximately 820 acres have been reserved to serve the dual function of providing for the recreational needs of the community while managing stormwater runoff. These areas shall be provided as generally shown in **Appendix 'H'**. Such area is in addition to the parkland dedication requirements of Title 19, Chapter 19.20.

6.3.1.2 Trailheads to the Franklin Mountains State Park

This District includes three trailhead areas adjacent to the Franklin Mountains State Park, which includes 1,640 acres contiguous to the District. These areas shall be provided as generally shown in **Appendix 'H'**.

6.3.2 Neighborhood Parks

6.3.2.1 Neighborhood Parks

The neighborhoods within each Subdistrict may include neighborhood parks and neighborhood pocket parks in accordance with Title 19 Subdivisions and in accordance with the Land Study.

6.3.2.2 Pocket Parks

In order to provide for an urban form that includes a variety of open space opportunities, and to meet the goal of having a park within walking distance of every home, pocket parks may be provided in accordance with Title 19 Subdivision and shall be credited toward the parkland dedication requirement provided they meet the following criteria:

6.3.2.2.1 *Pocket Parks Shall be No Smaller than 10,000 Square Feet*

Pocket parks shall be no smaller than 10,000 square feet and shall have a width of no less than eighty feet.

6.3.2.2.2 *Pocket Parks Shall Have Frontage*

Pocket parks shall have frontage on at least one Residential street and shall not have frontage on streets other than Residential streets.

6.3.2.2.3 *Pocket Parks Should Contain the Following Elements*

Pocket parks should contain, at a minimum, the following elements, as provided for in the Alternative Design Standards:

- bench(es)
- pedestrian access from street to bench(es)
- two shade trees
- native low-water landscaping

6.3.2.3 *Residential Units*

Every residential unit shall be within one-quarter mile of a designated park, plaza or useable open space.

6.3.2.4 *Trail Heads*

Facilities within the District provided in conjunction with Trail Heads shall be credited toward the parkland requirement for adjacent neighborhood(s) if such facilities are available for the recreational needs of those neighborhood(s).

6.3.3 *Public Trail System*

6.3.3.1 *Public Trail System Provided*

A public trail system shall be provided within and throughout the development and shall be credited toward the parkland dedication requirement unless it replaces a required sidewalk. It is the intent of such a trail system to provide an alternative to automobile travel. The trail system shall include, at a minimum, the following components:

6.3.3.1.1 *Connections to any Adjacent Trail System*

Connections to any adjacent trail system existing at the time of platting;

6.3.3.1.2 *Trailhead Connections*

Trailhead connections to the Franklin Mountain State Park and a linkage to the City's regional park to the south;

6.3.3.1.3 *Connections Between Neighborhoods*

Connections between neighborhoods;

6.3.3.1.4 *Connections to Schools, Parks, and Mixed-Use Areas*

Connections to schools, parks, and mixed-use areas within the District;

6.3.3.1.5 *Connections to Neighborhood Centers*

Connections to neighborhood centers and to Town Centers;

6.3.3.1.6 *Linkage Along the Southern Perimeter*

A linkage along the southern perimeter of the site; and

6.3.3.1.7 *Pedestrian and Trail Access*

Pedestrian and trail access improvements at the following key locations:

- an underpass at Patriot Freeway connecting to the regional park;
- an underpass at McCombs Street to provide access between the linear park and the golf course; and
- an underpass at Martin Luther King, Jr. Boulevard connecting to the linear park.

6.3.3.2 *Trail System Within the District*

The trail system within the District is intended to be a unifying element; thus it should connect as many uses and/or neighborhoods as practicable. The trail system may follow public right-of-way, may follow permanent open space, and/or may be placed within an easement across land owned by the HOA of the District, Subdistrict, Neighborhood or tract as applicable. Trails should be integrated into the community rather than separated by fences, barriers or poor land use planning. Pedestrian amenities such as landscaping and

benches should be strategically located at nodes rather than along the entire length of the hike and bike trail system to create a positive impact while minimizing the overall costs.

6.3.3.3 *Public Trail Routing and Type*

Public Trail routing and type shall be as generally shown in **Appendix 'H'**.

6.3.3.4 *Trail Types*

6.3.3.4.1 *Trail Type 'A'*

Trail type 'A' is predominant in the District and is intended to be the standard for the development as described herein.

6.3.3.4.2 *Trail Type 'B'*

Trail type 'B' is intended for use within the more urban areas of the District. Design components may include more formal street furniture and a planting pattern that contributes to an urban character.

6.3.3.4.3 *Trail Type 'C'*

Trail type 'C' is intended for the eastern side of the development in accordance with a golf-related community. Design components may include furnishings and plantings that contribute to a more manicured design approach.

6.3.3.5 *"Useable" Open Space*

To be considered "useable" open space, thus eligible for parkland dedication credit, Public Trail linkages shall be no less than sixteen feet in width.

6.3.4 Community Park

Approximately twenty-five acres adjacent to the proposed high school is required to be set aside for a community park.

6.3.4.1 Community Park Plans

Community park plans shall be submitted to the City within six months of adoption of this ordinance.

6.3.4.2 Community Park Construction

The Community park shall be constructed within two years of adoption of this ordinance.

6.3.5 Linear Park

A public linear park between McCombs Street and Martin Luther King, Jr. Boulevard should serve as a major organizing feature of the development, anchoring town centers and residential developments.

6.3.5.1 Linear Park Landscaping

The 68-acre (minimum) park should be designed with a natural landscaping theme and native plant species in harmony with other open areas of the master-planned community, as well as a stormwater management system, and seating/sun/shade amenities.

6.3.4.2 Linear Park Plans

Linear park plans shall be submitted to the City within six months of adoption of this ordinance.

6.3.4.3 Linear Park Construction

The Linear park shall be constructed within two years of adoption of this ordinance.

6.3.6 Off-Site Dedication

Parkland required to be dedicated within a particular phase of development within the District may be dedicated “off-site” to another phase of development within the District provided all other requirements of this section have been met. Such dedication will not require a metes and bounds description prior to the development of that phase. For the purposes of parkland deeded as part of an offsite dedication, a District shall be considered a single park zone.

6.3.7 Relationship with Drainage

Park and ponding areas shall be designed for dual purposes whenever possible. Such dual us requires support and recommendation from the Director of Parks and the Deputy Director. of Building Services

A linear park's form compliments the drainage function.

Section 7: Community Form

7.1 Purpose and Intent

The purpose and intent of this Section is to provide for the placement and design of forms and spaces within the District.

7.2 General Design Principles

7.2.1 Buildings Express Architectural Compatibility

Buildings express architectural compatibility, with coordinated architectural features that contribute to community identity.

7.2.2 Buildings are Compact

Buildings are compact, designed at human scale and are sited in a manner that supports pedestrian activity.

7.2.3 Architectural and Landscape Design

Architectural and landscape design are appropriate to physical, historical and economic conditions.

7.2.4 Landmark Buildings, Entry Statements, Public Spaces, and Art

Landmark buildings, entry statements, public spaces, and art establish focal points at appropriate locations within and throughout the development.

Buildings define streets as public places.

7.2.5 Design and Function of Buildings and Open Spaces

The design and function of buildings and open spaces respects and is influenced by local climate, topography, history, and building practice.

7.2.6 Buildings and Other Improvements

Buildings and other improvements are compatible in their arrangement, bulk, form, character, and landscaping.

7.3 Design Elements

7.3.1 Community Theme

The Community theme is desert southwest in keeping with the vernacular aesthetic.

7.3.2 General Form

The general form shall be one of interconnected neighborhoods with traditional rectangular architectural forms, narrow streets and grid pattern; less yard space (reduced setbacks) balanced by more neighborhood open space (oases) as per Code, but strategically placed and integrated into a community-wide system); and gateways.

7.3.3 Neighborhood Form

7.3.3.1 Homes

Multiple product types per neighborhood; traditional components: porches and patios, fountains and pools, portals/gateways and paths, vibrant color, native building materials.

7.3.3.2 Open Space

Enhanced views to the mountains; central park / plaza civic space; open space corridors for long views and for pedestrian circulation; native landscape materials, with focused landscaping for impact.

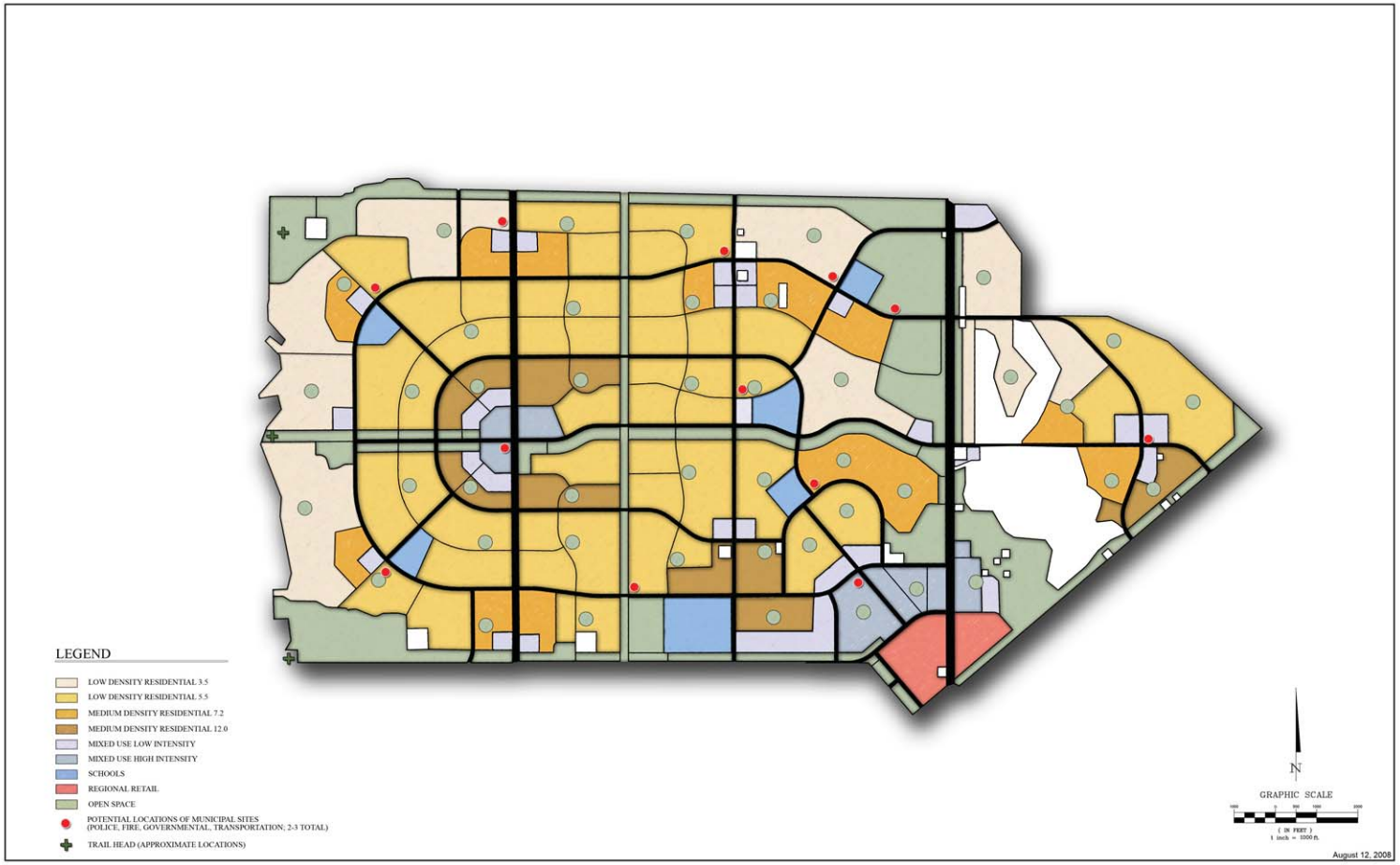
7.3.3.3 Circulation

“All paths lead to the park” concept; the neighborhood boulevard; narrow streets; strategically placed alley product (e.g., across from civic space, along collectors and boulevards, across from dissimilar land use category or sub-category), to eliminate clutter from the street scene.

7.3.4 Landscaping

Native plant materials, irrigation systems favor reclaimed water, greywater, roof water and surface stormwater as appropriate and practicable.

Appendices



Master Land Use Plan

El Paso, Texas

EL PASO WATER UTILITIES PUBLIC SERVICE BOARD

Kimley-Horn and Associates, Inc.

Appendix 'A' – Master Land Use Plan

Proximity to Mixed Use

El Paso, Texas

EL PASO WATER UTILITIES PUBLIC SERVICE BOARD

Kimley-Horn and Associates, Inc.

Appendix 'B' – Proximity to Mixed-Use

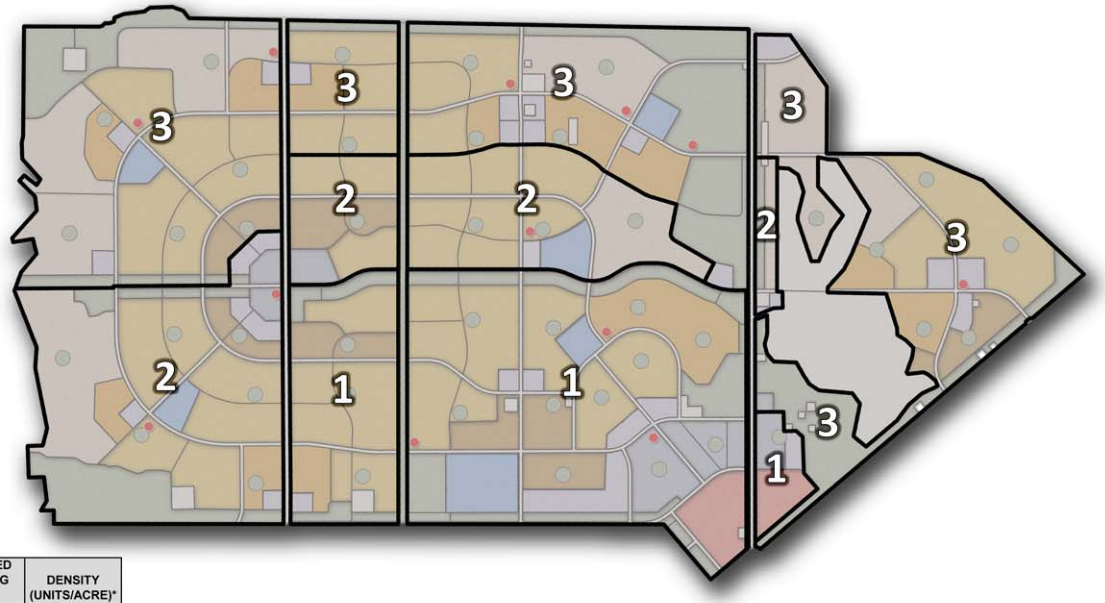
Proximity to Community Facilities

El Paso, Texas

EL PASO WATER UTILITIES PUBLIC SERVICE BOARD

Kimley-Horn and Associates, Inc.

Appendix 'C' – Proximity to Community Facilities



PHASE	APPROXIMATE AREA (ACRES)	ESTIMATED DWELLING UNITS	DENSITY (UNITS/ACRE)*
1	1,346.2	5,761	4.28
2	1,277.0	7,799	6.11
3	2,211.9	6,965	3.15
TOTAL	**4,835.1**	**20,525**	**4.25**

Note: The density depicted does not incorporate the land area for EPWU well sites, McCombs ROW dedication nor the proposed High School site, and will therefore differ from densities depicted elsewhere in the Master Zoning Plan.

N

GRAPHIC SCALE

(IN FEET)
1 inch = 1000 ft.

August 12, 2008

Phasing Key Map

El Paso, Texas

EL PASO WATER UTILITIES PUBLIC SERVICE BOARD

Kimley-Horn and Associates, Inc.

Appendix 'D' – Phasing Plan

Land Use Type	Minimum Lot Area	LOT COVERAGE Minimum	LOT COVERAGE Maximum	Minimum Lot Width	Minimum Lot Depth	MAX BLDG HEIGHT (1) Primary Structure	MAX BLDG HEIGHT (1) Accessory Structure
Low Density Residential 3.5							
Single-Family Detached (large lot)	9,600	0%	50%	70'	100'	35'	25'
Single-Family Detached (standard lot-1)	6,500	0%	50%	60'	100'	35'	25'
Single-Family Detached (standard lot-2)	5,000	0%	50%	50'	90'	35'	25'
Patio/ZLL	4,000	0%	50%	40'	90'	35'	25'
Low Density Residential 5.5							
Single-Family Detached (large lot)	9,600	0%	50%	70'	100'	35'	25'
Single-Family Detached (standard lot-1)	6,500	0%	50%	60'	100'	35'	25'
Single-Family Detached (standard lot-2)	5,000	0%	50%	50'	90'	35'	25'
Patio/ZLL	4,000	0%	50%	40'	90'	35'	25'
Duplex	3,500	0%	50%	35'	90'	35'	25'
Townhome	3,000	0%	100%	25'	100'	35'	15'
Medium Density Residential 7.2							
Single-Family Detached (large lot)	9,600	0%	50%	70'	100'	35'	25'
Single-Family Detached (standard lot-1)	6,500	0%	50%	60'	100'	35'	25'
Single-Family Detached (standard lot-2)	5,000	0%	50%	50'	90'	35'	25'
Patio/ZLL	4,000	0%	50%	40'	90'	35'	25'
Duplex	3,500	0%	50%	35'	90'	35'	25'
Townhome	1,800	0%	100%	15'	90'	40'	15'
Multifamily	6,000	0%	60%	50'	100'	40'	25'
Medium Density Residential 12.0							
Patio/ZLL	4,000	0%	50%	40'	90'	35'	25'
Duplex	3,500	0%	50%	35'	90'	35'	25'
Townhome	1,800	0%	100%	15'	90'	40'	15'
Multifamily	6,000	0%	60%	50'	100'	40'	25'

Notes

1. Building Height shall be 20 feet minimum in the Mixed Use High Intensity Land Use Type.

Appendix 'E' – Property Development Regulations

Land Use Type	SETBACKS (1) Front	Rear	Cumulative Front & Rear	Side Interior	Side Street	Cumulative Sides (4)	Garage Setbacks	Maximum Density (du/ac)
Low Density Residential 3.5								
Single-Family Detached (large lot)	15' - 20'	20'	35'	10'	10'	20'/20'	(5)	3.5
Single-Family Detached (standard lot-1)	10' - 15'	15'	25'	5'	10'	10'/15'	(5)	
Single-Family Detached (standard lot-2)	10' - 15'	15'	25'	5'	10'	10'/15'	(5)	
Patio/ZLL	10' - 15'	15'	25'	0' (2)	10'	0'/10'	(5)	
Low Density Residential 5.5								
Single-Family Detached (large lot)	15' - 20'	20'	35'	10'	10'	20'/20'	(5)	5.5
Single-Family Detached (standard lot-1)	10' - 15'	15'	25'	5'	10'	10'/15'	(5)	
Single-Family Detached (standard lot-2)	10' - 15'	15'	25'	5'	10'	10'/15'	(5)	
Patio/ZLL	10' - 15'	15'	25'	0' (2)	10'	0'/10'	(5)	
Duplex	10' - 15'	15'	25'	5'	10'	10'/15'	(5)	
Townhome	5' - 10'	10'	15'	0' (3)	10'	0'/10'	(5)	
Medium Density Residential 7.2								
Single-Family Detached (large lot)	15' - 20'	20'	35'	10'	10'	20'/20'	(5)	7.2
Single-Family Detached (standard lot-1)	10' - 15'	15'	25'	5'	10'	10'/15'	(5)	
Single-Family Detached (standard lot-2)	10' - 15'	15'	25'	5'	10'	10'/15'	(5)	
Patio/ZLL	10' - 15'	15'	25'	0' (2)	10'	0'/10'	(5)	
Duplex	10' - 15'	15'	25'	5'	10'	10'/15'	(5)	
Townhome	5' - 10'	10'	15'	0' (3)	10'	0'/10'	(5)	
Multifamily	10' - 15'	15'	25'	10'	10'	20'/20'	(5)	

Notes

1. Setbacks shown with a range represent a minimum and maximum setback requirement.
2. Minimum 10' building separation
3. Minimum 20' building separation
4. Cumulative Side Setbacks shall be dependent upon whether the lot is an interior lot or corner lot. (interior lot / corner lot)
5. Refer to Section 3.3.1.6 of the Master Zoning Plan for Garage Setbacks

Appendix 'E' – Property Development Regulations

Land Use Type	Minimum Lot Area	LOT COVERAGE Minimum	LOT COVERAGE Maximum	Minimum Lot Width	Minimum Lot Depth	MAX BLDG HEIGHT (1) Primary Structure	MAX BLDG HEIGHT (1) Accessory Structure
Mixed Use Low Intensity							
Patio/ZLL	4,000	0%	50%	40'	90'	35'	25'
Duplex	3,500	0%	50%	35'	90'	35'	25'
Townhome	1,800	0%	100%	15'	90'	35'	15'
Multifamily	6,000	0%	60%	50'	100'	35'	25'
Neighborhood Office	21,780	0%	50%	100'	100'	35'	n/a
Neighborhood Retail	21,780	0%	50%	100'	100'	35'	n/a
Vertically Integrated Mixed Use	21,780	0%	50%	100'	100'	35'	n/a
Mixed Use High Intensity							
Townhome	1,800	0%	100%	15'	90'	40'	15'
Multifamily	6,000	0%	60%	50'	100'	40'	25'
General Office	21,780	0%	50%	100'	100'	40'	n/a
General Retail	21,780	0%	50%	100'	100'	40'	n/a
General Commercial	43,560	0%	50%	100'	200'	40'	n/a
Vertically Integrated Mixed Use	21,780	0%	50%	100'	100'	40'	n/a
Regional Retail							
General Office	43,560	0%	50%	100'	200'	50'	n/a
General Retail	43,560	0%	50%	100'	200'	40'	n/a
General Commercial	43,560	0%	50%	100'	200'	40'	n/a

Notes

1. Building Height shall be 20 feet minimum in the Mixed Use High Intensity Land Use Type.

Appendix 'E' – Property Development Regulations

Land Use Type	SETBACKS (1) Front	Rear	Cumulative Front & Rear	Side Interior	Side Street	Cumulative Sides (4)	Garage Setbacks	Maximum Density (du/ac)	Maximum Intensity (FAR)
Mixed Use Low Intensity									
Patio/ZLL	10' - 15'	15'	25'	0' (2)	10'	0'/10'	(5)		
Duplex	10' - 15'	15'	25'	5'	10'	10'/15'	(5)		
Townhome	5' - 10'	10'	15'	0' (3)	10'	0'/10'	(5)		
Multifamily	10' - 15'	20'	30'	10'	10'	20'/20'	n/a	6.0	30% (6)
Neighborhood Office	10'	20'	30'	20'	10'	40'/30'	n/a		
Neighborhood Retail	10'	20'	30'	20'	10'	40'30'	n/a		
Vertically Integrated Mixed Use	10'	20'	30'	20'	10'	40/30'	n/a		
Mixed Use High Intensity									
Townhome	5' - 10'	0'	5'	0' (3)	10'	0'/10'	(5)		
Multifamily	10' - 15'	0'	10'	10'	10'	20'/20'	n/a		
General Office	0' - 5'	5'	5'	0' - 10'	0' - 10'	0' - 20'	n/a	3.6	42%
General Retail	0' - 5'	5'	5'	0' - 10'	0' - 10'	0' - 20'	n/a		
General Commercial	0' - 5'	5'	5'	0' - 10'	0' - 10'	0' - 20'	n/a		
Vertically Integrated Mixed Use	0' - 5'	5'	5'	0' - 10'	0' - 10'	0' - 20'	n/a		
Regional Retail									
General Office	25'	20'	45'	15'	25'	30'/45'	n/a		
General Retail	25'	20'	45'	15'	25'	30'/45'	n/a	n/a	60%
General Commercial	25'	20'	45'	15'	25'	30'/45'	n/a		

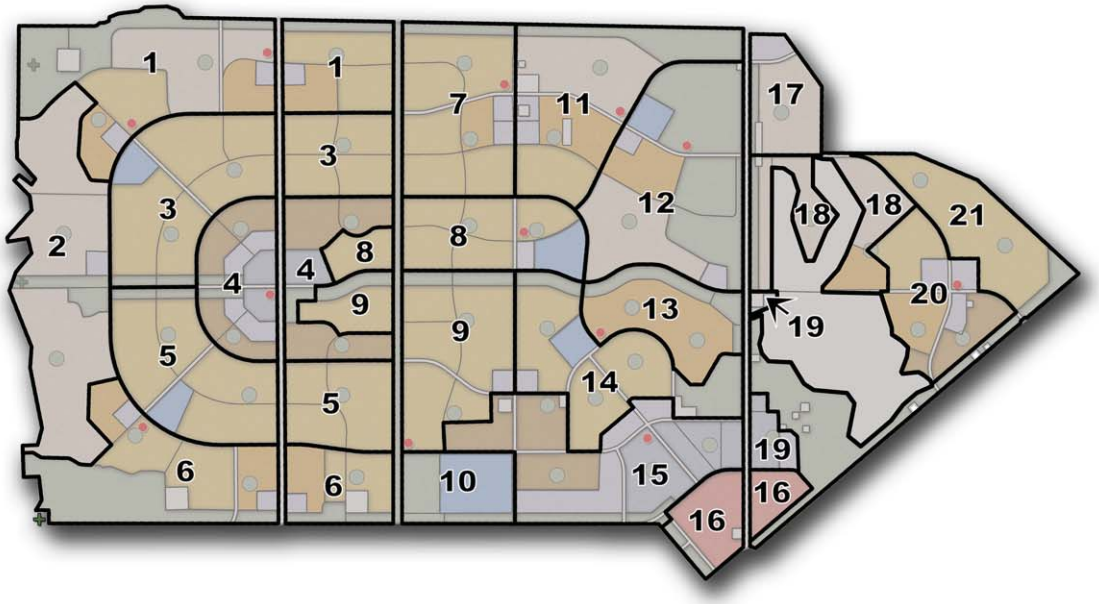
Notes

1. Setbacks shown with a range represent a minimum and maximum setback requirement.
2. Minimum 10' building separation
3. Minimum 20' building separation
4. Cumulative Side Setbacks shall be dependent upon whether the lot is an interior lot or corner lot. (interior lot / corner lot)
5. Refer to Section 3.3.1.6 of the Master Zoning Plan for Garage Setbacks
6. The maximum non-residential intensity may be increased to 60%, provided a reduction of one dwelling unit per acre is provide for each 5% increase in FAR

Appendix 'E' – Property Development Regulations

SUBDISTRICT	ACREAGE
1	438
2	322
3	360
4	261
5	333
6	351
7	232
8	192
9	263
10	96
11	270
12	343
13	140
14	233
15	293
16	101
17	91
18	142
19	38
20	157
21	286
Golf Course	257
TOTAL	**5,199**

Note: All acreages are rounded, therefore the total acreage may differ slightly from the acreage shown on other documents in the Master Zoning Plan.



Subdistricts Key Map

El Paso, Texas

EL PASO WATER UTILITIES PUBLIC SERVICE BOARD

Kimley-Horn and Associates, Inc.

Appendix 'F' – Subdistrict Key Map

AGRICULTURAL & RELATED OPERATIONS

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Animal cemetery	X	X	X	X	X	P	P
Animal crematory	P	P	P	P	X	P	P
Animal kennel	X	X	X	X	X	P	P
Animal pound, shelter	X	X	X	X	X	P	P
Animal training facility (school)	X	X	X	X	X	P	P
Barn	A	A	A	A	X	X	X
Composting facility	X	X	X	X	X	P	P
Farm	P	P	P	P	P	P	P
Farmer's market	X	X	X	X	P	P	P
Greenhouse (industrial-scale)	X	X	X	X	X	X	P
Harvesting (field, tree, bush crops)	P	P	P	P	P	P	P
Nursery (industrial scale)	X	X	X	X	X	X	P
Raising (field, tree, bush crops)	P	P	P	P	P	P	P
Veterinary treatment center (small animals)	X	X	X	X	P	P	P

COMMERCIAL, STORAGE & PROCESSING

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Boutique bottling	X	X	X	X	P	P	P
Contractor yard (large)	X	X	X	X	X	X	P
Contractor yard (small)	X	X	X	X	X	P	P
General Warehouse	X	X	X	X	X	P	P
Office warehouse	X	X	X	P	P	P	P
Self storage warehouse	X	X	X	P	P	P	P
Storage of supplies, equipment, goods	X	X	X	X	A	A	A

EDUCATIONAL, INSTITUTIONAL & SOCIAL USES

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Adult day care center	X	X	X	X	P	P	P
Art gallery	P	P	P	P	P	P	P

X-Use Not Allowed: P-Permitted Use; A-Permitted Accessory Use

Appendix 'G' – Allowable Land Uses

EDUCATIONAL, INSTITUTIONAL & SOCIAL USES (continued)

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Child care facility, Type 3	P	P	P	P	P	P	X
Child care facility, Type 4	X	X	X	X	P	P	P
Child care facility, Type 5	X	X	X	X	P	P	P
Child care facility, Type 6	P	P	P	P	P	P	P
Child care institution	X	X	X	X	P	P	P
Church	P	P	P	P	P	P	P
Community center	P	P	P	P	P	P	P
Convent	P	P	P	P	P	P	P
Library	P	P	P	P	P	P	P
Lodge	P	P	P	P	P	P	P
Monastery	P	P	P	P	P	P	P
Museum	P	P	P	P	P	P	P
Orphanage, shelter	P	P	P	P	P	P	P
School, public, private or parochial (9 through 12)	P	P	P	P	P	P	P
School, public, private or parochial (Pre-K through 8)	P	P	P	P	P	P	P
School, trade	X	X	X	X	P	P	P
School, vocational	X	X	X	X	P	P	P
Social, fraternal club	P	P	P	P	P	P	P
Synagogue	P	P	P	P	P	P	P
Temple	P	P	P	P	P	P	P
Union hall	P	P	P	P	P	P	P
University, college	P	P	P	P	P	P	P
Youth organization (with/without living facility)	P	P	P	P	P	P	P

OFFICE & RESEARCH SERVICES

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Automated Teller Machine (ATM)	X	X	X	X	A	P	P
Bank	X	X	X	X	P	P	P
Courier & message service	X	X	X	X	X	P	P
Credit union	X	X	X	X	P	P	P
Data processing center	X	X	X	X	P	P	P

X-Use Not Allowed: P-Permitted Use; A-Permitted Accessory Use

Appendix 'G' – Allowable Land Uses

OFFICE & RESEARCH SERVICES (continued)

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Employment agency	X	X	X	X	P	P	P
Financial institution	X	X	X	X	P	P	P
Office, administrative & manager's	X	X	X	X	P	P	P
Office, business	X	X	X	X	P	P	P
Office, medical	X	X	X	X	P	P	P
Office, professional	X	X	X	X	P	P	P
Radio broadcasting studio	X	X	X	X	X	P	P
Research laboratory	X	X	X	X	P	P	P
School, arts & crafts	X	X	X	X	P	P	P
Studio, dance	X	X	X	X	P	P	P
Studio, music	X	X	X	X	P	P	P
Studio, photography	X	X	X	X	P	P	P
Telemarketing agency	X	X	X	X	P	P	P
Television broadcasting studio	X	X	X	X	X	P	P

MANUFACTURING, PROCESSING & ASSEMBLING

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Apparel manufacturing	X	X	X	X	X	X	P
Bread & bakery product manufacturing	X	X	X	X	X	P	P
Computer electronic product assembly	X	X	X	X	P	P	P
Recycling collection facility (large)	X	X	X	X	X	X	P
Recycling collection facility (small)	X	X	X	X	X	A	A
Reverse vending machines	X	X	X	X	X	A	A

MEDICAL & RELATED USES

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Assisted living facility (elderly)	P	P	P	P	P	P	P
Clinic	X	X	P	P	P	P	P
Convalescent home	P	P	P	P	P	P	P
Drug store	X	X	X	X	P	P	P

X-Use Not Allowed: P-Permitted Use; A-Permitted Accessory Use

Appendix 'G' – Allowable Land Uses

MEDICAL & RELATED USES

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Hospital	P	P	P	P	P	P	P
Intermediate care facility (elderly)	P	P	P	P	P	P	P
Medical lab	X	X	P	P	P	P	P
Medical treatment facility	X	X	P	P	P	P	P
Nursing home	P	P	P	P	P	P	P
Optical dispensary	X	X	X	X	P	P	P
Pharmacy	X	X	X	X	P	P	P
Rest home	P	P	P	P	P	P	P
Sanitarium	P	P	P	P	P	P	P

MOTOR VEHICLE SALE & SERVICE OPERATIONS

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Ambulance service	X	X	X	X	X	P	P
Automobile (sales, service, storage & rental)	X	X	X	X	X	P	P
Automobile part sales	X	X	X	X	P	P	P
Automotive rental location (satellite)	X	X	X	X	P	P	P
Automotive repair garage	X	X	X	X	X	P	P
Automotive service station	X	X	X	X	P	P	P
Boat, boat-trailer (sales, service, storage & rental)	X	X	X	X	X	P	P
Carwash, fullservice	X	X	X	X	P	P	P
Carwash, selfservice	X	X	X	X	P	P	P
Commercial fueling station	X	X	X	X	X	P	P
Contractor equipment (sales, storage, repair & rental)	X	X	X	X	X	P	P
Light truck (sales, service, storage & rental)	X	X	X	X	X	P	P
Light truck part sales	X	X	X	X	P	P	P
Manufactured home (sales, display & repair)	X	X	X	X	X	P	P
Motor vehicle repair, major	X	X	X	X	X	P	P
Motor vehicle repair, minor	X	X	X	X	P	P	P
Motorcycle (sales, service, storage & rental)	X	X	X	X	X	P	P

X-Use Not Allowed: P-Permitted Use; A-Permitted Accessory Use

Appendix 'G' – Allowable Land Uses

PARKING & LOADING

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Garage or lot, parking (commercial)	X	X	X	X	P	P	P
Garage or lot, parking (community)	X	X	X	P	P	P	P
Garage or lot, parking (private)	A	A	A	A	P	P	P
Loading spaces (serving another property)	P	P	P	P	P	P	P
On-site loading	A	A	A	A	A	A	A
On-site parking	A	A	A	A	A	A	A
Parking spaces (serving another property)	P	P	P	P	P	P	P
Unenclosed parking space shelter	X	X	A	A	A	A	A

PERSONAL SERVICES

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Barber shop	X	X	X	X	P	P	P
Beauty salon	X	X	X	X	P	P	P
Cemetery	P	P	P	P	P	P	X
Dry cleaning shop (< 2,500 square feet)	X	X	X	X	P	P	P
Dry cleaning shop (> 2,500 square feet)	X	X	X	X	P	P	P
Dry-cleaners (commercial)	X	X	X	X	X	P	P
Extermination service	X	X	X	X	X	P	P
Funeral home	X	X	X	X	X	P	P
Laundromat, laundry (<5,000 square feet)	X	X	P	P	P	P	P
Laundromat, laundry (>5,000 square feet)	X	X	X	X	P	P	P
Laundry (commercial)	X	X	X	X	X	P	P
Locksmith	X	X	X	X	P	P	P
Massage parlor	X	X	X	X	P	P	P
Mausoleum	P	P	P	P	P	P	X
Mortuary	X	X	X	X	X	P	P
Photofinishing lab	X	X	X	P	P	P	P
Shoe repair shop	X	X	X	X	P	P	P
Tattoo parlor	X	X	X	X	P	P	P
Taxidermist	X	X	X	X	P	P	P

X-Use Not Allowed: P-Permitted Use; A-Permitted Accessory Use

Appendix 'G' – Allowable Land Uses

RECREATION, AMUSEMENT & ENTERTAINMENT

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Amusement game complex	X	X	X	X	P	P	P
Amusement park	X	X	X	X	X	X	P
Athletic facility (indoor)	X	X	X	A	A	P	P
Athletic facility (outdoor)	X	X	X	X	X	P	P
Ballroom	X	X	X	X	X	P	P
Billiard & pool hall	X	X	X	X	X	P	P
Bingo hall	X	X	X	X	X	P	P
Bowling alley	X	X	X	X	P	P	P
Coliseum	X	X	X	X	X	X	P
Community recreational facility	P	P	P	P	P	P	X
Dancehall	X	X	X	X	X	P	P
Exercise facility (indoor)	X	X	X	A	A	P	P
Gambling casino	X	X	X	X	X	X	P
Golf course < 75 acres (with/without restaurant & bar)	P	P	P	P	P	P	P
Golf course > 75 acres (with/without restaurant & bar)	P	P	P	P	P	P	P
Golf driving range	P	P	P	P	P	P	P
Ice skating facility	X	X	X	X	P	P	P
Laser games center	X	X	X	X	P	P	P
Miniature golf course	X	X	X	X	X	P	P
Movie theatre (indoor)	X	X	X	X	X	P	P
Movie theatre, drivein (outdoor)	X	X	X	X	X	X	P
Nightclub, bar, cocktail lounge	X	X	X	X	P	P	P
Open space (common, public or private)	P	P	P	P	P	P	P
Paint ball center (indoor)	X	X	X	X	X	P	P
Park, playground	P	P	P	P	P	P	P
Racquetball club, indoor (with/without restaurant & bar)	X	X	X	A	A	P	P
Racquetball club, outdoor (with/without restaurant & bar)	X	X	X	X	P	P	P
Roller skating facility	X	X	X	X	X	P	P
Sauna, exercise room	A	A	A	A	A	A	A
Skateboarding facility (indoor)	X	X	X	X	X	P	P
Skateboarding facility (outdoor)	X	X	X	X	X	P	P

X-Use Not Allowed: P-Permitted Use; A-Permitted Accessory Use

Appendix 'G' – Allowable Land Uses

RECREATION, AMUSEMENT & ENTERTAINMENT (continued)

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Sports arena	X	X	X	X	X	X	P
Stadium	X	X	X	X	X	X	P
Swimming pool (commercial)	X	X	X	X	P	P	P
Tennis club, indoor (with/without restaurant & bar)	P	P	P	P	P	P	P
Tennis club, outdoor (with/without restaurant & bar)	P	P	P	P	P	P	P
Theatre, performing	X	X	X	X	P	P	P

REPAIR SERVICES

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Commercial equipment repair	X	X	X	X	X	P	P
Electronic equipment repair	X	X	X	X	P	P	P
Household goods repair	X	X	X	X	P	P	P
Industrial equipment repair	X	X	X	X	X	P	P
Personal goods repair	X	X	X	X	P	P	P
Precision equipment repair	X	X	X	X	P	P	P

RESIDENTIAL

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Animals, keeping for enjoyment purposes	A	A	A	A	A	A	A
Apartment (5 or more units)	X	X	P	P	P	P	X
Bed and Breakfast (residence)	P	P	P	P	P	P	X
Bed and Breakfast Inn	X	X	X	X	P	P	P
Congregate home	A	A	A	A	A	A	X
Domestic garden house, toolhouse, playhouse	A	A	A	A	A	A	A
Domestic storage	A	A	A	A	A	A	A
Duplex (two-family dwelling)	P	P	P	P	P	X	X
Dwelling, resident watchman or property caretaker	X	X	A	A	A	A	X
Home occupation uses	A	A	A	A	A	A	X
Hotel	X	X	X	X	P	P	P
HUD-code manufactured home park	X	X	X	P	P	P	X

X-Use Not Allowed: P-Permitted Use; A-Permitted Accessory Use

Appendix 'G' – Allowable Land Uses

RESIDENTIAL (continued)

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Laundry room	A	A	A	A	A	A	X
Live-work flex unit	X	X	P	P	P	P	X
Motel	X	X	X	X	P	P	P
Quadraplex	X	X	P	P	P	P	X
Ranchette (>1 acre & <5 acres)	P	X	X	X	X	X	X
Single-family attached dwelling (atrium, patio, townhouse, condominium)	X	P	P	P	P	P	X
Single-family detached dwelling	P	P	P	P	P	P	X
Swimming pool, game court (noncommercial)	A	A	A	A	A	A	X
Triplex	X	X	P	P	P	P	X

SALES, RETAIL & WHOLESALE

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Bakery	X	X	X	X	P	P	P
Book store	X	X	X	X	P	P	P
Boutique	X	X	X	X	P	P	P
Cafeteria	X	X	X	X	P	P	P
Cafeteria, school	A	A	A	A	A	A	A
Coin-operated vending machines (inside a building)	A	A	A	A	A	A	A
Convenience store	X	X	X	X	P	P	P
Convenience store with gas pumps	X	X	X	X	P	P	P
Delicatessen	X	X	X	P	P	P	P
Drug store	X	X	X	P	P	P	P
Flea market (indoor)	X	X	X	X	P	P	P
Flea market (outdoor)	X	X	X	X	X	P	P
Flower shop, florist	X	X	X	P	P	P	P
Grocery	X	X	X	P	P	P	P
Hobby store	X	X	X	X	P	P	P
Home improvement center	X	X	X	X	P	P	P
Ice cream parlor	X	X	X	P	P	P	P
Material sales (building & construction)	X	X	X	X	X	P	P

X-Use Not Allowed: P-Permitted Use; A-Permitted Accessory Use

Appendix 'G' – Allowable Land Uses

SALES, RETAIL & WHOLESALE (continued)

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Music store	X	X	X	X	P	P	P
Newspaper printing facility	X	X	X	X	X	P	P
Nursery, greenhouse	P	P	P	P	P	P	P
Other retail establishment (high-volume)	X	X	X	X	X	P	P
Other retail establishment (low-volume)	X	X	X	X	P	P	P
Package liquor store	X	X	X	X	X	P	P
Pet shop (including grooming)	X	X	X	X	P	P	P
Print & copy shop	X	X	X	X	P	P	P
Produce stand	A	A	X	X	P	P	P
Restaurant (drive-in or walk up)	X	X	X	X	P	P	P
Restaurant (sit down)	X	X	X	X	P	P	P
Shopping center, community	X	X	X	X	P	P	P
Shopping center, regional	X	X	X	X	X	P	P
Snow cone, shaved ice stand or trailer	X	X	X	X	P	P	P
Specialty shop	X	X	X	X	P	P	P
Sporting goods store	X	X	X	X	P	P	P
Supermarket	X	X	X	X	P	P	P
Superstore	X	X	X	X	P	P	P
Warehouse club	X	X	X	X	P	P	P

SIGNS

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
On-premise advertising	A	A	A	A	A	A	A

TEMPORARY USES

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Amusement rides (commercial)	X	X	X	X	X	X	P
Borrow pit (related to construction operations)	P	P	P	P	P	P	P
Christmas tree stand	X	X	X	X	P	P	P
Circus	X	X	X	X	X	X	P

X-Use Not Allowed: P-Permitted Use; A-Permitted Accessory Use

Appendix 'G' – Allowable Land Uses

TEMPORARY USES (continued)

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Concrete mixing or batching plant	P	P	P	P	P	P	P
Firewood sales	X	X	X	P	P	P	P
Garage sale	A	A	A	A	A	A	X
Mobile office/storage unit (related to construction operations)	A	A	A	A	A	A	A
Mobile office/storage unit (related to sales or rental)	A	A	A	A	A	A	A
Model dwelling	P	P	P	P	P	P	P
Neighborhood fair, carnival	A	A	A	A	A	P	P
Pumpkin patch	X	X	X	X	P	P	P
Recycling collection facility (small)	A	A	A	A	A	A	A
Rummage sale	A	A	A	A	A	A	X
Sales stands (ranch & farm products)	A	A	A	A	P	P	P
Temporary events on public rights-of-way	A	A	A	A	A	A	A
Tents (special events)	P	P	P	P	P	P	P
Yard sale	A	A	A	A	A	A	X

TOWERS & RELATED STRUCTURES

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Amateur & CB radio stations (federally licensed)	A	A	A	A	A	A	A
Personal Wireless Service Facility (PWSF), facility-mounted	P	P	P	P	P	P	P
PWSF, ground-mounted	X	X	X	X	P	P	P
PWSF, roof-mounted	P	P	P	P	P	P	P
Radio broadcasting antenna	X	X	X	X	P	P	P
Radio receiving station (residential-type)	A	A	A	A	A	A	A
Satellite receiving dish, antenna	A	A	A	A	A	A	A
Solar conversion system	A	A	A	A	A	A	A
Television broadcasting antenna	X	X	X	X	P	P	P
Television receiving station (residential-type)	A	A	A	A	A	A	A
Wind-driven electrical generator, pump	A	A	A	A	P	P	P

X-Use Not Allowed: P-Permitted Use; A-Permitted Accessory Use

Appendix 'G' – Allowable Land Uses

TRANSPORTATION RELATED USES

USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Airpad	P	P	P	P	P	P	P
Helistop	P	P	P	P	P	P	P
Passenger station	X	X	X	X	P	P	P
Railroad R.O.W.	P	P	P	P	P	P	P
Transportation terminal, Type A	X	X	X	X	P	P	P
Transportation terminal, Type B	X	X	X	X	P	P	P

UTILITY & MISCELLANEOUS GOVERNMENTAL FACILITIES

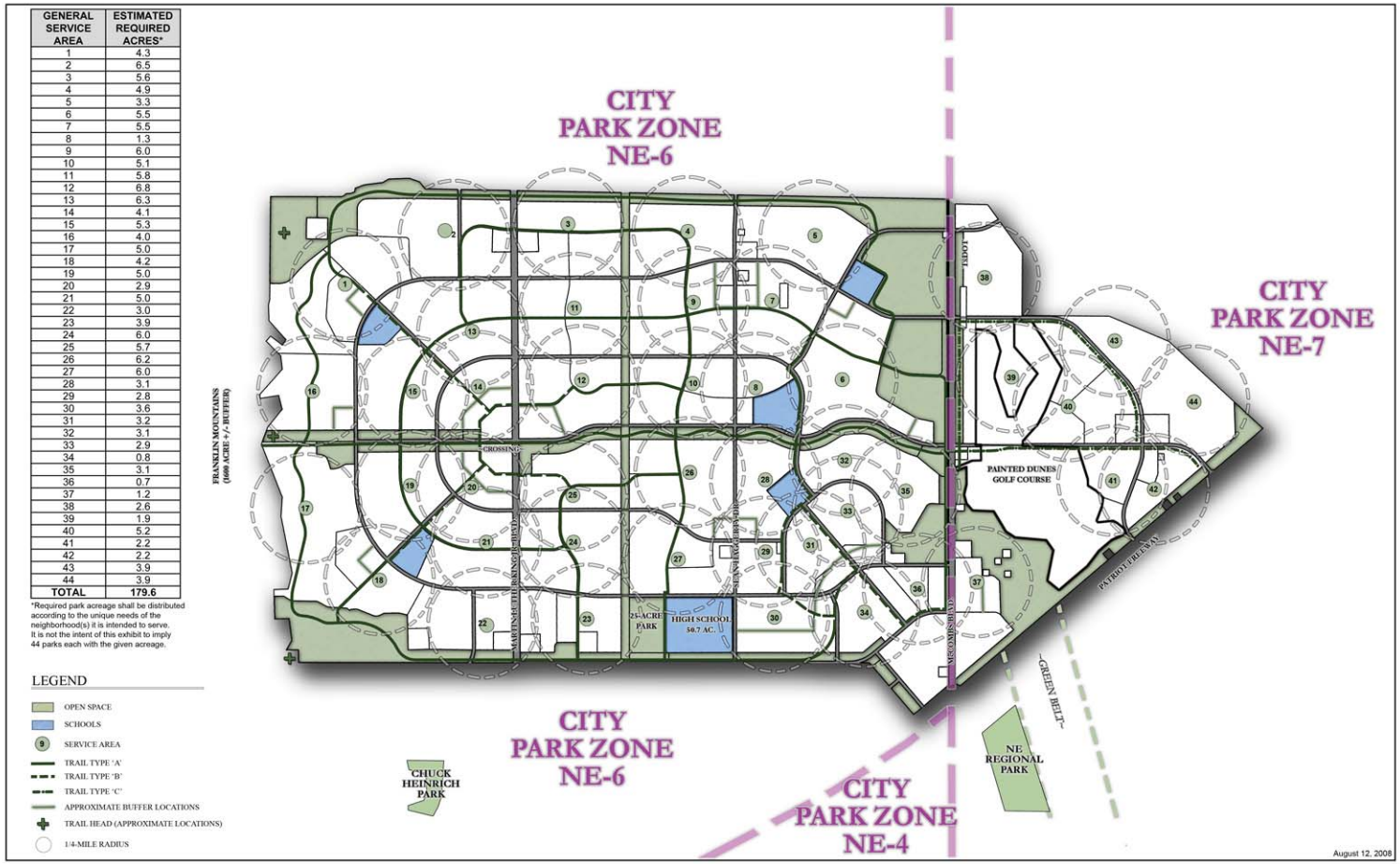
USE	LDR-3.5	LDR-5.5	MDR-7.2	MDR-12.0	MXD-L	MXD-H	RR
Communication utility facility	P	P	P	P	P	P	P
Detention basin (public/private)	P	P	P	P	P	P	P
Governmental use, building	P	P	P	P	P	P	P
Major utility facility	P	P	P	P	P	P	P
Minor utility facility	P	P	P	P	P	P	P
Streets and ROW (public or private)	P	P	P	P	P	P	P
Stormwater retention pond (public/private)	P	P	P	P	P	P	P
Utility storage yard	P	P	P	P	P	P	P
Water & wastewater utility facility	P	P	P	P	P	P	P

X-Use Not Allowed: P-Permitted Use; A-Permitted Accessory Use

Appendix 'G' – Allowable Land Uses

GENERAL SERVICE AREA	ESTIMATED REQUIRED ACRES*
1	4.3
2	6.5
3	5.6
4	4.9
5	3.3
6	5.5
7	5.5
8	1.3
9	6.0
10	5.1
11	5.8
12	6.8
13	6.3
14	4.1
15	5.3
16	4.0
17	5.0
18	4.2
19	5.0
20	2.9
21	5.0
22	3.0
23	3.9
24	6.0
25	5.7
26	6.2
27	6.0
28	3.1
29	2.8
30	3.6
31	3.2
32	3.1
33	2.9
34	0.8
35	3.1
36	0.7
37	1.2
38	2.6
39	1.9
40	5.2
41	2.2
42	2.2
43	3.9
44	3.9
TOTAL	179.6

*Required park acreage shall be distributed according to the unique needs of the neighborhood(s) it is intended to serve. It is not the intent of this exhibit to imply 44 parks each with the given acreage.



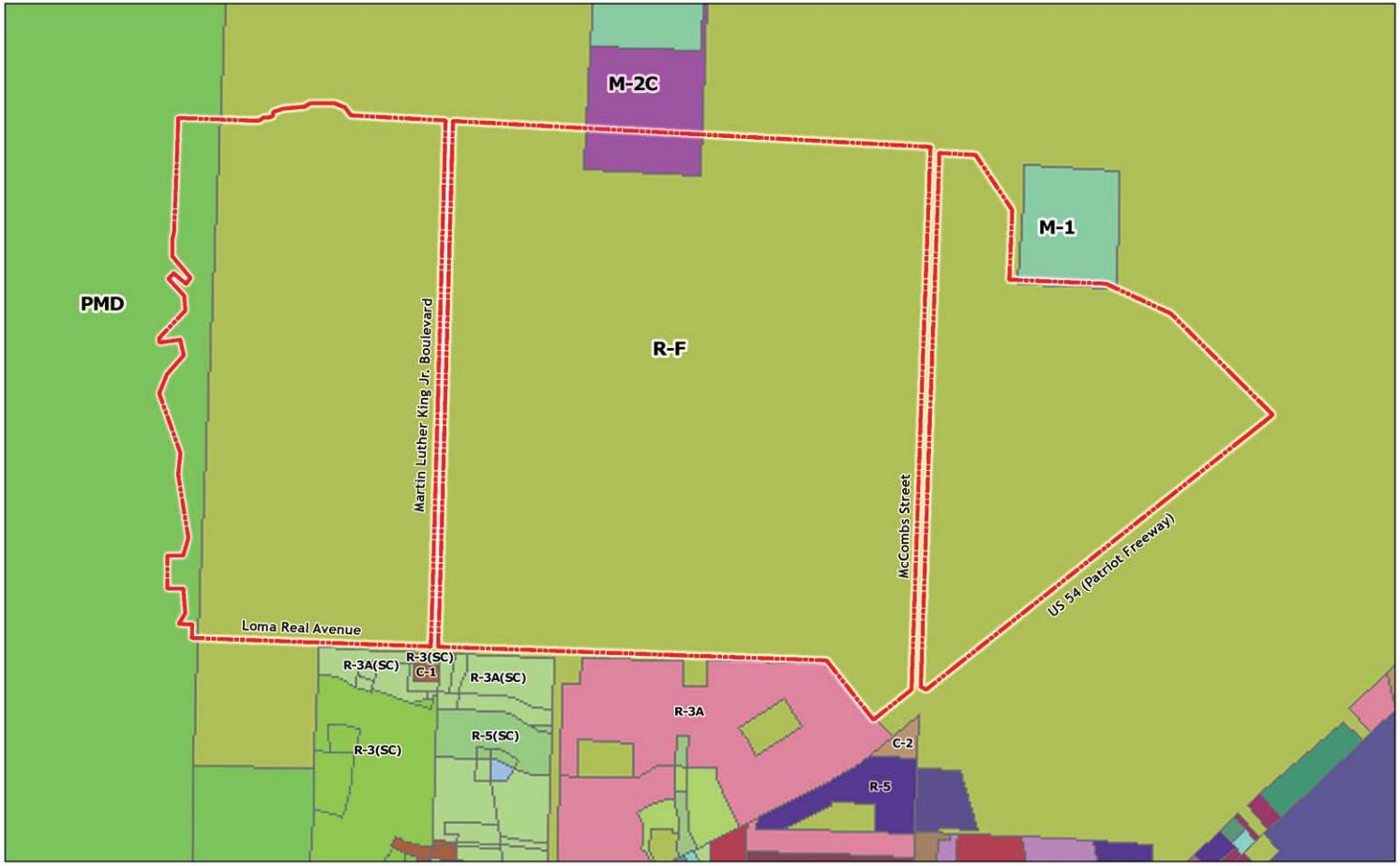
General Park Service Areas

El Paso, Texas

EL PASO WATER UTILITIES PUBLIC SERVICE BOARD

Kimley-Horn and Associates, Inc.

Appendix 'H' – General Park Service Areas



Zoning Map Sheet
El Paso, Texas

EL PASO PUBLIC WATER SERVICE UTILITIES BOARD

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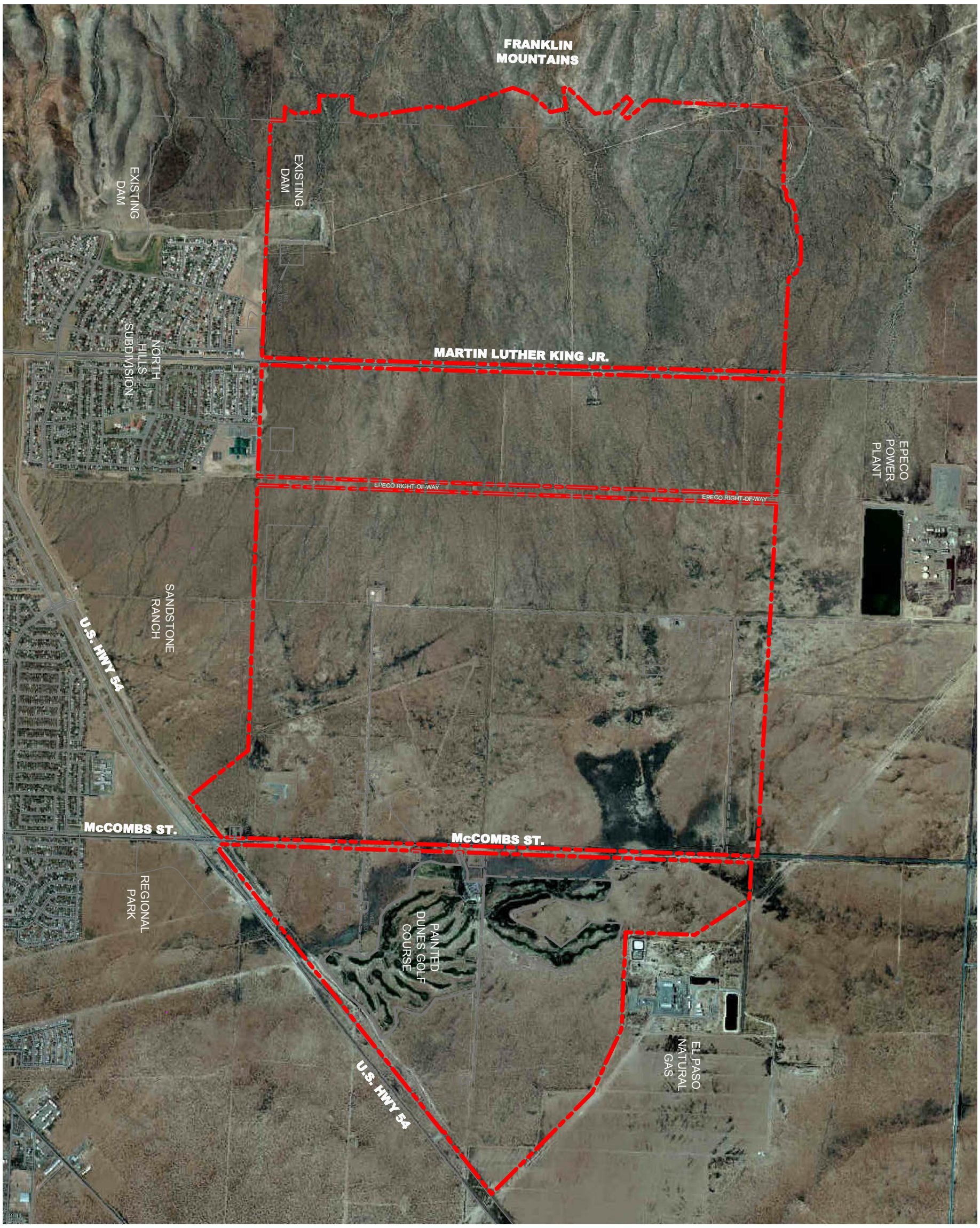
Appendix 'I' – Zoning Map



GRAPHIC SCALE

(IN FEET)
1 inch = 1000 ft.

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N

No.	Date	Revisions	App.

SHEET E-1

Scale:	AS SHOWN
Designed by:	
Drawn by:	
Checked by:	
Date:	AUGUST 12, 2008
Project No.	068200007

LOCATION MAP

HUNT BUILDING CORPORATION, INC
±4,900 ACRE TRACT
CITY OF EL PASO, TEXAS

Kimley-Horn and Associates, Inc.
12700 Park Central Drive, Suite 1800
Dallas, Texas 75251
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

File: G:\CIVIL\68200011\dwg-ALS-Exhibits\00E-ALS-Exhibit 1 - Location Map.dwg [Overall] 8/7/2008 11:04am
Xrefs: X2436-EP xexist-golfcourse-HUNT xexist-streets-EP3300 xstm-master XAERIAL-HUNT xbndy-final
Images: AERIAL-NEPSB.jpg

GRAPHIC SCALE

(IN FEET)
1 inch = 1000 ft.

LEGEND

- EPWU NE LAND STUDY BOUNDARY
- INDUSTRIAL
- COMMERCIAL
- MIXED-USE
- RESIDENTIAL
- PARKS & OPEN SPACE
- APARTMENT-OFFICE
- FT. BLISS & OTHER MILITARY LAND
- PUBLIC SAFETY FACILITIES
- PUBLIC USE FACILITY
- RESIDENTIAL-HEAVY DENSITY
- RESIDENTIAL-MEDIUM DENSITY
- RESIDENTIAL-MEDIUM-HIGH DENSITY
- RESIDENTIAL-LIGHT DENSITY
- RESIDENTIAL-UNSPECIFIED DENSITY
- RIGHT OF WAY

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HUNT BUILDING CORPORATION, INC
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CITY OF EL PASO, TEXAS

EXISTING FUTURE LAND USE PLAN

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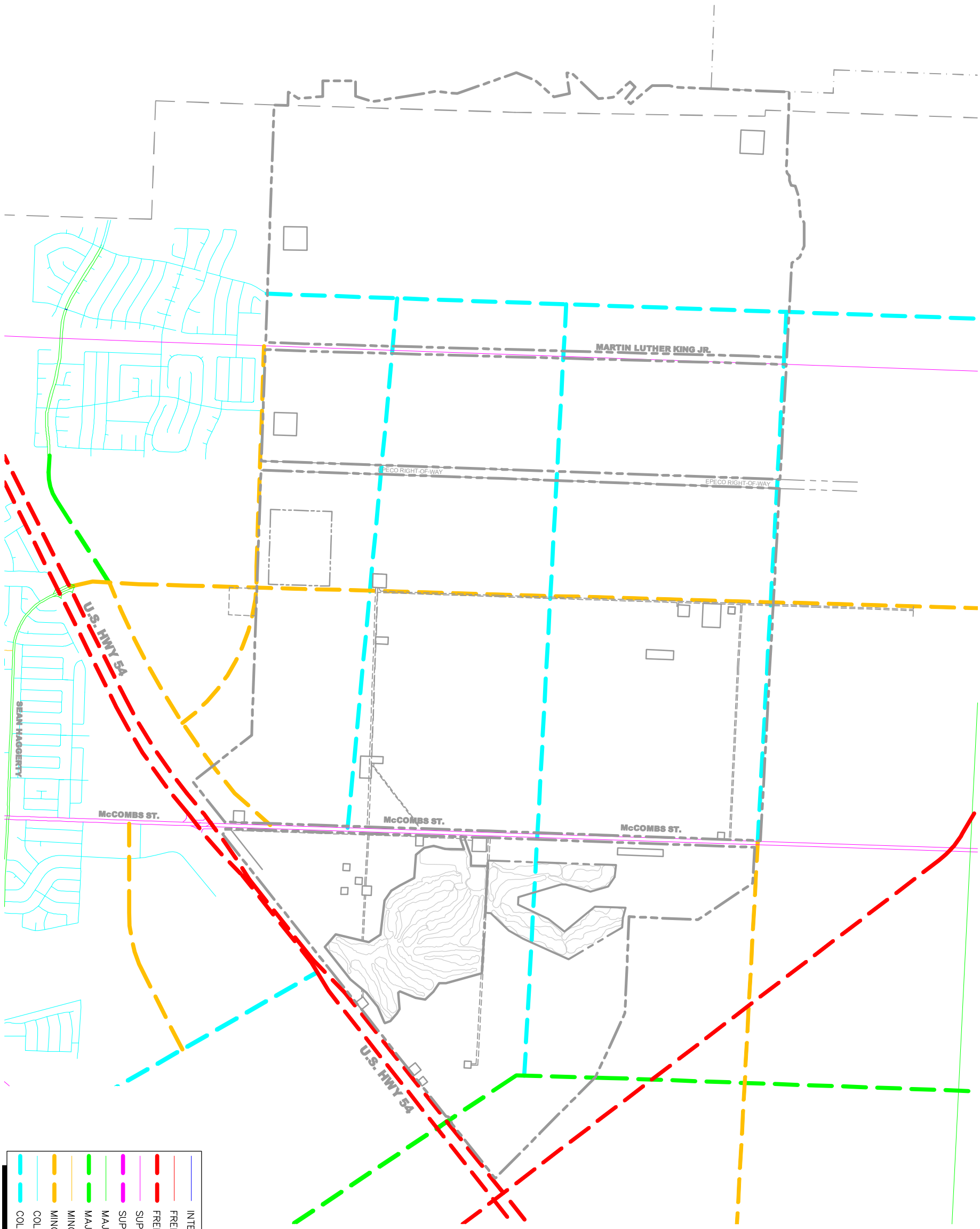
Project No. 068200007

SHEET
E-2



LEGEND

- INTERSTATE HIGHWAYS
- FREEWAYS/EXPRESSWAYS
- FREEWAYS/EXPRESSWAYS – PROPOSED
- SUPER ARTERIALS
- SUPER ARTERIALS – PROPOSED
- MAJOR ARTERIALS
- MAJOR ARTERIALS – PROPOSED
- MINOR ARTERIALS
- MINOR ARTERIALS – PROPOSED
- COLLECTORS
- COLLECTORS – PROPOSED

GRAPHIC SCALE

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(IN FEET)
1 inch = 1000 ft.

N

No.	Date	Revisions	App.

SHEET E-3

Scale:	AS SHOWN
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EXISTING THOROUGHFARE PLAN

HUNT BUILDING CORPORATION, INC
±4,900 ACRE TRACT
CITY OF EL PASO, TEXAS

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LEGEND

1. MAJOR ARTERIAL
2. MINOR ARTERIAL
3. MINOR ARTERIAL WITH BIKE LANE
4. ALL COLLECTORS WILL COMPLY WITH *TITLE 19-SUBDIVISION ORDINANCE, DESIGN STANDARDS FOR CONSTRUCTION* DATED JUNE 2008

SEE TYPICAL THOROUGHFARE CROSS-SECTIONS EXHIBIT FOR SECTION DETAILS

LEGEND

- COMMERCIAL
- MIXED USE - HIGH INTENSITY
- MIXED USE - LOW INTENSITY
- RESIDENTIAL 1 (3.5 DU/AC)
- RESIDENTIAL 2 (5.5 DU/AC)
- RESIDENTIAL 3 (7.2 DU/AC)
- RESIDENTIAL 4 (12.0 DU/AC)
- SCHOOL
- OPEN SPACE
- GOLF COURSE
- EPWU WELL
- TXDOT DRAINAGE
- 50' MCCOMBS R.O.W.

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HUNT BUILDING CORPORATION, INC
±4,900 ACRE TRACT
CITY OF EL PASO, TEXAS

MASTER LAND USE PLAN

Scale: AS SHOWN
Designed by:
Drawn by:
Checked by:
Date: AUGUST 12, 2008
Project No. 068200007

SHEET
E-4

LEGEND

1. MAJOR ARTERIAL
2. MINOR ARTERIAL
3. MINOR ARTERIAL WITH BIKE LANE
4. ALL COLLECTORS WILL COMPLY WITH *TITLE 19-SUBDIVISION ORDINANCE, DESIGN STANDARDS FOR CONSTRUCTION* DATED JUNE 2008

SEE TYPICAL THOROUGHFARE CROSS-SECTIONS EXHIBIT FOR SECTION DETAILS

LEGEND

- COMMERCIAL
- MIXED USE - HIGH INTENSITY
- MIXED USE - LOW INTENSITY
- RESIDENTIAL 1 (3.5 DU/AC)
- RESIDENTIAL 2 (5.5 DU/AC)
- RESIDENTIAL 3 (7.2 DU/AC)
- RESIDENTIAL 4 (12.0 DU/AC)
- SCHOOL
- OPEN SPACE
- GOLF COURSE
- EPWU WELL
- TXDOT DRAINAGE
- 50' MCCOMBS R.O.W.

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HUNT BUILDING CORPORATION, INC
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CITY OF EL PASO, TEXAS

MASTER LAND USE PLAN W/ HIKE & BIKE TRAIL

Scale: AS SHOWN
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Drawn by:
Checked by:
Date: AUGUST 12, 2008
Project No. 068200007

SHEET
E-4A

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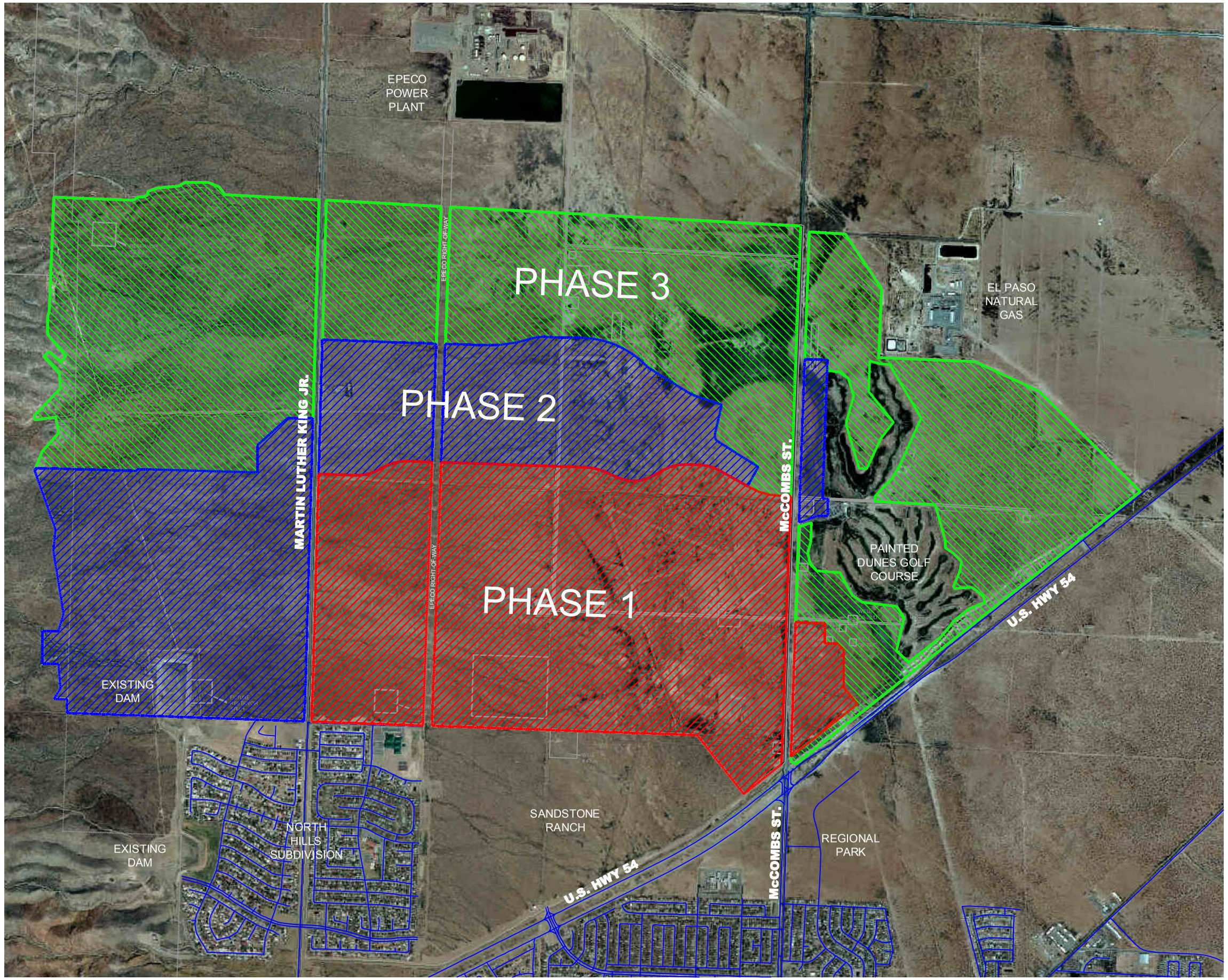

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GRAPHIC SCALE

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(IN FEET)
1 inch = 1000 ft.

LEGEND

- PHASE 1
- PHASE 2
- PHASE 3

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HUNT BUILDING CORPORATION, INC
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OVERALL PHASING PLAN

Scale: AS SHOWN
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Date: AUGUST 12, 2008
Project No. 068200007

SHEET
E-5

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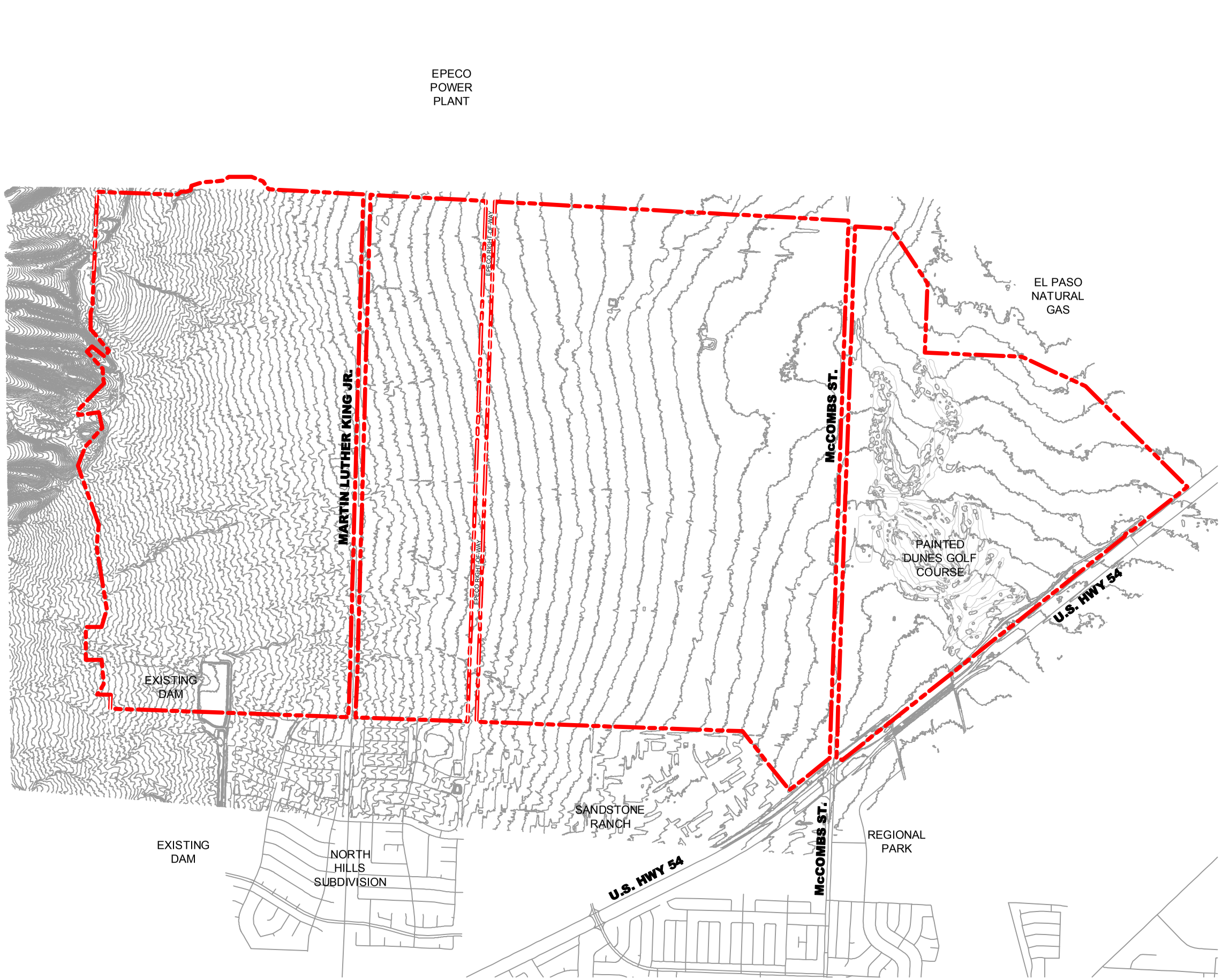

N

GRAPHIC SCALE

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(IN FEET)
1 inch = 1000 ft.

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HUNT BUILDING CORPORATION, INC
±4,900 ACRE TRACT
CITY OF EL PASO, TEXAS

TOPOGRAPHIC MAP

Scale: AS SHOWN
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Drawn by:
Checked by:
Date: AUGUST 12, 2008
Project No. 068200007

SHEET
E-6

Image:

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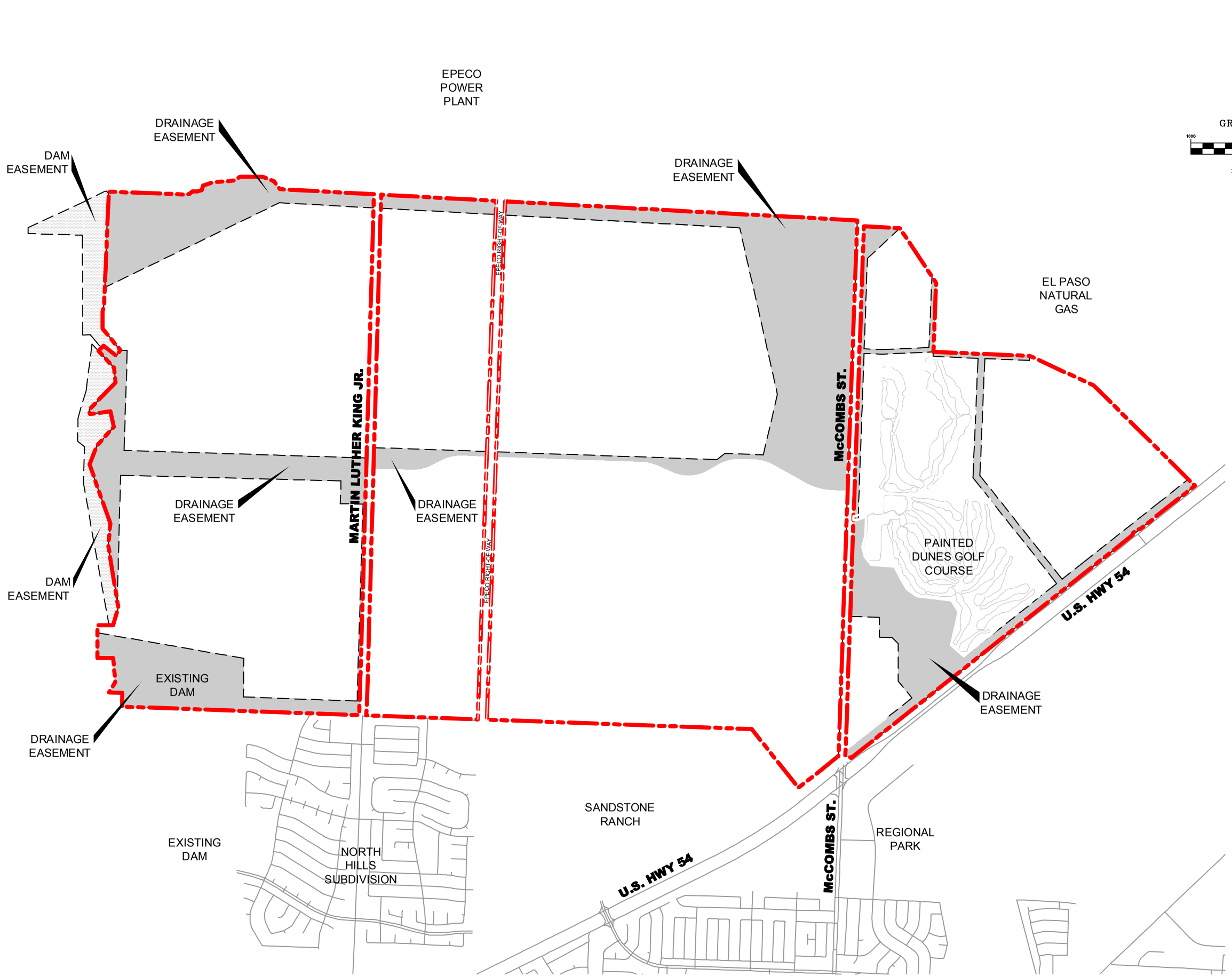

GRAPHIC SCALE

1000 0 500 1000 2000

(IN FEET)
1 inch = 1000 ft.

No.	Date	Revisions	App.

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HUNT BUILDING CORPORATION, INC
±4,900 ACRE TRACT
CITY OF EL PASO, TEXAS

OFF-SITE AND TEMPORARY EASEMENTS

Scale: AS SHOWN
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Drawn by:
Checked by:
Date: AUGUST 12, 2008
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SHEET
E-7

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HUNT BUILDING CORPORATION, INC
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CITY OF EL PASO, TEXAS

MASTER HIKE & BIKE PLAN

Scale: AS SHOWN
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Drawn by:
Checked by:
Date: AUGUST 12, 2008
Project No. 068200007

SHEET
E-8

Images:

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Xrefs: xwsdt-streets-EP3300 X2436-BP XAERIAL-HUNT xbldg- final xbase-final xtitleroughlines

TABLE 3.1

JUNCTION OR STRUCTURE COEFFICIENT OF LOSS

Case No.	Reference Figures	Description of Condition	Coefficient k_j	Equation $h_j =$
I	TABLE 1 Sheet 2	Inlet on Main Line	0.50	$\frac{V_2^2}{2g} - \frac{K_j V^2}{2g}$
II	TABLE 1 Sheet 2	Inlet on Main Line with Branch Lateral	0.25	
III	TABLE 1 Sheet 2	Manhole on Main Line with		
		90°	0.25	
		60°	0.35	
		45°	0.50	
		22.5°	0.75	
IV	TABLE 1 Sheet 2	Wye Connection or Cut In		
		60°	0.60	
		45°	0.75	
		22.5°	0.95	
V	TABLE 1 Sheet 3	Inlet or Manhole at Beginning of Line	1.25	$\frac{K_j V_2^2}{2g}$
VI	TABLE 1 Sheet 3	Conduit Curves for 90°*		
		Curve Radius: 2 to 8D**	0.40	
		8 to 20D	0.25	
		> 20 D	0.00	
VII	TABLE 1 Sheet 3	Bend Where Radius is Equal to Diameter		
		90°	0.50	
		60°	0.43	
		45°	0.35	
		22.5°	0.20	

The values of the coefficient k_j for determining the loss of head due to obstructions in pipes are shown in TABLE 1-A and the coefficients are used in the following Equation to calculate the head loss at the obstruction:

$$h_j = K_j \frac{V_2^2}{2g}$$

* Where deflection other than 90° are used, the 90° deflection coefficient can be used with the following percentage factors: 60° Bend - 85%; 45° Bend - 70%; 22 1/2° Bend - 40%.

**D - Inside Diameter of Pipe

Note: 90° Bends are not to be used in Storm Sewer System unless specifically approved by City Engineer.

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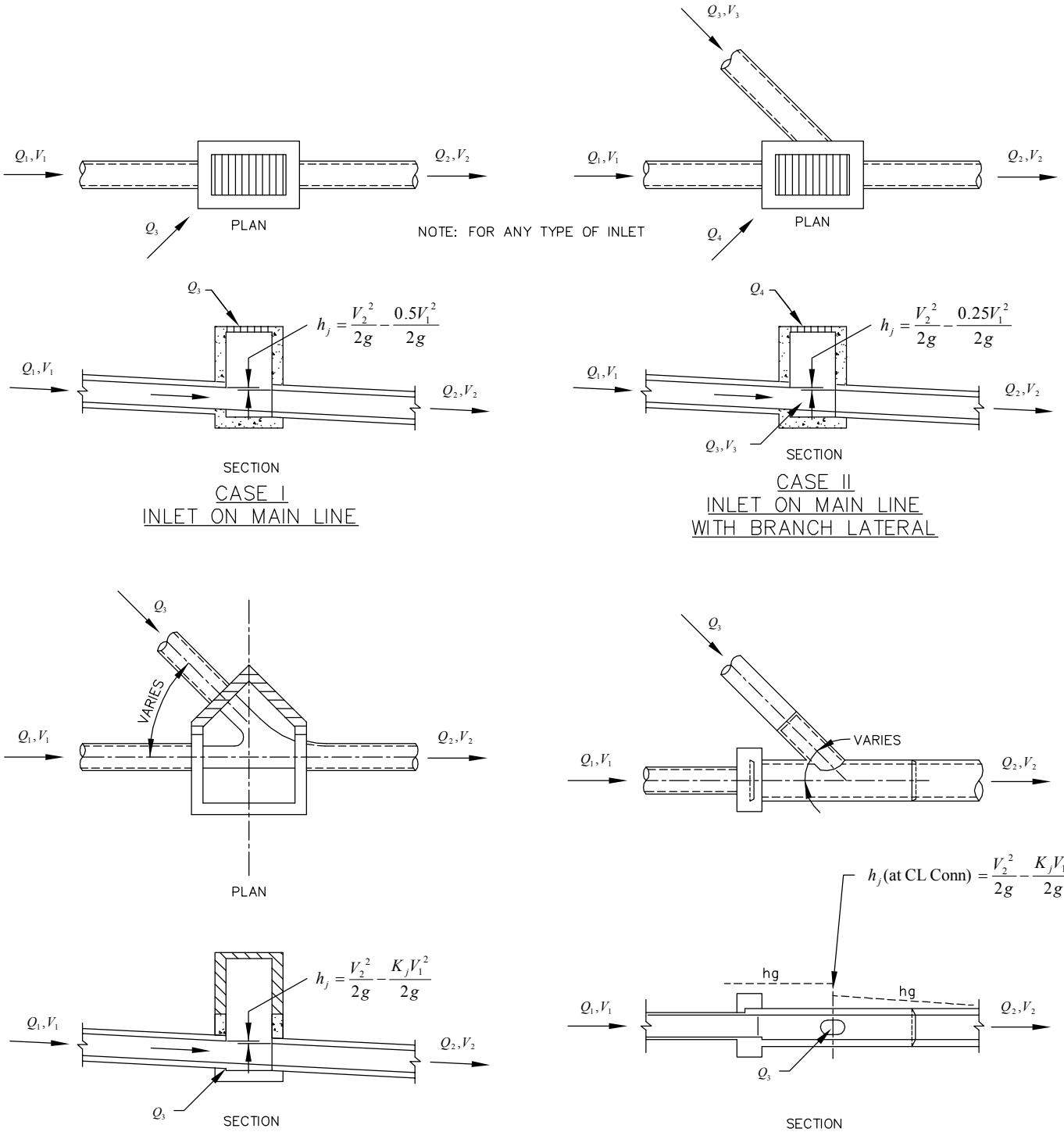

MINOR HEAD LOSSES DUE TO
TURBULENCE AT STRUCTURES

TABLE 3.2

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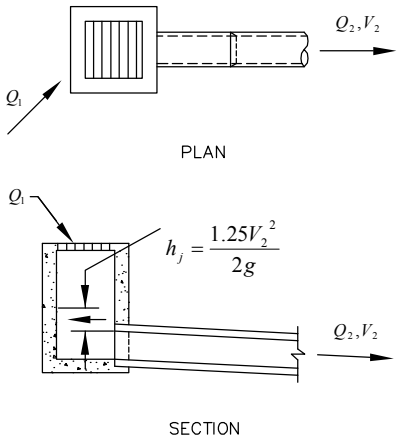
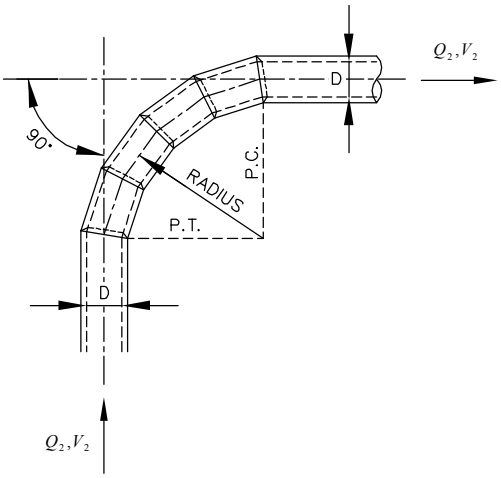


CASE V
INLET OR MANHOLE AT
BEGINNING OF LINE



CASE VI
CONDUIT ON 90° CURVES*

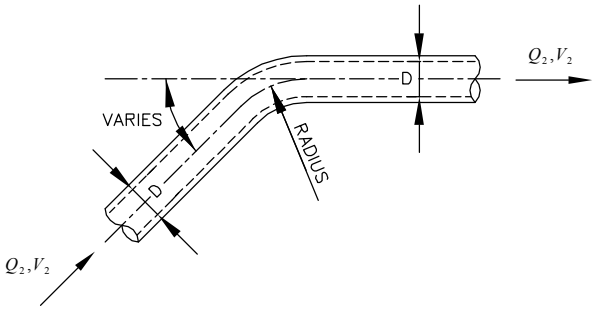
NOTE: HEAD LOSS APPLIED AT P.C.
FOR LENGTH OF CURVE

RADIUS=(2–8)xDIA. OF PIPE $h_j = 0.40\frac{V_2^2}{2g}$

RADIUS=(8–20)xDIA. OF PIPE $h_j = 0.25\frac{V_2^2}{2g}$

RADIUS= GREATER THAN 20xDIA. OF PIPE $h_j = 0$

*WHEN CURVES OTHER THAN 90° ARE USED, APPLY
THE FOLLOWING FACTORS TO 90° CURVES
60° CURVE 85%
45° CURVE 70%
22 ½° CURVE 40%



CASE VII
BENDS WHERE RADIUS IS
EQUAL TO DIAMETER OF PIPE

NOTE: HEAD LOSS APPLIED AT BEGINNING
OF BEND. BENDS TO BE USED ONLY
WITH THE PERMISSION OF THE
DRAINAGE DESIGN ENGINEER.

90° BEND $h_j = 0.50\frac{V_2^2}{2g}$ 60° BEND $h_j = 0.43\frac{V_2^2}{2g}$

45° BEND $h_j = 0.35\frac{V_2^2}{2g}$ 22.5° BEND $h_j = 0.20\frac{V_2^2}{2g}$

MINOR HEAD LOSSES DUE TO
TURBULENCE AT STRUCTURES

TABLE 3.3

File: G:\CIVIL\68200011\dwg-ALS-Exhibits\Minor Head Loss Exhibit\Cases 1 - 4.dwg [3-3] 8/7/2008 3:00pm
Xrefs:
Images:

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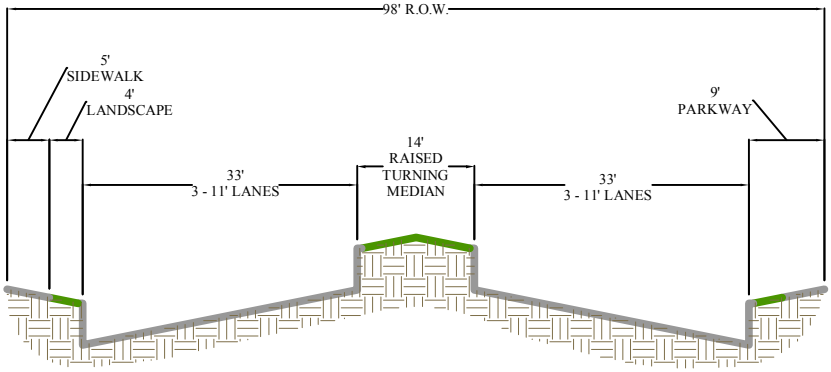
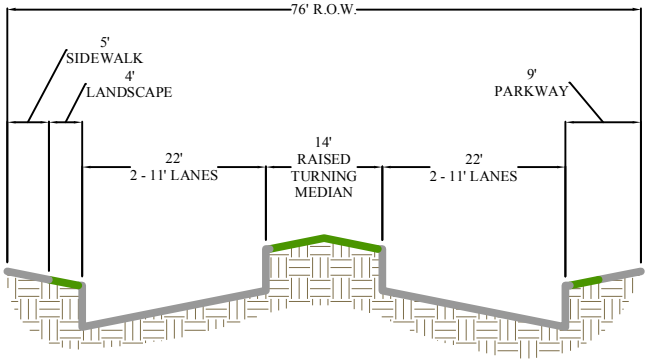
FIGURE 1
TYPICAL THOROUGHFARE CROSS-SECTIONS

N.T.S.

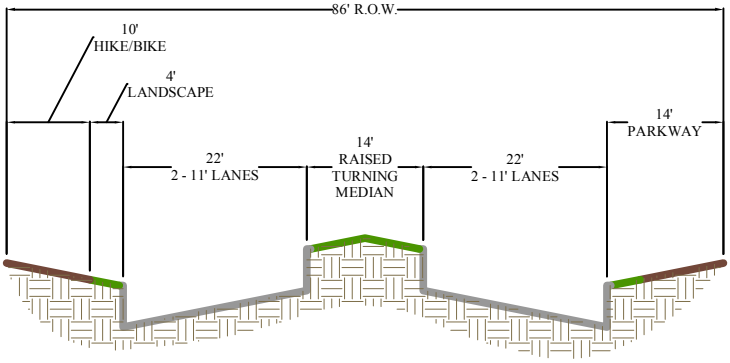
MAJOR ARTERIAL STREET

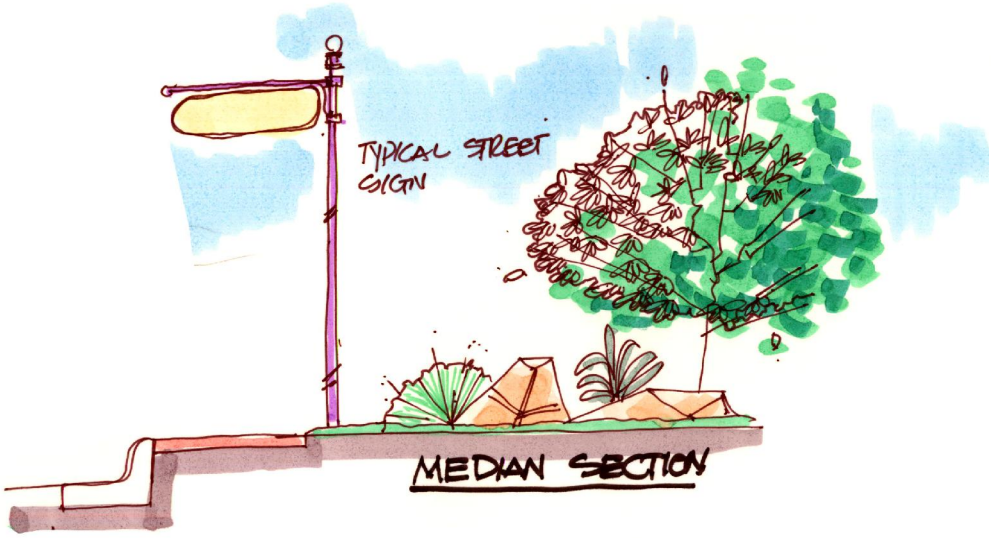


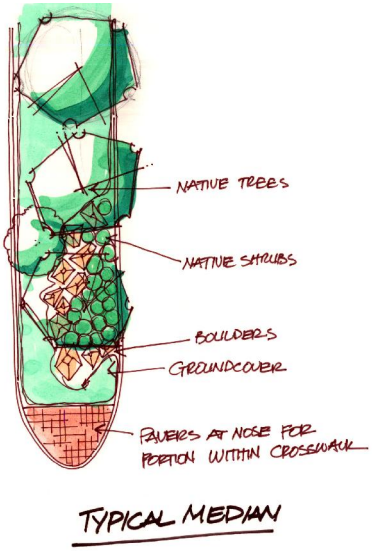
MINOR ARTERIAL STREET



MINOR ARTERIAL STREET WITH BIKE/HIKE







*REFERENCE *EL PASO WATER UTILITIES NORTHEAST MASTER PLAN DATED 2005* FOR TYPICAL MEDIAN SECTION
*REFERENCE *CITY OF EL PASO, DESIGN STANDARDS FOR CONSTRUCTION* FOR TYPICAL ARTERIAL SECTIONS

File: G:\CIVIL\68200011\dwg-ALS-Exhibits\00E-ALS-Exhibit - Cross Sections.dwg [Overall] 8/7/2008 3:43pm
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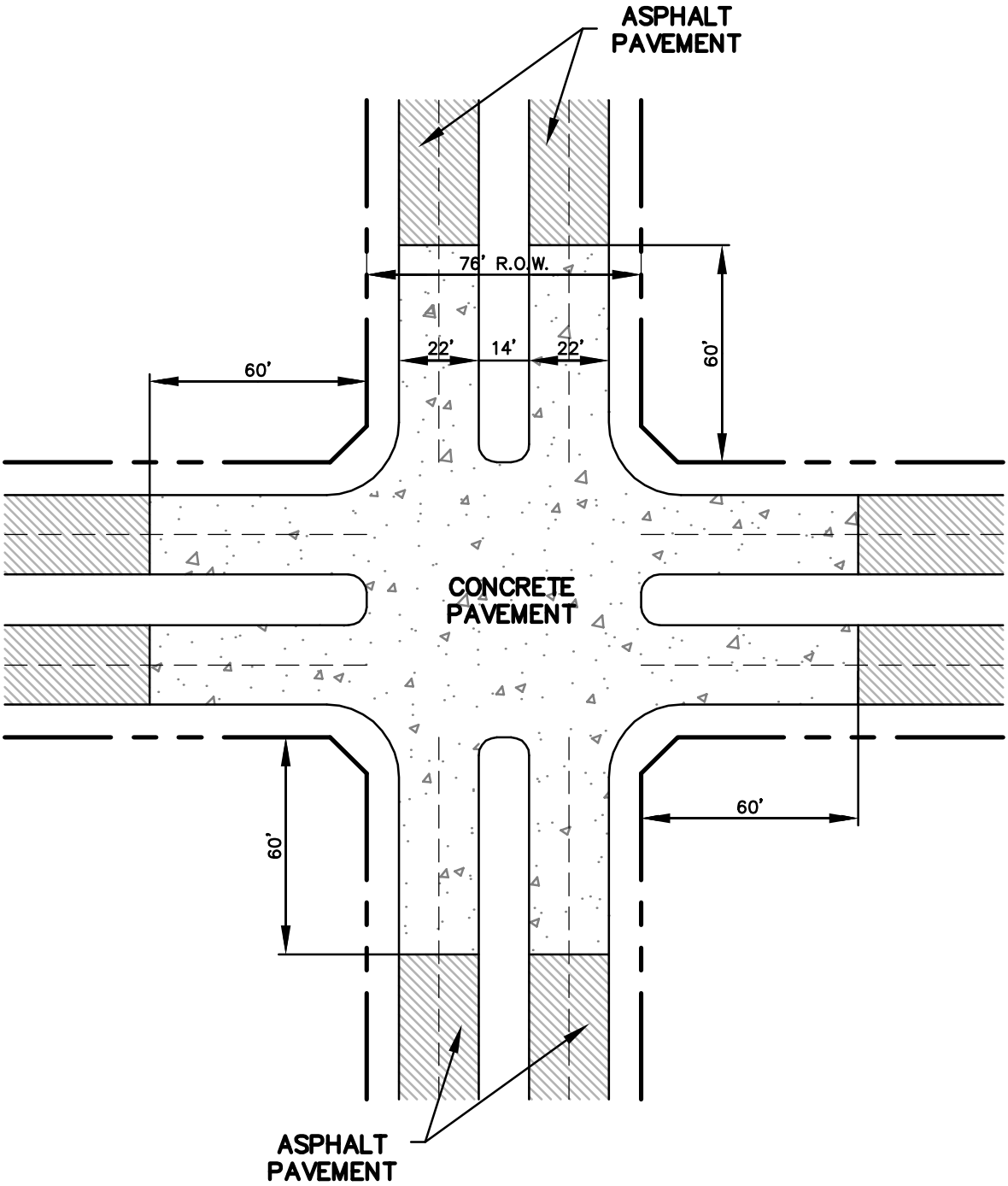
FIGURE 2
INTERSECTION PAVING GUIDELINES

N.T.S.



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Xrefs:
Images:

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