

**SPRING LAKE SPECIFIC PLAN
INFRASTRUCTURE STUDY REPORT**

City of Woodland

Prepared For

Spring Lake Planning Group, LLC
173 Court Street
Woodland, California 95695

Prepared By

Cunningham Engineering Corporation
2940 Spafford Street, Suite 200
Davis, CA 95616
(530) 758-2026

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11 June 2004

Gary Wegener
Public Works Director
City of Woodland
300 First Street
Woodland, CA 95695

Subject: Infrastructure Study Report
Spring Lake Specific Plan
Woodland, California

Dear Mr. Wegener

In accordance with our Scope of Services dated October 20, 2000, we are pleased to present this Infrastructure Study Report (ISR) for the subject project. This document includes design assumptions and constraints, discussion of project staging, and preliminary major infrastructure layouts.

This Infrastructure Study Report is a Master Planning-level document and should not be used for construction or bidding purposes. Detailed construction documents will be required for both onsite and offsite infrastructure items. This is a companion document to the Spring Lake Capital Improvement Plan (CIP). The reader is urged to refer to the CIP for additional information regarding cost allocations.

If you have any questions concerning the contents of this report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

Steven J. Greenfield
Project Manager

(25) Bound, (1) Unbound

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SPRING LAKE SPECIFIC PLAN FINAL DRAFT INFRASTRUCTURE STUDY REPORT

1.0 INTRODUCTION

At the request of Spring Lake Planning Group, LLC, Cunningham Engineering Corporation (CEC) has prepared this Infrastructure Study Report (ISR) as a requirement of the Spring Lake Specific Plan Source Document adopted by the City of Woodland. It is intended to be used by the City of Woodland (City) and developers to plan development of the Spring Lake Specific Plan Area (SLSP) and the Spring Lake Master Plan Remainder Area (MPRA). For the purposes of this report, the SLSP and the MPRA will be collectively referred to as the *South Urban Growth Area Master Plan Area*. The Specific Plan Area encompasses approximately 1,097 acres located southeast of the City of Woodland (Figure 1.1, Specific Plan Land Use Map). Buildout of the SLSP is anticipated to be phased over approximately 15 years. This report is prepared to satisfy the requirements of the *Spring Lake Specific Plan* source document, as adopted by the Woodland City Council on December 18, 2001. This document is considered a companion document to the Spring Lake Capital Improvement Plan (CIP). The reader is urged to refer to the CIP for backbone infrastructure definitions, cost opinions, and cost allocations.

1.1 Infrastructure Study Report Objectives

The general objective of this Infrastructure Study Report is to present, in one source, an Infrastructure Master Plan document for the planning and design of the major infrastructure that is required to develop the SLSP and the MPRA as presently envisioned. The proposed major Infrastructure Master Plan described in this report includes:

- Circulation
- Street improvements including arterials and collectors, roundabouts, and vehicle overpasses
- Pathway improvements including bike lanes and major greenbelts, and pedestrian overpasses
- Water supply and distribution
- Wastewater and Storm water conveyance systems
- Dry utilities such as electric, gas, and telecommunications

Note: This report does not address parks, police, or fire facilities. See the CIP report for this information.

In addition to identifying the major required infrastructure, an engineer's cost opinion has been included for planning purposes. The objectives did not include detailed engineering design or preparation of construction documents for bidding purposes.

It is the intent of the SLSP that necessary infrastructure keeps pace with Specific Plan development, and that the level of service meets thresholds specified in the City's General Plan and other relevant City documents. Additionally, it is intended that the SLSP pay its fair share of

the cost for providing these services and/or the costs of upgrading existing service systems when appropriate.

The ISR is one of several reports and studies prepared during the planning and implementation stages of the SLSP to identify backbone infrastructure for the Plan Area and establish funding sources to enable plan buildout. These documents include the Fiscal Study, CIP, Financing Plan, ISR, and the Nexus Study.

The flow chart in Figure 1.2, Specific Plan Planning and Implementation Process Diagram, illustrates the basic components of each report and their relationship to the planning and implementation of the SLSP. The Final ISR is necessary to identify the backbone infrastructure items in order that the CIP and Nexus Study can be completed to establish the Spring Lake Infrastructure Fee.

Sizing, phasing, and approximate timing of construction are included herein, together with engineering calculations and design guidelines.

The City of Woodland General Plan Public Facilities and Services Element, the Water System Master Plan, the Wastewater Collection System Master Plan, the Storm Drainage Facilities Master Plan, the Urban Water Management Plan, and the City's Major Projects Financing Plan provide relevant policy direction and information regarding programming of public facilities and services. Consistent with these documents, the SLSP requires that all development within the Plan Area accomplishes the following Plan-specific objectives in addition to requiring that the final infrastructure master plans for the SLSP be completed prior to review of in-tract improvement plans or approval of the first Final Subdivision Map:

Objective PF-1: Adequate facilities and services shall be available to serve new development.

Objective PF- 2: Where adequate facilities and services are not available, new development shall not be approved.

Objective PF- 3: New development should not be allowed to impact levels of service for existing/planned development.

Objective PF- 4: Services and facilities needed to serve the Plan Area should be extended in the most logical manner.

1.2 Information Sources and Previous Studies

Information for this report was obtained via meetings, telephone conversations, and correspondence with the City of Woodland, Spring Lake Planning Group LLC, Turn of the Century LLC, Ponticello Enterprises, Tschudin Consulting Group, Economic & Planning Systems, MBK Engineering, Wallace Kuhl and Associates, Borcalli & Associates, Wood Rodgers, Inc., Ecologic, Yuba Community College District, Woodland Joint Unified School District, PG&E, SBC, and several engineering contractors. Additional information was

collected from site visits, design manuals and other technical references, and various documents and reports. A list of references is provided in Appendix A.

1.3 Existing Site Description

The 1,097-acre site is located predominantly south of Gibson Road, east of State Route 113 (SR 113), west of County Road (CR) 102 and north of the projection of CR 25A. A portion of the SLSP Area is located west of SR 113 and north of the projection of CR24A. The MPRA includes an additional 651 acres located west of SR 113 and northeast of SR 113 and CR 25A. The limits and distinction between the SLSP Area and MPRA are illustrated on Figure 1.1.

The distinction between the SLSP Area and the MPRA is an important one. Assumptions about MPRA growth are based on Table 2-3 on pages 2-10 of the *Spring Lake Specific Plan* Source document. This ISR is predominantly focused on infrastructure required to serve the SLSP Area; however, based on master planning efforts, the City is requiring that the SLSP Area infrastructure be designed to incorporate future infrastructure needs for the MPRA. This will necessitate that some of the trunk sewer and drainage facilities, as well as certain arterials, be oversized to accommodate growth beyond the SLSP Area.

The SLSP Area is relatively flat and gently slopes from west to east. The topographic high is located at the west edge of the Plan Area at an elevation of approximately 60 feet (NAVD 88) above Mean Sea Level (MSL). The low spot within the Plan Area is located near CR 102 at an elevation of approximately 36 feet (NAVD 88) above MSL.

The predominant existing land use is agriculture characterized by furrowed seasonal crops and irrigation/drainage ditches. Trees and shrubs are limited to those adjacent to existing roadways, farm residences, and on property owned by Woodland Community College (WCC).

In addition to agricultural uses, the SLSP Area includes several public and semi-public institutional landowners. Yolo County owns approximately 39 acres located at the southwest corner of Gibson Road and CR 102. The County operates the County Jail, a youth correctional facility, and an animal shelter. The County is currently in the design stage for a new Juvenile Hall building. WCC owns approximately 121 acres, contiguous to the County property, which fronts both Gibson Road and CR 102. WCC has existing facilities within the northern 40 acres and plans to expand to the south over the course of approximately 20 to 30 years and recently began construction on a new Science Building. The Woodland Joint Unified School District (WJUSD) has recently purchased approximately 80 acres located along Gibson Road immediately west of the WCC. Construction of Pioneer High School was recently completed on the northern 50 acres and the school opened fall 2003. The WJUSD's southern 30 acres is being reserved for a future middle school. However, a temporary detention pond for storm drainage runoff from the High School has been constructed within that 30 acres. The Woodland Christian School has recently completed its new facility on approximately 27 acres west of SR 113 and north of the projection of CR 24A.

Existing roads within the Plan Area consist of CR 101, which extends from Gibson Road to CR 25A, and an approximate 250-foot extension of Matmor Road south of Tyler Drive to provide access to the Woodland Christian School facility.

Surrounding land use consists of existing residential development to the north, predominantly undeveloped land to the east, a portion of which contains a 9-hole golf course and radio towers, as well as a planned City Regional Park site also to the east, agricultural properties to the south and west, and a regional mall to the northwest. The Woodland Wastewater Treatment Plant is located immediately east of the land east of the Plan Area.

1.4 Specific Plan Description and Land Use

As currently proposed, the SLSP Area will consist predominantly of variable density residential dwellings. For planning purposes, 4,051 units are proposed, ranging in density from 3 single-family units per acre up to 25 multi-family units per acre. In addition to the residential development, the Specific Plan contains three neighborhood parks with three adjacent elementary schools, a central park/plaza, three neighborhood commercial centers plus a central commercial development, a fire substation, and the aforementioned high school and middle school sites. The WCC, Yolo County, Woodland Joint Unified School District, and Woodland Christian School all have future expansion plans for their respective facilities.

Additional plan improvements include a 35-foot wide perimeter landscape buffer along the north, east, and south and a greenbelt/bike loop system. A pedestrian overcrossing is currently in the design stage to extend over Gibson Road. A pedestrian overcrossing is planned over CR 102. If constructed, it is expected to be located just south of CR 25 (Parkway Drive).

Although located within the MPRA, a 34-acre sports park will be phased with the buildout of the SLSP. Within the MPRA, additional improvements described in this report, are a four-lane arterial and a four-lane over crossing of SR 113, and improvements to the CR 25A/SR 113 interchange.

Proposed roadway improvements include the following:

- Improving CR 25A from CR 101 to SR113.
- Constructing “A” Street.
- Frontage improvements along Gibson Road.
- Widening of CR 102.
- Extending CR 25A from CR 102 to CR 101.
- Widening and realignment (Master Plan Remainder Area) of CR 101.
- Extending Pioneer Avenue from Gibson Road to CR 25A.
- Constructing a two- to four-lane east-west arterial referred to as Parkway Drive.
- Constructing an east-west collector along the alignment of CR 24A, referred to as Farmers’ Central Road.
- Extending Matmor Road to future Farmers’ Central Road.
- Constructing a grid of east-west and north-south collectors (Collectors 1, 2 and 4, 5, and 24C).

The Land Use Map (Figure 1.1) depicts the SLSP planned land use designations, conceptual street alignments, park, school and neighborhood commercial locations and additional plan details. Proposed onsite land dedications are indicated on Figure 1.3, Preliminary Land Dedication Map. Proposed offsite land acquisitions and easements are illustrated in Figure 1.4, Offsite Land Acquisition Map. Land will be dedicated or otherwise conveyed to the City for the following purposes (per *Spring Lake Specific Plan* document, page 6-1):

- Street rights-of-way
- Major storm drainage conveyances and detention areas
- Fire Station
- Parks and open space
- SR 113 overpass
- Pedestrian bridges and overpasses
- Greenbelts and subdivision trails
- Utility facilities (e.g. wells, pump stations, etc.)

School sites are to be reserved for purposes of later acquisition by the WJUSD. Schools and the fire station are precisely identified in the SLSP. These specified locations are not intended to be "floating" or approximate, hence there is no underlying zoning for these parcels. Their location is integral to the Plan. Modification to the location of these uses is strongly discouraged and would require rezoning, Specific Plan amendment, and use permit per *Spring Lake Specific Plan* document, pages 2-29.

1.5 Project Development Stages

To allow for development to progress in a financially feasible and logical fashion, several phasing alternatives were analyzed. Based on those analyses, this report will consider infrastructure construction and costs to be separated into the following Development Stages with the approximate buildout time periods (illustrated in Figure 1.5, Development Stages):

- Stage 1: Years 2004-2005
- Stage 2: Years 2005-2006
- Stage 3: Years 2006-2007
- Stage 4: Years 2007-2008
- Probable Stage 5/6: Years 2009 on
- Probable Stage 7/8: Currently undetermined
- Prudler-Sievers, Merritt/Murphy, and/or Heidrick: Any stage once the individual developer has extended major infrastructure.

The infrastructure associated with Stage 1 will be that required to get the project started and allow for development to occur during the initial 1 to 2 years. The proposed infrastructure associated with subsequent stages is intended to be sufficient to support the incremental development for each stage. The staging of major infrastructure for streets, storm drainage, sewer, and water is depicted on the respective infrastructure layout diagrams: Figure 2.1 (Streets), Figure 3.1 (Water), Figure 4.1 (Sewer), and Figure 5.1 (Storm Drainage).

2.0 CIRCULATION

2.1 Existing Streets

The following existing streets lie within the South Urban Growth Area Master Plan Area:

- Gibson Road
- State Route 113
- County Road 102
- County Road 101
- County Road 25A

Proposed improvements to these streets are described in Section 2.2 below.

2.2 Proposed Street Improvements

2.2.1 Circulation

The SLSP Street Layout is depicted in Figure 2.1, Street Layout. The SLSP requires that all development within the Plan Area accomplish the following transportation objectives (Note: There is no objective C-5 in the SLSP document):

Objective C-1: The street network will be designed with multiple connections and direct routes.

Objective C-2: Major streets (arterials and collectors) will be spaced no more than one half-mile apart.

Objective C-3: Traffic calming measures will be used and encouraged throughout the Plan.

Objective C-4: Streets in excess of four-lanes are prohibited.

Objective C-6: The pedestrian/bicycle network shall be as efficient as the network for motorists.

Objective C-7: Pedestrians and bicyclists shall be provided with shortcuts and alternatives to travel along high-volume streets.

Objective C-8: Transit stops shall be located as close as possible to, and no more than one-quarter mile from, neighborhood commercial sites and concentrations of housing.

2.2.2 Street Pattern

The "modified grid" is the street pattern adopted for use in the Specific Plan Area (*Spring Lake Specific Plan* document, page 4-4). A "modified grid" system is defined as containing elements of both traditional (grid) patterns and conventional (curvilinear) patterns with a goal of not exceeding 50% cul-de-sacs in a subdivision.

2.2.3 Intersection Spacing (Block Size)

In accordance with City Standard Specifications, the minimum distance between local street intersections will be 240 feet between centerlines, and the minimum distance between collector and arterial intersections will be 660 feet between centerlines. The maximum block length will be 1,320 feet between centerlines.

Maximum block lengths are identified in the Specific Plan Land Use Element in Specific Plan Table 2.4 and in Specific Plan Development Regulation 2.34.

2.2.4 Street Classification

Arterial streets within the Plan Area are as follows:

- Pioneer Avenue -- Pioneer Avenue will be extended south to CR 25A and will serve as the primary north-south arterial. It will be a four-lane arterial from Gibson Road to Parkway West, a four-lane arterial (plus two turn lanes) abutting the Central Park (from Parkway West to Parkway East), and a two-lane arterial from Parkway East to CR 25A.
- Parkway Drive -- Parkway Drive will be the primary east-west arterial connecting CR 102 at the planned City Regional Park, over the freeway, and eventually to College Street. It will be a four-lane arterial in the segment from East Street to Pioneer Avenue, and a two-lane arterial elsewhere.
- CR 25A -- CR 25A will be a two-lane arterial from SR 113 to CR 102.
- CR 102 is a two-lane arterial, with a four-lane R/W reserved the entire length bordering the SLSP Plan Area.
- Gibson Road -- Gibson Road has recently been widened to a four-lane arterial.
- East Street -- East Street is a four-lane arterial from Gibson Road to CR 24A, and a two-lane arterial from CR 24A to the southern boundary of the Master Plan Remainder Area. The proposed area for future widening of East Street from CR 24A south has been conceptually planned and located so as to preserve the existing large canopy trees that currently exist along side the roadway. The transition between the existing right-of-way and planned right-of-way described herein may result in the removal of some trees.

Collector streets within the Plan Area are as follows (all collectors are planned to be or remain two-lane roadways):

- "A" Street -- a hybrid collector/local street from Parkway Drive to Farmers' Central Road. ("A" Street will be a local street south of Parkway Drive).
- Matmor Road -- extension of Matmor Road south to CR 24A.

- CR 101 -- extension of CR 101 south from Gibson Road to CR 25A, including a shifting of the right-of-way between Farmers' Central Road and Parkway Drive to preserve existing trees and a realignment south of Parkway Drive.
- CR 24A -- extension of CR 24A extending east from East Street to Matmor Road
- Farmers' Central Road -- extending from CR 101 east to CR 102
- College Street -- extension of College Street south from CR 24A to the Master Plan boundary
- CR 24C -- a segment of CR 24C extending east from Pioneer to Collector 1
- Collector 1 -- an unnamed north-south collector segment extending south from Farmers' Central Road to CR 25A
- Collector 2 -- an unnamed (primarily) east-west collector segment, between Parkway Drive and Collector 1
- Collector 4 -- an unnamed east-west collector segment extending west from the high school/middle school property line to CR 101
- Collector 5 -- an unnamed north-south collector segment between CR 24A and Parkway Drive

The following circulation requirements will apply to backbone infrastructure streets (arterials and collectors):

- Access onto arterials shall be limited at the discretion of the City. (See SLSP – 4.1.1.)
- The roadway system design shall take into account physical constraints, effects on livability of residential neighborhoods, and the need to incorporate traffic calming measures. (TOC EIR MM 4.6-2c) (See SLSP – 4.2.)
- Necessary improvements to bordering roadways (Gibson Road, CR 102, CR 25A, and Matmor Road) and off-site roadways within MPRA (CR 101 from Parkway Drive to CR 25A, CR 25A from the SLSP boundary to SR 113), or outside of planned growth area entirely, shall be made, as needed based on approved phasing and sequencing. (TOC EIR MM 4.6-2b) (See SLSP – 4.3.)
- Development within the Plan Area shall be assessed its fair share of off-site and on-site roadway improvement costs based on its use of existing and proposed facilities, and consistent with General Plan Policy 3.A.6. Prior to approval of the first tentative map or issuance of a building permit within the boundaries of the Specific Plan, a fee mechanism shall be established which will fund necessary roadway/freeway

improvements. These fees shall subsequently be collected from all development that proceeds in the area. (TOC EIR MM 4.6-8a) (See SLSP – 4.4.)

- Prior to approval of the first tentative map or issuance of a building permit within the boundaries of the Specific Plan, a plan for financing backbone infrastructure shall be established which will identify the means to fully fund all improvements wholly or partially triggered by the Specific Plan. All development that proceeds in the area shall participate on a fair-share basis. (TOC EIR MM 4.6-8c) (See SLSP – 4.5.)
- A capital improvement program (CIP) shall be finalized and shall identify and cost-out all improvements wholly or partially triggered by the Specific Plan. This plan shall provide a schedule for implementation of identified improvements, in coordination with the existing citywide Major Projects Financing Plan and the Specific Plan public facilities financing plan. This CIP shall be updated on a regular basis, based on the results of the monitoring of traffic volumes and based on project-specific traffic impact studies. (TOC EIR MM 4.6-8d) (See SLSP – 4.6.)
- All applicants shall be required to pay appropriate traffic mitigation fees or contractually bind themselves to voluntarily do so, prior to approval of tentative maps, or issuance of building permits, where a map is not required. (TOC EIR MM 4.6-8e) (See SLSP – 4.7.)
- Arterial medians must have a minimum 6-foot pedestrian landing area at intersections. Turn lanes must be 12-feet at intersections. "Outside" landscaping may not decrease at intersections -- additional R/W must be acquired if necessary and may not come out of the outside landscaping. (See SLSP – 4.7.1.)
- The City shall work with the railroad to secure title, easements, or some other mechanism or agreement to preserve the trees adjoining the tracks along East Street in the MPRA. (See SLSP – 4.7.2.)
- Arterials and collectors necessary to serve the fire station site must be completed before the fire station operating threshold is reached. (See SLSP – 4.7.3.)

Local streets will be designed through the subdivision process for individual projects, as approved on a case-by-case basis:

- The pattern of local streets is encouraged to reflect a grid system. A modified grid is acceptable so long as elements of traditional design are retained. The goal is not to exceed 50 percent cul-de-sacs in a subdivision. (See SLSP –4.8.)
- Local streets shall provide reasonably direct routes within the residential areas, to the neighborhood center, to the Spring Lake Center (central commercial and park area), and to connections with arterials and connectors. (See SLSP – 4.9.)

- Private streets may be utilized. Private streets may be narrower than standard City street specifications, so long as safety and access are properly addressed. The standards for private streets will be addressed on a case-by-case basis. (See SLSP – 4.9.1.)
- The local street pattern should eliminate barriers between residential areas and parks, schools, and commercial uses for vehicles, bikes, and pedestrians. It should facilitate access to transit. (See SLSP – 4.9.2.)
- No "intensive" land uses (e.g. park, school, apartment complex) can feed onto a 54-foot wide local street. No more than 200 homes can feed onto a 54-foot local street. Single-feed streets (the first street off a collector) cannot be a 54-foot local street. (See SLSP – 4.9.3.)
- Sidewalks along local streets and cul-de-sacs must meet Americans With Disabilities Act (ADA) requirements including widened turnout areas at specified intervals. (See SLSP – 4.9.4.)
- Local streets necessary to serve the fire station site must be completed before the fire station operating threshold is reached. (See SLSP – 4.9.5.)

2.2.5 Street Cross-Sections

The arterial street cross-sections described below will be implemented in the SLSP (see Figure 2.2, Arterial & Collector Street and Signal Location Layout, Figure 2.3A and 2.3 B, Major Street Cross Sections, and SLSP Table 4.1 - Street Cross-Sections Table). For all new arterials, there will be striped bike lanes, parking will not be allowed on either side of the street, and homes may not front on arterials:

ARTERIAL (TWO-LANE) -- 91-foot R/W/36-foot paved section comprised of two 12-foot travel lanes, one 14-foot median, two 6-foot striped bike lanes (including 2-foot gutter pan), and 20.5-foot landscaped area on each side (including 0.5-foot curb, and two 7-foot landscape strips with 6-foot sidewalk in between).

ARTERIAL (TWO-LANE) WITH OFF-STREET PATHWAY -- 111-foot R/W/36-foot paved section comprised of two 12-foot travel lanes, one 14-foot median, two 6-foot striped bike lanes (including 2-foot gutter pans), and 30.5-foot landscaped area on each side (including 0.5-foot curb, 7-foot landscape strip along the roadway, 10-foot pedestrian/bicycle path, and 13-foot landscape strip on other side of path). The 10-foot pedestrian/bicycle paths may be depressed (typically 12" to 18") relative to the curb in order to provide additional overland drainage conveyance.

ARTERIAL (FOUR-LANE) -- 127-foot R/W/60-foot paved section comprised of four 12-foot travel lanes, one 14-foot median, two 6-foot striped bike lanes (including 2-foot gutter pans),

and 26.5-foot landscaped area on each side (including 0.5-foot curb, 7-foot landscape strip along the roadway, 6-foot sidewalk¹, and 13-foot landscape strip on other side of sidewalk).

ARTERIAL (FOUR LANE) WITH OFF-STREET PATHWAY -- 135-foot R/W/60-foot paved section comprised of four 12-foot travel lanes, one 14-foot median, two 6-foot striped bike lanes (including 2-foot gutter pans), and 30.5-foot landscaped area (including 0.5-foot curb, 7-foot landscape strip along the roadway, 10-foot pedestrian/bicycle path, and 13-foot landscape strip on other side of sidewalk).

GIBSON ROAD (south half) -- 71-foot half-section R/W/30-foot paved section comprised of 6-foot half-median, one 14-foot travel lane, one 16-foot travel lane, and 35-foot landscaped area (including 0.5-foot curb, and 10-foot pedestrian/bicycle path meandering within 24.5-feet of landscaping). The intent of the large landscaped parkway along the south side is to create a "frame" around the Plan Area that will connect with a similar strip along CR 102 and CR 25A. Along Gibson the goal is to continue the existing landscaping established in front of the college, along the southern frontage of Gibson Road, from CR 102 to SR 113.

CR 102 (west half) -- 72-foot half-section R/W/30-foot paved section comprised of 7-foot half-median² two 12-foot travel lanes, 6-foot striped bike lane (including 2-foot gutter pan), and 35-foot landscaped area (including 0.5-foot curb, and 10-foot pedestrian/bicycle path meandering within 24.5-feet of landscaping).

CR 25A -- A 35-foot landscaped parkway planted primarily with drought-tolerant species is required as a part of the right-of-way along the north side of CR 25A.

The paved-section includes two 12-foot travel lanes, two 8-foot emergency/bicycle lanes within which a Class 2 bike lane will be striped adjacent to the edge-of-pavement, 35-feet of landscaping on the north side, and 8-feet on the south side containing an open drainage ditch drought-tolerant landscaping, plus an additional 8 feet containing native tree species. (*TOC EIR MM 4.6-2a*).

The 35-foot landscaping on the north side will be heavily planted with more natural-appearing (as opposed to formal) trees, shrubs, and grasses that reflect the transition from urban to rural. Drought-tolerant species will be used. The pathway will be composed of decomposed granite, asphalt, or concrete. There will be no curb, gutter, or sidewalk on either side. Landscaping within the 8 feet on the south side will also be drought-tolerant species. Total R/W will be 83 feet, with a 40-foot street section.

EAST STREET -- East Street extends through the Master Plan remainder area, from south of the existing mall to the south boundary of the Master Plan. It is broken up into three segments,

¹ Along the east side of Pioneer Avenue from Gibson Road to Farmers' Central Road, the sidewalk along the frontage of the schools will be 8-feet in width, with a 77.5' R/W half-width.

² In the interim until CR 102 is widened to 4-lanes, the area for the half-median will remain paved. Construction of the median is not required until the future widening.

each with a different cross-section. The following cross-sections have been developed for future widening, while preserving existing trees:

- From south of the Mall to CR 24A -- 145-foot R/W with 60.5-foot paved section, comprised of 45-foot median, four 12-foot travel lanes, two 6-foot striped bike lanes (including 2-foot gutter pan), and 39.5-foot landscaped area on the east side only (including 0.5-foot curb, 10-foot landscape strip along the roadway, 10-foot pedestrian/bicycle path, and 19-foot landscaping strip on other side of path).
- From CR 24A to Parkway Drive -- 105-foot R/W with 40.5-foot paved section, comprised of 30-foot median, two 12-foot travel lanes, two 8-foot striped bike lanes (including 2-foot gutter pan), and 34.5-foot landscaped area on the east side only (including 0.5-foot curb, 10-foot landscape strip along the roadway, 10-foot pedestrian/bicycle path, and 14-foot landscaping strip on other side of path).
- From Parkway Drive to south boundary of Master Plan Area -- shown as a 68-foot R/W on the Land Use Map (Figure 1.1) as a placeholder. This segment may require additional design modification to ensure that trees are preserved with future widening, and to extend the pedestrian/bicycle pathway south to CR 25A in the future.

The following Collector Street cross-sections will be implemented in the Specific Plan Area (see Figures 2.2, 2.3A, and 2.3 B):

COLLECTOR -- 68-foot R/W/40-foot paved section comprised of two 12-foot travel lanes, two 8-foot parking lanes (including 2-foot gutter pans), 8.5-foot street-side planter strips (including 0.5-foot curb), and 5.5-foot sidewalks (behind planters). Parking will be allowed on both sides of the street. There will be no striped bike lanes. It should be noted that in order to preserve existing trees along primarily the east side of CR 101, the R/W is shown approximately 10 feet off centerline to the west.

COLLECTOR WITH GREENBELT -- This cross-section applies to most of Collector 2³ from Collector 1 to SR 113, and the segment of Farmers' Central from CR 101 to Pioneer Avenue. It integrates the planned greenbelts into the standard collector cross-section. These roadways will have a 94-foot R/W with a 40-foot cross-section (see Figure 2.3, Major Street Cross-Sections) comprised of two 12-foot travel lanes, two 8-foot parking lanes (including 2-foot gutter pans), 8.5-foot minimum street-side planter strips (including 0.5-foot curb), 5.5-foot sidewalk (behind planters) on the non-greenbelt side of the street, and a 40-foot greenbelt (including 0.5-foot curb, 8-foot minimum landscape strip along the roadway, 10-foot pedestrian/bicycle path, and 21.5-foot landscape strip on other side of path). Parking will be allowed on both sides of the street. There will be no striped bike lanes. Homes may not front on the greenbelt side of the street.

COLLECTOR WITH CHANNEL -- This cross-section applies to Farmers' Central Road from Pioneer to CR 102. It recognizes and integrates the Farmers' Central channel, which adjoins the

³ Where Collector 2 splits off from the greenbelt as the greenbelt goes under the Parkway Drive overpass, the Collector 2 R/W would return to the standard collector R/W of 68 feet.

north side of this roadway. The channel will be a multi-use facility sized to meet drainage needs.

The entire facility along this segment will have a R/W of at least 160.5 feet. Greater R/W widths may be required if deemed hydraulically necessary to accommodate the proposed drainage channel. A 10-foot pedestrian/bicycle Class 1 pathway will be located near the top of the south bank, with trees and other landscaping. The banks are planned to be sloped, with naturalistic landscaping. The goal of the landscaping is to create an amenity. The roadway portion will have a 42-foot paved section, comprising (from north to south) a 5-foot bike lane (including 2-foot gutter pans) with no parking on the north side, two 12-foot travel lanes, 5-foot bike lane, 8-foot parking lane (including 2-foot gutter), and 7-foot landscape strip (including 0.5-foot curb), and 4.5-foot sidewalk.

In addition to arterials and collectors, the following street types will be implemented in the Specific Plan Area:

HYBRID COLLECTOR/LOCAL ("A" STREET, NORTH OF PARKWAY DRIVE) -- Section without median: 62-foot R/W, 40-foot paved section with two 12-foot travel lanes, two 8-foot parking lanes (including 2-foot gutter pans), 6.5-foot street-side landscape strips (including 0.5-foot curb), and 4.5-foot sidewalks (behind the landscape strip). Section with median: As above, but with an additional 14 feet of R/W for a 14-foot curbed median, for a total R/W width of 76-feet. Homes may front on the street.

LOCAL -- 54-foot R/W/34-foot paved section with two 10-foot travel lanes, two 7-foot parking lanes (including 2-foot gutter pans), 6-foot street-side landscape strips (including 0.5-foot curb), and 4.0 sidewalks (behind the landscape strip). Parking will be allowed on both sides of the street. There will be no striped bike lanes. Homes must front on these roads. No "intensive" land uses (e.g. park, school, apartment complex) can feed onto a 54-foot local street. No more than 200 homes can feed onto a 54-foot local street. Single-feed streets (the first street off a collector) cannot be a 54-foot local street.

LOCAL -- 57-foot R/W/35-foot paved section per City standard comprised of two 10-foot travel lanes, two 7.5-foot parking lanes (including 2-foot gutter pans), and 6.5-foot street-side landscape strips (including 0.5-foot curb), 4.5-foot sidewalks (behind the landscape strip). Parking will be allowed on both sides of street. There will be no striped bike lanes. Homes will front on these roads. "Intensive" land uses (e.g. park, school, apartment complex) must feed onto a 57-foot local street. If more than 200 homes are feeding onto a local street it must have a 57-foot cross-section. Single-feed streets (the first street off a collector) must have a 57-foot cross-section.

CUL-DE-SAC -- 54-foot R/W/34-foot paved section (same as local above). Parking will be allowed on both sides of the street. There will be no striped bike lanes. Homes must front on these roads. No "intensive" land uses (e.g. park, school, apartment complex) can feed onto a cul-de-sac. The maximum length for a cul-de-sac within R-3, R-4, and R-5 projects is 650 feet. The maximum length for a cul-de-sac within R-8 and greater densities is 500 feet. Within a subdivision, no more than 50 percent of the local roads can be cul-de-sac roads, the other 50

percent or more shall be through streets. Bulb shape may be hammerhead, with 90-foot depth dimension.

ALLEYS -- Alleys are encouraged. Standards will be developed at the subdivision level as a part of subdivision design, and are also addressed in the Specific Plan Design Standards. Separate funding mechanisms, supported by the users, may be required to provide operations and maintenance. These funding mechanisms shall be identified with the subdivision map application.

PRIVATE STREET OR COURT -- Private streets and courts are allowed. Standards will be developed at the subdivision level as a part of subdivision design.

GREENBELT -- Greenbelt design is addressed in the Specific Plan Design Standards.

SUBDIVISION TRAILS -- Design for connecting trails in subdivisions will be reviewed on a project basis as a part of subdivision and/or design review and are addressed in the Design Standards.

2.2.6 Level of Service

The City's standard for traffic flow/congestion of Level of Service (LOS) C (LOS D within one half mile of freeways and the downtown core) is applicable within the Specific Plan Area. The following regulation applies to ensure this:

SLSP Regulation 4.10: Every subdivision within the Plan Area shall be required to submit an acceptable Traffic Impact Study to confirm existing conditions and identify roadway and intersection improvements required to maintain the City's LOS thresholds identified in General Plan Policy 3.A.2. These project-level traffic studies will determine the timing of local improvements (such as traffic signals) to be implemented with each development. The analysis shall take into account proposed lotting, site design, local street pattern, access, traffic calming, and other pertinent factors including consistency with General Plan Policies 3.B.1, 3.B.5, and 3.B.6.

If a project-level study identifies a needed improvement prior to the collection of sufficient fees to fund the improvement, the developer shall install the improvement prior to occupancy and receive credit against future fees or be reimbursed. *(TOC EIR MM 4.6-8b)*

SLSP Regulation 4.10.1: Using information from required subdivision traffic impact studies or via other means if necessary, the City will monitor the level of service on Gibson Road and CR 102 on an annual basis.

2.2.7 Intersection Improvements

The following SLSP Regulation will apply:

SLSP Regulation 4.11: As each tentative map moves forward, project-specific traffic assessments will confirm signal locations and timing, based on subdivision lotting and other

relevant characteristics (see discussion of level of service above). As development occurs within the Plan Area, these signals and any others identified will be required to be installed. Appropriate traffic calming measures will also be required.

The following intersections have been identified as requiring a signal (or other improvements as noted) under "near-term" conditions (*TOC EIR MM 4.6-1*):

- East Gum Avenue/Matmor Road (signal and approach widening)
- Pioneer Avenue/East Gum Avenue (signal and approach widening)
- Gibson Road/CR 101. (A median has already constructed to prohibit left turn movements).
- Gibson Road/Ogden Street (signal and approach widening)

The following intersections have been identified as requiring a signal (or other improvement as noted) under "cumulative" conditions (*TOC EIR MM 4.6-6*):

- East Street/East Main Street (signal and approach widening)
- Gibson Road/East Street (signal and approach widening)
- Gibson Road/Matmor Road (signal and approach widening)
- CR 25A/East Street (signal and approach widening)
- CR 25A/SR 113 (signal at southbound and northbound ramps)
- Pioneer Avenue/High School entrance (signal and approach widening)
- Parkway Drive/CR 101 (signal and approach widening)
- Parkway Drive/CR 102 (signal and approach widening)
- Farmers' Central Road/CR 102 (signal and approach widening)
- Parkway Drive/Pioneer Avenue (see separate discussion below)
- Gibson Road/Pioneer Avenue (signal and approach widening)
- Parkway Drive/Collector 2 (signal and approach widening)
- CR 25A/CR 101 (signal and approach widening at north approach)

Additional signals that may be needed include:

- Farmers' Central Road/Collector 1
- Farmers' Central Road/Pioneer Avenue
- Parkway Drive/Collector 1
- CR 102/CR 25A
- Pioneer Avenue/Collector 2
- Pioneer Avenue/CR 25A
- Pioneer Avenue/CR 24C
- East Street/CR 24A
- East Street/Parkway Drive
- Parkway Drive/Collector 5

With the exception of signals needed for greenbelt operation/safety (e.g. Parkway Drive and Collector 1) and/or for pedestrian circulation (e.g. Farmers' Central Road and Pioneer Drive),

the decision regarding the need for a signal at any location will be based on the results of the required project-specific traffic studies.

Figure 2.2, Arterial and Collector Street and Signal Location Layout, identifies signals required on arterials and collectors within the Plan Area. At the discretion of the City, roundabouts may be substituted for signals at some locations in the Plan Area.

2.2.8 Parkway Drive/Pioneer Avenue Intersection

The following SLSP Regulation will apply:

SLSP Regulation 4.12: As part of this plan, the main intersection of Pioneer Avenue and Parkway Drive will have a special intersection feature in conjunction with the traffic signal, such as a statue, fountain, public art sculpture, or four-corner iron archway to reinforce it as a central point in the circulation network and to draw attention to the Spring Lake Center at that location.

2.2.9 Traffic Calming

The following SLSP Regulations apply:

- New development offers the opportunity to master plan traffic calming features to create livable neighborhoods and enhance alternative modes of transportation. As part of the implementation of the SLSP, the City shall require each new subdivision to have a traffic calming plan and implement all appropriate measures. (See SLSP – 4.13.)
- Calming measures shall be used where appropriate on local streets to soften the impact of motor vehicles on neighborhoods. Consideration should be given to pavement texturing and enhanced landscaping upon entering the local roadway network. Other methods should also be liberally used including, but not limited to, traffic circles, bulb outs, and raised intersections. (See SLSP – 4.14.)
- On collector streets, traffic calming measures may be used so long as mobility is not impeded. At heavier volume intersections, roundabouts may be used. Care should be taken at intersections with roundabouts to reserve additional right-of-way for sidewalk adjustments and maintenance of minimum diameters. (See SLSP – 4.15.)
- The intersection of Collector 1 and CR 24C and the intersection of Collector 1 and Collector 2 will have landscaped special traffic features, which may be roundabouts, traffic circles, or some other design. Additional right-of-way may be needed to accommodate these features. Roundabouts and/or traffic circles may be used at other locations. (See SLSP – 4.15.1.)

2.2.10 Community Gateways

Three intersections in the SLSP have been identified as community "gateways" for the City:

- Gibson Road/Pioneer Avenue
- CR 25A/SR 113
- CR 25A/CR 102

Design for these intersections shall be consistent with the concepts and standards provided in the Specific Plan Design Standards. Sufficient R/W shall be provided for landscaping and monument features.

2.2.11 Street Landscaping

The following SLSP Regulations will apply:

- Tree Canopy -- Majestic street tree species, as identified in the Design Standards, that create large canopies at maturity will be required in all medians and street side landscape strips. The goal is to create a maximum shade canopy. (See SLSP – 4.16.)
- Timing of Landscape -- Street landscaping shall be installed at the time of street construction. If a partial street section is built, the landscaping associated with that partial section shall be installed. (See SLSP – 4.17.)
- Landscaping at Intersections -- Landscaping along streets shall be continued all the way to/through intersections. Where additional area is needed for turn lanes, it shall be gained via increased R/W, and shall not be taken out of landscaping. (See SLSP – 4.17.1.)

2.2.12 Street Lighting

Typical street lighting types and spacing are indicated in Appendix B.

2.3 Proposed Pathway Improvements

2.3.1 Streets and Greenbelts

This Plan requires a number of features, listed below, to ensure good bicycle access and a convenient bicycle and pedestrian pathway system (*TOC EIR MM 4.6-5*). The bicycle circulation system, including both on-street and off-street facilities, is shown in Figure 2.4, Bicycle Circulation Layout. The following SLSP Regulations will apply:

- An on-street bicycle system shall be developed that connects all parks and schools in the Plan Area and future Master Plan remainder area, and provides links to downtown. Tree canopy plantings will be required for shade. (See SLSP – 4.18.)

- The off-street pedestrian/bicycle loop pathway system is depicted on the Figure 1.1, Land Use Map and on Figure 2.4, Bicycle Circulation Layout. Tree canopy plantings will be required for shade. (See SLSP – 4.19.)
- The minimum paved section for any combined pedestrian/bicycle (multi-use) pathway will be 10 feet, plus a 2-foot clear area on either side, for a total of 14 feet. (See SLSP – 4.19.1)

SLSP 4.20: Residential subdivisions must include trail connections to other subdivisions, and to adjacent existing or planned greenbelts or bicycle pathways.

- Pathways will be designed to accommodate emergency vehicle and maintenance vehicle access, when no other reasonable access is available for purposes of patrol, rescue, fire suppression, and maintenance (e.g. the pathway along the north side of the Farmers’ Central channel). Appropriate security features shall be provided on all pathways including low-wattage lighting, call boxes where appropriate, directional signage, and signage indicating location. (See SLSP – 4.21.)
- A 35-foot landscaped parkway is required along the south side of Gibson Road, the west side of CR 102, and the north side of CR 25A. A 10-foot pedestrian/bicycle pathway shall be constructed within this area, which will connect to other planned bicycle facilities ultimately creating a comprehensive, interconnected loop system throughout the entire Master Plan Area. (See SLSP – 4.22.)
- A planned grade-separated pedestrian/bicycle crossing across Gibson Road at the high school site shall be installed (by the City) pursuant to timing in the Major Projects Financing Plan. (See SLSP – 4.25.)
- Greenbelt and Bicycle Pathway Timing – Greenbelts and bicycle pathways shall be completed in conjunction with adjoining development and/or street improvements. CR 101 shall serve as an interim greenbelt/bicycle pathway connection until greenbelt/bicycle pathway segments that fall outside of the Specific Plan Area, but within the Master Plan remainder area, can be completed. (See SLSP – 4.26.)
- There shall be at least one footpath over the Farmers’ Central Channel and into the college property at the northerly terminus of the north/south greenbelt between Collector 1 and CR 102. (See SLSP – 4.27.)

2.3.2 Pedestrian/Bicycle Overcrossings

Grade-separated pedestrian/bicycle (non-vehicular) overcrossings will be provided at the following locations:

- Gibson Road at the High School/College property line – This overpass is also a planned and funded component of the Southeast Specific Plan (Sycamore Ranch), north of Gibson Road and is currently being designed.

- CR 102 at Parkway Drive – R/W for an overpass on the south side of Parkway Drive, over CR 102 to connect the Plan Area to the Regional Park site, shall be preserved. The estimated R/W needed for this improvement is an additional quarter-acre or 10,890 square feet adjoining the Parkway Drive R/W at the southwest corner of the intersection.
- Parkway Drive west of Collector 2 – The planned greenbelt will split off from the Collector 2 R/W and go under Parkway Drive where the arterial goes over SR 113.
- Farmers’ Central Road – Bridge over Farmers’ Central channel at the northern terminus of the greenbelt through the TOC, LLC property. The College may construct a future vehicle bridge over the Farmers’ Central channel at the intersection of Farmers’ Central Road and Collector 1.

2.4 State Route 113 Vehicle Overcrossing

The planned vehicular and pedestrian/bicycle overcrossing of SR 113 on Parkway Drive is necessary for effective functioning of the area roadway system. The overcrossing is required to be in place at build-out of the entire Master Plan Area. The City will continue to monitor level of service (particularly at the interchanges of Gibson Road/SR 113 and CR 25A/SR 113) using subdivision-level traffic analyses required of each development to assess project-specific traffic impact. Should LOS approach unacceptable levels; the City will require operational changes (e.g. signal timing) and roadway improvements (e.g. striping, widening, etc.) at the relevant location.

2.5 Public Transportation

It is the intent of the Specific Plan to promote good bus service. The proposed Bus Routes and Stops are indicated on Figure 2.5, Bus Routes/Stops. The following SLSP Regulations shall apply:

- Roadways within the Plan Area will be designed to accommodate bus service. (See SLSP – 4.29.)
- Turnouts and shelters/stops will be sited on all arterials and collectors with input from Yolobus. These must be completed prior to subdivision or development within the Specific Plan Area. (See SLSP – 4.30.)
- To the greatest feasible extent, transit routes and/or stops will be no more than one-half mile apart. (See SLSP – 4.31.)
- The location of transit stops will be coordinated with the location of bicycle and pedestrian pathway connections to facilitate the use of public transportation. (See SLSP – 4.32.)
- To the greatest feasible extent, transit stops are to be located within one-quarter mile of multi-family attached development projects. (See SLSP – 4.33.)

- Streets adjacent to the Spring Lake Center will have transit stop facilities. (See SLSP – 4.34.)
- Prior to approval of the first final map or other development, the project must determine and fund a fair share of the capital and operating costs associated with providing public transit service to the Plan Area. It is anticipated that new transit vehicles would be required to provide the additional service within the project site. (TOC EIR MM 4.6-3) (See SLSP – 4.35).
- A plan for the location, design, and construction timing of sheltered bus stops and bus turnouts shall be developed, and approved by the City and Yolobus prior to approval of the first final map or other development in the Plan Area. (TOC EIR MM 4.6-4) (See SLSP – 4.36.)

Turnouts may also be required depending on traffic volumes at the stop location. Where turnouts are required, the additional pavement may not reduce the width of the adjacent landscaping. Two-lane arterials and collectors will have turnouts; four-lane arterials and collectors will not.

2.6 Offsite EIR Mitigation

2.6.1 Traffic Generation

Traffic studies performed in support of the SLSP Environmental Impact Report (EIR) estimate that development of the Specific Plan would generate 52,200 daily vehicle trips, and full buildout of the Specific Plan plus MPRA would generate 115,330 daily vehicle trips.

The addition of Specific Plan traffic without mitigation would adversely effect existing and cumulative peak hour traffic operations. Under Cumulative plus Specific Plan conditions, the EIR states that up to seven study intersections located offsite or on the perimeter of the Specific Plan Area would operate worse than the City's minimum acceptable LOS. Additional intersections and roadways could be adversely affected by the proposed project depending on the phasing and implementation of development and new roadway construction.

The mitigation measures listed below are recommended by the EIR:

- (a) Development within the Specific Plan shall be assessed its fair share of offsite and onsite roadway improvement costs based on its use of existing and proposed facilities and consistent with General Plan Policy 3.A.6. A fee mechanism shall be established to fund necessary roadway/freeway improvements prior to approval of any tentative map or issuance of a building permit within the boundaries of the Specific Plan. These fees shall subsequently be charged for all development that proceeds in the area.
- (b) Every development within the new growth area shall be required to submit an acceptable traffic impact study to confirm existing conditions and identify roadway and

intersection improvements required to maintain the City's LOS thresholds identified in General Plan Policy 3.A.2. These project-level traffic studies will determine the timing of local improvements (such as traffic signals) to be implemented with each development. The analysis shall take into account proposed lotting, site design, local street pattern, access, traffic calming, and other pertinent factors including consistency with General Plan Policies 3.B.1, 3.B.5, and 3.B.6. If a project-level study identifies a needed improvement prior to the collection of sufficient fees to fund the improvement, the developer shall install the improvement prior to occupancy and receive credit against future fees or be reimbursed.

- (c) A plan for financing public facilities shall be finalized and shall identify the means to fully fund all improvement wholly or partially triggered by the Spring Lake Specific Plan. These mechanisms shall be put into place and the collection of fees shall commence prior to the approval of the first Final map within the Plan Area.
- (d) A Capital Improvement Program (CIP) shall be finalized and shall identify and cost-out all improvements wholly or partially triggered by the Specific Plan. This Plan shall provide a schedule of implementation of identified improvements in coordination with the existing citywide Major Projects Financing Plan and the Specific Plan Public Facilities Financing Plan. This CIP shall be updated on a regular basis, based on the results of the monitoring volumes and based on project-specific traffic impact studies.
- (e) All subdivision map applicants for shall be required to pay appropriate traffic mitigation fees or contractually bind themselves to voluntarily do so, prior to approval of tentative maps (or prior to issuance of building permits where a map is not required).

2.6.2 Project-Specific Impacts and Mitigation Measures

Traffic studies for the SLSP EIR indicate that development of SLSP would cause an increase in a.m. and p.m. peak hour traffic volumes at certain study intersections, resulting in unacceptable LOS and warranting the installation of traffic signals. The studies conclude that four study intersections would operate at worse than the City's minimum acceptable LOS under Existing plus Specific Plan conditions. These intersections and their associated peak hour LOS under Existing plus Specific Plan conditions are listed below:

- (a) E. Gum Avenue/Matmor Road (LOS E – p.m. peak hour)
- (b) Pioneer Avenue/E. Gum Avenue (LOS D – p.m. peak hour)
- (c) Gibson Road/Road 101 (LOS F – p.m. peak hour)
- (d) Gibson Road/Ogden Street (LOS D – p.m. peak hour)

The following mitigation measures are proposed by the EIR:

- (a) Install traffic signal at the E. Gum Avenue/Matmor Road intersection and widen each approach to include one exclusive left-turn lane, one through lane, and one right-turn lane.

The above improvements were warranted by previously approved development and are included in the City of Woodland Major Projects Financing Plan (MPFP) as being funded by an assessment district. However, SLSP could require implementation of the improvements prior to their programmed installation in the MPFP. A traffic impact study for each tentative map will be required to confirm existing conditions and to determine the specific mitigation timing that is required to maintain the City's LOS thresholds. If this intersection requires signalization and widening prior to the programmed installation of these improvements in the MPFP, then SLSP will be required to install the improvements and shall be reimbursed by the assessment district.

- (b) Install geometric design features to prohibit left-turn movements at the Gibson Road/Road 101 intersection, prior to the issuance of building permits.
- (c) Improve offsite roadways needed to serve SLSP (e.g., Road 101, Road 25A, and E Street) to City design standards.

2.6.3 Cumulative Impacts and Mitigation Measures

The SLSP, in conjunction with cumulative citywide development, would increase cumulative a.m. and p.m. peak hour traffic volumes at certain study intersections, causing unacceptable LOS and warranting the installation of traffic signals. A number of intersections are identified in the SLSP EIR as operating at worse than the City's minimum acceptable LOS under Cumulative plus Specific Plan conditions. These intersections and their associated peak hour LOS under Cumulative plus Specific Plan conditions are listed below.

- (a) East Street/E Main Street (LOS E – pm. peak hour)
- (b) Gibson Road/East Street (LOS D – a.m. peak hour and LOS E – p.m. peak hour)
- (c) Gibson Road/Matmor Road (LOS F – p.m. peak hour)
- (d) Gibson Road/Road 101 (LOS E – p.m. peak hour)
- (e) Road 25A/East Street (LOS F – p.m. peak hour)
- (f) Road 25A/SR 113 Southbound Ramps (LOS F – p.m. peak hour)
- (g) Road 25A/SR 113 Northbound Ramps (LOS F - peak hour)

Each of these intersections also would have peak hour traffic volumes that would be high enough to meet the peak hour warrant for installation of a traffic signal, with the exception of the Gibson Road/Road 101 intersection.

In order to reduce impacts to a less-than-significant level, the EIR recommends that SLSP implement mitigation measures (a) through (g) listed below. Where appropriate, the City shall determine the method and timing of contributions for mitigation measures. To assist the City in its determinations, SLSP shall prepare a traffic impact study for each tentative map to confirm existing conditions and to determine the specific mitigation timing that is required to maintain the City's LOS thresholds.

- (a) Contribute a fair-share cost to modify the traffic signal at the East Street/E. Main Street intersection and widen the eastbound approach to include an exclusive left-turn lane,

two exclusive through lanes, and one exclusive right-turn lane. This improvement was previously identified in the East Street Corridor Specific Plan, City of Woodland, May 19, 1998.

Implementation of this mitigation measure would provide LOS E operations during the p.m. peak hour under Cumulative plus Specific Plan conditions. Although the LOS would not improve to the City's minimum LOS D threshold for this location, the proposed improvement would mitigate the Specific Plan's incremental impact by decreasing intersection delay to 46.9 seconds per vehicle, which is less than the 2020 no-project intersection delay of 47.7 seconds per vehicle.

Improving the intersection p.m. peak hour operation to LOS D or better would require additional widening, such as providing an exclusive westbound right-turn lane. As part of the East Street Corridor Specific Plan, City staff determined that widening the westbound, northbound, or southbound approaches of this intersection would not be feasible.

- (b) Contribute a fair share cost to modify the traffic signal at the Gibson Road/East Street intersection and widen the northbound and southbound approaches to include two exclusive left-turn lanes, one exclusive through lane, and one shared through/right-turn lane. These improvements were previously identified in the East Street Corridor Specific Plan, City of Woodland, May 19 1998.

Implementation of this mitigation measure would provide LOS C operations during the a.m. peak hour under Cumulative plus Specific Plan conditions. Implementation of this mitigation measure would provide LOS D operations during the p.m. peak hour under Cumulative plus Specific Plan conditions.

Although the p.m. peak hour LOS would not improve to the City's minimum LOS C threshold for this location, the proposed improvements would mitigate the incremental impact of the Specific Plan. Under Cumulative 2020 no-project conditions, the p.m. peak hour intersection delay would be 36.2 seconds. With mitigation, the Cumulative plus Specific Plan an intersection delay during the p.m. peak hour would be 34.7 seconds.

- (c) Contribute a fair share cost to modify the traffic signal at the Gibson Road/Matmor Road intersection and widen the northbound and southbound approaches to include one exclusive left-turn lane, one through lane, and one right-turn lane.

Implementation of this mitigation measure would provide LOS D operations during the p.m. peak hour under Cumulative plus Specific Plan conditions.

- (d) Install geometric design features to prohibit left-turn movements at the Gibson Road/Road 101 intersection prior to the issuance of building permits.

Implementation of this mitigation measure would improve the p.m. peak hour intersection operations to LOS A under Cumulative plus Specific Plan conditions.

- (e) Contribute a fair share cost to install a traffic signal at the Road 25A/East Street intersection and widen the northbound, southbound, and eastbound approaches to include an exclusive left-turn lane and a shared through/right-turn lane. The westbound approach shall be widened to include one exclusive left-turn lane, one through lane, and one right-turn lane.
- (f) Install a traffic signal at the Road 25A/SR 113 Southbound Ramps intersection.

Implementation of this mitigation measure would improve the p.m. peak hour intersection operations to LOS D under Cumulative plus Specific Plan conditions.

- (g) Install a traffic signal at the Road 25A/SR 113 Northbound Ramps intersection.

3.0 WATER SUPPLY AND DISTRIBUTION INFRASTRUCTURE PLAN

This section describes the proposed water infrastructure plan for the Specific Plan Area, in conformance with the intent of following regulations:

Specific Plan Regulation 6.1: Prior to approval of the first tentative map or other development in the Specific Plan Area, the final water infrastructure plan for the Specific Plan Area shall be completed identifying an acceptable water supply, treatment, and delivery system, and addressing well locations, phasing, and financing of water infrastructure. (TOC EIR MM 4.13-13)

Specific Plan Regulation 6.2: The water infrastructure plan shall be consistent with the City's Water Master Plan, shall meet the City's standard specifications or an acceptable alternative, and the requirements of the Mitigation Monitoring Plan. (TOC EIR MM 4.4-5) Any approved alternative not consistent with the City's Water Master Plan shall be incorporated into the Water Master Plan as an amendment. Should there be differences between the Specific Plan and planned infrastructure, and the infrastructure systems described in the City's infrastructure master plans, the City may take action to adopt the Specific Plan with language that amends the infrastructure master plans to be consistent. If this approach is taken, Specific Plan development will be responsible for the cost of subsequent revision or amendment of the infrastructure master plans to incorporate the approved Specific Plan infrastructure systems.

Specific Plan Regulation 6.3: The design shall seek to minimize operational complexities and maintenance requirements of the system.

Specific Plan Regulation 6.3.1: In order to ensure adequate fire flow to service the area, the water distribution system installed throughout the Plan Area shall meet the requirements of the City. Fire hydrants and mains shall be installed to meet applicable fire protection standards and City design standards. (TOC EIR MM 4.13-3)

3.1 Existing Water Supply and Distribution Facilities

Existing rural residences in the Specific Plan Area are currently served by private domestic wells. Irrigation supply for agricultural areas is provided from private wells and from surface supplies from the Farmers' Central Ditch operated by Yolo County Flood Control and Water Conservation District (YCFCWCD). However, the Specific Plan Area lies within the water service area of the City. As development proceeds, private systems will be replaced by an expansion of the City's supply and distribution system. The existing agricultural wells will be abandoned in accordance with State and County Health Standards. Final design of the new water system for the Specific Plan Area must maintain compatibility with the City's existing system to ensure that water facilities are developed in a logical manner.

The existing City water supply facilities in and adjacent to the Specific Plan Area are shown on Figure 3.1, Water Layout.

The City relies entirely on groundwater resources for its urban water supply. Wells and treatment (chlorine disinfection) facilities are distributed throughout the City at appropriate locations to meet the water demand of residents. The aquifer is recharged primarily from precipitation and irrigation water applied to agricultural lands in the region. Groundwater levels fluctuate seasonally and reflect City and agricultural pumping patterns. Groundwater pumping for agricultural uses in the unincorporated area has been shown to influence water levels under the City on a short-term basis, with relatively rapid recovery. The City has determined the groundwater supply is adequate to serve development anticipated under the General Plan, including the Specific Plan.

Groundwater quality is generally good, although some wells require disinfection treatment for non-fecal coli form bacteria. The water is characterized as "very hard" and has relatively high concentrations of dissolved solids and elevated nitrate levels. With the current chlorine treatment program, the City's water meets all applicable potable water standards.

3.1.1 Yolo County Water Well

The Yolo County property on Gibson Road has an existing independent domestic well and pumping system. The well was constructed in 1988. The well is believed to be constructed in accordance with American Water Works Association (AWWA) specifications, and is thought to conform to State of California Drinking Water standards. The City and the County have discussed a proposal to incorporate this well into the City system, upgrade it, and maintain it as a City well. A final decision has not yet been reached on the City's possible acquisition of this well. If acquired, the well would be connected to the existing 12" water line in Gibson Road, and brought on-line to serve the Sycamore Ranch Communities Facilities District (CFD) on the north side of Gibson Road. Funding to acquire and upgrade this well is already included in the Sycamore Ranch CFD.

3.1.2 Woodland Community College Water Well

The Woodland Community College has an existing independent domestic well system currently serving its own needs. The well was constructed in 1988. The College has approached the City regarding an acquisition of the well in connection to the municipal system.

In the event this well is acquired by the City it could be used in place of, or in conjunction with, the Yolo County well as one of the first wells serving the Plan Area.

3.1.3 Regional Park Well

A domestic well owned by the City is situated within the northern portion of the Regional Park site. It is used to provide potable water to the aero modelers' facilities. It is not currently connected to the City's municipal system. The City had previously expressed concern about permanently connecting it to the municipal system due to potential future water quality issues associated with the former landfill, and long-range plans to irrigate the park using reclaimed water. However, recent testing suggests that the well may be suitable as an interim connection to the municipal system.

3.1.4 Existing Water Pipelines

A 10” ductile iron pipe is located in Gibson Road from Pioneer Avenue to CR 101. The 12” line continues west under to Highway 113 to Matmor Road. As part of Phase 2 of the Sycamore Ranch development, a 12” pipe was installed in Gibson Road from Pioneer Avenue to CR 102. It is anticipated that the proposed Specific Plan Area Water System will connect to these pipes at CR 101, at Pioneer Avenue, at CR 102, and at Matmor Road. Two additional connections for the western portion of the Master Plan Area are proposed for East Street and for College Street, and possibly one at Sixth Street.

3.2 Proposed Water Wells

General locations for up to three new well sites plus a stand-by well site have been generally identified to serve the Specific Plan Area. Wells at these sites would be constructed to depths of approximately 600 feet, following construction of a test well and determination of safe yield. The precise locations for these wells have not yet been identified and therefore are not shown on the Land Use Map (Figure 1.1). However, conceptual locations for wells are shown on Figure 3.1. The general locations of these well sites are intended to be within the planned Neighborhood Commercial areas as follows:

1. East of Collector 1, just north of Road 24C.
2. East of Collector 1, just north of Collector 2.
3. South of Parkway Drive, just west of Central Park.
4. West of Road 101, near the intersection with Collector 4.

Well sites will not be placed on land designated for parks, landscape parkways, or greenbelts without first obtaining approval from the City and acquiring additional land for that specific purpose. There will be no net loss in parkland. Well development must include appropriate screening, landscaping, access roads, and separation from proposed homes (for noise control).

The City has, until recently, been studying the possibility of a well field (located outside the Specific Plan Area) to serve the Specific Plan Area. However, at this time, the City is not actively pursuing the well-field option. If the well-field option were to be reintroduced, then the number of new wells in the Specific Plan Area could be reduced.

As build-out of the Specific Plan Area progresses, the City will periodically update demand projections. The final number of new wells at full build-out of the Plan Area will be adjusted per these water demand projections. The timing and location of new well construction will depend on the rate at which demand grows, and on the location of new demands as the project is built out. For the purposes of this report, the Staging Plan presented in Figure 1.2 serves as a current guide to the rate and location of build-out.

The water well requirements for the Specific Plan will be evaluated in the context of the Citywide Water Master Plan. In late 2002, the City retained Geo-Trans to assist with its water master planning efforts. Cunningham Engineering (CEC) furnished the City with Specific Plan land-use acreages, population estimates, the current Development Staging Plan, the preliminary Backbone Water Layout (Figure 3.1), and a Water Demand Estimate (included herein). CEC requested that the City transmit this information to Geo-Trans, for use in evaluating the number

of wells required to serve each of the proposed development stages as demand is increased cumulatively. GeoTrans' preliminary analysis is summarized in the *Technical Memorandum – Hydraulic Modeling for the Spring Lake Development, City of Woodland*, by GeoTrans, Inc., July 18, 2003. It includes evaluation of connecting any or all of the wells described in Section 3.1 and new wells within the Plan Area. Geo-Trans also evaluated backbone water infrastructure pipeline sizing and staging to evaluate residual fire flow pressures at selected node locations.

Geo-Trans' work suggests that the Specific Plan Area could be served by the three existing wells in the area (the County Well, the College Well, and the Regional Park Well), or by two existing wells plus one new well onsite. It is expected that the location of the onsite well will either be east of Collector 1, just north of Road 24C, or near the proposed Central Park. Negotiations between the City and County and between the City and College are ongoing regarding possible well acquisition.

Two wells will be required to serve Stage 1 of development. This may consist of one of the existing wells shown in Figure 3.1, Water Layout, plus one new well. These two wells will also be sufficient to serve Stages 2 and 3. Depending on looping within the system, it may be possible to postpone the third well installation until Stage 5. Three total wells are sufficient for Stages 5 through 8 if one of the wells is constructed near the Central Park location.

3.3 Proposed Onsite Distribution System

New water distribution pipelines will be required in the Specific Plan Area to serve new growth. Facilities will be sized to provide delivery capacity to meet water demands during peak conditions and at the same time meet fire protection needs. Peaking factors, fire flow requirements, and a system pressure range, which must be utilized in designing the distribution pipe network, are set out in the City's Standard Specifications.

The proposed City water distribution piping in the Specific Plan Area is shown on Figure 3.1.

New "backbone" water lines in the Specific Plan Area will connect to existing and proposed water mains in Gibson Road, and will form the basis of a grid extending through the Plan Area as arterial and collector roads are built. It is anticipated that main backbone lines in arterial and collector streets will typically be 12-inch diameter, reducing to 10-inch and 8-inch lines within neighborhoods. At the time of writing, final sizes and basic configuration of the backbone water line system are in the process of being confirmed by the City, using its existing computer model of the City water distribution system. This effort may result in some modifications to the pipe arrangements and sizes indicated in Figure 3.1. As noted in Section 3.2 above, CEC has furnished the City with Specific Plan land-use acreages, population estimates, the current Development Staging Plan and the preliminary backbone Water Layout. Using the demand estimates generated from this data in combination with City fire flow and pressure requirements, the City will confirm the preliminary sizing of the backbone distribution pipes.

Looping of water mains will be required as individual subdivisions and neighborhoods are built out. Based on the Staging Plan (Figure 1.2), it is anticipated that the initial primary loop will consist of water lines in CR 102, in Pioneer Avenue, in Parkway Drive and in Farmers' Central Road.

4.0 WASTEWATER CONVEYANCE SYSTEM INFRASTRUCTURE PLAN

This section describes the proposed sewer infrastructure plan for the Specific Plan Area, in conformance with the intent of the following regulations:

Specific Plan Regulation 6.4: Prior to approval of the first tentative map or other development in the Specific Plan Area, the final sewer infrastructure plan for the Specific Plan Area shall be completed identifying an acceptable sewer collection system (including design to reduce groundwater infiltration), and addressing siting of the final selected system, and phasing and financing of sewer infrastructure. (TOC EIR MM 4.13-11)

Specific Plan Regulation 6.5: The sewer infrastructure plan shall be consistent with the City's Wastewater Collection System Master Plan, shall meet the City's standard specifications or an acceptable alternative, and the requirements of the Mitigation Monitoring Plan. Any approved alternative not consistent with the City's Wastewater Collection System Master Plan shall be incorporated into the Wastewater Collection System Master Plan as an amendment. Should there be differences between the Specific Plan and planned infrastructure, and the infrastructure systems described in the City's infrastructure master plans, the City may take action to adopt the Specific Plan with language that amends the infrastructure master plans to be consistent. If this approach is taken, Specific Plan development will be responsible for the cost of subsequent revision or amendment of the infrastructure master plans to incorporate the approved Specific Plan infrastructure systems.

Specific Plan Regulation 6.6: The design shall seek to minimize operational complexities and maintenance requirements of the system.

Specific Plan Regulation 6.6.1: Prior to installation of off-site wastewater infrastructure, all potential conflict locations with the existing PG&E high-pressure natural gas line shall be potholed and verified. (TOC EIR MM 4.13-22)

4.1 Existing Wastewater Facilities

Existing development in the Specific Plan Area utilizes septic systems, except for the Woodland Community College and the County facilities, which are both connected to the City sewer system.

The City will provide sewer collection, treatment, and disposal services for the South Urban Growth Area Master Plan Area. The City's sewer collection system is a gravity system with four trunk mains that run along East Main Street, Gibson Road, Beamer Street, and Kentucky Avenue. The City's wastewater treatment plant is located south of I-5 and east of CR 102, along an extension from Gibson Road, which functions as the wastewater treatment plant (WWTP) access road, about one-half mile from the South Urban Growth Area Master Plan Area. The WWTP currently has a dry weather capacity at 7.8 mgd. There is one pump station in the collection system, located at the northwest corner of Gibson Road and CR 102. It was brought

on-line in 1995 to serve a portion of the Southeast Area Specific Plan (Sycamore Ranch) area and is anticipated to have a maximum capacity of 2.0 mgd.

4.1.1 Gibson Road Sewer

An existing 24" trunk sewer runs from west to east in the Gibson Road corridor. Based on an analysis performed by CH2MHill there is no remaining capacity in this line and portions are in a surcharge condition during peak wet weather flow conditions. There is limited physical capacity for construction of another line in Gibson Road. As such, the Woodland Wastewater Master Plan identified an alternative corridor for a main trunk line to serve the Plan Area. The SLSP has identified an alternate plan to that presented in the Wastewater Master Plan. The evolution and description are presented in Section 4.4.

4.1.2 Wastewater Treatment Plant Access Road Sewer

The WWTP access road extends within a 25 foot-wide strip of land approximately ¼-mile east of Road 102 along the northern edge of the Barton property. At the northeast corner of the Barton property the alignment of the road shifts south via an "S" curve. The road then continues to the east, along the north edge of one of the wastewater ponds, approximately one more ¼-mile to the WWTP head works and operations building.

The 24" Gibson trunk sewer extends offsite from CR 102 to the east beneath the WWTP access road and ranges in depth from approximately 6 to 8 feet. At the "S" curve the 24" pipe alignment turns to the south and then drops to the east (slope = 0.04ft/ft) relatively steeply to a depth of approximately 13 feet below the existing ground surface. At that point the 24" pipe transitions to a 33" pipeline, which eventually merges into a 48" pipe that enters the head works at the plant. CH2M Hill's report indicates that the 24" pipeline beneath the WWTP access road is also surcharged until it outfalls into the 33" pipe.

4.1.3 Woodland Christian School

The Woodland Christian School sewer is connected to an existing pipeline in Matmor Road that connects to the Gibson Road trunk line. Currently the school's holding tank is configured to pump during off-peak hours. Future expansions of the school will be required to connect to the new trunk sewer in the SLSP area.

4.1.4 Woodland Community College Site

WCC wastewater from its existing buildings flows to the Gibson Road trunk sewer via a series of onsite pipes. The College has recently broken ground for a new science building and plans to connect the building to their existing system and thus to Gibson Road.

Based on information provided in the referenced Final WCC Master Plan (September 2001) at buildout of the College, approximately 0.5 mgd of peak wastewater flow will be generated. All wastewater from future buildings will be directed to the SLSP sewer system.

4.1.5 Yolo County Site

Wastewater from the Yolo County property currently flows into the existing 24" Gibson Road trunk sewer. Design of the first phase of new Juvenile Hall facility is currently in progress. Construction of the facility must be completed by December 2004 or the County's use of federal funding may be jeopardized. The County would like to connect directly to the 24" Gibson trunk sewer. The City has indicated that it will allow a temporary connection until such time as the proposed sewer is constructed from CR 102 to the Wastewater Treatment Plant. Various alternatives were discussed to accommodate the County and an offsite alternative was selected, details of which are described in Section 4.4.2.

4.1.6 Proposed Interim High School Facilities

The Pioneer High School opened in Fall 2003, prior to the SLSP wastewater system becoming operational. WJUSD negotiated the right to temporarily discharge Pioneer High School wastewater to the Gibson trunk sewer. This will be accomplished via a lift station to pump the effluent north to the Gibson trunk via a 4" force main. The right to discharge terminates in October 2004 without the WJUSD providing an approved alternative.

Once the SLSP system is operational (see Figure 4.1, Sanitary Sewer Layout) the High School will cease discharging to Gibson Road and will drain via gravity to the south via Pioneer Avenue to Farmers' Central Road.

4.2 Future Wastewater Treatment Plant Improvements

The sewer plant is an oxidation-ditch facility operational since 1989. Wastewater is treated to a secondary level. As of February 2001, the plant has an average dry weather capacity of 7.8 million gallons per day (mgd). The facility is planned to expand to eventually treat an average dry weather flow of 16 mgd with a peak flow of 35 mgd. New development in the South Urban Growth Area Master Plan Area will require additional plant expansion. The plant will undergo incremental expansion to provide capacity for planned growth throughout the City. Current design plans have been prepared for an incremental expansion of the plant.

4.3 Gibson Relief Sewer

The City hired CH2M Hill to evaluate options to relieve the impacted Gibson trunk sewer. The results of the study were presented in a report dated November 2000. Five options were developed to upgrade the capacity of the Gibson trunk. Since the timing of the Spring Lake project was unknown during the study, options were developed that either assumed Spring Lake was moving forward or were separate from the Spring Lake infrastructure. The report recommended two options depending on the status of Spring Lake. The first recommended option was to relieve the Gibson trunk by diverting up to 1.0 mgd wet weather flows into the Spring Lake wastewater conveyance system. The diversion would occur at Gibson Road and Pioneer Avenue via a 15" sewer pipe extending south into the South Urban Growth Area Master Plan Area.

The second option, assuming Spring Lake was not constructed, consisted of removing Sycamore Ranch flows from the Gibson trunk and constructing a new gravity line from Sycamore Ranch to the head works. In addition, an inter-tie between the new pipe and the Gibson trunk would be constructed.

The SLSP was adopted and thus the City selected the Gibson relief sewer option. This option would remove sufficient flow to alleviate the surcharge but not to provide any additional capacity in the Gibson trunk sewer. All new development flows within the SLSP and MPRA boundaries would require a connection to the SLSP backbone wastewater conveyance system except as otherwise identified in this report.

4.4 Discussion/Selection of Offsite Conveyance Alternatives

A master plan pump station/force main gravity system is planned for wastewater conveyance from the SLSP to the WWTP. A discussion of the decision factors leading to the selection of this system is included herein. The pump station will be physically located within the SLSP area along the Farmers' Central Road corridor (Figure 4.1, Sewer Layout); however, for the purposes of this report, "offsite" conveyance refers to the pump station and the conveyance downstream from the pump station including both force main and gravity pipes ending at the head works of the WWTP.

4.4.1 Gravity Pipeline or Master Plan Pump Station/Force Main Analysis

The City of Woodland Wastewater Master Plan recommends a deep 30" diameter, gravity trunk sewer extending to depths greater than 20 feet be installed to serve the SLSP and MPRA. The proposed alignment, beginning at Farmers' Central Road and CR 102, was to head to the east along a projection of Farmers' Central Road across the Barton and/or Brauner properties. The pipeline alignment was then to turn toward the north along the eastern edge of the Barton property until reaching the WWTP access road. Once at the access road, it would be extended to the east and connect to the head works. The connection to the head works would be accomplished by expanding the wet well at the head works via an existing capped opening to the wet well.

The SLSP applicant requested that the deep gravity alternative be re-evaluated due to the following design/construction concerns:

1. The southeastern portion of the SLSP area would still require a lift station in order to tie into the proposed offsite 30" gravity line.
2. The deep gravity trunk sewer would be very expensive to install due to narrow construction corridors along the proposed offsite route and extensive dewatering requirements due to shallow groundwater (as shallow as 4 feet below the ground surface).
3. A geotechnical investigation performed by Wallace Kuhl & Associates indicated that loose soil conditions were present at depth along the proposed alignment, which could exacerbate construction difficulties.

4. The deep trench backfill would present conditions that would require careful and proper bedding and pipe placement to obtain a sound pipeline.

G.S Dodson and Associates was requested by the City to explore several alternative options in addition to the deep gravity sewer/lift station option. The additional options included:

- A pump station/force main system sized to serve the entire SLSP/MPRA and the Gibson relief flows (approximately 7.1 mgd). The pump station was located at Farmers' Central and CR 102 with the force main alignment extending northward along CR 102, then east along the WWTP access road.
- Boring the 30" gravity sewer beneath existing oxidation ponds at the WWTP to avoid the deep open cut trench for the deep gravity sewer option.

G.S. Dodson and Associates prepared an alternatives analysis report dated January 2002 that reached the conclusion that the present day value, when both capital and operation and maintenance costs are taken into account, of the open cut deep gravity option and a SLSP/MPRA pump station were essentially the same. The bored 30" sewer alternative was significantly more costly and thus eliminated.

The City accepted the Master Plan pump station option once it was determined that moving the pump station west within the development would lower the overall length of deep gravity sewer pipes within the Plan Area. This was considered beneficial from a cost standpoint as well as construct ability based on difficulties that have recently arisen with deep installations, especially as related to deep lateral connections.

The pump station will be located at the intersection of Farmers' Central Road and Collector 1 within the alignment of the Farmers' Central Channel. Design of the pump station began in November 2002 assuming a 7.0 mgd station and a force main consisting of dual 12" pipelines along Farmers' Central Road, then north on CR 102 and east along the WWTP access road corridor to the head works.

4.4.2 County Gravity Option - CR 102 to WWTP

The County and College expressed concern to the City that the Spring Lake wastewater system will not be operational in time for the juvenile hall opening and requested that a separate 10" gravity line be constructed to the WWTP. Based on space limitations and to reduce the amount of future maintenance required for multiple pipelines in addition to the planned SLSP force mains, the City denied this option. The County subsequently proposed in December 2002 that a junction box be constructed at Road 102 and Gibson Road to collect flows from the entire County property at buildout and the existing WCC plus the science building under construction via a 10" pipe, and from the SLSP via the dual force mains. These wastewater flows would then be conveyed to the WWTP via a single 30" gravity pipeline.

The City agreed to move forward with this option based on the ability to divert the Sycamore Ranch flows to the junction box thus eliminating the capacity problem in the Gibson 24"

trunk sewer. Diverting the Sycamore Ranch flows also eliminates the need for the Gibson relief flow into the SLSP system. The offsite sewer conveyance system is being designed based on this concept and the pump station ultimate capacity was reduced to 6.0 mgd. The plan also requires that the 24" Gibson trunk sewer be extended from the "S" curve and connected to a new 48" pipeline entrance to the wet well at the head works. The new 30" pipeline would connect to the remaining segment of the 24" pipeline that drops down to existing 33" pipeline. An inter-tie will be constructed between the two alignments to better accommodate peak wet weather flows and provide diversion options during maintenance. These proposed alignments are conceptually shown on Figure 4.1. Additional details can be found in the *Final Pre-design Report, Off-Site Sewer System for the Spring Lake Specific Plan*, prepared by G.S. Dodson & Associates, dated April 1, 2003 and in *100% Design Submittal* for the same project dated May 28, 2003.

The County has since indicated that they intend to connect to the Gibson trunk sewer based on a 1986 agreement with the City. The City is currently negotiating with the County and the College to determine where they will connect and the fair share allocations for these entities and the SLSP. Additional discussion regarding costs/fair share allocations is presented in the Spring Lake Capital Improvement Plan.

4.5 Proposed Onsite Conveyance

4.5.1 Design Parameters

The onsite collection and conveyance system will be designed in accordance with the engineering design standards published in the *City of Woodland Standard Specifications and Details, 2002* or latest edition, plus any exceptions noted herein. For the proposed 30" line east of the Gibson Road/CR 102 intersection, the City has requested that the pipe be designed to convey its design flow at a depth of 70% of pipe diameter.

For the purposes of planning and overall system layout, the following parameters have been used:

- Design Flow=Peak Flow plus Infiltration and Inflow
- Peak Flow =2.5 x Average Flow
- Wastewater Average Flows per City of Woodland Design Guidelines with the following exceptions/clarifications:
 - Unit counts to determine gallons per day (gpd) per unit was based on approximate net acreages and planned densities as shown on the Specific Plan Land Use Map (Figure 1.1). An average density of 6.1 units per acre was assumed for the MPRA, which is consistent with the SLSP average unit density.
 - Specific flow information was used when provided. (e.g. Woodland Community College Master Plan)
 - 11.25 gpd/unit for all R-3, R-4, and R-5 lots was added to account for second units on an estimated 10% of these lots. (1.5 people/second unit x 75 gpd/person x 1 second unit/10 unit = 11.25 gpd/unit)

- Infiltration and Inflow = 600 gallons per day per acre
- Infiltration and Inflow for offsite gravity trunk = 500 gallons per inch-diameter per mile
- Except for force mains, all hydraulic grade lines contained within the pipe
- Manning's "n"=0.013 based on vitrified clay pipe
- Minimum velocity=2 feet per second (ft/s) flowing full
- Minimum main line slopes:
 - 8" - 0.0035 ft/ft
 - 10" - 0.0025 ft/ft
 - 12" - 0.0020 ft/ft
- Manholes at maximum spacing of 500 feet on centers
- 0.1 foot elevation change across manholes unless pipes change size at manholes
- Pipes of unequal size match crowns at manholes.
- Typically a minimum of 7 feet cover from top of main line pipe to existing ground. (Note: 7 feet from existing ground was used since finish grades were not known. City standard design parameter is 6 feet minimum to top of pipe from finish grade.)
- Laterals may not be tied-in to a sewer main if any part of the main pipe lies at a depth greater than 15 feet below finish grade. 8" minimum diameter parallel lateral tie-in pipe required where sewer mains are deeper than 15 feet on collectors and local streets.

4.5.2 Onsite Gravity Conveyance System

The proposed backbone onsite sewer system is illustrated in Figure 4.1. Supporting calculations are presented in the accompanying Wastewater Calculation Table. The reader is referred to the Spring Lake Capital Improvement Plan for a discussion of the definition of what constitutes a backbone pipeline and the funding sources.

The main lines of the on-site sewer infrastructure will generally run within the approved roadway system per the City of Woodland Design Standards. There are generally four sheds within the Plan Area. They are generally defined on Figure 4.1 and the Wastewater Calculation Table by reviewing which development areas will connect to specific backbone sewer infrastructure nodes. Key nodes within the system have minimum depths assigned to them relative to existing ground elevations. To ensure that all areas of the Plan can be served, these minimum depths shall be maintained during design unless otherwise approved by the City. Final grades throughout the Plan Area are of course not known at this time and modifications to the minimum depths may be warranted once additional information is available. However, any modifications must show that all upstream properties will be able to tie-in to any proposed modified sewer main elevations.

The four general sewer sheds are as follows:

1. **Farmers' Central Shed:** This shed consists of all SLSP and MPRA west of Hwy 113, the area north of Farmers' Central and west of Woodland College, and the area north of Parkway and west of Pioneer. Wastewater from these properties will be conveyed to the Spring Lake pump station via an 18" main constructed along Farmers' Central Road west of the pump station. This pipeline will be on the order of 20 to 25 feet deep; hence an 8" lateral

tie-in will be required where units front Farmers' Central Road. There is an existing 24" conductor pipe located beneath Highway 113 along the Farmers' Central corridor. Based on Caltrans plans the invert elevation of the conductor pipe is at an approximate elevation of 37.3 (NAVD 88 post Andregg subsidence study). This conductor pipe will need to be potholed to verify its elevation prior to preparation of construction drawings for the sewer main that will be constructed beneath the highway. The 15" sewer pipe in Pioneer Avenue between Gibson Road and Farmers' Central has been oversized for the previous Gibson Relief Sewer concept. In order to not hold up the construction of Pioneer Avenue for the High School, the decision was made to install the 15" sewer pipe even though it may not be needed any longer for the relief flows.

2. **Collector 1 Shed:** All areas south of Parkway Drive plus areas north of Parkway Drive and east of Pioneer are included in this shed. A 21" pipe will be constructed within Collector 1 from Parkway to Farmers' Central Road to convey wastewater generated within this shed to the Spring Lake pump station. A 24" pipe will be required on Farmers' Central Road to connect the 21" pipe in Collector 1 to the inlet pipe to the pump station. This pipeline will be on the order of 25 feet deep; hence an 8" lateral tie-in will be required where units front Collector 1. The new main lines within the South Urban Growth Area Master Plan Area will direct flows generally from west to east. All onsite flows will gravity-flow to the proposed pump station located at intersection of Collector 1 and Farmers' Central Road.
3. **Woodland Community College – South Shed:** A 10" stub will be installed from the north side of the pump station wet well, extending north to the City's R/W line. All new improvements constructed in the southern portion of the college will be required to connect to this stub for wastewater.
4. **Yolo County and Woodland Community College – North Shed:** All wastewater from the Yolo County property and the existing buildings (including the new Science Building) within the northern portion of the College will be conveyed to a 10" stub in the junction box to be constructed at the southwest corner of Gibson Road and CR 102.

The backbone infrastructure pipes have been sized taking into account the various land uses and sheds described above. Modification to these sheds or changes in land use within the SLSP/MPRA area will require calculations to show that adequate capacity exists within the downstream trunks and approval by the City.

4.6 Offsite Land Acquisition and Easements

Land acquisition requirements associated with offsite regional sewer facilities are indicated on Figure 1.4, and consist of:

- A strip of land on the Barton Property along its north boundary for a portion of the sewer outfall pipe.
- A strip of land along the east boundaries of the College and County properties abutting CR 102 for the location of the proposed CR 102 sewer force main.
- An approximate 20' x 18' acquisition of the County property at the southwest corner of Gibson Road and CR 102 to install the force main/offsite gravity pipeline junction box.

5.0 STORM WATER INFRASTRUCTURE PLAN

This Section describes the proposed drainage infrastructure plan for the Plan Area in conformance with the intent of the following SLSP regulations:

Specific Plan Regulation 6.7: Prior to approval of the first tentative map or other development in the SLSP, the final drainage infrastructure plan for the Specific Plan Area shall be completed identifying off-site and on-site permanent detention options and design criteria. The Plan shall identify an acceptable (10-year flows and 100-year flows) drainage management plan, including best management practices for controlling storm water quality, and addressing phasing and financing of drainage infrastructure. (TOC EIR MM 4.4-1)

Specific Plan Regulation 6.8: The drainage infrastructure plan shall be consistent with the City's Storm Drainage Master Plan, shall meet the City's standard specifications or an acceptable alternative, and the requirements of the Mitigation Monitoring Plan. Any approved alternative not consistent with the City's Storm Drainage Master Plan shall be incorporated into the Storm Drainage Master Plan as an amendment. Should there be differences between the Specific Plan and planned infrastructure, and the infrastructure systems described in the City's infrastructure master plans, the City may take action to adopt the Specific Plan with language that amends the infrastructure master plans to be consistent. If this approach is taken, Specific Plan development will be responsible for the cost of subsequent revision or management of the infrastructure master plans to incorporate the approved Specific Plan infrastructure systems.

Specific Plan Regulation 6.9: The design shall seek to minimize operational complexities and maintenance requirements of the system.

Specific Plan Regulation 6.10: The drainage infrastructure plan shall identify drainage design features to control increased runoff from Specific Plan development to prevent additional off-site flooding and comply with NPDES Phase II requirements.

Specific Plan Regulation 6.11: Off-site detention will require assessment for environmental impact, including inconsistency with any underlying Williamson Act Contracts, and impacts to biological resources.

Specific Plan Regulation 6.12: On-site detention/retention facilities may be utilized to manage storm water runoff, either on an interim or permanent basis as depicted on the land use plan. Where utilized these facilities will be designed to be naturalized, aesthetically pleasing, landscaped open space areas, accessible for passive recreational uses (e.g. trails, picnicking, etc.) and/or habitat. Minimum design criteria for interim and permanent detention facilities shall be identified in the final drainage infrastructure plan.

Specific Plan Regulation 6.13: Prior to construction of off-site infrastructure, appropriate biological surveys (for rare plants, valley elderberry longhorn beetles, raptors, and wetlands) shall be conducted and mitigation measures implemented pursuant to the Mitigation Monitoring Plan and State and Federal requirements.

Specific Plan Regulation 6.14: Development within areas shown on the "revised preliminary" April 17, 2001 Federal flood insurance rate maps to be potentially subject to flooding under 100-year storm conditions shall comply with all applicable requirements. This may affect development timing, and/or the design and grading, on portions of the County property and off-site Plan Area infrastructure facilities east of CR 102. (TOC EIR MM 4.4-7)

Specific Plan Regulation 6.14.1: A project-level drainage study shall be required for each subdivision setting pad elevations and identifying any other appropriate site-specific drainage facilities (e.g. detention/retention facilities) to be implemented as a part of the project.

5.1 Existing and Proposed Conditions/Flood Plains and Flowage Easements

Existing Drainage Patterns

Drainage throughout the City is managed through a system of collection, conveyance, storage, and pumping facilities. Flows are conveyed generally from west to east. The conveyance system consists of pipelines (laterals and trunk lines), detention and retention ponds, and open channels. Flows drain by gravity to storm drainage pumping facilities located near the intersection of East Main Street and the projection of CR 103. From there, flows are pumped into an outfall channel that discharges directly to the Yolo Bypass, a few miles east of the Plan Area.

The Specific Plan Area itself is relatively flat with slopes ranging from 0.15% to 0.3% from west to east, and nearly flat north to south. The elevation changes from 60 feet above mean sea level (msl) west of SR 113 to 36 feet above msl along CR 102. There are no natural streams or waterways on the site. The overall existing drainage patterns are depicted on Figure 5.1, Existing General Drainage Patterns.

The Yolo County Flood Control and Water Conservation District has an open ditch (Farmers' Central Ditch) through the Plan Area that serves primarily as a supply canal for irrigation water, but also receives limited occasional drainage from upstream properties (see Figure 5.1). There are other roadside ditches, the function of which is to accept runoff from existing county roadways. However, there is no developed drainage system within the Plan Area with sufficient capacity to manage future flows from development of the area.

Floodplains

The Federal Emergency Management Agency (FEMA) delineates the boundaries of the FEMA 100-year floodplain on the basis of hydrology, topography, and modeling of flows during specified design rainstorms. FEMA has identified areas of special flood hazard in Woodland and the vicinity. These areas are designated as flood zones on published Flood Insurance Rate Maps (FIRM). The maps originally adopted by the City were published prior to 1990, and indicate that the Plan Area is located in Zone C, which depicts an area of minimal flooding.

In October 1998, FEMA released "preliminary revised" 100-year floodplain maps for the Woodland Vicinity. These maps show flooding over a portion of the site adjoining CR 102 due

to right bank overflows from Cache Creek during a 100-year event. Under the revised maps, a portion of the Plan Area was designated Zone A, which reflects that base flood elevation and flood hazard had not been determined. The area shown as affected included a substantial portion of the Woodland Community College property (approx. 60 acres), and all of the County property (37 acres), about 80 acres of the TOC property and the northeast corner of the Russell property (20 acres).

In April of 1999, the City appealed the revised maps and provided additional technical analysis to FEMA in support of the appeal. In a letter to the City in April 2000, FEMA agreed to re-evaluate the floodplain west of I-5 and conduct a detailed study east of I-5. On April 17, 2001, in a letter to the Yolo County Board of Supervisors, FEMA stated that the City's appeal had been resolved, and released a new April 2001 "revised Preliminary" FEMA Flood Insurance Rate Map (FIRM). See Figure 5.2, FEMA Flood Zones.

The April 2001 "revised Preliminary" FEMA FIRM shows only a small portion of the Plan Area designated as Zone AE, which reflects that the base flood elevation for overflows from Cache Creek have been determined. The area potentially affected includes only a small portion of land on the southwest corner of Gibson Road and CR 102, located on property owned by the County. The remainder of the Plan Area is designated as Zone X, corresponding to areas outside the 500-year floodplain, areas within the 500-year floodplain, areas of 100-year flooding where average depths are less than one foot, areas of 100-year flooding where the contributing drainage is less than one square mile, and areas protected from the 100-year flood by levees.

In addition, from Gibson Road to CR 25A and beyond, the new map designates the land along CR 102 and to the east of CR 102, as Zone AE. This area is being proposed for off-site drainage facilities to support the Plan Area.

FEMA indicated that the new maps would remain "preliminary", and that a Letter of Final Determination would not be issued until completion of the 30-day comment period and a subsequent 90-day appeal period. The pre-1990 FIRMs originally adopted by the City indicate that the Plan Area is located in Zone C, which reflects an area of minimal flooding. These maps will be considered current until the Letter of Final Determination is issued. As such, there are presently no special development considerations or insurance requirements affecting any portion of the site.

However, upon adoption of new maps, habitable structures constructed in Zone AE will be required to be above the FEMA 100-year base flood elevation, and property owners within the zone will be required to have flood insurance. Non-habitable structures require engineered flood proofing of the area below the base flood elevation.

The analysis summarized in the *City Storm Drainage Facilities Master Plan Update and Preliminary Engineering, Technical Memorandum Task G: Spring Lake Specific Plan Drainage Master Plan* (Borcalli & Associates, Inc., November 16, 2001) indicates localized areas of existing residual 100-year floodplain on parts of the Plan Area. These existing 100-year floodplain areas lie immediately west of CR 101 and CR 102, respectively. There is also an existing residual floodplain on agricultural land lying west of SR 113 between CR

25A and CR 25. The floodplain west of SR113 is outside the Plan Area, and discharges to the MPRA east of SR 113.

The floodplains comprise informal temporary ponding of accumulated 100-year storm runoff behind the upstream (western) roadway embankments of SR 113, CR 101, and CR 102, respectively. The ponding is due to existing roadway culvert capacities being less than the upstream 100-year peak runoff rate. The upstream flows originate from the west, and from south of CR 25A. As the 100-year storm recedes, the ponded areas will generally drain east via existing roadway culverts and the existing Farmers' Central Ditch.

The floodplain west of SR 113, between CR 25A and CR 25, will remain and will continue to drain through existing culverts under SR 113. However, the discharge from the culverts will be collected by a planned agricultural interceptor and conveyance system, which will route the flows around the Plan Area to their existing ultimate point of discharge, the South Canal.

As development of the Plan Area proceeds, the localized residual floodplain areas inside the Plan Area will be removed. New development will occupy those existing floodplain areas that are removed, and a formal drainage system will be built to collect and convey runoff from the developed areas. Developing areas will be protected from upstream agricultural runoff by temporary agricultural interceptor ditches. These are discussed in Subsection 5.7 below

The "lost" storage associated with removing the existing floodplains is effectively replaced in the proposed East Regional Pond as part of the overall drainage solution for the Plan Area.

5.2 Existing Storm Drainage Facilities

5.2.1 Downstream Facilities and Future Improvements

As noted in Subsection 5.1, City drainage flows by gravity to the pumping facilities located near the intersection of East Main Street and the projection of CR 103. Flows are then pumped into an outfall channel that discharges directly to the Yolo Bypass.

The existing drainage facilities in the general vicinity of the Plan Area include the storm drainage piping in Gibson Road west of CR 102, and the Gibson Channel east of CR 102. The storm drains in Gibson Road west of CR 102 have been determined to be at capacity, and cannot receive additional flow. The Gibson Channel is an earthen open channel, which appears to be capable of being enlarged (if required) to accept additional flows. It begins at the intersection of Gibson Road and CR 102, runs east along an extension of Gibson Road, and ends at the CR103 corridor where it discharges to the South Canal. The South Canal flows north along the CR 103 corridor to East Main Street where it discharges to the South Canal Pump Station and to the East Main Street Pump Station

As part of the City's Storm Drainage Facility Master Plan Update, Borcalli & Associates (now merged with Wood Rodgers) calculated that under existing conditions in the 100-year storm the South Canal would overtop just south of its confluence with the Gibson Channel and also at I-5. (*Storm Drainage Facility Master Plan Update Task G*, Borcalli & Associates, November 16,

2001, and *Technical Memorandum – Draft: City of Woodland Storm Drain Facilities Master Plan (8164.012) - Spring Lake Specific Plan Area, Drainage Facilities Master Plan*, Wood Rodgers, July 25, 2003). In addition, Borcalli & Associates found the outfall channel to be hydraulically deficient in the 100-year storm under existing conditions, with the south levee being overtopped. Unless improved, these channels cannot convey additional flows without exacerbating the overtopping.

Mitigation of increased flows associated with development of the Plan Area will be accomplished using new detention ponds and pumping. Subsequent development in the MPRA may be mitigated with increased pumping at the outlet of the South Canal at East Main Street or through additional detention facilities. As such, it is proposed to construct a regional detention facility east of CR 102 and south of East Main Street. This is discussed in Subsection 5.4 below.

5.2.2 Yolo County Site

Certain properties within the Plan Area may elect not to participate in the Specific Plan regional drainage facilities. Such properties are those designated Public/Quasi-Public, and include the Yolo County property, the WJUSD property, the WCC property and the Woodland Christian School. At the time of writing, a final decision has not been reached on whether any of these properties will participate.

Public/quasi-public properties that are not subject to a requirement to participate, and for which the property owner elects not to participate, will be required to detain/retain-increased runoff from developing areas to pre-development conditions in order to avoid an increase in flooding to downstream properties.

If the Yolo County site does elect to participate, its site drainage will be collected near the southeast corner of its site, and conveyed south via a new pipe along the west side of CR 102, discharging to the Farmers' Central Channel (FCC) at the entrance of the proposed FCC undercrossing of CR 102. The pipe exit to the FCC will require appropriate outlet protection. The proposed box culverts that will convey the FCC flows under CR 102 will have provision to accept developed, 100-year free discharge from the site, assuming up to 80% site imperviousness for a full site buildout of 39 acres.

5.2.3 Woodland Community College Site

This site is partially developed, with existing improvements located on the northwest portion of the property. The site drains to the south and east. An onsite retention basin currently exists on the southeastern portion of the property. This basin currently accepts runoff from a part of the campus site including the developed area. The design basis for the retention basin is not known. In the event of overtopping, the basin would spill to the south and east. The September 2001 Campus Master Plan calls for the future elimination of the retention basin and the routing of all site drainage (including planned future site improvements) to the proposed FCC (See Campus Master Plan). The Campus Master Plan states that the existing (as of September 2001) 10-year peak flow rate to the basin is 28 cubic feet per second (cfs)

and that the projected 10-year peak flow rate at campus build-out will be 60 cfs. It is proposed to design onsite collection lines to convey the 10-year storm.

If the College site elects to participate in the Specific Plan regional drainage facilities, its site drainage will be collected near the southeast corner of the site, and discharged to the FCC upstream of the proposed FCC undercrossing of CR 102. The proposed FCC culverts under CR 102 will have provision to accept developed, 100-year unponded discharge from the site, assuming up to 60% site imperviousness for a full site buildout of 120 acres.

For the purposes of sizing the FCC, it will be assumed that all flows from the Community College will enter the FCC downstream (east) of the proposed Spring Lake Wastewater Pump Station, approximately 1200 feet west of CR 102 (See Section 4.0).

5.2.4 Woodland Christian School

This site is partially developed, and drains generally to the east. An onsite storm water basin currently exists on the property. The design basis and outlet provisions for the basin are not known. However, the *Technical Memorandum Task G* (Borcalli & Assoc., 16 November, 2001) indicates the pond ultimately discharging to the FCC. In the event of overtopping, it is anticipated that the basin would spill to the south and east. If the proposed FCC is to receive unponded drainage from the campus, then the 100-year peak discharge from the site would need to be used as the site's contribution to the FCC.

5.2.5 Agricultural Drainage Ditches and Culverts

Since the majority of the land is cultivated for either dry farming or irrigated crops, many agricultural ditches and culverts currently exist within the Plan Area. Overall, agricultural drainage follows the fall of the existing topography from west to east. The roadway embankments of SR 113 and CR 102 form north-south barriers to drainage originating west of their alignments. Culverts under the two roadways convey drainage from west to east. The locations of existing culverts are shown on Figure 5.1, together with the existing overall agricultural drainage patterns.

As development proceeds, existing agricultural flows will, in general, continue to be routed to their existing points of discharge. As the existing agricultural areas are gradually replaced by development, agricultural drainage will obviously diminish. Developed drainage will be collected and conveyed by the proposed urban storm drainage system and will be routed through a new detention pond east of CR 102 (the proposed East Regional Pond - see Subsection 5.4). Routing of existing upstream agricultural runoff is discussed in Subsection 5.7 below.

5.2.6 High School Drainage Facilities

Construction of the new Pioneer High School was completed in September 2003. The existing site topography falls from west to east. In view of the lack of available drainage conveyance capacity in Gibson Road, the site was graded to drain to the south, to the proposed FCC. In the absence of the proposed FCC, the High School site currently drains to

a new temporary detention pond on the future Middle School property. The pond drains via a proposed pump installation to an above-ground manifold designed to spread the discharge over an area adjacent to the existing Farmers' Central Ditch. Upon construction of the Middle School, the pond will be removed, and the pond inflow pipe will be extended south to discharge to the proposed FCC. Half-street improvements have been constructed across the high school's frontage on Pioneer Avenue. These improvements include local storm drains to collect street runoff. Additional parallel storm drain piping will be eventually needed in Pioneer to convey future developed drainage from an area up to approximately 80 acres west of the high school.

5.3 Design Constraints, Parameters and Criteria

Major constraints affecting storm drainage for the Specific Plan Area and MPRA include:

1. Insufficient existing downstream capacity in the South Canal and in the Outfall Channel.
2. Insufficient existing downstream capacity in the Gibson Road Storm Drain.
3. Economic infeasibility and physical limitations of installing new lines in existing Gibson Road, resulting in the need for new conveyances south of Gibson.
4. Limited fall for gravity drainage on Specific Plan/MPRA land and on lands downstream.
5. Higher elevations of CR 102 relative to that portion of the Specific Plan Area adjacent to CR 102, forming a drainage barrier.
6. Limited capacity in the existing 60" culvert that conveys the existing Farmers' Central Ditch under SR 113.
7. Significant upstream area discharging agricultural runoff through the development area - the City wishes to keep agricultural runoff separate from urban runoff.
8. Potential wetlands/listed biological resources in portions of the sites considered for regional detention ponding east of CR 102 (Brauner Property, City Regional Park Site).
9. Presence of an old landfill on part of the Regional Park Site.

Major parameters to be used in the design of storm drainage facilities for the Specific Plan and MPRA will include the computed peak flow rates and runoff volumes for selected design storms – these will be used in sizing conveyances and detention facilities. For the onsite conveyances, the key parameter is the peak runoff rate (10-year for pipes, 100-year for channels, and overland release). For the offsite conveyances, the key parameter is the 100-year peak runoff rate. For the offsite detention facilities, the key parameter is the 100-year peak runoff volume.

Design criteria for the design of storm water facilities are outlined in the document *City of Woodland Storm Drainage Facilities Master Plan Update: Storm Drainage Guidelines and Criteria, Preliminary Draft* (Wood Rodgers, August 1, 2002). Additional criteria and standards are presented in the *City of Woodland Standard Specifications and Details 2002*.

For the purposes of this report, the preliminary sizing of the permanent backbone storm drainage channels and pipes is based on the following basic criteria:

Farmers' Central Channel:

- Channel design storm = 100-year, based on HEC-HMS/HEC-1 Modeling
- Channel Manning's "n" = 0.07, based on natural channel treatment ("unmaintained")
- Side slopes = 3H: 1V or flatter
- Bottom width = 6 feet minimum
- Freeboard = 1 foot minimum
- Proposed path to be above 10-year water surface

Storm Drain Pipes:

- Pipe design flow = 10-year peak flow, based on City of Woodland Rational Method
- 10-year hydraulic grade line (HGL) typically contained within the pipe wherever feasible
- If the 10-year HGL rises above the pipe soffit, then it shall remain at least 1 foot below finish grade
- Minimum 2 feet of cover over pipes
- Pipe Manning's "n" = 0.015, to include pipe friction and minor losses
- Minimum velocity in pipes = 2.0 feet per second (ft/s) flowing full
- Minimum main line pipe slope: 0.0010 ft/ft (steeper if required to achieve $V_{min} = 2.0$ ft/s)
- Manholes at typical maximum spacing of 500 feet on centers for pipe 48" and smaller; 800 feet on centers for pipes 54" and larger
- Pipe slopes projected through manholes unless pipes change size at manholes
- Pipes of unequal size typically match crowns at manholes, unless infeasible due to limited cover. In such cases, the smaller pipe's invert will be set at 1 ft or more above the larger pipe's invert, provided City approval is granted

The preliminary sizing of the temporary onsite agricultural interceptor channels is based on the following proposed criteria:

Temporary interceptor channels for onsite agricultural storm runoff:

- Design storm = 100-year, based on hydrologic analysis summarized in *Preliminary Engineering Report – City of Woodland South Urban Area Regional Storm Drainage Facilities (SLSPA Phase 1)*, prepared by Wood Rodgers, dated April 11, 2003
- Channel Manning's "n" = 0.03, based on earthen, maintained channel (subject to City Engineer approval)
- Side slopes = 2H: 1V or flatter (subject to City Engineer approval)
- Bottom width = 6 feet minimum
- Freeboard = 1 foot minimum (subject to City Engineer approval)
- 12-foot maintenance/access road on one side (subject to City Engineer approval)

5.4 Proposed Offsite Detention and Conveyances

The essence of the regional drainage solution for the Specific Plan Area and MPRA is to reduce the ultimate developed peak discharge from the area to a level consistent with implementing moderate increases in downstream capacity.

The initial phase of SLSP development (Specific Plan Stages 1, 2, 3 and possibly 4, as defined in Figure 1.2) will be accomplished using the proposed detention basin east of CR 102 (the East Regional Pond). Later phases of development (Stages 4 or 5 and onwards) will require additional detention storage and/or additional pumping. This concept is described in detail in *Technical Memorandum – Draft: City of Woodland Storm Drain Facilities Master Plan (8164.012) - Spring Lake Specific Plan Area, Drainage Facilities Master Plan*, by Wood Rodgers, July 25, 2003. The July 25, 2003 Technical Memorandum considers the ponds to be bermed, and indicates that initial pond construction will accommodate development through Stage 4. Further analysis is required to determine the precise extent of development that may be accommodated by initial pond construction without berming. Refer to discussion below on pond berming.

Additional background information is presented in References 17 through 27, Appendix A. These documents are part of an ongoing Storm Drainage Facility Master Plan (SDFMP) Update to determine the specific off-site improvements required for the entire Master Plan Area.

In the Update, pond concepts and cost estimates are presented for two alternative sites abutting the east side of CR 102:

1. The City Regional Park Site, located south of CR 25
2. The Brauner Property, located north of CR 25

The locations of both sites are shown on Figure 5.3. The shed draining to the pond will include the Specific Plan Area, the Master Plan remainder area, plus approximately 160 acres of existing agricultural land west of College Street. For the purposes of this report, this total area will be called the South Urban Growth Area Shed. The shed boundaries within the Plan Area are indicated on Figure 5.3.

The Brauner Property and the City Regional Park Site are each nominally one half-mile by one half-mile square. Both sites consist of largely open, relatively flat areas (with the exception of the landfill mounds). The City Regional Park Site was once operated as a landfill, but that use was discontinued in the mid-1970's. The landfill has not yet been closed from a regulatory standpoint, but the City is planning to solicit proposals from consultants to prepare a closure plan. In addition to the area occupied by the landfill mounds, the southern portion of the Regional Park Site is currently occupied and operated by a local model aircraft club and by a rodeo club, via lease agreements with the City.

The Brauner Site is mostly undeveloped, except for an auto recycling facility at the south end of the property. A 20" PG&E gas main bisects the site, traversing from northwest to southeast.

Both sites have been shown to be hydraulically feasible for detention ponding to serve the South Urban Growth Area. However, both sites have potential physical and environmental constraints associated with them.

For the Regional Park Site, the known physical and environmental constraints are as follows:

- Presence of old landfill
- Presence of City water supply well on site
- Evidence of wetlands near northwest corner of site
- Potential Bracted Bird's Beak habitat associated with wetlands area
- Displacement of existing leases

For the Brauner Site, the known physical and environmental constraints are as follows:

- Existing 20" PG & E gas main traversing property
- Evidence of wetlands in south-central and west-central part of site
- Potential Bracted Bird's Beak habitat associated with wetlands areas
- Auto recycling facility along part of site's southern boundary
- Possible displacement of existing leases

The approximate limits of the wetland areas on the Regional Park Site, the Brauner Site, and the Turn of the Century (TOC) property are shown on Figure 5.3. The US Army Corps of Engineers (ACOE) recently made a determination that these wetland areas fall under its jurisdiction. The Spring Lake Planning Group has also reviewed the evidence of the existing wetlands on the Brauner site with the US Fish and Wildlife Service (FWS) and the California Department of Fish and Game (DFG). The DFG has stated that it considers at least portions of both sites to be potential habitat for the Bracted Bird's Beak plant, which is a federal and state-listed special status species.

Estimated pond construction costs are generally comparable for both sites, with one significant exception: there is a potential need for a pond liner on the City Regional Park Site, which adds approximately \$7 million to the estimated construction cost of a pond on that site (*Technical Memorandum – Draft. City of Woodland, Storm Drainage Facilities Master Plan – South Urban Area – Alternative 3*, Wood Rodgers, August 15, 2002). The potential need for the liner is related to the close proximity of the old landfill mounds (whose contents and disposition are not fully characterized) to a pond on the Park Site. As such, the state Regional Water Quality Control Board has taken the position that it would require a liner for a pond on the Regional Park Site.

Given the significant construction cost of a liner on the Regional Park Site, and uncertainties associated with its operation and maintenance costs, the Brauner property has emerged as the more feasible choice for the regional detention pond. At the time of writing, the Spring Lake Planning Group is under contract to purchase the property (excluding the recycling facility) from the current owners as the site for the proposed regional pond. In recognition of the presence of seasonal wetlands and potential Bird's Beak habitat on the site, the Spring Lake Planning Group has agreed to limit pond construction to the northern third of the property

(outside the wetlands), and to set aside the majority of the remainder of the site (excluding the recycling facility and a corridor needed for the pond inlet channel) as a habitat conservation easement.

Given the location of the existing PG&E gas line on the Brauner Property (see Figure 5.3), the pond will consist of two storage areas, bisected by the gas line. For the purposes of this report, the two ponding areas within the East Regional Pond will be referred to as Pond 1 (west of the gas line) and Pond 2 (east of the gas line). Ponds 1 and 2 will be hydraulically interconnected by means of a short channel section. It is proposed that the gas line be lowered locally to allow construction of interconnection facilities. PG&E is currently in the design phase for the gas line lowering with planned construction in Summer 2004.

The minimum invert elevation for the pond's flood pool will be at elevation 27.0 (NAVD 88). The target 100-year WSE of has been set at an upper limit of 35.5 (which allows for berms to be built to elevation 36.5 around the ponds for additional storage). The corresponding 10-year WSE (to be used as the starting water surface for upstream storm drain pipe sizing) has been computed at 32.8. For a pond without berms, the maximum 100-year pond WSE is expected to be around 33.5. At the time of writing, the corresponding maximum 10-year WSE is undetermined. However, it is expected to be lower than the "with-berm" 10-year WSE of 32.8.

The City has expressed concern that berms may impede 100-year flood overflows from Cache Creek. Although potential future flood control works may prevent Cache Creek 100-year overflows from reaching the Brauner site, such measures (if implemented) are unlikely to be available for several years. For this reason the City has recommended that initial pond construction proceed without berms. In the event that Cache Creek flood protection works are built in the future, then berms could be added around the Brauner Ponds at that time. With this in mind, the 100-yr and 10-yr "with-berms" WSE's of 35.5 and 32.8 respectively should be considered when designing upstream improvements.

"Offsite" channels will be constructed east of CR 102 to receive runoff from Specific Plan/Master Plan Remainder Area. These are described in detail in the *Technical Memorandum – Draft: City of Woodland Storm Drain Facilities Master Plan (8164.012) - Spring Lake Specific Plan Area, Drainage Facilities Master Plan*, by Wood Rodgers, July 25, 2003.

Onsite developed drainage will generally flow east to CR 102. It will then be conveyed under CR 102 in new box culverts, sized for developed 100-year peak flows (as computed by Wood Rodgers), at four proposed crossing locations between CR 25A and the FCC:

- | | |
|---|---------------------|
| 1. A single 5' x 8' concrete box culvert (CBC) just north of CR 25A | $Q_{100} = 269$ cfs |
| 2. A double 5' x 8' CBC just north of Parkway Drive (CR 25) | $Q_{100} = 419$ cfs |
| 3. A single 5' x 5' CBC approximately 400 feet south of the FCC | $Q_{100} = 158$ cfs |
| 4. A double 5' x 8' CBC to carry FCC flows under CR 102 | $Q_{100} = 583$ cfs |

The new culvert at location 1 (as defined above) will discharge to the head of a proposed inlet channel along the east side of CR 102 (see Figure 5.3). Beginning at the northeast corner of the intersection of CR 102 and CR 25A, the inlet channel will run north along the west boundary of

the City Regional Park Site for about 1500 feet. The channel will then turn east for about 600 feet, and subsequently turn north again to enter the Brauner property near the southwest corner of the existing auto recycling facility. The new culvert at location 2 (as defined above) will discharge to a branch of the inlet channel near the northeast corner of the intersection of CR 25 and CR 102. This branch will flow east along the south side of the Brauner property, joining the main inlet channel at the southwest corner of the auto recycling yard. From there, the combined inlet channel will continue north, discharging to Pond 1. The new culverts at locations 3 and 4 will discharge directly to Pond 1.

A proposed outlet channel will run from the northeast corner of the pond to the Gibson Channel. The Gibson Channel will then convey storm drainage flows east to the existing South Canal. In the South Canal, flows will be conveyed north to the outlet of the South Canal near the East Main Pumping Station. Flows will continue in the existing Outfall Channel, which flows east to the Yolo Bypass.

At the time of writing, plans and specifications for the first phase of the proposed regional drainage improvements have been released for bidding. The plans include the Brauner pond, three CR 102 undercrossings north of Parkway Drive, the pond inlet channel on the Brauner Property, the pond outlet channel, and the agricultural interceptor/conveyance from approximately ½ mile west of CR 102 to the South Canal.

5.5 Proposed Onsite Detention

East of SR 113, all of the new detention ponding for the Plan Area is currently proposed take place offsite, on the Brauner property. No formal onsite detention is proposed east of SR 113. However, some detention will effectively occur in the FCC during the higher stages in the East Regional Pond, since the pond will cause a backwater effect on the channel.

In the future, a second regional detention facility will be located just west of SR 113, in the MPRA. For the purposes of this report, this pond will be referred to as the West Regional Pond. Its function will be to reduce peak runoff flow rates from the developing areas to the west of SR 113. It is proposed that developed drainage from the area west of SR 113 be routed through the pond, and then conveyed under SR 113 via the existing 60" inverted-siphon that conveys the existing Farmers' Central Ditch under SR 113 (see Figure 5.1). The capacity of this culvert installation has been estimated by Wood Rodgers to be approximately 60 cfs. Under developed conditions, the 100-year discharge from the area west of SR 113 would exceed the capacity of the culvert. As such, the planned West Regional Pond will be sized to attenuate these peak flows, and limit the 100-year peak discharge in the culvert to approximately 60 cfs, the culvert capacity.

The location of the West Regional Pond has not been finalized, but is shown conceptually on Figure 5.3.

5.6 Onsite Mixed Use Conveyances

As development proceeds, a multi-use open channel called the Farmers' Central Channel (FCC) will be constructed from Pioneer Avenue to CR 102 (see Figure 5.3). The channel will run along the general alignment of the existing Farmers' Central Ditch, which abuts the south boundaries of the Woodland Community College site and the future middle school site. It will be contained in new right-of-way dedicated to the City by south-abutting properties. The FCC will form the backbone storm drainage conveyance for the proposed North Drainage Shed (as defined in Subsection 5.7 below), and will afford opportunities for pedestrian and bicycle circulation.

West of Pioneer Avenue, the FCC will run underground in a proposed large-diameter pipe. The pipeline segment will be sized to convey the 100-year fully-developed peak outflow from the west regional detention pond (approximately 55 cfs) plus 10-year lateral inflows from tributary areas east of SR 113 (see Figures 5.3 and 5.4).

At the intersection of Pioneer and Farmers' Central, piped flows (10-year) and street flows (100-year) will be combined in a proposed junction box and conveyed to the head of the open channel via a double 6'x'6 CBC.

East of Pioneer Avenue, the open channel reach will be built as part of the first phase of onsite backbone infrastructure, and will be sized for the 100-year flows. A proposed typical cross-section for Farmers' Central Road and Channel is illustrated on Figure 2.3A, Major Street Cross-Sections.

A 10-foot pedestrian/bicycle Class 1 pathway will be located near the top of the south bank, with trees and other landscaping. This path will be located higher than the computed 10-year water surface elevation, but may be located below the computed 100-year water surface elevation. The channel banks will be typically sloped no steeper than 3:1, with natural plantings. The goal of the landscaping and pathways is to create a public amenity.

FCC Hydrology and Hydraulics

A summary of hydrologic and hydraulic computations for the FCC is included with the storm drainage calculations and figures at the end of this Section. Design water surface profiles and typical channel cross-sections are also included. The design flows reflect the shed delineations shown on the Overall Shed Map on Figure 5.3.

The channel was given a nominal bed slope of 0.001 ft/ft, 25 ft bottom width, 3:1 side-slopes, and a Manning's "n" of 0.07. Design of the channel from Pioneer Avenue to CR 102 is currently underway (*90% Civil Improvement Plans (Package A) for SLSP Backbone Infrastructure*, by Cunningham Engineering Corporation, dated May 21, 2004).

5.7 Onsite Conveyance System

The proposed onsite drainage system will consist of a system of collection and conveyance facilities, which will carry stormwater via gravity to the eastern boundary of the project at CR 102. Thence, new offsite gravity flow channels will carry runoff to the proposed East Regional Detention pond. Figure 5.3 indicates the components of the onsite drainage infrastructure plan; depicting preliminary sizing and locations of major onsite storm drain pipes. On-site infrastructure will be sized to accommodate MPRA development as well as SLSP development.

Under developed conditions, the drainage from the proposed Plan Area can be divided into four main subsheds, as shown on Figure 5.3. For the purposes of this report, these four subsheds will be referred to as follows:

1. Farmers' Central Channel (FCC) Shed (North Shed)
2. Parkway Drive Shed (Central Shed)
3. County Road 25A (CR 25A) Shed (South Shed)
4. County Road 102 (CR 102) Shed (East Shed)

The FCC Shed (North Shed) will consist of three components: (1) All the Master Plan Area lying west of SR 113, the portion of the Plan Area lying north of FCC west of SR 113, and about 160 acres of agricultural land west of College Street (2) All the Plan Area lying north of FCC on the east side of SR 113, and (3) A portion of the Plan Area lying south of FCC on the east side of SR 113. The onsite point of discharge from this shed will be the FCC where it crosses under CR 102.

The Parkway Drive Shed (Central Shed) will consist of a portion of the Master Plan Area adjacent to Parkway Drive, on the east side of SR 113. The onsite point of discharge from this shed will be just north of the intersection of Parkway Drive and CR 102.

The CR 25 A Shed (South Shed) will consist of a portion of the Master Plan Area lying north of CR 25A, on the east side of SR 113. The onsite point of discharge from this shed will be just north of the intersection of CR 25A and CR 102.

The CR 102 Shed (East Shed) will consist of the balance of the Plan Area, lying adjacent to CR 102. The onsite points of discharge from this shed will be along CR 102, at multiple locations between CR 25A and the FCC.

The proposed arterial and collector streets in the Plan Area represent opportunities for major onsite drainage pipe corridors. Of these streets, Parkway Drive and CR 25A will accommodate major trunk lines discharging east to CR 102. Together with Farmers' Central Channel, Parkway Drive and CR 25A will constitute the main west-to-east drainage corridors within the Plan Area (see Subsections 5.7.1 and 5.7.2 below).

Interception and routing of existing upstream agricultural flows around the intermediate stages of development will be accomplished by temporary interceptor-conveyance channels.

Such channels will be sized to convey the upstream existing 100-year flow, and will generally flow from north to south along the west edge of any particular development stage or individual subdivision. The temporary interceptors will drain to the proposed permanent agricultural runoff conveyance shown along CR 25A in Figure 5.3. This concept is in keeping with the City's desire (in anticipation of impending NPDES Phase II regulations) to minimize co-mingling of agricultural runoff with urban runoff wherever practical. As such, upstream agricultural runoff will be routed around new development and around the proposed East Regional Pond to its existing point of discharge on the Dowling property (see Figure 5.3). Proposed design criteria for the temporary agricultural interceptors are listed in Subsection 5.2, above.

Plans for onsite temporary channels to intercept upstream agricultural drainage will need to accompany individual tentative map submittals as development progresses. Alternatively, the development community may elect to combine individual subdivision-specific channels into facilities which are more regional in nature. Two regional-type channel alignments are depicted on Figure 5.3. Both channels run from north to south, and are located nominally ½ mile and 1 mile west of CR 102 respectively.

The downstream starting hydraulic condition for the temporary channels will be the interim 100-year HGL in the proposed CR 25A permanent interceptor conveyance. For the first ½ mile west of CR 102, the CR 25A permanent interceptor conveyance will consist of an open channel. In November 2003, Wood Rodgers reported a calculated interim HGL elevation in this channel as 41.4 at ½ mile west of CR 102, for a flow of 300 cfs (*City of Woodland Regional Storm Drainage Facilities Project – Interceptor Conveyance Facility Hydraulics, November 20, 2003*). Further west, interim HGL's may be a function of whether the CR 25A interceptor conveyance takes the form of a pipe or channel. Additional analysis will be required to determine interim HGL's in the CR 25A channel west of a point ½ mile west of CR 102.

A first regional-type channel will be located nominally 2600 feet west of CR 102. This will be built as part of the initial SLSP onsite backbone infrastructure improvements (see *90% Civil Improvement Plans - Package A*, by Cunningham Engineering Corporation, dated May 21, 2004). The sizing of this channel will be based on capturing the existing 100-year storm runoff from existing agricultural land lying to the west. The contributing agricultural drainage sheds were identified and corresponding design flows computed in the *Preliminary Engineering Report – City of Woodland South Urban Area Regional Storm Drainage Facilities (SLSPA Phase 1)*, prepared by Wood Rodgers, dated April 11, 2003. That report indicates design flow rates of 130 cfs at Farmers' Central; 180 cfs at Parkway Drive; and 340 cfs at CR 25A (see Figure 5 of the referenced report). For the temporary channel design criteria proposed in Subsection 5.2, the above design flows of 180-340 cfs and the existing topography along the alignment, this channel is expected to occupy a corridor typically 60 to 80 feet wide. Final sizing of the channel and associated corridor will accompany detailed design.

A second regional-type channel may be built later at the west edge of the Plan Area. Such channel, located along CR 101, would protect the built-out Plan Area until such time that the MPRA develops, and would replace the first channel described above. For the future CR 101

channel, the above-referenced Wood Rodgers report indicates design flow rates of 100 cfs at Farmers' Central; 160 cfs at the projection of Parkway Drive; and 300 cfs at CR 25A (see Figure 6 of the referenced report). The downstream ¼-mile of the channel is depicted in Figure 6 as being located 2600 feet west of CR 102. In this ISR, Figure 5.3 shows the same ¼-mile of channel shifted west to run along CR 101. This shift will result in lower design flows for this reach than shown in the Wood Rodgers report, since the contributing shed will be reduced by approximately ¼-mile by ½-mile (80 acres). As such, further studies will need to be conducted to define the precise alignment and size of a CR 101 channel.

In addition to the two regional-type temporary interceptors described above, minor temporary drainage interceptors may be required at intermediate locations to protect individual subdivisions. Analysis and plans for such channels will be prepared as part of subdivision-specific improvement designs.

As part of future MPRA improvements, a permanent agricultural drainage interceptor will be installed along the east side of SR 113, discharging to the proposed permanent agricultural runoff conveyance along CR 25A.

5.7.1 10-Year Storm Routing

The proposed backbone storm drain system and associated sheds are shown in Figure 5.3.

Developed on-site flows will generally be conveyed from west to east through new storm drainage pipes and by the FCC. Storm drain pipes will usually be located in public streets or in proposed storm drain easements. Because of the flat topography within the Plan Area, it is expected that grading plans and street profiles will generally be undular, with alternating shallow crests and sags. The sags will be drained by inlets connected to the new storm drain system.

Storm drain pipes will be designed to flow full under gravity in the 10-year storm. Open channels (such as the FCC east of Pioneer Avenue) will be sized for the 100-year storm with one foot of freeboard. Normally, pipe runs will be designed to match crowns at changes in pipe size. However, because of the grade constraints imposed by the flatness of the site, lack of pipe cover may make matching pipe crowns at changes in pipe size difficult in some areas. In such cases, pipe runs may be designed to match inverts at changes in pipe size, provided that the design 10-year HGL in the pipe remains at least one foot below inlet grate elevations and is approved by the City.

Supporting calculations for the backbone infrastructure pipelines are presented in the Storm Water Peak Flow Calculation Table included herein. Figure 5.4, Storm Drain Analysis Nodes and Tributary Areas, indicates the internal shed boundaries. Pipe sizes and invert elevations are included and take into account the various land uses and sheds depicted in Figure 5.3. Future modifications to the shed boundaries or significant changes in land use will require new calculations to show that adequate capacity exists within the downstream trunks. Similarly, any significant future changes from the approximate invert elevations will require demonstration that upstream properties will be able to drain to the modified pipes.

5.7.2 100-Year Storm Routing and Release Point

The downstream (east) edge of the overall Plan Area shed lies along CR 102. As such, the 100-year release points from the overall shed will be along CR 102, located between CR 25A and the FCC. The general locations of these release points are depicted on Figure 5.3. Since the existing CR 102 is elevated relative to the adjacent land, the 100-year release flows will be conveyed under CR 102. This will be accomplished via multiple box culvert installations sized for the 100-year flows (at the four proposed locations listed in Subsection 5.4). The FCC will outlet into a proposed double 5'x 8' box culvert under CR 102, which will discharge directly to the proposed regional pond on the Brauner Site. The proposed single 5'x 5' box culvert 400 feet south of the FCC will also discharge directly to the proposed regional pond. The two remaining proposed box culverts along CR 102 will discharge to a proposed pond inlet channel along the east side of CR 102. The design of the proposed CR 102 culverts and pond inlet channel (part of the proposed Regional Drainage Facilities design) shall seek to keep head losses in those facilities low, in order to keep the 100-year HGL's low at the culvert entrances. Each building pad elevation within the Plan Area shed will be set at least one foot above the estimated 100-year headwater elevation of the particular culvert providing 100-year release for that pad, or one foot above the estimated adjacent 100-year street water elevation, whichever is higher.

In storms greater than the 100-year event, overflows may begin to spill over CR 102. For the segment of CR 102 from the FCC to CR 25A, the low point in the existing road profile lies about mid-way between the FCC and Parkway Drive. The elevation of CR 102's crown at the low point in the profile is approximately 37.9 (NAVD 88). Finish floor elevations within the SLSP shall be set at least 6" above elevation 37.9. This provides a measure of protection in storms greater than the 100-year, or in the event of a partial blockage in one of the proposed culverts under CR 102.

Within the Plan Area shed itself, on-site flows in excess of pipe capacities (i.e. in excess of the 10-year flows) will generally be conveyed overland from west to east via arterial and collector streets, in greenbelt corridors and in the FCC. Release points for the 100-year storm will be provided for all onsite developed drainage sub areas. The overland flow patterns will generally follow the direction of piped (10-year) flows. The overall flow directions and sub-basin typical release points are depicted on Figure 5.4.

In general, local street profiles are expected to be designed such that low points overflow when the water depth reaches a maximum of 1 foot. Overflows will "cascade" over successive local street high-points to an outlet downstream. Successive downstream high-points in streets will decrease in elevation, with a desirable minimum projected slope of -0.0005 ft/ft between successive high-points going downstream. As stated above, building pad elevations will be at least 1 ft above the 100-year estimated maximum standing water elevation in the adjacent street.

Individual subdivisions and developed sites (such as apartments, schools, parks and commercial sites) should be designed such that their 100-year release points discharge to a channel, or to an abutting arterial or collector street. Such streets must have an overland flow

path to the downstream end of the Specific Plan Area at CR 102. This is considered preferable to having subdivisions release through the local streets of downstream subdivisions. Overland release to a proposed greenbelt may be acceptable, provided that (i) the greenbelt connects directly to a downstream channel or arterial street, (ii) the greenbelt can be shown to have sufficient hydraulic capacity to carry the 100-year flow from its ultimate developed contributing area, (iii) frequent flows will not compromise the primary function of the greenbelt as an amenity, and (iv) City approval is granted.

5.8 Storm Water Quality Considerations

Provisions to address storm water quality will be incorporated into the design of “in-tract” onsite improvements, and also into the design of the proposed East Regional Detention Pond.

The onsite water quality provisions will consist of applying Best Management Practices (BMP’s), currently under development by the City, and contained in the document *City of Woodland Technical Guidance Manual for Stormwater Quality Control Measures* (August 2003). The applied BMP’s will be indicated on subdivision improvement plans associated with individual tentative maps.

The water quality provisions associated with the East Regional Pond will consist of a water quality pool located below the flood pool. The sizing and design of the water quality pool is described in the *Preliminary Engineering Report – Draft, City of Woodland, South Urban Area Regional Storm Drainage Facilities (SLSPA Phase 1)*, by Wood Rodgers, March 11, 2003.

5.9 Phasing of Facilities

Phasing of drainage facilities is proposed on Figure 5.3. The drainage facilities phasing plan is based on the SLSP phasing plan depicted on Figure 1.5.

The East Regional Pond and associated facilities will be built in phases. Since the construction cost of these facilities is substantial, a phased approach will spread expenditures over time. Initially, Ponds No. 1 and 2 are proposed to be built, together with the Outlet Channel and the portion of the Inlet Channel lying on the Brauner Property.

Construction of onsite drainage conveyances will begin at CR 102 and proceed upstream to the west. All new developed areas will require a developed drainage outlet to CR 102 and thence to the East Regional Pond.

5.10 Cost Allocations

Cost allocations are described in the SLSP Capital Improvement Plan (CIP), which is a companion document to this ISR.

5.11 Land Acquisition and Easements

Land acquisition requirements associated with offsite regional drainage facilities are indicated on Figure 1.4 and consist of:

- The Brauner Property (approx. 150 ac) for the East Regional Pond and a Preserve Area
- A strip of land on the Barton Property along its east boundary for a portion of the East Regional Pond Outlet Channel
- A strip of land on the Russell Property along the south side of CR25A (from CR 102 to ½ mile west) for one reach of the Agricultural Interceptor-Conveyance
- City property on WWTP site and Regional Park

Easement requirements for regional drainage facilities are also indicated on Figure 1.4 and consist of:

- An easement on the Dowling Property for one reach of the Permanent Agricultural Interceptor-Conveyance
- Easements for Temporary Agricultural Drainage Interceptor-Conveyances

6.0 DRY UTILITIES

Other public utilities important to future development include electricity, gas, and communication services. All are provided by private utility companies, but all are critical for existing and new development.

The following requirements related to utilities shall apply:

- 6.0.1 All utilities shall be under grounded unless proven to be infeasible. *(TOC EIR MM 4.13-26)*
- 6.0.2 Utility facilities including transformers, terminal boxes, meters, fire risers, backflow preventers, wells, force mains, pumps, lift stations, and other similar units shall be screened and oriented from public view to the greatest feasible extent.
- 6.0.3 The most feasible available communications wiring shall be required in all residential units to allow residents to connect to available state-of-the-art communications systems and services. This may require fiber optic connectivity, hard-wiring, for faster line service, and/or multiple phone lines pre-wired at every unit. A determination of satisfactory implementation of these requirements shall be made by the Community Development Director.

6.1 Pacific Gas & Electric

6.1.1 Electricity

Pacific Gas and Electric (PG&E) provides electricity and gas to the City. PG&E operates and maintains three 60 kV electric transmission lines and a switching substation, along with corresponding distribution facilities, within the project site boundaries. Land uses are restricted along the transmission facilities.

Implementation of the Specific Plan will require expansion of electrical distribution and transmission lines and related facilities. In addition to adding new distribution feeders, the range of electric system improvements needed to accommodate new growth may also include upgrading existing substation and transmission line equipment, expanding existing substation(s) to their ultimate build-out capacity, building new substations, and interconnecting transmission lines. The new development will be responsible for the costs associated with the necessary expansion and upgrading of the systems. Any authorized provider may provide the service.

Initial power brought to the site will come from the existing distribution overhead power lines on Road 102 and/or via Pioneer Avenue. Various power poles may require relocation for roadway construction, particularly in the vicinity of CR 102 and Farmers' Central Road.

6.1.2 Natural Gas

PG&E operates and maintains a 20-inch natural gas line, an 8-inch gas transmission line, and several smaller gas distribution lines within the project site. Initial gas service will be extended either down Pioneer and/or CR 102 to serve the project.

Implementation of the Specific Plan will require the expansion of distribution and gas transmission lines, and related facilities to serve the Specific Plan Area. The new development will be responsible for the costs associated with the necessary expansion and upgrading of these systems. Any authorized provider may provide the service.

Local lowering of the existing 20" PG & E gas line will be performed on the Brauner property and on the Dowling Property. This is to accommodate the construction of the proposed Brauner Pond and Agricultural Interceptor-Conveyance Facility (ICF) respectively. In addition, construction of the ICF will require local lowering of an existing 6" Calpine gas line on the Dowling Property.

6.2 SBC (formerly Pacific Bell)

SBC provides telephone service to existing land uses within the Specific Plan boundaries. Implementation of the Specific Plan will require the expansion of telephone system to serve the Specific Plan Area. The new development will be responsible for the costs associated with the necessary expansion and upgrading of any authorized system. SBC has indicated that initial service will be extended into the Plan Area along Pioneer Avenue. A total of four switching stations will be required throughout the SLSP.

6.3 Cable Television & Computer Cabling

Charter Communications provides cable service in the City and will serve the homes within the Plan Area on a subscription basis. The existing system has capacity for about 6,000 more homes, with the ability to expand. As new development occurs, any authorized provider may install the system and sell subscriptions to users.

7.0 OUTSTANDING DESIGN ISSUES AND RECOMMENDATIONS

At the time of writing this report, the following design-related items are still in the process of being addressed:

Storm Drainage:

- Agreement with RD2035 for use of South Canal.
- Resolution of the Cache Creek floodplain issue and its potential effect on regional drainage improvements for the South Urban Growth Area.
- Completion of the SDFMP Update to fully define all regional drainage improvements associated with full buildout of the South Urban Growth Area.
- Acquisition of an easement on the Dowling property for the agricultural interceptor conveyance and a possible flowage easement.
- Acquisition of City property – WWTP/Regional Park.

Water:

- Final confirmation of major backbone pipe sizes.
- Final confirmation of well capacity requirements and timing.
- Confirmation of status of City's potential acquisition of wells from Yolo County and /or Woodland Community College.

Wastewater:

- Negotiation resolution with the County and the College regarding the connection location for new facilities currently under construction or in design.

Right-of-Way:

- Acquisition of right-of-way along the west side of CR 102 adjacent to the College and County properties for the purpose of road widening and construction of the 35' landscape buffer.

**APPENDIX A
REFERENCES
FOR
SPRING LAKE SPECIFIC PLAN
INFRASTRUCTURE STUDY REPORT**

General:

1. *Spring Lake Specific Plan*, prepared by Tschudin Consulting Group, adopted December 18, 2001.
2. *Draft Infrastructure Study for City of Woodland, General Plan Residential Area, Plan A*, prepared by Laugenour and Meikle, Civil Engineers, dated February 3, 1999.
3. *Final Turn of the Century Specific Plan Financing Plan*, prepared by Economic & Planning Systems, dated January 15, 2003.
4. *City of Woodland Standard Specifications and Details 2002*, prepared by City of Woodland Public Works Department.
5. *Final Yuba Community College District - Woodland Community College Campus Master Plan*, prepared by Lionakis Beaumont Design Group, dated September 2001.
6. *Turn of the Century Specific Plan Environmental Impact Report*, prepared by EIP Associates.
7. *Final Supplement to the Turn of the Century Specific Plan EIR*, prepared by EIP Associates, dated August 2003.
8. *Spring Lake Specific Plan Design Standards, City of Woodland*, prepared by Williams Paddon Architects and Planners Inc., September 22, 2003.
9. *90% Civil Improvement Plans (Package A) and Design Memorandum for SLSP Backbone Infrastructure*, by Cunningham Engineering Corporation, dated May 21, 2004.

Water:

10. *City of Woodland Water Master Plan, City of Woodland, 1996-1999*.
11. *Technical Memorandum – Hydraulic Modeling for the Spring Lake Development, City of Woodland*, prepared by GeoTrans, Inc., dated July 18, 2003.

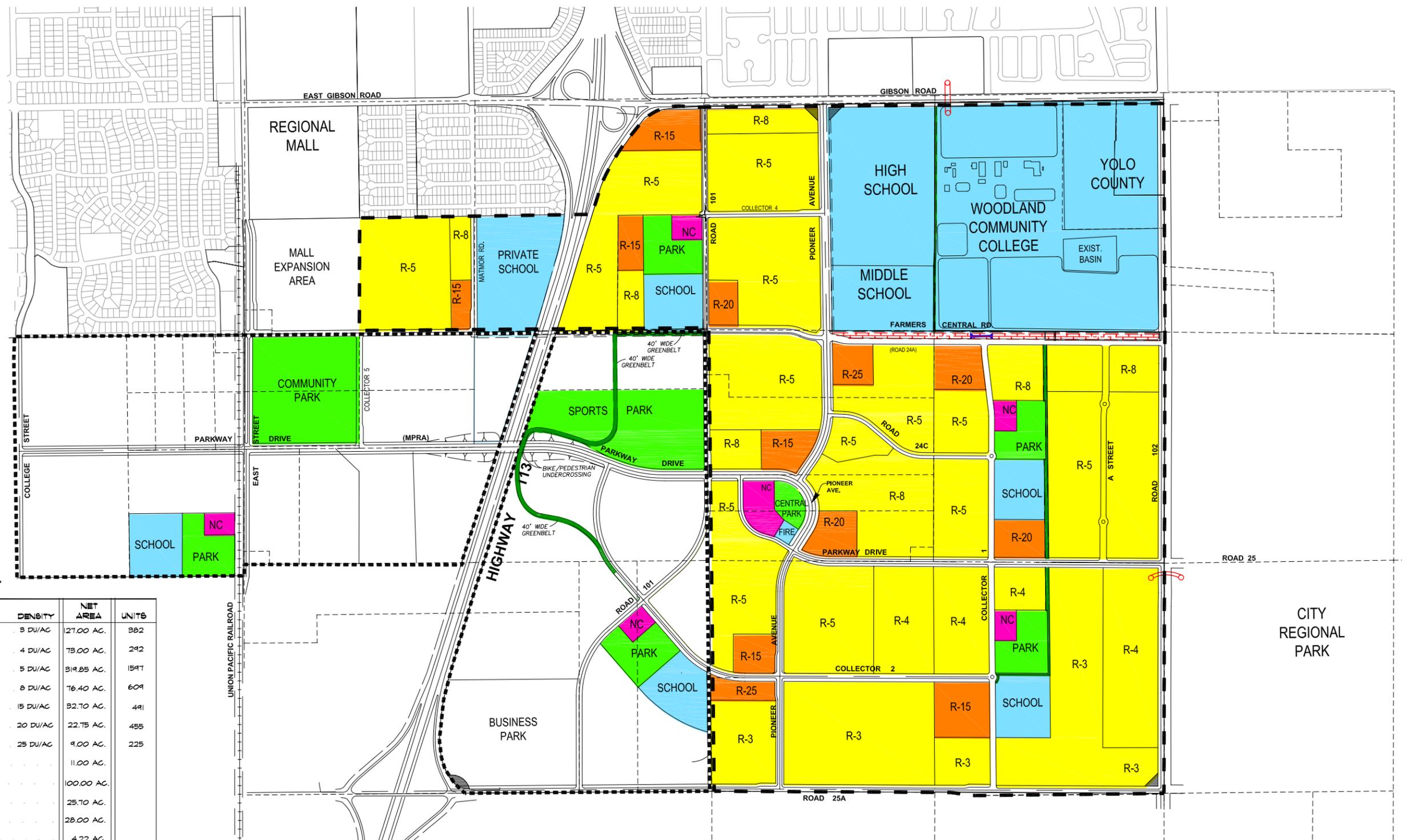
Wastewater:

12. *City of Woodland Wastewater Collection System Master Plan Report*, prepared by CH2M Hill, dated January 2000.
13. *Evaluation of the Sewer System Alternatives for the Spring Lake Specific Plan*, prepared by G.S. Dodson & Associates, dated January 2002.
14. *Final Pre-design Report, Off-Site Sewer System for the Spring Lake Specific Plan*, prepared by G.S. Dodson & Associates, dated April 1, 2003.
15. *100% Design Submittal for the Spring Lake Specific Plan*, prepared by G.S. Dodson & Associates, dated May 28, 2003.
16. *CH2MHill – Gibson Trunk Sewer Hydraulic Capacity Review, November 2000*

Storm Drainage:

17. *City of Woodland Storm Drainage Facilities Master Plan*, prepared by Borcalli & Associates, Inc., dated December 1999.
18. *City of Woodland Storm Drainage Facilities Master Plan Update and Preliminary Engineering, Technical Memorandum Task G: Spring Lake Specific Plan Drainage Master Plan* prepared by Borcalli & Associates, Inc., dated November 16, 2001.
19. *Technical Memorandum Task G: East Regional Detention Pond – Alternative 1* prepared by Borcalli & Associates, Inc., dated January 18, 2002.
20. *Technical Memorandum – Draft. City of Woodland Draft Task G: East Regional Detention Pond – Alternative 2* prepared by Wood Rodgers, dated April 25, 2002.
21. *Technical Memorandum – Preliminary Draft. City of Woodland Draft Task G: East Regional Detention Pond – Alternative 2B* prepared by Wood Rodgers, dated April 25, 2002.
22. *City of Woodland Storm Drainage Facilities Master Plan Update: Storm Drainage Guidelines and Criteria, Preliminary Draft* prepared by Wood Rodgers, dated August 1, 2002.
23. *Technical Memorandum – Draft. City of Woodland, Storm Drainage Facilities Master Plan – South Urban Area – Alternative 3* prepared by Wood Rodgers, dated August 15, 2002.
24. *Preliminary Engineering Report - City of Woodland, South Urban Area Regional Storm Drainage Facilities (SLSPA Phase 1)*, prepared by Wood Rodgers, dated April 11, 2003.
25. *Technical Memorandum – Draft: City of Woodland Storm Drain Facilities Master Plan (8164.012) - Spring Lake Specific Plan Area, Drainage Facilities Master Plan*. Prepared by Wood Rodgers, dated July 25, 2003.
26. *City of Woodland Regional Storm Drainage Facilities Project – Interceptor Conveyance Facility Hydraulics*, prepared by Wood Rodgers dated November 20, 2003 (11x17” Profile Drawing/Hydraulics Summary Sheet).
27. *City of Woodland Storm Drainage Facilities Master Plan Update – Technical Memorandum – Investigation of Alternatives (Draft)*. Prepared by Wood Rodgers, dated February 18, 2004.
28. *100% Plan Submittal for South Urban Growth Area Regional Storm Drainage Facilities Project (SLSPA – Phase 1A)*, Prepared by Wood Rodgers, dated March 16, 2004.
29. *Drainage Design Memorandum for Package A SLSP Backbone Infrastructure*, by Cunningham Engineering Corporation, dated May 21, 2004.

APPENDIX B
STREET LIGHTING STANDARDS



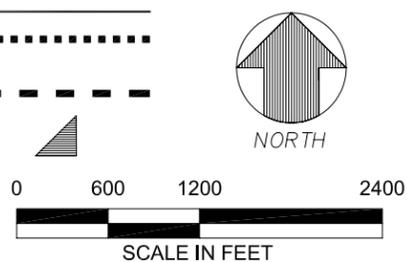
LAND USE SUMMARY

KEY	USE	DENSITY	NET AREA	UNITS
R-3	SINGLE FAMILY RESIDENTIAL	3 DU/AC	27.00 AC.	382
R-4	SINGLE FAMILY RESIDENTIAL	4 DU/AC	79.00 AC.	292
R-5	SINGLE FAMILY RESIDENTIAL	5 DU/AC	319.85 AC.	1597
R-8	SINGLE FAMILY RESIDENTIAL	8 DU/AC	76.40 AC.	609
R-15	MULTI FAMILY RESIDENTIAL	15 DU/AC	32.70 AC.	491
R-20	MULTI-FAMILY RESIDENTIAL	20 DU/AC	22.75 AC.	455
R-25	MULTI FAMILY RESIDENTIAL	25 DU/AC	9.00 AC.	225
NC	NEIGHBORHOOD COMMERCIAL		11.00 AC.	
SCHOOL	PUBLIC SCHOOLS		100.00 AC.	
PRIVATE SCHOOL	PRIVATE SCHOOL		25.70 AC.	
PARK	PARKS		28.00 AC.	
GREENBELT	GREENBELT AREAS		4.22 AC.	
FIRE	FIRE STATION		1.00 AC.	
MAJOR ROADS AND STREETS	MAJOR ROADS AND STREETS		107.28 AC.	
WCC	WOODLAND COMMUNITY COLLEGE (INCLUDES RELOCATED DRAINAGE CHANNEL)		20.50 AC.	
YOLO	YOLO COUNTY		31.00 AC.	
DRAINAGE	DRAINAGE		7.50 AC.	
TOTALS			1036.8AC.	4,051

NOTE: NET ACREAGES DO NOT INCLUDE STREETS WITH RIGHT OF WAYS LARGER THAN 60'.

LEGEND

- MASTER PLAN REMAINDER AREA BOUNDARY
- SPECIFIC PLAN BOUNDARY
- COMMUNITY GATEWAY ENTRIES



2940 SPAFFORD ST.
Davis, CA 95616
530.758.2026
Fax: 530.758.2066
cecdavis.com

JUNE 11, 2004

SPRING LAKE SPECIFIC PLAN

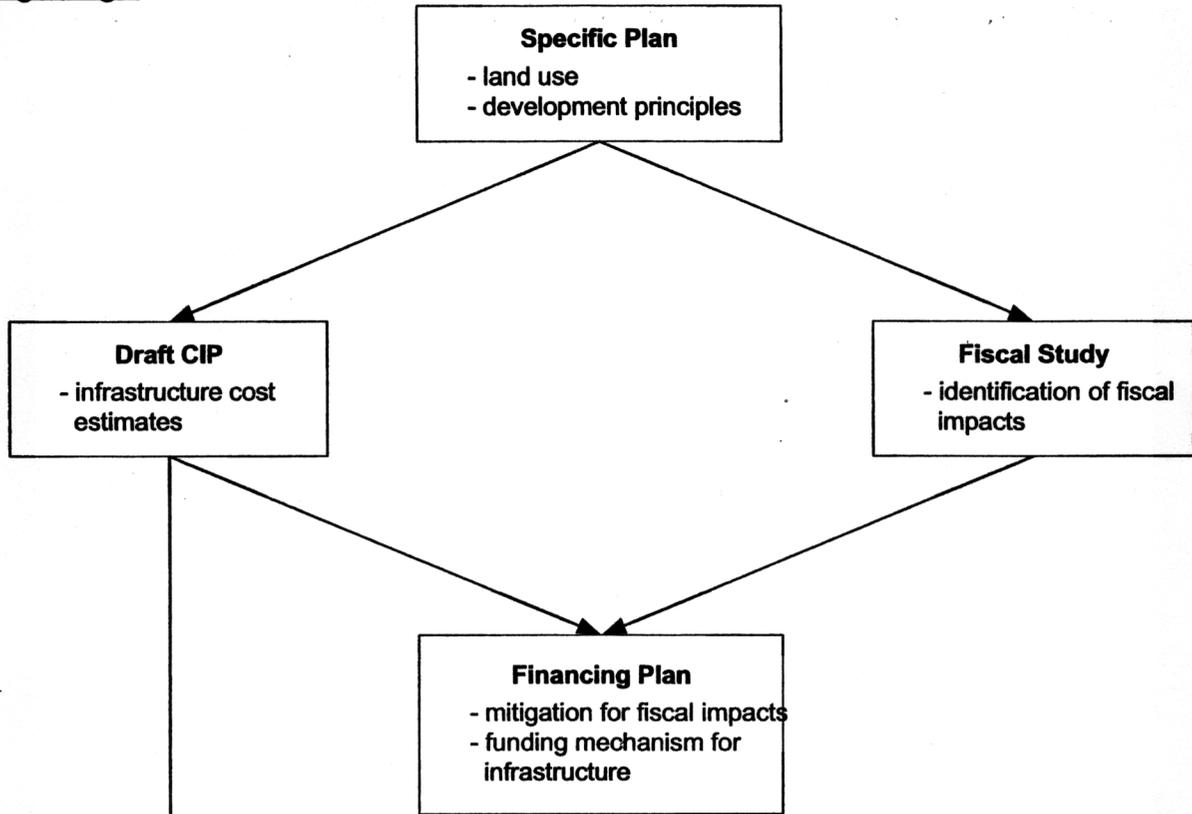
INFRASTRUCTURE STUDY REPORT

FIGURE 1.1 - SPECIFIC PLAN LAND USE MAP

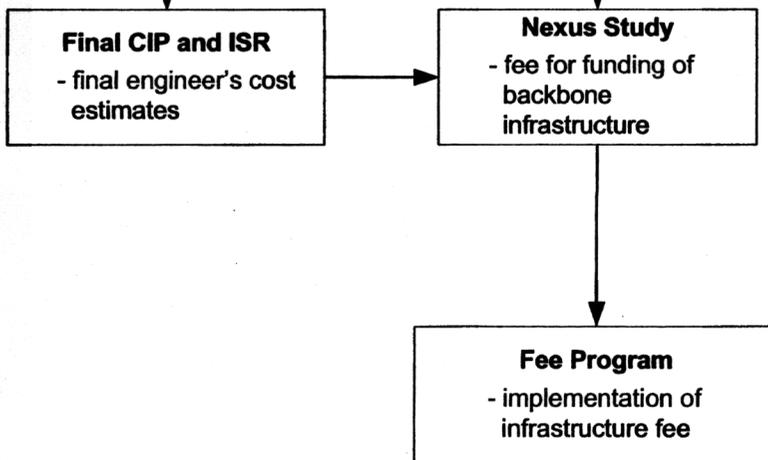
S:\Autocad\400\477 SPRING LAKES - TOC\477-07 INFRASTRUCTURE PLAN\EXHIBITS\E-SP LAND USE ELEMENT-2.dwg - FIGURE 1.2 7/29/2004 - 10:15AM Plotted by: john

Spring Lake Specific Plan Planning and Implementation Process

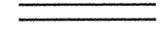
Planning Stage

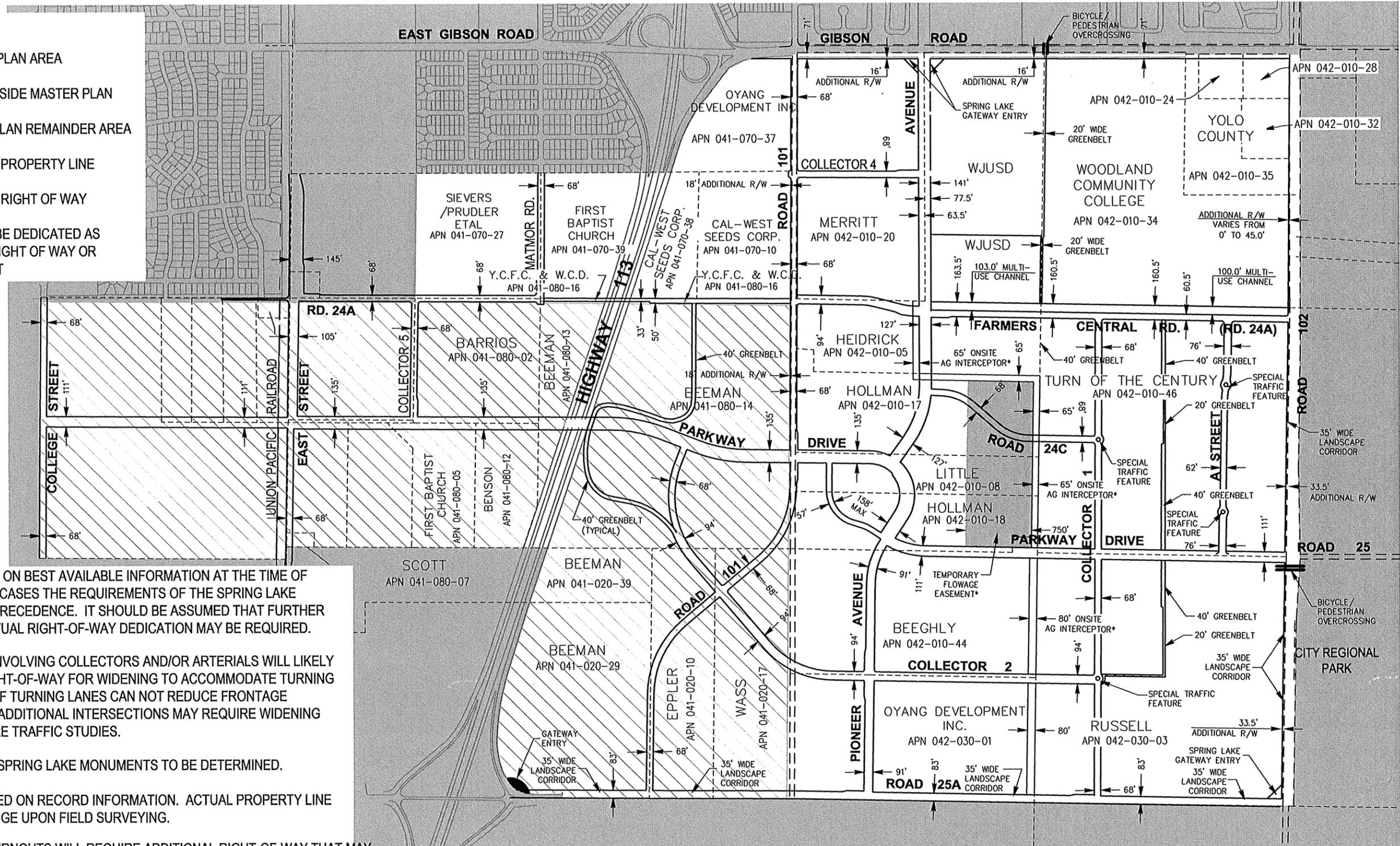


Implementation Stage



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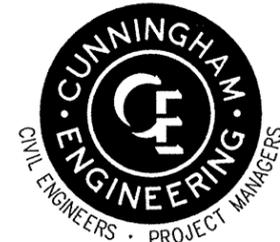
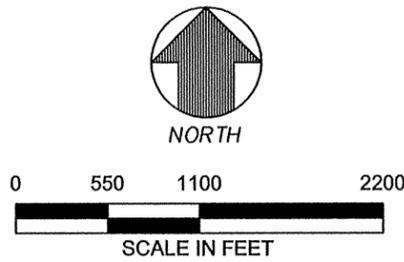
-  .. SPECIFIC PLAN AREA
-  .. AREA OUTSIDE MASTER PLAN
-  .. MASTER PLAN REMAINDER AREA
-  .. EXISTING PROPERTY LINE
-  .. EXISTING RIGHT OF WAY
-  .. AREA TO BE DEDICATED AS STREET RIGHT OF WAY OR EASEMENT



NOTES:

1. THIS EXHIBIT IS BASED ON BEST AVAILABLE INFORMATION AT THE TIME OF PREPARATION. IN ALL CASES THE REQUIREMENTS OF THE SPRING LAKE SPECIFIC PLAN TAKE PRECEDENCE. IT SHOULD BE ASSUMED THAT FURTHER ADJUSTMENT FOR ACTUAL RIGHT-OF-WAY DEDICATION MAY BE REQUIRED.
2. ALL INTERSECTIONS INVOLVING COLLECTORS AND/OR ARTERIALS WILL LIKELY NEED ADDITIONAL RIGHT-OF-WAY FOR WIDENING TO ACCOMMODATE TURNING LANES. PLACEMENT OF TURNING LANES CAN NOT REDUCE FRONTAGE LANDSCAPE WIDTHS. ADDITIONAL INTERSECTIONS MAY REQUIRE WIDENING DEPENDING ON FUTURE TRAFFIC STUDIES.
3. AREA REQUIRED FOR SPRING LAKE MONUMENTS TO BE DETERMINED.
4. PROPERTY LINES BASED ON RECORD INFORMATION. ACTUAL PROPERTY LINE LOCATIONS MAY CHANGE UPON FIELD SURVEYING.
5. STREETS WITH BUS TURNOUTS WILL REQUIRE ADDITIONAL RIGHT-OF-WAY THAT MAY BE TAKEN FROM FRONTAGE LANDSCAPING WITH APPROVAL FROM THE CITY ENGINEER.
6. BICYCLE / PEDESTRIAN OVERCROSSINGS WILL LIKELY REQUIRE ADDITIONAL RIGHT-OF-WAY (TO BE DETERMINED).

* ONSITE AGRICULTURE STORM WATER INTERCEPTOR AND TEMPORARY FLOWAGE EASEMENT ARE TEMPORARY AND WILL BE ELIMINATED AND RELOCATED (SIZE AND LOCATION TO BE DETERMINED) AS DEVELOPMENT PROGRESSES FROM EAST TO WEST.



2940 SPAFFORD ST.
 Davis, CA 95616
 530.758.2026
 Fax: 530.758.2066
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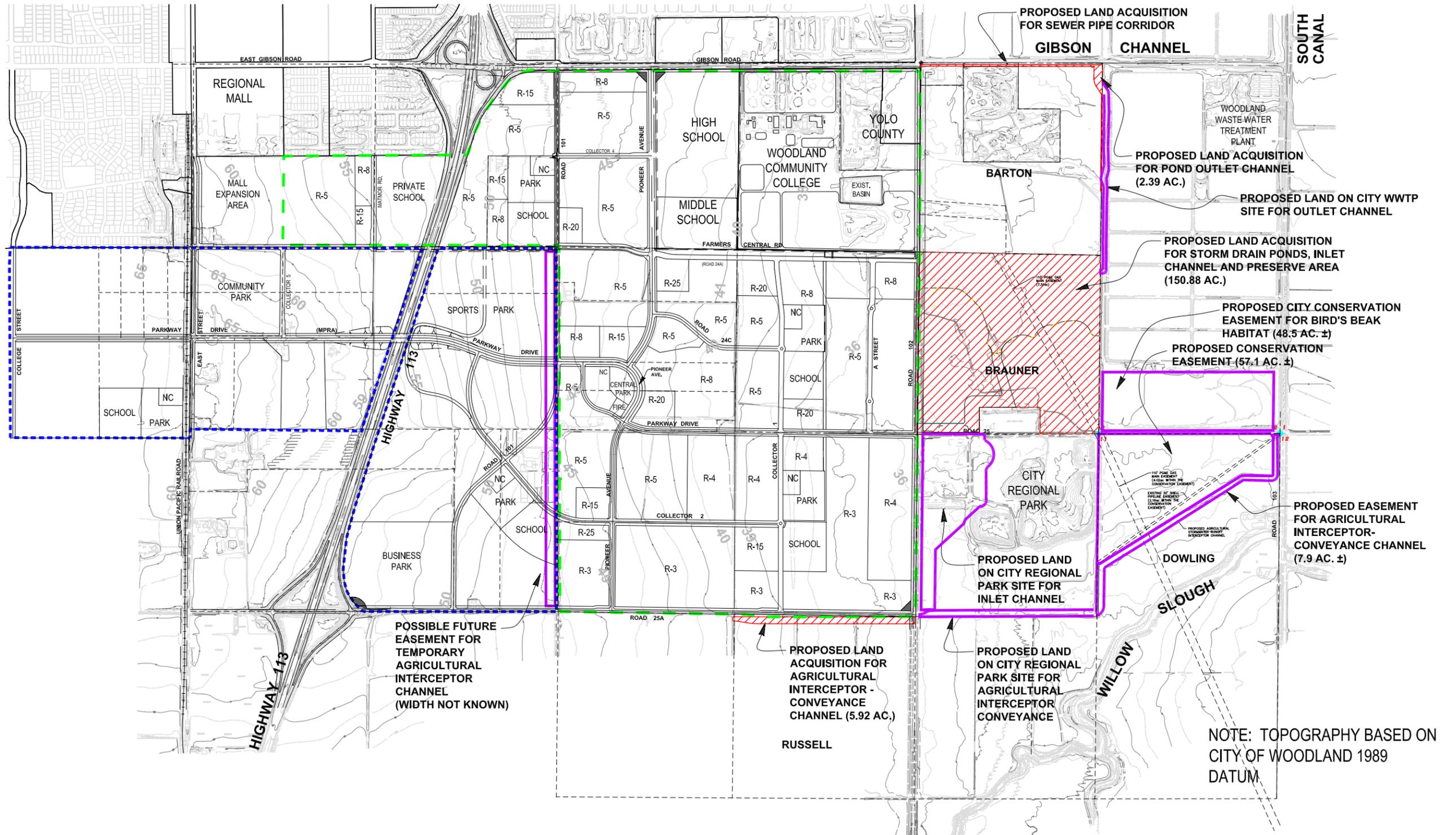
APRIL 8, 2004

SPRING LAKE SPECIFIC PLAN

INFRASTRUCTURE STUDY REPORT

FIGURE 1.3 - PRELIMINARY LAND DEDICATION MAP

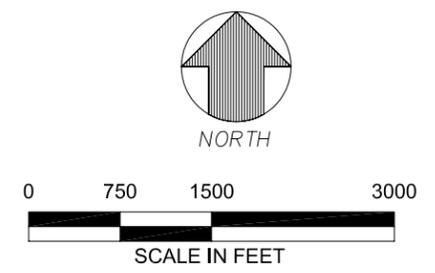
S:\AutoCAD\400\477 SPRING LAKES - TOC\477-07 INFRASTRUCTURE PLAN\EXHIBITS\SR-Dedication Exhibit-2.dwg - FIGURE 1.3 6/09/2004 - 6:02PM Plotted by: john



NOTE: TOPOGRAPHY BASED ON CITY OF WOODLAND 1989 DATUM

LEGEND:

- - - .. SPECIFIC PLAN BOUNDARY
- - - .. MASTER PLAN REMAINDER AREA BOUNDARY
- / / / .. LAND ACQUISITION AREA
- .. EASEMENTS





2940 SPAFFORD ST.
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530.758.2026
Fax: 530.758.2066
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SPRING LAKE SPECIFIC PLAN

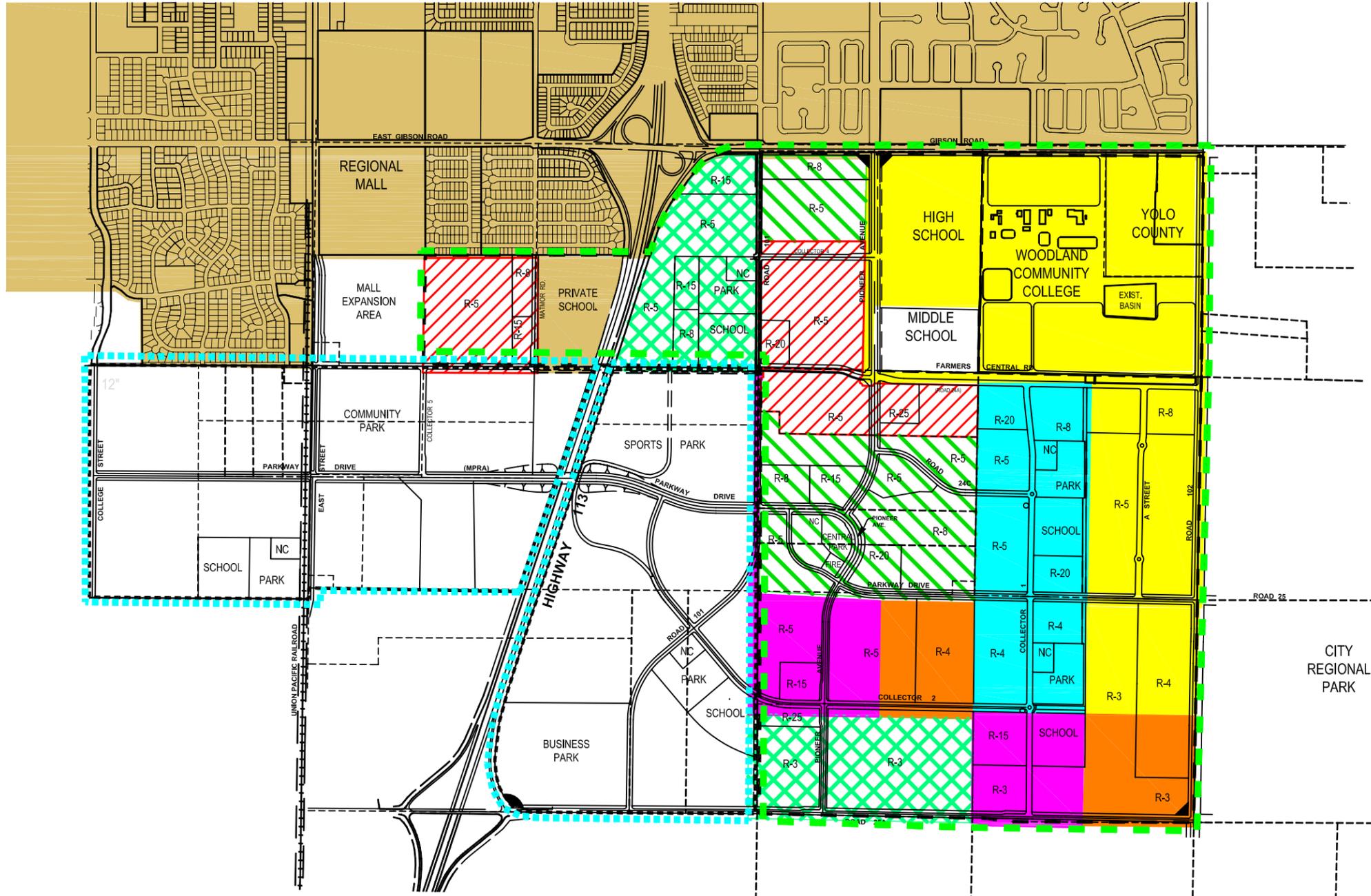
INFRASTRUCTURE STUDY REPORT

FIGURE. 1.4 - OFFSITE LAND ACQUISITION MAP

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LEGEND:

-  .. SPECIFIC PLAN BOUNDARY
-  .. MASTER PLAN REMAINDER AREA BOUNDARY
-  .. STAGE 1 (2004 - 2005)
-  .. STAGE 2 (2005 - 2006)
-  .. STAGE 3 (2006 - 2007)
-  .. STAGE 4 (2007 - 2009)
-  .. PROBABLE STAGE 5 / 6 (2009 - ?)
-  .. ANY STAGE ONCE PROPERTY OWNER HAS EXTENDED BACKBONE INFRASTRUCTURE
-  .. EXISTING DEVELOPMENT
-  .. PROBABLE STAGES 7 & 8



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 Davis, CA 95616
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 Fax: 530.758.2066
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JUNE 11, 2004

SPRING LAKE SPECIFIC PLAN

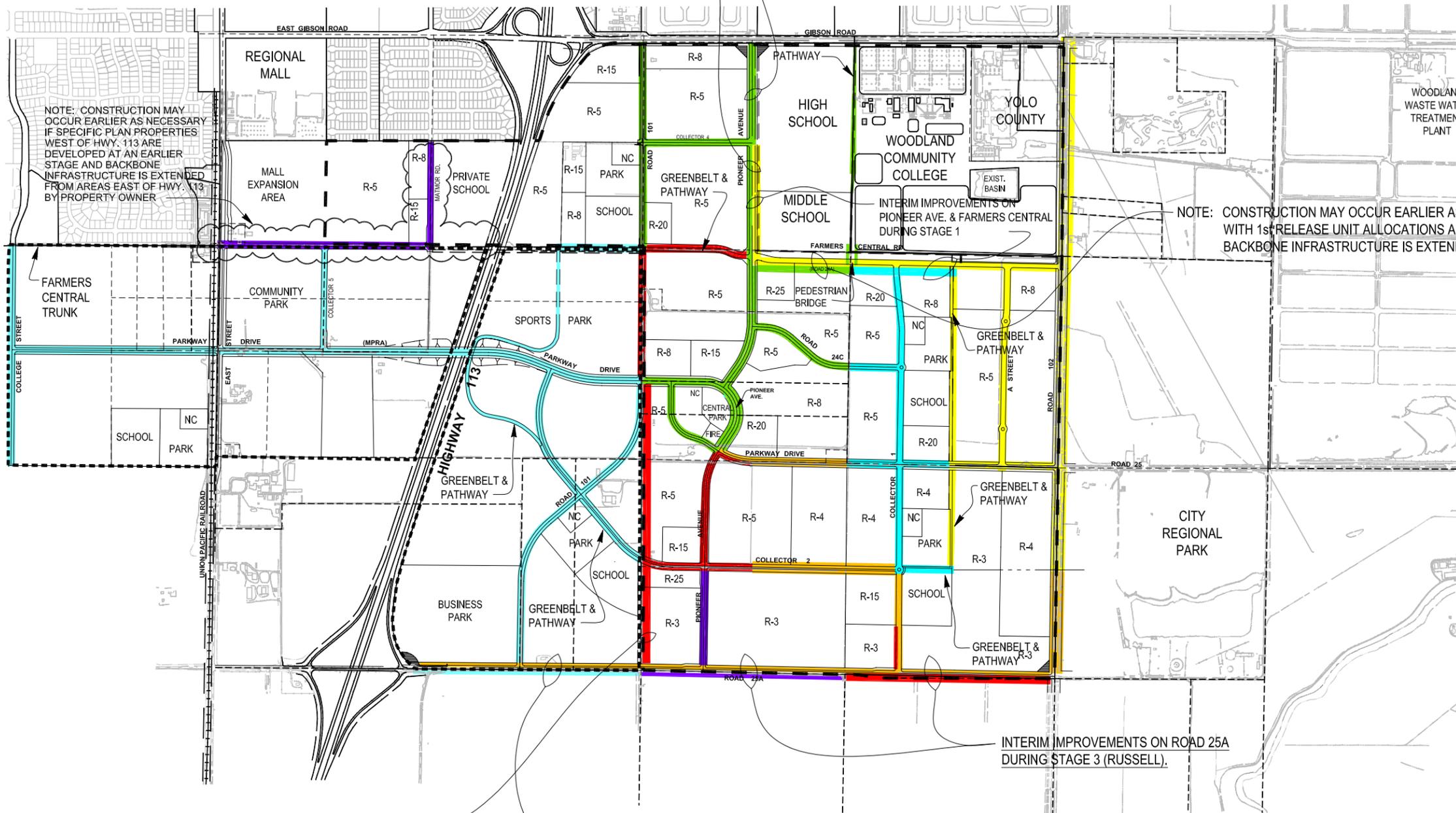
INFRASTRUCTURE STUDY REPORT

FIGURE 1.5 - DEVELOPMENT STAGES



NOTE: CONSTRUCTION MAY OCCUR EARLIER AS NECESSARY IF SPECIFIC PLAN PROPERTIES WITH 1st RELEASE UNIT ALLOCATIONS ARE DEVELOPED AT AN EARLIER STAGE AND BACKBONE INFRASTRUCTURE IS EXTENDED BY PROPERTY OWNERS.

INTERIM IMPROVEMENTS ON PIONEER AVE. BY HIGH SCHOOL (PRIOR TO STAGE 1)



NOTE: CONSTRUCTION MAY OCCUR EARLIER AS NECESSARY IF SPECIFIC PLAN PROPERTIES WEST OF HWY. 113 ARE DEVELOPED AT AN EARLIER STAGE AND BACKBONE INFRASTRUCTURE IS EXTENDED FROM AREAS EAST OF HWY. 113 BY PROPERTY OWNER

NOTE: CONSTRUCTION MAY OCCUR EARLIER AS NECESSARY IF SPECIFIC PLAN PROPERTIES WITH 1st RELEASE UNIT ALLOCATIONS ARE DEVELOPED AT AN EARLIER STAGE AND BACKBONE INFRASTRUCTURE IS EXTENDED BY PROPERTY OWNERS.

LEGEND:

- .. SLSP STAGE 1
- .. SLSP STAGE 2
- .. SLSP STAGE 3
- .. SLSP STAGE 4
- .. PROBABLE SLSP STAGE 5/6
- .. PROBABLE SLSP STAGE 7/8
- .. MASTER PLAN REMAINDER AREA
- .. SPECIFIC PLAN BOUNDARY
- .. MASTER PLAN REMAINDER AREA BOUNDARY

INTERIM IMPROVEMENTS ON EXISTING ROAD 101 DURING STAGE 4.

INTERIM IMPROVEMENTS ON ROAD 25A DURING STAGE 3 (BEEGHLY OR RUSSELL).

INTERIM IMPROVEMENTS ON ROAD 25A DURING STAGE 3 (RUSSELL).



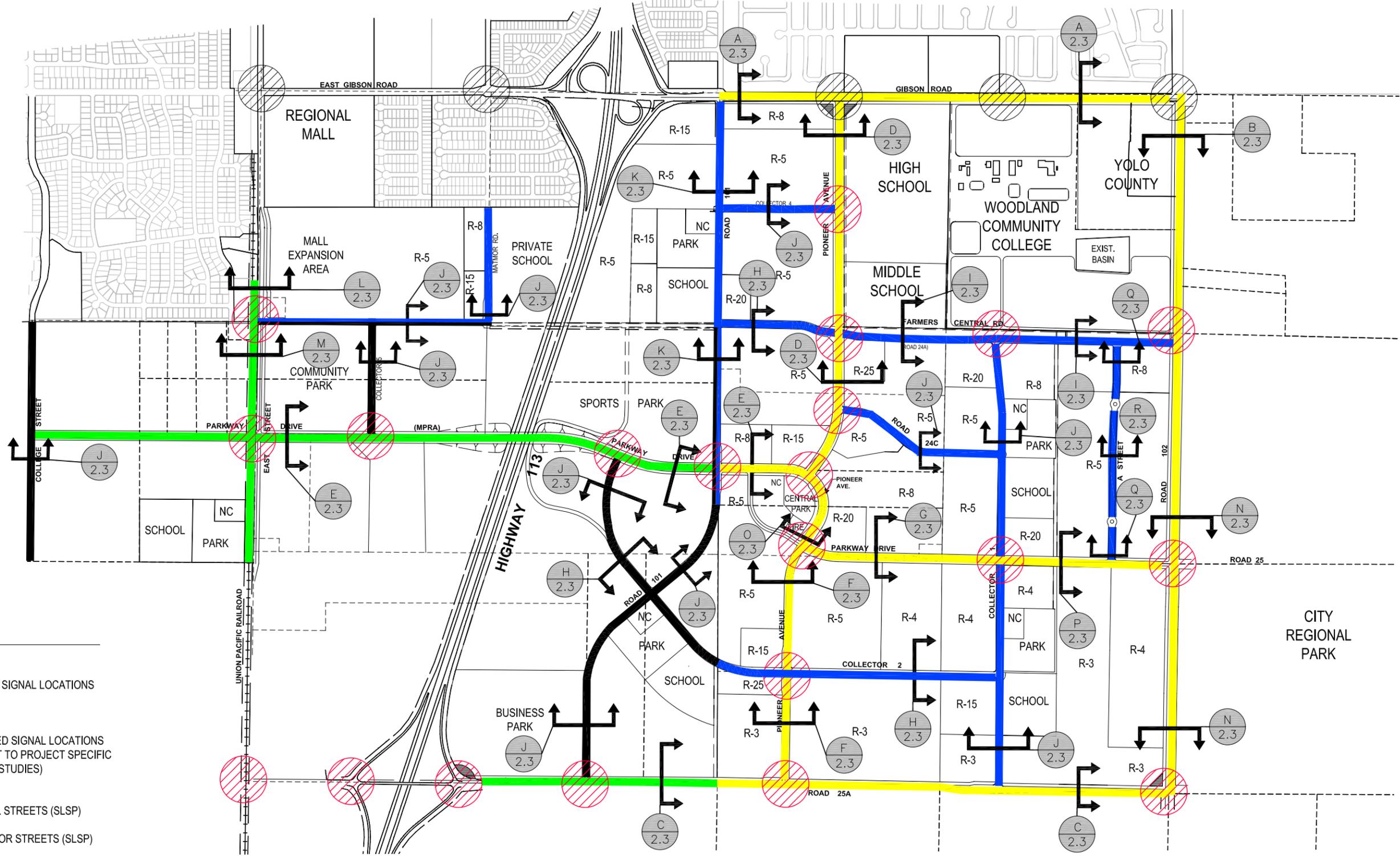
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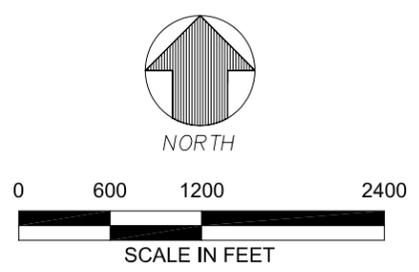
FIGURE 2.1 - STREET LAYOUT



LEGEND:

-  .. EXISTING SIGNAL LOCATIONS
-  .. PROPOSED SIGNAL LOCATIONS (SUBJECT TO PROJECT SPECIFIC TRAFFIC STUDIES)
-  .. ARTERIAL STREETS (SLSP)
-  .. COLLECTOR STREETS (SLSP)
-  .. ARTERIAL STREETS (MPRA)
-  .. COLLECTOR STREETS (MPRA)

NOTE:
 EAST STREET FROM PARKWAY DRIVE TO MASTER PLAN LINE IS TO BE DETERMINED. THIS SEGMENT IS SHOWN AS A 68' RIGHT OF WAY ON THE LAND USE MAP AS A PLACEHOLDER. SEE TABLE 4.1 OF SPECIFIC PLAN FOR ADDITIONAL INFORMATION.





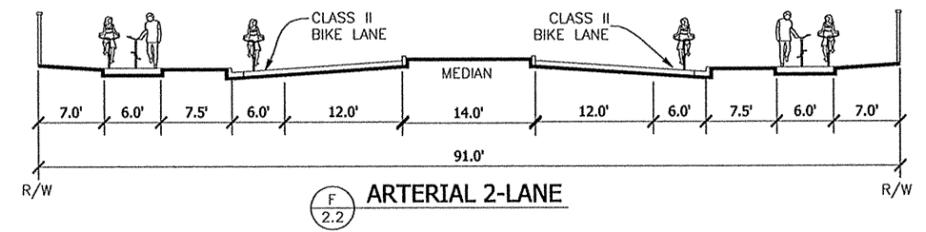
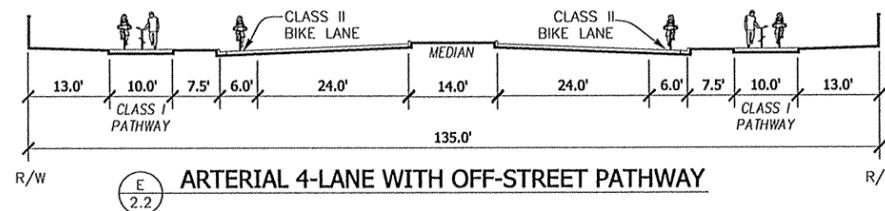
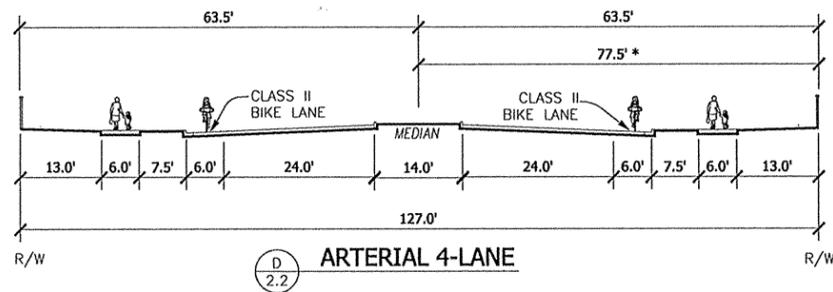
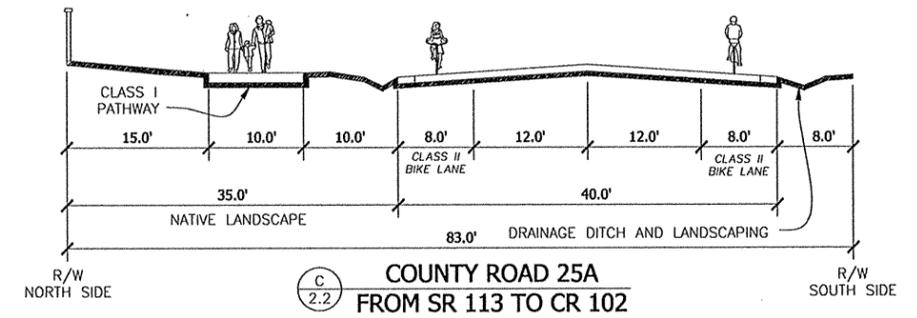
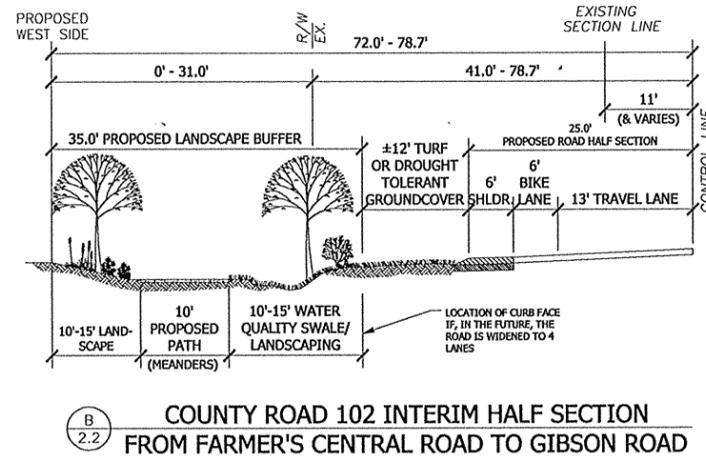
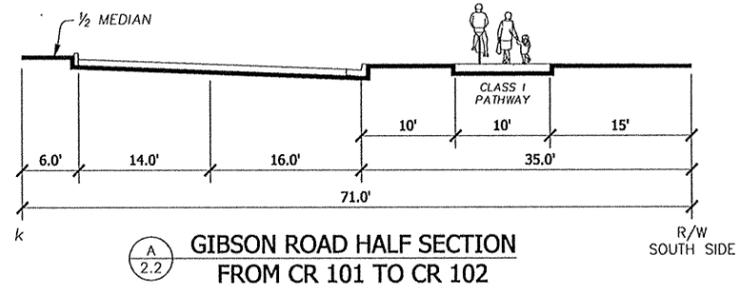
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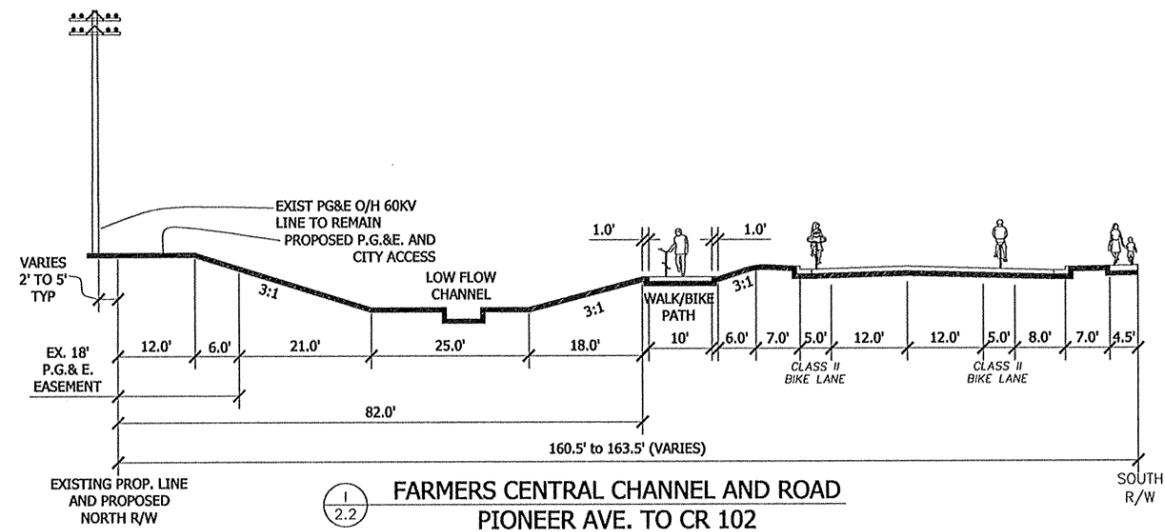
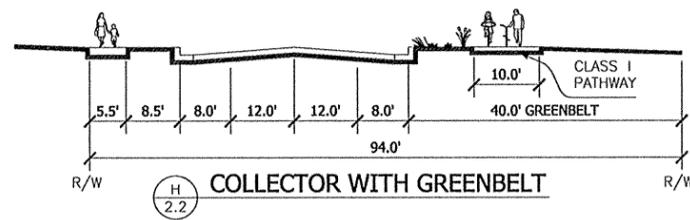
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FIGURE 2.2 - ARTERIAL & COLLECTOR ST. AND SIGNAL LOCATION LAYOUT



* 141' ROW FROM GIBSON ROAD TO FARMER'S CENTRAL ROAD ADJACENT TO W.J.U.S.D. PROPERTY.



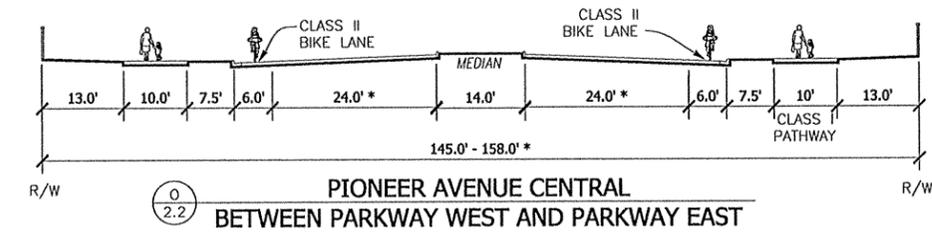
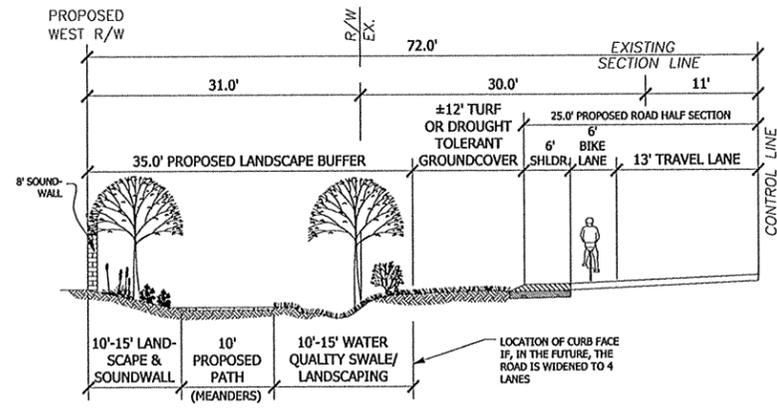
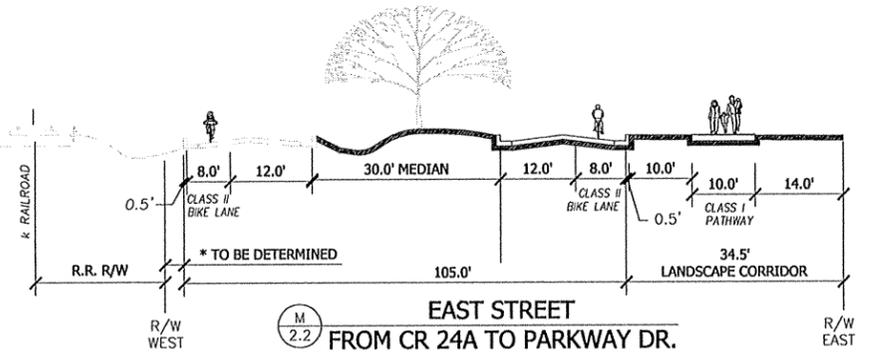
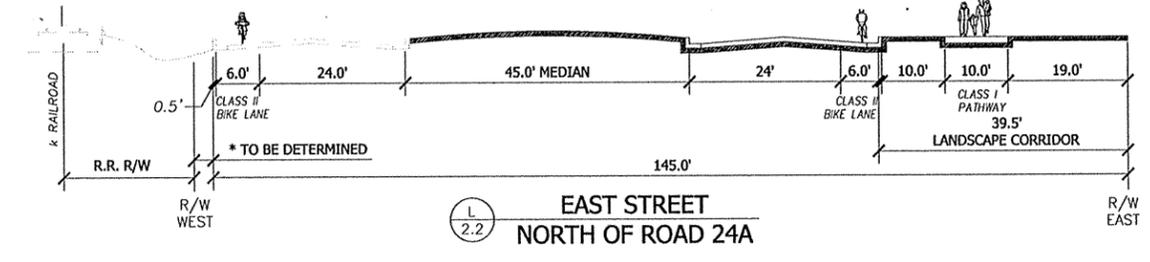
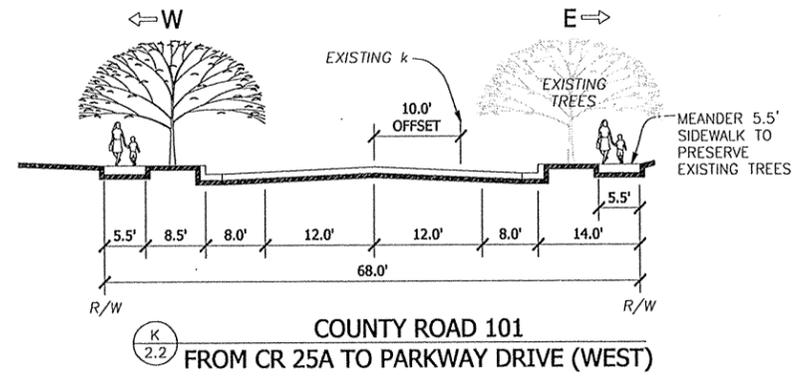
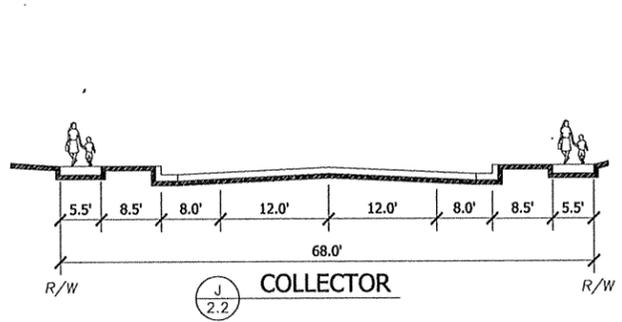
- Notes: ① Mirror Image For Farmer's Central Road
② No Houses Will Front On The Greenbelt Side Of The Street



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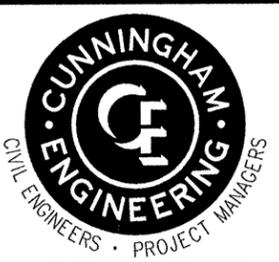
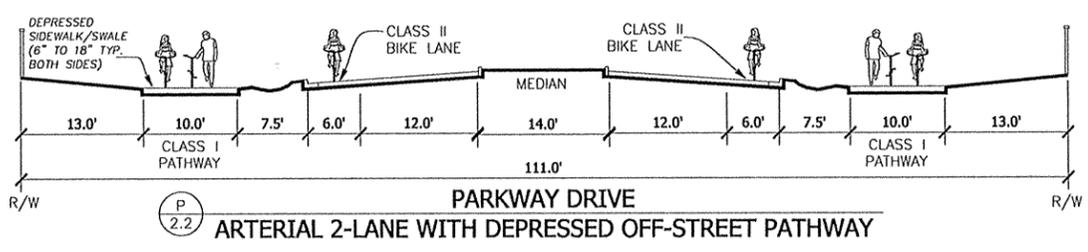
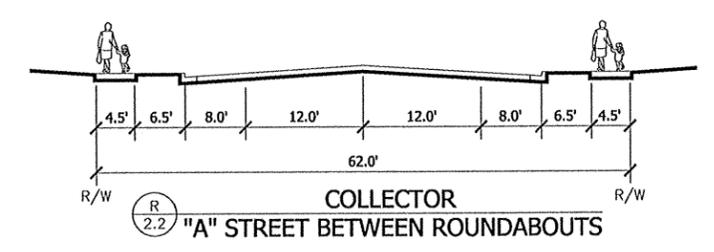
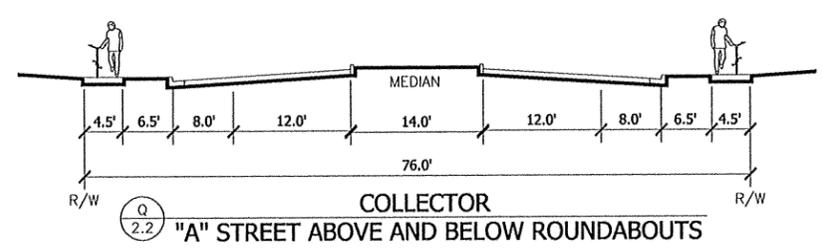
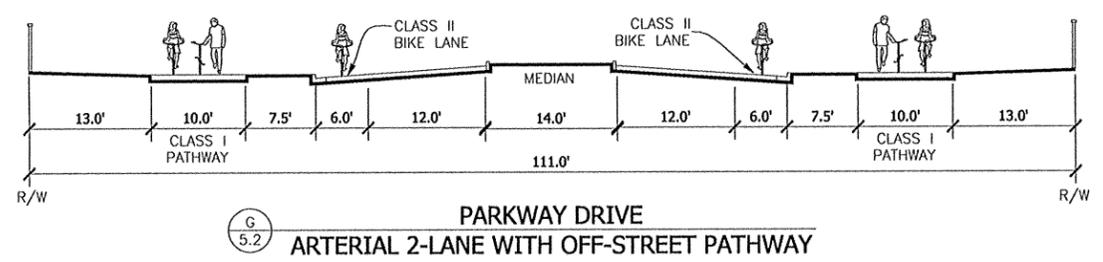
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**FIGURE 2.3A - MAJOR STREET
CROSS-SECTIONS**



* ADDITIONAL WIDTH REQUIRED FOR TURN LANES.
MINIMUM ANTICIPATED CURB-TO-CURB WIDTH IS 84'.

N 2.2 COUNTY ROAD 102 INTERIM HALF SECTION FROM CR 25A TO FARMER'S CENTRAL ROAD



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FIGURE 2.3B - MAJOR STREET CROSS-SECTIONS

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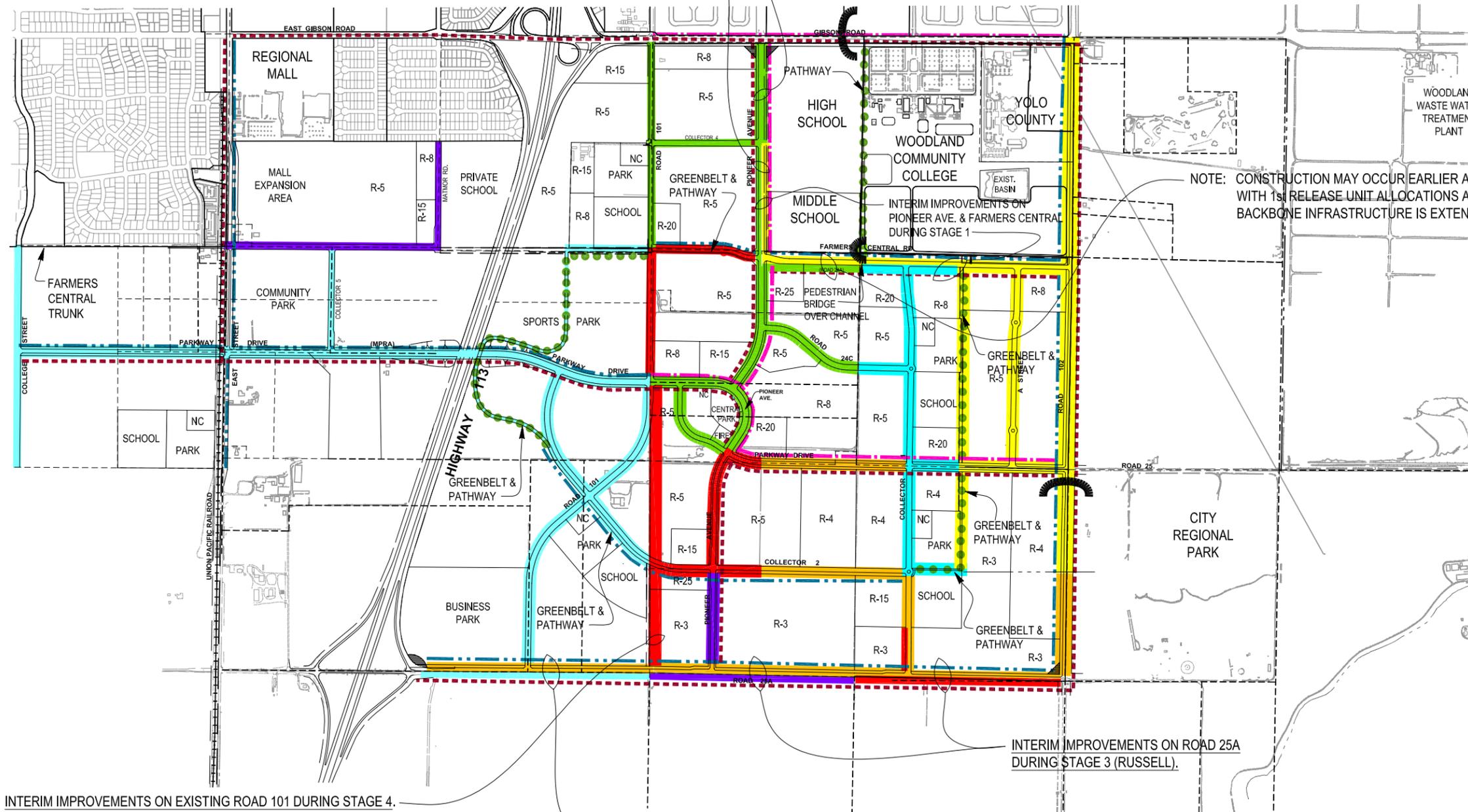
S:\Autocad\400\477 SPRING LAKES - TOC\477-07 INFRASTRUCTURE PLAN\EXHIBITS\E-RD SECTS_2-3B.dwg - FIGURE 2.3B 6/09/2004 - 6:02PM Plotted by: john



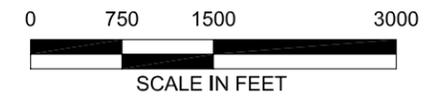
NOTE: CONSTRUCTION MAY OCCUR EARLIER AS NECESSARY IF SPECIFIC PLAN PROPERTIES WITH 1st RELEASE UNIT ALLOCATIONS ARE DEVELOPED AT AN EARLIER STAGE AND BACKBONE INFRASTRUCTURE IS EXTENDED BY PROPERTY OWNERS.

INTERIM IMPROVEMENTS ON PIONEER AVE. BY HIGH SCHOOL (PRIOR TO STAGE 1)

NOTE: CONSTRUCTION MAY OCCUR EARLIER AS NECESSARY IF SPECIFIC PLAN PROPERTIES WITH 1st RELEASE UNIT ALLOCATIONS ARE DEVELOPED AT AN EARLIER STAGE AND BACKBONE INFRASTRUCTURE IS EXTENDED BY PROPERTY OWNERS.



- LEGEND:**
- .. SLSP STAGE 1
 - .. SLSP STAGE 2
 - .. SLSP STAGE 3
 - .. SLSP STAGE 4
 - .. PROBABLE SLSP STAGE 5/6
 - .. PROBABLE SLSP STAGE 7/8
 - .. MASTER PLAN REMAINDER AREA
 - .. GREENBELT W / MULTI-USE PATHWAY
 - .. MULTI-USE PATHWAY AS PART OF R.O.W. (ONE SIDE)
 - .. MULTI-USE PATHWAY AS PART OF R.O.W. (BOTH SIDES)
 - .. ON-STREET STRIPED BICYCLE LANES (BOTH SIDES)
 - .. BICYCLE / PEDESTRIAN OVERCROSSING



INTERIM IMPROVEMENTS ON EXISTING ROAD 101 DURING STAGE 4.

INTERIM IMPROVEMENTS ON ROAD 25A DURING STAGE 3 (BEEGHLI OR RUSSELL).

INTERIM IMPROVEMENTS ON ROAD 25A DURING STAGE 3 (RUSSELL).



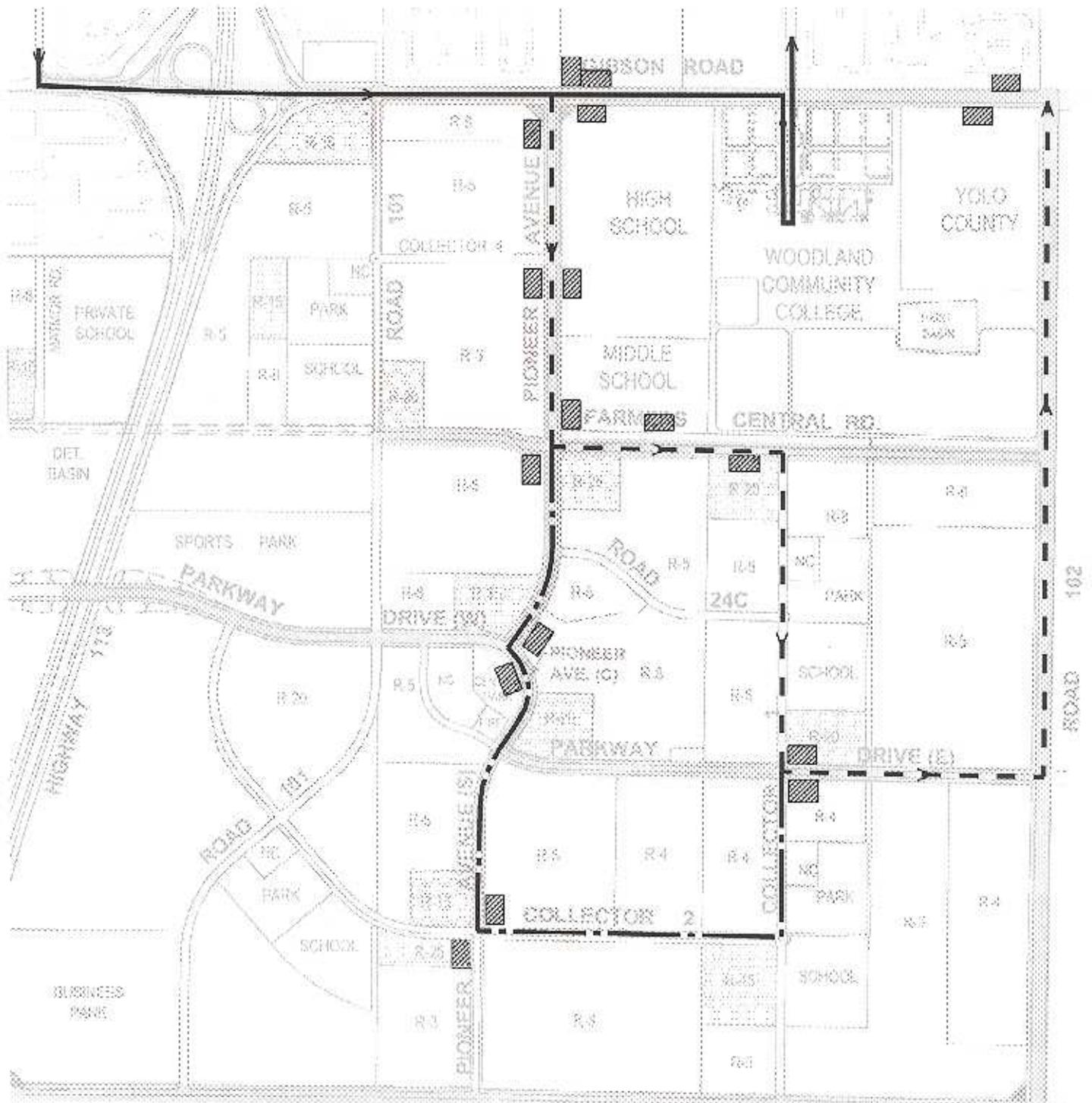
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FIGURE 2.4 - BICYCLE CIRCULATION LAYOUT



-  EXISTING BUS ROUTE
-  FUTURE BUS ROUTE (PHASE 1)
-  FUTURE BUS ROUTE (PHASE 2)

-  PROPOSED MULTI-FAMILY PROJECTS
-  PROPOSED BUS STOPS
-  ON-STREET STRIPED BICYCLE LANE

NOTES:
 1) 2 LANE ARTERIALS AND COLLECTORS WILL HAVE TURNOUTS, 4 LANE ARTERIALS AND COLLECTORS WILL NOT.
 2) ULTIMATE BUS ROUTES WILL BE DETERMINED IN CONJUNCTION WITH YOLO COUNTY TRANSPORTATION DISTRICT AND CITY OF WOODLAND BASED ON DEMAND AND COMMUNITY NEED.

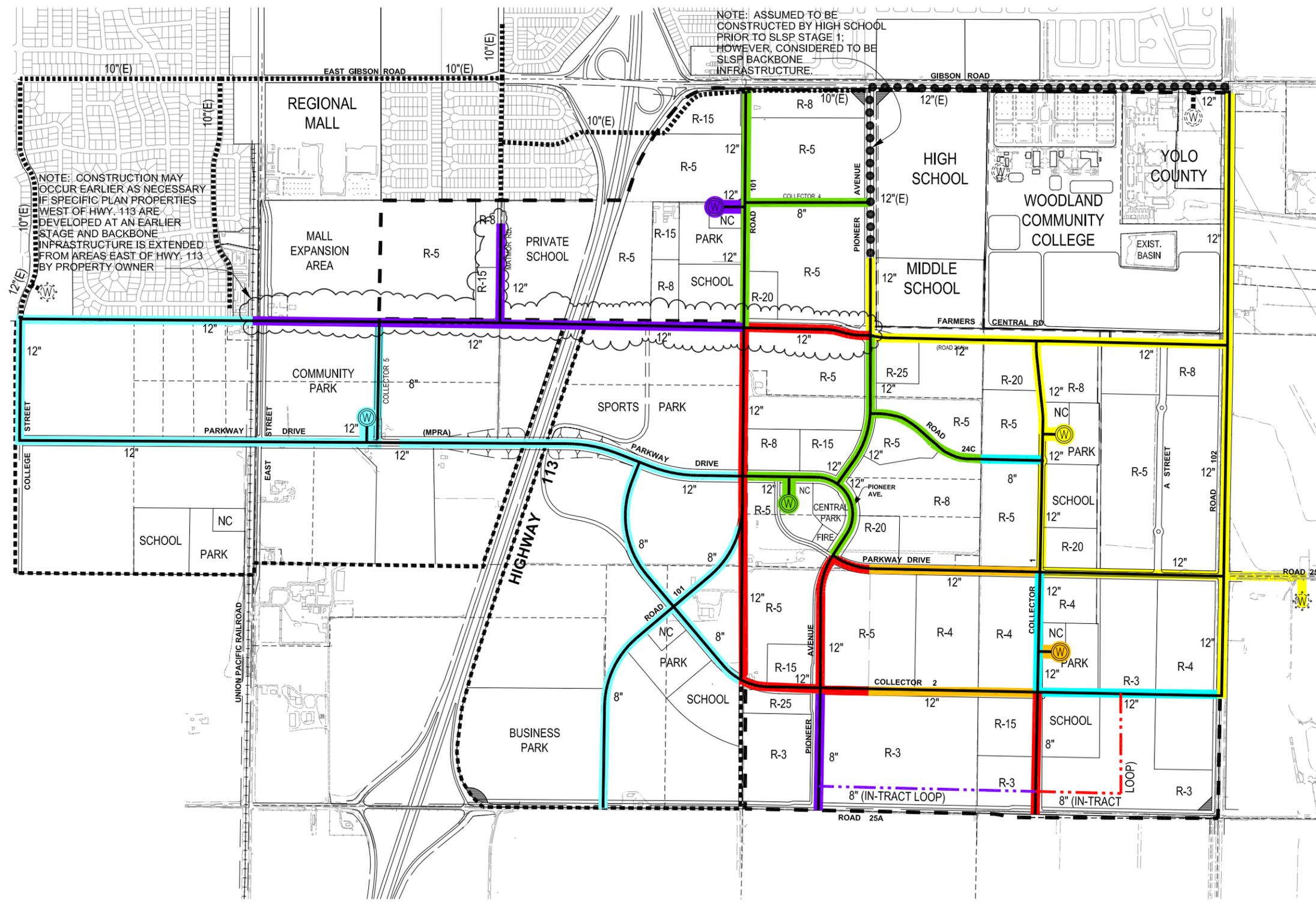


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FIGURE 2.5 - BUS ROUTES/STOPS

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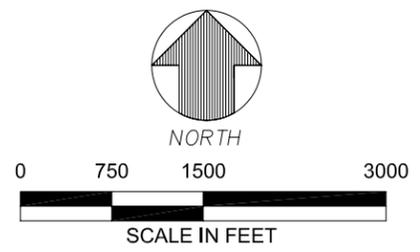


NOTE: ASSUMED TO BE CONSTRUCTED BY HIGH SCHOOL PRIOR TO SLSP STAGE 1; HOWEVER, CONSIDERED TO BE SLSP BACKBONE INFRASTRUCTURE.

NOTE: CONSTRUCTION MAY OCCUR EARLIER AS NECESSARY IF SPECIFIC PLAN PROPERTIES WEST OF HWY. 113 ARE DEVELOPED AT AN EARLIER STAGE AND BACKBONE INFRASTRUCTURE IS EXTENDED FROM AREAS EAST OF HWY. 113 BY PROPERTY OWNER

- LEGEND:**
- SPECIFIC PLAN BOUNDARY
 - MASTER PLAN REMAINDER AREA BOUNDARY
 - 12" .. PROPOSED WATER
 - 10"(E) .. EXISTING WATER MAIN
 - 10"(E) .. EXISTING WATER MAIN w / SLSP COST ALLOCATION
 - ⊙ .. PROPOSED WATER WELL
 - ⊙ .. EXISTING WATER WELL (PRIVATE)
 - ⊙ .. EXISTING WATER WELL (CITY-OWNED)
 - .. SLSP STAGE 1
 - .. SLSP STAGE 2
 - .. SLSP STAGE 3
 - .. SLSP STAGE 4
 - .. PROBABLE SLSP STAGE 5/6
 - .. PROBABLE SLSP STAGE 7/8
 - .. MASTER PLAN REMAINDER AREA

- NOTES:**
1. WATERLINE SIZING SUBJECT TO CHANGE BASED ON FUTURE DEMAND PROJECTIONS AND WATER MODELING.
 2. ONLY THE EXISTING WELL SHOWN ON COLLEGE STREET IS CURRENTLY CONNECTED AS PART OF THE CITY MUNICIPAL WATER SYSTEM.

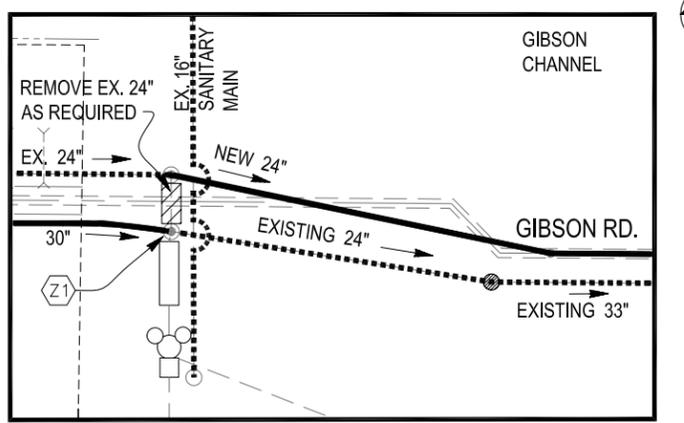
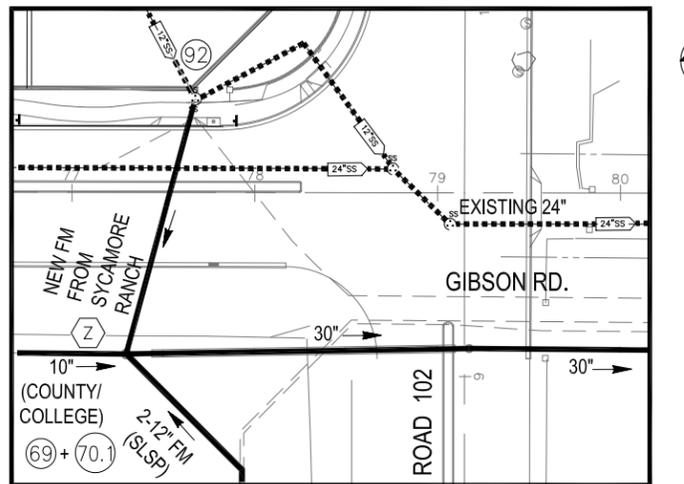
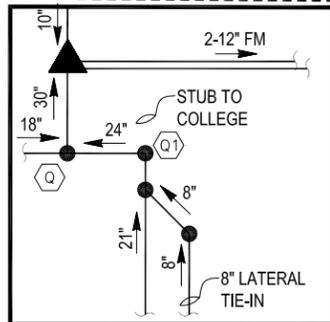
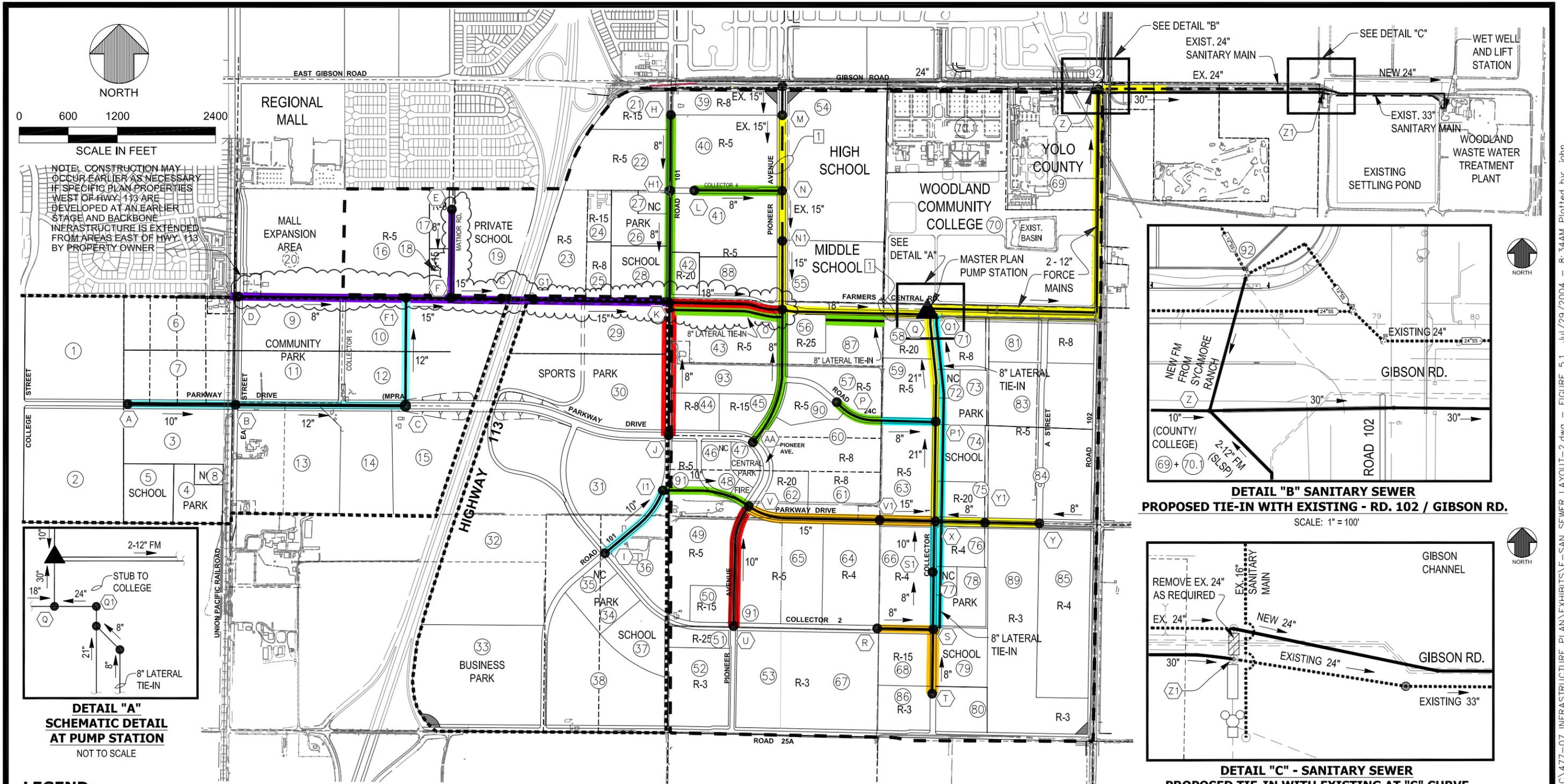


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FIGURE 3.1 - WATER LAYOUT

S:\AutoCAD\400\477 SPRING LAKES - TOC\477-07 INFRASTRUCTURE PLAN\EXHIBITS\E-WATER LAYOUT-2.dwg - FIGURE 4.1 Jul/29/2004 - 10:21AM Plotted by: john



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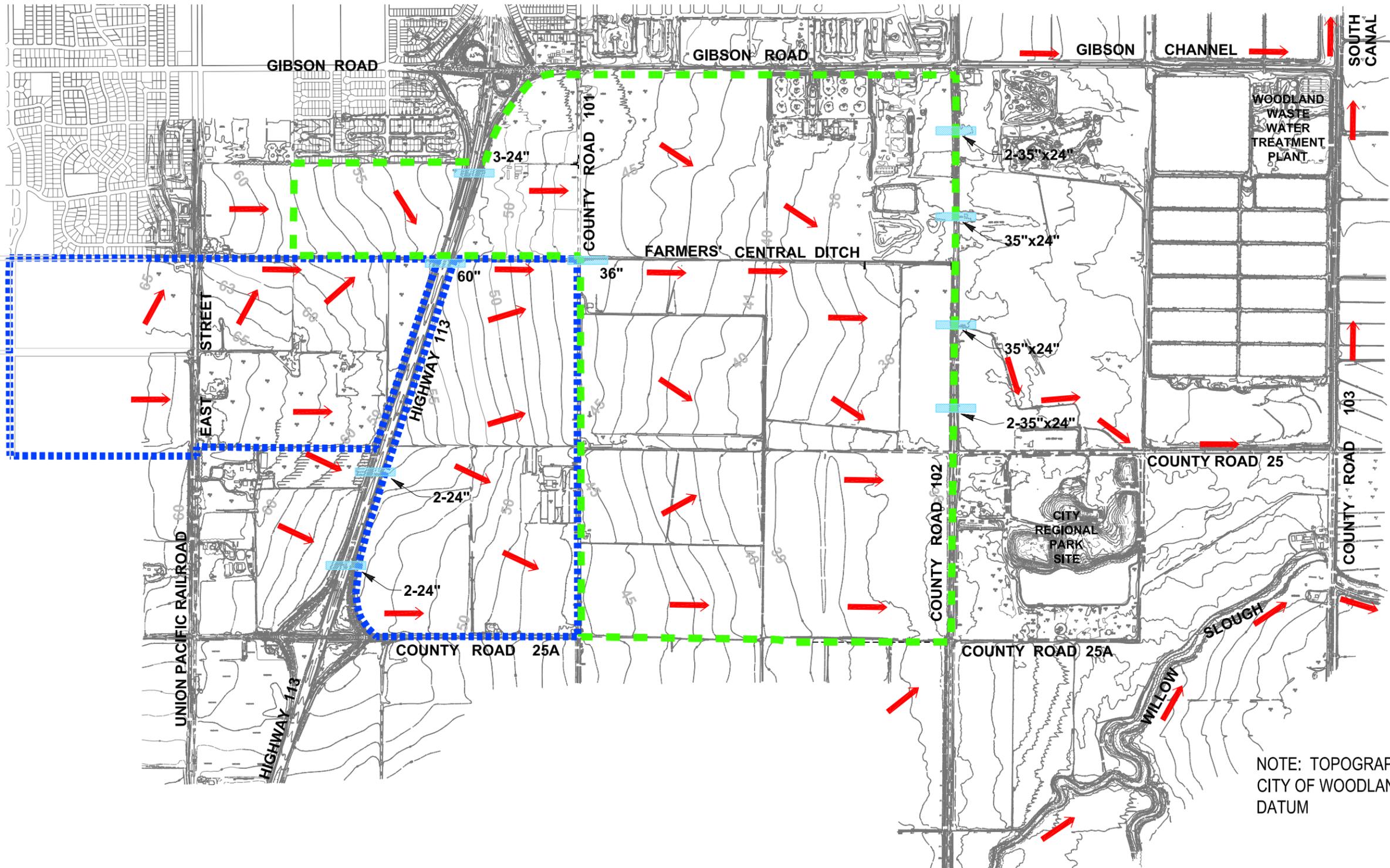
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FIGURE 4.1 - SANITARY SEWER LAYOUT

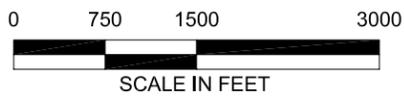
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NOTE: TOPOGRAPHY BASED ON CITY OF WOODLAND 1989 DATUM

LEGEND:

- - - - - .. SPECIFIC PLAN BOUNDARY
- - - - - .. MASTER PLAN REMAINDER AREA BOUNDARY
- .. EXISTING CULVERT
- .. DIRECTIONAL FLOW ARROWS



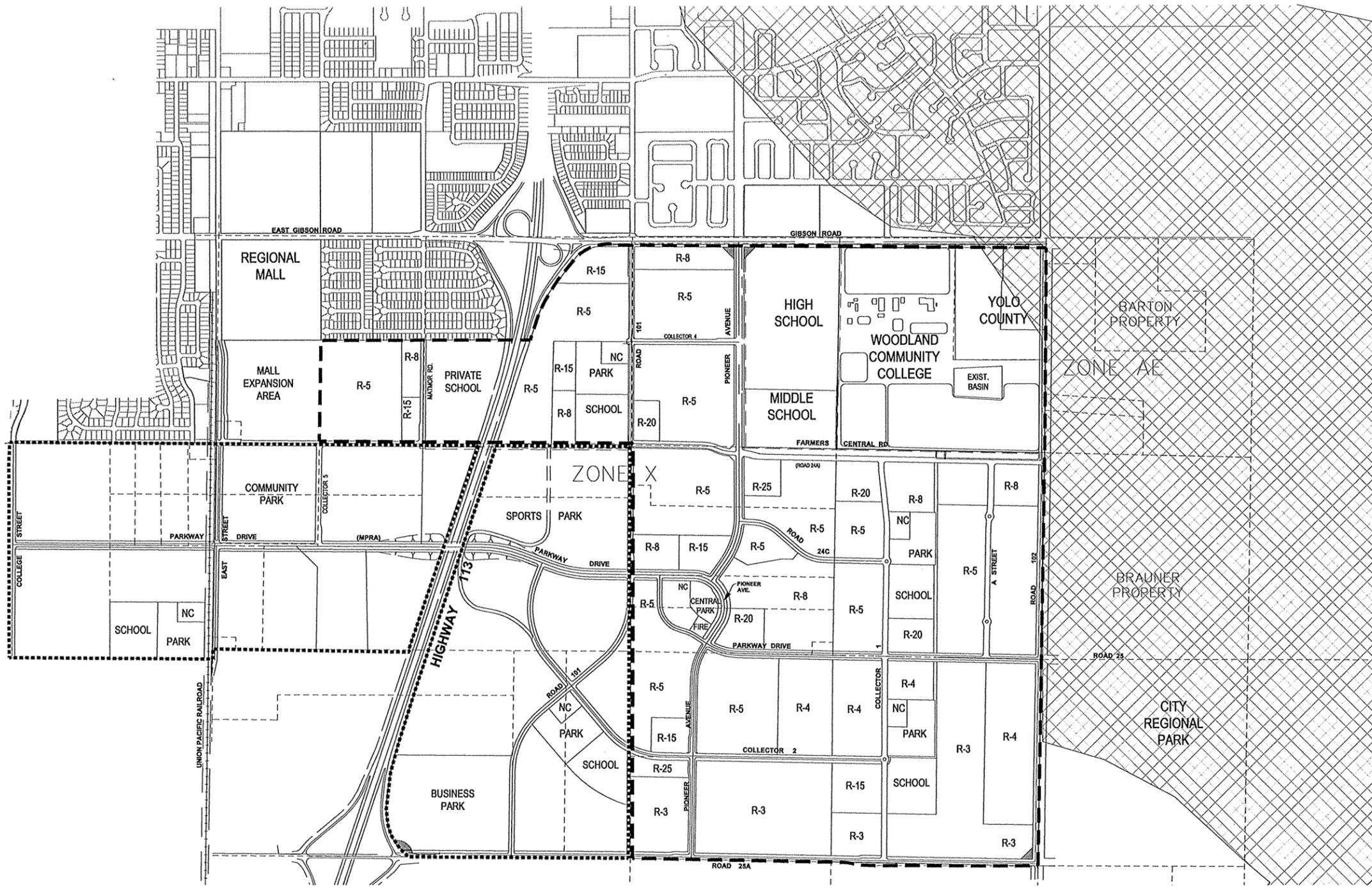
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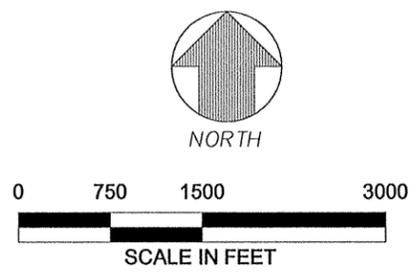
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FIGURE. 5.1 - EXISTING GENERAL DRAINAGE PATTERNS



NOTE:
 Flood zone designations shown hereon are base on the FIRM Flood Insurance Rate Map, Community Panel number 0604230440 F, revised April 17, 2001.

- LEGEND:**
- SPECIFIC PLAN BOUNDARY
 - MASTER PLAN REMAINDER AREA BOUNDARY
 - ▣ ZONE AE Base flood elevation determined
 - ZONE X Areas determined to be outside 500-year floodplain.

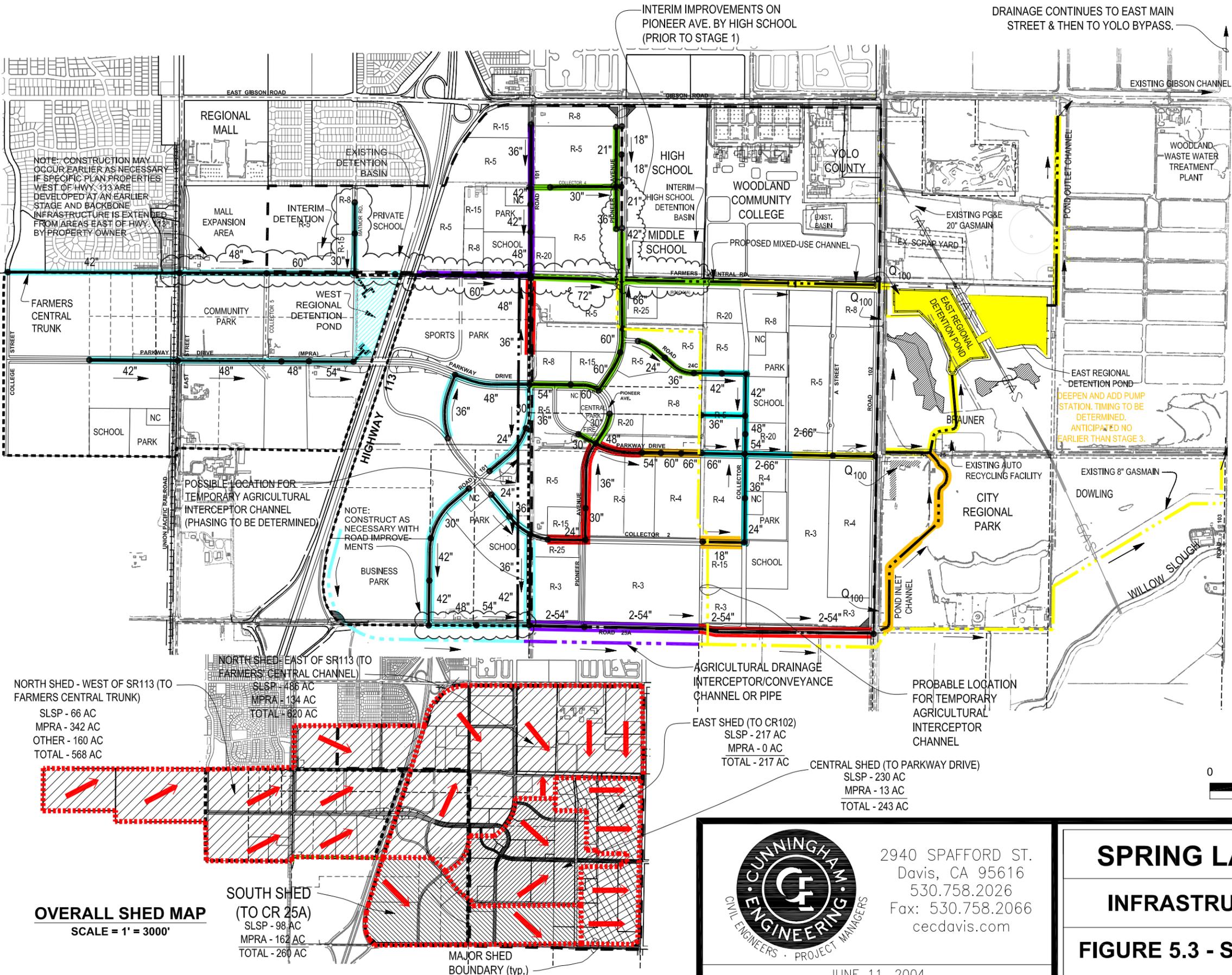


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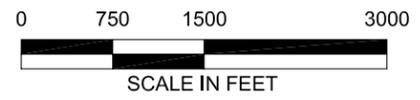
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FIGURE. 5.2 - FEMA FLOOD ZONES

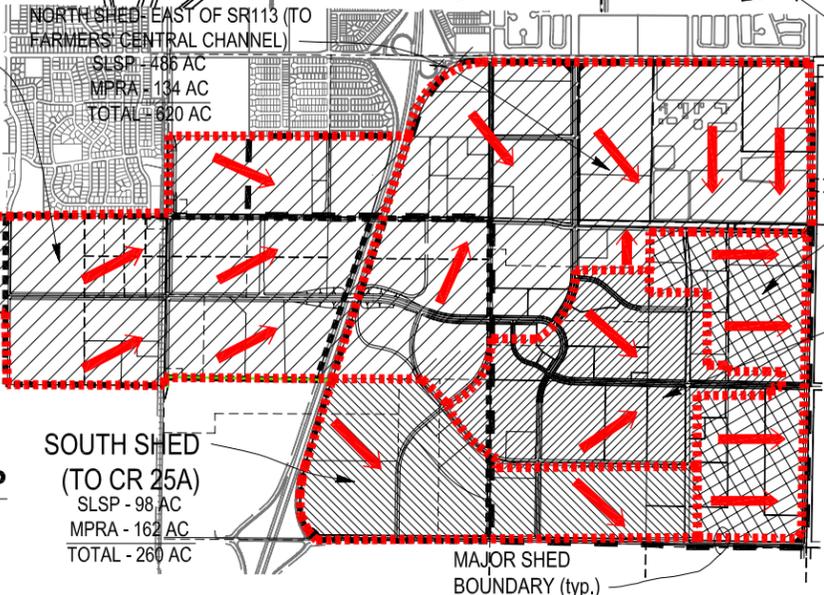


NOTES
 High School Detention Pond to be constructed and paid for by School District.
 See Figure 5.4 for Internal Subsheds

- LEGEND:**
- .. SLSP STAGE 1
 - .. SLSP STAGE 2
 - .. SLSP STAGE 3
 - .. SLSP STAGE 4
 - .. PROBABLE SLSP STAGE 5/6
 - .. PROBABLE SLSP STAGE 7/8
 - .. MASTER PLAN REMAINDER AREA
 - .. 100-YEAR RELEASE AT CR102
 - .. SPECIFIC PLAN BOUNDARY
 - .. MASTER PLAN REMAINDER AREA BOUNDARY
 - .. INTERNAL SHED BOUNDARY
 - .. PROPOSED CHANNEL
 - .. AGRICULTURAL DRAINAGE INTERCEPTOR/CONVEYANCE CHANNEL (SEE COLORS ABOVE FOR STAGING)
 - .. PROPOSED DRAINAGE PIPE
 - .. EXISTING WETLANDS



NORTH SHED - WEST OF SR113 (TO FARMERS CENTRAL TRUNK)
 SLSP - 66 AC
 MPRA - 342 AC
 OTHER - 160 AC
 TOTAL - 568 AC



OVERALL SHED MAP
 SCALE = 1" = 3000'

SOUTH SHED (TO CR 25A)
 SLSP - 98 AC
 MPRA - 162 AC
 TOTAL - 260 AC

EAST SHED (TO CR102)
 SLSP - 217 AC
 MPRA - 0 AC
 TOTAL - 217 AC

CENTRAL SHED (TO PARKWAY DRIVE)
 SLSP - 230 AC
 MPRA - 13 AC
 TOTAL - 243 AC



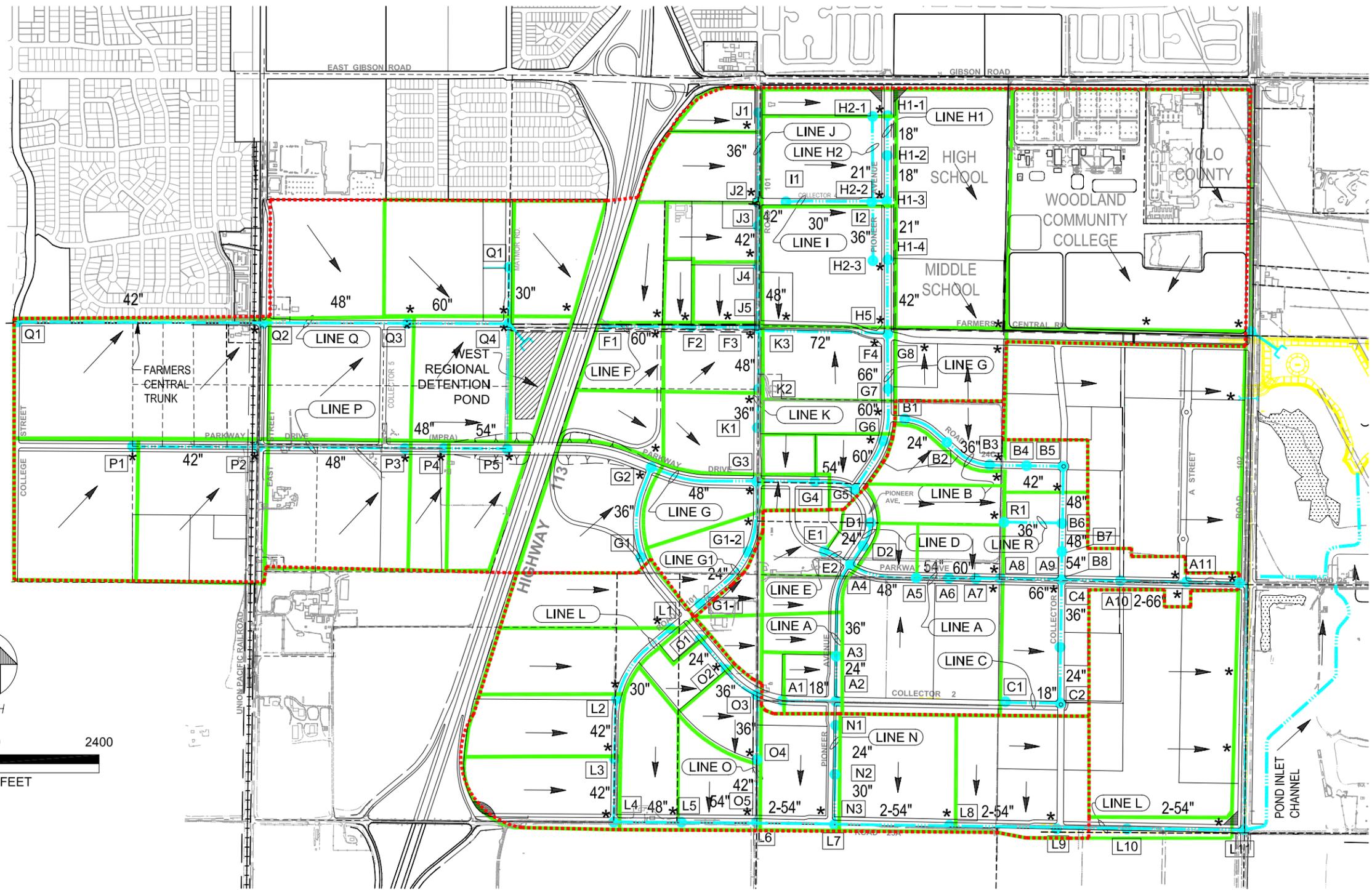
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FIGURE 5.3 - STORM DRAINAGE LAYOUT



LEGEND:

- LINE A .. STORM DRAIN LINE
- L12 .. STORM DRAIN ANALYSIS NODE
- * .. SUBBASIN OVERLAND RELEASE POINT
- MAJOR SHED BOUNDARY
- SUBSHED BOUNDARY
- PROPOSED PIPE OR CHANNEL

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FIGURE 5.4 - STORM DRAIN ANALYSIS NODES & TRIBUTARY AREAS