# *Appendix I-2*
# *Water Quality Management Plan (Conceptual)*

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PROJECT-SPECIFIC

# WATER QUALITY MANAGEMENT PLAN – (CONCEPTUAL)

for:

WARNER AVENUE FROM MAIN STREET TO GRAND AVENUE WIDENING PROJECT

in:

THE CITY OF SANTA ANA, CALIFORNIA

Prepared For:
The City of Santa Ana
P.O. Box 1988
Santa Ana, CA 92702
(714) 647-5690

WQMP Prepared By:
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**Conceptual WQMP Preparation/Revision Date:** JUNE 11, 2013

# DOCUMENT CONTROL

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# TABLE OF CONTENTS

# 1. OWNER'S CERTIFICATION

This Conceptual project-specific Water Quality Management Plan (WQMP) has been prepared for:

SANTA ANA CITY/ORANGE COUNTY by IBI GROUP for the WARNER AVENUE FROM MAIN STREET TO GRAND AVENUE WIDENING PROJECT. This WQMP is intended to comply with the requirements of Santa Ana City and Orange County. If requirements for the preparation and implementation of this report are not consistent between agencies, the most restrictive shall govern.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation of the Water Quality Management Plan or WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions of the Warner Avenue construction area. This WQMP will be reviewed with pertinent facility supervisors, employees, tenants, land owners, maintenance personnel or any other party/stakeholder having responsibility for its implementation as applicable. At least one copy of this WQMP will be maintained at the project site and at the City in perpetuity. Any changes made will need to be reflected in both of these sets

The undersigned is authorized to certify and to approve the implementation of this WQMP. The undersigned is aware that implementation of the WQMP is enforceable under the current Santa Ana City/Orange County Water Quality Ordinance.

If the undersigned transfers its interest in the subject property/project, its successor in interest of the undersigned shall notify the successor in interest of its responsibility to implement this WQMP in perpetuity.

"I certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to any future successors in interest."

(TO BE SIGNED AT FINAL)

_____ _____

Santa Ana City Representative - Signature Date

_____ _____

Santa Ana City Representative - Printed Name Title/Position

# 2. INTRODUCTION

This Conceptual Water Quality Management Plan has been developed to address possible post-construction Urban-Runoff as a result of the future widening of Warner Avenue from Main Street to Grand Avenue and is under the jurisdiction of the Co-Permittees. The drainage basin contributing to the Urban Run-off for the area is the Newport Bay regional basin. The WQMP is intended to provide guidelines for Post-Construction implementation of BMPs in order to manage run-off quantities and the quality of resulting Receiving Waters. The WQMP identifies the BMPs, including design criteria for Treatment Control BMPs that may be applicable when considering any map or permit for which discretionary approval is sought. Examples may include tentative tract maps, parcel maps with land disturbing activity, discretionary grading permits where the Project is not part of a master plan of development and conditional use permits.

This document is intended to be a preliminary conceptual WQMP to support the development of the environmental document for the project. A full WQMP that complies with recent changes to the requirements related to content and format will be prepared as part of subsequent stages of project development.

Implementation of the WQMP will occur through the review and approval by the Co-Permittee of a project-specific WQMP prepared by the project applicant. This preliminary project-specific WQMP will address management of Urban Runoff from a Project site, represented by a map or permit for which discretionary approval is sought from a Co-Permittee. The primary objective of the WQMP, by addressing Site Design, Source Control, and Treatment Control BMPs applied on a project-specific and/or sub-regional or regional basis, is to ensure that the land use approval and permitting process of each Co-Permittee will minimize the impact of Urban Runoff.

## 2.1 CONDITIONS OF APPROVAL

The Co-Permittees will utilize conditions of approval to implement the WQMP requirements. Each Co-Permittee will utilize the following (or substantially similar) conditions of approval for Projects:

Prior to the issuance of a building or grading permit, the applicant shall submit to the Co-Permittee for review and approval, a project-specific WQMP that:

a. Addresses Site Design BMPs such as minimizing impervious areas, maximizing permeability, minimizing directly connected impervious areas, creating reduced or "zero discharge areas, and conserving natural areas

b. Incorporates the applicable Source Control BMPs as described in this WQMP and provides a detailed description of their implementation (recommended procedures will be provided at a later date)

c. Incorporates Treatment Control BMPs as described in the WQMP and provides information regarding design considerations

d. Describes the long-term operation and maintenance requirements for BMPs requiring long-term maintenance

e. Describes the mechanism for funding the long-term operation and maintenance of the BMPs requiring long-term maintenance.

f. Prior to issuance of any building or grading permits, the property owner shall record a "Covenant and Agreement" with the Orange County-Clerk Recorder or other instrument acceptable to the Co- Permittee on a form provided by the Co-Permittee to inform future property owners of the requirement to implement the approved project-specific WQMP. Other alternative instruments for requiring implementation of the approved project-specific WQMP

include: requiring the implementation of the project-specific WQMP in Home Owners Association or Property Owner Association Conditions, Covenants and Restrictions (CC&Rs); formation of Landscape, Lighting and Maintenance Districts, Assessment Districts or Community Service Areas responsible for implementing the project-specific WQMP; or equivalent may also be considered. Alternative instruments must be approved by the Co-Permittee prior to the issuance of any building or grading permits.

h. If the project will cause land disturbance of one acre or more, which this project does, it must comply with the statewide General Permit for Storm Water Discharges Associated with Construction Activity. The project applicant shall cause the approved final project-specific WQMP to be incorporated by reference or attached to the project's Storm Water Pollution Prevention Plan as the Post-Construction Management Plan.

i. Prior to building or grading permit close-out or the issuance of a certificate of occupancy or certificate of use, the applicant shall:

1. Demonstrate that all recommended structural BMPs described in the project-specific WQMP have been constructed and installed in conformance with approved plans and specifications

2. Demonstrate that applicant is prepared to implement all non-structural BMPs described in the approved project-specific WQMP

3. Demonstrate that an adequate number of copies of the approved project-specific WQMP are available for the future owners/occupants

# 3. PROJECT DESCRIPTION

The proposed project area is located in the City of Santa Ana in Orange County, CA and consists of approximately 1 mile of street widening along Warner Avenue between Main Street and Grand Avenue. Total land mass is just over 12 acres in area. This construction provides for some opportunity for infiltrates to be introduced into the existing storm drain system and possibly any existing aquifer. Current report findings indicate that elevated levels of selenium and nitrogen exist in the groundwater within the Santa Ana Watershed. Metals also contribute to degradation of receiving waters in the Orange County area. Common conventional BMPs offer some substantial removal of total recoverable metals.

The City of Santa Ana requires a Project Specific Water Quality Management Plan based on Best Management Practices (BMPs) for Site, Treatment and Source BMPs. This report assesses the effectiveness of recommended BMPs in the Orange County area. Points of contact regarding this report are the following:

**Project Owner:** The City of Santa Ana
P.O. Box 1988
Santa Ana, CA 92702
(714) 647-5690

**WQMP Prepared By:**
IBI Group
18401 Von Karman Avenue, Suite 110
Irvine, CA 92612
(949) 833-5588

**APN Numbers Affected** Numerous. See Appendix B.

**Map Reference:** USGS Southern California Map 6 1994, Tustin Quadrangle California Seismic Hazard Zones

**Project Watershed:** Newport Bay Region

**Permits/Approvals required for the Project:**

| **AGENCY** | **PERMIT REQUIRED** |
|---|---|
| Santa Ana Regional Water Quality Control Board | MS-4 Permit per Order R8-2009-0030 |

# 4. SITE CHARACTERIZATION

Land Use Designation or Zoning: Current land use surrounding Warner Avenue includes Industrial (IND), General Commercial (GC), Low Density Residential (LR-7) and small areas of Open Space (OS). (See Appendix C).

Current Property Use: Private residency, government and manufacturing as well as green space make up the neighborhoods along Warner Avenue. With the presence of open channels in green space areas and by-products of manufactured goods, the potential for contaminants is higher than that of typical residential use. The impact of the project widening in these higher-risk areas needs to be monitored during (SWPPP) and after (WQMP) construction.

Phase 1 Site Assessment: One Recognized Environmental Condition was identified in connection with the site. This is an active gasoline station located at 2245 S. Main Street. Soil and groundwater are impacted with petroleum hydrocarbons. This is an open case with the Santa Ana Regional Water Quality Control Board. The probability of residual pesticides present in soil at levels of concern is very low.

Soils Report: (See Appendix D): This report represents a reconnaissance level investigation only. Soils in this project area are mostly Silty-Sandy Clay and Clays with 5-20% moisture contents. Distressed levels of concrete and asphalt were observed through presence of alligator cracking. Ground water levels are on the order of 5-12 feet below grade. The Newport-Inglewood Fault is located approximately 1.7 miles from Warner Avenue on the west end. The design horizontal acceleration for the site is 0.34g based on this fact. Finally, Warner Avenue is located in a known liquefaction zone.

**Receiving Waters for Urban Run-off from Site**

| Receiving Waters | 303(d) Impairments | Designated Uses | Proximity to RARE Use |
|---|---|---|---|
| Newport Bay | Metals, pesticides, and priority organics | Wildlife habitat<br>Recreation<br>Commercial and sport fishing<br>Preservation of biological habitat<br>Shellfish<br>Municipal and domestic supply<br>Navigation<br>Spawning, reproduction and/or early development<br>RARE | Lower and Upper Newport Beach are designated |

# 5. POLLUTANTS OF CONCERN

Potential pollutants associated with the Urban Run-off this project have been identified to the greatest extent possible given the current conceptual state of the project. The items mentioned reflect typical potential pollutants with general types of development and land use. Co-Permittees may also accept updated studies from the California Association of Stormwater Quality Agencies (CASQA) such as USEPA, SWRCB and/or other commonly accepted agencies/associations acceptable to the Co-Permittee for determination of Pollutants of Concern associated with the project.

**General Categories of Pollutants of Concern**

**Pathogens** – Pathogens (bacteria and viruses) are micro-organisms that thrive under certain environmental conditions. Their proliferation is typically caused by the transport of animal or human fecal wastes from the watershed. Water, containing excessive bacteria and viruses can alter the aquatic habitat and create a harmful environment for humans and aquatic life. Also, the decomposition of excess organic waste causes increased growth of undesirable organisms in the water.

**Metals** – The primary source of metal pollution in Urban Runoff is typically commercially available metals and metal products. Metals of concern include cadmium, chromium, copper, lead, mercury, and zinc. Lead and chromium have been used as corrosion inhibitors in primer coatings and cooling tower systems. Metals are also raw material components in non-metal products such as fuels, adhesives, paints, and other coatings. At low concentrations naturally occurring in soil, metals may not be toxic. However, at higher concentrations, certain metals can be toxic to aquatic life. Humans can be impacted from contaminated groundwater resources, and bioaccumulation of metals in fish and shellfish.

**Nutrients** – Nutrients are inorganic substances, such as nitrogen and phosphorus. They commonly exist in the form of mineral salts that are either dissolved or are suspended in water. Primary sources of nutrients in Urban Runoff are fertilizers and eroded soils. Excessive discharge of nutrients to water bodies and streams can cause excessive aquatic algae and plant growth. Such excessive production, referred to as cultural eutrophication, may lead to excessive decay of organic matter in the water body, loss of oxygen in the water, release of toxins in sediment, and the eventual death of aquatic organisms.

**Pesticides** – Pesticides (including herbicides) are chemical compounds commonly used to control nuisance growth or prevalence of organisms. Excessive or improper application of a pesticide may result in runoff containing toxic levels of its active ingredient.

**Organic Compounds** – Organic compounds are carbon-based. Commercially available or naturally occurring organic compounds are found in pesticides, solvents, and hydrocarbons. Organic compounds can, at certain concentrations, indirectly or directly constitute a hazard to life or health. When rinsing off objects, toxic levels of solvents and cleaning compounds cannot be discharged into the MS4 (Municipal Separate Storm Sewer System). Dirt, grease, and grime retained in the cleaning fluid or rinse water may also adsorb levels of organic compounds that are harmful or hazardous to aquatic life.

**Sediments** – Sediments are soils or other surface materials eroded and then transported or deposited by the action of wind, water, ice, or gravity. Sediments can increase turbidity, clog fish gills, reduce spawning habitat, lower young aquatic organisms survival rates, smother bottom dwelling organisms, and suppress aquatic vegetation growth.

**Trash and Debris** – Trash (such as paper, plastic, polystyrene packing foam, and aluminum materials) and biodegradable organic matter (such as leaves, grass cuttings, and food waste) are

general waste products on the landscape. The presence of trash and debris may have a significant impact on the recreational value of a water body and aquatic habitat. Excess organic matter can create a high biochemical oxygen demand in a stream and thereby lower its water quality. In addition, in areas where stagnant water exists, the presence of excess organic matter can promote septic conditions resulting in the growth of undesirable organisms and the release of odorous and hazardous compounds such as hydrogen sulfide.

**Oxygen-Demanding Substances** – This category includes biodegradable organic material as well as chemicals that react with dissolved oxygen in water to form other compounds. Proteins,

Further information can be found at www.swrcb.ca.gov/tmdl/303d_lists.html

# 6. HYDROLOGIC CONDITIONS OF CONCERN

Impervious areas (concrete, asphalt) are increasing with the establishment of higher zoning densities and parking in the Santa-Ana area. The widening of the roadway itself lends impact to this scenario. Increase of impervious areas impact the natural infiltration process of surface water and creates more burden on the existing storm water infrastructure to manage and convey said flows. This in turn increases the likelihood of contaminants to reach tail-water discharge points and possible surface contamination due to inadequate piping and its resultant surcharging.

This project-specific WQMP must address the issue of Hydrologic Conditions of Concern unless one of the following conditions are met:

- **Condition A:** Runoff from the Project is discharged directly to a publicly-owned, operated and maintained MS4 (Municipal Separate Storm Sewer System); the discharge is in full compliance with Co-Permittee requirements for connections and discharges to the MS4 (including both quality and quantity requirements); the discharge would not significantly impact stream habitat in proximate Receiving Waters; and the discharge is authorized by the Co-Permittee.

- **Condition B:** The project disturbs less than 1 acre. The disturbed area calculation should include all disturbances associated with larger plans of development. (NOT APPLICABLE)

- **Condition C:** The project's runoff flow rate, volume, velocity and duration for the post-development condition do not exceed the pre-development condition for the 2-year, 24-hour and 10-year 24-hour rainfall events. This condition can be achieved by minimizing impervious area on a site and incorporating other site-design concepts that mimic pre-development conditions. This condition must be substantiated by hydrologic modeling methods acceptable to the Co-Permittee. **(It is foreseeable that Condition C applies to the widening of the roadway. Current Hydrologic-Hydraulic models indicate an excess of volume flows in most underground piping that leads to flooding and additional ponding.)**

# 7. BEST MANAGEMENT PRACTICES

BMPs shall be incorporated into the project-specific WQMP to minimize the impact from the Pollutants of Concern and Hydrologic Conditions of Concern identified for the Project. Where Pollutants of Concern include pollutants that are listed as causing or contributing to impairments of Receiving Waters, BMPs must be selected so that the project does not cause or contribute to an exceedance of water quality objectives. Strategies to minimize the Pollutants of Concern in runoff from the project site and minimize hydrologic impact include Site Design BMPs, Source Control BMPs, and Treatment Control BMPs. In preparing a project-specific WQMP, BMPs should be considered and incorporated into the project design plans, in the following progression:

**A) SITE DESIGN BMPs**

Project proponents shall implement Site Design concepts that achieve minimal urban run-off, minimal impervious footprints, and conservation of natural areas and minimize Directly Connected Impervious Areas (DCIAs). Site Design BMPs aim to incorporate site features such as vegetation to reduce and control post-development runoff rates. Because Site Design BMPs reduce runoff, incorporating them into project design plans minimizes the:

1. transport mechanism (runoff) for moving pollutants off site

2. difference between pre- and post-development hydrology thereby reducing changes in flow regime

3. size of necessary Treatment Control BMPs to treat Pollutants of Concern in Urban Runoff prior to discharge from the site or at regional facilities

**B) SOURCE CONTROL BMPs**

Source Control BMPs reduce the potential for Urban Runoff and pollutants from coming into contact with one another. Source Control BMPs are defined as any administrative action, design of a structural facility, usage of alternative materials, and operation, maintenance, and inspection procedures that eliminate or reduce Urban Runoff pollution. Each Project is required to implement appropriate Source Control BMPs.

**Non-Structural Source Control BMPs**

- Irrigation System and Landscape Maintenance

A project-specific WQMP must describe how the following concepts have been incorporated into project design features:

1. Employing rain shutoff devices to prevent irrigation during and after precipitation events.

2. Designing irrigation systems to each landscape area's specific water requirements.

3. Using flow reducers or shutoff valves triggered by a pressure drop to control water loss due to broken sprinkler heads or lines.

4. The timing and application methods of irrigation water shall be designed to minimize the runoff of excess irrigation water into the MS4.

5. Other comparable, equally effective, methods to reduce irrigation water runoff.

6. Preparation and implementation of a landscape plan consistent with the Co-Permittee's water conservation ordinance, which may include the use of water sensors, programmable irrigation times (for short cycles), etc.

Preparation and implementation of a landscape plan that:

a. Utilizes plants with low irrigation requirements (for example, native or a drought tolerant species)

b. Groups plants with similar water requirements together to reduce excess irrigation runoff and promote surface infiltration as needed.

c. Use mulches (such as wood chips or shredded wood products) in planter areas without ground cover to minimize sediment in runoff.

d. Install appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant material where possible and/or as recommended by the landscape architect.

e. Maintaining or creating a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible.

f. Choose plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth.

- Drainage Facility Inspections and Maintenance

The frequency shall be no less than the frequency of drainage facility cleaning conducted by the Co-Permittee. At a minimum, routine maintenance of privately owned drainage facilities should take place in the late summer or early fall prior to the start of the rainy season (October 1st). The drainage facilities must be cleaned if accumulated sediment/debris fills 25% or more of the sediment/debris storage capacity. Privately owned drainage facilities shall be inspected annually and the cleaning frequency shall be assessed. The final project-specific WQMP should identify the party responsible for conducting the drainage facility inspection and maintenance.

- Protection of Slopes and Channels

Project plans shall include Source Control BMPs to decrease the potential for erosion of slopes and/or channels, consistent with local codes and ordinances and with the approval of all agencies with jurisdiction, e.g., the U.S. Army Corps of Engineers, the Regional Boards and the California Department of Fish and Game. The following design principles shall be considered, incorporated, and implemented where determined applicable and feasible by the Co-Permittee:

a. Convey runoff safely from the tops of slopes.

b. Avoid disturbing steep or unstable slopes and natural channels.

c. Install permanent stabilization BMPs on disturbed slopes as quickly as possible.

d. Plant slopes with native or drought tolerant vegetation. Hillside areas that are disturbed shall be landscaped with deep-rooted, drought tolerant plant species selected for erosion control.

e. Control and treat flows in landscaping and/or other controls prior to reaching existing natural drainage systems.

f. Install permanent stabilization BMPs in channel crossings as quickly as possible, and ensure that increases in runoff velocity and frequency caused by the project do not erode the channel.

g. Install energy dissipaters at the outlets of new MS4s, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion. Energy dissipaters shall be installed in such a way as to minimize impacts to Receiving Waters.

h. Onsite conveyance channels should be lined, where appropriate, to reduce erosion caused by increased flow velocity due to increases in tributary impervious area. The first choice for linings should be grass or some other vegetative surface, since these materials not only reduce runoff velocities, but also provide water quality benefits from filtration and infiltration. If velocities in the channel are large enough to erode grass or other vegetative linings, riprap, concrete soil cement or geo-grid stabilization may be substituted or used in combination with grass or other vegetation stabilization.

i. Other comparable and equally effective site design options as approved by the Co-Permittee.

**Structural Source Control BMPs**

MS4 (Municipal Separate Storm Sewer System) Road Stenciling and Signage:

The following requirements must be addressed in a project-specific WQMP and/or shall be denoted on Project plan sheets:

- Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language (such as: "NO DUMPING ONLY RAIN IN THE DRAIN") and/or graphical icons to discourage illegal dumping.

- Post signs and prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

- Identify the party responsible for maintaining the legibility of stencils and signs.
The stencils contain a brief statement that prohibits dumping into the MS4. Graphical icons, either illustrating anti-dumping symbols or images of Receiving Water fauna, are effective supplements to the text message. Stencils and signs alert the public to the destination of pollutants discharged into Urban Runoff.

Properly Designed:

1) Sites

All new development and significant redevelopment shall incorporate Site Design BMPs to the extent feasible. This includes, but is not limited to:

a. Education/Training for property Owners, Operators, Occupants and Employees
b. Irrigation and Landscape Maintenance or upgrades
c. Common litter control and access to refuse containers
d. Street Sweeping and Parking Lot sweeping
e. Drainage facility Inspection and Maintenance

Examples of methodology include:

a. Maximize the permeable area. This can be achieved in various ways, including, but not limited to increasing building floor area ratio (number of stories above or below ground) and developing land use regulations seeking to limit impervious surfaces. Decreasing the project's footprint can substantially reduce the project's impacts to water quality and hydrologic conditions, provided that the undeveloped area remains open space. Runoff from developed areas may be reduced by using alternative materials or surfaces with a lower Runoff Coefficient (C factor). The C factor is a representation of the ability of a surface to produce runoff. Surfaces that provide higher runoff volumes

are represented by higher C factors. By incorporating more pervious, lower C factor surfaces into a development, lower volumes of runoff will be produced. Lower volumes and rates of runoff translate directly to lowering treatment requirements.

b. Conserve natural areas. This can be achieved by concentrating or clustering development on the least environmentally sensitive portions of a site while leaving the remaining land in a natural, undisturbed condition. The Co-Permittees and Project applicants should refer to a Multiple Species Habitat Conservation Plan or other natural resource plans, as appropriate to assist in identifying sensitive portions of the site. Sensitive areas include, but are not limited to, areas necessary to maintain the viability of wildlife corridors, occupied habitat of sensitive species and all wetlands and bike trails along Warner Avenue.

c. Construct walkways, trails, patios, overflow parking lots, alleys, driveways, low-traffic streets and other low-traffic areas with open-jointed paving materials or permeable surfaces, such as pervious concrete, porous asphalt, unit pavers, and granular materials in areas that will be widened and directly affect runoff coefficiants of adjacent land or structures..

2) Fueling Areas

Some portions of Warner Avenue require the taking of existing pump space at the gas station located at Main and Warner. The following is a guideline to ensure proper pad and pump replacement and design.

a. At a minimum, the fuel dispensing area must extend 6.5 feet (2.0 meters) from the corner of each fuel dispenser, or the length at which the hose and nozzle assembly may be operated plus 1 foot (0.3 meter), whichever is less.

b. The fuel dispensing area shall be paved with Portland cement concrete (or equivalent smooth impervious surface). The use of asphalt concrete is prohibited.

3) Trash Storage Areas

All trash container areas shall meet the following requirements:

a. Paved with an impervious surface, designed not to allow run-on from adjoining areas, designed to divert drainage from adjoining roofs and pavements diverted around the area, screened or walled to prevent off-site transport of trash.

b. Trash dumpsters (containers) shall be leak proof and have attached covers or lids.

c. Connection of trash area drains to the MS4 is prohibited.

d. Trash compactors shall be roofed and set on a concrete pad. The pad shall be a minimum of one foot larger all around than the trash compactor and sloped to drain to a sanitary sewer line.

4) Loading Docks

Loading docks of multiple manufacturing facilities may be impacted with the widening project. The design of loading/unloading dock areas shall include the following:

a. Cover loading dock areas, or design drainage to preclude run-on and runoff.

b. Direct connections to the MS4 from below-grade loading docks (truck wells) or similar structures are prohibited. Urban Runoff from a below-grade loading dock may only be

discharged to the MS4 when designed to use a Treatment Control BMP applicable to the use. Loading docks shall be kept in a clean and orderly condition through a regular program of sweeping and litter control and immediate cleanup of spills and broken containers. Cleanup procedures should minimize or eliminate the use of water. If wash-down water is used, it must be properly disposed (containment, collection, and disposal to sanitary sewer) and not discharged to the MS4. The project specific WQMP shall describe the frequency for implementing loading dock housekeeping measures and the party responsible.

5) Maintenance Bays and General Vehicle Maintenance

This particular section is in reference to the Fire Station and Ware Housing/Trucking areas along Warner Avenue. Any upgrades of impacts Maintenance Bays along Warner Avenue shall include the following:

a. Repair/maintenance bays shall be indoors; or, designed to preclude run-on and runoff.

b. Design a repair/maintenance bay drainage system to capture all wash water, leaks and spills. Provide impermeable berms, drop inlets, trench catch basins, or overflow containment structures around repair bays to prevent spilled materials and wash-down waters from entering the MS4. Connect drains to a sump for collection and disposal. Discharge from the repair/maintenance bays to the MS4 is prohibited.

c. Use drip pans where needed

d. Recycle used POL (Petroleum/Oil/Lubricants) in approved containers

e. Remove liquids from retired, wrecked or immovable vehicles

f. Dispose of solvents per instructions on the container

g. Relay said information to your neighbor

h. Avoid washing down driveways or bays but use dry sweep methods (sawdust).

i. Inspect areas under vehicles for class I,II,III leaks.

6) Vehicle and Equipment Wash Areas

In projects where car washing or rinsing is not specifically prohibited via CC&Rs or other acceptable means, or for projects having a common parking area where car washing or rinsing is not specifically prohibited via CC&Rs or other acceptable means, a designated car washing and rinsing area that does not drain directly to a MS4 shall be provided for use. Wash and rinse waters from this area must either be directed to the sanitary sewer (with prior approval of the sewer agency), to an engineered filtration system, or an equally effective alternative prior to discharging to the MS4.

## C) TREATMENT CONTROL BMPs

Treatment Control BMPs are defined as any engineered system designed and constructed to treat the adverse impacts of Urban Runoff pollution. Treatment Control BMPs must be selected and installed with respect to identified pollutant characteristics and concentrations that will be discharged from the site.

These BMPs may remove Pollutants of Concern by filtration, media absorption, or other physical, biological, or chemical process. Lists of these BMPs and action plans will be provided in a final report later on.

Be advised that this:

(1) Periodic performance assessment and updating of the guidance provided by this recommendation may be necessary.
(2) Includes grass swales, grass strips, wetland vegetation swales and bio-retention areas.
(3) Includes extended/dry detention basins with grass lining/impervious lining. This is based on a drawdown time of 36-48 hours.
(4) Includes infiltration basins, trenches and porous pavements
(5) Includes permanent pool wet ponds and man-made wetlands
(6) Includes sand and media filters
(7) Includes proprietary stormwater treatment devices as listed in CASQA

**D) EQUIVALENT TREATMENT CONTROL ALTERNATIVES**

Where off-site Treatment Control BMPs are determined to be more feasible/practicable, treatment may be provided off site when approved by the Co-Permittee. Off-site Treatment Control BMPs must:

1. Be located in the same watershed as the Warner Avenue site.

2. Treat a volume and/or flow equal to or greater than the treatment volume and/or flow calculated for the project site using the guidance in this WQMP.

3. Treat a pollutant loading equal to or greater than the pollutant loading from the Warner Avenue project site.

4. Address the Pollutants of Concern and Hydrologic Conditions of Concern not addressed at the project site but witnessed in the field. Have BMP Capacity functional prior to the issuance of occupancy permits, or certificates of use (or equivalent), if no occupancy permits are issued.

5. Off-site BMPs must be implemented prior to proximate Receiving Waters as applicable.

6. Off-site Treatment Control BMPs shall not cause water quality impairment or contribute to an excess of water quality objectives.

# 8. OPERATION, IMPLEMENTATION AND MAINTENANCE RESPONSIBILITY FOR TREATMENT CONTROL BMPs

Co-Permittees may/will have several departments ranging from local to county governments involved in implementing and/or administering WQMP requirements. However, as the Co-Permittee's organizational structures are dynamic to reflect the changing needs of their jurisdictions, the assignment of these responsibilities may change. Therefore, the Co-Permittees will update each Annual Report. The Co- Permittees' documented procedures must be included in their Annual Reports. The project-specific WQMP shall address the following:

a. Identify each BMP that requires O&M.

b. Thorough description of O&M activities, the O&M process, and the handling and placement of any wastes. Points of contact shall also be noted and updated annually.

c. BMP start-up dates.

d. Schedule of the frequency of O&M for each BMP. This should also include before, during and after procedures as applicable.

e. Identification of the parties (name, address, and telephone number) responsible for O&M, including a written agreement with the entities responsible for O&M. This agreement can take the form of a Covenant and Agreement recorded by the Project Proponent with the County Recorder, HOA or POA CC&Rs, formation of a maintenance district or assessment district or other instrument sufficient to guarantee perpetual O&M. Project proponents should speak to the Co-Permittee for Co-Permittee specific requirements.

f. Self-inspections and record-keeping requirements for BMPs (review local specific requirements regarding self-inspections and/or annual reporting), including identification of responsible parties for inspection and record- keeping.

g. Thorough descriptions of water quality monitoring covering who, what, when, where, if required by the Co-Permittee.

h. Co-Permittees should have authority to maintain the BMP, if necessary, and invoice the owner for costs.

# 9. FUNDING

A funding source or sources for the O&M of each Treatment Control BMP identified in the project specific WQMP must be identified and agreed upon in writing. By certifying the project-specific WQMP (see Section 4.8), the Project applicant is certifying that the funding responsibilities have been addressed and a legal vehicle has been provided that can be transferred to future owners. One recommendation of how to adhere to the requirement to transfer O&M responsibilities is to record the project-specific WQMP against the title to the property.

- **References**

California Storm Water Best Management Practice Handbook. Industrial and Commercial. 2008. www.cabmphandbooks.com

California Storm Water Best Management Practice Handbooks. Industrial/Commercial Best Management Practice Handbook. Prepared by Camp Dresser& McKee, Larry Walker Associates, Uribe and Associates, Resources Planning Associates for Stormwater Quality Task Force. March 1993.

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality Control Board. July 1998 (Revised February 2002 by the California Coastal Commission).

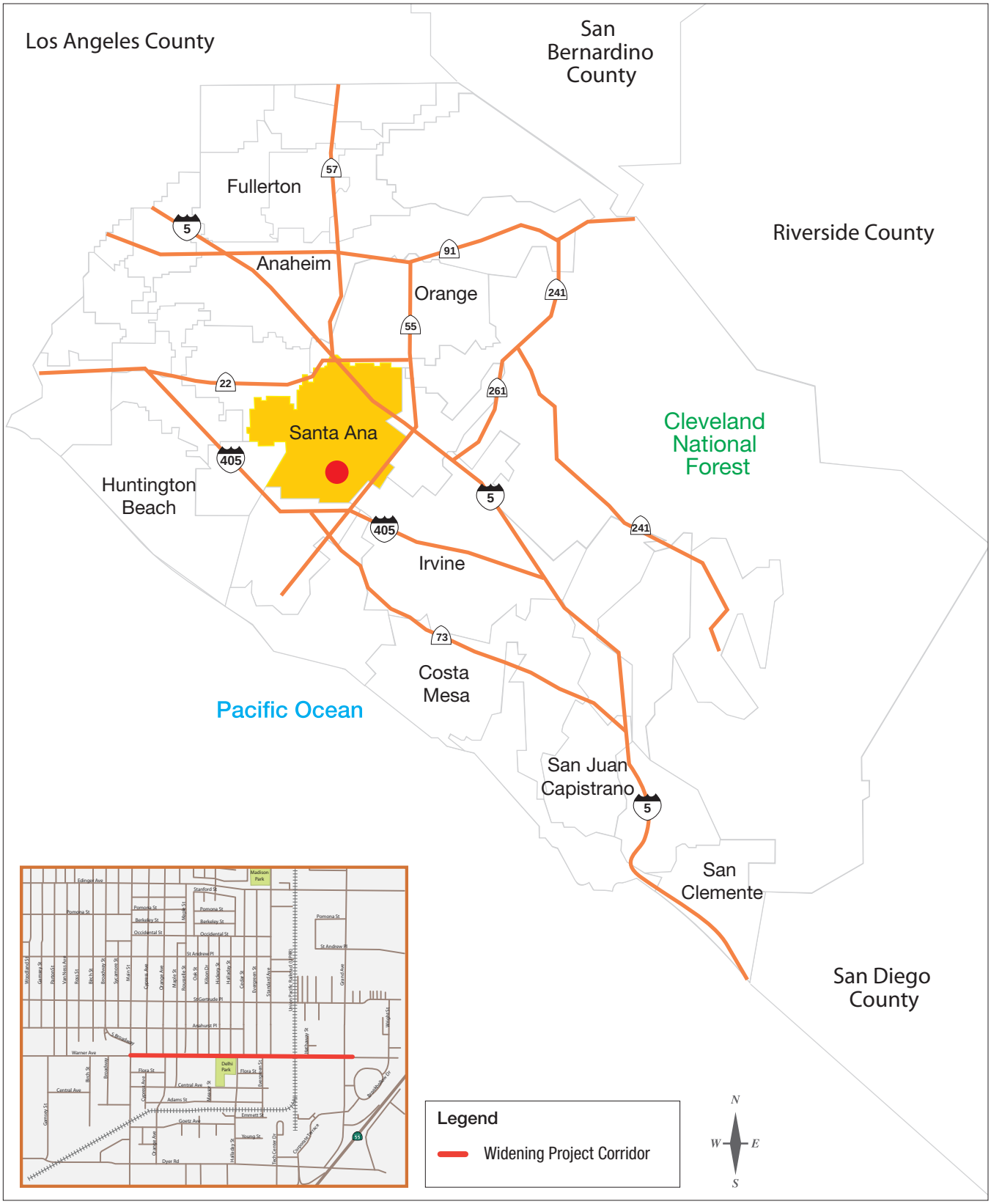
Stormwater Management Manual for Western Washington. Volume IV Source Control BMPs. Prepared by Washington State Department of Ecology Water Quality Program.

**For additional information contact:**

County of Orange Watershed & Coastal Resources Stormwater Program(714)567-6363or visit our website at:www.ocwatersheds.com

# APPENDIX A: VICINITY MAP/SITE PLAN

# Project Vicinity Map



# APPENDIX B: PRELIMINARY ENGINEERING REPORT

# PRELIMINARY ENGINEERING REPORT

As part of the:

WARNER AVENUE FROM MAIN STREET TO GRAND AVENUE WIDENING PROJECT

Located in:

THE CITY OF SANTA ANA, CALIFORNIA

Prepared For:
The City of Santa Ana
P.O. Box 1988
Santa Ana, CA 92702
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REVISED MAY 2013

# DOCUMENT CONTROL

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# TABLE OF CONTENTS

**REPORT**



**APPENDICES**

# 1. INTRODUCTION

IBI Group was contracted by The Planning Center to provide engineering and traffic impact analysis support services for the preparation of an Environmental Impact Report (EIR) for the Warner Avenue from Main Street to Grand Avenue Widening Project within the City of Santa Ana (City). This project involves the widening of Warner Avenue from Main Street to Grand Avenue from four to six lanes. Specifically, this included the following tasks:

- Project scoping and the development of potential build alternatives for the widening of Warner Avenue to six lanes within the designated project limits.
- Completion of a hydrology and drainage study for the project area.
- Development of preliminary engineering plans for the selected build alternative consistent with a 30% level of engineering completion.
- Completion of traffic impact analysis for existing, Opening Year, and Horizon Year build and no-build scenarios.
- Analysis of impacts to existing utilities within the project limits and identification of mitigation strategies.
- The preparation of preliminary construction cost estimates for the selected build alternatives.

This report documents and summarizes the work completed as part of these tasks and provides recommendations for specific improvements and upgrades that could be implemented as part of this street improvement project. This report is meant to supplement the technical information included within the EIR for the selected build alternatives and to provide a record of the project scoping, alternatives screening, and build alternatives selection process.

# 2. BACKGROUND AND NEED/PURPOSE

As discussed in this project's Request for Proposals prepared by the City of Santa Ana, Warner Avenue is designated within the current General Plan Circulation Element (Feb. 2, 1998) Master Plan of Streets and Highways as a Major Arterial within the city limits. A Major Arterial is defined by the City generally as a six-lane divided arterial. The Orange County Master Plan of Arterial Highways (MPAH) (August, 2008) also designates Warner Avenue within the Santa Ana city limits as a Major Arterial, which it defines as a six-lane divided arterial designed to accommodate 45,000 to 60,000 vehicles per day. The maximum average daily volumes for arterial roadways by street classification and lane configuration and the corresponding Level of Service are summarized in Table 2-1.

Table 2-1 Maximum Average Daily Traffic and LOS for Arterial Roads

| Street Classification | Lane Configuration | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|
| Principal Arterial | 8 Lanes Divided | 45,000 | 52,500 | 60,000 | 67,500 | 75,000 | >75,000 |
| Major Arterial | 6 Lanes Divided | 33,900 | 39,400 | 45,000 | 50,600 | 56,300 | >56,300 |
| Primary Arterial | 4 Lanes Divided | 22,500 | 26,300 | 30,000 | 33,800 | 37,500 | >37,500 |
| Secondary Arterial | 4 Lanes Undivided | 15,000 | 17,500 | 20,000 | 22,500 | 25,000 | >25,000 |
| Commuter Street | 2 Lanes Undivided | 7,500 | 8,800 | 10,000 | 11,300 | 12,500 | >12,500 |

Source: City of Santa Ana, General Plan – Circulation Element, 1998

Existing traffic volumes on Warner Avenue between Main Street and Grand Avenue are in the range between 23,800 and 28,600 vehicles per day without the project and 24,900 to 29,800 vehicles per day with the project. By the year 2035 estimated traffic volumes along this segment are forecast to be 30,000 to 31,900 vehicles per day without the project and 30,200 to 34,300 vehicles per day with the project. Both the existing and future daily traffic volumes exceed the acceptable level of service for a four-lane undivided roadway.

Warner Avenue is a regionally significant arterial roadway, providing for east-west travel through the City of Santa Ana and connecting residents in the City with the neighboring cities of Fountain Valley and Tustin. The section of Warner Avenue under study in this design effort experiences substantial congestion during peak periods in the existing condition. This congestion is anticipated to worsen in the future as traffic volumes increase. The existing cross section of Warner Avenue is deficient in many locations and does not meet existing City of Santa Ana standards.

The environmental and engineering effort currently underway originated as a mitigation measure for the proposed Tustin Legacy project, which involves the redevelopment of the former Tustin Marine Corps Air Station (MCAS) as a mixed-use commercial, residential, and industrial project. The environmental documents prepared by the City of Tustin for the Tustin Legacy project identified traffic impacts to this section of Warner Avenue due to traffic generated by the proposed development. As a mitigation measure, the City of Tustin agreed to fund the preparation of an environmental analysis and preliminary engineering of improvements to Warner Avenue between Main Street and Grand Avenue.

Widening Warner Avenue from four to six lanes between Main Street and Grand Avenue will make this section of the street consistent with the City of Santa Ana General Plan Circulation Element and the

Orange County MPAH. The project will also extend the six-lane cross section of Warner Avenue west of its existing terminus at Grand Avenue. The City of Santa Ana also proposes to implement a Class II bikeway on Warner Avenue for the full distance between Main Street and Grand Avenue. The City's General Plan Circulation Element Bikeway Master Plan calls for a Class II on-street bikeway along Warner Avenue from Flower Street to the existing Class I bike trail that crosses Warner Avenue in the vicinity of Rousselle Street.

# 3. EXISTING CONDITIONS

Warner Avenue within the project limits is a four lane undivided arterial with widely variable curb to curb and right of way widths. The segments of Warner Avenue between Oak Street and Halladay Street and between Standard Avenue and Grand Avenue provide a center left turn lane. Some segments include a contiguous sidewalk while others have a parkway separating the sidewalk from the curb. Sidewalk widths vary from four to ten feet depending on the location. Bike lanes are not currently provided along Warner Avenue within the project limits. Most driveways and curb returns within the project limits do not meet current the Americans with Disabilities Act (ADA) clearance and slope requirements. In addition, there are several locations along the northerly sidewalk where insufficient ADA clearance currently exists between existing power poles and property line walls.

Land uses along Warner Avenue within the project limits include a mixture of commercial, residential, and industrial uses. A listing of these uses is provided below:

- Except for the gas station on the northeast corner of Warner Avenue and Main Street, the entire north side of the street from Main Street to Standard Avenue is lined with homes, which include driveway approaches either along Warner Avenue or adjacent cross streets.

- Homes line the south side of Warner Avenue between Orange Avenue and Rousselle Street and between Halladay Street and Standard Avenue.

- Commercial uses along Warner Avenue include a bank and a small neighborhood shopping center along the south side between Main Street and Orange Avenue. A small neighborhood shopping center is also located on the northwest corner of Main Street and Grand Avenue.

- From Maple Street to Halladay Street, Warner Avenue is fronted along the south side of the street by James Monroe Elementary School, a National Guard Armory, and Delhi Park. The armory facility is located in between the school and the park.

- A mixture of small and large industrial uses line both sides of Warner Avenue from Standard Avenue to Grand Avenue, with some of the larger uses including Cherry Aerospace at 1224 Warner Avenue and Heritage Paper on the southwest corner of the Warner Avenue/Grand Avenue intersection.

A Union Pacific Railroad (UPRR) owned railroad corridor crosses Warner Avenue between Standard Avenue and Grand Avenue. This freight corridor includes tracks that are a spur off the Metrolink railroad corridor, which serves the many industrial uses along this spur within the City of Santa Ana. The existing crossing at Warner Avenue is gated with crossings occurring approximately one to two times a day.

Warner Avenue within the project limits is served by three local OCTA bus routes including Routes 72 and 463, which run along Warner Avenue between Main Street and Grand Avenue; and Route 55, which runs between Halladay Street and Grand Avenue. OCTA Route 53 operates on Main Street. Route 59 operates on Grand Avenue. Bus stops with concrete bus pads are provided at the following locations:

- Eastbound far side of the Main Street intersection
- Westbound far side of the Maple Street intersection
- Eastbound mid block between Maple and Oak Streets
- Westbound far side of Halladay Street intersection
- Eastbound near side of Halladay Street intersection
- Eastbound and Westbound far side of Standard Avenue intersection
- Westbound between UPRR corridor and Hathaway Street
- Westbound and eastbound far side of Grand Avenue intersection

### *Drainage/Storm Drains*

Major drainage facilities within the project limits include the following:

- 60"-66" diameter storm drain that runs along the north side of Warner Avenue between Rousselle and Main Streets and continues westerly along Warner Avenue.

- 27" diameter storm drain that runs along the north side of Warner Avenue from Standard Avenue and connects to the 60" storm drain at Rousselle Street.

- A 7' x 6' reinforced concrete box culvert that that runs along the north side of Warner Avenue from a junction structure within the Grand Avenue intersection to the UPRR corridor. Just east of the railroad tracks, the culvert turns to the north and continues running along the east side of the railroad right of way.

Additional details regarding existing drainage facilities, including locations of existing catch basins, can be found within Hydrology/Drainage Report prepared as part of this project phase. This is a stand-alone document not included in this report.

### *Utilities*

A variety of wet and dry utilities exist within the Warner Avenue corridor within the project limits, both underground and overhead. A detailed summary of these existing utilities is provided within the utilities report included in **Appendix A**. A listing of the major wets and dries is provided below:

### *Wet Utilities*

- An 18" MWD water line runs along the south side of Warner Avenue within the project limits.

- A 16" water line runs along the north side of Warner Avenue from Main Street to Rousselle, where it transitions to the south side, increases in size to a 20" line, and continues easterly past Grand Avenue.

- An 8" sewer line runs along the center of the street from Main Street to Orange Avenue, where it turns south and continues down Orange Avenue.

### *Dry Utilities*

- 66kV overhead power lines originating from the Southern California Edison (SCE) Johanna substation located south of Warner Avenue just east of the UPRR corridor run north to Warner Avenue. At Warner Avenue, the lines run both easterly and westerly along the north side of Warner Avenue, with the power poles located within the existing northerly sidewalk. Telephone lines are mounted on the lower portions of the poles supporting these SCE lines.

- Overhead cable lines run along the southerly sidewalk within the project limits.

- A 4" gas line runs under the roadway and northerly sidewalk (depending on the segment) from Main Street to just east of Kilson Street.

- An AT&T telecommunications line runs under the southerly sidewalk from Main Street to Standard Avenue. An MCI telecommunications line runs under the south side of the street from Main Street to just east of Cypress Avenue.

# 4. PROJECT SCOPING

The intent of the project scoping process was to evaluate a range of potential improvement alternatives with the intent of choosing a build alternative that is cost effective and best meets the project's purpose and need; while minimizing impacts to the community, environment, and the existing infrastructure.

Two elements of any arterial widening project such as this which must be carefully considered are impacts to adjacent properties and to existing utilities. Large impacts to either can significantly affect project cost, the project approval and construction schedule, and construction complexity. This project is no exception, with minimization of right of way, community, and utilities impacts being the most significant factors in the scoping of the proposed improvements.

In defining the scope of the proposed improvements, the following major design variables were considered:

- **Proposed Arterial Street Typical Cross Section:** According to the City of Santa Ana Standard Plan 1103A, the Major Arterial classification includes a 120' total right of way width, provides a 14' raised median, 10' sidewalks (6' for sidewalk and 4' for parkway) and 43' curb to curb widths in each direction. The 43' paved areas allow for three 12' lanes and a 7' shoulder/bike lane in each direction. The Major Arterial cross section includes two modified cross section options, at 110' ROW and at 106' ROW. The 110' modified cross section consists of six 11' lanes, 5' bike lanes, 14' raised median, and 10' sidewalks (6' for sidewalk and 4' for parkway). The 106' cross section consists of six 11' lanes, 5' bike lanes, 10' raised median, and 10' sidewalks (6' for sidewalk and 4' for parkway).

- **Proposed Roadway Alignments:** Several alignment options were evaluated to complete the widening/reconstruction of Warner Avenue to provide a six-lane section. The first would be to maintain the existing roadway center line and widen/reconstruct the existing street concentrically on either side. This results in right of way and construction impacts to both sides of the existing street. Another option is to maintain the existing right of way line on one side of the street, which restricts right of way impacts to one side only. Which side the right of way is held can vary by segment along the corridor depending on the nature of the properties lining the street and the potential level of impact to these properties.

***Initial Build Alternatives***

Both the Street Sections and Alignment variables were considered collectively as an initial step in the scoping of the proposed improvements for this project. Exhibits were prepared that overlaid the right of way envelopes of both the Major and Primary Arterial cross sections along the corridor between Main Street and Grand Avenue so that the construction footprint associated with each could be graphically identified. The following three improvement concepts were prepared as part of this initial scoping:

- **120' South (Alternative 1):** This improvement concept applied the City's standard major arterial cross section (120' ROW). It assumed that a new roadway center line would be established so that the existing right of way line could be held on one side of the street as a way to reduce the number of impacted properties. The existing northerly right of way line was held between Main Street and Halladay Street with all right of way impacts confined to the south. Widening to the south vs. the north within this segment resulted in fewer impacted properties and fewer full residential property acquisitions. The roadway alignment transitioned from the south side of the existing center line to the north through the Halladay Street intersection, and the southerly right of way line was held from Halladay Street to the UPRR railroad corridor. This avoided impacts to the Cherry Aerospace Fastening building, which set back only a few feet from the right of way

line. From the UPRR railroad corridor to Grand Avenue, the roadway alignment is shown to transition several more times, and a Modified Major Arterial cross section (100' ROW) was applied in an attempt to minimize right of way impacts. This alignment resulted in a total of **7 partial and 21 full** property acquisitions.

- **120' Center (Alternative 2):** This improvement concept was considered a best case/worst case alternative in that it applied the City's standard Major Arterial cross section (120' ROW) in combination with widening concentrically about the existing roadway center line. As expected, the right of way impacts associated with this alternative were the greatest among the five considered, affecting all properties on both sides of the street, which resulted in **25 partial and 35 full** property acquisitions.

- **100' South (Alternative 3):** Similar to Alternative 1, this alternative sought to "optimize" the roadway alignment within the project limits in order to limit right of way impacts to one side of the road or the other. The same general center line was followed as Alternative 1; however, the narrower Modified Major Arterial Cross Section (100' ROW) footprint was applied. The resultant number of property impacts was reduced substantially to **8 partial and 12 full** acquisitions. It is important to note that Alternative 3 proposed street cross section does not include a bike lane, a major component of the desired improvements to be consistent with the City Bike Master Plan; therefore, this alternative does not meet the purpose and need of this report.

Strip maps showing the right of way footprints and impacted properties associated with each of these concepts are included in **Appendix B**. In addition, inventories were prepared of impacted properties associated with each of these initial build alternatives. These tabular inventories are also included in **Appendix B**. Both the strip maps and initial right of way impact inventories were submitted to the City for review and comment. The intent of the information provided for these initial improvement alternatives was to provide City staff with information needed to make a determination on a preferred alignment and street cross section(s) to be applied to the build alternative carried forward into Preliminary Engineering, whether they were one of the three presented or a combination thereof.

To help inform the design process and as part of the public outreach process for the project, the City of Santa Ana request consideration of a 120' North Alternative to assess the potential right-of-way impacts associated with focusing the roadway widening on the north side of the street. This alternative would avoid impacts to the school and public facilities on the south side of the street, but would impact a greater number of properties on the north side of the street when compared to the 120' Center Alternative.
This alternative included the following design characteristics and alignment preferences:

**120' North (Alternative 4):**

a) From Main Street to Orange Avenue, maintain the 54' offset to the north to straighten out the right of way. Use a 120' total right-of-way width. Acquisitions would be mostly residential, with Arco to the north as the only commercial site.

b) From +/- Orange Avenue to Standard Avenue, maintain the 40' offset from existing centerline to the north, and 120' total proposed right-of-way width. All acquisitions for this segment would be to residential properties on the north side.

c) From Standard Avenue to Grand Avenue use a modified version of the major arterial street cross sections, 100' ROW and 110' ROW respectively, to minimize impacts to the large industrial properties. East of the SCE substation access road, the existing right of way width is 110'. As such, it was assumed that the proposed right of way envelope would transition from 106' to its existing width of 110' between the UPRR corridor and the access road.

d) Although shifting the widening between Maple and Halladay Streets resulted in additional property impacts within this segment compared to the initial build Alternative 1, it avoided impacts to the National Guard Armory, school, and park, which are public facilities utilized by the surrounding communities. Additionally, the City of Santa Ana has a low ratio of park, recreation, and open space to population compared to surrounding cities; therefore, the project's purpose is also to minimize the impacts to these public facilities.

Build **120' North (Alternative 4)** resulted in a total of **19 partial and 41 full** property acquisitions.

Along several segments of Warner Avenue between Main Street and Standard Avenue, the second set of residential parcels located behind the parcels fronting the existing street are shown to be acquired although the existing residential structures are not physically impacted by the proposed widening. The reason for these acquisitions had to do with the impacts to the existing driveway approaches along the joining cross streets. To maintain these parcels, the existing driveway approaches would need to be shifted northward to accommodate the new curb returns. This would trigger the need to relocate or expand the existing driveways within each parcel to match the new driveway approach locations, which was seen by the City as a significant enough impact to these properties to warrant the assumption of full acquisitions as part of the current project phase. "Second row" parcels were impacted with the 120' North (Alternative 4) concept along the following cross streets:

- Orange Avenue (west side)
- Maple Street (west side)
- Oak Street (east side)
- Kilson Drive (west side)
- Hickory Street (east side)
- Cedar Street (both sides)
- Evergreen Street (both sides)
- Standard Avenue (west side)

***Refined Build Alternatives***

After a full review of build 120' North (Alternative 4), the City decided to investigate the application of a modified major arterial street cross section (110' ROW). This would allow class II bike lanes and a 14' raised median wide enough to accommodate left turn pockets. The 110' ROW would be a compromise to minimize the ROW impacts and conform to the required characteristics and design elements of the arterial street.

IBI Group was tasked with developing build 110' North (Alternative 5). The City of Santa Ana developed a design concept for build 110' South (Alternative 6). Summaries of both alternatives are provided below.

**110' North (Alternative 5):**

a) From Main Street to Orange Avenue, Reduce sidewalk to 10' (6' for sidewalk and 4' for parkway) and maintain the 40' eastbound width. Northern curb and westbound width shifted south to accommodate two 10' left turn lanes, three 11' through lanes, one 5' bike lane, and one 12' right turn lane. Acquisitions would be mostly residential, with Arco to the east as the only commercial site.

b) From +/- Orange Avenue to Standard Avenue, Maintain 40' offset from existing centerline to the north, and implement the modified major arterial street section (110' ROW) width.

c) From Standard Avenue to Grand Avenue, Implement the modified 106' ROW and 110' ROW major arterial street cross sections to minimize impacts to the large industrial properties. East of

the SCE substation access road, the existing right of way width is 110'. As such, it was assumed that the proposed right of way envelope would transition from 106' to its existing width of 110' between the UPRR corridor and the access road.

d) The ROW impacts were reduced substantially as a result of the reduced footprint of the modified major arterial street cross section (110' ROW) implemented in the majority of the corridor. This alternative reduces impacts to residential properties compared to the 120' North Alternative; however, it increases the impact to public facilities (i.e., schools, parks, etc).

Build **110' North (Alternative 5)** resulted in a total of **19 partial and 33 full** property acquisitions.

The final components of this alternative include widening to the North throughout the whole section, except for the segment between Standard Avenue and UPRR Railroad Corridor, where the median is reduced by 4', leaving a 106' ROW. Initial ROW Impact Exhibits were prepared for the 110' North (Alternative 5) as described above and a detailed inventory of impacted properties was conducted. These exhibits and the inventory matrix are included in **Appendix C**. A complete set of the street sections considered are included in **Appendix C**.

**110' South (Alternative 6):**

The **110' South (Alternative 6)** concept would have the same design parameters as the 110' North (Alternative 5), but would instead focus the widening and right-of-way impacts to the south side of Warner Avenue. A 106' ROW cross section for the street would also be required between Standard Avenue and the UPRR Railroad Corridor. Key aspects of this design concept include:

a) From Main Street to Orange Avenue, Reduce sidewalk to 8' and maintain the 40' eastbound width. Northern curb and westbound width shifted south to accommodate two 10' left turn lanes, three 12' through lanes, one 5' bike lane, and one 12' right turn lane. Acquisitions would be mostly residential, with Arco and the office building to the east the only commercial sites.

b) From +/- Orange Avenue to Standard Avenue, maintain 40' offset from existing centerline to the north, and implement the modified major arterial street section (110' ROW) width.

c) From Standard Avenue to Grand Avenue, Implement the modified 106' ROW and 110' ROW primary and major arterial street cross sections to minimize impacts to the large industrial properties. East of the SCE substation access road, the existing right of way width is 110'. As such, it was assumed that the proposed right of way envelope would transition from 106' to its existing width of 110' between the UPRR corridor and the access road.

The design exhibits for this alternative were developed by the City of Santa Ana and are not presented in this report.

# 5. PROPOSED BUILD ALTERNATIVE

The City has designated Build 110' North (Alternative 5) as the **Preferred Alternative** and this alternative was carried forward into the preparation of Preliminary Engineering Plans, which are consistent with a 15% level of design development. This included the development of the following:

- Typical Sections Plans.
- Layout Plans showing the proposed improvements, 1"=50' scale.
- Location Specific Cross Sections cut at key locations along the project limits
- Existing Storm Drain and Utilities Plans showing existing storm drain facilities and utilities within the project limits. 1"=50' scale.
- Right-of-Way Impact Plans showing the proposed project ROW footprint and identifying impacted properties, 1"=50' scale.

This section provides a thorough discussion and evaluation of the Preferred Alternative, Build 110' North (Alternative 5) as depicted within the Preliminary Engineering Plans, which are included in **Appendix D**. This discussion is organized into specific categories and disciplines for organizational purposes.

The proposed widening concept included within the Preliminary Engineering Plans was designed according to the current editions of either the City of Santa Ana Standard Plans or the American Public Works Association (APWA) Standard Plans as appropriate. References to the appropriate City and APWA standard plans are included within the construction notes on the plans. Any nonstandard design features included within the plans are also presented within this section. Other design references include the latest editions of the Caltrans Highway Design Manual and the American Association of State Highway and Transportation Officials (AASHTO) publication "A Policy on Geometric Design of Highways and Streets".

The design shown adheres to the most current edition of the Caltrans Design Information Bulletin 82 on ADA accessibility along pedestrian paths; which affects the design of sidewalks, curb ramps, and driveways.

***Typical Sections***
Implementation of the City's standard major arterial street section would require 25% more ROW acquisitions than the modified version of the section. In applying the recommended modified typical cross sections along the corridor as part of the conceptual design, IBI further refined the limits of the modified typical section and identified a need for a second modified version of the Major Arterial street section that would include class II bike lanes. These typical sections are graphically depicted within the Preliminary Engineering Plans.

- Main Street to Standard Avenue: Modified Major Arterial cross section; with 110' total ROW, six 11' lanes, 5' bike lanes, 14' raised median, and 10' sidewalks (6' for sidewalk and 4' for parkway). Section widens out at Main Street intersection approach to accommodate dual left turn lanes and to match the existing lane configuration west of Main Street.

- Standard Avenue to UPRR Railroad Corridor: Modified Major Arterial cross section; with 106' total ROW, six 11' lanes, 5' bike lanes, 10' raised median, and 10' sidewalks (6' for sidewalk and 4' for parkway).

- UPRR Railroad Corridor to Grand Avenue: Modified Major Arterial cross section; with 110' total ROW, six 11' lanes, 5' bike lanes, 14' raised median, and 10' sidewalks (6' sidewalk and 4' parkway). Section widens out at Grand Avenue intersection approach to accommodate dual left turn lanes. This section was ideal to take advantage of the 110' total ROW width within this segment.

***Geometrics***

As discussed previously, the recommended alignment chosen is dictated by the desire to minimize right of way impacts to residential and commercial properties and public facilities. By doing so, a new roadway center line is established that is offset relative to the existing. As such, a new roadway crown must be established. This, coupled with the fact that existing roadway infrastructure (roadway pavement, curb & gutter, and sidewalk) is in poor condition, realistically precludes salvaging any portions of the existing roadway infrastructure as part of the widening. It was assumed for the purpose of the Preliminary Engineering Plans that the entire roadway will be fully reconstructed from the existing back of walks between Main Street and Grand Avenue. The only portion of Warner Avenue that was not considered to be physically impacted by the proposed widening and thus shown to be maintained was the curb & gutter along the north side of Warner Avenue between Hathaway Street and Grand Avenue. The existing sidewalk will be replaced with a 6' sidewalk and 4' parkway. The plans do call for the reconstruction of the existing driveway approaches within this segment to make them ADA compliant.

There may be opportunities to explore ways to salvage some of the existing infrastructure during a later phase of design as part of the value engineering exercise, but the reconstruction shown in the Preliminary Engineering Plans is meant to be a conservative, "worst case" scenario.

It was assumed that the posted speed along Warner Avenue after the widening would be 45 mph. As such, the improvements were designed to accommodate a design speed of 55 mph. The radii used for the reversing horizontal curves is 2,000' through the two sets of transitions easily accommodate a 55 mph design speed and should be gentle enough to provide an aesthetically pleasing appearance. The introduction of reversing curves through intersections is not good design practice and to be avoided where possible. It is typically desirable to locate an intersection on a horizontal tangent that extends a minimum of 50' past the curb returns on each side. At the Standard Avenue intersection, a curb line taper transition was included along the north side of the street while maintaining the centerline at a constant distance from the existing ROW line in the south.

In order to line up the eastbound approach and departure lanes through the Warner Avenue/Grand Avenue intersection, the south side widening along Warner Avenue had to be extended east of the intersection for approximately 530', consistent with the length of the westbound left turn bays. A horizontal transition, made up of a set of 2000' reversing curves, was then included to transition back to join the existing lane configuration.

West of Main Street, sufficient room was available within the existing curb to curb width to accommodate the second eastbound left turn lane and the transition back to the existing geometrics through restriping. This restriping is shown to extend approximately 445' in both the eastbound and westbound direction.

The following geometric intersection modifications/enhancements were included within the design per the results of the traffic impact analysis:

- A second left turn lane was added along both the eastbound and westbound approaches of the Main Street/Warner Avenue intersection. The exclusive right turn lanes along both approaches were maintained.

- The Warner Avenue/Standard Avenue intersection was modified to replace the exclusive right turn lane along the westbound approach with a shared through/right. An exclusive westbound left turn lane was provided at the intersection to provide controlled left turn access into the Cherry Aerospace property as discussed further below.

- The existing approach geometrics at the Warner Avenue/Grand Avenue intersection, which is already built out with dual lefts and exclusive rights along both the eastbound and west approaches, were shown to be restored as part of the proposed improvements.

- The cul-de-sac at Rousselle Street was restored with a radius of 38'[1]. The existing class I bike path east of Rousselle Street was reconstructed in place, with the exception of the pedestrian/bike crossing signal which was relocated to Maple Street. The class I bike path was realigned to connect to the intersection of Maple Street and the new signalized intersection introduced at Maple Street with Warner Avenue.

***Access and Circulation***

Per the City's direction, left turn access along Warner Avenue is provided at existing signalized intersections. These include Main Street, Halladay Street South, Standard Avenue, and Grand Avenue. In addition, the City requested that the Maple Street intersection be signalized in order to maintain left turn access. In order to improve traffic flow and to reduce accident potential, left turn access was restricted at all remaining existing unsignalized intersections:

- Cypress Avenue
- Orange Avenue
- Oak Street
- Kilson Drive
- Hickory Street
- Halladay Street North
- Cedar Street
- Evergreen Street
- SCE substation access road

Access to these side streets will be restricted to right turn in/right turn out only through the extension of the raised median through the intersection. These access restrictions were taken into account as part of the traffic impact analysis that was completed as part of this project in support of the EIR. Per the City's request, the existing pedestrian/bicycle crossing along Warner Avenue at Rousselle Street was removed. As part of the proposed improvements, pedestrians and bicyclists will now be directed to cross Warner Avenue at the Maple Street signal.

Access to all remaining land uses along Warner Avenue within the project limits is maintained, except that these access points would only provide for right-in/right-out movements. Three driveways currently provide access to the Cherry Aerospace site, including the one at the Standard Avenue intersection. Left turn access into the Cherry Aerospace site is currently provided at the eastern most driveway only, while the driveway at Standard Avenue is an exit-only. As part of the proposed improvements, the existing Standard Avenue driveway is proposed to be modified to accommodate both entrances and exits, and left turn access into the site will be provided at this driveway so that the movement can be signal controlled. As noted in the traffic impact analysis addendum, this driveway is proposed to be widened to accommodate three outbound travel lanes. This change was agreed to by the city and property owner after completion of the design plans, and is not reflected in this report. The eastern most driveway will be modified to allow right in/right out movements only, and the middle driveway will allow only right turns in.

***ADA Compliance***

All sidewalks, curb ramps, and driveways must be designed to comply with the most current Americans with Disabilities Act (ADA) requirements per Caltrans DIB 82. The City's standard curb ramps per Std. Dwg. No. 1122 do meet the latest ADA requirements, and were accordingly called for within the Preliminary Engineering Plans. DIB 82 requires a minimum horizontal clearance along a sidewalk of 4' from the face of curb to any obstructions. This clearance requirement is met within the design shown, even if the sidewalk must accommodate utility poles as they currently do.

[1] Design alternatives for a 38' and 40' radius were included in previous discussions with the City. The radius was originally designed as a 40' radius. A design for a 38' radius was requested by the City to reduce the impact of property takes. After further evaluation, the City has decided to move forward with the 38' radius.

For driveway approaches, the City's driveway approach standard per Std. Dwg. No. 1112, is not compliant with current ADA requirements. The ADA requires that a minimum 4' wide traversable area with a cross slope of no greater than 2% be provided across driveway approaches. The driveway design included within the Caltrans Standard Plans per Std. A87A meets these requirements and is very similar to the City's standard driveway, Case 1. As such, The Caltrans Std Plan A87A was referenced for all driveway replacement shown in the Preliminary Engineering Plans. This driveway approach design involves lowering the sidewalk through the driveway approach to maintain a 2% cross slope. Doing so would require partial reconstruction of all driveways or parking lots behind the driveway approach to accommodate the vertical transition between the new back of walk elevation along the driveway approach and the existing surface elevation within the driveway/parking lot. The approximate limits of this reconstruction are shown behind all driveway approaches within the Preliminary Engineering plans. Additionally, existing driveways within the project limits adjacent to curb returns, specifically on the north side of Warner Avenue, that were impacted by the widening will require a modified type of the City's standard driveway, as to avoid impacting the access to private properties and result in additional ROW impacts. The modified version of the City's driveway includes a slight modification of the driveway wing, to reduce the driveway footprint, the modified City Driveway Access Detail is included in the plans.

***Nonstandard Features***

The design included within the Preliminary Engineering Plans for 110' North (Alternative 5) includes the following nonstandard features:

- Lane widths of 11' were assumed for the (110' ROW) Modified Major Arterial, in order to minimize ROW impacts. The standard lane width is 12'. It should be noted that the use of 5' wide bike lanes precludes the application of local depressions at catch basins wider than 2'.

- A 10' raised median is assumed for the (106' ROW) Modified Major Arterial cross section rather than the standard width of 14'. As a result, a raised separation cannot be provided between the westbound left turn bay and the eastbound lanes at the Standard Avenue intersection approach.

- The Preliminary Engineering Plans do not address any vertical design issues. As part of the widening of the street, the driveway serving the fire station at Sta. 141+23 must be reconstructed to match the new finished grade elevation at the back of the driveway approach. The existing slope along the driveway is approximately 12%. If a standard roadway crown is assumed through the fire station, the resultant back of walk elevation at the driveway approach would be approximately 1.7' lower than its current elevation. If the driveway were reconstructed to match this new back of walk elevation, the resultant slope on the driveway would be approximately 23%. This is unacceptably steep and may cause vehicles to bottom out when entering and exiting the fire station. To mitigate this condition, IBI proposes to construct the segment of the roadway through the fire station driveway using a -2% roadway cross fall for the eastbound lanes. If used as shown within cross section J-J of the Preliminary Engineering Plans, the existing driveway cross slope can be maintained. More detailed design will be needed in subsequent phases to verify the applicability of this approach.

***Curb Returns and Curb Ramps***

All curb returns were designed per City of Santa Ana Std. Dwg. Nos. 1122A and 1122B depending on the location. Curb return radii were designed to be either 25' or 35' depending on the intersection per Santa Ana Std. Dwg. No. 1105. Type 1 curb returns were designed where they could be accommodated within the proposed project right of way footprint. If the use of a Type 1 return would require additional right of way, than a Type 2 would be utilized for that particular location.

At the southerly approach of the Warner Avenue/Standard Avenue intersection, which is the driveway serving the Cherry Aerospace property, the curb ramps were designed according to APWA Sd. Dwg. No. 111-3 (Case D) in order to maintain the curb ramps within public right of way.

***Right of Way Needs***

The proposed project right of way limits are shown within the Preliminary Engineering Plans. The right of way impacts resulting from the 110' North (Alternative 5) alignment are summarized in general terms as follows:

- Alignment results in full acquisitions of all properties lining the north side of Warner Avenue between Main Street and Standard Avenue, including the Arco Gas Station at the corner of Warner Avenue/Main Street.

- Requires "partial" acquisitions of existing setback areas to industrial properties lining the north side of Warner Avenue between Standard Avenue and Hathaway Street.

- Reconstruction of curb return at southeast corner of Warner Avenue and Main Street per the City's standard radius of 35' impacts the northeast corner of the existing Wells Fargo bank building. This will require the partial demolition and reconstruction of the building to accommodate the curb return or full acquisition of the property. If the building is modified to accommodate the curb return, a "partial" take will be required of the existing setback area along the rest of the parcel in front of the parking lot. Per the City's request, this property was assumed as a full take for the purpose of this study.

- Requires full acquisition of residential properties located on the south side of Warner Avenue just east of the Wells Fargo property.

- Requires "partial" acquisition of existing setback area to neighborhood shopping center property and partial acquisition of residential parcel on the south side of Warner Avenue between Cypress and Orange Avenues.

- Requires full acquisition of the private property on the southeast corner of the Warner Avenue/Maple intersection to accommodate the realigned Class I Bike Path.

- Requires "partial" acquisition of existing setback area in front of the Cherry Aerospace building on the south side of Warner Avenue just west of the railroad corridor.

- Requires "partial" acquisition of Sakioka Farms parcel along south side of Warner Avenue bounded by the railroad corridor on the west and the RV & Boat Storage lot to the east. Acquisition impacts existing parking lot and yard area in front of adjacent structure.

- Requires "partial" acquisition of existing setback area in front of Heritage Paper building on the south side of Warner Avenue just west of Grand Avenue.

- Requires "partial" acquisition of existing setback area and a portion of the existing parking lot serving office park along the south side of Warner Avenue just east of Grand Avenue.

A detailed inventory of impacted parcels for 110' North (Alternative 5) was prepared as part of this current phase of the project by VA Consulting based upon the Preliminary Engineering Plans, with impacted parcels identified both graphically on a set of right of way exhibits and in tabular form. These are included **Appendix E**. According to this inventory, the proposed improvements result in a total of 35 full property acquisitions and 25 partial.

***Utility Impacts***
A preliminary utility impact assessment associated with the proposed improvements for 110' North (Alternative 5) was conducted by VA Consulting as part of the current project phase. The assessment was summarized in a technical memorandum with supporting utilities exhibits and is included in **Appendix A** for reference.

***Drainage Impacts***
Impacts to existing drainage facilities within the project limits were analyzed separately as part of the hydrology/drainage study completed as part of the current project phase and are discussed in detail within the Hydrology/Drainage Report.

***Parking Impacts***
Parking impacts associated with 110' North (Alternative 5) are limited to the following two sites:

- Approximately 11 parking spaces will be lost within the parking lot at the Sakioka Farms property located just east of the railroad corridor. Immediately south of Sakioka Farms is an asphalt paving company, whose property extends south to the limits of the SCE substation. The area includes a large vehicle and materials storage area and could be a potential location to replace the impacted parking spaces.

- The required south side widening along Warner Avenue east of Grand Avenue impacts almost an entire row of parking serving the adjacent office building located within Brookhollow Office Park. A total of approximately 49 spaces will be lost due to the widening, which includes the construction of a retaining wall and a 3' wide planter along the proposed back of walk due to the elevation difference between the roadway and parking lot. Finding or creating on site replacement parking for these lost spaces may be difficult due to the existing building and parking lot layouts.

A full assessment of the parking impacts identified above and the identification of potential mitigation strategies are outside the scope of this document.

***Landscaping, Beautification, and Water Quality Opportunities***
The introduction of a raised median along Warner Avenue and the remnant land remaining as part of the necessary property acquisitions will provide a significant opportunity to aesthetically upgrade the Warner Avenue corridor as part of the project. These upgrades could include the use of landscape and hardscape treatments within these areas. Other aesthetic treatments that could be considered would be the use of decorative or themed street lights and other appurtenances. A detailed urban design concept should be prepared and approved by the City prior to final design so that the appropriate landscape, hardscape and other plans can be included within the bid package. A cost for the landscaping, which includes a 4' parkway throughout the entire Warner Avenue segment, or hardscaping of these areas was included in the preliminary construction cost estimate.

When the Warner Avenue from Main Street to Grand Avenue Widening Project advances to final design, it will need to conform to the requirements of the MS4 Water Quality Permit. This involves the infiltration or treatment of the volume produced from the 85% 24 hour storm event. This can be achieved by using either vegetated swales or bio filtration units.

***Minimizing Construction Impacts***
Due to the large scale nature of this project, the construction associated with the proposed improvements has the potential to create significant temporary impacts to traffic flow, circulation, and access within the

corridor during construction. As such, it is critical that measures be taken during construction to reduce these impacts so that the disruption to the public can be minimized. Although this is a large street improvement project, there are many standard measures that can be taken during construction to minimize disruption to the residents, business owners, and motorists who utilize the Warner Avenue corridor every day. These measures include:

- Keeping at least one traffic lane open in each direction during construction.
- Coordinating the construction schedule with local businesses and residents.
- Maintaining access to driveways during construction.

The most significant measure that can be taken to minimize traffic impacts is to stage the construction so that:

- Construction is completed in longitudinal segments along Warner Avenue so that the entire length of Warner Avenue within the project limits is not disrupted at once. In addition, the number of intersecting cross streets that require closure during construction can be minimized if the road is constructed in segments. This substantially reduces access impacts to the residents who live on the north side of Warner Avenue between Warner Avenue and Anahurst Place. If a cross street must be closed at Warner Avenue during construction, motorists wishing to access their homes along the closed street can easily do so by utilizing an adjacent cross street.

- Within each segment, the roadway is reconstructed in stages so that four lanes of traffic can be maintained during construction. By holding the existing curb line and widening to the other as is proposed as part of this project, this can likely be effectively accomplished. Since each half of the proposed roadway is 45' wide, each half could accommodate four temporary 10' lanes if constructed in halves while providing 5 feet for the installation of K-rail.

- For parcels that are accessed by multiple driveways which are to be reconstructed, reconstruct one driveway approach at a time so that access to the property can be maintained during construction. For properties with single driveway access, quick curing concrete can be used to reconstruct the driveway approach so that the disruption time can be minimized.

It is recommended that the City require the preparation of a detailed Traffic Management Plan and traffic control plans as part of final design so that appropriate project-specific measures for reducing construction impacts can be developed and costed prior to construction. In addition to traffic control and staging, other measures that should be considered within the Traffic Control Plan include extensive public outreach and a public awareness campaign through the use of mailers and notices in local papers and other publications,

***Cost Estimate***

A planning level construction cost estimate was prepared for the proposed improvements based on the Preliminary Engineering Plans. Unit costs for each pay item were based on recent bid-prices for roadway construction projects within Southern California, the most current edition of the Caltrans Cost Data Book, current industry standards, and past recent experience on similar types of projects. Quantities were obtained from the Preliminary Engineering Plans. The cost estimate calculation worksheet is included in Appendix F. The attached estimate does not include the cost of any right of way acquisition or the demolition of existing structures on acquired properties. These costs are being prepared separately by City staff.

The various items included within the cost estimate reflect the current preliminary level of design. The drainage items are taken from the preliminary drainage report and are split into two separate categories; drainage modifications required to accommodate the proposed widening, and optional recommended

upgrades to the existing storm drain system to better accommodate design year flows. Total project costs are provided both with and without these optional drainage upgrades and are summarized as follows:

- Total construction cost without drainage upgrades = $8.71M
- Total construction cost with drainage upgrades = $10.91M

These costs do not include any project implementation costs, such as design costs and construction management/engineering costs.

With regard to utility location costs, a lump sum cost was applied to cover the relocation of any City-owned wet utilities as part of the project. It is assumed that the relocation of all dry utilities will be done at the expense of the respective utility owners.

Per the City's request, project implementation costs were also included in the estimate; including an estimate of the final design cost (5% of construction cost) and a construction management cost (12% of construction cost). These factors were provided by the City. Project implementation costs are as follows:

- Total project implementation cost without drainage upgrades = $1.91M
- Total project implementation cost with drainage upgrades = $2.40M

# APPENDIX A

# UTILITY IMPACT ASSESSMENT

# UTILITY COORDINATION

FOR

## WARNER AVENUE WIDENING

From Main Street to Grand Avenue

Santa Ana, California

October 2009

Prepared for:

The Planning Center
**1580 Metro Drive**
**Costa Mesa, CA 92626**

Prepared by:

VA Consulting, Inc.

VA CONSULTING, INC.
ENGINEERS•PLANNERS•SURVEYORS
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www. vaconsultinginc.com

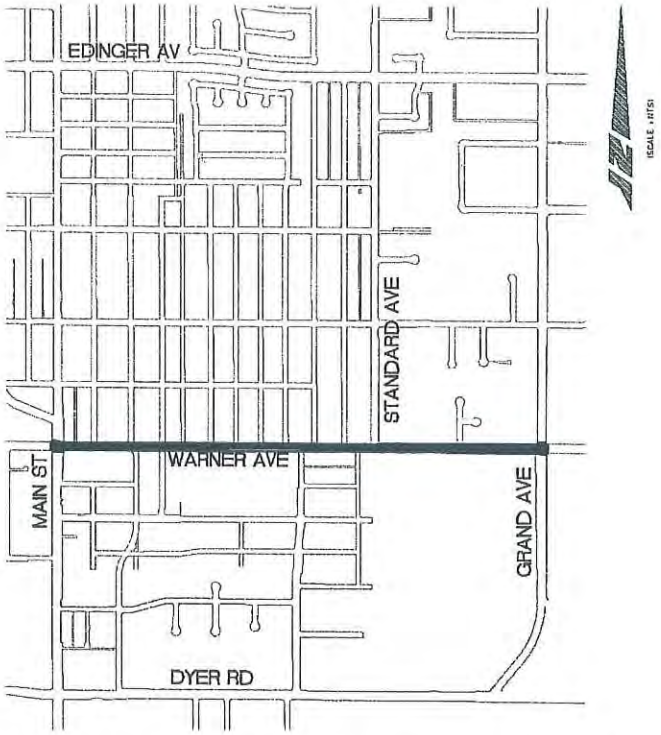
# TABLE OF CONTENTS

## A INTRODUCTION

VA Consulting Inc. (VA) was retained by The Planning Center (TPC) to research the utility relocation requirements associated with the proposed widening of Warner Avenue from two lanes to three lanes in each direction with a raised median, from Main Street to Grand Avenue as shown on the Vicinity Map below.

Based upon the roadway improvement plans prepared by the IBI Group (IBI), VA contacted the affected utility companies and assembled available data and record drawings to document the existing utilities and determine the likely impacts and relocation requirements associated with the proposed roadway improvements.

This report summarizes the details and findings associated with the utility coordination task. The existing utilities and the utility impacts are shown on the exhibits in the Appendix. The utility relocation requirements are summarized in Section C along with the opinion of probable construction costs.




VICINTY MAP – Warner Avenue Widening, City of Santa Ana

## B UTILITY COORDINATION

The following utility companies with facilities within the project limits were contacted:

Water
- Metropolitan Water
- City of Santa Ana

Sewer
- Orange County Sanitation
- City of Santa Ana

Power
- SC Edison

Gas
- SC Gas

Telephone/Communication lines
- AT&T Transmission & Distribution
- MCI/Verizon
- MPower Communications
- Airtouch Cellular
- Time Warner Cable

In addition, the following utility companies with facilities at the intersections of Warner Avenue with Grand Avenue and Main Street were contacted. These utility companies reported that they don't have any facilities along Warner Ave.

- Time Warner Telecom
- Qwest
- XO Communications
- Abovenet

The assembled utility data from site visits, topographic mapping and the record drawings received from the City of Santa Ana and the Utility Companies were added to the CAD base files for the project.

This utility research did not include potholing for finding and/or confirming the location of underground utilities.

## C UTILITY IMPACTS AND RELOCATION COSTS

Based on the preliminary roadway improvement geometrics prepared by IBI, VA reviewed the utility impacts and quantified the utility relocation requirements. Most of the utilities are aligned longitudinally paralleling the centerline of Warner Avenue. For purposes of the preliminary design of the planned roadway widening, it was assumed that subsurface utilities would be protected in place and the surface or above surface facilities would be relocated or adjusted to grade, where necessary. The utility facilities to be relocated or adjusted to grade are listed in Table 1 below along with a preliminary opinion of probable construction costs for the indicated modifications required for the planned roadway widening. The findings provided are preliminary - the relocation requirements and the estimated construction costs have not been confirmed by the utility companies. Also, the issue of "prior rights" was not investigated. Therefore, these are total costs for the relocation of utilities and do not identify whether the City or Utility Companies are responsible for the relocation of these facilities.

Table 1 - **Warner Avenue Widening Project**
From Main Street to Grand Avenue
**Preliminary Opinion of Probable Construction Cost of Utilities Impact**

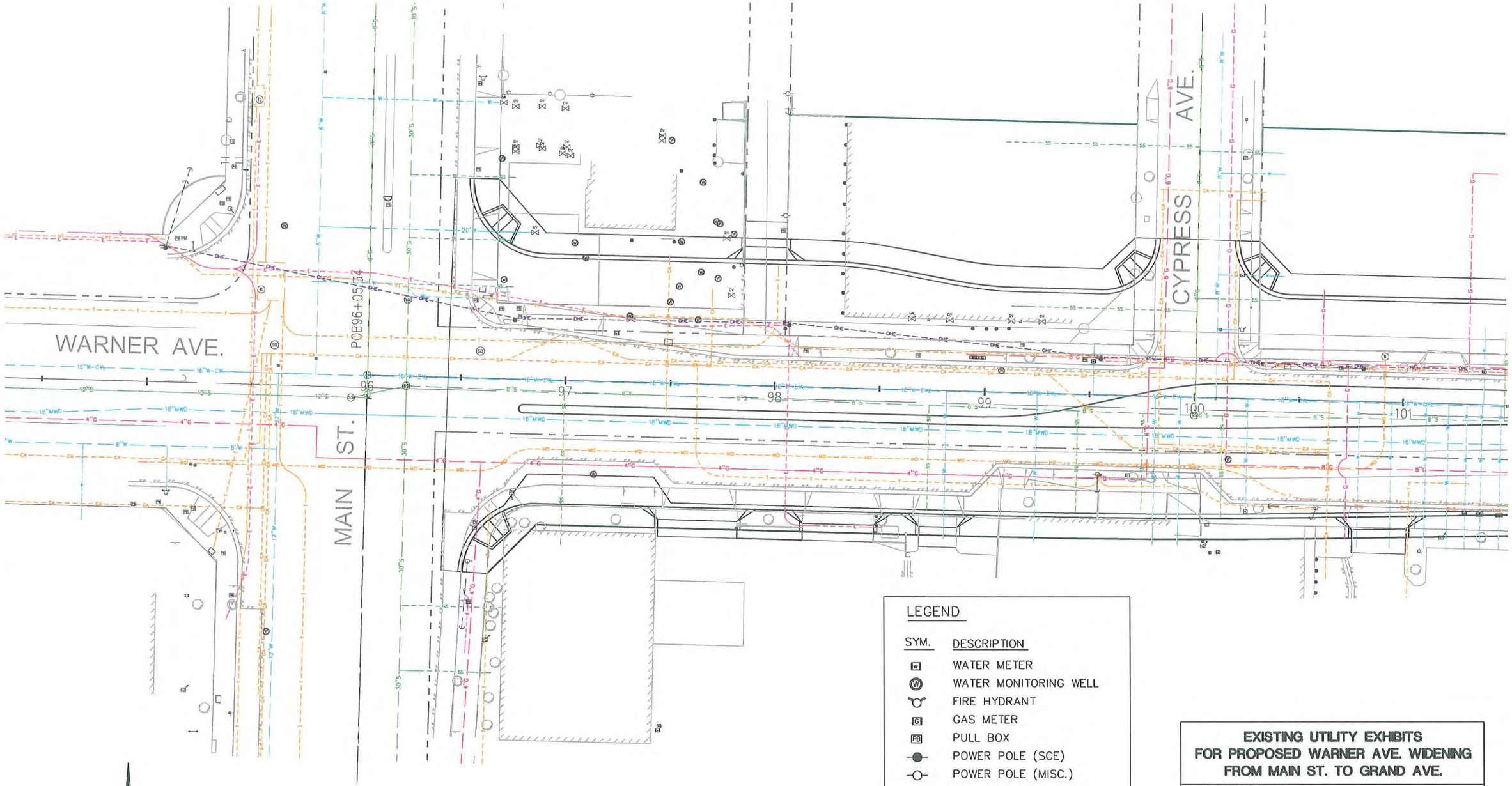
| No. | Description | Approx. Reloc. Distance[1] | Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|---|
| 1. | Relocate Fire Hydrant | 3' to 65' | 14 | EA | $2,000 | $28,000 |
| 2. | Relocate Water Meter | 2' to 40' | 52 | EA | $800 | $41,600 |
| 3. | Relocate Water Monitoring Well | 10' | 1 | EA | $1,000 | $1,000 |
| 4. | Relocate Gas Meter | 5' to 36' | 8 | EA | $500 | $4,000 |
| 5. | Relocate Pull Box | 5' to 50' | 51 | EA | $250 | $12,750 |
| 6. | Relocate Power Transmission Poles and Lines (north side of Warner Ave) | 5' to 50' | 3,600 | LF | $400 to $800 | $1.5 M to $3.0 Million |
| 7. | Relocate Miscellaneous Poles | 3' to 25' | 10 | EA | $10,000 | $100,000 |
| 8. | Relocate Street Light | 5' to 15' | 6 | EA | $1,500 | $9,000 |
| 9. | Relocate Telephone Vault (Or MH) | 5' to 40' | 5 | EA | $25,000 | $125,000 |
| 10. | Relocate Miscellaneous Vault | 5' to 50' | 7 | EA | $25,000 | $175,000 |
| 11. | Relocate Electrical Vault / Box | 8' to 45' | 3 | EA | $50,000 | $150,000 |
| 12. | Relocate Electrical Vent | 5' | 1 | EA | $500 | $500 |
| 13. | Remove / Relocate Water Valve | 3' to 35' | 5 | EA | $200 | $1,000 |
| 14. | Remove / Relocate Gas Valve | 10' to 35' | 7 | EA | $200 | $1,400 |
| 15. | Adjust Water Valve to Grade | - | 42 | EA | $150 | $6,300 |
| 16. | Adjust Gas Valve to Grade | - | 2 | EA | $150 | $300 |
| 17. | Adjust MH to Grade (SS/SD/WA/TEL) | - | 49 | EA | $300 | $14,700 |
| | | | | | | |
| | **Total** | | | | | $2.2 M to $3.7 Million |
| | | | | | | |
| | **Contingencies (20% due to timing & relocation uncertainty)** | | | | | $0.4 M to $0.7 Million |
| | | | | | | |
| | **Grand Total** | | | | | $2.6 M to $4.4 Million |

Notes: 1. Except for No. 6 which is measured along Warner Avenue, the other distances are measured perpendicular to the Warner Avenue centerline.

Based on the tabulation of utility relocation requirements for the widening of Warner Ave from Main Street to Grand Avenue, the Preliminary Opinion of Probable Construction Cost of Utilities Impact is in the range of $ 2.6 Million to $4.4 Million.

## APPENDIX

Illustrations of the existing in-street utilities along Warner Avenue from Main Street to Grand Avenue to be impacted by the proposed construction are provided on Exhibits 1 to 8 in this Appendix.




NOT TO SCALE

THE TOPOGRAPHIC BASE DRAWING AND UTILITY LINE WORK WERE PREPARED BY VA CONSULTING, INC. THE PROPOSED ROADWAY GEOMETRICS WERE PREPARED BY THE IBI GROUP

LEGEND

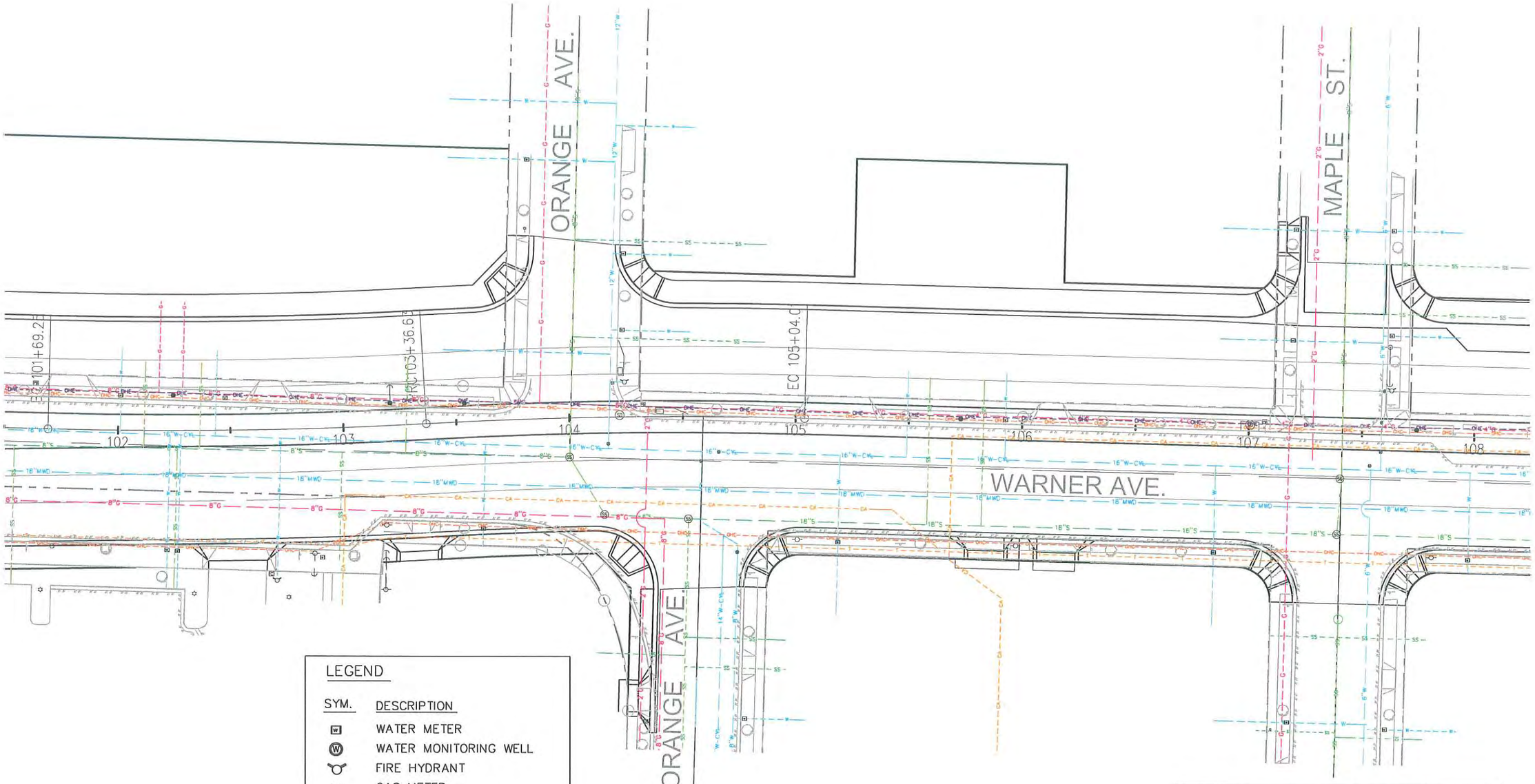
| SYM. | DESCRIPTION |
|---|---|
| W | WATER METER |
| W | WATER MONITORING WELL |
| | FIRE HYDRANT |
| G | GAS METER |
| PB | PULL BOX |
| | POWER POLE (SCE) |
| | POWER POLE (MISC.) |
| □/TL | TEL. VAULT (OR MH) |
| □ | MISC. VAULT |
| ⊗ | WATER VALVE |
| GV | GAS VALVE |
| SS | SEWER MH |
| SD | STORM DRAIN MH |
| W | WATER WELL |
| ⊗ | WATER VALVE |
| ● | BOLLARD |

**EXISTING UTILITY EXHIBITS FOR PROPOSED WARNER AVE. WIDENING FROM MAIN ST. TO GRAND AVE.**

PREPARED FOR:
**THE PLANNING CENTER**
1580 METRO DRIVE
COSTA MESA CA 92626

PREPARED BY:
**VA CONSULTING, INC.**
6400 OAK CANYON, SUITE 150
IRVINE, CA 92618

OCT. 2009
1 OF 8

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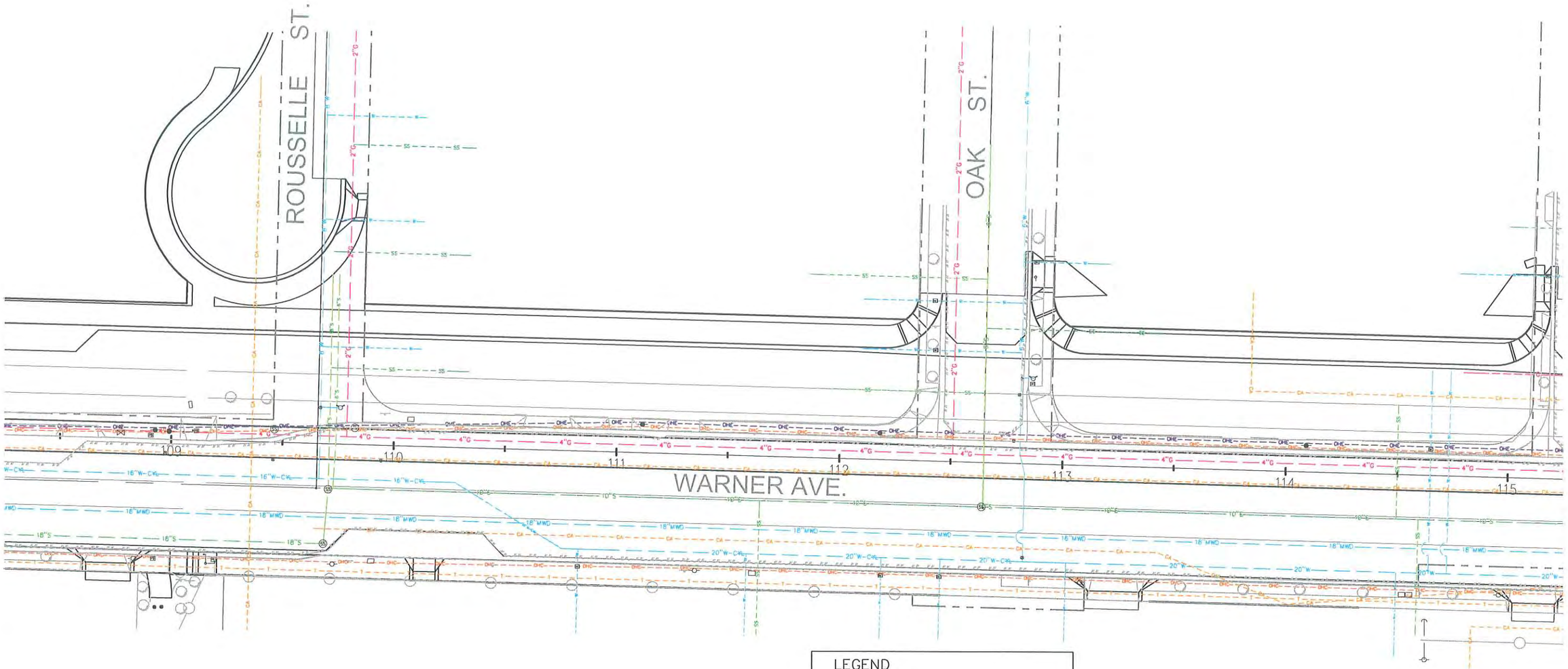


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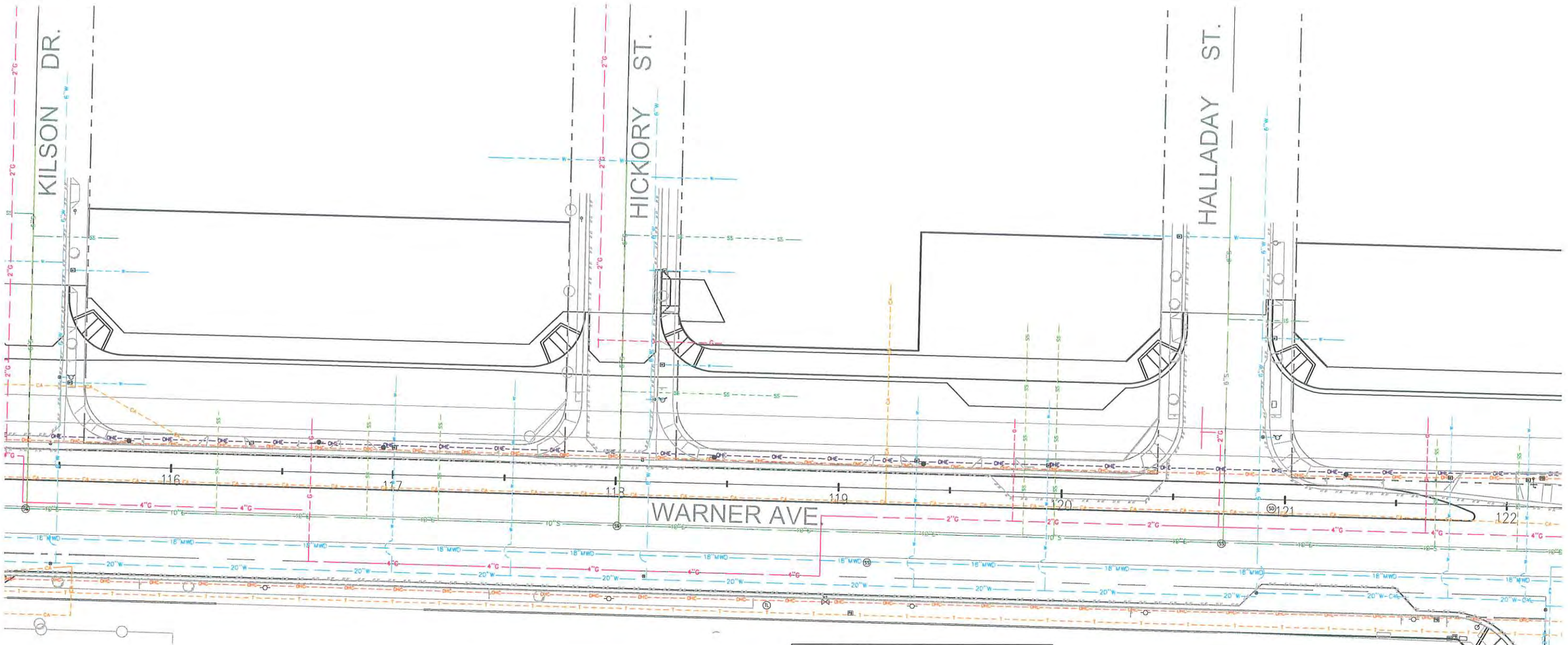


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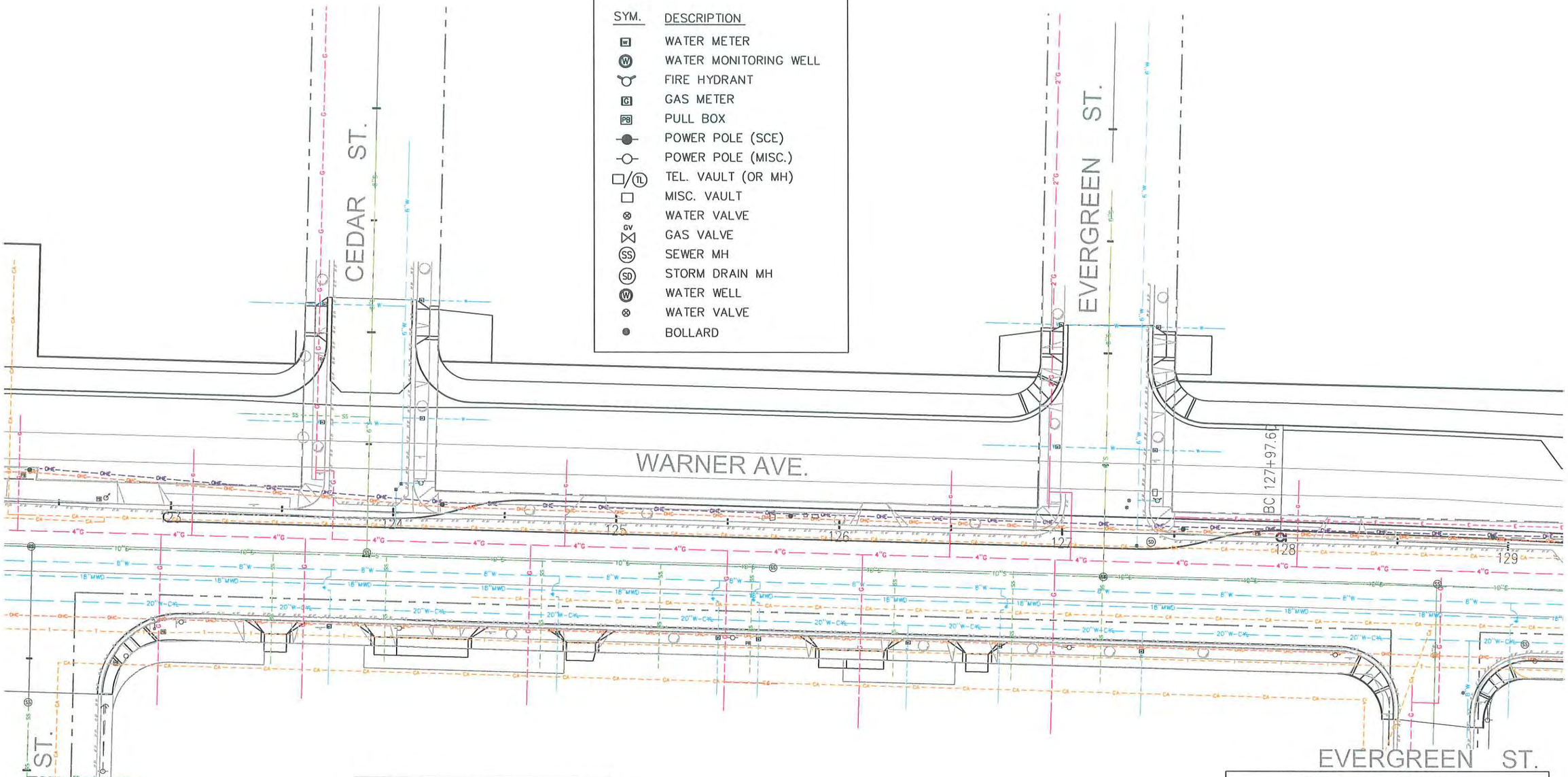


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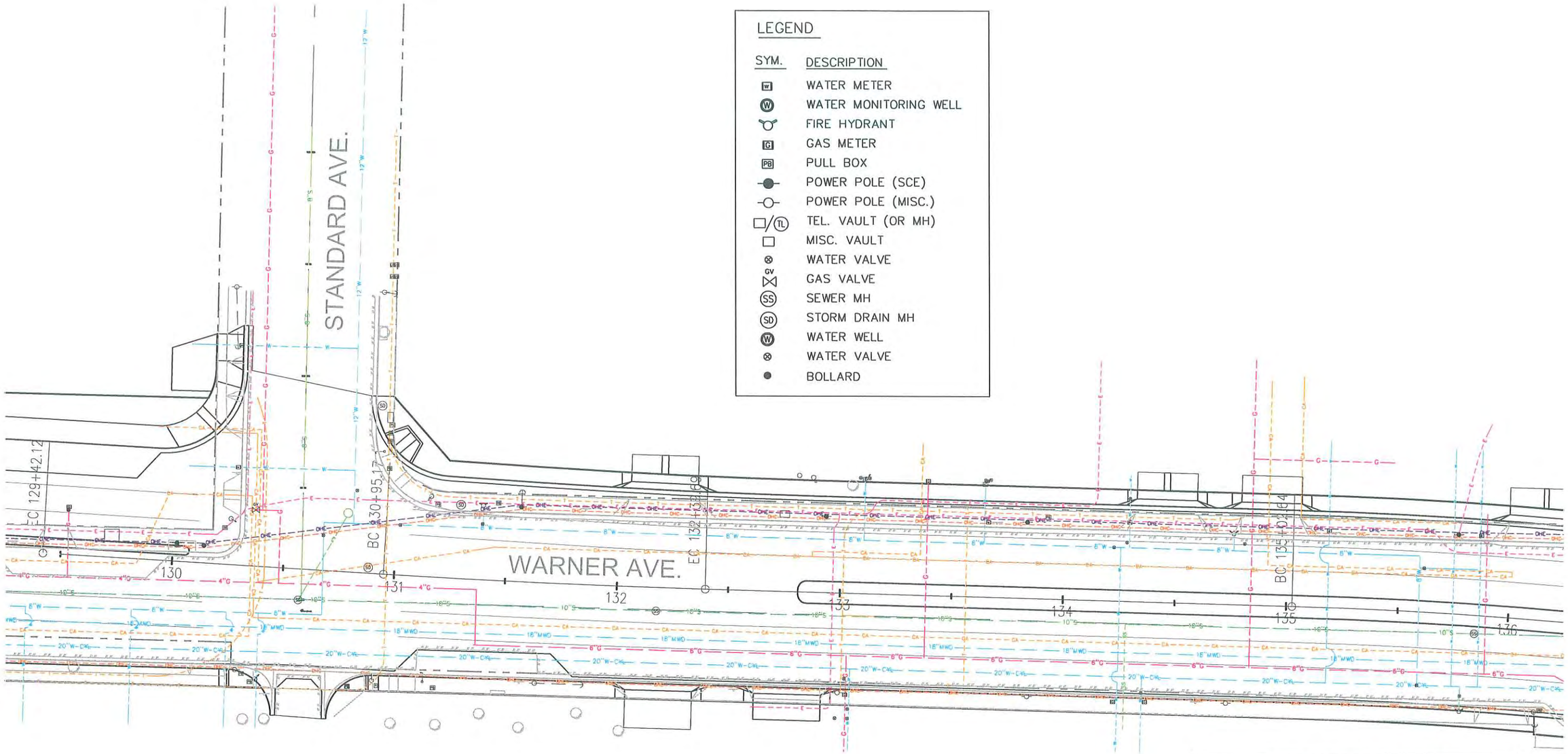


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| | FIRE HYDRANT |
| G | GAS METER |
| PB | PULL BOX |
| | POWER POLE (SCE) |
| | POWER POLE (MISC.) |
| TL | TEL. VAULT (OR MH) |
| | MISC. VAULT |
| | WATER VALVE |
| GV | GAS VALVE |
| SS | SEWER MH |
| SD | STORM DRAIN MH |
| W | WATER WELL |
| | WATER VALVE |
| | BOLLARD |

N

NOT TO SCALE

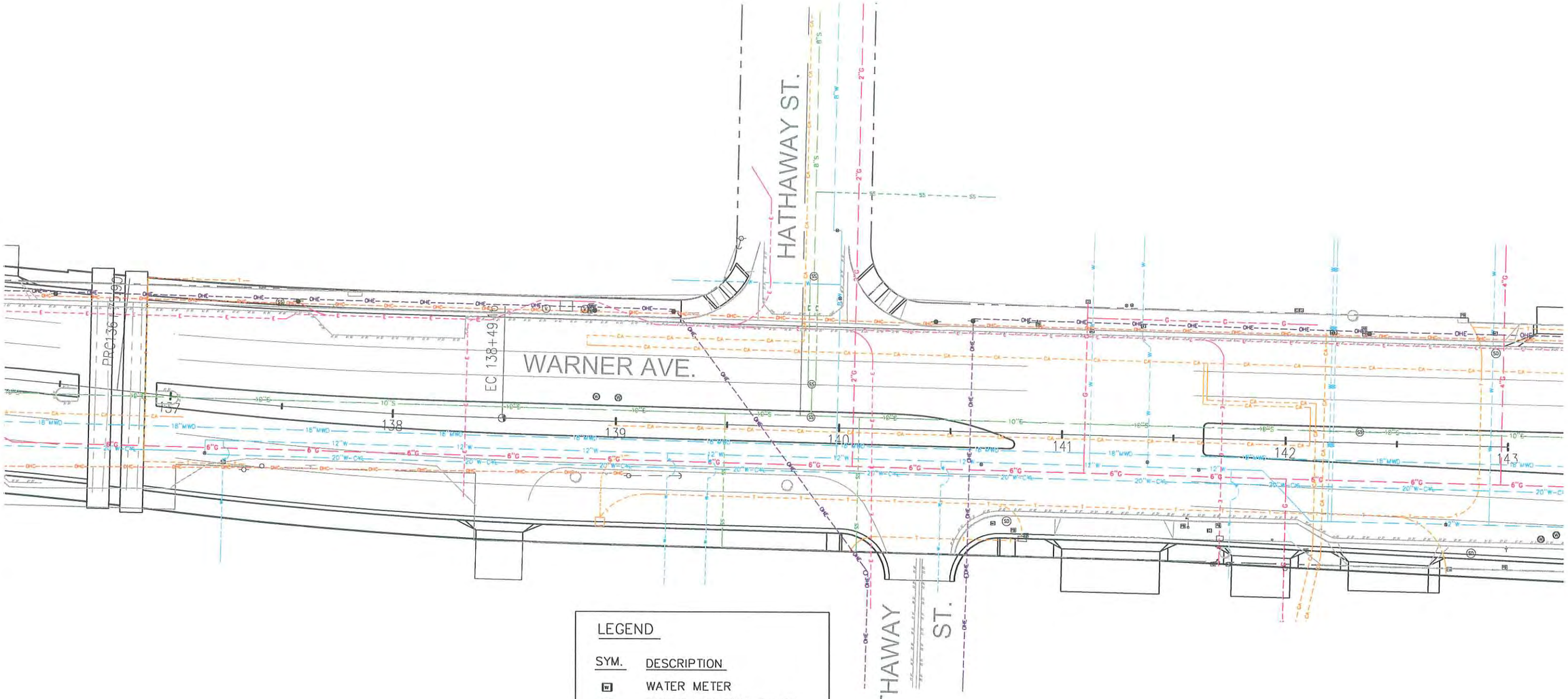
THE TOPOGRAPHIC BASE DRAWING AND UTILITY LINE WORK WERE PREPARED BY VA CONSULTING, INC. THE PROPOSED ROADWAY GEOMETRICS WERE PREPARED BY THE IBI GROUP

**EXISTING UTILITY EXHIBITS**
**FOR PROPOSED WARNER AVE. WIDENING**
**FROM MAIN ST. TO GRAND AVE.**

PREPARED FOR:
**THE PLANNING CENTER**
1580 METRO DRIVE
COSTA MESA CA 92626

PREPARED BY:
**VA CONSULTING, INC.**
6400 OAK CANYON, SUITE 150
IRVINE, CA 92618

OCT. 2009
6 OF 8




THE TOPOGRAPHIC BASE DRAWING AND UTILITY LINE WORK WERE PREPARED BY VA CONSULTING, INC. THE PROPOSED ROADWAY GEOMETRICS WERE PREPARED BY THE IBI GROUP

N

NOT TO SCALE

LEGEND

| SYM. | DESCRIPTION |
|---|---|
| W | WATER METER |
| W | WATER MONITORING WELL |
| | FIRE HYDRANT |
| G | GAS METER |
| PB | PULL BOX |
| | POWER POLE (SCE) |
| | POWER POLE (MISC.) |
| TL | TEL. VAULT (OR MH) |
| | MISC. VAULT |
| | WATER VALVE |
| GV | GAS VALVE |
| SS | SEWER MH |
| SD | STORM DRAIN MH |
| W | WATER WELL |
| | WATER VALVE |
| | BOLLARD |

**EXISTING UTILITY EXHIBITS FOR PROPOSED WARNER AVE. WIDENING FROM MAIN ST. TO GRAND AVE.**

PREPARED FOR:

**THE PLANNING CENTER**
1580 METRO DRIVE
COSTA MESA CA 92626

PREPARED BY:

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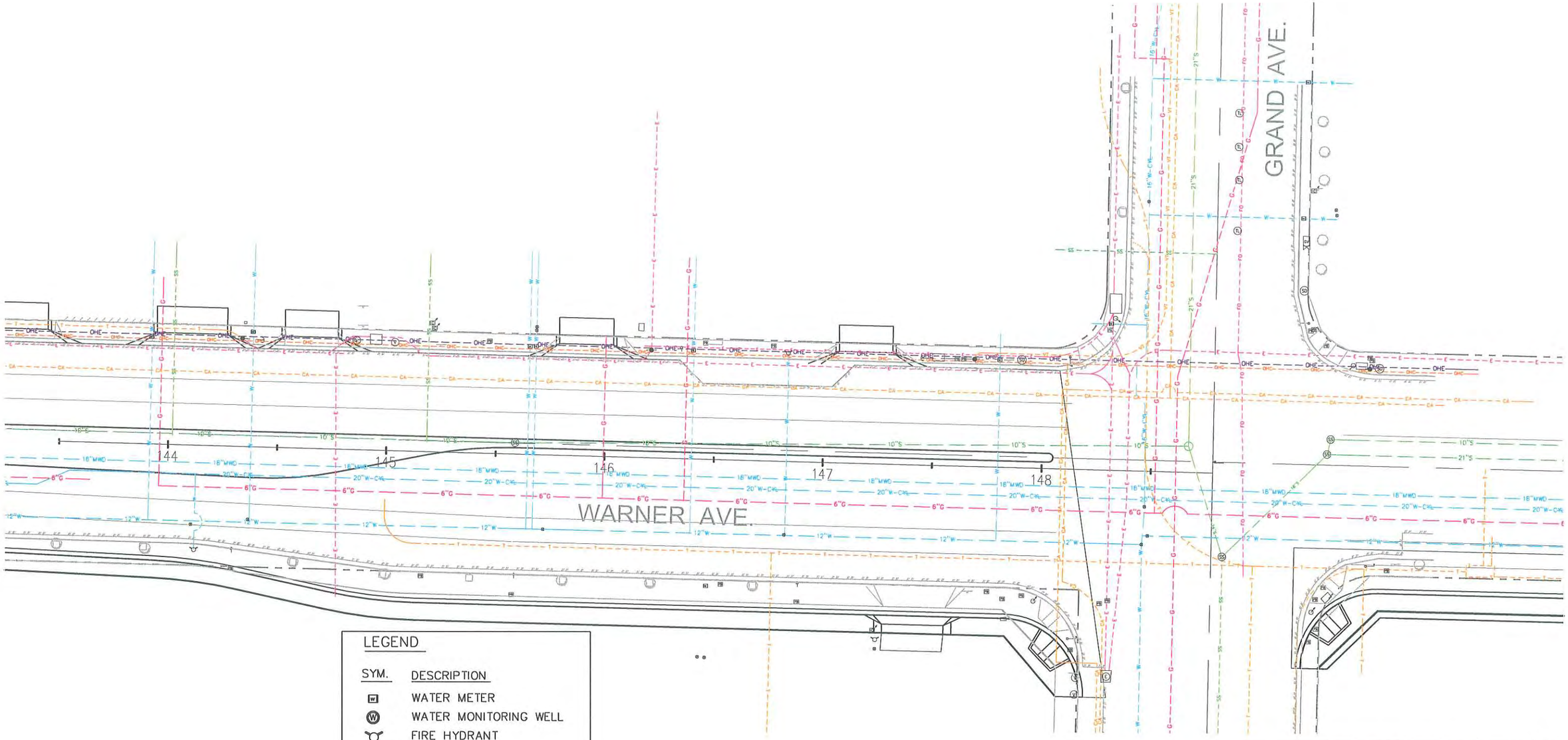
6400 OAK CANYON, SUITE 150
IRVINE, CA 92618

OCT. 2009




## LEGEND

| SYM. | DESCRIPTION |
|---|---|
| W | WATER METER |
| W | WATER MONITORING WELL |
| | FIRE HYDRANT |
| G | GAS METER |
| PB | PULL BOX |
| | POWER POLE (SCE) |
| | POWER POLE (MISC.) |
| TL | TEL. VAULT (OR MH) |
| | MISC. VAULT |
| | WATER VALVE |
| GV | GAS VALVE |
| SS | SEWER MH |
| SD | STORM DRAIN MH |
| W | WATER WELL |
| | WATER VALVE |
| | BOLLARD |

N

NOT TO SCALE

THE TOPOGRAPHIC BASE DRAWING AND UTILITY LINE WORK WERE PREPARED BY VA CONSULTING, INC. THE PROPOSED ROADWAY GEOMETRICS WERE PREPARED BY THE IBI GROUP

**EXISTING UTILITY EXHIBITS FOR PROPOSED WARNER AVE. WIDENING FROM MAIN ST. TO GRAND AVE.**

PREPARED FOR:

**THE PLANNING CENTER**

1580 METRO DRIVE
COSTA MESA CA 92626

PREPARED BY:

**VA CONSULTING, INC.**

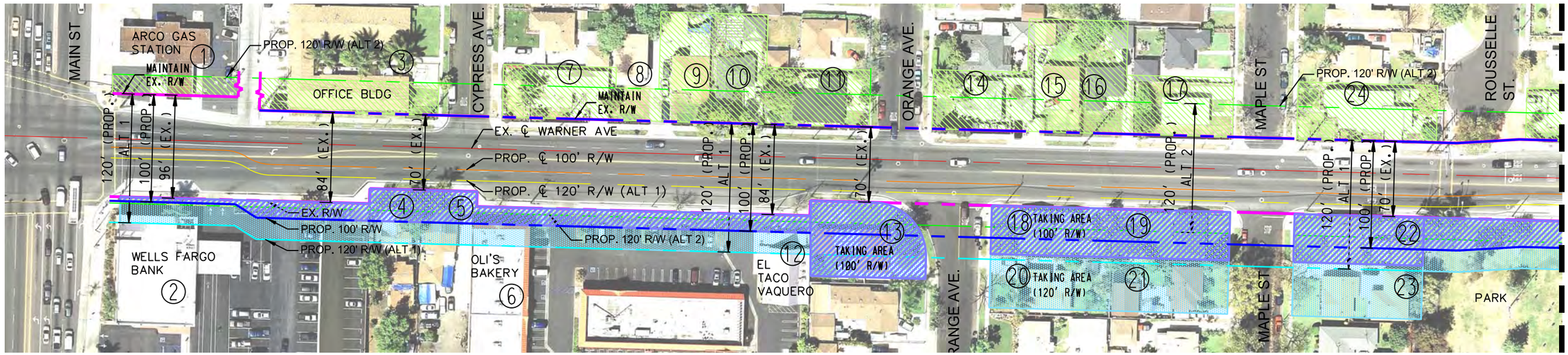
6400 OAK CANYON, SUITE 150
IRVINE, CA 92618

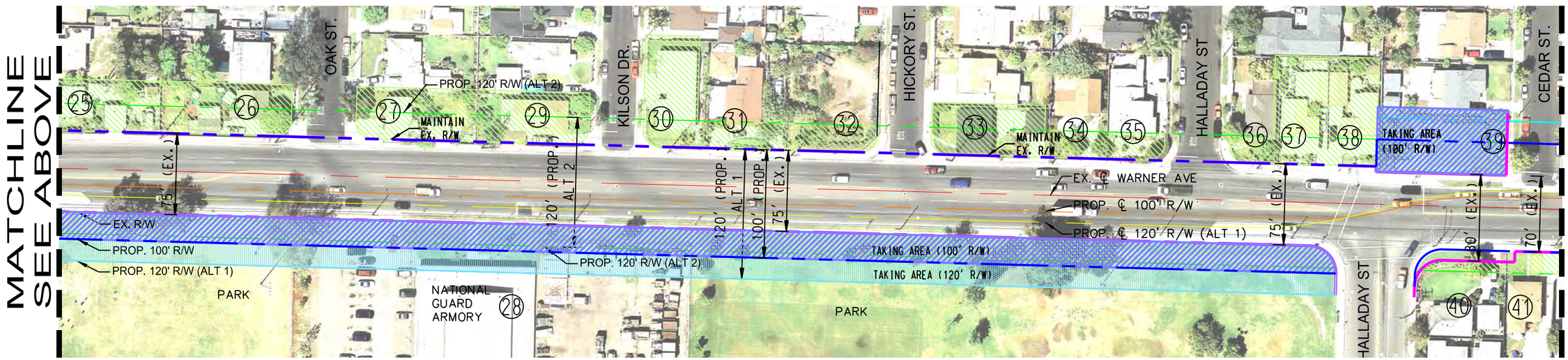
OCT. 2009

8 OF 8

# APPENDIX B

# INITIAL BUILD ALTERNATIVE (ALTERNATIVES 1-3) CONCEPTS




## LEGEND

- EXISTING RIGHT OF WAY (PER CITY OF SANTA ANA AS-BUILTS, PROJECT NO. 1806, DATED FEBRUARY 2001)
- PROPOSED RIGHT OF WAY (120') - ALT 1
- PROPOSED RIGHT OF WAY (120') - ALT 2
- PROPOSED RIGHT OF WAY (100') - ALT 3
- PROPOSED CENTERLINE (120') - ALT 1
- EXISTING CENTERLINE/PROPOSED ALT 2
- PROPOSED CENTERLINE (100') - ALT 3
- TAKING AREA (120' R/W) - ALT 1
- TAKING AREA (120' R/W) - ALT 2
- TAKING AREA (100' R/W) - ALT 3
- (1) IMPACTED PROPERTY (SEE SPREADSHEET)

100 0 50 100 200

*1 inch = 100 ft.

* WHEN PLOTTED ON 11"x17" PAPER

# INITIAL ALTERNATIVES

IBI GROUP

**CITY OF SANTA ANA**

WARNER AVE WIDENING
BETWEEN MAIN ST AND GRAND AVE

Sheet No. 1 OF 3

Scale 1" = 100'



Plotted By:ovivar On: Aug 01, 2012 - 2:07pm
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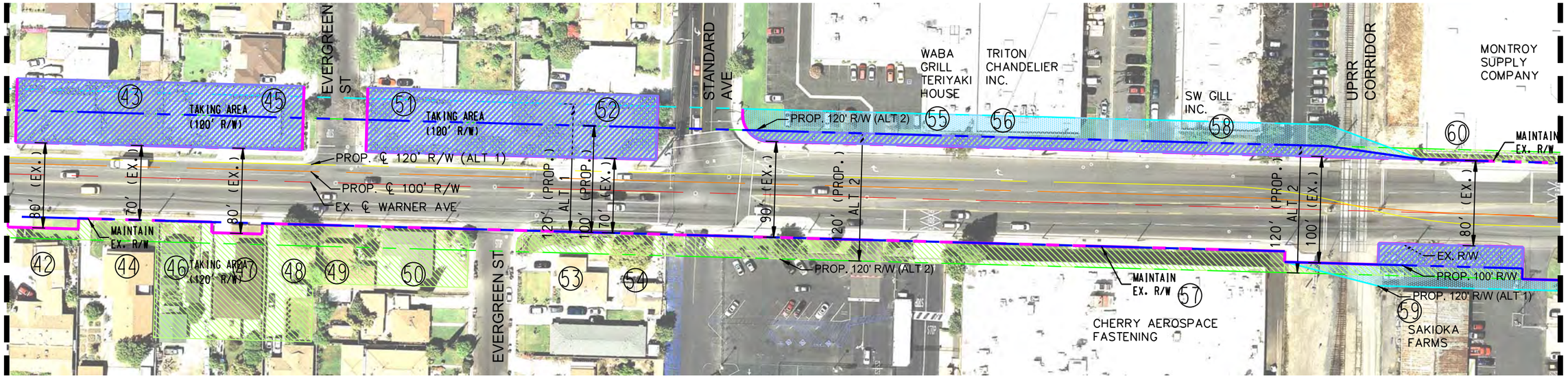
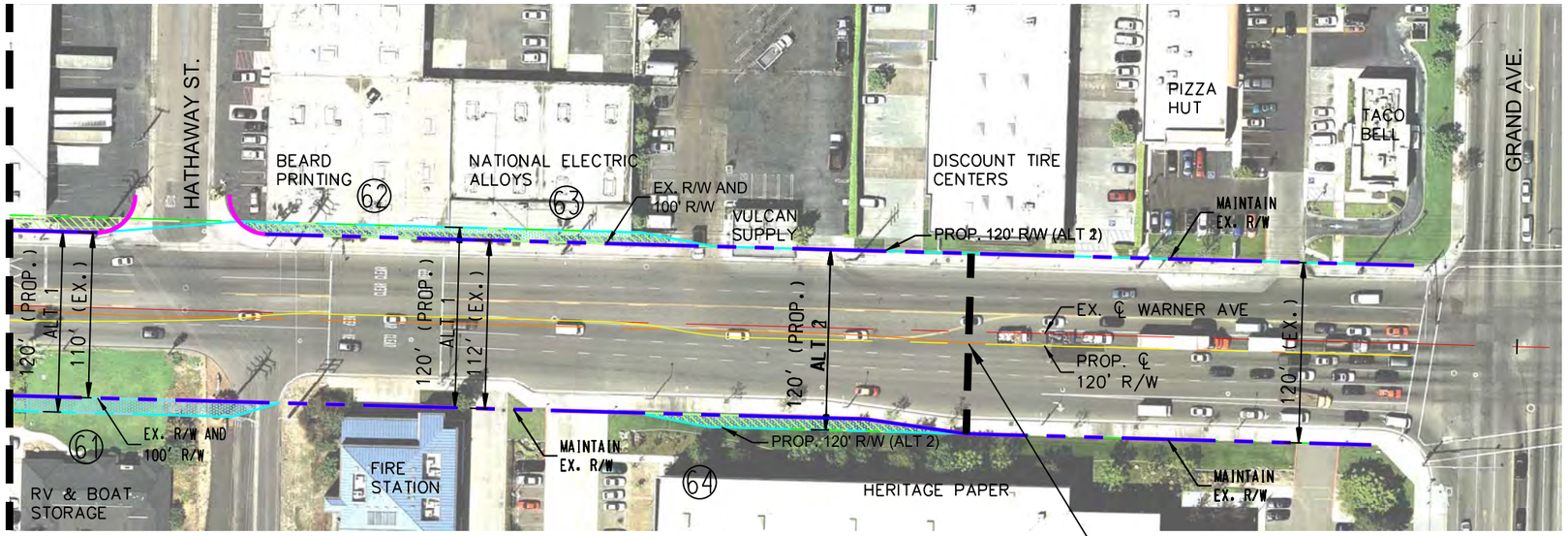
Layout: Model




## LEGEND

- EXISTING RIGHT OF WAY, PER CITY OF SANTA ANA AS-BUILTS, PROJECT NO. 1806, DATED FEBRUARY 2001)
- PROPOSED RIGHT OF WAY (120') - ALT 1
- PROPOSED RIGHT OF WAY (120') - ALT 2
- PROPOSED RIGHT OF WAY (100') - ALT 3
- PROPOSED CENTERLINE (120') - ALT 1
- EXISTING CENTERLINE/PROPOSED ALT 2
- PROPOSED CENTERLINE (100') - ALT 3
- TAKING AREA (120' R/W) - ALT 1
- TAKING AREA (120' R/W) - ALT 2
- TAKING AREA (100' R/W) - ALT 3
- (1) IMPACTED PROPERTY (SEE SPREADSHEET)

PROPOSED END OF IMPROVEMENTS (TO BE DETERMINED)

100 0 50 100 200

*1 inch = 100 ft.

* WHEN PLOTTED ON 11"x17" PAPER

# INITIAL ALTERNATIVES

IBI GROUP

**CITY OF SANTA ANA**

WARNER AVE WIDENING
BETWEEN MAIN ST AND GRAND AVE

Sheet No. 2 OF 3

Scale 1" = 100'

Plotted By: ovivar On: Aug 01, 2012 - 2:07pm
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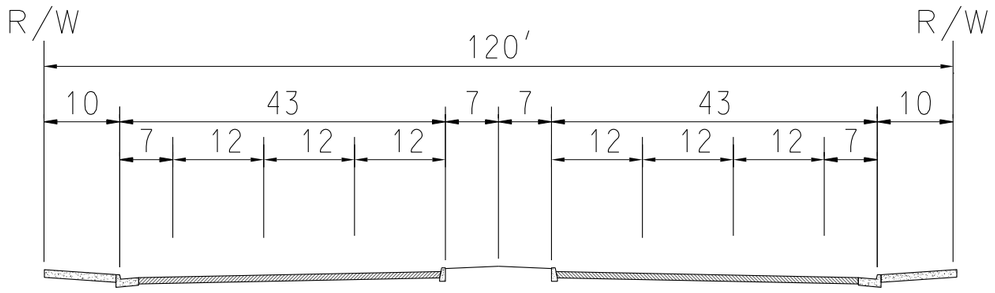
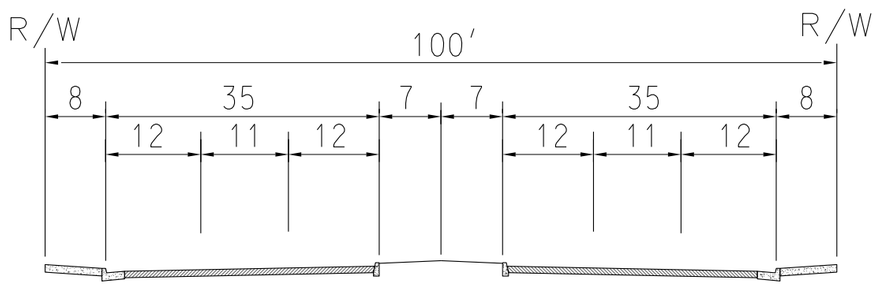
Layout: Model




MAJOR ARTERIAL 120' R/W SECTION
SANTA ANA STANDARD
NTS




PRIMARY ARTERIAL 100' R/W SECTION
SANTA ANA STANDARD
NTS

# INITIAL ALTERNATIVES

| | | |
|---|---|---|
| IBI GROUP | **CITY OF SANTA ANA**<br>WARNER AVE WIDENING<br>BETWEEN MAIN ST AND GRAND AVE | Sheet No.<br>3 OF 3<br>Scale |

| | General Location | Acquisition No. | Property Impacted | Specific Location | Alternative 1: 120' R/W Option | | | Alternative 2: 120' R/W Option (Concentric Around Ex. CL) | | | Alternative 3: 100' R/W Option | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Partial or Full Taking? | Parking Impacted? | Structures Impacted? | Partial or Full Taking? | Parking Impacted? | Structures Impacted? | Partial or Full Taking? | Parking Impacted? | Structures Impacted? |
| Sheet 1 | | 1 | ARCO Gas Station/Smog Pros | 2245 S Main Street | Full | No | Yes | Full | No | Yes | - | - | - |
| | | 2 | Wells Fargo Bank | 2301 S Main Street | Full | Yes | Yes | Partial | No | No | Partial | Yes | No |
| | | 3 | Multi-Family | 2246-2248 Cypress Ave | Full | Yes | Yes | Full | Yes | Yes | Full | Yes | Yes |
| | | 4 | House | South side of Warner Ave, west of Cypress Ave | Full | Yes | Yes | Full | Yes | Yes | Full | Yes | Yes |
| | | 5 | House | South side of Warner Ave, west of Cypress Ave | Full | Yes | Yes | Full | Yes | Yes | Full | Yes | Yes |
| | | | | Number of Takes | Partial: | 0 | | Partial: | 1 | | Partial: | 1 | |
| | | | | | Full: | 5 | | Full: | 4 | | Full: | 3 | |
| | Between Cypress Avenue and Orange Avenue | 6 | Oli's Bakery Buildin | 204 E Warner Ave | Partial | No | No | Yes | Yes | Yes | Partial | Yes (13 Spaces) | Possible |
| | | 7 | House | North side of Warner Ave, east of Cypress Ave | - | - | - | Full | Yes | Yes | - | - | - |
| | | 8 | House | North side of Warner Ave, between Cypress Ave and Orange Ave | - | - | - | Partial | Yes (Driveway Entrance) | No | - | - | - |
| | | 9 | House | North side of Warner Ave, between Cypress Ave and Orange Ave | - | - | - | Full | Yes | Yes | - | - | - |
| | | 10 | House | North side of Warner Ave, between Cypress Ave and Orange Ave | - | - | - | Full | Yes | Yes | - | - | - |
| | | 11 | House | North side of Warner Ave, west of Orange Ave | - | - | - | Full | Yes | Yes | - | - | - |
| | | 12 | El Taco Vaquero | 222 E Warner Ave | Full | Yes | Yes (Driveway Entrance) | Partial | No | No | Partial | Yes (Driveway Entrance) | Possible |
| | | 13 | House | South side of Warner Ave, west of Orange Ave | Full | Yes | Yes | Partial | No | No | Full | Yes | Yes |
| | | | | Number of Takes | Partial: | 1 | | Partial: | 4 | | Partial: | 2 | |
| | | | | | Full: | 2 | | Full: | 4 | | Full: | 1 | |
| | Between Orange Avenue and Maple Street | 14 | House | North side of Warner Ave, east of Orange Ave | - | - | - | Full | Yes | Yes | - | - | - |
| | | 15 | House | North side of Warner Ave, between Orange Ave and Maple St | - | - | - | Full | Yes | Yes | - | - | - |
| | | 16 | House | North side of Warner Ave, between Orange Ave and Maple St | - | - | - | Full | Yes | Yes | - | - | - |
| | | 17 | House | North side of Warner Ave, west of Maple St | - | - | - | Full | Yes | Yes | - | - | - |
| | | 18 | House | East side of Orange Ave, south of Warner Ave | Full | Yes | Yes | Full | Yes | Yes | Full | Yes | Yes |
| | | 19 | House | West side of Maple Ave, south of Warner Ave | Full | Yes | Yes | Full | Yes | Yes | Full | Yes | Yes |
| | | 20 | House | East side of Orange Ave, south of Warner Ave | Full | Yes | Yes | - | - | - | - | - | - |
| | | 21 | House | West side of Maple Ave, south of Warner Ave | Full | Yes | Yes | - | - | - | - | - | - |
| | | | | Number of Takes | Partial: | - | | Partial: | - | | Partial: | - | |
| | | | | | Full: | 4 | | Full: | 6 | | Full: | 2 | |
| Sheet 1 | Between Maple Street and Oak Street | 22 | House | East side of Maple Ave, south of Warner Ave | Full | Yes | Yes | Full | Yes | Yes | Full | Yes | Yes |
| | | 23 | House | North side of Warner Ave, east of Maple Ave | Full | Yes | Yes | - | - | - | - | - | - |
| | | 24 | House | North side of Warner Ave, east of Maple Ave | - | - | - | Full | Yes | Yes | - | - | - |
| | | 25 | House | North side of Warner Ave, east of Rouselle St | - | - | - | Full | Yes | Yes | - | - | - |
| | | 26 | House | North side of Warner Ave, west of Oak St | - | - | - | Full | Yes | Yes | - | - | - |
| | | | | Number of Takes | Partial: | - | | Partial: | - | | Partial: | - | |
| | | | | | Full: | 2 | | Full: | 4 | | Full: | 1 | |
| | Between Oak Street and Halladay Street | 27 | House | North side of Warner Ave, east of Oak St | - | - | - | Full | Yes | Yes | - | - | - |
| | | 28 | National Guard Arn | 612 E Warner Ave | Full | Yes (9 spaces) | Yes | Partial | No | No | Partial | Yes (3 Spaces) | No |
| | | 29 | House | North side of Warner Ave, west of Kilson Dr | - | - | - | Full | Yes | Yes | - | - | - |
| | | 30 | House | North side of Warner Ave, east of Kilson Dr | - | - | - | Full | Yes | Yes | - | - | - |
| | | 31 | House | North side of Warner Ave, between Kilson Dr and Hickory St | - | - | - | Partial | No | No | - | - | - |
| | | 32 | Undeveloped Lot | North side of Warner Ave, west of Hickory St | - | - | - | Partial | No | No | - | - | - |
| | | 33 | House | North side of Warner Ave, east of Hickory St | - | - | - | Full | Yes | Yes | - | - | - |
| | | 34 | House | North side of Warner Ave, east of Hickory St | - | - | - | Partial | No | No | - | - | - |
| | | 35 | House | North side of Warner Ave, west of Halladay St | - | - | - | Partial | No | No | - | - | - |
| | | | | Number of Takes | Partial: | - | | Partial: | 5 | | Partial: | 1 | |
| | | | | | Full: | 1 | | Full: | 4 | | Full: | - | |
| | Between Halladay Street and Cedar Street | 36 | House | North side of Warner Ave, east of Halladay St | - | - | - | Partial | No | No | - | - | - |
| | | 37 | House | North side of Warner Ave, between Halladay St and Cedar St | - | - | - | Full | Yes | Yes | - | - | - |
| | | 38 | House | North side of Warner Ave, between Halladay St and Cedar St | - | - | - | Full | Yes | Yes | - | - | - |
| | | 39 | House | North side of Warner Ave, west of Cedar Street | Full | Yes | Yes | Full | Yes | Yes | Full | Yes | Yes |
| | | 40 | House | South side of Warner Ave, east of Halladay St | - | - | - | Partial | No | No | - | - | - |
| | | 41 | House | South side of Warner Ave, south of Cedar St | - | - | - | Partial | No | No | - | - | - |
| | | | | Number of Takes | Partial: | - | | Partial: | 3 | | Partial: | - | |
| | | | | | Full: | 1 | | Full: | 3 | | Full: | 1 | |
| | | | | **Subtotal (Sheet 1):** | **Partial:** | **1** | | **Partial:** | **13** | | **Partial:** | **4** | |
| | | | | | **Full:** | **15** | | **Full:** | **25** | | **Full:** | **8** | |

| | General Location | Acquisition No. | Property Impacted | Specific Location | Alternative 1: 120' R/W Option<br>Partial or Full Taking? | Parking Impacted? | Structures Impacted? | Alternative 2: 120' R/W Option (Concentric Around Ex. CL)<br>Partial or Full Taking? | Parking Impacted? | Structures Impacted? | Alternative 3: 100' R/W Option<br>Partial or Full Taking? | Parking Impacted? | Structures Impacted? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sheet 2 | Between Cedar Street and Evergreen Street | 42 | House | South side of Warner Ave, between Halladay St and Evergreen St | - | - | - | Partial | No | No | - | - | - |
| | | 43 | House | North side of Warner Ave, east of Cedar St | Full | Yes | Yes | Full | Yes | Yes | Full | Yes | Yes |
| | | 44 | House | South side of Warner Ave, between Halladay St and Evergreen St | - | - | - | Partial | No | No | - | - | - |
| | | 45 | House | South side of Warner Ave, between Halladay St and Evergreen St | Full | Yes | Yes | Full | Yes | Yes | Full | Yes | Yes |
| | | 46 | House | South side of Warner Ave, between Halladay St and Evergreen St | - | - | - | Full | Yes | Yes | - | - | - |
| | | 47 | House | South side of Warner Ave, between Halladay St and Evergreen St | - | - | - | Full | Yes | Yes | - | - | - |
| | | 48 | House | South side of Warner Ave, between Halladay St and Evergreen St | - | - | - | Full | Yes | Yes | - | - | - |
| | | 49 | House | South side of Warner Ave, west of Evergreen St | - | - | - | Full | Yes | Yes | - | - | - |
| | | | | Number of Takes | Partial: - | | | Partial: 2 | | | Partial: - | | |
| | | | | | Full: 2 | | | Full: 7 | | | Full: 2 | | |
| | Between Evergreen Street and Standard Avenue | 50 | House | North side of Warner Ave, east of Evergreen St | Full | Yes | Yes | Full | Yes | Yes | Full | Yes | Yes |
| | | 51 | House | North side of Warner Ave, west of Standard Ave | Full | Yes | Yes | Full | Yes | Yes | Full | Yes | Yes |
| | | 52 | House | South side of Warner Ave, east of Evergreen St | - | - | - | Partial | Yes (Driveway Entrance) | No | - | - | - |
| | | | | Number of Takes | Partial: - | | | Partial: 2 | | | Partial: - | | |
| | | | | | Full: 2 | | | Full: 2 | | | Full: 2 | | |
| | Between Standard Avenue and the Railroad | 53 | Waba Grill Teriyaki House Building | 1215 E Warner Ave | Partial | Yes (9 spaces) | Yes | Partial | Yes | No | Partial | Yes | No |
| | | 54 | Triton Chadelier Inc | 1221 E Warner Ave | Full | Yes (1 Space) | Yes | Partial | No | No | Partial | No | No |
| | | 55 | Cherry Aerospace Fastening | 1224 E Warner Ave | - | - | - | Full | Yes | Yes | - | - | - |
| | | 56 | SW Gill Inc. | 1231 E Warner Ave | Full | Yes | Yes | Partial | No | No | Partial | No | No |
| | | | | Number of Takes | Partial: 1 | | | Partial: 3 | | | Partial: 3 | | |
| | | | | | Full: 2 | | | Full: 1 | | | Full: - | | |
| Sheet 2 | Between the Railroad and Hathaway Street | 57 | Sakioka Farms | 1302 E Warner Ave | Partial | Yes (13 Stalls) | Possible | Partial | Yes (13 Stalls) | No | Partial | Yes (13 Spaces) | No |
| | | 58 | Montroy Supply Company | 1307 E Warner Ave | - | - | - | Partial | No | Possible | - | - | - |
| | | 59 | RV & Boat Storage | 1316 E Warner Ave | Partial | No | No | - | - | - | - | - | - |
| | | | | Number of Takes | Partial: 2 | | | Partial: 2 | | | Partial: 1 | | |
| | | | | | Full: - | | | Full: - | | | Full: - | | |
| | Between Hathaway Street and Grand Avenue | 60 | Beard Printing | 1331 E Warner Ave | Partial | No | Possible | Partial | No | Possible | - | - | - |
| | | 61 | National Electric Alloys | 1335 E Warner Ave | Partial | No | Possible | Partial | No | Possible | - | - | - |
| | | 62 | Heritage Paper | 2400 S Grand Ave | Partial | No | No | Partial | No | No | - | - | - |
| | | | | Number of Takes | Partial: 3 | | | Partial: 3 | | | Partial: - | | |
| | | | | | Full: - | | | Full: - | | | Full: - | | |
| | | | | **Subtotal (Sheet 2):** | **Partial: 6** | | | **Partial: 12** | | | **Partial: 4** | | |
| | | | | | **Full: 6** | | | **Full: 10** | | | **Full: 4** | | |
| | | | | **TOTAL NUMBER OF TAKES** | **PARTIAL: 7** | | | **PARTIAL: 25** | | | **PARTIAL: 8** | | |
| | | | | | **FULL: 21** | | | **FULL: 35** | | | **FULL: 12** | | |

# APPENDIX C

# PREFERRED BUILD 110' NORTH (ALTERNATIVE 5) CONCEPT

## WARNER AVENUE

FROM MAIN STREET TO GRAND AVENUE
TABULATION OF RIGHT OF WAY REQUIREMENTS
NORTH SIDE OF WARNER AVENUE (WEST TO EAST)

| APN | DESCRIPTION OF PROPERTY TAKE | ADDRESS | AREA SF. |
|---|---|---|---|
| 403-141-08 | FULL PARCEL | 2245 S. MAIN ST. | 11,800 S.F. |
| 403-141-09 | FULL PARCEL | 2246 S. CYPRESS AVE. | 17,422 S.F. |
| 403-142-13 | FULL PARCEL | 2245 S. CYPRESS AVE. | 5,142 S.F. |
| 403-142-14 | FULL PARCEL | 209 E. WARNER AVE. | 5,040 S.F. |
| 403-142-15 | FULL PARCEL | 215 E. WARNER AVE. | 5,040 S.F. |
| 403-142-16 | FULL PARCEL | 219 E. WARNER AVE. | 5,040 S.F. |
| 403-142-17 | FULL PARCEL | 2246 S. ORANGE AVE. | 5,142 S.F. |
| 403-143-12 | FULL PARCEL | 2245 S. ORANGE AVE. | 4,935 S.F. |
| 403-143-13 | FULL PARCEL | 309 E. WARNER AVE. | 4,830 S.F. |
| 403-143-14 | FULL PARCEL | 315 E. WARNER AVE. | 4,830 S.F. |
| 403-143-15 | FULL PARCEL | 2246 S. MAPLE ST. | 4,935 S.F. |


(NOT TO SCALE)

LEGEND

- FULL ACQUISITION
- PARTIAL ACQUISITION
- EXISTING PROPERTY LINES (PER RECORD MAPS AND PARCEL MAPS)

## WARNER AVENUE

FROM MAIN STREET TO GRAND AVENUE
TABULATION OF RIGHT OF WAY REQUIREMENTS
SOUTH SIDE OF WARNER AVENUE (WEST TO EAST)

| APN | DESCRIPTION OF PROPERTY TAKE | ADDRESS | AREA SF. |
|---|---|---|---|
| 016-031-38,54 | FULL PARCEL | 2301 S. MAIN ST. | 52,583 S.F. |
| 016-031-37 | FULL PARCEL | 124 E. WARNER AVE. | 9,072 S.F. |
| 016-031-32 | FULL PARCEL | 128 E. WARNER AVE. | 9,250 S.F. |
| 016-031-33,50,51 | NORTH PORTION | 204,216 E. WARNER AVE. | 823 S.F. |
| 016-031-40 | NORTH PORTION | 230 E. WARNER AVE. | 453 S.F. |
| 016-034-01 | NORTHWEST CORNER | 302 E. WARNER AVE. | 48 S.F. |
| 016-034-26 | NORTHEAST CORNER | 310 E. WARNER AVE. | 48 S.F. |

# PRELIMINARY RIGHT OF WAY REQUIREMENTS FOR WARNER AVENUE WIDENING

**DRAFT RELOCATION IMPACT STATEMENT**

**FROM MAIN STREET TO GRAND AVENUE**

## WARNER AVENUE

FROM MAIN STREET TO GRAND AVENUE
TABULATION OF RIGHT OF WAY REQUIREMENTS
NORTH SIDE OF WARNER AVENUE (WEST TO EAST)

| APN | DESCRIPTION OF PROPERTY TAKE | ADDRESS | AREA SF. |
|---|---|---|---|
| 403-144-11 | SOUTHWEST CORNER AND EAST | 2243 S. MAPLE ST | 440 S.F. |
| 403-144-12 | FULL PARCEL | 2245 S. MAPLE ST. | 7,062 S.F. |
| 016-101-29 | FULL PARCEL | 2247 S. ROUSELLE ST. | 5,912 S.F. |
| 016-101-28 | FULL PARCEL | 2246 S. OAK ST. | 5,806 S.F. |
| 016-102-24 | FULL PARCEL | 2245 S. OAK ST. | 5,099 S.F. |
| 016-102-23 | FULL PARCEL | 2246 S. KILSON DR. | 5,098 S.F. |
| 016-103-22 | FULL PARCEL | 2245 S. KILSON DR. | 5,314 S.F. |
| 016-103-23 | FULL PARCEL | 705 E. WARNER AVE. | 16,114 S.F. |


(NOT TO SCALE)

LEGEND

- FULL ACQUISITION
- PARTIAL ACQUISITION
- EXISTING PROPERTY LINES (PER RECORD MAPS AND PARCEL MAPS)

## WARNER AVENUE

FROM MAIN STREET TO GRAND AVENUE
TABULATION OF RIGHT OF WAY REQUIREMENTS
SOUTH SIDE OF WARNER AVENUE (WEST TO EAST)

| APN | DESCRIPTION OF PROPERTY TAKE | ADDRESS | AREA SF. |
|---|---|---|---|
| 016-035-01 | FULL PARCEL | 402 E. WARNER AVE. | 4,902 S.F. |

# PRELIMINARY RIGHT OF WAY REQUIREMENTS FOR WARNER AVENUE WIDENING

**DRAFT RELOCATION IMPACT STATEMENT**

**FROM MAIN STREET TO GRAND AVENUE**



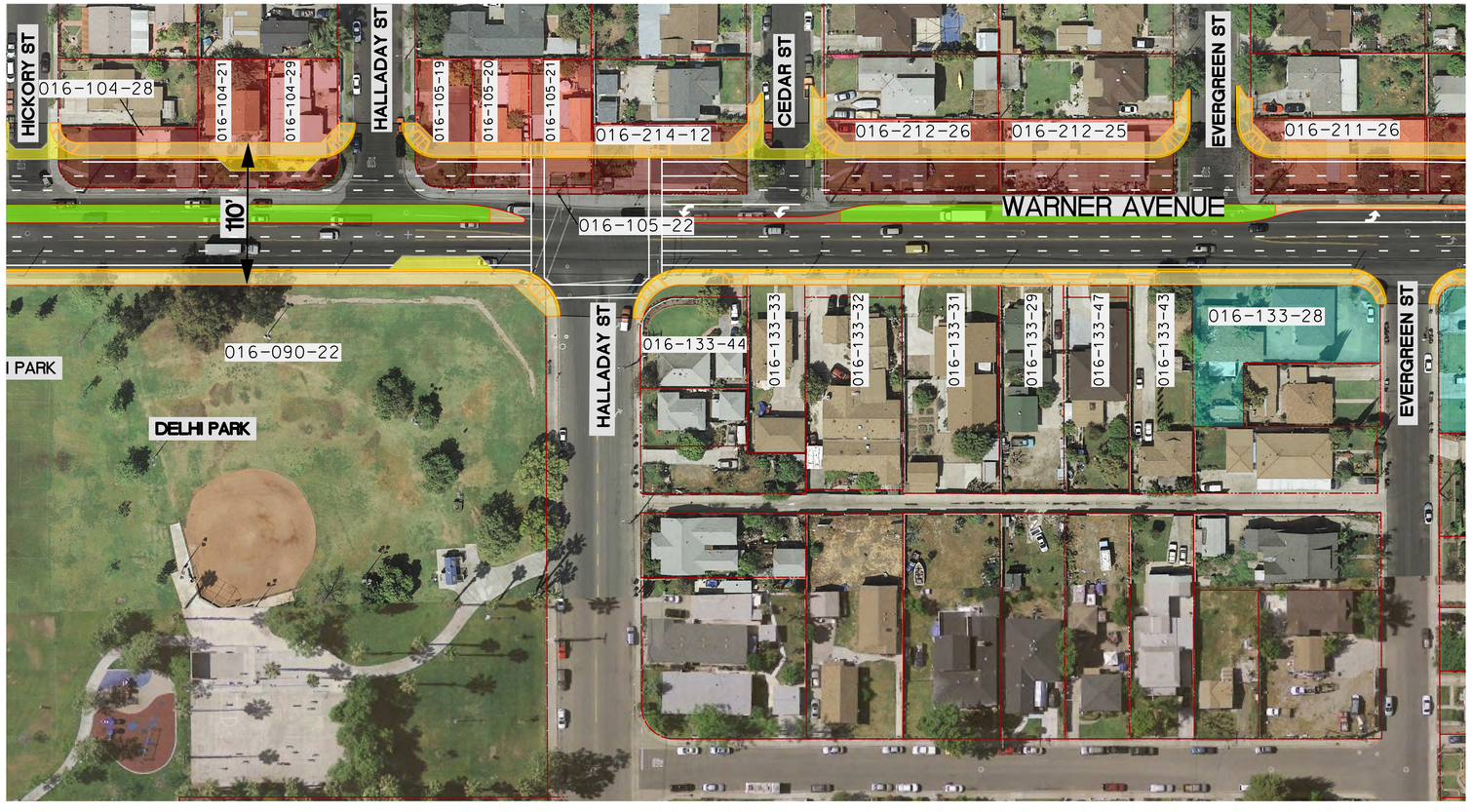
I-2-67

## WARNER AVENUE

FROM MAIN STREET TO GRAND AVENUE
TABULATION OF RIGHT OF WAY REQUIREMENTS
NORTH SIDE OF WARNER AVENUE (WEST TO EAST)

| APN | DESCRIPTION OF PROPERTY TAKE | ADDRESS | AREA SF. |
|---|---|---|---|
| 016-104-28 | FULL PARCEL | 2245 S. HICKORY ST. | 5,045 S.F. |
| 016-104-21 | FULL PARCEL | 809 E. WARNER AVE. | 5,400 S.F. |
| 016-104-29 | FULL PARCEL | 2244 S. HALLADAY ST. | 5,314 S.F. |
| 016-105-19 | FULL PARCEL | 2245 S. HALLADAY ST. | 4,316 S.F. |
| 016-105-20 | FULL PARCEL | 905 E. WARNER AVE. | 4,401 S.F. |
| 016-105-21 | FULL PARCEL | 909 E. WARNER AVE. | 4,828 S.F. |
| 016-105-22 | FULL PARCEL | 909 E. WARNER AVE. | 241 S.F. |
| 016-214-12 | FULL PARCEL | 2246 S. CEDAR ST. | 6,570 S.F. |
| 016-212-26 | FULL PARCEL | 2247 S. CEDAR ST. | 7,842 S.F. |
| 016-212-25 | FULL PARCEL | 2246 S. EVERGREEN ST. | 7,872 S.F. |
| 016-211-26 | FULL PARCEL | 2247 S. EVERGREEN ST. | 7,894 S.F. |

(NOT TO SCALE)




LEGEND

FULL ACQUISITION

PARTIAL ACQUISITION

EXISTING PROPERTY LINES
(PER RECORD MAPS AND PARCEL MAPS)

## WARNER AVENUE

FROM MAIN STREET TO GRAND AVENUE
TABULATION OF RIGHT OF WAY REQUIREMENTS
SOUTH SIDE OF WARNER AVENUE (WEST TO EAST)

| APN | DESCRIPTION OF PROPERTY TAKE | ADDRESS | AREA SF. |
|---|---|---|---|
| 016-133-28 | NORTHEAST CORNER | 1106 E. WARNER AVE. | 97 S.F. |
| | | | |

# PRELIMINARY RIGHT OF WAY REQUIREMENTS FOR WARNER AVENUE WIDENING

DRAFT RELOCATION IMPACT STATEMENT

FROM MAIN STREET TO GRAND AVENUE

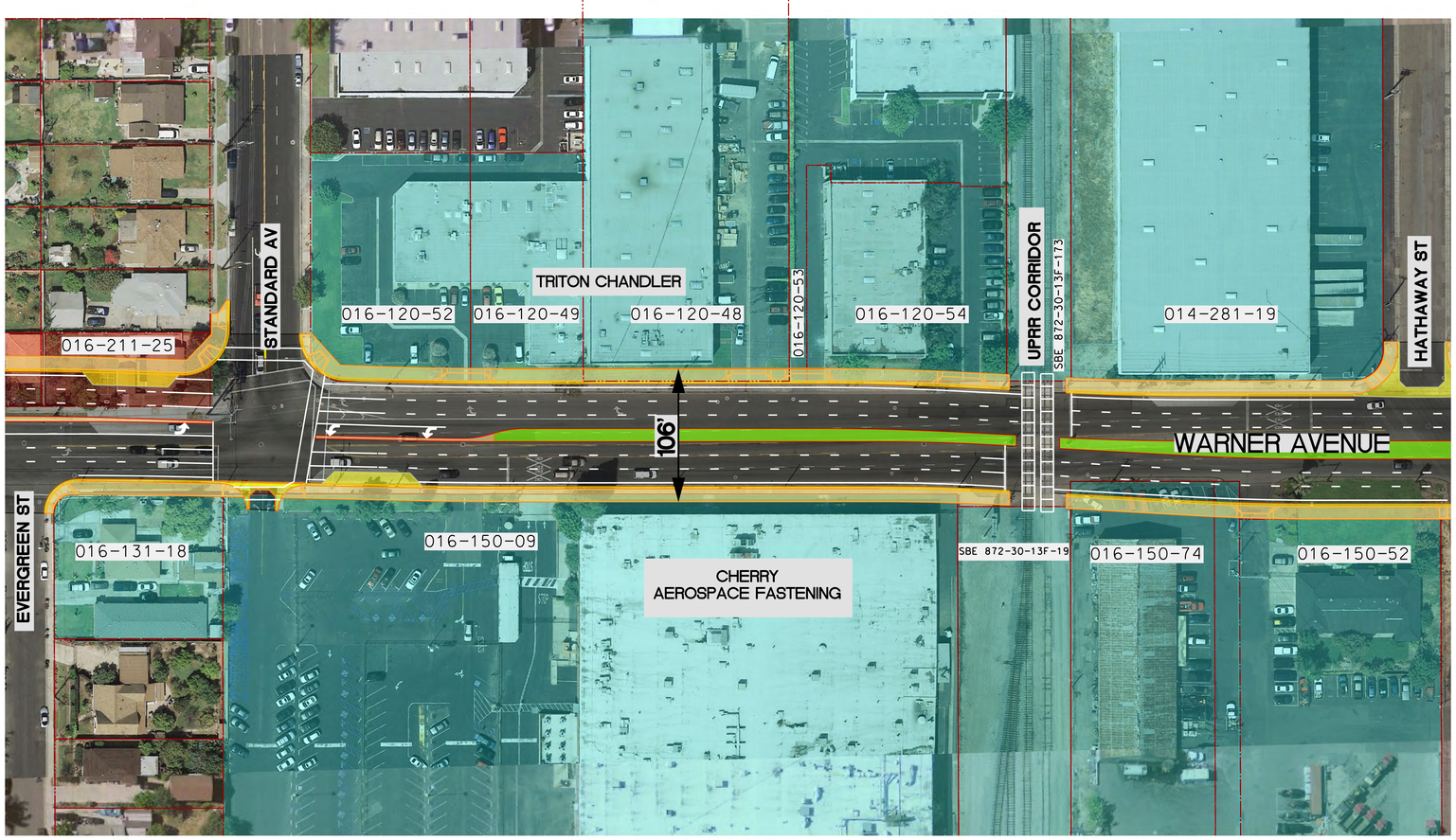


I-2-68

## WARNER AVENUE

FROM MAIN STREET TO GRAND AVENUE
TABULATION OF RIGHT OF WAY REQUIREMENTS
NORTH SIDE OF WARNER AVENUE (WEST TO EAST)

| APN | DESCRIPTION OF PROPERTY TAKE | ADDRESS | AREA SF. |
|---|---|---|---|
| 016-211-25 | FULL PARCEL | 2246 S. STANDARD AVE. | 7,924 S.F. |
| 016-120-49,52 | SOUTH PORTION | 1201 E. WARNER AVE. | 2,633 S.F. |
| 016-120-48 | SOUTH PORTION | 1221 E. WARNER AVE. | 1,641 S.F. |
| 016-120-53,54 | SOUTH PORTION | 1243 E. WARNER AVE. | 1,458 S.F. |
| 872-30-13F-173 | SOUTH PORTION | RAILROAD | 138 S.F. |
| 014-281-19 | SOUTH PORTION | 1301 E. WARNER AVE. | 133 S.F. |




(NOT TO SCALE)

LEGEND

FULL ACQUISITION

PARTIAL ACQUISITION

EXISTING PROPERTY LINES
(PER RECORD MAPS AND PARCEL MAPS)

## WARNER AVENUE

FROM MAIN STREET TO GRAND AVENUE
TABULATION OF RIGHT OF WAY REQUIREMENTS
SOUTH SIDE OF WARNER AVENUE (WEST TO EAST)

| APN | DESCRIPTION OF PROPERTY TAKE | ADDRESS | AREA SF. |
|---|---|---|---|
| 016-131-18 | NORTH PORTION | 2301 S. EVERGREEN ST. | 100 S.F. |
| 016-150-09 | NORTHEAST PORTION | 1224 E. WARNER AVE. | 3,224 S.F. |
| 872-30-13F-19 | NORTHEAST PORTION | RAILROAD | 8 S.F. |
| 016-150-52,74 | NORTH PORTION | 1302 E. WARNER AVE. | 3,496 S.F. |

# PRELIMINARY RIGHT OF WAY REQUIREMENTS FOR WARNER AVENUE WIDENING

**DRAFT RELOCATION IMPACT STATEMENT**

**FROM MAIN STREET TO GRAND AVENUE**



I-2-69


(NOT TO SCALE)

WARNER AVENUE
FROM MAIN STREET TO GRAND AVENUE
TABULATION OF RIGHT OF WAY REQUIREMENTS
SOUTH SIDE OF WARNER AVENUE (WEST TO EAST)

| APN | DESCRIPTION OF PROPERTY TAKE | ADDRESS | AREA SF. |
|---|---|---|---|
| 016-150-70 | NORTHEAST CORNER | 1320 E. WARNER AVE. | 41 S.F. |
| 016-150-71 | NORTH PORTION | 2400 S. GRAND AVE. | 5,398 S.F. |

LEGEND

FULL ACQUISITION

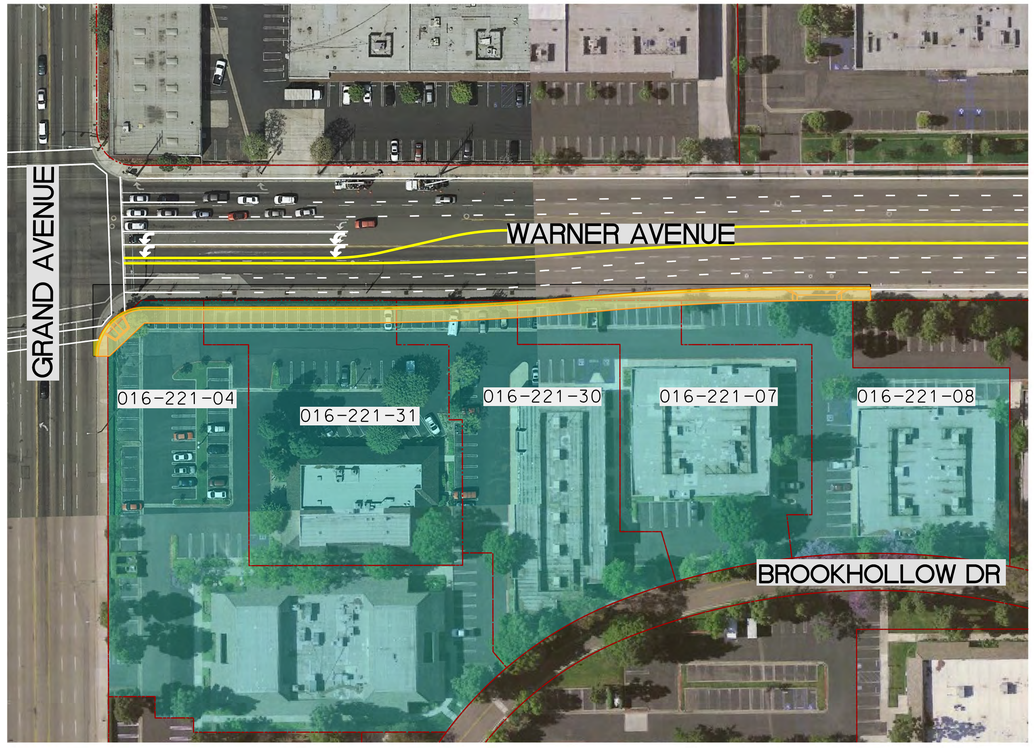
PARTIAL ACQUISITION

EXISTING PROPERTY LINES
(PER RECORD MAPS AND PARCEL MAPS)

# PRELIMINARY RIGHT OF WAY REQUIREMENTS FOR WARNER AVENUE WIDENING

DRAFT RELOCATION IMPACT STATEMENT

FROM MAIN STREET TO GRAND AVENUE




(NOT TO SCALE)

## WARNER AVENUE
FROM MAIN STREET TO GRAND AVENUE
TABULATION OF RIGHT OF WAY REQUIREMENTS
SOUTH SIDE OF WARNER AVENUE (WEST TO EAST)

| APN | DESCRIPTION OF PROPERTY TAKE | ADDRESS | AREA SF. |
|---|---|---|---|
| 016-221-04 | NORTH PORTION | 1504 E. WARNER AVE. | 1,390 S.F. |
| 016-221-31 | FULL PARCEL | 1500 BROOKHOLLOW DR. | 31,294 S.F. |
| 016-221-30 | NORTH PORTION | 1502 E. WARNER AVE. | 1,290 S.F. |
| 016-221-07 | NORTH PORTION | 1530 E. WARNER AVE. | 897 S.F. |
| 016-221-08 | NORTH PORTION | 1532 E. WARNER AVE. | 109 S.F. |

LEGEND

FULL ACQUISITION

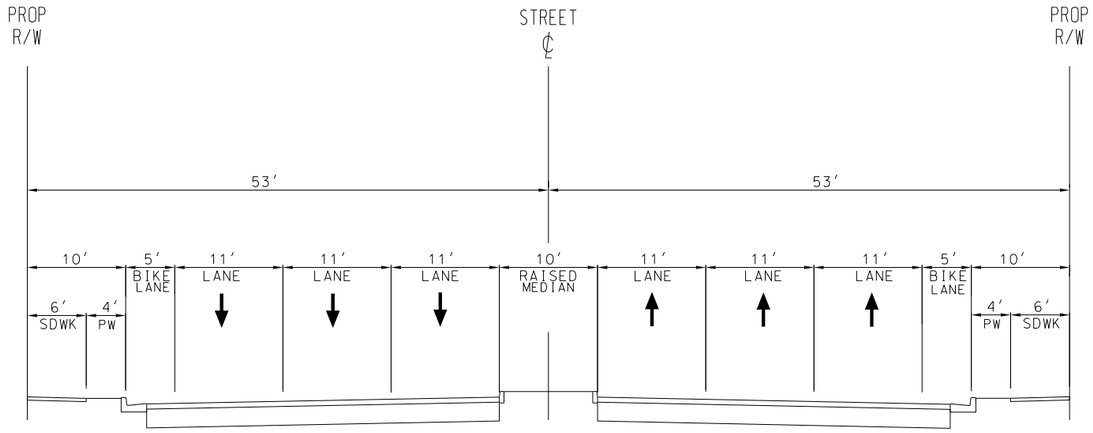
PARTIAL ACQUISITION

EXISTING PROPERTY LINES
(PER RECORD MAPS AND PARCEL MAPS)

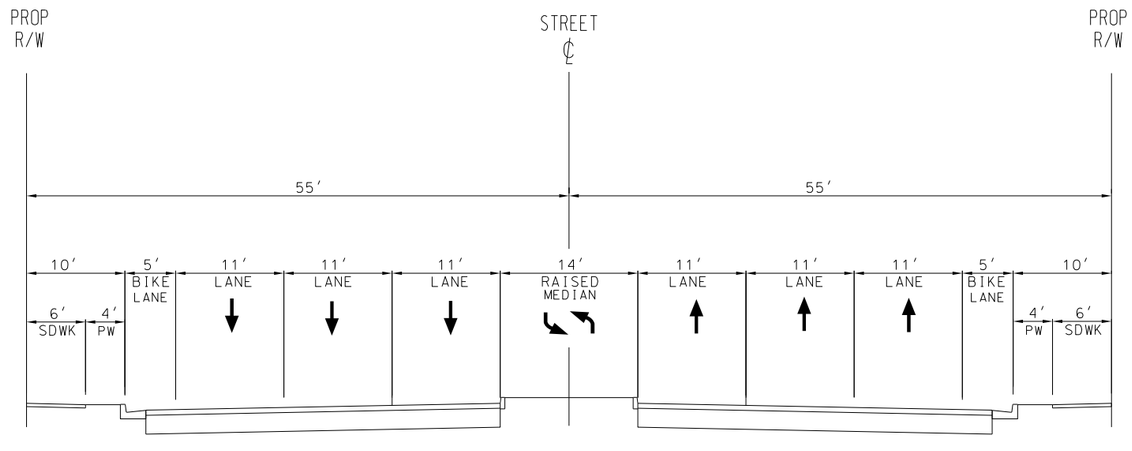
# PRELIMINARY RIGHT OF WAY REQUIREMENTS FOR WARNER AVENUE WIDENING

DRAFT RELOCATION IMPACT STATEMENT

FROM MAIN STREET TO GRAND AVENUE




**PRIMARY ARTERIAL - 106' R/W**
**FROM STANDARD AVENUE TO**
**HATHAWAY ST**




**MODIFIED MAJOR ARTERIAL TYPICAL STREET SECTION - 110 R/W**
**FROM MAIN ST TO STANDARD AVENUE**
**FROM HATHAWAY ST TO GRAND AVENUE**

IBI GROUP

**CITY OF SANTA ANA**
PROPOSED
WARNER AVE WIDENING
BETWEEN MAIN ST AND GRAND AVE

Sheet No.
3 OF 3

Scale
NTS

| | | | | | Alternative 4: Hybrid Option (120' RW Street Section) | | | Alternative 5: Hybrid Option (110' RW Street Section) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | General Location | Acquisition No. | Property Impacted | Specific Location | Partial or Full Taking? | Parking Impacted? | Structures Impacted? | Partial or Full Taking? | Parking Impacted? | Structures Impacted? |
| Sheet 1 | | 1 | ARCO Gas Station | 2245 S Main Street | Full | No | Yes | Full | No | Yes |
| | | 2 | Wells Fargo Bank | 2301 S Main Street | Full | No | Yes | Full | No | Yes |
| | | 3 | Multi-Family | 2246-2248 Cypress Ave | Full | Yes | Yes | Full | Yes | Yes |
| | | 4 | House | 124 E Warner Ave | Full | Yes | Yes | Full | Yes | Yes |
| | | 5 | House | 128 E warner Ave | Full | Yes | Yes | Full | Yes | Yes |
| | | | | Number of Takes | Partial: | 0 | | Partial: | 0 | |
| | | | | | Full: | 5 | | Full: | 5 | |
| | Between Cypress Avenue and Orange Avenue | 6A | Oli's Bakery Buildin | 204 E Warner Ave | Partial | No | No | Partial | No | No |
| | | 6B | Shopping Center | 216 E. Warner Ave | Partial | No | No | Partial | No | No |
| | | 6C | El Taco Vaquero | 222 E Warner Ave | | | | Partial | No | No |
| | | 7 | House | 2245 S Cypress Ave | Full | Yes | Yes | Full | Yes | Yes |
| | | 8 | House | 209 E warner Ave | Full | Yes | Yes | Full | Yes | Yes |
| | | 9 | House | 215 E Warner Ave | Full | Yes | Yes | Full | Yes | Yes |
| | | 10 | House | 219 E Warner Ave | Full | Yes | Yes | Full | Yes | Yes |
| | | 11 | House | 2246 S Orange Ave | Full | Yes | Yes | Full | Yes | Yes |
| | | 12 | House | 2242 S. Orange Ave. North of Warner | Full | Yes (Entrance) | No | None | No | No |
| | | 13 | House | 230 E Warner Ave | Partial | No | No | Partial | No | No |
| | | | | Number of Takes | Partial: | 3 | | Partial: | 4 | |
| | | | | | Full: | 6 | | Full: | 5 | |
| | Between Orange Avenue and Maple Street | 14 | House | 2245 S Orange Ave | Full | Yes | Yes | Full | Yes | Yes |
| | | 15 | House | 2241 S Orange Ave | Partial | No | No | None | No | No |
| | | 16 | House | 309 E warner Ave | Full | Yes | Yes | Full | Yes | Yes |
| | | 17 | House | 315 E Warner Ave | Full | Yes | Yes | Full | Yes | Yes |
| | | 18 | House | 2246 S Maple St | Full | Yes | Yes | Full | Yes | Yes |
| | | 19 | House | 2242 S Maple St | Full | Yes | No | None | No | No |
| | | 20 | House | 302 E warner Ave | Partial | No | No | Partial | No | No |
| | | 21 | House | 310 E Warner Ave | Partial | No | No | Partial | No | No |
| | | | | Number of Takes | Partial: | 3 | | Partial: | 2 | |
| | | | | | Full: | 5 | | Full: | 4 | |
| | Between Maple Street and Oak Street | 22 | House | 402 E Warner Ave | Partial | No | No | Full | Yes | Yes |
| | | 23 | House | 2245 S Maple St | Full | Yes | Yes | Full | Yes | Yes |
| | | 24A | House | 2243 S. Maple St. North of Warner Ave. | Full | Yes | No | Partial | Yes | No |
| | | 24B | House | 2239 S. Maple St. North of Warner Ave. | Partial | Yes | No | None | No | No |
| | | 25 | House | 2247 S Rousselle St | Full | Yes | Yes | Full | Yes | Yes |
| | | 26A | House | 2246 S Oak St | Full | Yes | Yes | Full | Yes | Yes |
| | | 26B | House | 2242 S Oak St | Partial | No | No | None | No | No |
| | | | | Number of Takes | Partial: | 3 | | Partial: | 1 | |
| | | | | | Full: | 4 | | Full: | 4 | |

| | | | | | Alternative 4: Hybrid Option (120' RW Street Section) | | | Alternative 5: Hybrid Option (110' RW Street Section) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | General Location | Acquisition No. | Property Impacted | Specific Location | Partial or Full Taking? | Parking Impacted? | Structures Impacted? | Partial or Full Taking? | Parking Impacted? | Structures Impacted? |
| Sheet 1 | Between Oak Street and Halladay Street | 27A | House | 2245 S Oak St | Full | Yes | Yes | Full | Yes | Yes |
| | | 27B | House | 2241 S. Oak St. North of Warner Ave. | Partial | No | No | None | No | No |
| | | 28A | National Guard Armory | 612 E Warner Ave | | | | None | No | No |
| | | 28B | City Park | 2314 S Halladay St | | | | None | No | No |
| | | 29A | House | 2246 S Kilson Dr | Full | Yes | Yes | Full | Yes | Yes |
| | | 29B | House | 2242 S. Kilson Dr. North of Warner Ave. | Partial | No | No | None | No | No |
| | | 30 | House | 2245 S Kilson Dr | Full | Yes | Yes | Full | Yes | Yes |
| | | 31 | House | 705 E Warner Ave | Full | Yes | Yes | Full | Yes | Yes |
| | | 32 | House | 2245 S Hickory St | Full | Yes | Yes | Full | Yes | Yes |
| | | 33 | House | 2241 S. Hickory St. North of Warner Ave. | Full | Yes | Yes | None | No | No |
| | | 34 | House | 809 E warner Avenue | Full | Yes | No | Full | Yes | No |
| | | 35 | House | 2244 S Halladay St | Full | Yes | Yes | Full | Yes | Yes |
| | | | | Number of Takes | Partial: | 2 | | Partial: | 0 | |
| | | | | | Full: | 8 | | Full: | 7 | |
| | Between Halladay Street and Cedar Street | 36 | House | 2245 S Halladay St | Full | Yes | Yes | Full | Yes | Yes |
| | | 37 | House | 905 E Warner Ave | Full | Yes | Yes | Full | Yes | Yes |
| | | 38 | House | 909 E Warner Ave | Full | Yes | Yes | Full | Yes | Yes |
| | | 39A | House | 2246 S Cedar St | Full | Yes | Yes | Full | Yes | Yes |
| | | 39B | House | 2242 S Cedar St | Full | Yes | Yes | None | No | No |
| | | 40 | House | 2305 S Halladay St | - | - | - | None | No | No |
| | | 41 | House | 910 E warner Ave | - | - | - | None | No | No |
| | | | | Number of Takes | Partial: | 0 | | Partial: | 0 | |
| | | | | | Full: | 5 | | Full: | 4 | |
| | | | | **Subtotal (Sheet 1):** | **Partial:** | **11** | | **Partial:** | **7** | |
| | | | | | **Full:** | **33** | | **Full:** | **29** | |

| | | | | | Alternative 3: 100' R/W Option | | | Alternative 3: 100' R/W Option | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | General Location | Acquisition No. | Property Impacted | Specific Location | Partial or Full Taking? | Parking Impacted? | Structures Impacted? | Partial or Full Taking? | Parking Impacted? | Structures Impacted? |
| Sheet 2 | Between Cedar Street and Evergreen Street | 42 | House | 2243 S Cedar St | Full | Yes | No | None | No | No |
| | | 43 | House | 2247 S Cedar St | Full | Yes | Yes | Full | Yes | Yes |
| | | 44 | House | 2242 S Evergreen St | Full | Yes | No | None | No | No |
| | | 45 | House | 2246 S Evergreen St | Full | Yes | Yes | Full | Yes | Yes |
| | | 46 | House | 1002 E Warner Ave | | | | None | No | No |
| | | 47 | House | 1008 E Warner Ave | - | - | - | None | No | No |
| | | 48 | House | 1012 E Warner Ave | - | - | - | None | No | No |
| | | 49 | House | 1016 E Warner Ave | - | - | - | None | No | No |
| | | 50A | House | 1020 E Warner Ave | | | | None | No | No |
| | | 50B | House | 1106 E Warner Ave | Partial | No | No | Partial | No | No |
| | | | | Number of Takes | Partial: | 1 | | Partial: | 1 | |
| | | | | | Full: | 4 | | Full: | 2 | |

Sheet 2

| General Location | Acquisition No. | Property Impacted | Specific Location | Alternative 4: Hybrid Option (120' RW Street Section) Partial or Full Taking? | Parking Impacted? | Structures Impacted? | Alternative 5: Hybrid Option (110' RW Street Section) Partial or Full Taking? | Parking Impacted? | Structures Impacted? |
|---|---|---|---|---|---|---|---|---|---|
| Between Evergreen Street and Standard Avenue | 51 | House | 2247 S Evergreen St | Full | Yes | Yes | Full | Yes | Yes |
| | 52 | House | 2243 S. Evergreen St. North of Warner Ave. | Full | Yes | Yes | None | No | No |
| | 53 | House | 2246 S Standard Ave | Full | Yes | Yes | Full | Yes | Yes |
| | 54 | House | 2242 S. Standard Ave. North of Warner Ave. | Full | Yes | Yes | None | No | No |
| | 55 | House | 2301 S Evergreen St | | | | Partial | No | No |
| | | | Number of Takes | Partial: 0 | | | Partial: 1 | | |
| | | | | Full: 4 | | | Full: 2 | | |
| Between Standard Avenue and the Railroad | 56 | Cherry Aerospace Fastening | 1224 E Warner Ave | | | | Partial | No | No |
| | 57A | Waba Grill Teriyaki House Building | 1215 E Warner Ave | Partial | No | No | Partial | No | No |
| | 57B | Triton Chandelier | 1221 E Warner Ave | Partial | No | No | Partial | No | No |
| | 58 | SW Gill Inc. | 1231 E Warner Ave | Partial | No | No | Partial | No | No |
| | | | Number of Takes | Partial: 3 | | | Partial: 4 | | |
| | | | | Full: 0 | | | Full: 0 | | |
| Between the Railroad and Hathaway Street | 59 | Sakioka Farms | 1302 E Warner Ave | Partial | Yes (13 Spaces) | No | Partial | Yes (13 Spaces) | No |
| | 60 | Montroy Supply Company | 1307 E Warner Ave | Partial | No | No | Partial | No | No |
| | 61 | RV & Boat Storage | 1316 E Warner Ave | | | | Partial | No | No |
| | | | Number of Takes | Partial: 2 | | | Partial: 3 | | |
| | | | | Full: 0 | | | Full: 0 | | |
| Between Hathaway Street and Grand Avenue | 62 | Beard Printing | 1331 E Warner Ave | | | | None | No | No |
| | 63 | National Electric Alloys | 1335 E Warner Ave | | | | None | No | No |
| | 63 | Fire Station | | | | | Partial | No | No |
| | 64 | Heritage Paper | 2400 S Grand Ave | Partial | No | No | Partial | No | No |
| | | | Number of Takes | Partial: 1 | | | Partial: 2 | | |
| | | | | Full: 0 | | | Full: 0 | | |
| Between Grand Avenue and Brookhollow Drive | 65 | Business Center | 1500 E Warner Ave | Partial | Yes (38 spaces) | No | Partial | Yes (55 spaces) | No |
| | | | Number of Takes | Partial: 1 | | | Partial: 1 | | |
| | | | | Full: 0 | | | Full: 0 | | |
| | | | **Subtotal (Sheet 2):** | **Partial: 8** | | | **Partial: 12** | | |
| | | | | **Full: 8** | | | **Full: 4** | | |
| | | | **TOTAL NUMBER OF TAKES** | **PARTIAL: 19** | | | **PARTIAL: 19** | | |
| | | | | **FULL: 41** | | | **FULL: 33** | | |

# APPENDIX D

# PRELIMINARY ENGINEERING PLANS

# CITY OF SANTA ANA

## PUBLIC WORKS AGENCY

# PROJECT NO. 091749 WARNER AVENUE WIDENING FROM MAIN STREET TO GRAND AVENUE PRELIMINARY DESIGN PLANS SEPTEMBER 2012


VICINITY MAP

(NOT TO SCALE)

## ABBREVIATIONS

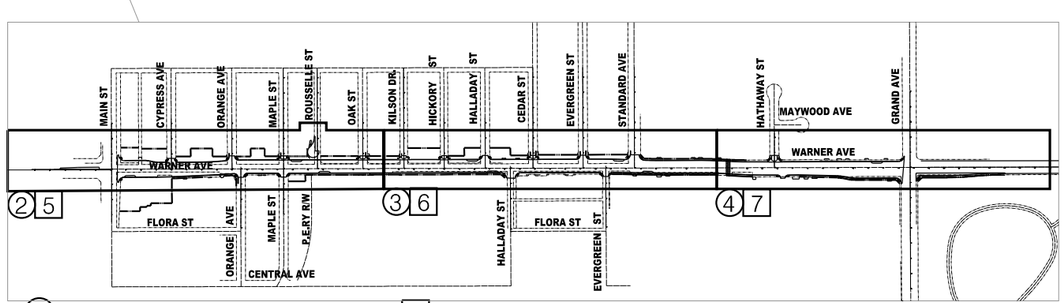
| | |
|---|---|
| AVE | AVENUE |
| BC | BEGIN CURVE POINT |
| BCR | BEGIN CURB RETURN |
| CL | CENTER LINE |
| DR | DRIVE |
| EC | END CURVE POINT |
| ECR | END CURB RETURN |
| EX. EXIST | EXISTING |
| LT | LEFT |
| MPH | MILES PER HOUR |
| NB | NORTHBOUND |
| NO. | NUMBER |
| PI | POINT OF INTERSECTION |
| PKWY | PARKWAY |
| PRC | POINT OF REVERSE CURVE |
| PROP | PROPOSED |
| R | RADIUS |
| RT | RIGHT |
| R/W | RIGHT OF WAY |
| SB | SOUTHBOUND |
| ST | STREET |
| STA | STATION |
| SWLK | SIDEWALK |
| TC | TOP OF CURB |
| VAR | VARIES |
| W | WIDTH |

## GENERAL NOTES

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" 2009 EDITION AS WRITTEN AND PROMULGATED BY THE SOUTHERN CALIFORNIA CHAPTER OF THE A.P.W.A. A.G.C.C. JOINT COOPERATIVE COMMITTEE HEREIN REFERRED TO AS THE STANDARD SPECIFICATIONS (UNLESS SPECIFICALLY NOTED OTHERWISE OR IN THE SPECIAL PROVISIONS FOR THIS PROJECT).
2. THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY OR STRUCTURE SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. NO CERTIFICATION IS MADE AS TO ACCURACY OR THOROUGHNESS OF THESE RECORDS. APPROVAL OF THIS PLAN BY THE CITY OF SANTA ANA DOES NOT CONSTITUTE A WARNER STREET CUL-DE-SAC IMPROVEMENT. EXISTENCE OR NONEXISTENCE OF ANY UNDERGROUND UTILITY OR SUBSTRUCTURE WITHIN THE LIMITS OF THIS PROJECT. THE CONTRACTOR SHALL CALL UNDERGROUND SERVICE ALERT (1-800-422-4133) 48 HOURS BEFORE ANY EXCAVATION.
3. WHEN REPLACING CURB AND GUTTER, LOCATE AND REPLACE ALL EXISTING UTILITY MARKINGS ON CURB FACE (ie: 3" S FOR SEWER, ETC.)
4. THESE PLANS ARE PRELIMINARY AND ARE SUBJECT TO CHANGE PENDING FURTHER STUDY DURING SUBSEQUENT PROJECT PHASES. THEY ARE NOT TO BE USE FOR CONSTRUCTION.
5. PROPOSED STRIPING/CHANNELIZATION IS SHOWN FOR REFERENCE ONLY. DETAILS ON REQUIRED STRIPING AND PAVEMENT MARKINGS WILL BE DEVELOPED DURING A FUTURE PROJECT PHASE.
6. LENGTHS AND LIMITS OF RETAINING WALLS SHOWN ARE APPROXIMATE AND WILL BE FULLY DEFINED DURING A FUTURE PROJECT PHASE.
7. TOPOGRAPHICAL MAPPING SHOWN IN PLANS BASED ON THE FOLLOWING DATUM:
   HORIZONTAL: NAD 83 ZONE 5
   VERTICAL: NAVD 88
8. PROPOSED DRAINAGE MODIFICATIONS ASSOCIATED WITH THE WIDENING ARE NOT SHOWN HEREIN. REFER TO DRAINAGE REPORT FOR DETAILS.

## SHEET INDEX






2 CIVIL DESIGN SHEETS  5 EXISTING UTILITIES SHEETS

INDEX MAP

(NOT TO SCALE)

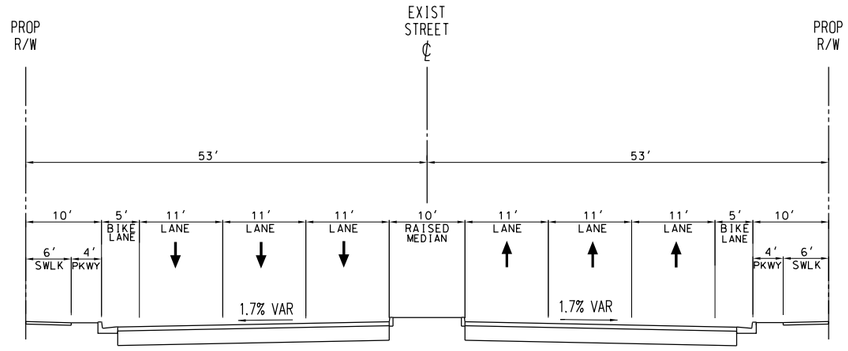
## CONSTRUCTION NOTES

1. DEMOLISH EXISTING STRUCTURE AND CLEAR EXISTING PARCEL.
2. REMOVE EXISTING CURB & GUTTER.
3. REMOVE EXISTING SIDEWALK.
4. REMOVE EXISTING DRIVEWAY APPROACH AND/OR DRIVEWAY.
5. REMOVE EXISTING AC PAVEMENT.
6. REMOVE EXISTING TREE.
7. SAWCUT EXISTING PAVEMENT.
11. CONSTRUCT A-2-8 CURB & GUTTER PER CITY OF SANTA ANA STD. DWG. NO. 1101.
12. CONSTRUCT B-1 MEDIAN CURB PER CITY OF SANTA ANA STD. DWG. NO. 1101.
13. CONSTRUCT CROSS GUTTER PER CITY OF SANTA ANA STD. DWG. NO. 1109.
14. CONSTRUCT SIDEWALK PER CITY OF SANTA ANA STD. DWG. NO. 1104.
15. CONSTRUCT NEW ROADWAY PAVEMENT PER SHADED AREA.
16. RECONSTRUCT EXISTING PCC DRIVEWAY, PER DETAIL ON SHEET 11.
17. RECONSTRUCT EXISTING AC DRIVEWAY/PARKING LOT.
18. CONSTRUCT DRIVEWAY APPROACH AT WIDTH SHOWN PER CALTRANS STD 87A.
19. CONSTRUCT NEW BUS PAD PER CITY OF SANTA ANA STD. DWG. NO. 1108.
20. CONSTRUCT CURB RAMP PER CITY OF SANTA ANA STD. 1122, TYPE I.
21. CONSTRUCT CURB RAMP PER CITY OF SANTA ANA STD. 1122, TYPE II.
22. CONSTRUCT CURB RAMP PER APWA STD. DWG. NO. 111-3. CASE D (SW) & CASE E (SE).
23. MODIFY EXISTING TRAFFIC SIGNAL AT INTERSECTION SHOWN.
24. MODIFY EXISTING RAILROAD GRADE CROSSING.
25. PROVIDE LANDSCAPING WITHIN AREA SHOWN.
26. PROVIDE HARDSCAPING WITHIN AREA SHOWN.
36. RELOCATE EXISTING OVERHEAD ELECTRICAL UTILITIES (BY OTHERS).
37. EXISITNG OVERHEAD UTILITIES TO BE PROTECTED IN PLACE.
39. CONSTRUCT MASONRY BLOCK RETAINING WALL PER APWA STANDARD DWG. NO. 618-3. MAXIMUM HEIGHT = 3', AVERAGE HEIGHT = 3'.

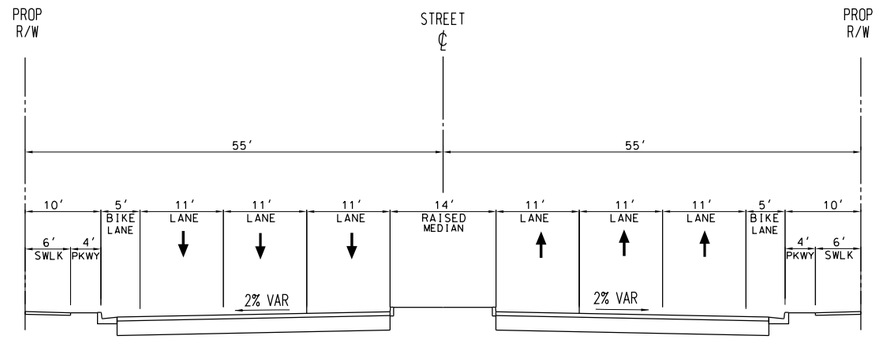




PROJECT #XXXX WARNER STREET IMPROVEMENTS




**TYPICAL SECTION (106' ROW)**
**FROM STANDARD AVENUE TO**
**HATHAWAY STREET**




**TYPICAL SECTION (110' ROW)**
**FROM MAIN STREET TO STANDARD AVENUE**
**FROM HATHAWAY STREET TO GRAND AVENUE**

IBI GROUP

FILE NO.

| REVISIONS | | | | |
|---|---|---|---|---|
| NUMBER | DATE | INITIALS | DESCRIPTIONS | APPRVD |
| | | | | |
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| | | | | |

| REFERENCES | | |
|---|---|---|
| PLANS | BENCH MARK # | ELEV. |
| | | |
| | | |
| | | |
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| | | |
| | | |

PREPARED UNDER THE SUPERVISION OF — R.C.E. NO. — DATE

DESIGNED — DRAWN

R/W APPROVED — CHECKED

RECOMMENDED

SENIOR CIVIL ENGINEER — R.C.E. NO.

TYPICAL SECTIONS

**WARNER AVENUE WIDENING**

MAIN STREET TO GRAND AVENUE

**PUBLIC WORKS AGENCY**
CITY OF SANTA ANA

SHEET 1 OF 11



User carlos serrano
Date Plotted 6/6/2013 6:44:20 PM
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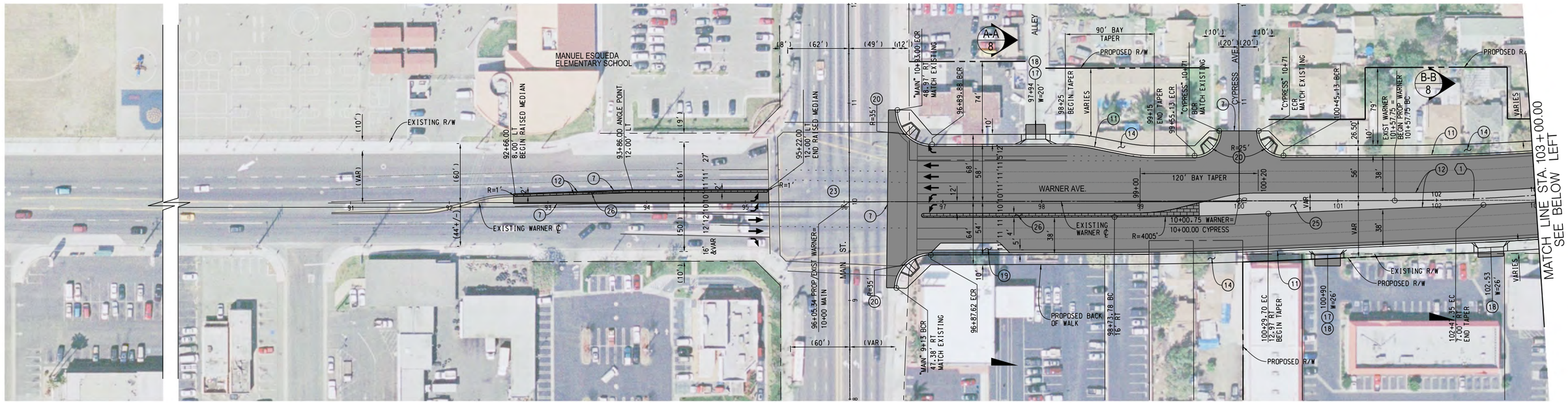
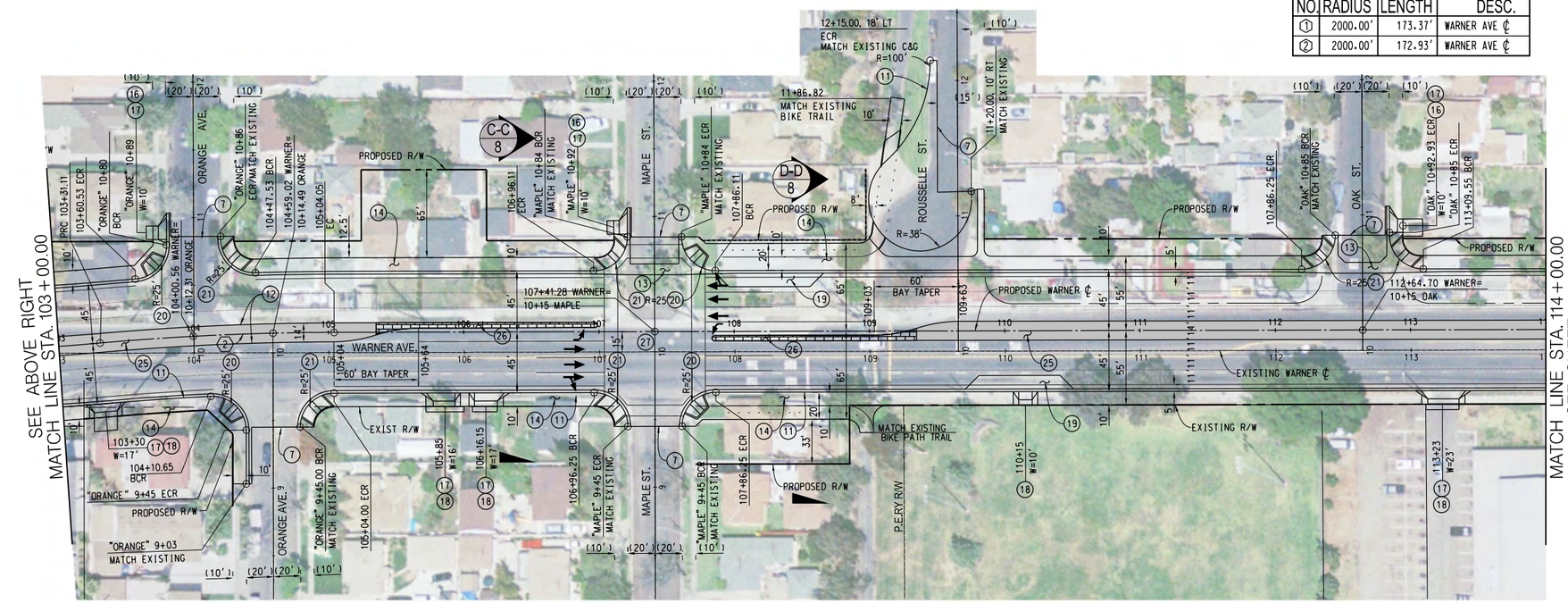



| CURVE DATA TABLE | | | |
|---|---|---|---|
| NO. | RADIUS | LENGTH | DESC. |
| ① | 2000.00' | 173.37' | WARNER AVE ℄ |
| ② | 2000.00' | 172.93' | WARNER AVE ℄ |

LEGEND:

- PROPOSED HARDSCAPING AREA
- PROPOSED LANDSCAPING AREA
- PROPOSED PAVEMENT AREA

NOTE:
ALL OFFSETS TO POINT ALONG WARNER BETWEEN MAIN AND GRAND AVE TAKEN FROM THE PROPOSED WARNER CENTER LINE AS DEPICTED HEREON.

## CONSTRUCTION NOTES

(7) SAWCUT EXISTING PAVEMENT.

(11) CONSTRUCT A-2-8 CURB & GUTTER PER CITY OF SANTA ANA STD. DWG. NO. 1101.

(12) CONSTRUCT B-1 MEDIAN CURB PER CITY OF SANTA ANA STD. DWG. NO. 1101.

(13) CONSTRUCT CROSS GUTTER PER CITY OF SANTA ANA STD. DWG. NO. 1109.

(14) CONSTRUCT SIDEWALK PER CITY OF SANTA ANA STD. DWG. NO. 1104.

(15) CONSTRUCT NEW ROADWAY PAVEMENT PER SHADED AREA.

(16) RECONSTRUCT EXISTING PCC DRIVEWAY, PER DETAIL ON SHEET 11.

(17) RECONSTRUCT EXISTING AC DRIVEWAY/PARKING LOT.

(18) CONSTRUCT DRIVEWAY APPROACH AT WIDTH SHOWN PER CALTRANS STD 87A.

(19) CONSTRUCT NEW BUS PAD PER CITY OF SANTA ANA STD. DWG. NO. 1108.

(20) CONSTRUCT CURB RAMP PER CITY OF SANTA ANA STD. 1122, TYPE I.

(21) CONSTRUCT CURB RAMP PER CITY OF SANTA ANA STD. 1122, TYPE II.

(22) CONSTRUCT CURB RAMP PER APWA STD. DWG. NO. 111-3, CASE D (SW) & CASE E (SE).

(23) MODIFY EXISTING TRAFFIC SIGNAL AT INTERSECTION SHOWN.

(25) PROVIDE LANDSCAPING WITHIN AREA SHOWN.

(26) PROVIDE HARDSCAPING WITHIN AREA SHOWN.

(27) SIGNALIZE EXISTING INTERSECTION.

N

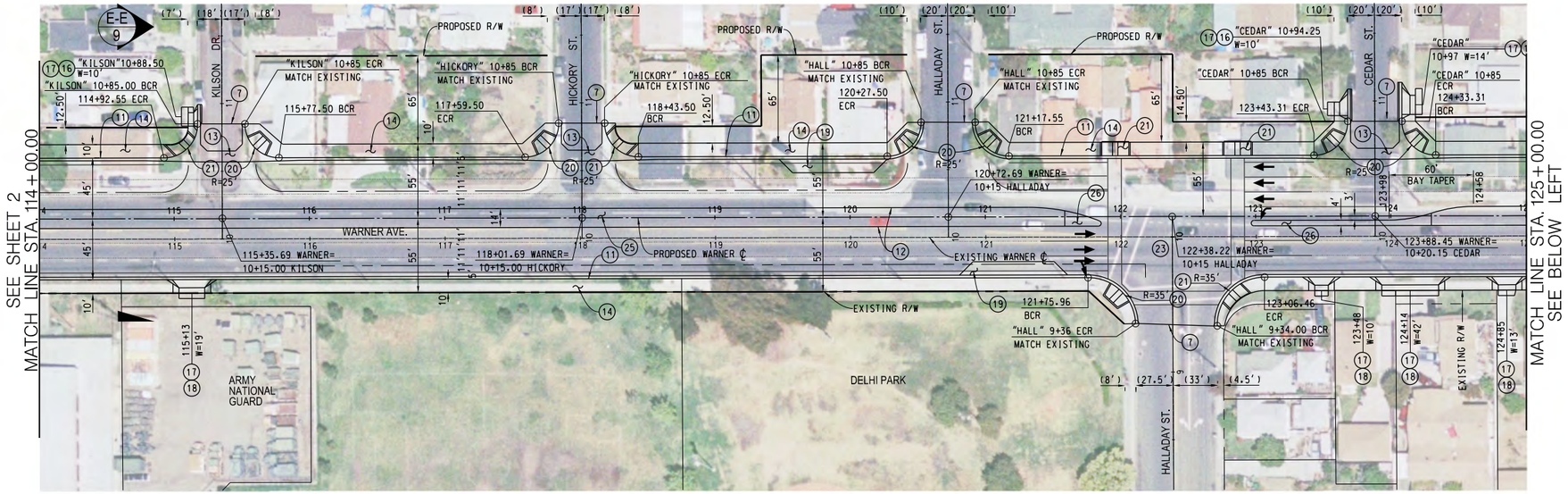
0 50 100 150
SCALE IN FEET

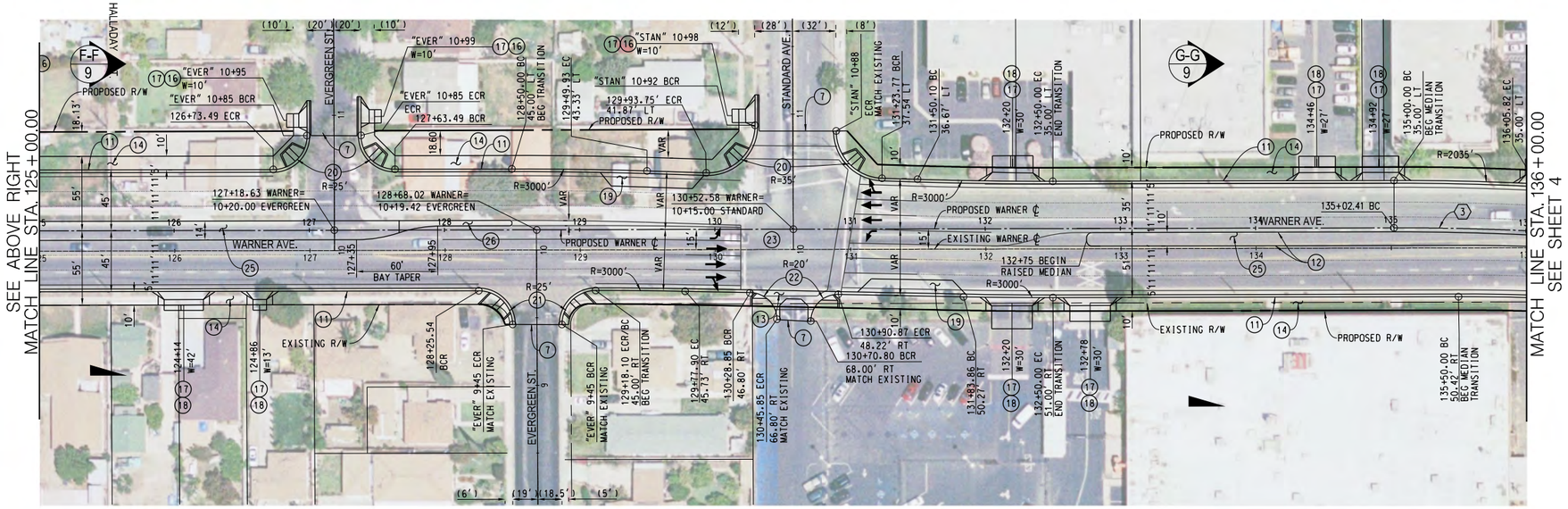
IBI GROUP

User: carlos serrano
Date Plotted: 6/6/2013 6:44:22 PM
Filename: J\25683 EnviroWarner\S9 Drawings\S9civil\layouts\Road\Sheets\25683S02PP.dgn

| FILE NO. | REVISIONS | | | | REFERENCES | | | PREPARED UNDER THE SUPERVISION OF | DATE | STREET IMPROVEMENT PLAN |
|---|---|---|---|---|---|---|---|---|---|---|
| | NUMBER | DATE | INITIALS | DESCRIPTIONS / APPRVD | PLANS | BENCH MARK # | ELEV. #### | R.C.E. NO. | | **WARNER AVENUE WIDENING** |
| | | | | | | | | DESIGNED / DRAWN | | MAIN ST TO GRAND AVE |
| | | | | | | | | R/W APPROVED / CHECKED | | **PUBLIC WORKS AGENCY** |
| | | | | | | | | RECOMMENDED | | CITY OF SANTA ANA |
| | | | | | | | | SENIOR CIVIL ENGINEER R.C.E. NO. | | SHEET 2 OF 11 |

I-2-79




## CONSTRUCTION NOTES

(7) SAWCUT EXISTING PAVEMENT.

(11) CONSTRUCT A-2-8 CURB & GUTTER PER CITY OF SANTA ANA STD. DWG. NO. 1101.

(12) CONSTRUCT B-1 MEDIAN CURB PER CITY OF SANTA ANA STD. DWG. NO. 1101.

(13) CONSTRUCT CROSS GUTTER PER CITY OF SANTA ANA STD. DWG. NO. 1109.

(14) CONSTRUCT SIDEWALK PER CITY OF SANTA ANA STD. DWG. NO. 1104.

(15) CONSTRUCT NEW ROADWAY PAVEMENT PER SHADED AREA.

(16) RECONSTRUCT EXISTING PCC DRIVEWAY, PER DETAIL ON SHEET 11.

(17) RECONSTRUCT EXISTING AC DRIVEWAY/PARKING LOT.

(18) CONSTRUCT DRIVEWAY APPROACH AT WIDTH SHOWN PER CALTRANS STD 87A.

(19) CONSTRUCT NEW BUS PAD PER CITY OF SANTA ANA STD. DWG. NO. 1108.

(20) CONSTRUCT CURB RAMP PER CITY OF SANTA ANA STD. 1122, TYPE I.

(21) CONSTRUCT CURB RAMP PER CITY OF SANTA ANA STD. 1122, TYPE II.

(22) CONSTRUCT CURB RAMP PER APWA STD. DWG. NO. 111-3, CASE D (SW) & CASE E (SE).

(23) MODIFY EXISTING TRAFFIC SIGNAL AT INTERSECTION SHOWN.

(25) PROVIDE LANDSCAPING WITHIN AREA SHOWN.

(26) PROVIDE HARDSCAPING WITHIN AREA SHOWN.

LEGEND:

- PROPOSED HARDSCAPING AREA
- PROPOSED LANDSCAPING AREA
- PROPOSED PAVEMENT AREA

| CURVE DATA TABLE | | | |
|---|---|---|---|
| NO | RADIUS | LENGTH | DESC. |
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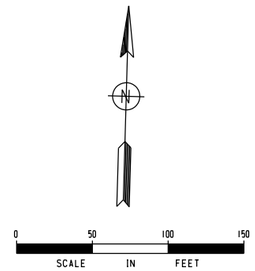
| (4) | 2000.00' | 173.25' | WARNER AVE ℄ |
| | | | |




IBI GROUP



FILE NO.

| REVISIONS | | | | |
|---|---|---|---|---|
| NUMBER | DATE | INITIALS | DESCRIPTIONS | APPRVD |
| | | | | |

| REFERENCES | | |
|---|---|---|
| PLANS | BENCH MARK # | ELEV. |
| | | I-2-80 |

PREPARED UNDER THE SUPERVISION OF — R.C.E. NO. — DATE

DESIGNED — DRAWN

R/W APPROVED — CHECKED

RECOMMENDED

SENIOR CIVIL ENGINEER — R.C.E. NO.

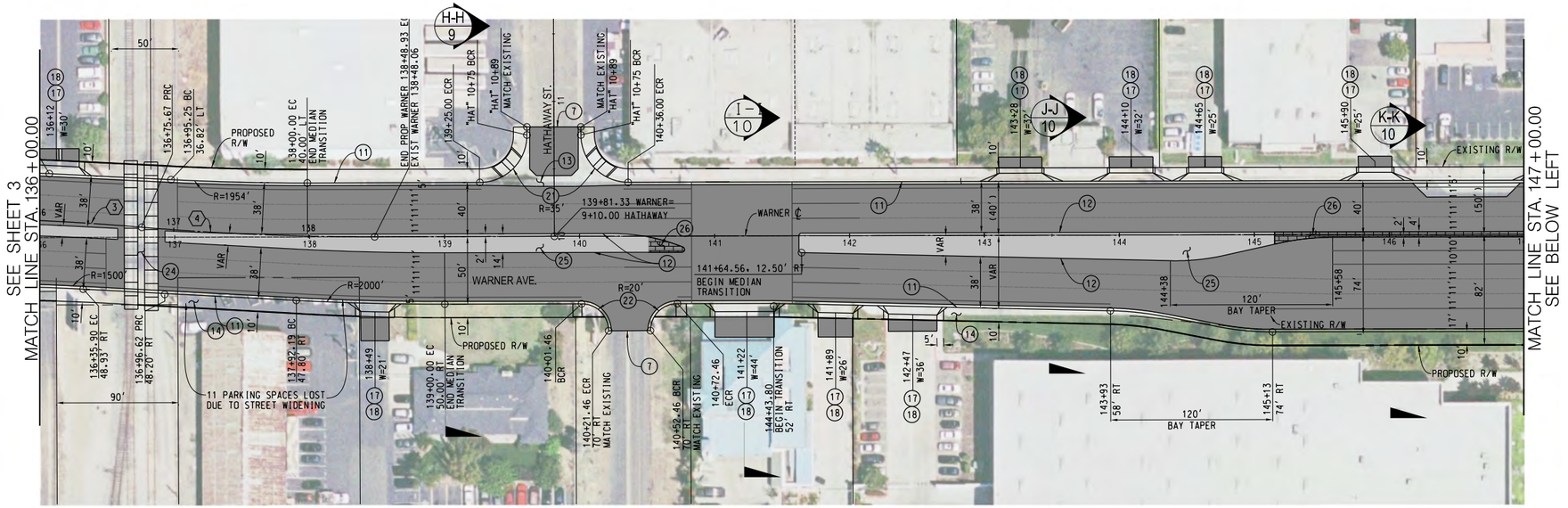
STREET IMPROVEMENT PLAN

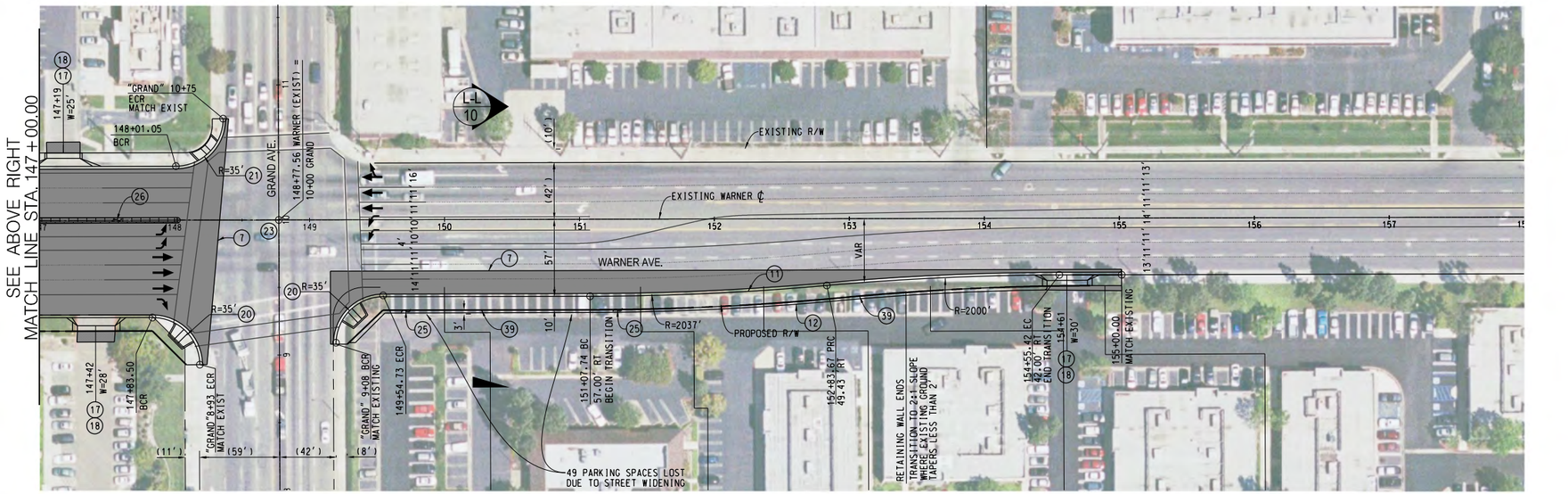
# WARNER AVENUE WIDENING

MAIN ST TO GRAND AVE

## PUBLIC WORKS AGENCY

CITY OF SANTA ANA




## CONSTRUCTION NOTES

(7) SAWCUT EXISTING PAVEMENT.

(11) CONSTRUCT A-2-8 CURB & GUTTER PER CITY OF SANTA ANA STD. DWG. NO. 1101.

(12) CONSTRUCT B-1 MEDIAN CURB PER CITY OF SANTA ANA STD. DWG. NO. 1101.

(14) CONSTRUCT SIDEWALK PER CITY OF SANTA ANA STD. DWG. NO. 1104.

(15) CONSTRUCT NEW ROADWAY PAVEMENT PER SHADED AREA.

(16) RECONSTRUCT EXISTING PCC DRIVEWAY, PER DETAIL ON SHEET 11.

(17) RECONSTRUCT EXISTING AC DRIVEWAY/PARKING LOT.

(18) CONSTRUCT DRIVEWAY APPROACH AT WIDTH SHOWN PER CALTRANS STD 87A.

(19) CONSTRUCT NEW BUS PAD PER CITY OF SANTA ANA STD. DWG. NO. 1108.

(20) CONSTRUCT CURB RAMP PER CITY OF SANTA ANA STD. 1122, TYPE 1.

(22) CONSTRUCT CURB RAMP PER APWA STD. DWG. NO. 111-3, CASE D (SW) & CASE E (SE).

(24) MODIFY EXISTING RAILROAD GRADE CROSSING.

(25) PROVIDE LANDSCAPING WITHIN AREA SHOWN.

(26) PROVIDE HARDSCAPING WITHIN AREA SHOWN.

(39) CONSTRUCT MASONRY BLOCK RETAINING WALL PER APWA STANDARD DWG. NO. 618-3. MAXIMUM HEIGHT = 3', AVERAGE HEIGHT = 3'.

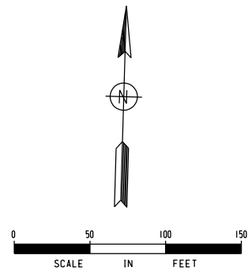
LEGEND:

PROPOSED HARDSCAPING AREA

PROPOSED LANDSCAPING AREA

PROPOSED PAVEMENT AREA

| CURVE DATA TABLE | | | |
|---|---|---|---|
| NO. | RADIUS | LENGTH | DESC. |
| (3) | 2000.00' | 173.25' | WARNER AVE ℄ |
| (4) | 2000.00' | 173.25' | WARNER AVE ℄ |




IBI GROUP

FILE NO.

**REVISIONS**

| NUMBER | DATE | INITIALS | DESCRIPTIONS | APPRVD |
|---|---|---|---|---|
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**REFERENCES**

| PLANS | BENCH MARK # | ELEV. |
|---|---|---|
| | | |

I-2-81

PREPARED UNDER THE SUPERVISION OF — R.C.E. NO. — DATE

DESIGNED — DRAWN

R/W APPROVED — CHECKED

RECOMMENDED

SENIOR CIVIL ENGINEER — R.C.E. NO.

STREET IMPROVEMENT PLAN

# WARNER AVENUE WIDENING

MAIN ST TO GRAND AVE

## PUBLIC WORKS AGENCY

CITY OF SANTA ANA



User carlos serrano
Date Plotted 6/6/2013 6:44:40 PM
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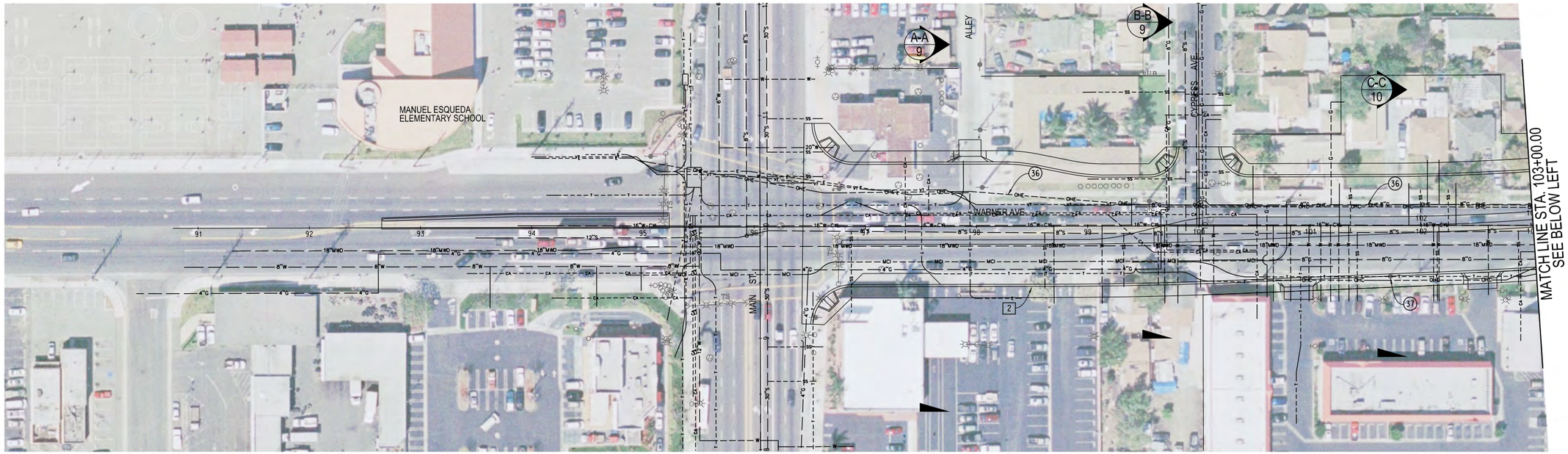


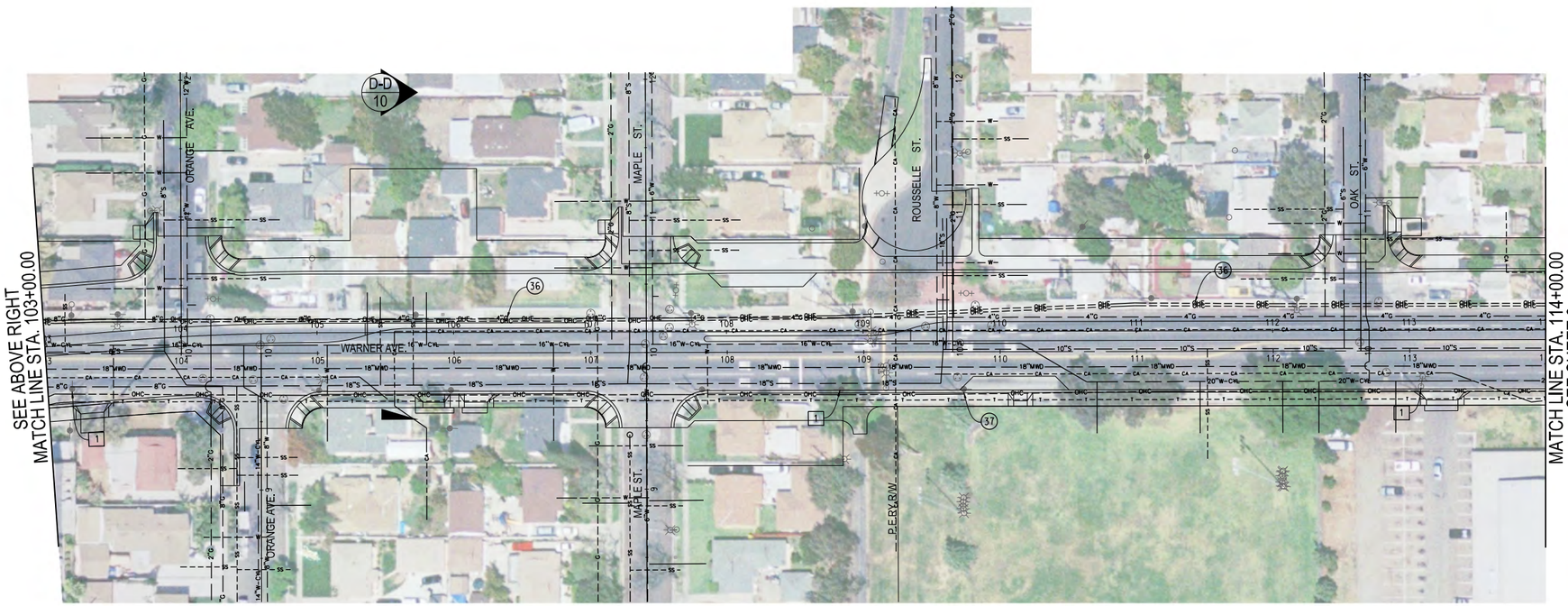


## CONSTRUCTION NOTES

(36) RELOCATE EXISTING OVERHEAD ELECTRICAL UTILITIES (BY OTHERS).

(37) EXISITNG OVERHEAD UTILITIES TO BE PROTECTED IN PLACE.

## LEGEND:

| | |
|---|---|
| E | EXISTING ELECTRICAL |
| G | EXISTING GAS |
| CA | EXISTING CABLE |
| FO | EXISTING FIBER OPTIC CABLE |
| OHC | EXISTING OVERHEAD CABLE |
| S | EXISTING SEWER |
| MCI | EXISTING TELECOMUNICATION |
| T | EXISTING TELECOMUNICATION |
| W | EXISTING WATER |

NOTES:

[1] EXISTING UTILITY POLES ALONG SOUTH SIDE OF WARNER ASSUMED TO BE PROTECTED IN PLACE. IDENTIFIED POLE IS IN CONFLICT WITH PROPOSED DRIVEWAY APPROACH AS DRAWN AND WILL REQUIRE POLE RELOCATION OR NONSTANDARD DRIVEWAY APPROACH DESIGN.

[2] EXISTING UTILITY LANDMARK ALONG SOUTH SIDE OF WARNER ASSUMED TO BE PROTECTED IN PLACE. IDENTIFIED LANDMARK IS IN CONFLICT WITH PROPOSED DRIVEWAY APPROACH AS DRAWN AND WILL REQUIRE RELOCATION.

N

0 50 100 150
SCALE IN FEET

IBI GROUP

FILE NO.

**REVISIONS**

| NUMBER | DATE | INITIALS | DESCRIPTIONS | APPRVD |
|---|---|---|---|---|
| | | | | |

**REFERENCES**

| PLANS | BENCH MARK # | ELEV. #### |
|---|---|---|
| | | |

I-2-82

PREPARED UNDER THE SUPERVISION OF

R.C.E. NO.

DESIGNED DRAWN

R/W APPROVED CHECKED

RECOMMENDED

SENIOR CIVIL ENGINEER R.C.E. NO.

DATE

EXISTING STREET UTILITIES PLAN

**WARNER AVENUE WIDENING**

MAIN ST TO GRAND AVE

**PUBLIC WORKS AGENCY**

CITY OF SANTA ANA

SHEET 5 OF 11

User carlos serrano
Date Plotted 6/6/2013 6:44:54 PM
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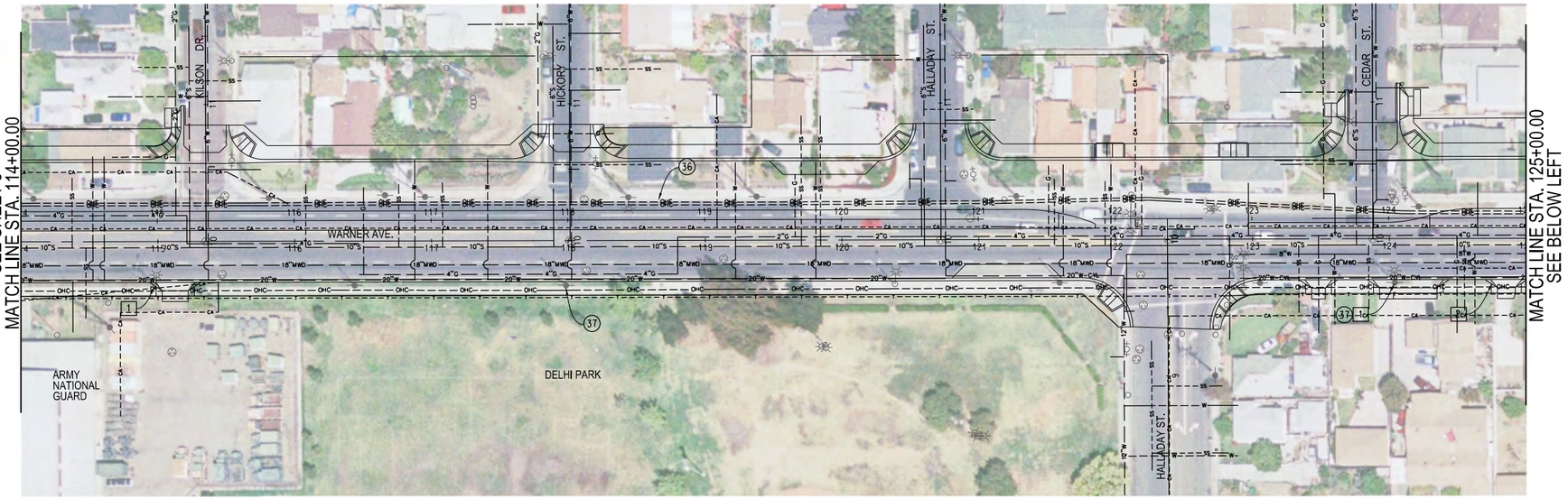


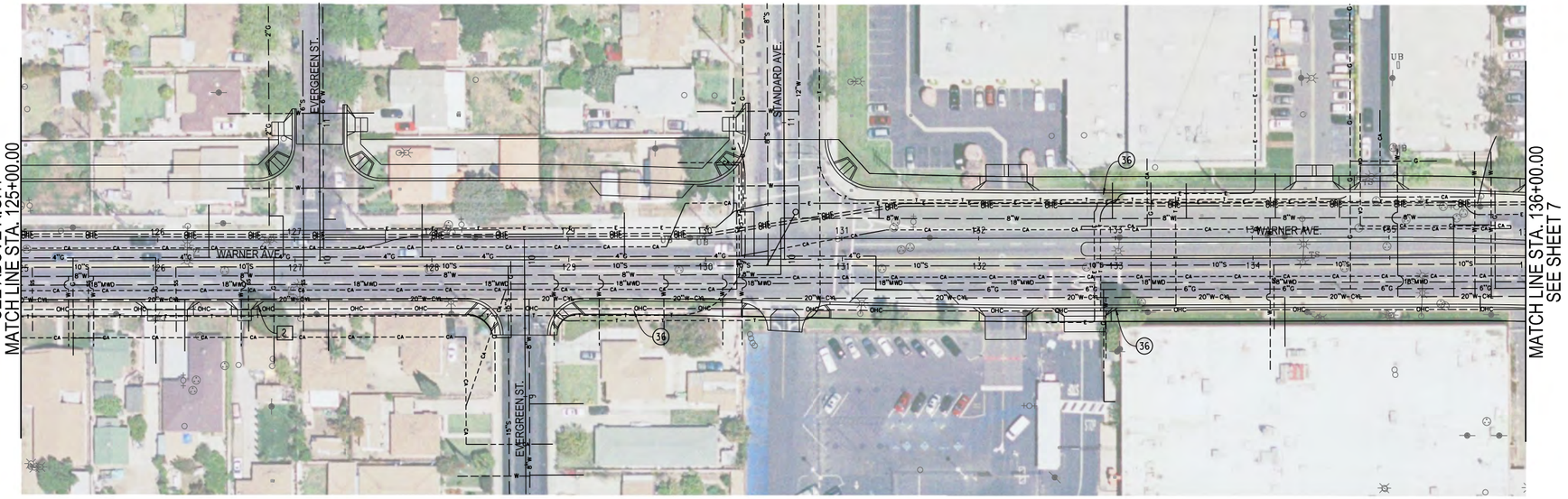


## CONSTRUCTION NOTES

(36) RELOCATE EXISTING OVERHEAD ELECTRICAL UTILITIES (BY OTHERS).

(37) EXISITNG OVERHEAD UTILITIES TO BE PROTECTED IN PLACE.

## LEGEND:

| | |
|---|---|
| E | EXISTING ELECTRICAL |
| G | EXISTING GAS |
| CA | EXISTING CABLE |
| FO | EXISTING FIBER OPTIC CABLE |
| OHC | EXISTING OVERHEAD CABLE |
| S | EXISTING SEWER |
| MCI | EXISTING TELECOMUNICATION |
| T | EXISTING TELECOMUNICATION |
| W | EXISTING WATER |

NOTES:

1. EXISTING UTILITY POLES ALONG SOUTH SIDE OF WARNER ASSUMED TO BE PROTECTED IN PLACE. IDENTIFIED POLE IS IN CONFLICT WITH PROPOSED DRIVEWAY APPROACH AS DRAWN AND WILL REQUIRE POLE RELOCATION OR NONSTANDARD DRIVEWAY APPROACH DESIGN.
2. EXISTING UTILITY LANDMARK ALONG SOUTH SIDE OF WARNER ASSUMED TO BE PROTECTED IN PLACE. IDENTIFIED LANDMARK IS IN CONFLICT WITH PROPOSED DRIVEWAY APPROACH AS DRAWN AND WILL REQUIRE RELOCATION.

N

0 50 100 150
SCALE IN FEET

IBI GROUP

FILE NO.

| REVISIONS | | | | |
|---|---|---|---|---|
| NUMBER | DATE | INITIALS | DESCRIPTIONS | APPRVD |
| | | | | |

| REFERENCES | | |
|---|---|---|
| PLANS | BENCH MARK # | ELEV. |
| | | |
| | I-2-83 | |

PREPARED UNDER THE SUPERVISION OF

R.C.E. NO.

DESIGNED DRAWN

R/W APPROVED CHECKED

RECOMMENDED

SENIOR CIVIL ENGINEER R.C.E. NO.

DATE

EXISTING STREET UTILITIES PLAN

**WARNER AVENUE WIDENING**

MAIN ST TO GRAND AVE

**PUBLIC WORKS AGENCY**

CITY OF SANTA ANA

SHEET 6 OF 11

User carlos serrano
Date Plotted 6/6/2013 6:45:00 PM
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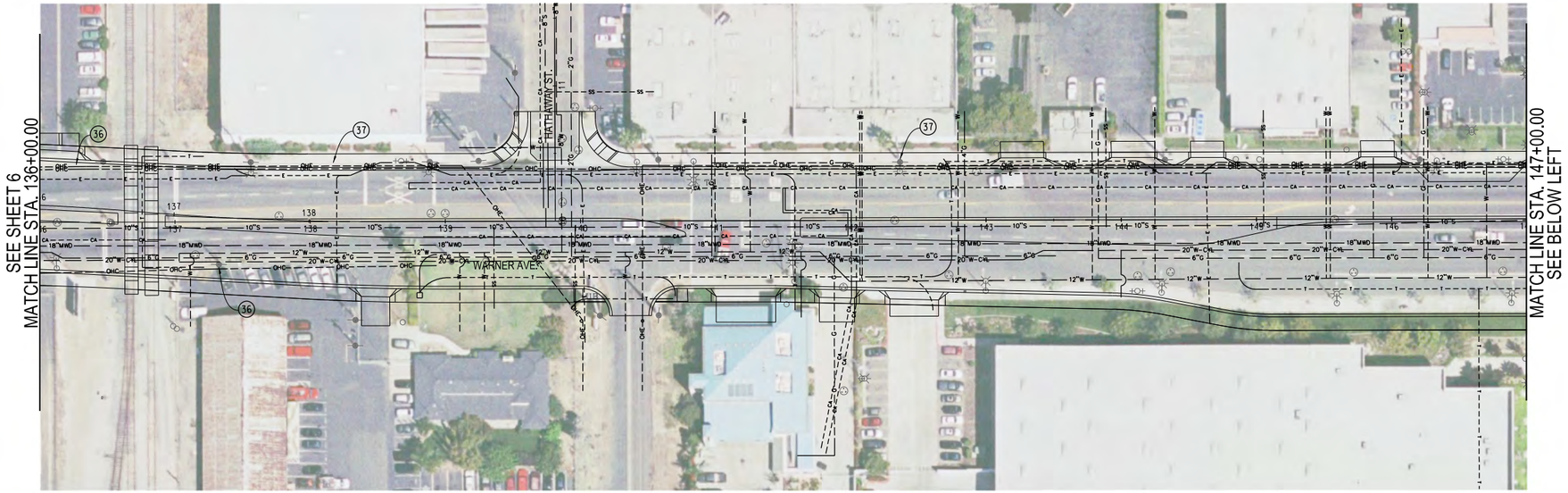


## CONSTRUCTION NOTES

(36) RELOCATE EXISTING OVERHEAD ELECTRICAL UTILITIES (BY OTHERS).

(37) EXISITNG OVERHEAD UTILITIES TO BE PROTECTED IN PLACE.

## LEGEND:

| | |
|---|---|
| E | EXISTING ELECTRICAL |
| G | EXISTING GAS |
| CA | EXISTING CABLE |
| FO | EXISTING FIBER OPTIC CABLE |
| OHC | EXISTING OVERHEAD CABLE |
| S | EXISTING SEWER |
| MCI | EXISTING TELECOMUNICATION |
| T | EXISTING TELECOMUNICATION |
| W | EXISTING WATER |

NOTES:

1. EXISTING UTILITY POLES ALONG SOUTH SIDE OF WARNER ASSUMED TO BE PROTECTED IN PLACE. IDENTIFIED POLE IS IN CONFLICT WITH PROPOSED DRIVEWAY APPROACH AS DRAWN AND WILL REQUIRE POLE RELOCATION OR NONSTANDARD DRIVEWAY APPROACH DESIGN.
2. EXISTING UTILITY LANDMARK ALONG SOUTH SIDE OF WARNER ASSUMED TO BE PROTECTED IN PLACE. IDENTIFIED LANDMARK IS IN CONFLICT WITH PROPOSED DRIVEWAY APPROACH AS DRAWN AND WILL REQUIRE RELOCATION.

N

0 50 100 150
SCALE IN FEET

IBI GROUP

FILE NO.

| REVISIONS | | | | |
|---|---|---|---|---|
| NUMBER | DATE | INITIALS | DESCRIPTIONS | APPRVD |

| REFERENCES | | |
|---|---|---|
| PLANS | BENCH MARK # | ELEV. |
| | | |
| | I-2-84 | |

PREPARED UNDER THE SUPERVISION OF — R.C.E. NO. — DATE

DESIGNED — DRAWN

R/W APPROVED — CHECKED

RECOMMENDED

SENIOR CIVIL ENGINEER — R.C.E. NO.

EXISTING STREET UTILITIES PLAN

**WARNER AVENUE WIDENING**

MAIN ST TO GRAND AVE

**PUBLIC WORKS AGENCY**

CITY OF SANTA ANA

SHEET 7 OF 11

User carlos serrano
Date Plotted 6/6/2013 6:45:07 PM
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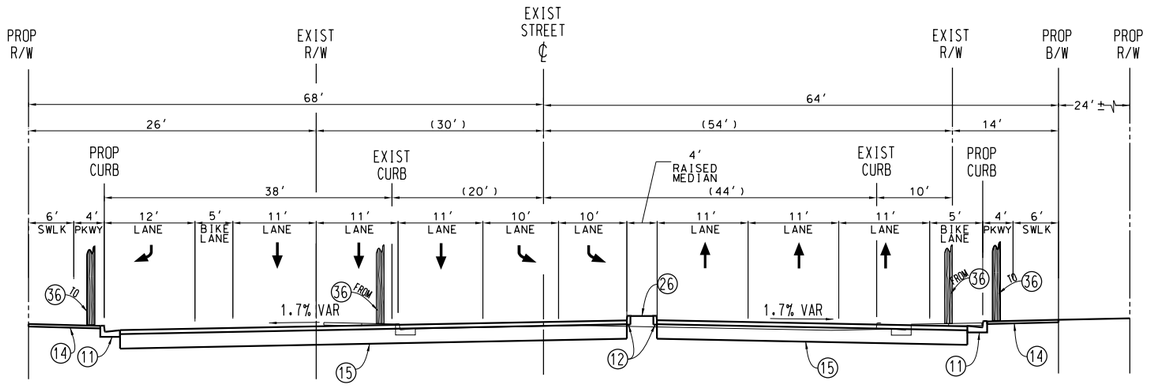
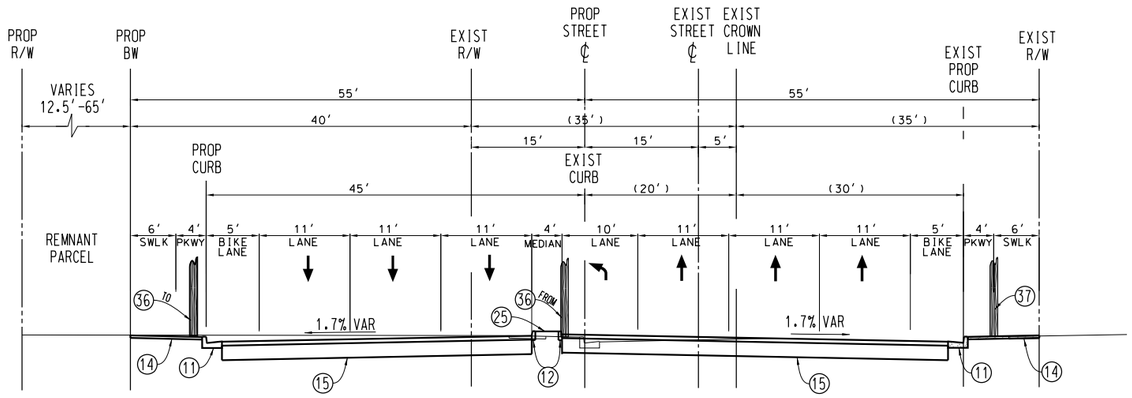



**SECTION A-A**
**MAIN ST TO CYPRESS AVE**
**96' EXISTING R/W**
**(SECTION CUT @ STA 98+00)**




**SECTION C-C**
**ORANGE AVE TO MAPLE ST**
**70' EXISTING R/W**
**(SECTION CUT @ STA 106+50)**

## CONSTRUCTION NOTES

(11) CONSTRUCT A-2-8 CURB & GUTTER PER CITY OF SANTA ANA STD. DWG. NO. 1101.

(12) CONSTRUCT B-1 MEDIAN CURB PER CITY OF SANTA ANA STD. DWG. NO. 1101.

(14) CONSTRUCT SIDEWALK PER CITY OF SANTA ANA STD. DWG. NO. 1104.

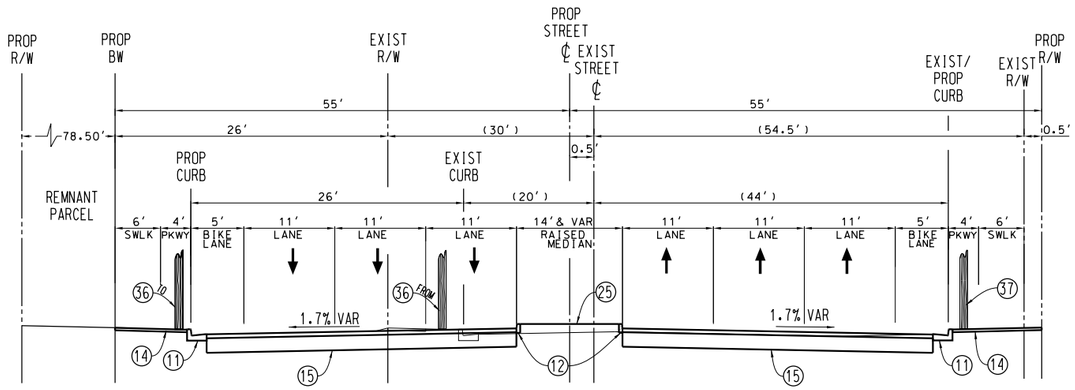
(15) CONSTRUCT NEW ROADWAY PAVEMENT PER SHADED AREA.

(25) PROVIDE LANDSCAPING WITHIN AREA SHOWN.

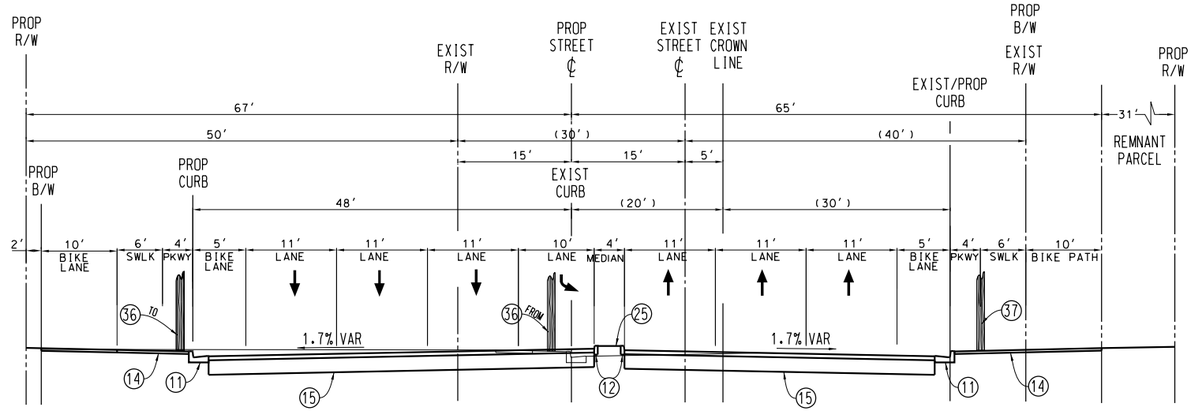
(26) PROVIDE HARDSCAPING WITHIN AREA SHOWN.

(36) RELOCATE EXISTING OVERHEAD ELECTRICAL UTILITIES (BY OTHERS).

(37) EXISITNG OVERHEAD UTILITIES TO BE PROTECTED IN PLACE.




**SECTION B-B**
**CYPRESS ST TO ORANGE AVE**
**84' EXISTING R/W**
**(SECTION CUT @ STA 102+00)**




**SECTION D-D**
**MAPLE ST TO ROUSSELLE ST**
**70' EXISTING R/W**
**(SECTION CUT @ STA 108+00)**

IBI GROUP

| FILE NO. | REVISIONS | | | | REFERENCES | | | PREPARED UNDER THE SUPERVISION OF | DATE | CROSS-SECTIONS |
|---|---|---|---|---|---|---|---|---|---|---|
| | NUMBER | DATE | INITIALS | DESCRIPTIONS / APPRVD | PLANS | BENCH MARK # | ELEV. | R.C.E. NO. | | **WARNER AVENUE WIDENING** |
| | | | | | | | | DESIGNED DRAWN | | MAIN ST TO GRAND AVE |
| | | | | | | | | R/W APPROVED CHECKED | | **PUBLIC WORKS AGENCY** |
| | | | | | | | | RECOMMENDED | | CITY OF SANTA ANA |
| | | | | | | | | SENIOR CIVIL ENGINEER R.C.E. NO. | | SHEET 8 OF 11 |

I-2-85

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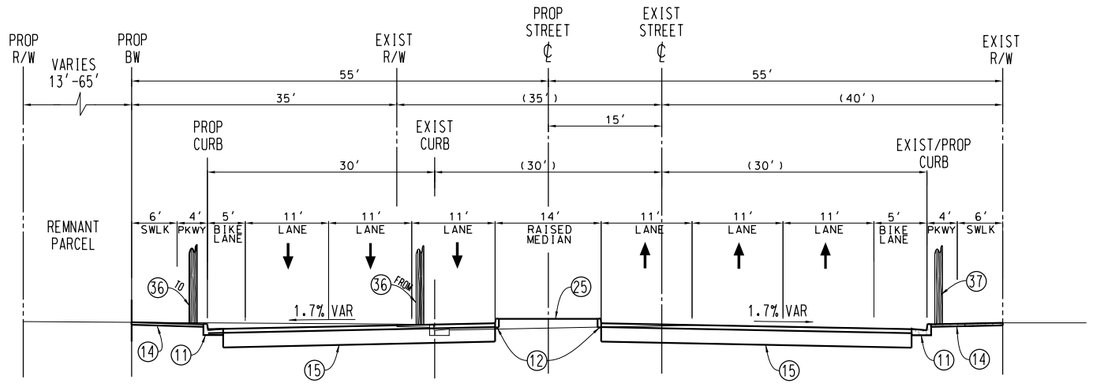
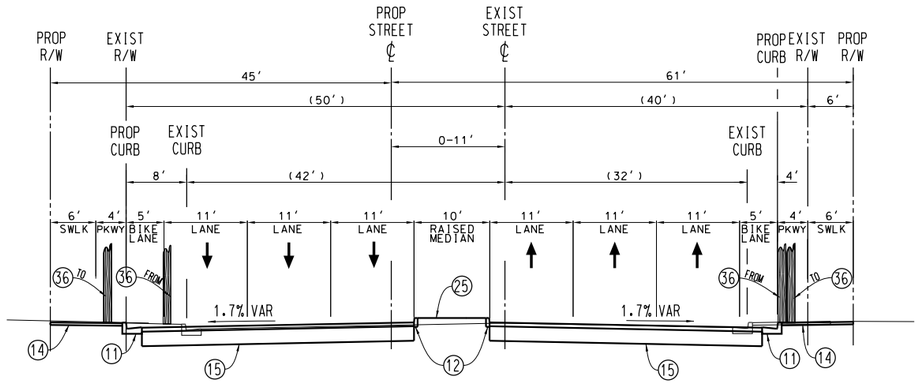



**SECTION E-E**
**ROUSSELLE ST TO NORTH HALLADAY ST**
**75' EXISTING R/W**
**(SECTION CUT @ STA 114+00)**




**SECTION G-G**
**STANDARD AVE TO UPRR RAILROAD CORRIDOR**
**90' EXISTING R/W**
**(SECTION CUT @ STA 133+50)**

## CONSTRUCTION NOTES

(1) DEMOLISH EXISTING STRUCTURE AND CLEAR EXISTING PARCEL.

(11) CONSTRUCT A-2-8 CURB & GUTTER PER CITY OF SANTA ANA STD. DWG. NO. 1101.

(12) CONSTRUCT B-1 MEDIAN CURB PER CITY OF SANTA ANA STD. DWG. NO. 1101.

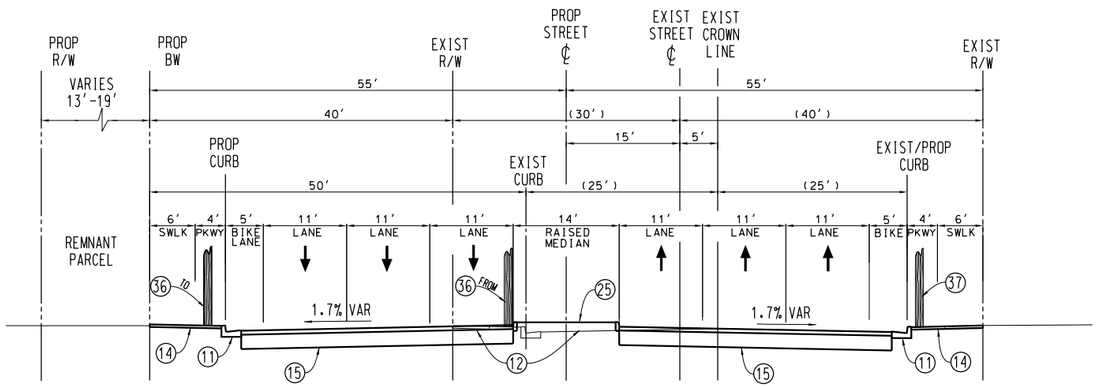
(14) CONSTRUCT SIDEWALK PER CITY OF SANTA ANA STD. DWG. NO. 1104.

(15) CONSTRUCT NEW ROADWAY PAVEMENT PER SHADED AREA.

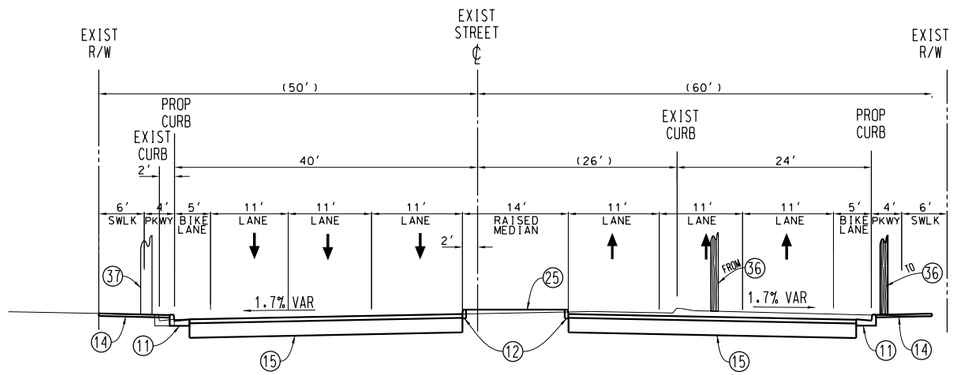
(25) PROVIDE LANDSCAPING WITHIN AREA SHOWN.

(36) RELOCATE EXISTING OVERHEAD ELECTRICAL UTILITIES (BY OTHERS).

(37) EXISITNG OVERHEAD UTILITIES TO BE PROTECTED IN PLACE.




**SECTION F-F**
**NORTH HALLADAY ST TO STANDARD AVE**
**70' EXISTING R/W**
**(SECTION CUT @ STA 126+00)**




**SECTION H-H**
**STA 138+71.56 TO HATHAWAY ST**
**110' EXISTING R/W**
**(SECTION CUT @ STA 139+00)**

IBI GROUP

| FILE NO. | REVISIONS | | | | REFERENCES | | | PREPARED UNDER THE SUPERVISION OF | DATE | CROSS-SECTIONS |
|---|---|---|---|---|---|---|---|---|---|---|
| | NUMBER | DATE | INITIALS | DESCRIPTIONS | APPRVD | PLANS | BENCH MARK # ELEV. | R.C.E. NO. | | **WARNER AVENUE WIDENING** |
| | | | | | | | | DESIGNED DRAWN | | MAIN ST TO GRAND AVE |
| | | | | | | | | R/W APPROVED CHECKED | | |
| | | | | | | | | RECOMMENDED | | **PUBLIC WORKS AGENCY** |
| | | | | | | | | SENIOR CIVIL ENGINEER R.C.E. NO. | | CITY OF SANTA ANA |

I-2-86

SHEET 9 OF 11

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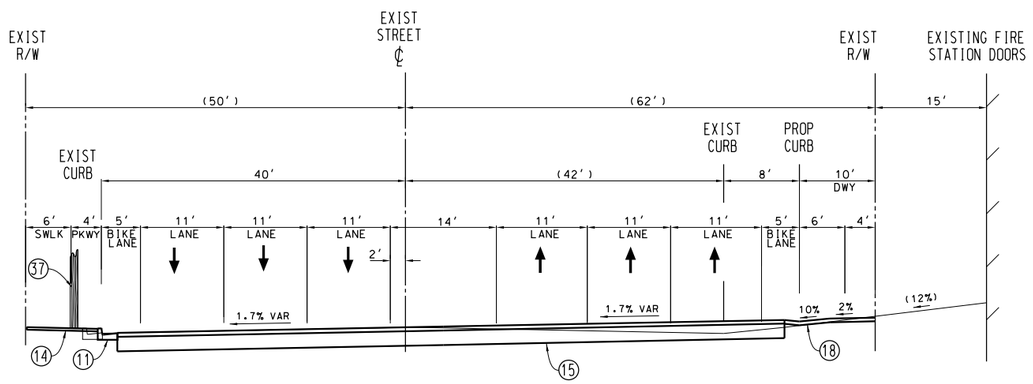
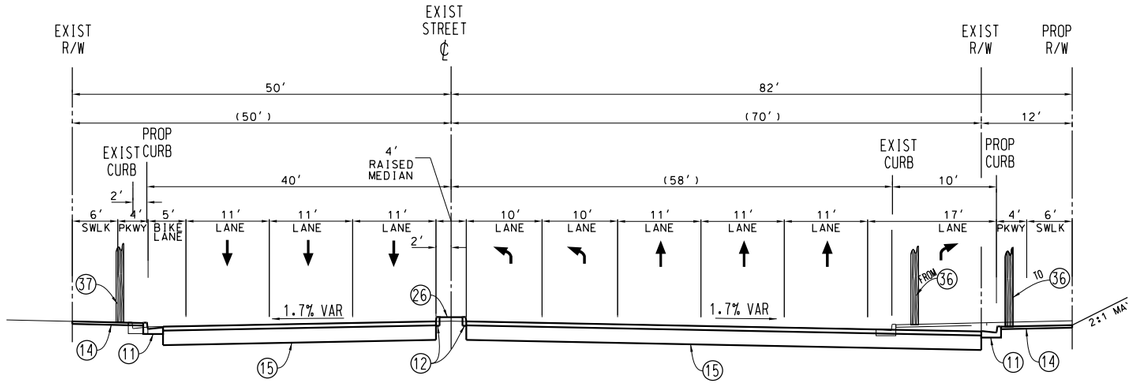



**SECTION I-I**
**@ FIRE STATION**
**110' EXISTING R/W**
**REVERSE 2% CROSSFALL REQUIRED**
**(SECTION CUT @ STA 141+25)**




**SECTION K-K**
**SIX LANE CROSS SECTION - 132' R/W**
**120' EXISTING W/ RAISED MEDIAN AND LEFT TURN**
**(SECTION CUT @ EXISTING STA 146+00)**

## CONSTRUCTION NOTES

(7) SAWCUT EXISTING PAVEMENT.

(11) CONSTRUCT A-2-8 CURB & GUTTER PER CITY OF SANTA ANA STD. DWG. NO. 1101.

(12) CONSTRUCT B-1 MEDIAN CURB PER CITY OF SANTA ANA STD. DWG. NO. 1101.

(14) CONSTRUCT SIDEWALK PER CITY OF SANTA ANA STD. DWG. NO. 1104.

(15) CONSTRUCT NEW ROADWAY PAVEMENT PER SHADED AREA.

(17) RECONSTRUCT EXISTING AC DRIVEWAY/PARKING LOT.

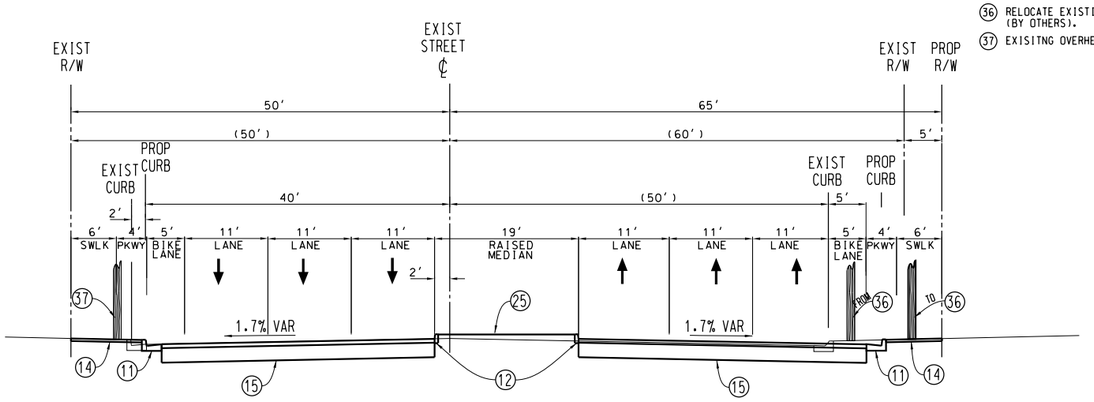
(18) CONSTRUCT DRIVEWAY APPROACH AT WIDTH SHOWN PER CALTRANS STD 87A.

(25) PROVIDE LANDSCAPING WITHIN AREA SHOWN.

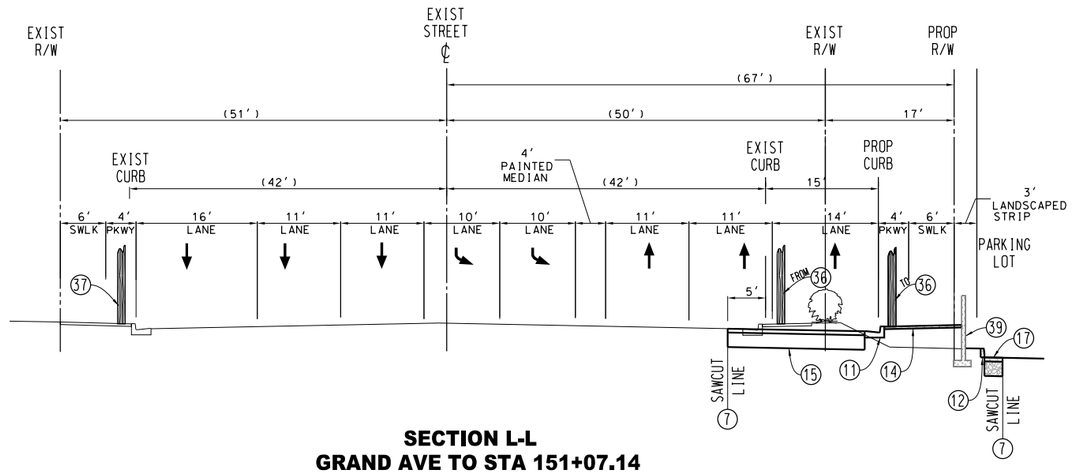
(26) PROVIDE HARDSCAPING WITHIN AREA SHOWN.

(36) RELOCATE EXISTING OVERHEAD ELECTRICAL UTILITIES (BY OTHERS).

(37) EXISITNG OVERHEAD UTILITIES TO BE PROTECTED IN PLACE.




**SECTION J-J**
**SIX LANE CROSS SECTION**
**110' EXISTING R/W**
**(SECTION CUT @ EXISTING STA 143+50)**




**SECTION L-L**
**GRAND AVE TO STA 151+07.14**
**107' EXISTING R/W**

IBI GROUP

| FILE NO. | REVISIONS | | | | | REFERENCES | | | PREPARED UNDER THE SUPERVISION OF | | DATE | CROSS-SECTIONS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NUMBER | DATE | INITIALS | DESCRIPTIONS | APPRVD | PLANS | BENCH MARK # | ELEV. | | R.C.E. NO. | | **WARNER AVENUE WIDENING** |
| | | | | | | | | | DESIGNED | DRAWN | | MAIN ST TO GRAND AVE |
| | | | | | | | | | R/W APPROVED | CHECKED | | |
| | | | | | | | | | RECOMMENDED | | | **PUBLIC WORKS AGENCY** |
| | | | | | | | | | SENIOR CIVIL ENGINEER | R.C.E. NO. | | CITY OF SANTA ANA |



SHEET 10 OF 11

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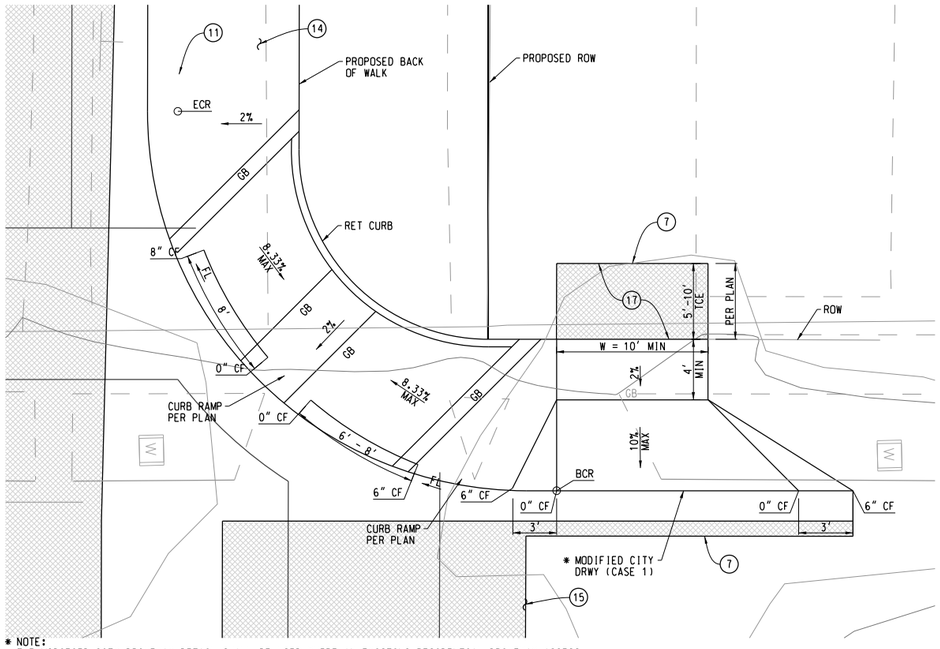


* NOTE:
THE MODIFIED CITY DRIVEWAY DETAIL SHALL BE USED WHERE AN EXISTING RESIDENTIAL DRIVEWAY ACCESS IS TO BE RECONSTRUCTED IN CLOSE PROXIMITY TO A CURB RETURN AND ADA ACCESS RAMP AND A STANDARD DRIVEWAY IS NOT FEASIBLE.

**MODIFIED CITY DRIVEWAY ACCESS DETAIL**
**NTS**

## CONSTRUCTION NOTES

(7) SAWCUT EXISTING PAVEMENT.

(11) CONSTRUCT A-2-8 CURB & GUTTER PER CITY OF SANTA ANA STD. DWG. NO. 1101.

(14) CONSTRUCT SIDEWALK PER CITY OF SANTA ANA STD. DWG. NO. 1104.

(15) CONSTRUCT NEW ROADWAY PAVEMENT PER SHADED AREA.

(17) RECONSTRUCT EXISTING AC DRIVEWAY/PARKING LOT.

IBI GROUP

| FILE NO. | REVISIONS | | | | | REFERENCES | | | PREPARED UNDER THE SUPERVISION OF | DATE | CONSTRUCTION DETAILS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NUMBER | DATE | INITIALS | DESCRIPTIONS | APPRVD | PLANS | BENCH MARK # | ELEV. | R.C.E. NO. | | **WARNER AVENUE WIDENING** | |
| | | | | | | | | | DESIGNED DRAWN | | MAIN ST TO GRAND AVE | |
| | | | | | | | | | R/W APPROVED CHECKED | | **PUBLIC WORKS AGENCY** | |
| | | | | | | | | | RECOMMENDED | | CITY OF SANTA ANA | |
| | | | | | | | | | SENIOR CIVIL ENGINEER R.C.E. NO. | | | SHEET 11 OF 11 |

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# APPENDIX E

# RIGHT OF WAY PLANS AND IMPACT INVENTORY OF RECOMMENDED ALIGNMENT

## WARNER AVENUE WIDENING PROJECT

From Main Street to Grand Avenue

## TABULATION OF RIGHT OF WAY REQUIREMENTS

| ROW SHEET | APN | DESCRIPTION OF PROPERTY REQUIREMENTS | PROPERTY OWNER | Property Owner **ADDRESS,** if different than the Site Address | SITE ADDRESS | AREA (SF) | Unit Cost ($/SF) | Total Cost ($) |
|---|---|---|---|---|---|---|---|---|
| **North Side of Warner (west to east)** | | | | | | | | |
| 1 | 403-141-008 | FULL PARCEL | BP West Coast Products | PO Box 5015, Buena Park, CA 90622-5015 | 2245 S MAIN ST. | 11,800 | | 0 |
| 1 | 403-141-009 | FULL PARCEL | Hawken, Susan A ADM John | 517 S Broadway, Santa Ana, CA 92701-5639 | 2246 S CYPRESS AVE. | 17,422 | | 0 |
| 1 | 403-142-013 | FULL PARCEL | Bergara, Amalia Garcia | | 2245 S CYPRESS AVE. | 5,143 | | 0 |
| 1 | 403-142-014 | FULL PARCEL | Hallmark, Harriet Louise | | 209 E WARNER AVE. | 5,040 | | 0 |
| 1 | 403-142-015 | FULL PARCEL | Carlos, Rual | 1480 Voyager Dr, Tustin, CA 92782-1724 | 215 E WARNER AVE. | 5,040 | | 0 |
| 1 | 403-142-016 | FULL PARCEL | Chavez, Henry A | | 219 E WARNER AVE. | 5,040 | | 0 |
| 1 | 403-142-017 | FULL PARCEL | Castillo, Delia | | 2246 S ORANGE AVE. | 5,143 | | 0 |
| 1 | 403-143-012 | FULL PARCEL | Castro, Jorge | | 2245 S ORANGE AVE. | 4,935 | | 0 |
| 1 | 403-143-013 | FULL PARCEL | Rojas, Gregorio Ornelas | | 309 E WARNER AVE. | 4,830 | | 0 |
| 1 | 403-143-014 | FULL PARCEL | Formey, Christian W | | 315 E WARNER AVE. | 4,902 | | 0 |
| 1 | 403-143-015 | FULL PARCEL | Homesales Inc | | 2246 S MAPLE ST. | 4,935 | | 0 |
| 2 | 403-144-011 | EAST PORTION | Vargas, Quirino | | 2243 S MAPLE ST. | 420 | | 0 |
| 2 | 403-144-012 | FULL PARCEL | Fernandez, Roberto R | | 2245 S MAPLE ST. | 7,056 | | 0 |
| 2 | 016-101-029 | FULL PARCEL | Rodriguez, Alejandro | | 2247 S ROUSSELLE ST. | 5,912 | | 0 |
| 2 | 016-101-028 | FULL PARCEL | Gomez, Oscar | | 2246 S OAK ST. | 5,806 | | 0 |
| 2 | 016-102-024 | FULL PARCEL | IB Property Holdings LLC | | 2245 S OAK ST. | 5,099 | | 0 |
| 2 | 016-102-023 | FULL PARCEL | Bahena, Santos Popaco | | 2246 S KILSON DR. | 5,098 | | 0 |
| 2 | 016-103-022 | FULL PARCEL | Campos, Abraham R | 1113 N Concord St, Santa Ana, CA 92701-3211 | 2245 S KILSON DR. | 5,314 | | 0 |
| 2 | 016-103-023 | FULL PARCEL | Gallegos, Gerald R | | 705 E WARNER AVE. | 16,114 | | 0 |
| 3 | 016-104-028 | FULL PARCEL | Martinez, Vivian | 2030 S Hickory St, Santa Ana, CA 92707-2910 | 2245 S HICKORY ST. | 5,045 | | 0 |
| 3 | 016-104-021 | FULL PARCEL | Cruz, Rosa | c/o Recontrust Company, 1757 Tapo Canyon Rd, Simi Valley, CA 93063-3391 | 809 E WARNER AVE. | 5,400 | | 0 |
| 3 | 016-104-029 | FULL PARCEL | Gallardo, Francisco | | 2244 S HALLADAY ST. | 5,314 | | 0 |
| 3 | 016-105-019 | FULL PARCEL | Steele, Kenneth A | PO Box 9598, Laguna Beach, CA 92652-7564 | 2245 S HALLADAY ST. | 4,316 | | 0 |
| 3 | 016-105-020 | FULL PARCEL | Peralta, Ruben V Tr | | 905 E WARNER AVE. | 4,401 | | 0 |
| 3 | 016-105-021 | FULL PARCEL | Solis, Fidel | | 909 E WARNER AVE. | 4,828 | | 0 |
| 3 | 016-105-022 | FULL PARCEL | Davis, Barbara | 10072 Roads End Dr, Garden Grove, CA 92840-1543 | 909 E WARNER AVE. | 241 | | 0 |
| 3 | 016-214-012 | FULL PARCEL | Ambriz, Virginia G | 4485 Thornbush Dr, Hemet, CA 92545-8090 | 2246 S CEDAR ST. | 6,570 | | 0 |
| 3 | 016-212-026 | FULL PARCEL | Gallegos, Eloisa | | 2247 S CEDAR ST. | 7,842 | | 0 |
| 3 | 016-212-025 | FULL PARCEL | Silvas, John r | | 2246 S EVERGREEN ST. | 7,872 | | 0 |
| 3 | 016-211-026 | FULL PARCEL | Gamboa, Desiderio T Tr | | 2247 S EVERGREEN ST. | 7,894 | | 0 |
| 4 | 016-211-025 | FULL PARCEL | Meisami-Fard, Hossein Tr | | 2246 S STANDARD AVE. | 7,924 | | 0 |
| 4 | 016-120-052 | SOUTH PORTION | Wiliz Investment LLC | c/o Wilhelmina G Van Hunnick, 9141 Valley View, Cypress, CA 90630-5803 | 1209 E WARNER AVE. | 1,713 | | 0 |
| 4 | 016-120-049 | SOUTH PORTION | Wiliz Investment LLC | c/o Wilhelmina G Van Hunnick, 9141 Valley View, Cypress, CA 90630-5803 | 1201 E WARNER AVE. | 920 | | 0 |
| 4 | 016-120-048 | SOUTH PORTION | R & R Leasing LLC | | 1221 E WARNER AVE. | 1,641 | | 0 |
| 4 | 016-120-053 | SOUTH PORTION | Sandberg, Robert W Tr | 18832 Winnwood Ln, Santa Ana, CA 92705-1233 | 1243 E WARNER AVE. | 160 | | 0 |
| 4 | 016-120-054 | SOUTH PORTION | Sandberg, Robert W Tr | 18832 Winnwood Ln, Santa Ana, CA 92705-1233 | 1231 E WARNER AVE. | 1,298 | | 0 |
| 4 | 872-30-13F-173 | SOUTH PORTION | RAILROAD | | RAILROAD | 138 | | 0 |
| 4 | 014-281-019 | SOUTH PORTION | Gates Warner LLC | 15 Dartmouth, Newport Beach, CA 92660-9003 | 1301 E WARNER AVE. | 133 | | 0 |
| | | | | | North Side Total | **198,699** | | **0** |
| **South Side of Warner (west to east)** | | | | | | | | |
| 1 | 016-031-054 | FULL PARCEL | United California Bank | c/o Thompson Property Tax, PO Box 2609, Carlsbad, CA 92018-2609 | 100 E WARNER AVE. | 42,899 | | 0 |
| 1 | 016-031-038 | FULL PARCEL | United California Bank | c/o Thompson Property Tax, PO Box 2609, Carlsbad, CA 92018-2609 | 120 E WARNER AVE. | 7,695 | | 0 |
| 1 | 016-031-037 | FULL PARCEL | Quiroz, Francisco | | 124 E WARNER AVE. | 8,325 | | 0 |
| 1 | 016-031-032 | FULL PARCEL | Quiroz, Francisco | | 128 E WARNER AVE. | 9,250 | | 0 |
| 1 | 016-031-033 | NORTH PORTION | Lee, Kyong Ha Tr | 4 Narbonne, Newport Beach, CA 92660-6823 | 204 E WARNER AVE. | 410 | | 0 |
| 1 | 016-031-050 | NORTH PORTION | Lee, Kyong Ha Tr | 4 Narbonne, Newport Beach, CA 92660-6823 | 216 E WARNER AVE. | 413 | | 0 |
| 1 | 016-031-040 | NORTH PORTION | Herrera, Dulci I. | | 230 E WARNER AVE. | 453 | | 0 |
| 1 | 016-034-001 | NORTHWEST CORNER | Hernandez, Filipe De | | 302 E WARNER AVE. | 48 | | 0 |
| 1 | 016-034-026 | NORTHEAST CORNER | Martinez, Armando A. | | 310 E WARNER AVE. | 48 | | 0 |
| 2 | 016-035-001 | FULL PARCEL | Pena, Maria J. | | 402 E WARNER AVE. | 4,898 | | 0 |
| 3 | 016-133-028 | NORTHEAST CORNER | Gallegos, Martin C. | 21415 Via Del Parque, Yorba Linda, CA 92887-2525 | 1106 E WARNER AVE. | 97 | | 0 |
| 4 | 016-131-018 | NORTH PORTION | | | 2301, 2307, 2311, 2313 S. EVERGREEN ST. | 80 | | 0 |
| 4 | 016-150-009 | NORTH PORTION | SPS Technologies, LLC | | 1224 E WARNER AVE. | 3,119 | | 0 |
| 4 | 872-30-13F-19 | NORTHEAST CORNER | RAILROAD | | RAILROAD | 8 | | 0 |
| 4 | 016-150-074 | NORTH PORTION | Maas, Frederick Jr Tr | 1 Sierra Vista, Laguna Niguel, CA 92677-7952 | 1310 E WARNER AVE. (TBC*) | 3,496 | | 0 |
| 5 | 016-150-070 | NORTHEAST CORNER | City of Santa Ana | | 1320 E WARNER AVE. (TBC*) | 41 | | 0 |
| 5 | 016-150-071 | NORTH PORTION | Ramboat Investments | 2430 S Grand Ave, Santa Ana, CA 92705-5211 | 2400 GRAND AVE. (TBC*) | 5,398 | | 0 |
| 6 | 016-221-001 | NORTH PORTION | Watrous, Duff Edward | 341 Flint Ave, Long Beach, CA 908143205 | 1504 E WARNER AVE. | 1,847 | | 0 |
| 6 | 016-221-031 | NORTH PORTION | RCA Properties Management | 415 Evening Star Ln, Newport Beach, CA 92660-5706 | 1500 E WARNER AVE. (TBC*) | 2,322 | | 0 |
| 6 | 016-221-030 | NORTH PORTION | Hashemian, Ahmad | | 1502 E WARNER AVE | 1,290 | | 0 |
| 6 | 016-221-007 | NORTH PORTION | 1530 Hap Properties | c/o Pete Harle, PO Box 981 Tustin, CA 92781-0981 | 1530 E WARNER AVE. | 897 | | 0 |
| 6 | 016-221-008 | NORTH PORTION | Noryar Properties | 26 Plumeria, Irvine, CA 92620-7901 | 1532 E WARNER AVE. | 100 | | 0 |
| | | | | | South Side Total | **93,134** | | **0** |
| | | | | | | | | |
| | | | | | **TOTALS** | **291,833** | | **0** |

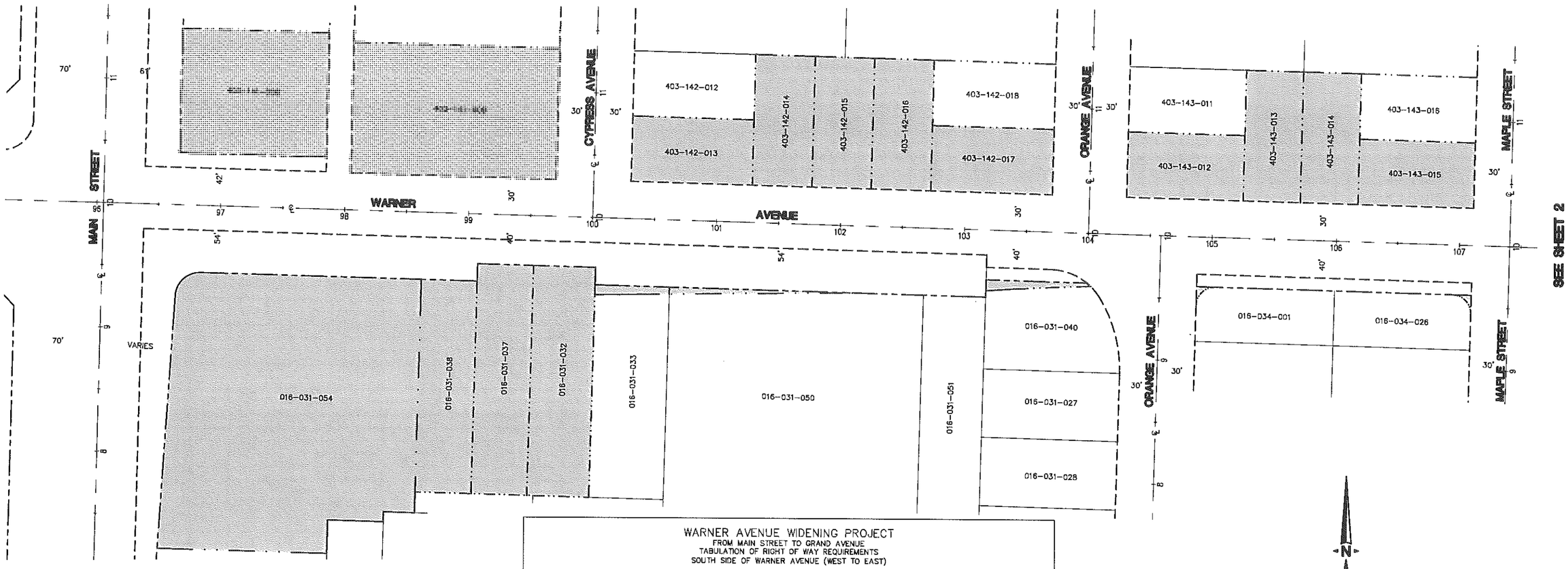
* NOTES: TBC = to be confirmed

J:\25683_EnviroWarner\10.0 Reports\PE report\Appendix E\[ROW Table R8_2012-10-31.xls]ROW Table
11/1/2012

NOTE: THE RIGHT OF WAY (ROW) REQUIREMENTS WERE DETERMINED BY OVERLAYING THE PROPOSED ROADWAY WIDENING GEOMETRICS OVER THE ROW INFORMATION ASSEMBLED FOR THE PROJECT. THE ASSEMBLED ROW INFORMATION INCLUDED TRACT MAPS (TM) WHERE AVAILABLE AND COUNTY ASSESSOR PARCEL NUMBER MAPS (APNM) FOR THE PROJECT SITE. IN SOME CASES, THE INDICATED PROPERTY LINES AND EXISTING ROADWAY ROW LINES WERE IN THE SAME LOCATION ON BOTH THE TM AND APNM. IN OTHER CASES, THE PROPERTY LINES AND THE EXISTING ROADWAY ROW LINES WERE NOT IN THE SAME LOCATION ON BOTH THE TM AND APNM. IN THE LATTER CASES, THE APNM LOCATION OF THE PROPERTY LINES WAS ASSUMED TO GOVERN AND IS THE BASIS FOR THE TABULATION OF ROW REQUIREMENTS ESTABLISHED FOR THIS PRELIMINARY ASSESSMENT OF THE ROW IMPACTS DUE TO THE PROPOSED ROADWAY WIDENING IMPROVEMENTS. TITLE REPORTS WHICH WOULD PROVIDE BETTER DEFINITION OF THE CURRENTLY RECORDED PROPERTY OWNERSHIP INFORMATION WERE NOT OBTAINED FOR USE IN THIS ASSIGNMENT.

## WARNER AVENUE WIDENING PROJECT
FROM MAIN STREET TO GRAND AVENUE
TABULATION OF RIGHT OF WAY REQUIREMENTS
NORTH SIDE OF WARNER AVENUE (WEST TO EAST)

| APN | DESCRIPTION OF PROPERTY TAKE | ADDRESS | AREA SF. | UNIT COST $/SF | TOTAL COST |
|---|---|---|---|---|---|
| 403-141-008 | FULL PARCEL | 2245 S. MAIN ST. | 11,800 S.F. | | |
| 403-141-009 | FULL PARCEL | 2246 S. CYPRESS AVE. | 17,422 S.F. | | |
| 403-142-013 | FULL PARCEL | 2245 S. CYPRESS AVE. | 5,143 S.F. | | |
| 403-142-014 | FULL PARCEL | 209 E. WARNER AVE. | 5,040 S.F. | | |
| 403-142-015 | FULL PARCEL | 215 E. WARNER AVE. | 5,040 S.F. | | |
| 403-142-016 | FULL PARCEL | 219 E. WARNER AVE. | 5,040 S.F. | | |
| 403-142-017 | FULL PARCEL | 2246 S. ORANGE AVE. | 5,143 S.F. | | |
| 403-143-012 | FULL PARCEL | 2245 S. ORANGE AVE. | 4,935 S.F. | | |
| 403-143-013 | FULL PARCEL | 309 E. WARNER AVE. | 4,830 S.F. | | |
| 403-143-014 | FULL PARCEL | 315 E. WARNER AVE. | 4,902 S.F. | | |
| 403-143-015 | FULL PARCEL | 2246 S. MAPLE ST. | 4,935 S.F. | | |




## WARNER AVENUE WIDENING PROJECT
FROM MAIN STREET TO GRAND AVENUE
TABULATION OF RIGHT OF WAY REQUIREMENTS
SOUTH SIDE OF WARNER AVENUE (WEST TO EAST)

| APN | DESCRIPTION OF PROPERTY TAKE | ADDRESS | AREA SF. | UNIT COST $/SF | TOTAL COST |
|---|---|---|---|---|---|
| 016-031-054 | FULL PARCEL | 100 E. WARNER AVE. | 42,899 S.F. | | |
| 016-031-038 | FULL PARCEL | 120 E. WARNER AVE. | 7,695 S.F. | | |
| 016-031-037 | FULL PARCEL | 124 E. WARNER AVE. | 8,325 S.F. | | |
| 016-031-032 | FULL PARCEL | 128 E. WARNER AVE. | 9,250 S.F. | | |
| 016-031-033 | NORTH PORTION | 204 E. WARNER AVE | 410 S.F. | | |
| 016-031-050 | NORTH PORTION | 216 E. WARNER AVE. | 413 S.F. | | |
| 016-031-040 | NORTH PORTION | 230 E. WARNER AVE. | 453 S.F. | | |
| 016-034-001 | NORTHWEST CORNER | 302 E. WARNER AVE. | 48 S.F. | | |
| 016-034-026 | NORTHEAST CORNER | 310 E. WARNER AVE. | 48 S.F. | | |

LEGEND:

RECORD MAP RIGHT-OF-WAY
ASSESSOR PARCEL MAP RIGHT-OF-WAY
ROADWAY CENTERLINE
LOT LINE
LIMITS OF ROW TO BE ACQUIRED

N

GRAPHIC SCALE
40' 0' 40' 120'
SCALE: 1" = 40'

PROJECT NO.: 992.01.0300

FILE NO.

REVISIONS

| NUMBER | DATE | INITIALS | DESCRIPTIONS | APPRVD |
|---|---|---|---|---|

REFERENCES

| PLANS | BENCH MARK # | ELEV. |
|---|---|---|

PREPARED UNDER THE SUPERVISION OF
J.O. AUSTINSON L.S. NO. 5394
DESIGNED TCE DRAWN TCE
R/W APPROVED CHECKED
RECOMMENDED
M.R. HEIAT
SENIOR CIVIL ENGINEER R.C.E. NO. 45776

DATE 06/13/12

PRELIMINARY RIGHT OF WAY REQUIREMENTS FOR WARNER AVENUE STREET IMPROVEMENTS
FROM MAIN STREET TO GRAND AVENUE

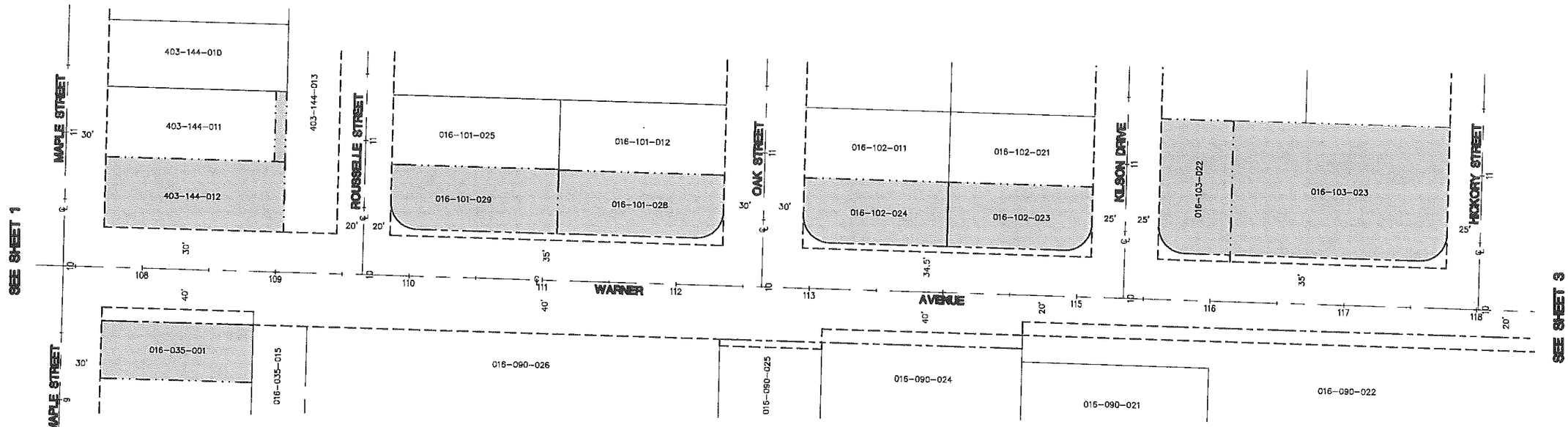
PUBLIC WORKS AGENCY
CITY OF SANTA ANA

SHEET 1 OF 6

NOTE: THE RIGHT OF WAY (ROW) REQUIREMENTS WERE DETERMINED BY OVERLAYING THE PROPOSED ROADWAY WIDENING GEOMETRICS OVER THE ROW INFORMATION ASSEMBLED FOR THE PROJECT. THE ASSEMBLED ROW INFORMATION INCLUDED TRACT MAPS (TM) WHERE AVAILABLE AND COUNTY ASSESSOR PARCEL NUMBER MAPS (APNM) FOR THE PROJECT SITE. IN SOME CASES, THE INDICATED PROPERTY LINES AND EXISTING ROADWAY ROW LINES WERE IN THE SAME LOCATION ON BOTH THE TM AND APNM. IN OTHER CASES, THE PROPERTY LINES AND THE EXISTING ROADWAY ROW LINES WERE NOT IN THE SAME LOCATION ON BOTH THE TM AND APNM. IN THE LATTER CASES, THE APNM LOCATION OF THE PROPERTY LINES WAS ASSUMED TO GOVERN AND IS THE BASIS FOR THE TABULATION OF ROW REQUIREMENTS ESTABLISHED FOR THIS PRELIMINARY ASSESSMENT OF THE ROW IMPACTS DUE TO THE PROPOSED ROADWAY WIDENING IMPROVEMENTS. TITLE REPORTS WHICH WOULD PROVIDE BETTER DEFINITION OF THE CURRENTLY RECORDED PROPERTY OWNERSHIP INFORMATION WERE NOT OBTAINED FOR USE IN THIS ASSIGNMENT.

## WARNER AVENUE WIDENING PROJECT
FROM MAIN STREET TO GRAND AVENUE
TABULATION OF RIGHT OF WAY REQUIREMENTS
NORTH SIDE OF WARNER AVENUE (WEST TO EAST)

| APN | DESCRIPTION OF PROPERTY TAKE | ADDRESS | AREA SF. | UNIT COST $/SF | TOTAL COST |
|---|---|---|---|---|---|
| 403-144-011 | PARTIAL PARCEL | 2243 S. MAPLE ST. | 420 S.F. | | |
| 403-144-012 | FULL PARCEL | 2245 S. MAPLE ST. | 7,056 S.F. | | |
| 016-101-029 | FULL PARCEL | 2247 S. ROUSSELLE ST. | 5,912 S.F. | | |
| 016-101-028 | FULL PARCEL | 2246 S. OAK ST. | 5,806 S.F. | | |
| 016-102-024 | FULL PARCEL | 2245 S. OAK ST. | 5,099 S.F. | | |
| 016-102-023 | FULL PARCEL | 2246 S. KILSON DR. | 5,098 S.F. | | |
| 016-103-022 | FULL PARCEL | 2245 S. KILSON DR. | 5,314 S.F. | | |
| 016-103-023 | FULL PARCEL | 705 E. WARNER AVE. | 16,114 S.F. | | |




## WARNER AVENUE WIDENING PROJECT
FROM MAIN STREET TO GRAND AVENUE
TABULATION OF RIGHT OF WAY REQUIREMENTS
SOUTH SIDE OF WARNER AVENUE (WEST TO EAST)

| APN | DESCRIPTION OF PROPERTY TAKE | ADDRESS | AREA SF. | UNIT COST $/SF | TOTAL COST |
|---|---|---|---|---|---|
| 016-035-001 | FULL PARCEL | 402 E. WARNER AVE. | 4,898 S.F. | | |

GRAPHIC SCALE
40' 0' 40' 120'
SCALE: 1" = 40'

LEGEND:

RECORD MAP RIGHT-OF-WAY
ASSESSOR PARCEL MAP RIGHT-OF-WAY
ROADWAY CENTERLINE
LOT LINE
LIMITS OF ROW TO BE ACQUIRED

PROJECT NO.: 992.01.0300

FILE NO.

REVISIONS

| NUMBER | DATE | INITIALS | DESCRIPTIONS | APPRVD |
|---|---|---|---|---|
| | | | | |

REFERENCES

| PLANS | BENCH MARK # | ELEV. |
|---|---|---|
| | | |

PREPARED UNDER THE SUPERVISION OF
J.O. AUSTINSON L.S. NO. 5394
DESIGNED TCE DRAWN TCE
R/W APPROVED CHECKED
RECOMMENDED
M.R. HEIAT
SENIOR CIVIL ENGINEER R.C.E. NO. 45776

DATE 06/13/12

PRELIMINARY RIGHT OF WAY REQUIREMENTS FOR WARNER AVENUE STREET IMPROVEMENTS
FROM MAIN STREET TO GRAND AVENUE

PUBLIC WORKS AGENCY
CITY OF SANTA ANA

SHEET 2 OF 6

NOTE: THE RIGHT OF WAY (ROW) REQUIREMENTS WERE DETERMINED BY OVERLAYING THE PROPOSED ROADWAY WIDENING GEOMETRICS OVER THE ROW INFORMATION ASSEMBLED FOR THE PROJECT. THE ASSEMBLED ROW INFORMATION INCLUDED TRACT MAPS (TM) WHERE AVAILABLE AND COUNTY ASSESSOR PARCEL NUMBER MAPS (APNM) FOR THE PROJECT SITE. IN SOME CASES, THE INDICATED PROPERTY LINES AND EXISTING ROADWAY ROW LINES WERE IN THE SAME LOCATION ON BOTH THE TM AND APNM. IN OTHER CASES, THE PROPERTY LINES AND THE EXISTING ROADWAY ROW LINES WERE NOT IN THE SAME LOCATION ON BOTH THE TM AND APNM. IN THE LATTER CASES, THE APNM LOCATION OF THE PROPERTY LINES WAS ASSUMED TO GOVERN AND IS THE BASIS FOR THE TABULATION OF ROW REQUIREMENTS ESTABLISHED FOR THIS PRELIMINARY ASSESSMENT OF THE ROW IMPACTS DUE TO THE PROPOSED ROADWAY WIDENING IMPROVEMENTS. TITLE REPORTS WHICH WOULD PROVIDE BETTER DEFINITION OF THE CURRENTLY RECORDED PROPERTY OWNERSHIP INFORMATION WERE NOT OBTAINED FOR USE IN THIS ASSIGNMENT.

## WARNER AVENUE WIDENING PROJECT
FROM MAIN STREET TO GRAND AVENUE
TABULATION OF RIGHT OF WAY REQUIREMENTS
NORTH SIDE OF WARNER AVENUE (WEST TO EAST)

| APN | DESCRIPTION OF PROPERTY TAKE | ADDRESS | AREA SF. | UNIT COST $/SF | TOTAL COST |
|---|---|---|---|---|---|
| 016-104-010 | FULL PARCEL | 2241 S. HICKORY ST. | 5,670 S.F. | | |
| 016-104-028 | FULL PARCEL | 2245 S. HICKORY ST. | 5,045 S.F. | | |
| 016-104-021 | FULL PARCEL | 809 E. WARNER AVE. | 5,400 S.F. | | |
| 016-104-029 | FULL PARCEL | 2244 S. HALLADAY ST. | 5,314 S.F. | | |
| 016-105-019 | FULL PARCEL | 2245 S. HALLADAY ST. | 4,316 S.F. | | |
| 016-105-020 | FULL PARCEL | 905 E. WARNER AVE. | 4,401 S.F. | | |
| 016-105-021 | FULL PARCEL | 909 E. WARNER AVE. | 4,828 S.F. | | |
| 016-105-022 | FULL PARCEL | 909 E. WARNER AVE. | 241 S.F. | | |
| 016-214-012 | FULL PARCEL | 2246 S. CEDAR ST. | 6,570 S.F. | | |
| 016-212-026 | FULL PARCEL | 2247 S. CEDAR ST. | 7,842 S.F. | | |
| 016-212-025 | FULL PARCEL | 2246 S. EVERGREEN ST. | 7,872 S.F. | | |
| 016-211-026 | FULL PARCEL | 2247 S. EVERGREEN ST. | 7,894 S.F. | | |


## WARNER AVENUE WIDENING PROJECT
FROM MAIN STREET TO GRAND AVENUE
TABULATION OF RIGHT OF WAY REQUIREMENTS
SOUTH SIDE OF WARNER AVENUE (WEST TO EAST)

| APN | DESCRIPTION OF PROPERTY TAKE | ADDRESS | AREA SF. | UNIT COST $/SF | TOTAL COST |
|---|---|---|---|---|---|
| 016-133-028 | NORTHEAST CORNER | 1106 E. WARNER AVE. | 97 S.F. | | |

GRAPHIC SCALE
40' 0' 40' 120'
SCALE: 1" = 40'

LEGEND:

RECORD MAP RIGHT-OF-WAY
ASSESSOR PARCEL MAP RIGHT-OF-WAY
ROADWAY CENTERLINE
LOT LINE
LIMITS OF ROW TO BE ACQUIRED

FILE NO.

REVISIONS

| NUMBER | DATE | INITIALS | DESCRIPTIONS | APPRVD |
|---|---|---|---|---|
| | | | | |

REFERENCES

| PLANS | BENCH MARK # | ELEV. |
|---|---|---|
| | | |

PREPARED UNDER THE SUPERVISION OF
J.O. AUSTINSON L.S. NO. 5394
DESIGNED TCE DRAWN TCE CHECKED
R/W APPROVED
RECOMMENDED
M.R. HEIAT
SENIOR CIVIL ENGINEER R.C.E. NO. 45776

DATE 06/13/12

PROJECT NO.: 992.01.0300

PRELIMINARY RIGHT OF WAY REQUIREMENTS FOR WARNER AVENUE STREET IMPROVEMENTS
FROM MAIN STREET TO GRAND AVENUE

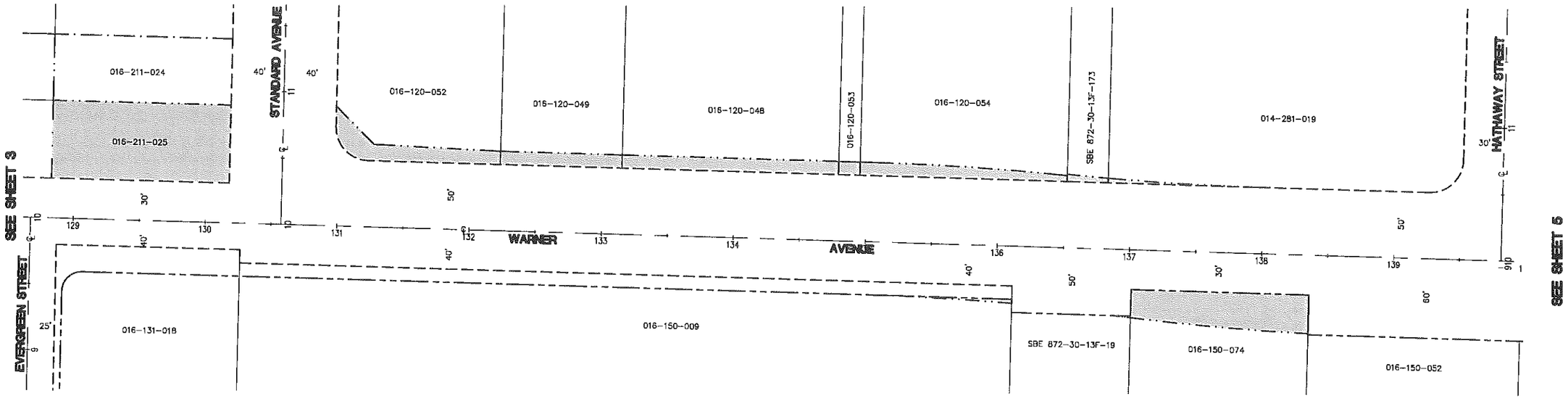
PUBLIC WORKS AGENCY
CITY OF SANTA ANA

SHEET 3 OF 6

NOTE: THE RIGHT OF WAY (ROW) REQUIREMENTS WERE DETERMINED BY OVERLAYING THE PROPOSED ROADWAY WIDENING GEOMETRICS OVER THE ROW INFORMATION ASSEMBLED FOR THE PROJECT. THE ASSEMBLED ROW INFORMATION INCLUDED TRACT MAPS (TM) WHERE AVAILABLE AND COUNTY ASSESSOR PARCEL NUMBER MAPS (APNM) FOR THE PROJECT SITE. IN SOME CASES, THE INDICATED PROPERTY LINES AND EXISTING ROADWAY ROW LINES WERE IN THE SAME LOCATION ON BOTH THE TM AND APNM. IN OTHER CASES, THE PROPERTY LINES AND THE EXISTING ROADWAY ROW LINES WERE NOT IN THE SAME LOCATION ON BOTH THE TM AND APNM. IN THE LATTER CASES, THE APNM LOCATION OF THE PROPERTY LINES WAS ASSUMED TO GOVERN AND IS THE BASIS FOR THE TABULATION OF ROW REQUIREMENTS ESTABLISHED FOR THIS PRELIMINARY ASSESSMENT OF THE ROW IMPACTS DUE TO THE PROPOSED ROADWAY WIDENING IMPROVEMENTS. TITLE REPORTS WHICH WOULD PROVIDE BETTER DEFINITION OF THE CURRENTLY RECORDED PROPERTY OWNERSHIP INFORMATION WERE NOT OBTAINED FOR USE IN THIS ASSIGNMENT.

WARNER AVENUE WIDENING PROJECT
FROM MAIN STREET TO GRAND AVENUE
TABULATION OF RIGHT OF WAY REQUIREMENTS
NORTH SIDE OF WARNER AVENUE (WEST TO EAST)

| APN | DESCRIPTION OF PROPERTY TAKE | ADDRESS | AREA SF. | UNIT COST $/SF | TOTAL COST |
|---|---|---|---|---|---|
| 016-211-025 | FULL PARCEL | 2246 S. STANDARD AVE. | 7,924 S.F. | | |
| 016-120-052 | SOUTH PORTION | 1209 E. WARNER AVE. | 1,713 S.F. | | |
| 016-120-049 | SOUTH PORTION | 1201 E. WARNER AVE. | 920 S.F. | | |
| 016-120-048 | SOUTH PORTION | 1221 E. WARNER AVE. | 1,641 S.F. | | |
| 016-120-053 | SOUTH PORTION | 1243 E. WARNER AVE. | 160 S.F. | | |
| 016-120-054 | SOUTH PORTION | 1231 E. WARNER AVE. | 1,298 S.F. | | |
| 872-30-13F-173 | SOUTH PORTION | RAILROAD | 138 S.F. | | |
| 014-281-019 | SOUTH PORTION | 1301 E. WARNER AVE. | 133 S.F. | | |




WARNER AVENUE WIDENING PROJECT
FROM MAIN STREET TO GRAND AVENUE
TABULATION OF RIGHT OF WAY REQUIREMENTS
SOUTH SIDE OF WARNER AVENUE (WEST TO EAST)

| APN | DESCRIPTION OF PROPERTY TAKE | ADDRESS | AREA SF. | UNIT COST $/SF | TOTAL COST |
|---|---|---|---|---|---|
| 016-150-009 | NORTHEAST CORNER | 1224 E. WARNER AVE. | 114 S.F. | | |
| 872-30-13F-19 | NORTHEAST CORNER | RAILROAD | 8 S.F. | | |
| 016-150-074 | NORTH PORTION | 1310 E. WARNER AVE. | 3,496 S.F. | | |

N

GRAPHIC SCALE
40' 0' 40' 120'
SCALE: 1" = 40'

LEGEND:

RECORD MAP RIGHT-OF-WAY
ASSESSOR PARCEL MAP RIGHT-OF-WAY
ROADWAY CENTERLINE
LOT LINE
LIMITS OF ROW TO BE ACQUIRED

PROJECT NO.: 992.01.0300

FILE NO.

| REVISIONS | | | | |
|---|---|---|---|---|
| NUMBER | DATE | INITIALS | DESCRIPTIONS | APPRVD |

| REFERENCES | | |
|---|---|---|
| PLANS | BENCH MARK # | ELEV. |

PREPARED UNDER THE SUPERVISION OF
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R/W APPROVED CHECKED
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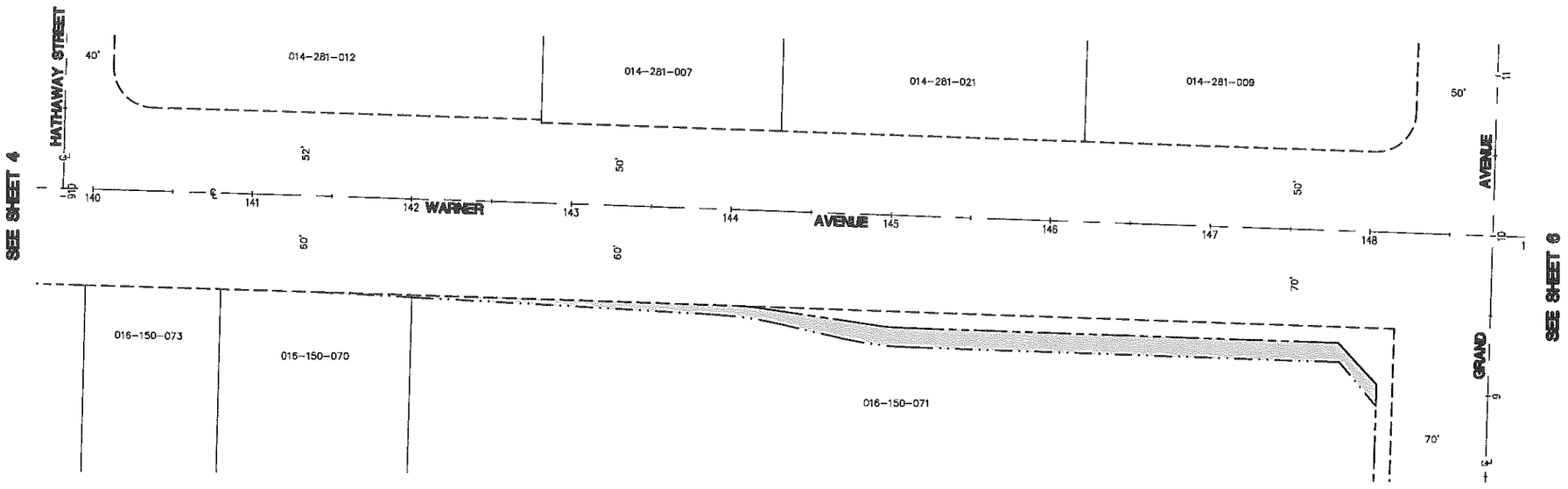
M.R. HEIAT
SENIOR CIVIL ENGINEER R.C.E. NO. 45776

PRELIMINARY RIGHT OF WAY REQUIREMENTS FOR WARNER AVENUE STREET IMPROVEMENTS
FROM MAIN STREET TO GRAND AVENUE

PUBLIC WORKS AGENCY
CITY OF SANTA ANA

SHEET 4 OF 6

NOTE: THE RIGHT OF WAY (ROW) REQUIREMENTS WERE DETERMINED BY OVERLAYING THE PROPOSED ROADWAY WIDENING GEOMETRICS OVER THE ROW INFORMATION ASSEMBLED FOR THE PROJECT. THE ASSEMBLED ROW INFORMATION INCLUDED TRACT MAPS (TM) WHERE AVAILABLE AND COUNTY ASSESSOR PARCEL NUMBER MAPS (APNM) FOR THE PROJECT SITE. IN SOME CASES, THE INDICATED PROPERTY LINES AND EXISTING ROADWAY ROW LINES WERE IN THE SAME LOCATION ON BOTH THE TM AND APNM. IN OTHER CASES, THE PROPERTY LINES AND THE EXISTING ROADWAY ROW LINES WERE NOT IN THE SAME LOCATION ON BOTH THE TM AND APNM. IN THE LATTER CASES, THE APNM LOCATION OF THE PROPERTY LINES WAS ASSUMED TO GOVERN AND IS THE BASIS FOR THE TABULATION OF ROW REQUIREMENTS ESTABLISHED FOR THIS PRELIMINARY ASSESSMENT OF THE ROW IMPACTS DUE TO THE PROPOSED ROADWAY WIDENING IMPROVEMENTS. TITLE REPORTS WHICH WOULD PROVIDE BETTER DEFINITION OF THE CURRENTLY RECORDED PROPERTY OWNERSHIP INFORMATION WERE NOT OBTAINED FOR USE IN THIS ASSIGNMENT.




WARNER AVENUE WIDENING PROJECT
FROM MAIN STREET TO GRAND AVENUE
TABULATION OF RIGHT OF WAY REQUIREMENTS
SOUTH SIDE OF WARNER AVENUE (WEST TO EAST)

| APN | DESCRIPTION OF PROPERTY TAKE | ADDRESS | AREA SF. | UNIT COST $/SF | TOTAL COST |
|---|---|---|---|---|---|
| 016-150-070 | NORTHEAST CORNER | 1320 E. WARNER AVE. | 41 S.F. | | |
| 016-150-071 | NORTH PORTION | 2400 S. GRAND AVE. | 5,398 S.F. | | |

N

GRAPHIC SCALE
40' 0' 40' 120'
SCALE: 1" = 40'

LEGEND:

RECORD MAP RIGHT-OF-WAY
ASSESSOR PARCEL MAP RIGHT-OF-WAY
ROADWAY CENTERLINE
LOT LINE
LIMITS OF ROW TO BE ACQUIRED

FILE NO.

REVISIONS

| NUMBER | DATE | INITIALS | DESCRIPTIONS | APPRVD |
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REFERENCES

| PLANS | BENCH MARK # | ELEV. |
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M.R. HEIAT
SENIOR CIVIL ENGINEER R.C.E. NO. 45776

DATE 05/13/12

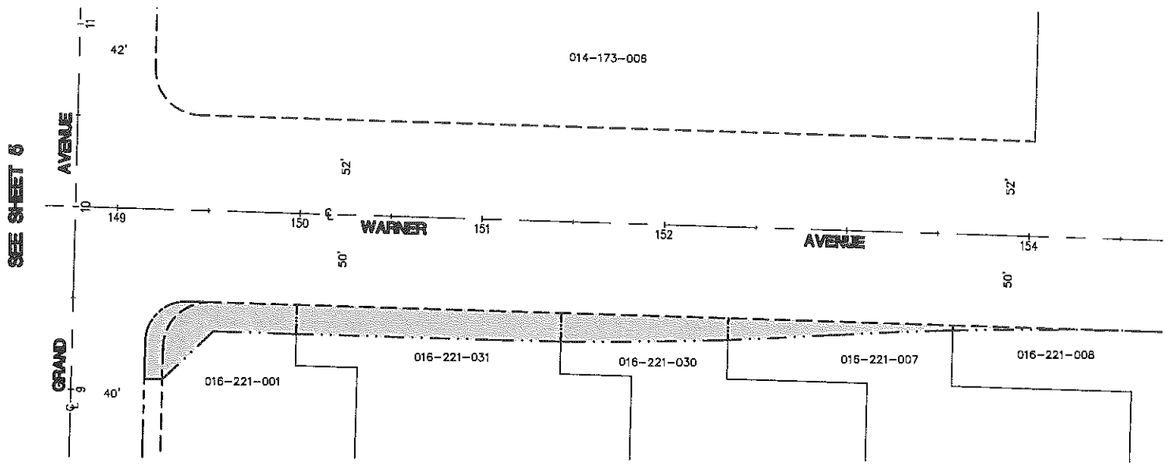
PROJECT NO.: 992.01.0300

PRELIMINARY RIGHT OF WAY REQUIREMENTS FOR
WARNER AVENUE STREET IMPROVEMENTS
FROM MAIN STREET TO GRAND AVENUE

PUBLIC WORKS AGENCY
CITY OF SANTA ANA

SHEET 5 OF 6

NOTE: THE RIGHT OF WAY (ROW) REQUIREMENTS WERE DETERMINED BY OVERLAYING THE PROPOSED ROADWAY WIDENING GEOMETRICS OVER THE ROW INFORMATION ASSEMBLED FOR THE PROJECT. THE ASSEMBLED ROW INFORMATION INCLUDED TRACT MAPS (TM) WHERE AVAILABLE AND COUNTY ASSESSOR PARCEL NUMBER MAPS (APNM) FOR THE PROJECT SITE. IN SOME CASES, THE INDICATED PROPERTY LINES AND EXISTING ROADWAY ROW LINES WERE IN THE SAME LOCATION ON BOTH THE TM AND APNM. IN OTHER CASES, THE PROPERTY LINES AND THE EXISTING ROADWAY ROW LINES WERE NOT IN THE SAME LOCATION ON BOTH THE TM AND APNM. IN THE LATTER CASES, THE APNM LOCATION OF THE PROPERTY LINES WAS ASSUMED TO GOVERN AND IS THE BASIS FOR THE TABULATION OF ROW REQUIREMENTS ESTABLISHED FOR THIS PRELIMINARY ASSESSMENT OF THE ROW IMPACTS DUE TO THE PROPOSED ROADWAY WIDENING IMPROVEMENTS. TITLE REPORTS WHICH WOULD PROVIDE BETTER DEFINITION OF THE CURRENTLY RECORDED PROPERTY OWNERSHIP INFORMATION WERE NOT OBTAINED FOR USE IN THIS ASSIGNMENT.




WARNER AVENUE WIDENING PROJECT
FROM MAIN STREET TO GRAND AVENUE
TABULATION OF RIGHT OF WAY REQUIREMENTS
SOUTH SIDE OF WARNER AVENUE (WEST TO EAST)

| APN | DESCRIPTION OF PROPERTY TAKE | ADDRESS | AREA SF. | UNIT COST $/SF | TOTAL COST |
|---|---|---|---|---|---|
| 016-221-001 | NORTH PORTION | 1504 E. WARNER AVE. | 1,847 S.F. | | |
| 016-221-031 | NORTH PORTION | 1500 E. WARNER AVE. | 2,322 S.F. | | |
| 016-221-030 | NORTH PORTION | 1502 E. WARNER AVE | 1,290 S.F. | | |
| 016-221-007 | NORTH PORTION | 1530 E. WARNER AVE. | 897 S.F. | | |
| 016-221-008 | NORTH PORTION | 1532 E. WARNER AVE. | 100 S.F. | | |

N

GRAPHIC SCALE
40' 0' 40' 120'
SCALE: 1" = 40'

LEGEND:

RECORD MAP RIGHT-OF-WAY
ASSESSOR PARCEL MAP RIGHT-OF-WAY
ROADWAY CENTERLINE
LOT LINE
LIMITS OF ROW TO BE ACQUIRED

PROJECT NO.: 992.01.0300

FILE NO.

REVISIONS

| NUMBER | DATE | INITIALS | DESCRIPTIONS | APPRVD |
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| | | | | |

REFERENCES

| PLANS | BENCH MARK # | ELEV. |
|---|---|---|
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PRELIMINARY RIGHT OF WAY REQUIREMENTS FOR WARNER AVENUE STREET IMPROVEMENTS
FROM MAIN STREET TO GRAND AVENUE

PUBLIC WORKS AGENCY
CITY OF SANTA ANA

SHEET 6 OF 6

# APPENDIX F: ENGINEERING COST ESTIMATE

**WARNER AVENUE STREET WIDENING**
**PRELIMINARY ENGINEER'S ESTIMATE**

*Preliminary Engineering* *Date:* *July-12*

| C.N. NO. | PAY ITEM | UNIT | UNIT COST | QUANTITY | ITEM TOTAL |
|---|---|---|---|---|---|
| | ***Roadway/Civil Improvements*** | | | | |
| | Mobilization | LS | $ 50,000.00 | 1 | $ 50,000.00 |
| | Clearing and Grubbing | LS | $ 30,000.00 | 1 | $ 30,000.00 |
| | Excavation for Proposed Roadway Pavement | CY | $ 10.00 | 4,070 | $ 40,700 |
| 1 | Demolish and Remove Existing Structures, Parcel Clearing | EA | | 36 | $ - |
| 2 | Remove Existing Curb & Gutter | LF | $ 5.00 | 10,120 | $ 50,600 |
| 3 | Remove Existing Sidewalk | SF | $ 2.50 | 68,570 | $ 171,425 |
| 4 | Remove Existing Driveway Approach And/Or Driveway | SF | $ 2.50 | 11,000 | $ 27,500 |
| 5 | Remove Existing AC Pavement | CY | $ 15.00 | 27,900 | $ 418,500 |
| 6 | Remove Existing Tree | EA | | | |
| 7 | Sawcut Existing Pavement* | LF | $ - | 4,560 | $ - |
| 11 | Construct Curb & Gutter | LF | $ 25.00 | 11,550 | $ 288,750 |
| 12 | Construct Median Curb | LF | $ 20.00 | 9,660 | $ 193,200 |
| 13 | Construct Cross Gutter | SF | $ 10.00 | 4,160 | $ 41,600 |
| 14 | Construct Sidewalk | SF | $ 5.00 | 84,570 | $ 422,850 |
| 15 | Construct Roadway Pavement** | SF | | 832,810 | |
| | Asphalt Concrete (AC) Pavement | TON | $ 100.00 | 19,990 | $ 1,999,000 |
| | Aggregate Base (AB) Class 2 | CY | $ 30.00 | 19,730 | $ 591,900 |
| 16 | Reconstruct Exist PCC Driveway | SF | $ 15.00 | 1,250 | $ 18,750 |
| 17 | Reconstruct Exist AC Driveway | SF | $ 5.00 | 6,915 | $ 34,575 |
| 18 | Construct Driveway Approach | SF | $ 15.00 | 8,650 | $ 129,750 |
| 19 | Construct New Bus Pad | SF | $ 7.50 | 4,900 | $ 36,750 |
| 20 | Construct Curb Ramp Per City Std. 1122, Type I | EA | $ 1,500.00 | 21 | $ 31,500 |
| 21 | Construct Curb Ramp Per City Std. 1122, Type II | EA | $ 1,500.00 | 15 | $ 22,500 |
| 22 | Construct Curb Ramp Per APWA Std Plan 111-3 | EA | $ 1,500.00 | 4 | $ 6,000 |
| 24 | Modify Existing Railroad Grade Crossing*** | EA | $ 150,000.00 | 1 | $ 150,000 |
| 25 | Provide Median Landscaping | SF | $ 5.00 | 45,520 | $ 227,600 |
| 26 | Construct Median Hardscape, Stamped Conc. per City Std 1118. | SF | $ 10.00 | 5,930 | $ 59,300 |
| 39 | Construct Masonry Block Retaining Wall | SF | $ 40.00 | 1,260 | $ 50,400 |
| | | | | **Roadway Improvements Subtotal** | **$ 5,093,150** |
| | | | | | |
| ***DRAINAGE/UTILITIES*** | | | | | |
| | ***Requried Drainage/Utility Modifications*** | | | | |
| | Excavation & Backfill | CY | $ 10.00 | | |
| | Install 18" R.C.P. | LF | $ 200.00 | 378 | $ 75,600 |
| | Install 30" R.C.P. | LF | $ 150.00 | 56 | $ 8,400 |
| | Install 60" R.C.P. | LF | $ 200.00 | 37 | $ 7,400 |
| | Install 7' Catch Basin | EA | $ 5,500.00 | 1 | $ 5,500 |
| | Install 14' Catch Basin | EA | $ 8,000.00 | 5 | $ 40,000 |
| | Install 21' Catch Basin | EA | $ 10,000.00 | 2 | $ 20,000 |
| | Remove Existing Catch Basin | EA | $ 1,000.00 | 8 | $ 8,000 |
| | Remove Existing R.C.P. Pipe | LF | $ 25.00 | 378 | $ 9,450 |
| | Remove Existing Concrete Box Culvert | LF | $ 262.00 | | |
| | Utility Relocation (10% of Roadway Cost) | LS | $ 509,315.00 | 1 | $ 509,315 |
| | Temporary Erosion Control (4% of Roadway Cost) | LS | $ 203,726.00 | 1 | $ 203,726 |
| | | | | **Drainage/Utility Subtotal** | **$ 887,391** |
| | | | | | |
| | ***Optional Drainage Upgrades*** | | | | |
| | Excavation & Backfill | CY | $ 10.00 | 11,675 | $ 116,750 |

**WARNER AVENUE STREET WIDENING**
**PRELIMINARY ENGINEER'S ESTIMATE**

*Preliminary Engineering* *Date:* *July-12*

| C.N. NO. | PAY ITEM | UNIT | UNIT COST | QUANTITY | ITEM TOTAL |
|---|---|---|---|---|---|
| | Install 13' x 9' R.C. Box Culvert | LF | $ 745.00 | 485 | $ 361,325 |
| | Install 11' x 9' R.C. Box Culvert | LF | $ 625.00 | 372 | $ 232,500 |
| | Install 11' x 8' R.C. Box Culvert | LF | $ 595.00 | 510 | $ 303,450 |
| | Install 11' x 6.5' R.C. Box Culvert | LF | $ 550.00 | 158 | $ 86,900 |
| | Install 72" R.C.P. | LF | $ 200.00 | 1,150 | $ 230,000 |
| | Install 66" R.C.P. | LF | $ 175.00 | 1,000 | $ 175,000 |
| | Remove Existing Pipe | LF | $ 25.00 | 3,550 | $ 88,750 |
| | Remove Existing Concrete Box Culvert | LF | $ 262.00 | | |
| | Remove Existing Junction Box | EA | $ 1,245.00 | 1 | $ 1,245 |
| | Miscelleneous (15% of total drainage items above) | LS | | | $ 239,388.00 |
| | | | | **Drainage/Utility Subtotal** | **$ 1,835,308** |
| | | | | | |
| | ***Traffic Improvements*** | | | | |
| | Striping | LF | $ 1.00 | 39,900 | $ 39,900 |
| 23 | Modify Existing Traffic Signal At Intersection Shown | EA | $ 150,000.00 | 4 | $ 600,000 |
| 27 | Signalize Existing Intersection | EA | $ 150,000.00 | 1 | $ 150,000 |
| | Misc. Signing & Pavement Marking (2% of Roadway Cost) | LS | $ 101,863.00 | 1 | $ 101,863 |
| | Traffic Control During Construction (3% of Roadway Cost) | LS | $ 152,794.50 | 1 | $ 152,795 |
| | Install New Street Light (every 250') | EA | $ 10,000.00 | 24 | $ 235,840 |
| | | | | **Signing and Striping Subtotal** | **$ 1,280,398** |

| | | |
|---|---|---|
| **Subtotal Cost** | | **$ 9,096,247** |
| **Subtotal Cost Without Drainage Upgrades** | | **$ 7,260,939** |
| **Contingency 20%** | | **$ 1,819,249** |
| **Contingency 20% Without Drainage Upgrades** | | **$ 1,452,188** |
| **TOTAL CONSTRUCTION COST** | | **$ 10,915,000** |
| **Total Construction Cost Without Drainage Upgrades** | | **$ 8,713,000** |
| ***Project Implementation Costs (based on higher construction cost)*** | | |
| **Final Design (7% of construction cost)** | | **$ 764,000** |
| **Construction Engineering (15% of construction cost)** | | **$ 1,637,000** |
| **TOTAL IMPLEMENTATION COST** | | **$ 2,401,000** |

Notes:

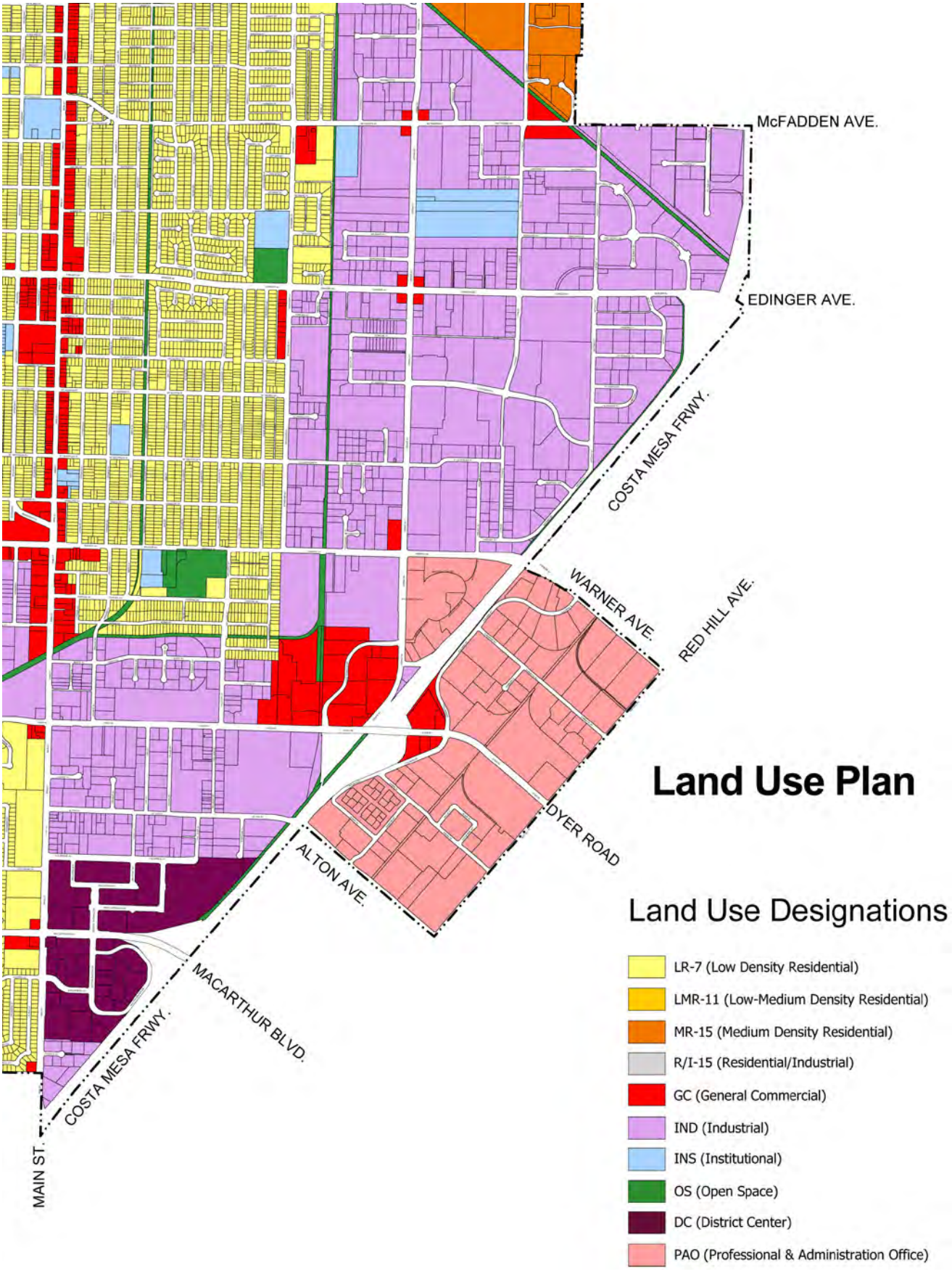
1. All unit costs in 2012 dollars, from recent similar projects and Caltrans Cost Data Book 2011.
2. Estimate includes relocation/modification of City owned utilities only. Relocation of privately owned utilities are to be completed at owner's expense.
3. Right of Way costs not included as part of this estimate.
4. These figures are supplied as a general guide for planning purposes only. This firm is not responsible for fluctuations in cost of material, labor, components, or unforseen contingencies.

* Sawcutting of existing pavement is included in the pavement removal cost.

** Street Pavement Section is assumed to be silar to existing, 6" AC over 12" AB.

*** RR crossing modification is for roadway modifications only, additional crossing signals upgrade may be required.

# APPENDIX C: LAND USE DESIGNATION AND ZONING


McFADDEN AVE.
EDINGER AVE.
COSTA MESA FRWY.
WARNER AVE.
RED HILL AVE.
DYER ROAD
ALTON AVE.
MACARTHUR BLVD.
COSTA MESA FRWY.
MAIN ST.
Land Use Plan
Land Use Designations
LR-7 (Low Density Residential)
LMR-11 (Low-Medium Density Residential)
MR-15 (Medium Density Residential)
R/I-15 (Residential/Industrial)
GC (General Commercial)
IND (Industrial)
INS (Institutional)
OS (Open Space)
DC (District Center)
PAO (Professional & Administration Office)

# APPENDIX D: SOILS REPORT

Geo-Logic ASSOCIATES
Geologists, Hydrogeologists and Engineers

# GEOTECHNICAL RECONNAISSANCE
# PROPOSED WARNER AVENUE WIDENING
# MAIN STREET TO GRAND AVENUE
# SANTA ANA, CALIFORNIA

**Prepared For:**

Planning Center
Attention: Ms. JoAnn Hatfield
3 MacArthur Place, Suite 1100
Santa Ana, California 92707

**Prepared By:**

**G**eo**L**ogic **A**ssociates
3921-A East La Palma Avenue
Anaheim, California 92807

Project No. 09-1749
GLA Project No. 2009-0035

July 20, 2009
Revised March 26, 2013

Geo-Logic ASSOCIATES
Geologists, Hydrogeologists and Engineers

July 20, 2009
Revised March 26, 2013
Project No. 2009-0035

Ms. JoAnn Hatfield
Planning Center
3 MacArthur Place, Suite 1100
Santa Ana, Ca 92707

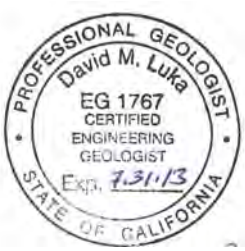
**GEOTECHNICAL RECONNAISSANCE – PROPOSED WARNER AVENUE WIDENING BETWEEN GRAND AVENUE AND MAIN STREET SANTA ANA, CALIFORNIA**

In accordance with your request and authorization under Proposal No. P08-235, dated September 25, 2008, **G**eo**L**ogic **A**ssociates (**GLA**), has conducted a reconnaissance level geotechnical evaluation for the proposed widening of E. Warner Avenue between Grand Avenue and Main Street in Santa Ana, California (Figure 1, Vicinity Map).

Based upon a review of the available published data and a field reconnaissance, the most significant geotechnical design concerns include relatively fine-grain and soft subgrade soils, and episodic relatively shallow groundwater. With additional site-specific design level studies, these potential impacts can be quantified and appropriate pavement sections developed.

We appreciate this opportunity to be of service. If you have any questions regarding this report, please contact the undersigned.

GeoLogic Associates





David M. Luka
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PG 5541, CEG 1767 (Expires July 31, 2013)

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GE 2278 (Expires March 31, 2010)

Distribution: Planning Center, Ms. JoAnn Hatfield (1 electronic copy via e-mail)

# TABLE OF CONTENTS

**PAGE**



## FIGURES



## TABLES



## APPENDICES

# 1.0 INTRODUCTION

## 1.1 PURPOSE AND SCOPE

This report presents the results of a reconnaissance level evaluation for the proposed widening of E. Warner Avenue (Warner Avenue) between Main Street and Grand Avenue in the City of Santa Ana, California. The purpose of the study was to provide preliminary geotechnical information pertinent to the development of design criteria.

Specifically, the scope of work included the following elements:

- Review of available pertinent, published, and unpublished geotechnical literature (Section 4.0).
- Performance of a field reconnaissance walk along the alignment to observe ground conditions (Appendix A).
- Compilation and analysis of geotechnical data obtained from previous field investigations and laboratory testing.
- Preparation of this report presenting findings, conclusions and preliminary recommendations.

## 1.2 SITE LOCATION AND PROPOSED IMPROVEMENTS

The project site is located between Main Street and Grand Avenue in the City of Santa Ana and includes the current Warner Avenue alignment and proposed adjacent right-of-way to the north and south (Figure 1). Existing road improvements include a two lane highway with left turn pockets. Traffic at major crossing roads is controlled with signals. The majority of the alignment is completed with curb and gutter and adjacent sidewalks. (A short section of the eastbound roadway (southern limits) lacks curb and gutter between the railroad tracks and Fire Station located at 1320 E. Warner Avenue.) Ground along and adjacent to the alignment is flat with a slight overall gradient down to the west (about 10 feet of elevation drop in one mile). Local grade changes at sidewalks and adjacent landscaped areas are on the order of 6- to 24-inches. Surface drainage is collected at storm drain inlets and it is assumed that below grade utilities are located within the roadway. Overhead power and communication lines are present along the northern and southern limits of the current alignment.

Current road width (curb-to-curb) varies along the alignment from approximately 100 feet near Grand Avenue to 50 feet west of Standard Avenue. The 100-foot width near Grand Avenue includes a 120-foot right-of-way. It is understood that the 106’ to 110’-foot width is planned as the ultimate right-of-way for the remaining section of the alignment, and will be used a basis for acquiring additional property.

Improvements adjacent to Warner Avenue include a mix of commercial and industrial east of Standard Avenue on both sides of the road. Commercial properties, a school, park and National Guard Armory are also present along the south side of the road from Halladay Street west to near Maple Street, and on both sides of the road from Main Street to Cypress Avenue (north side of the road) and Orange Avenue (south side of the road). The remaining properties adjacent to the alignment include single-family, detached residential structures.

## 1.3 SITE HISTORY

A consultant report published by Cogstone Resource Management Inc. for the subject project (2009) included aerial photographs dating back to the mid-1940s. Based upon a review of the photographs in the report, historic site features are interpreted as follows:

| **Photograph Date** | **Significant Site Features** |
|---|---|
| 1946 | Warner Avenue alignment established from east of Grand Avenue to west of Main Street. Alignment is linear and oriented east-west. Main Street appears to consist of at least two lanes in each direction. The southern limit of Grand Avenue terminates at Warner Avenue.<br><br>Cypress Avenue, Orange Avenue, E. Maple Street, S. Oak Street, Kilson Drive, Halladay Street, and Evergreen Street are established with homes adjacent to each street and also adjacent to Warner Avenue. Possible commercial property developments in the vicinity of Main Street.<br><br>East of Halladay Street on the north side of Warner Avenue, and east of Evergreen Street on the south side of Warner Avenue, land use includes row crop and orchard farming. Farm land extends to the east of Grand Avenue. A large building complex is situated on the north side of Warner Avenue near the present day Standard Avenue. A few large tracks of undeveloped land are located south of and adjacent to Warner Avenue between Orange Avenue and Halladay Street. No evidence of significant grading was discernable from the photograph. |
| 1952 | Dense residential development extends east to Evergreen Street on the north side of Warner Avenue and on the south side of Warner Avenue between Halladay and Evergreen Streets. Farming dominates land use to the east. Minor grading is evident along the present day rail tracks. |

| Photograph Date | Significant Site Features |
|---|---|
| 1972 | Continued expansion of residential development south of and adjacent to Warner Avenue to the west of Evergreen Street, with only a few open areas remaining (Delhi Park, Monroe Elementary School sites; or predecessors). Commercial and industrial developments located east of Evergreen Street north and south of Warner Avenue to Grand Avenue and east. Additional commercial development in the vicinity of Main Street. Warner Avenue widening apparent east of Standard Avenue.<br><br>Farm land along the alignment is restricted to the area south of Warner Ave from the current Sakioka Farms property east. Grand Avenue extends southerly of Warner Avenue. Rail tracks are evident along the current rail alignment. |
| Post 1972 | Additional farm land developed for commercial/industrial use and includes the current Fire Station and Heritage Paper. |

# 2.0 SUMMARY OF GEOTECHNICAL CONDITIONS

## 2.1 PREVIOUS PAVEMENT SECTION STUDIES

LaBelle·Marvin performed pavement evaluation studies along Warner Avenue between Main Street and Grand Avenue from 1990 to 1993. Three separate reports were published: Main Street to Standard Avenue (1992), Standard Avenue east to the rail tracks (1993a), and the rail tracks east to Grand Avenue (1993b). In addition to documenting a general inventory of pavement conditions along the alignment, a total of 14 core holes were made through the pavement to evaluate the pavement section and subgrade. Visual classification of the subgrade soil, as well as moisture content and selective R-Value testing were performed. The locations of core holes are shown on Figures 2 and 3, and a summary of the measured pavement section thicknesses and laboratory testing is presented in Table 1. Reported subsurface conditions, in general, included clay-rich subgrade soils with moisture contents ranging from 5 to 20 %. The R-Values of four samples varied from 12 to 15.

LaBelle·Marvin (1992, 1993a, 1993b) also reviewed pavement conditions at the time (late 1992, early 1993). Slight alligator, longitudinal, and transverse cracking, along with depressions in the pavement surface were reported for the east- and west-bound lanes between Main Street and Grand Avenue. Local severe cracking was reported for the east- and west-bound lanes between the railroad tracks and Standard Avenue and in the eastbound lanes between the railroad tracks and Grand Avenue.

**TABLE 1**

**SUMMARY OF PAVEMENT CORES BY LABELLE MARVIN 1992/1993**

| Core No. | Date | Location | AC (in) | Base (in) | Subgrade | Lab Testing |
|---|---|---|---|---|---|---|
| | | | | | | |
| 1-110 | 1/24/1990 | Lane 1<br>500' W of CL of Standard Ave, 15' S of N curb | 5.75 | 9.25 | Silty Clay (19.3% Moist) | R-Value 14 |
| 1-111 | 1/24/1990 | Lane 2<br>1630' W of CL of Standard Ave, 7' S of N curb | 5.75 | 9.25 | Silty Sandy Clay (17.9% Moist) | R-Value 12 |
| 1-112 | 1/24/1990 | Lane 2<br>2770' W of CL of Standard Ave, 3' S of N curb | 4 over 5.5 CTB | 10.5 | Silty Sandy Clay (17.3% Moist) | |
| 1-113 | 1/24/1990 | Lane 1<br>1784' E of CL of Main St, 21'N of S curb | 6.75 | 8.25 | Silty Sandy Clay (17.8% Moist) | |
| 1-114 | 1/24/1990 | Lane 2<br>2880' E of CL of Main St, 9' N of S curb | 7.75 | 12.25 | Sandy Silty Clay (16.6% Moist) | |
| 1-115 | 1/24/1990 | Lane 2<br>676' E of CL of Main St, 9' N of S curb | 6 | 13 | Sandy Clayey Silt (16.5% Moist) | |
| 16-67 | 12/31/1992 | Lane 1<br>185' E of CL of Standard Ave, 16' N of curb | 4.5 | 29.5 | Clay (12.3% Moist) | |
| 12-68 | 12/21/1992 | Lane 2<br>415' E of CL of Standard Ave, 4' N of curb | 4.6 | 26 | Clay (15.8% Moist) | |
| 12-69 | 12/21/1992 | Lane 1<br>125' W of CL of RxR, 30' S of curb | 4.5 | 18.5 | Clay (17.0% Moist) | R-Value 15 |
| 12-70 | 12/21/1992 | Lane 2<br>310' W of CL of RxR, 32' S of curb | 4.25 | 25.75 | Clay (17.1% Moist) | |
| 2-81 | 2/16/1993 | Lane 2<br>500' W of RxR, 30' N of curb | 4 | 12 | Silty Clay (20.0% Moist) | R-Value 12 |
| 2-82 | 2/16/1993 | Lane 1<br>970' E of RxR, 15' N of soft shoulder | 5.6 | 7.4 | Sand 13-23 in. (5.6% Moist), >23 in Silt (11.2% Moist) | |
| 2-83 | 2/16/1993 | Lane 2<br>500' W of Cl of Grand Ave, 12' S of curb | 6.5 | 21.5+ | NE due to obstruciton at 28 in | |
| 2-84 | 2/16/1993 | Lane 1<br>1060' W of CL of Grand Ave, 29' S of curb | 4.25 | 16.25 | Silty Clay (18.6% Moist) | |

NE- Not encountered.

## 2.2 CURRENT SITE CONDITIONS

A reconnaissance review of street improvements was made by **GLA** personnel on May 12, 2009. The review included a walk of the alignment from Main Street to Grand Avenue and the recordation and photo-documentation of observed conditions. A summary of observed conditions (recordation) is presented in Appendix A. In general, observed conditions included only minor evidences of pavement distress. Slight longitudinal and lateral cracking were observed in the No. 2 lane (for purposes of discussion, the lane designated closest to the curb) both east- and west-bound. Shallow rutting (depressions) were also observed for both the east- and west-bound lanes, but primarily within the No. 1 lane (for purposes of discussion, the lane designated closest to the centerline). The most significant evidence of distress was observed at the: railroad track approaches, bike lane approaches (near Maple Street), west-bound approach at Main Street, and west-bound approach to the drive entrance at the Vulcan Supply facility (between 1409 and 1335 Warner Avenue).

Some evidence of overlay or re-paving was observed in both lanes along the alignment. Distressed pavement on intersecting streets was observed at Standard Avenue and Hickory Street. A few severely cracked concrete driveways and deflected sidewalks (tree root wedging) were noted adjacent to Warner Avenue.

## 2.3 GEOLOGY AND SEISMICITY

### 2.3.1 Site Geology

The subject site is located in the coastal (Los Angeles Basin) section of the Peninsular Range Province, a geomorphic province with a long and active geologic history, including deep marine sedimentation followed by regional uplift with subsequent fluvial and marine erosion. Throughout the last several million years, this area has accumulated thick sequences of sediment from area rivers. Gradual emergence of the region from the sea occurred in Pleistocene time (last two million years).

Locally, the site is underlain by Quaternary Young Alluvial Fan and Valley Deposits (Saucedo, et. al., 2003), with the upper several tens of feet associated with recent (Holocene age) alluvial sedimentation from the Santa Ana River. These Holocene deposits form the subgrade soils along the alignment and likely vary significantly in composition.

### 2.3.2 Groundwater

Artmn, Inc. (2008) and Delta Environmental Consultants, Inc. (2006, 2009) reported measured depths to the local perched groundwater table for locations north of Warner Avenue at Standard Avenue and in the vicinity of Main Street and Warner Avenue (Artmn, Inc. and Delta Environmental Consultants, Inc., respectively). Reported depths to water in the vicinity of Standard Avenue were on the order of 5 to 12 feet below the ground surface as measured on July 25, 2008 (Artmn, Inc., 2008). In the vicinity of Main Street and Warner Avenue, Delta

Environmental Consultants, Inc. (Delta) reported depths to water on the order of 8 to 10 feet (measured relative to top of casing on July 28, 2008). Delta's monitoring records dated back to 1991. The reported data indicate seasonal fluctuations in water levels on the order of two to three feet. The highest water levels reported by Delta were associated with the spring through fall readings of 2005; one of the highest rainfall years on record in Southern California. The shallowest water level reported was 6.55 feet.

### 2.3.3 Faulting and Seismicity

The discussion on faults at the site is prefaced with a summary of California legislation and policies concerning classification and land-use criteria. By definition of the California Mining and Geology Board, an active fault is a fault that has had surface displacement within Holocene time (about the last 11,000 years). The state geologist has defined a potentially active fault as any fault considered to have been active during Quaternary time (last 1,600,000 years). This definition is used in delineating Earthquake Fault Zones as mandated by the Alquist-Priolo Geologic Hazards Zones Act of 1972 and as most recently revised in 1977. The intent of this act is to assure that unwise urban development and certain habitable structures do not occur across the traces of active faults. Based on review of geologic maps, the site is not within a State-mandated Earthquake Fault Zone.

A review of available geologic literature (Section 4.0) indicates that the nearest known active regional faults are the San Joaquin Hills Blind Thrust fault and the Newport-Inglewood fault, which are located approximately 1.7 and 7.7 miles, respectively, from the site (see Figure 4).

### 2.3.4 Seismic Design Parameters

Southern California, including the project site, is located within a seismically active region. The principal seismic considerations for most structures in southern California are damage caused by surface rupturing along fault traces, ground shaking, seismically-induced ground settlement and liquefaction. The seismic hazard most likely to impact the site is ground-shaking resulting from an earthquake on one of the major active regional faults. The possibility of damage due to ground rupture at the site is considered low since no active faults are known to cross the site.

Site-specific seismic parameters included in Table 2 are the distances to the causative faults, earthquake magnitudes, and expected peak ground accelerations based on a typical attenuation relationship for a site with similar alluvium conditions as the subject site. As defined by the State of California, a maximum credible earthquake is defined as the maximum event that a fault is capable of producing considering its known tectonic setting. The San Joaquin Hills Blind Thrust fault is considered to have the most significant effect on the site from a design standpoint. Using the attenuation relationship by Boore et al. (1997) for alluvium, and the PC Program EQFAULT (Blake, 2004a), the maximum credible earthquake event on this fault is expected to produce a horizontal ground surface acceleration at the site of 0.56g.

**TABLE 2**
**SEISMIC PARAMETERS FOR ACTIVE FAULTS (BLAKE, 2004A)**

| Fault | Approximate Distance From Fault (miles) | Maximum Credible Earthquake | | Peak Ground Acceleration 10% in 50 Year Earthquake Event, (g) (Blake, 2004b) |
|---|---|---|---|---|
| | | Moment Magnitude | Peak Ground Acceleration; (g) | |
| San Joaquin Hills Blind Thrust | 1.7 | 6.6 | 0.56 | 0.34 |
| Newport-Inglewood (LA Basin) | 7.7 | 7.1 | 0.32 | |
| Chino-Central Ave. (Elsinore) | 13.7 | 6.7 | 0.21 | |
| Whittier | 13.7 | 6.8 | 0.19 | |
| Puente Hills Blind Thrust | 14.6 | 7.1 | 0.25 | |
| Palos Verdes | 18.9 | 7.3 | 0.19 | |
| San Jose | 22.4 | 6.4 | 0.13 | |
| Upper Elysian Park Blind Thrust | 28.0 | 6.4 | 0.11 | |
| Sierra Madre | 28.8 | 7.2 | 0.16 | |
| Cucamonga | 29.3 | 6.9 | 0.13 | |
| Coronado Bank | 31.1 | 7.6 | 0.15 | |
| Raymond | 31.3 | 6.5 | 0.10 | |
| Hollywood | 35.1 | 6.4 | 0.09 | |
| San Jacinto-San Jacinto Valley | 41.6 | 6.9 | 0.08 | |
| San Andreas | 44.6 | 8.0 | 0.14 | |
| Northridge (E. Oak Ridge) | 46.9 | 7.0 | 0.10 | |
| Anacapa-Dume | 51.4 | 7.5 | 0.12 | |

Accordingly, the design horizontal acceleration for the site is 0.34g. This compares reasonably well with the calculated site acceleration based on the USGS Earthquake Hazards Program website providing a horizontal site acceleration of 0.29g for a return period of 475 years.

The effects of seismic shaking can be reduced by adhering to the most recent edition of the CBC and current design parameters of the Structural Engineers Association of California. A seismic hazard analysis is included in Appendix B.

Secondary effects associated with severe ground shaking following a relatively large earthquake on a regional fault that may affect the site include: shallow ground rupture, soil liquefaction and

dynamic settlement, lateral spreading, tsunamis, and seiches. These secondary effects of seismic shaking are discussed in following sections.

### 2.3.5 Shallow Ground Rupture, Lateral Spreading, Seiches and Tsunamis

Ground rupture on the site due to active faulting is considered unlikely as no known active faults cross the property. Cracking and lateral spreading due to shaking from distant seismic events is not considered a significant hazard, although it is a possibility at any site in Southern California.

Currently, no significant confined bodies are located near the alignment and seiche phenomenon is not considered a design issue. The site is located at about elevation 50+ feet and approximately eight miles from the Pacific Ocean. Tsunamis are not considered a design issue.

### 2.3.6 Liquefaction and Dynamic Settlement

Liquefaction and dynamic settlement of soils can be caused by strong vibratory motion due to earthquakes. Both research and historical data indicate that loose, saturated, granular soils are susceptible to liquefaction and dynamic settlement while the stability of silty clays and clays is not adversely affected by vibratory motion. Liquefaction is typified by a total loss of shear strength in the affected soil layer, thereby causing the soil to flow as a liquid. Excessive settlements and sand boils at the ground surface may manifest this effect.

Review of the State of California Seismic Hazard Zones Maps, (Tustin Quadrangle released January 17, 2001) indicates that the site is within a currently established liquefaction zone that has a potential for permanent ground displacement (Figure 5). The available data also indicate a shallow groundwater table for the area. Accordingly, the site may be prone to deformations associated with liquefaction. Additional design study exploration and testing would be necessary to quantify the depth and magnitude of potential settlements.

## 3.0 CONCLUSIONS AND PRELIMINARY RECOMMENDATIONS

The project is considered feasible from a geotechnical perspective. Based upon the available data, the following conclusions regarding the performance of the site are presented:

- Site subgrade soils are generally fine grained (i.e., high percentage fraction of silt and/or clay) and, with significant traffic demands, will warrant a robust section. (This is supported by the significant cracking reported by LaBelle·Marvin in 1992 and 1993.)

- In their reports LaBelle·Marvin indicated that some area subgrades would require significant drying.

- Additional right of way acquisition will result in the relocation of overhead and underground utilities. Some remedial grading will be necessary to address these abandoned improvements.

- A review of the State of California Seismic Hazard Zones Maps indicates that the site is within a liquefaction zone. In addition, the depth to groundwater is relatively shallow, particularly during wetter years. An unknown risk of ground deformation due to liquefaction exists.

- The Design Earthquake having a 10 percent probability of being exceeded in 50 years (average return period of 475 years), is expected to produce a peak ground surface acceleration at the site of 0.34g.

## 3.1 RECOMMENDATIONS

In their 1992 and 1993 reports, LaBelle·Marvin provided recommendations for pavement structure based on R-Values that varied from 12 to 15 and for Traffic Indexes ranging from 8.4 to 9.5. The thinnest section consisted of 5 inches of asphaltic concrete over 15 inches of aggregate base and the corresponding thicknesses for the thickest section were 6 inches and 19 inches, respectively.

More current data should be considered for final design. This should include sampling and testing of the subgrade and analysis based on current Traffic Index values. In addition, the condition of the subgrade should be confirmed to establish the depth of removals and moisture conditioning that may be necessary to provide adequate support for the pavement.

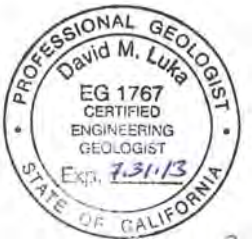
Seismic risk should also be considered during the course of final design. Although the impact of liquefaction is not normally considered for street improvements, quantification of the potential would allow provisions to be made for alternative emergency access and/or requirements for repair. Deep investigation with appropriate drilling equipment or cone penetration testing (CPT) would be necessary for this purpose.

# 4.0 CLOSURE

This report has not been prepared for use by parties or projects other than the City of Santa Ana for the Warner Avenue Widening Project. It may not contain sufficient information for other parties or other purposes. It has been prepared in accordance with generally accepted geotechnical practices and makes no other warranties either express or implied, as to the professional advice or data included in it.

We appreciate this opportunity to be of service. If you have any questions regarding this report, please contact the undersigned.

**G**eo**L**ogic **A**ssociates





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GE 2278 (Expires March 31, 2014)

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# FIGURES

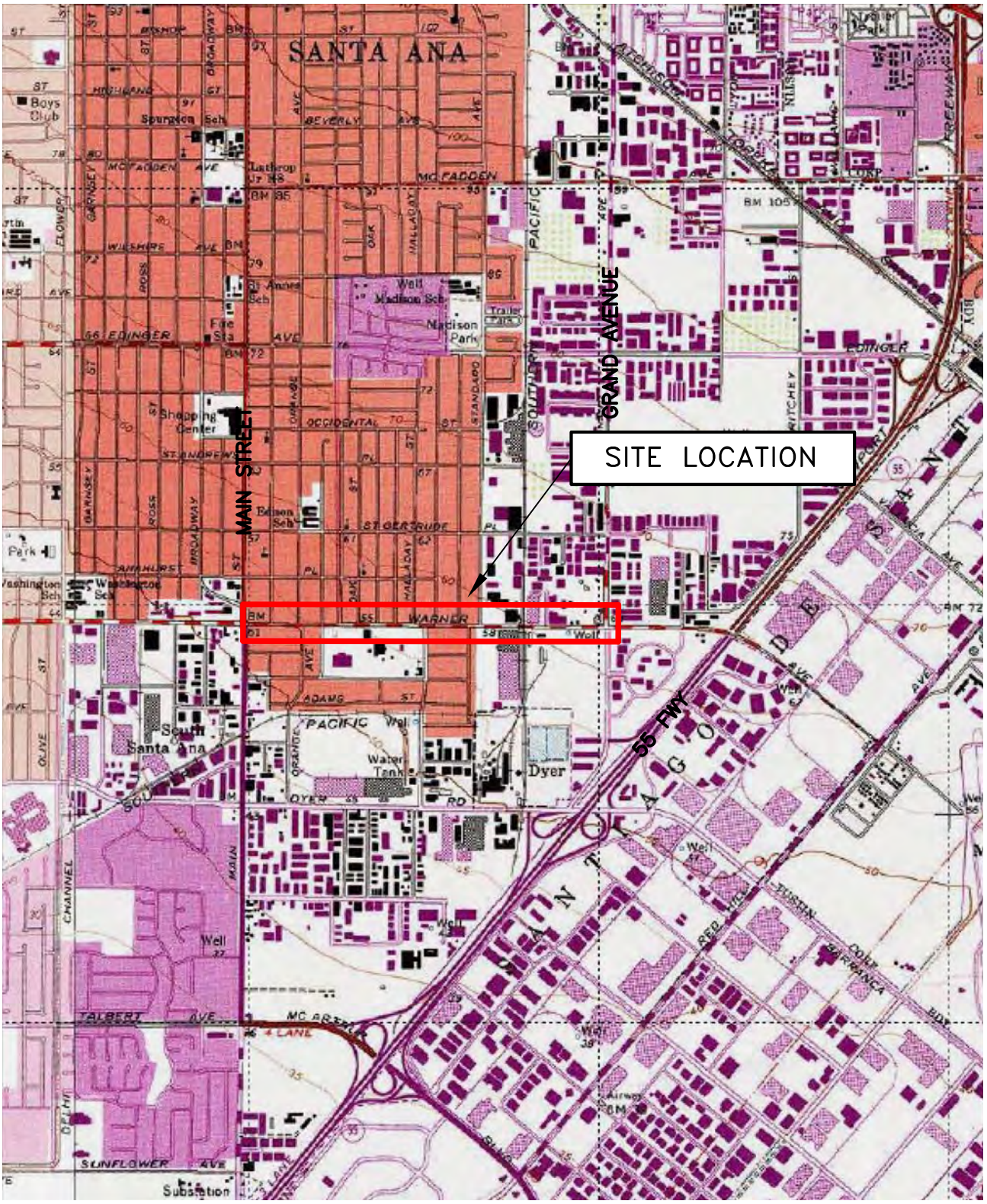



FIGURE 1

GRAPHIC SCALE (FT)

1000 0 2000 4000 8000

N

Reference: TOPO! 2003, National Geographic Tustin 7.5 Minute Series Quadrangle, 1965 Photorevised 1981

VICINITY MAP

GEOTECHNICAL RECONNAISSANCE
PROPOSED WARNER AVENUE WIDENING
GRAND AVENUE TO MAIN STREET
SANTA ANA, ORANGE COUNTY, CALIFORNIA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

| DRAWN BY: | DATE: | JOB NO. |
|---|---|---|
| DML | JULY 2009 | 2009-0035 |


Match Line-See Figure 3

Reference: Google Earth Photo Imagery, 2011 with labels by The Planning Center.

N

0 200 400 FEET

APPROXIMATE SCALE

LEGEND

1-115 APPROXIMATE LOCATION OF LABELLE-MARVIN EXPLORATORY COREHOLES (1990, 1992, 1993)

FIGURE 2

EXPLORATORY BORING PLAN - 1 OF 2

GEOLOGICAL RECONAISSANCE
PROPOSED WARNER AVENUE WIDENING
GRAND AVENUE TO MAIN STREET
SANTA ANA, ORANGE COUNTY, CALIFORNIA

Geo-Logic ASSOCIATES

| Draft | Date | Project No. |
|---|---|---|
| JGF | 3/2013 | 2009-0035 |

Match Line-See Figure 2


Reference: Google Earth Photo Imagery, 2011 with labels by The Planning Center.

N

0 200 400 FEET

APPROXIMATE SCALE

## LEGEND

16-67 — APPROXIMATE LOCATION OF LABELLE-MARVIN EXPLORATORY COREHOLES (1990, 1992, 1993)

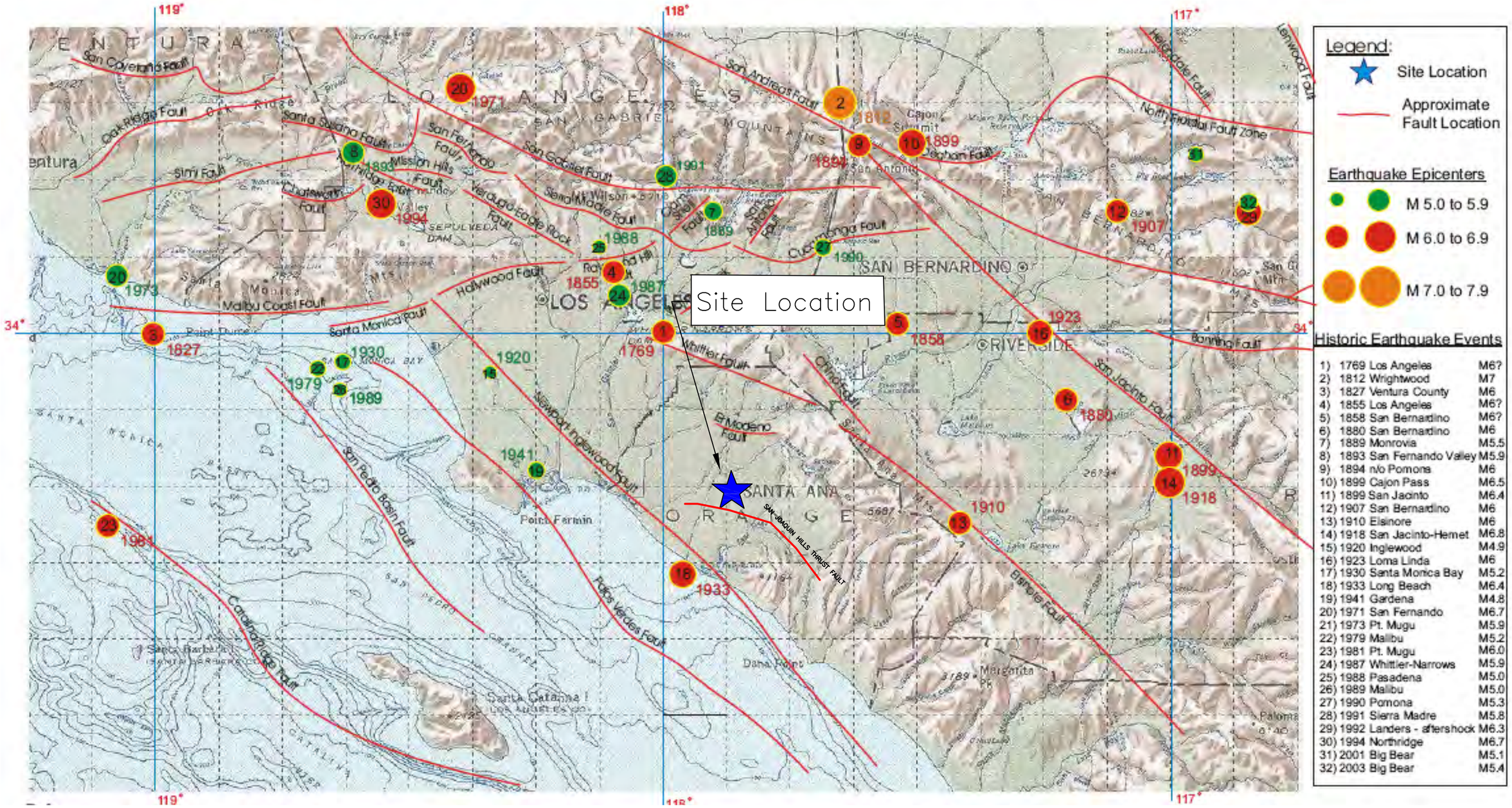
FIGURE 3

EXPLORATORY BORING PLAN - 2 OF 2

GEOLOGICAL RECONAISSANCE
PROPOSED WARNER AVENUE WIDENING
GRAND AVENUE TO MAIN STREET
SANTA ANA, ORANGE COUNTY, CALIFORNIA

Geo-Logic ASSOCIATES

| Draft | Date | Project No. |
|---|---|---|
| JGF | 3/2013 | 2009-0035 |




Legend:

- Site Location
- Approximate Fault Location

Earthquake Epicenters

- M 5.0 to 5.9
- M 6.0 to 6.9
- M 7.0 to 7.9

Historic Earthquake Events

| | | |
|---|---|---|
| 1) | 1769 Los Angeles | M6? |
| 2) | 1812 Wrightwood | M7 |
| 3) | 1827 Ventura County | M6 |
| 4) | 1855 Los Angeles | M6? |
| 5) | 1858 San Bernardino | M6? |
| 6) | 1880 San Bernardino | M6 |
| 7) | 1889 Monrovia | M5.5 |
| 8) | 1893 San Fernando Valley | M5.9 |
| 9) | 1894 n/o Pomona | M6 |
| 10) | 1899 Cajon Pass | M6.5 |
| 11) | 1899 San Jacinto | M6.4 |
| 12) | 1907 San Bernardino | M6 |
| 13) | 1910 Elsinore | M6 |
| 14) | 1918 San Jacinto-Hemet | M6.8 |
| 15) | 1920 Inglewood | M4.9 |
| 16) | 1923 Loma Linda | M6 |
| 17) | 1930 Santa Monica Bay | M5.2 |
| 18) | 1933 Long Beach | M6.4 |
| 19) | 1941 Gardena | M4.8 |
| 20) | 1971 San Fernando | M6.7 |
| 21) | 1973 Pt. Mugu | M5.9 |
| 22) | 1979 Malibu | M5.2 |
| 23) | 1981 Pt. Mugu | M6.0 |
| 24) | 1987 Whittier-Narrows | M5.9 |
| 25) | 1988 Pasadena | M5.0 |
| 26) | 1989 Malibu | M5.0 |
| 27) | 1990 Pomona | M5.3 |
| 28) | 1991 Sierra Madre | M5.8 |
| 29) | 1992 Landers - aftershock | M6.3 |
| 30) | 1994 Northridge | M6.7 |
| 31) | 2001 Big Bear | M5.1 |
| 32) | 2003 Big Bear | M5.4 |

FIGURE 4

Source Data:

Base Map–USGS Southern California, 1:1,000,000 Los Angeles Map
Faults–CDMG Map No. 6, 1994
Earthquake epicenters–CDMG SP 116, Fig 1, Page 10
and SCEC 2006

Printed from TOPO! 1999 (www.topo.com)

N

GRAPHIC SCALE (miles)

0 5 10 15 30

FAULT LOCATION MAP

GEOTECHNICAL RECONNAISSANCE
PROPOSED WARNER AVENUE WIDENING
GRAND AVENUE TO MAIN STREET
SANTA ANA, ORANGE COUNTY, CALIFORNIA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

| DRAWN BY: | DATE: | JOB NO. |
|---|---|---|
| DML | JULY 2009 | 2009–0035 |

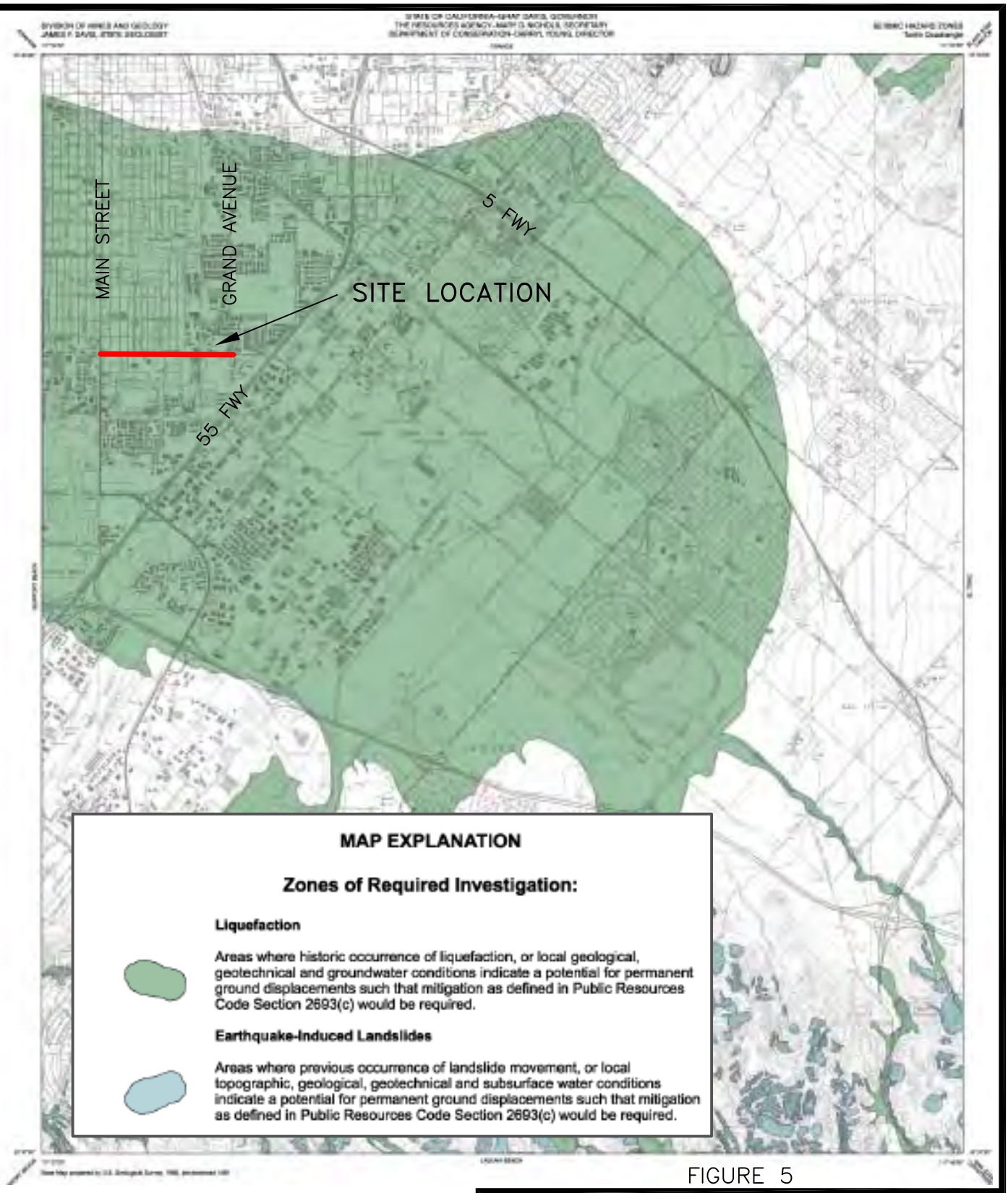



FIGURE 5

SEISMIC HAZARD ZONES—LIQUEFACTION SUSCEPTIBILITY MAP

GRAPHIC SCALE (FT)

1000 0 2000 4000 8000

N

State of California Seismic Hazard Zones — Tustin Quadrangle, Official Revised Map Released January 17, 2001 (California Department of Conservation, Division of Mines and Geology, 2001)

GEOTECHNICAL RECONNAISSANCE
PROPOSED WARNER AVENUE WIDENING
GRAND AVENUE TO MAIN STREET
SANTA ANA, ORANGE COUNTY, CALIFORNIA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

| DRAWN BY: | DATE: | JOB NO. |
|---|---|---|
| DML | JULY 2009 | 2009-0035 |

# APPENDIX A

# RECONNAISSANCE LEVEL PAVEMENT SURVEY NOTES, SURVEY DATE – MAY 12, 2009

Geo-Logic ASSOCIATES

**Project No.:** 2009-035
**Project:** Warner Avenue Widening
**Client:** The Planning Center
**Date:** July 2009

## PAVEMENT CONDITION - FIELD SURVEY NOTES

| North of Centerline - Main Street to Grand Avenue (5/12/09) | |
|---|---|
| | |
| **Address** | **Description** |
| Northbound Grand Ave. to westbound Warner Ave. | Pavement rutting, patching in intersection - left turn lane to westbound Warner Ave. |
| 1409 (Discount Tire) | Alligator cracking at drive apron, sidewalk cracks. |
| 1401 (Vulcan Materials) | Ruts at drive apron, limited cracking in No 2 lane to west. |
| 1331 (Beard Printing) | Localized longitudinal and alligator cracking in No 2 lane. |
| RXR crossing west of 1301 (Montroy Supply Company) | Alligator cracking at approach to tracks in No 2 lane. |
| Standard Ave. | Transverse cracks in pavement at eastern crosswalk stripe, No 1 and 2 lanes. Shallow rutting in No 1 and 2 lanes. Shallow rutting in right turn lane to Standard Ave. Transverse cracks in Standard Ave. at intersection with Warner Ave. |
| 2246 Standard Ave. (private residence) | Shallow rutting on Warner Ave., No 1 lane, minor longitudinal cracking No 2 lane. |
| 2246 and 2247 Evergreen St. (private residences) | Shallow rutting on Warner Ave., No 1 lane, minor longitudinal cracking No 2 lane. |
| 2246 and 2247 Cedar St. (private residences) | Shallow rutting on Warner Ave., No 1 lane, minor longitudinal cracking No 2 lane. |
| Between 2246 Cedar St. and 2244 Halladay St. (private residences) | Shallow rutting on Warner Ave., No 1 lane, minor to moderate longitudinal cracking No 2 lane (1/8- to 3/16-inch wide). Minor transverse cracking at east side of bus stop apron in No 2 lane. |
| 2245 Hickory St. (private residence) | Shallow rutting on Warner Ave., No 1 lane, minor longitudinal cracking No 2 lane. Significant cracking in Hickory St. pavement at intersection with Warner Ave. |
| Between Hickory St. and Rousselle St. (private residences) | Shallow rutting on Warner Ave., No 1 lane, minor longitudinal cracking No 2 lane. Local significant rutting in No 1 and 2 lanes at bike trail crossing. |
| 2245 Maple St. (private residence) | Shallow rutting on Warner Ave., No 1 and 2 lanes west of bus stop apron. |
| Between 2246 Maple St. and 2245 Cypress Ave. (private residences) | Shallow rutting on Warner Ave., No 1 and 2 lanes. |
| 2248 Cypress St. (office building) | Moderate rutting in No 2 lane west to intersection of Main St. |
| Arco Gas Station | Moderate rutting in No 1 and 2 lanes at intersection of Main St. |

Geo-Logic ASSOCIATES

**Project No.:** 2009-035
**Project:** Warner Avenue Widening
**Client:** The Planning Center
**Date:** July 2009

## PAVEMENT CONDITION - FIELD SURVEY NOTES

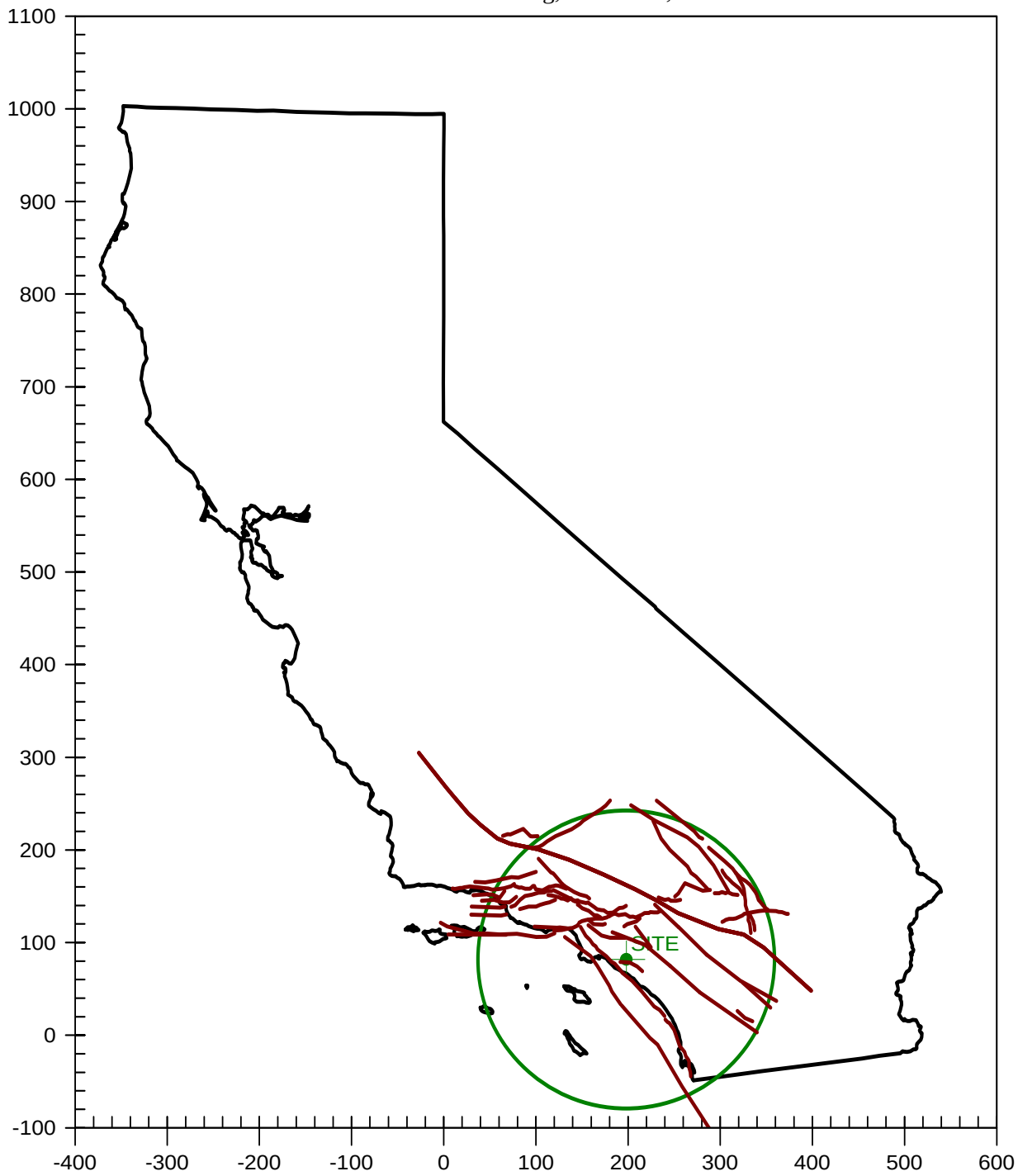
| South of Centerline - Main Street to Grand Avenue (5/12/09) | |
|---|---|
| | |
| **Address** | **Description** |
| 124, 128, 204 Warner Ave. | Shallow rutting on Warner Ave., No 2 lane. |
| 230 Orange Ave. (private residence) | Pavement cracks at utility trench. |
| 230 Orange Ave. to 402 Maple St. (private residences) | Shallow rutting on Warner Ave., No 1 and 2 lanes. |
| 402 Maple St. (private residence) | Moderate rutting on Warner Ave., No 1 and 2 lanes west of bike crossing. |
| Monroe Elementary School | Minor rutting on Warner Ave. in No 1 lane and in No 2 lane east of bus stop apron. |
| 612 E (National Guard Armory) | Shallow rutting on Warner Ave., No 2 lane, minor longitudinal cracking No 1 lane east of bus stop apron and near driveway apron to Armory opposite Kilson St. |
| Delhi Park (Hickory St. to Halladay St.) | Shallow rutting on Warner Ave., No 1 and 2 lanes, longitudinal crack No 1 lane opposite Hickory St. |
| 2305 Halladay St. (private residence) | Shallow rutting on Warner Ave., No 1 and 2 lanes, transverse crack No 2 lane at west side of driveway. |
| 1004 E. Warner Ave. (private residence) | Longitudinal crack No 2 lane at west side of driveway. |
| 1004 to 1106 E. Warner Ave., 2301 Evergreen St. (private residences) | Shallow rutting on Warner Ave., No 1 and 2 lanes. |
| Standard Ave. intersection | Shallow/moderate rutting on Warner Ave., No 1 and 2 lanes. |
| 1224 E. Warner Ave. (Cherry Aerospace Fastening) | Transverse crack No 1 lane at bus stop apron, longitudinal crack No 2 lane at driveway entrance, shallow rutting to east of driveway in No 1 and 2 lanes. |
| Approx. 70 ft west of RXR tracks to tracks | Approx. 70 ft west of RXR tracks transverse crack No 1 and 2 lanes; 70 ft to tracks, moderate to severe rutting in No 1 and 2 lanes. |
| East of RXR tracks | Longitudinal crack No 2 lane. |

# APPENDIX B

# SEISMIC ANALYSIS

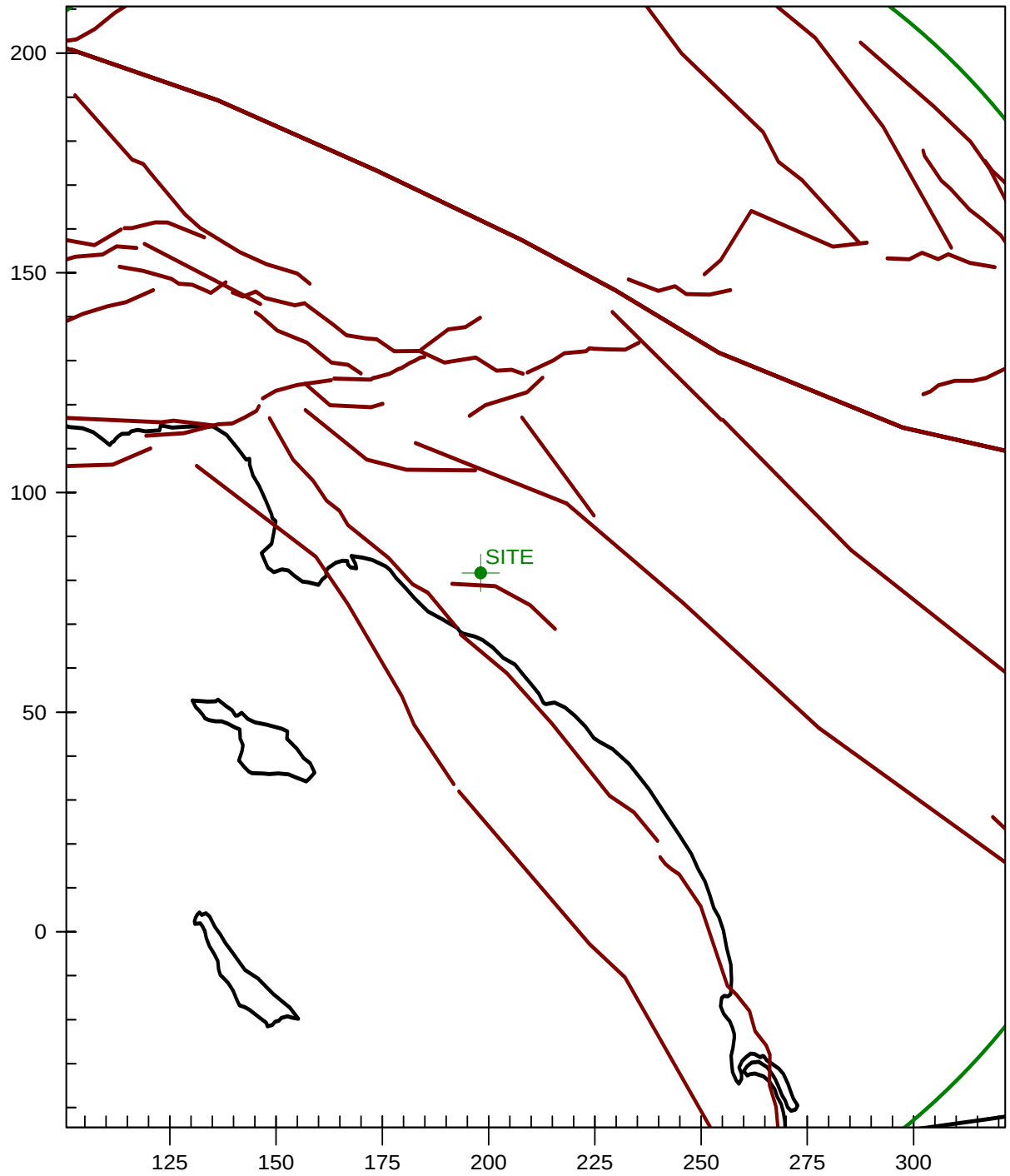
# CALIFORNIA FAULT MAP

Warner Avenue Widening, Santa Ana, CA



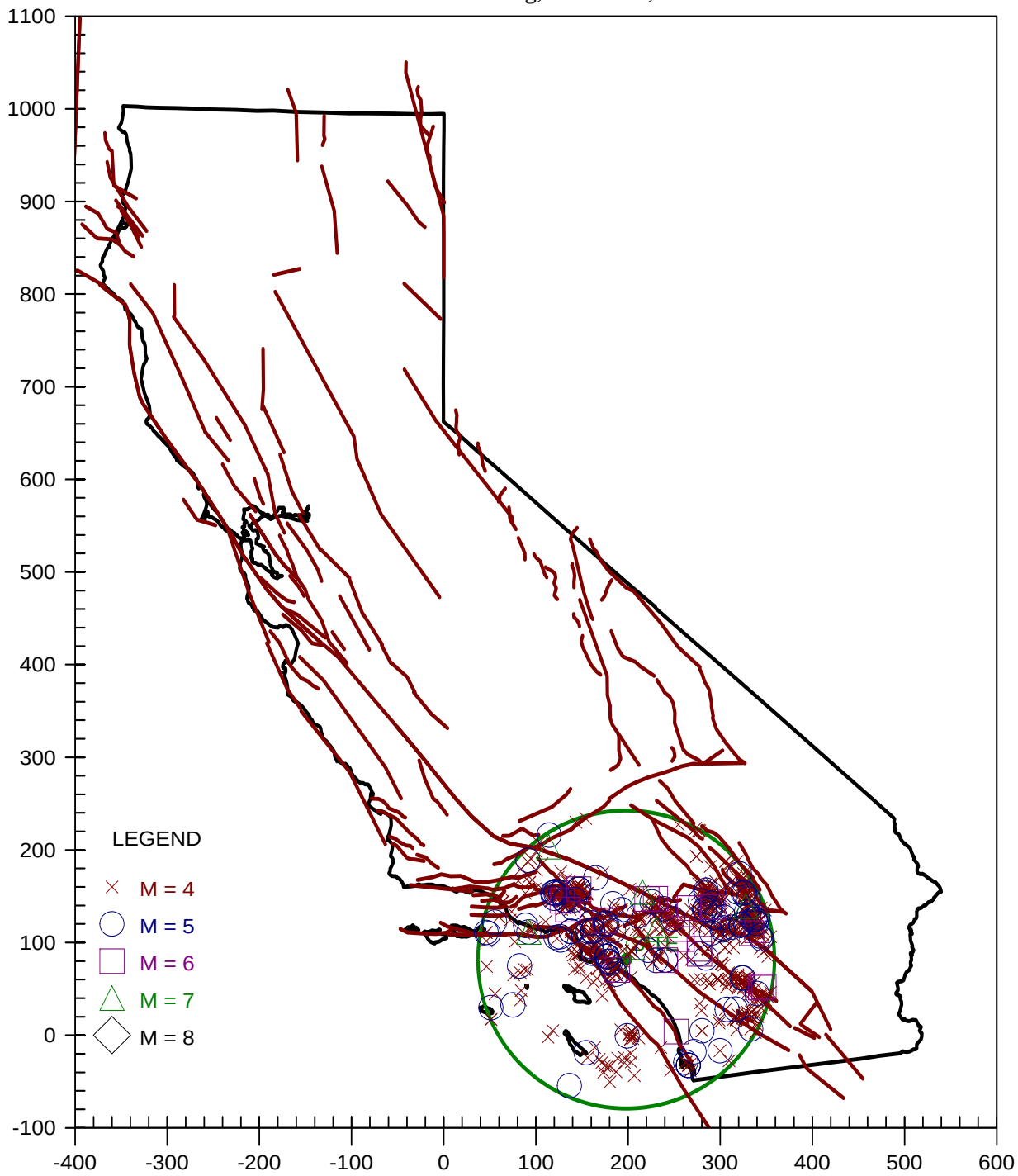
# CALIFORNIA FAULT MAP

Warner Avenue Widening, Santa Ana, CA



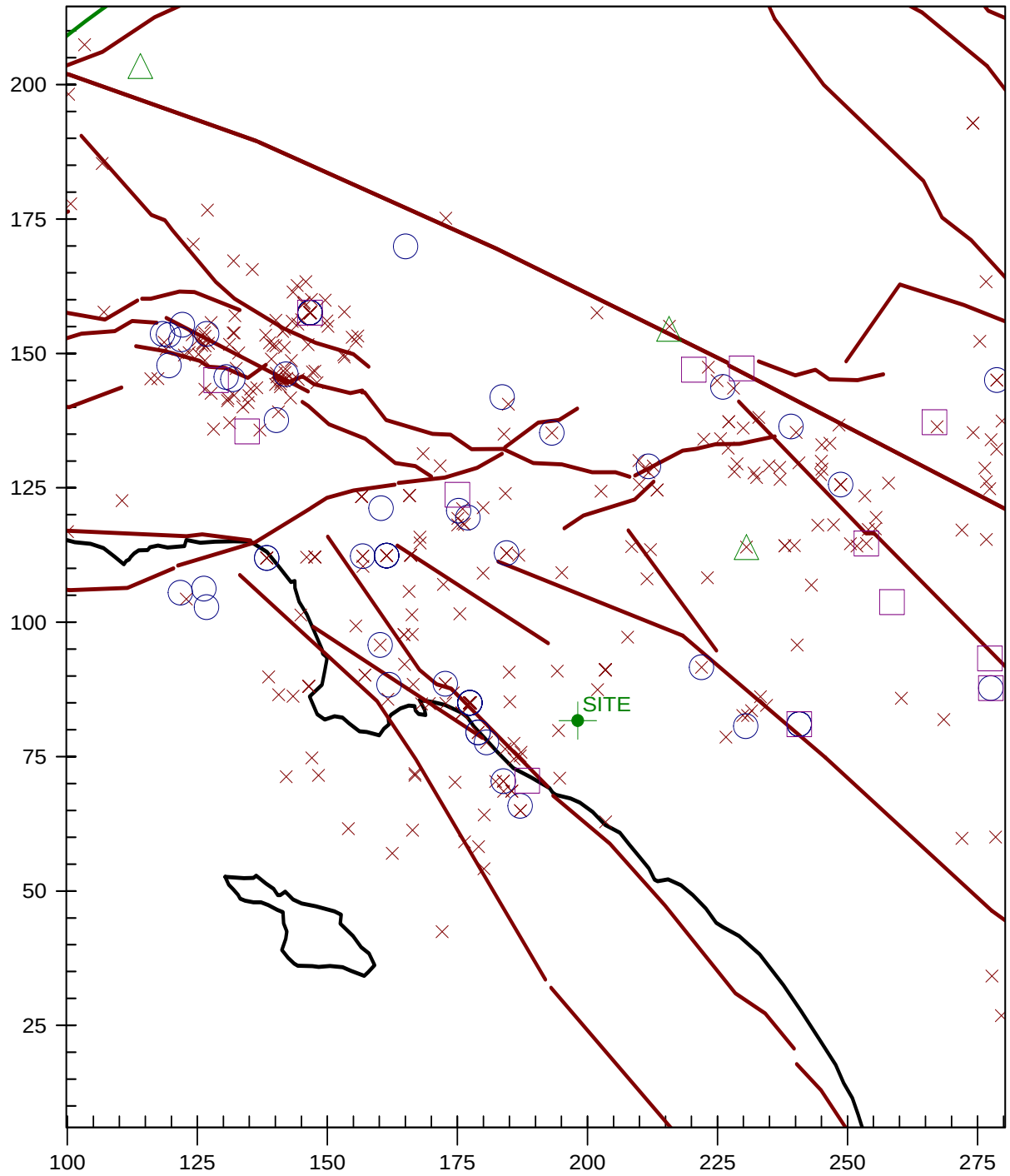
# EARTHQUAKE EPICENTER MAP

Warner Avenue Widening, Santa Ana, CA



# EARTHQUAKE EPICENTER MAP

Warner Avenue Widening, Santa Ana, CA



```
**********************
*                    *
*    E Q F A U L T   *
*                    *
*    Version 3.00    *
*                    *
**********************

     DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS


JOB NUMBER: 2009-0035
                                                DATE: 06-17-2009

JOB NAME:    Warner Avenue Widening, Santa Ana, CA

CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\CGSFLTE_2009_MCE.DAT

SITE COORDINATES:
   SITE LATITUDE:  33.7159
   SITE LONGITUDE:  117.8595

SEARCH RADIUS:   100  mi

ATTENUATION RELATION:   3) Boore et al. (1997) Horiz. - NEHRP D (250)
   UNCERTAINTY (M=Median, S=Sigma): M       Number of Sigmas:  0.0
   DISTANCE MEASURE:  cd_2drp
   SCOND:   0
   Basement Depth:  5.00 km     Campbell SSR:        Campbell SHR:
   COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED:  C:\Program Files\EQFAULT1\CGSFLTE_2009_MCE.DAT

MINIMUM DEPTH VALUE (km):  0.0
```

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

| ABBREVIATED FAULT NAME | APPROXIMATE DISTANCE mi (km) | ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw) | ESTIMATED MAX. EARTHQUAKE EVENT: PEAK SITE ACCEL. g | ESTIMATED MAX. EARTHQUAKE EVENT: EST. SITE INTENSITY MOD.MERC. |
|---|---|---|---|---|
| SAN JOAQUIN HILLS | 1.7( 2.8) | 6.6 | 0.556 | X |
| NEWPORT-INGLEWOOD (L.A.Basin) | 7.7( 12.4) | 7.1 | 0.324 | IX |
| NEWPORT-INGLEWOOD (Offshore) | 9.2( 14.8) | 7.1 | 0.288 | IX |
| CHINO-CENTRAL AVE. (Elsinore) | 13.7( 22.1) | 6.7 | 0.214 | VIII |
| WHITTIER | 13.7( 22.1) | 6.8 | 0.185 | VIII |
| PUENTE HILLS BLIND THRUST | 14.6( 23.5) | 7.1 | 0.252 | IX |
| ELSINORE (GLEN IVY) | 16.0( 25.7) | 6.8 | 0.166 | VIII |
| PALOS VERDES | 18.9( 30.4) | 7.3 | 0.190 | VIII |
| SAN JOSE | 22.4( 36.0) | 6.4 | 0.127 | VIII |
| UPPER ELYSIAN PARK BLIND THRUST | 28.0( 45.0) | 6.4 | 0.107 | VII |
| SIERRA MADRE | 28.8( 46.4) | 7.2 | 0.159 | VIII |
| CUCAMONGA | 29.3( 47.1) | 6.9 | 0.134 | VIII |
| ELSINORE (TEMECULA) | 29.8( 48.0) | 6.8 | 0.103 | VII |
| CORONADO BANK | 31.1( 50.1) | 7.6 | 0.152 | VIII |
| RAYMOND | 31.3( 50.3) | 6.5 | 0.103 | VII |
| CLAMSHELL-SAWPIT | 32.9( 52.9) | 6.5 | 0.100 | VII |
| VERDUGO | 33.3( 53.6) | 6.9 | 0.122 | VII |
| HOLLYWOOD | 35.1( 56.5) | 6.4 | 0.090 | VII |
| SAN JACINTO-SAN BERNARDINO | 40.1( 64.5) | 6.7 | 0.078 | VII |
| SANTA MONICA | 40.1( 64.5) | 6.6 | 0.090 | VII |
| SAN JACINTO-SAN JACINTO VALLEY | 41.6( 66.9) | 6.9 | 0.084 | VII |
| MALIBU COAST | 44.4( 71.4) | 6.7 | 0.088 | VII |
| SAN ANDREAS - SB-Coach. M-1b-2 | 44.6( 71.8) | 7.7 | 0.122 | VII |
| SAN ANDREAS - SB-Coach. M-2b | 44.6( 71.8) | 7.7 | 0.122 | VII |
| SAN ANDREAS - Whole M-1a | 44.6( 71.8) | 8.0 | 0.143 | VIII |
| SAN ANDREAS - San Bernardino M-1 | 44.6( 71.8) | 7.5 | 0.110 | VII |
| SAN ANDREAS - Mojave M-1c-3 | 44.7( 72.0) | 7.4 | 0.104 | VII |
| SAN ANDREAS - 1857 Rupture M-2a | 44.7( 72.0) | 7.8 | 0.128 | VIII |
| SAN ANDREAS - Cho-Moj M-1b-1 | 44.7( 72.0) | 7.8 | 0.128 | VIII |
| SIERRA MADRE (San Fernando) | 46.2( 74.3) | 6.7 | 0.085 | VII |
| NORTHRIDGE (E. Oak Ridge) | 46.9( 75.4) | 7.0 | 0.099 | VII |
| CLEGHORN | 47.0( 75.6) | 6.5 | 0.062 | VI |
| ROSE CANYON | 48.0( 77.3) | 7.2 | 0.088 | VII |
| SAN GABRIEL | 48.1( 77.4) | 7.2 | 0.088 | VII |
| ANACAPA-DUME | 51.4( 82.8) | 7.5 | 0.119 | VII |
| NORTH FRONTAL FAULT ZONE (West) | 52.5( 84.5) | 7.2 | 0.100 | VII |
| ELSINORE (JULIAN) | 54.0( 86.9) | 7.1 | 0.077 | VII |
| SAN JACINTO-ANZA | 54.2( 87.2) | 7.2 | 0.080 | VII |
| SANTA SUSANA | 55.7( 89.6) | 6.7 | 0.074 | VII |
| HOLSER | 60.8( 97.9) | 6.5 | 0.062 | VI |

DETERMINISTIC SITE PARAMETERS

Page 2

| ABBREVIATED FAULT NAME | APPROXIMATE DISTANCE mi (km) | ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw) | PEAK SITE ACCEL. g | EST. SITE INTENSITY MOD.MERC. |
|---|---|---|---|---|
| SIMI-SANTA ROSA | 62.6( 100.7) | 7.0 | 0.079 | VII |
| OAK RIDGE (Onshore) | 66.1( 106.4) | 7.0 | 0.075 | VII |
| PINTO MOUNTAIN | 69.5( 111.9) | 7.2 | 0.066 | VI |
| NORTH FRONTAL FAULT ZONE (East) | 69.7( 112.1) | 6.7 | 0.062 | VI |
| SAN CAYETANO | 71.9( 115.7) | 7.0 | 0.071 | VI |
| HELENDALE - S. LOCKHARDT | 72.6( 116.8) | 7.3 | 0.068 | VI |
| SAN ANDREAS - Carrizo M-1c-2 | 77.5( 124.7) | 7.4 | 0.068 | VI |
| SAN JACINTO-COYOTE CREEK | 79.7( 128.3) | 6.6 | 0.043 | VI |
| OAK RIDGE(Blind Thrust Offshore) | 81.2( 130.6) | 7.1 | 0.068 | VI |
| SAN ANDREAS - Coachella M-1c-5 | 81.2( 130.6) | 7.2 | 0.059 | VI |
| EARTHQUAKE VALLEY | 82.2( 132.3) | 6.5 | 0.040 | V |
| CHANNEL IS. THRUST (Eastern) | 82.8( 133.3) | 7.5 | 0.082 | VII |
| LENWOOD-LOCKHART-OLD WOMAN SPRGS | 83.0( 133.6) | 7.5 | 0.068 | VI |
| SANTA YNEZ (East) | 83.8( 134.9) | 7.1 | 0.054 | VI |
| VENTURA - PITAS POINT | 85.6( 137.7) | 6.9 | 0.059 | VI |
| BURNT MTN. | 85.7( 138.0) | 6.5 | 0.039 | V |
| JOHNSON VALLEY (Northern) | 87.6( 141.0) | 6.7 | 0.043 | VI |
| LANDERS | 88.0( 141.6) | 7.3 | 0.058 | VI |
| EUREKA PEAK | 88.7( 142.8) | 6.4 | 0.036 | V |
| OAK RIDGE MID-CHANNEL STRUCTURE | 89.4( 143.9) | 6.6 | 0.048 | VI |
| M.RIDGE-ARROYO PARIDA-SANTA ANA | 91.4( 147.1) | 7.2 | 0.065 | VI |
| RED MOUNTAIN | 94.4( 151.9) | 7.0 | 0.057 | VI |
| EMERSON So. - COPPER MTN. | 94.4( 151.9) | 7.0 | 0.047 | VI |
| GARLOCK (West) | 95.3( 153.3) | 7.3 | 0.055 | VI |
| GRAVEL HILLS - HARPER LAKE | 96.1( 154.6) | 7.1 | 0.049 | VI |
| PLEITO THRUST | 96.8( 155.8) | 7.0 | 0.056 | VI |
| SANTA CRUZ ISLAND | 97.1( 156.2) | 7.0 | 0.056 | VI |

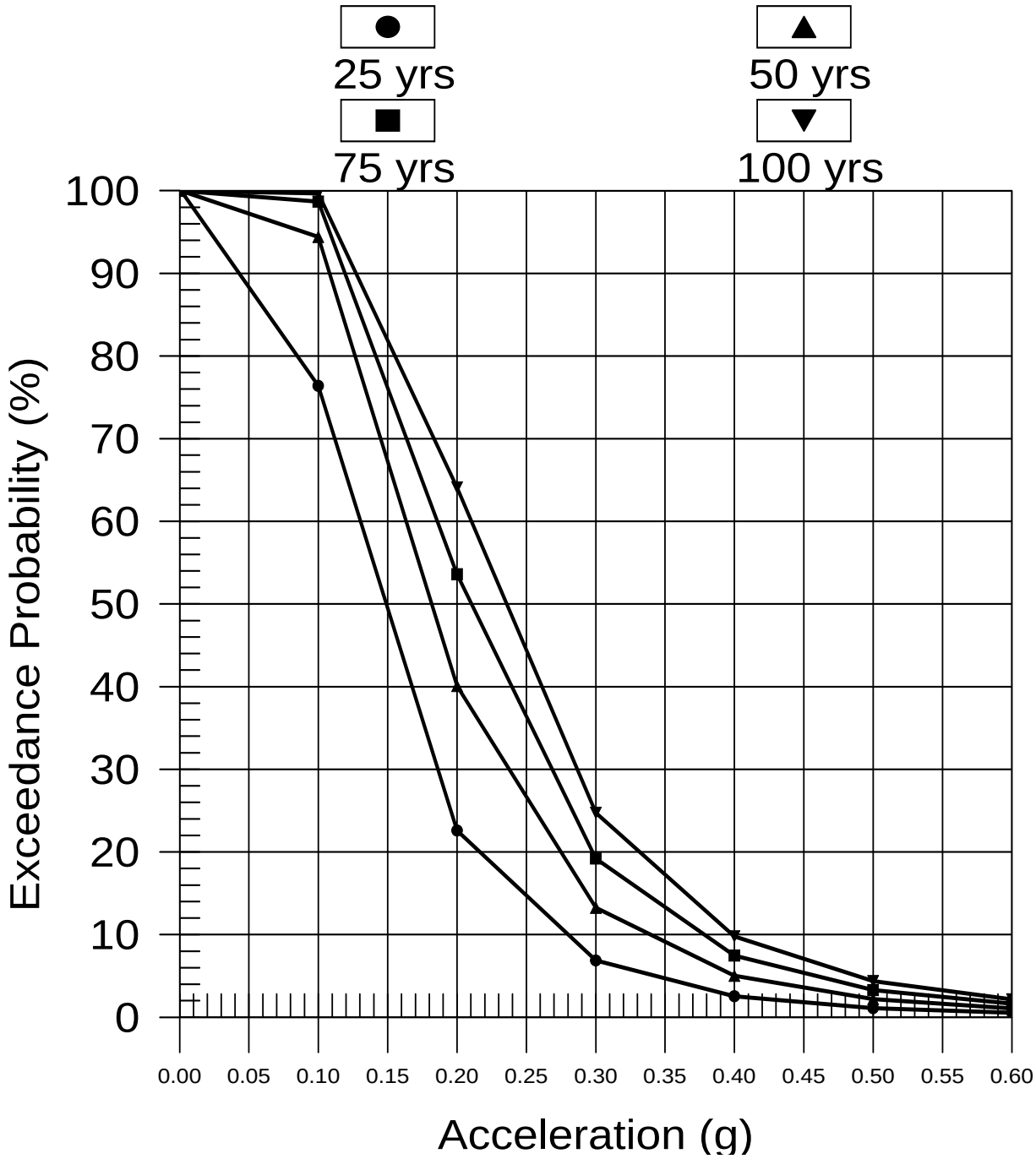
-END OF SEARCH- 67 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE SAN JOAQUIN HILLS FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 1.7 MILES (2.8 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.5563 g

# PROBABILITY OF EXCEEDANCE

## BOORE ET AL(1997) NEHRP D (250)2



# APPENDIX E: FEMA FLOOD MAP

6070000 FT

JOINS PANEL 0276

6075000 FT

tional Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

50 0 500 1000

FEET

METERS

BROADWAY PLACE

DX1926

CYPRESS AVENUE

ORANGE AVENUE

MAPLE STREET

ROUSSELLE STREET

OAK STREET

KILSON DRIVE

HICKORY STREET

ANAHURST PLACE

CEDAR STREET

EVERGREEN STREET

STANDARD AVENUE

UNION PACIFIC RAILROAD

HATHAWAY STREET

WARNER AVENUE

ZONE X

FLORA STREET

FLORA STREET

BROADWAY

DX1928

CYPRESS AVENUE

MEASOR STREET

CENTRAL AVENUE

NTRAL AVENUE

ADAMS STREET

City of
anta Ana
060232

HOTEL TERRACE DRIVE

GOETZ AVENUE

OAK STREET

HALLADAY STREET

YOUNG STREET

BIRTCHER DRIVE

GRAND AVENUE

DX1930

DYER ROAD

ZO

MAIN STREET

KILSON DRIVE

TECH CENTER

PULLMAN ST

ORDS LANE

GARRY AVENUE

GE AVENUE

K STREET

1% ANNUAL CHANCE
FLOOD DISCHARGE
CONTAINED IN CHANNEL

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0278J

# FIRM

## FLOOD INSURANCE RATE MAP

**ORANGE COUNTY, CALIFORNIA**
**AND INCORPORATED AREAS**

**PANEL 278 OF 539**

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

| COMMUNITY | NUMBER | PANEL | SUFFIX |
|---|---|---|---|
| COSTA MESA, CITY OF | 060216 | 0278 | J |
| IRVINE, CITY OF | 060222 | 0278 | J |
| ORANGE COUNTY | 060212 | 0278 | J |
| SANTA ANA, CITY OF | 060232 | 0278 | J |
| TUSTIN, CITY OF | 060235 | 0278 | J |

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

**MAP NUMBER**
**06059C0278J**

**MAP REVISED**
**DECEMBER 3, 2009**

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov