# Addendum to The Preserve - Chino Sphere of Influence-Subarea 2 EIR

# For South of Pine Update 2022

# State Clearinghouse No. 2000121036

The following Addendum has been prepared in compliance with CEQA

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## Table of Contents


*1 INTRODUCTION AND BACKGROUND ..... 1*

*2 PURPOSE AND SCOPE ..... 3*

*3 PROJECT DESCRIPTION ..... 4*

*4 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED ..... 10*

*5 DETERMINATION (TO BE COMPLETED BY THE LEAD AGENCY) ..... 10*

*6 ENVIRONMENTAL IMPACT ANALYSIS ..... 11*

**6.1 AESTHETICS ..... 11**
*6.1.1 Summary of PSP EIR Findings ..... 11*
*6.1.2 Impact Analysis of Proposed Project ..... 12*

**6.2 AGRICULTURAL RESOURCES ..... 14**
*6.2.1 Summary of PSP EIR Findings ..... 14*
*6.2.2 Impact Analysis of Proposed Project ..... 14*

**6.3 AIR QUALITY ..... 16**
*6.3.1 Summary of PSP EIR Findings ..... 16*
*6.3.2 Impact Analysis of Proposed Project ..... 19*

**6.4 BIOLOGICAL RESOURCES ..... 21**
*6.4.1 Summary of PSP EIR Findings ..... 21*
*6.4.2 Impact Analysis of Proposed Project ..... 22*

**6.5 CULTURAL RESOURCES ..... 24**
*6.5.1 Summary of PSP EIR Findings ..... 24*
*6.5.2 Impact Analysis of Proposed Project ..... 24*

**6.6 ENERGY ..... 25**
*6.6.1 Summary of PSP EIR Findings ..... 25*
*6.6.2 Impact Analysis of Proposed Project ..... 26*

**6.7 GEOLOGY AND SOILS ..... 27**
*6.7.1 Summary of PSP EIR Findings ..... 27*
*6.7.2 Impact Analysis of Proposed Project ..... 29*

**6.8 GREENHOUSE GAS EMISSIONS ..... 31**
*6.8.1 Summary of PSP EIR Findings ..... 31*
*6.8.2 Impact Analysis of Proposed Project ..... 31*

**6.9 HAZARDS AND HAZARDOUS MATERIALS ..... 35**
*6.9.1 Summary of PSP EIR Findings ..... 35*
*6.9.2 Impact Analysis of Proposed Project ..... 36*

**6.10 HYDROLOGY AND WATER QUALITY ..... 38**
*6.10.1 Summary of PSP EIR Findings ..... 38*
*6.10.2 Impact Analysis of Proposed Project ..... 39*

**6.11 LAND USE AND PLANNING ..... 41**
*6.11.1 Summary of PSP EIR Findings ..... 41*
*6.11.2 Impact Analysis of Proposed Project ..... 43*

**6.12 NOISE ..... 44**

*6.12.1 Summary of PSP EIR Findings* ..... 44
*6.12.2 Impact Analysis of Proposed Project* ..... 45

**6.13 POPULATION & HOUSING** ..... **47**
*6.13.1 Summary of PSP EIR Findings* ..... 47
*6.13.2 Impact Analysis of Proposed Project* ..... 47

**6.14 PUBLIC SERVICES** ..... **49**
*6.14.1 Summary of PSP EIR Findings* ..... 49
*6.14.2 Impact Analysis of Proposed Project* ..... 50

**6.15 RECREATION** ..... **52**
*6.15.1 Summary of PSP EIR Findings* ..... 52
*6.15.2 Impact Analysis of Proposed Project* ..... 53

**6.16 TRANSPORTATION** ..... **54**
*6.16.1 Summary of PSP EIR Findings* ..... 54
*6.16.2 Impact Analysis of Proposed Project* ..... 55

**6.17 TRIBAL CULTURAL RESOURCES** ..... **57**
6.17.1 *Summary of PSP EIR Findings* ..... 57
6.17.2 *Impact Analysis of the Proposed Project* ..... 57

**6.18 UTILITIES & SERVICE SYSTEMS** ..... **58**
*6.18.1 Summary of PSP EIR Findings* ..... 58
*6.18.2 Impact Analysis of Proposed Project* ..... 60

**6.19 WILDFIRE** ..... **64**
*6.19.1 Summary of PSP EIR Findings* ..... 64
*6.19.2 Impact Analysis of Proposed Project* ..... 64

## Appendices

**Appendix A:** Summary of Prior Project Approvals and Environmental Review Applicable to the Proposed Project

**Appendix B:** Mitigation Measures from the Preserve Specific Plan

**Appendix C:** Example Site Specific Geotechnical Report, prepared by RMA Group, dated August 2020

**Appendix D:** Example Preliminary Hydrology Study, prepared by DRC Engineering, Inc. dated September 2020

**Appendix E:** Trip Generation and Qualitative VMT Assessment for the Master Site Approval for The Preserve Specific Plan, prepared by Linscott Law & Greenspan, dated September 2021

**Appendix F:** Example Site Specific Water Quality Management Plan, prepared by DRC Engineering, Inc

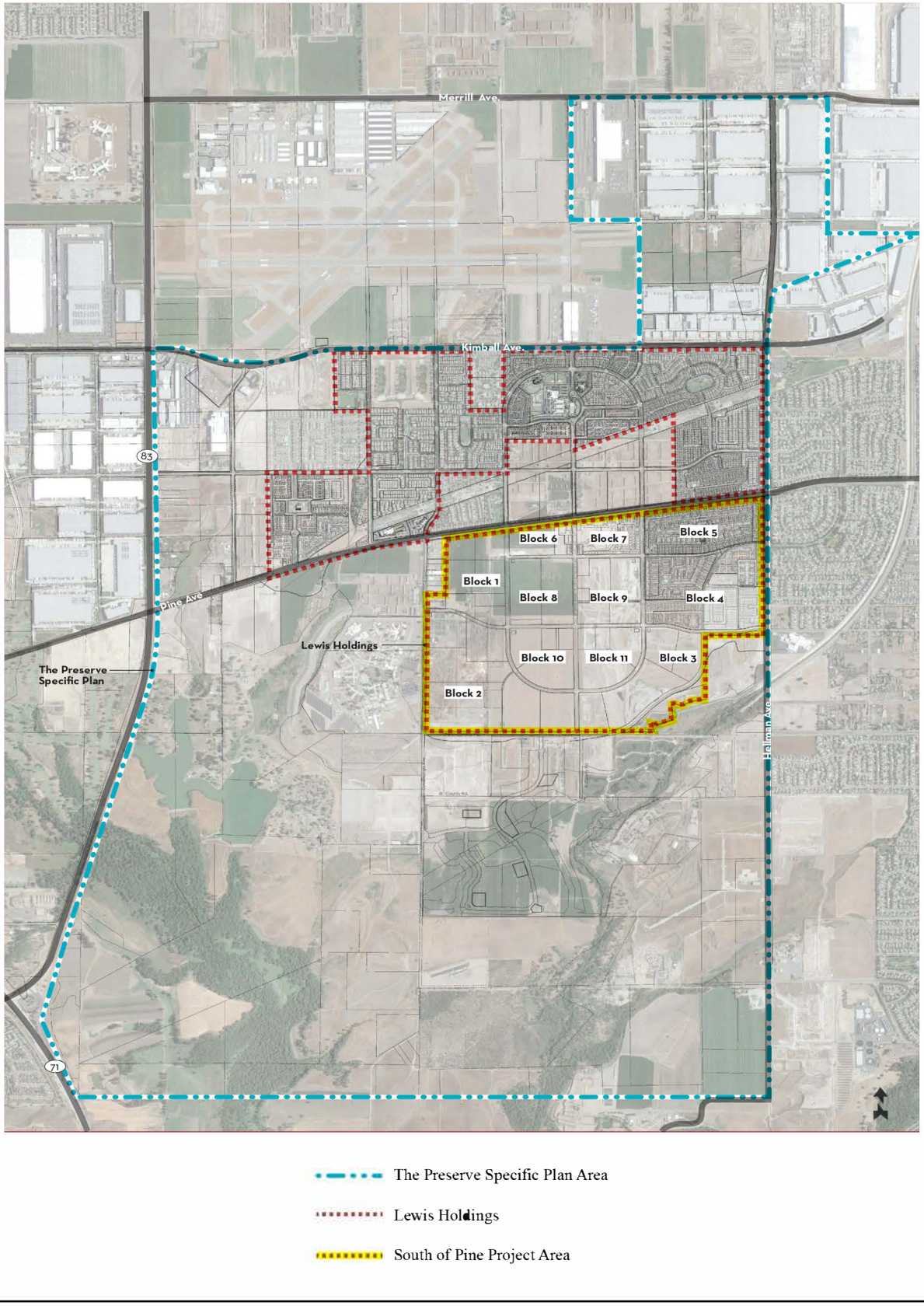
# 1 INTRODUCTION AND BACKGROUND

In March 2003, the City of Chino (City) approved the Preserve Specific Plan (PSP, Specific Plan, or the Plan), which covers an area of 5,435 acres generally located south of Merrill Avenue between Euclid Avenue and Hellman Avenue (Figure 1). The City certified The Preserve – Chino Sphere of Influence – Sub-Area 2 Environmental Impact Report (PSP EIR) (State Clearinghouse [SCH] No. 2000121036) in 2003. The PSP EIR was prepared in accordance with the California Environmental Quality Act (CEQA, California Public Resources Code, Sections 21000, et seq.) and the State CEQA Guidelines (California Code of Regulations, Title 14, Sections 15000, et seq.). In certifying the PSP EIR, the City Council found that it adequately addressed the potential environmental impacts associated with planned buildout of the PSP Area. The PSP EIR analyzed a Land Use Plan containing a variety of land use designations, including: a range of residential land uses including estate, low density, medium density, high density, and mixed use; non-residential uses including neighborhood and regional commercial, light industrial, airport, and airport-related uses; and public facilities, parks, schools, open space, and right-of-way. There have been a number of updates to the PSP since its approval, each of which was reviewed under CEQA as explained in Appendix A to this Addendum. The PSP EIR and subsequent addenda are collectively referred to as the "Previous Environmental Documentation."

The City and Chino Development Corporation (CDC) and Chino Preserve Development Corporation (CPDC) entered into The Preserve Development Agreement (City of Chino Contract No. 2004-073) on July 1, 2004.[1] The Development Agreement provides for the right to transfer dwelling units or densities throughout the PSP Area for properties under CDC and CPDC's ownership, provided the total maximum allowable number of units is not exceeded. As of January 2022, CDC and CPDC have entitled 4,989 units and have 4,209 units left out of a total of 8,129 allowed units. Therefore, there is remaining development capacity within CDC's and CPDC's ownership in the PSP.

This Addendum has been prepared to document that proposed updates to the South of Pine (SOP) Master Site Approval and Tentative Tract Map, and changes to the conditions of approval (collectively, the SOP Update) are consistent with and within the scope of the Previous Environmental Documentation. CPDC has also submitted applications for development of Block 9 in the SOP area (Block 9 Entitlements). The Block 9 Entitlements are entirely consistent with the PSP and Previous Environmental Documentation and no new environmental review is required under CEQA. However, because the Block 9 Entitlements will be processed subsequent to the SOP Update, they are included in this Addendum for informational purposes only. The SOP Update and Block 9 Entitlements are collectively referred to as the Proposed Project and are further described in Section 3 below. Entitlements for future development in the PSP that are consistent with the PSP and the Previous Environmental Documentation would also not require additional environmental review. This includes the transfer of dwelling units (discussed in Section 3 below), as allowed for by the Development Agreement and the PSP.

[1] The Development Agreement was amended in 2008, 2014 and 2016 and each amendment was reviewed under CEQA as described in Appendix A.




Source: Lewis Management Corp.

Figure 1. Location of the Preserve Specific Plan

# 2 PURPOSE AND SCOPE

The Proposed Project is consistent with the development density and intensity allowed under the City of Chino General Plan and the PSP, as amended. Section 15183(a) of the CEQA Guidelines (Projects Consistent with a Community Plan or Zoning) states:

> *CEQA mandates that projects which are consistent with the development density established by existing zoning, community plan, or general plan policies for which an EIR was certified shall not require additional environmental review, except as might be necessary to examine whether there are project-specific significant effects which are peculiar to the project or its site. This streamlines the review of such projects and reduces the need to prepare repetitive environmental studies.*

The Proposed Project would not involve any changes to the land use, zoning, or development density allowed by the PSP and the Proposed Project is specifically designed to implement the previously-approved PSP which was adopted by the City in 2003 along with a certified Environmental Impact Report. The Proposed Project is therefore exempt from further CEQA review pursuant to CEQA Guidelines section 15183. In addition, Government Code section 65457 and CEQA Guidelines section 15182 provide that a residential development project that is consistent with a previously-approved specific plan for which an EIR has been certified is exempt from further CEQA review unless "changed circumstances" have occurred within the meaning of CEQA section 21166 and CEQA Guidelines Section 15162. (See *Concerned Dublin Citizens v. City of Dublin* (2013) 214 Cal.App.4th 1301, 1310-11.)

CEQA Guidelines Section 15162 provides that once an EIR has been certified, no subsequent EIR shall be prepared unless the lead agency determines, on the basis of substantial evidence, one or more of the following:

- Substantial changes are proposed in the project which would require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;
- Substantial changes occur with respect to the circumstances under which the project is undertaken which would require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;
- New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete, shows any of the following:
    a) The project would have one or more significant effects not discussed in the previous EIR;
    b) Significant effects previously examined would be substantially more severe than shown in the previous EIR;

c) Mitigation measures previously found not to be feasible would in fact be feasible and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or

d) Mitigation measures which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.

CEQA Guidelines Section 15164 states that the lead agency shall prepare an addendum to a previously certified EIR if some changes or additions are necessary but those changes will not result in any new or more severe environmental impacts pursuant to CEQA Guidelines Section 15162. Notwithstanding the lack of changes to the approved PSP, an Addendum has conservatively been prepared for the Proposed Project to satisfy the requirements of CEQA Section 21166 and CEQA Guidelines Sections 15162, 15164(a), 15164(d), and 15164(e).

Based on the analysis below, this Addendum concludes that the Proposed Project would not result in any new significant adverse impacts, nor an increase in the severity of significant adverse impacts previously identified and studied in Previous Environmental Documentation. Nor would the Proposed Project require the adoption of any new or considerably different mitigation measures or alternatives.

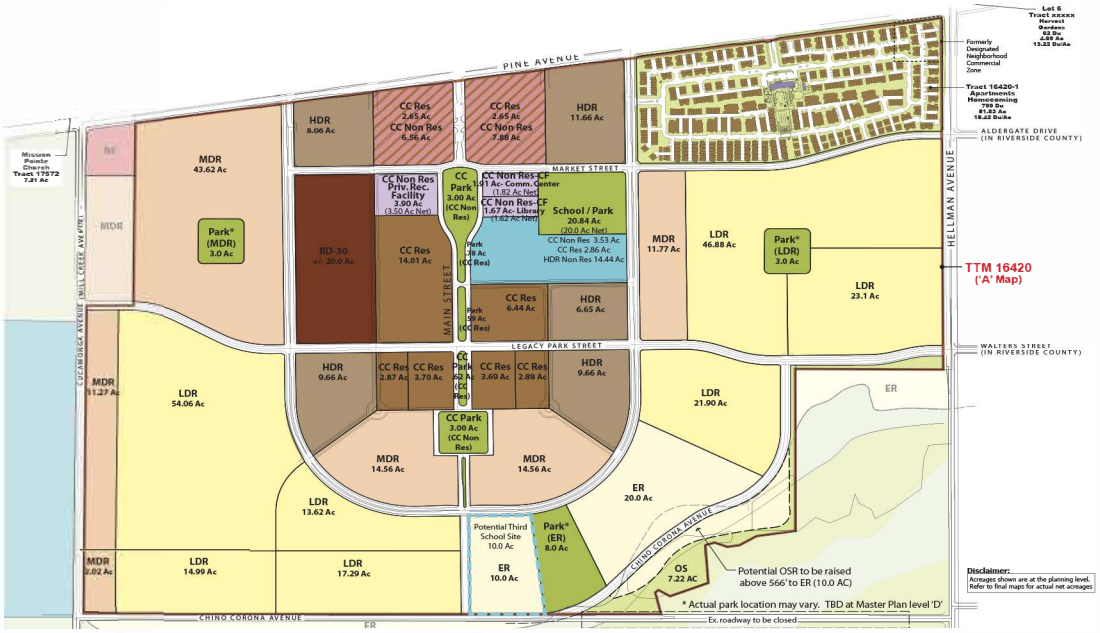
# 3 PROJECT DESCRIPTION

This Addendum analyzes the following proposed entitlement applications associated with the SOP portion of the PSP, which are collectively referred to as the "Proposed Project." As shown on Figures 1 and 2, the SOP area is generally located south of Pine Avenue, between Hellman Avenue and Mill Creek, and north of Chino Corona Road, and east of Mill Creek Avenue. This area encompasses approximately 345.8 acres and is referred to herein as the "SOP area" or "Proposed Project Area".

- **SOUTH OF PINE UPDATE (Developer Modification Applications)**

The Proposed Project includes the following modifications to the Master Site Approval (MSA) 2006-02 and TTM 16420 approvals:

- **Developer Modification of Master Site Approval (MSA) 2006-02 (PL 21-0032).** As part of the Developer modification of MSA 2006-02, the current Master Plan for the SOP area will be updated. As part of the updated SOP Master Plan, the following modifications are proposed, consistent with the recently approved PSP amendment (SPA):
  - The median island in Main Street will be eliminated and the park acreage will be moved to other areas in the SOP area.
  - The orientation of the second school site south of Market Street will be revised.
  - The site designated for a conceptional third K-8 school will be removed.
  - Cleanup changes consistent with previously approved revisions to the SOP Master Plan. The existing and proposed SOP Master Plan is shown on Figure 2.




CURRENT MASTER PLAN

SUMMARY OF PROPOSED CHANGES

- Revised orientation of School #2 Site.
- Changes to Main Street from Market down to Chino-Corona Road.
- Re-location of Parks and Median Acreage to larger Parks on Block 9 and 3.
- Re-location of Private Recreation Center to SEC of Legacy Park Street and Main Street.
- Removal of 3rd K-8 School Site.
- Updates to Blocks 6&7 for the recently approved Preserve Town Center and Main Street Rental Community Entitlements




PROPOSED MASTER PLAN

Source: Lewis Management Corp.

Figure 2. Existing and Proposed South of Pine Master Plan

As part of the Developer Modification of MSA 2006-02, dwelling units will be shifted between the various sub-areas (Blocks) of the PSP, as allowed by the PSP and the Development Agreement, with no net change in total units allowed for development. Table 1 below and Figure 3 show the currently approved residential unit count by Block and the proposed shift in units between Blocks. Figure 3 also shows new Improvement Areas labelled A-K. These Improvement Areas are established to provide logical utility extensions and road improvements to service new development.

The proposed modification to MSA 2006-02 does not allow for any new uses or residential units that were not previously approved for the PSP and analyzed in the Previous Environmental Documentation.[2]

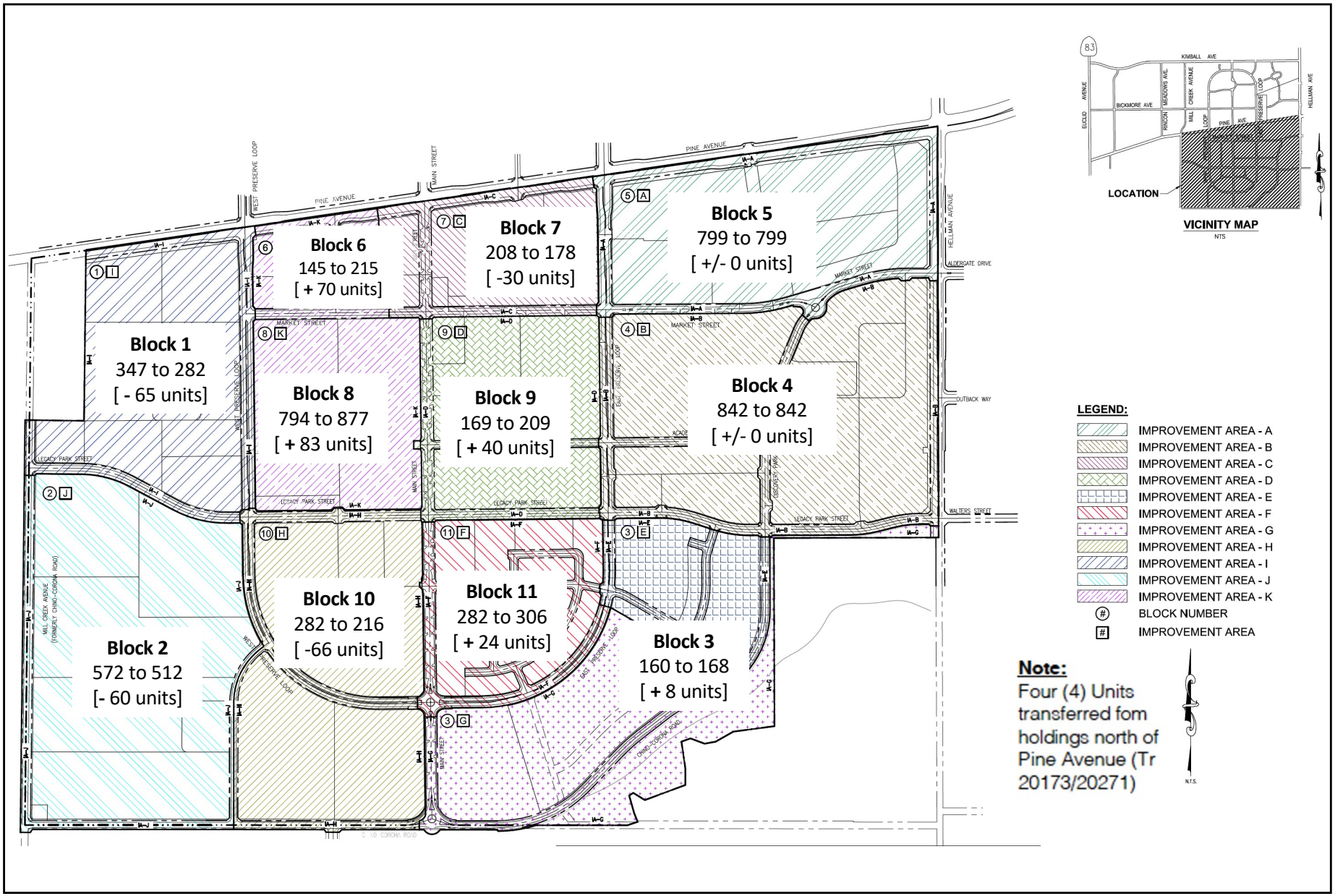
**Table 1:** Shift of Residential Units Within the Preserve

| Block Numbers | Entitled Residential Units | Proposed Residential Units | Difference |
|---|---|---|---|
| SOP Block 1 | 347 | 282 | -65 |
| SOP Block 2 | 572 | 512 | -60 |
| SOP Block 3 | 160 | 168 | 8 |
| SOP Block 4 | 842 | 842 | 0 |
| SOP Block 5 | 799 | 799 | 0 |
| SOP Block 6 | 145 | 215 | 70 |
| SOP Block 7 | 208 | 178 | -30 |
| SOP Block 8 | 794 | 877 | 83 |
| SOP Block 9 | 169 | 209 | 40 |
| SOP Block 10 | 282 | 216 | -66 |
| SOP Block 11 | 282 | 306 | 24 |
| Van Vliet PA-6 | 57 | 56 | -1 |
| Van Vliet PA-7 | 96 | 93 | -3 |
| **Total** | **4,753** | **4,753** | **0** |

- **Amended Tentative Tract Map 16420.** TTM 16420 will be modified to be consistent with the previously approved changes to the configuration of Main Street and other street sections.

- **Developer Modification of Conditions of Approval (PL 21-0031).** The conditions of approval for TTM 16420 will be modified to reflect the revisions to the proposed development of improvement areas within the PSPand the proposed revisions to TTM 16420. There are identified new Improvement Areas labelled A-K (see Figure 3). As explained above, these Improvement Areas are established to provide logical utility extensions and road improvements to service new development.

[2] These changes are all consistent with the Preserve SPA.




Source: Lewis Management Corp.

Figure 3. South of Pine – Block Unit Count Changes

- **BLOCK 9 ENTITLEMENTS**

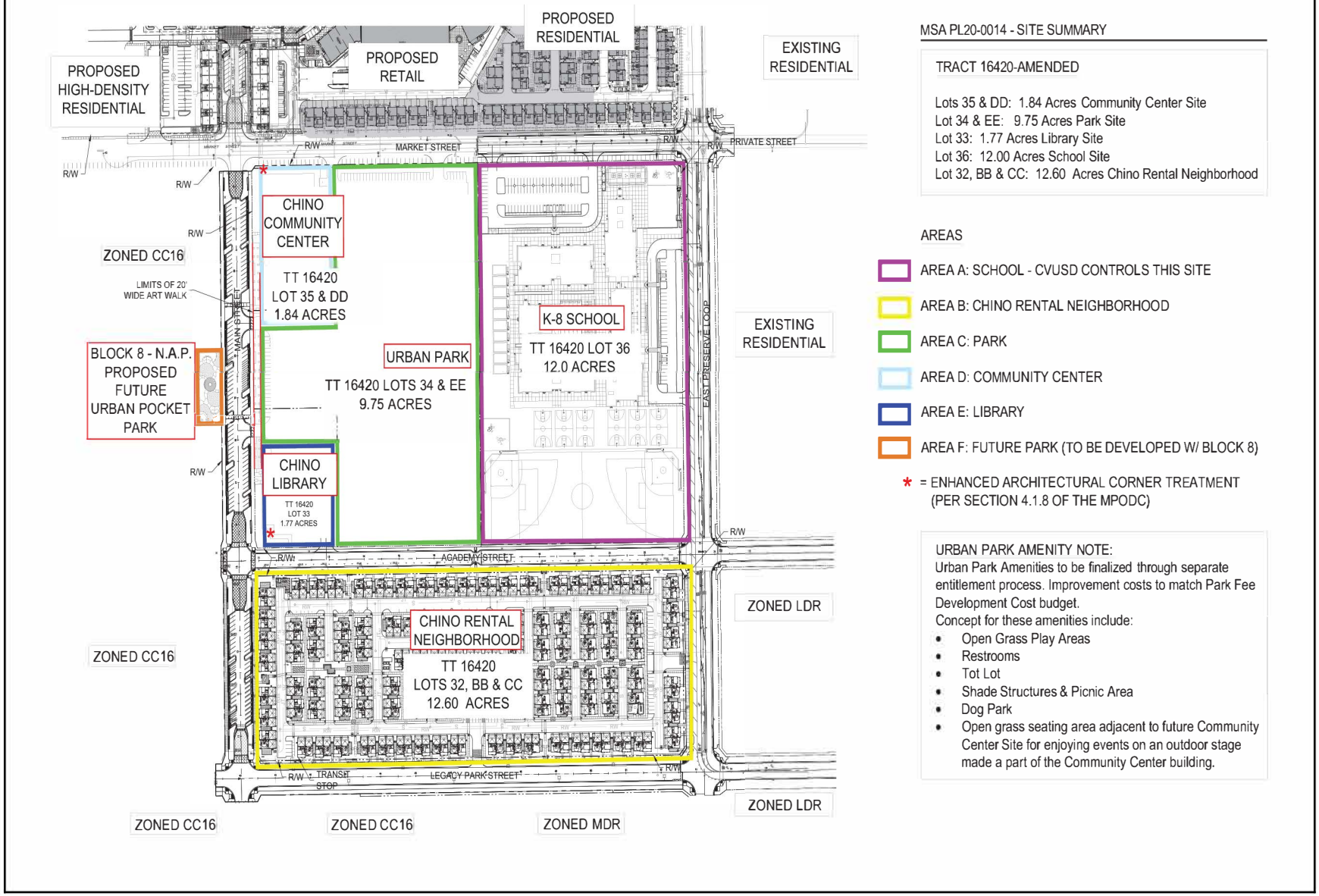
As shown on Figure 1, Block 9 is bounded by the extension of East Preserve Loop, vacant land, and existing residential uses on the east; proposed Legacy Park Street and vacant land to the south; proposed Main Street and agricultural property to the west; and proposed Market Street and vacant land to the north. Block 9 is currently vacant.

The Proposed Project includes the following approvals associated with development of Block 9:

- **Master Site Approval for the Block 9 Area (PL 21-0014).** The proposed Master Site Approval (MSA) would allow for development of a 37.96-acre sub-area referred to as SOP Block 9 with 209 residential units, an approximately 12-acre K-8 school site, an approximately 9.75-acre community park, a public community center, and a public library (refer to Figure 4).

- **Site Approval (PL 20-0062) and Tentative Tract Map 20380 (PL 21-0021).** The southern portion of Block 9 is proposed for development with residential uses. The Site Approval (SA) and Tentative Tract Map (TTM) 20380 allow for the construction of 209 multi-family homes in 105 buildings on a 12.60-acre site within Block 9 referred to as the Chino Rental Neighborhood. Each building has 2 units that are accessed by a shared paseo that leads to front entries with shared alleys that lead to garages.

  The Chino Rental Neighborhood is designated High Density Residential -16 (HDR-16) and Community Core -16 (CC-16) in the PSP. The average allowable density for the HDR-16 and CC-16 designations is between 12-20 dwelling units per acre (du/ac). The Chino Rental Neighborhood has an average density of 16.6 du/ac, consistent with the PSP.




Source: Lewis Management Corp, Sitescapes (10-27-2021)

Figure 4. Block 9 Master Site Plan

## 4 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

| | | | | | |
|---|---|---|---|---|---|
| ☐ | Aesthetics | ☐ | Agriculture and Forestry | ☐ | Air Quality |
| ☐ | Biological Resources | ☐ | Cultural Resources | ☐ | Energy |
| ☐ | Geology /Soils | ☐ | Greenhouse Gas Emissions | ☐ | Hazards & Hazardous Materials |
| ☐ | Hydrology / Water Quality | ☐ | Land Use / Planning | ☐ | Mineral Resources |
| ☐ | Noise | ☐ | Population / Housing | ☐ | Public Services |
| ☐ | Recreation | ☐ | Transportation | ☐ | Tribal Cultural Resources |
| ☐ | Utilities/Service Systems | ☐ | Wildfire | ☐ | Mandatory Findings of Significance |

## 5 DETERMINATION (TO BE COMPLETED BY THE LEAD AGENCY)

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☒ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Maria Staar

Signature Maria Staar, Senior Planner

February 10, 2022

Date
For: City of Chino

# 6 ENVIRONMENTAL IMPACT ANALYSIS

On the basis of the below evaluation, the City determines that the significant effects that would result from the Proposed Project have been addressed in an earlier certified EIR for The Preserve – Chino Sphere of Influence-Subarea 2 (State Clearinghouse #2000121036) (PSP EIR) and the subsequent addenda, and that none of the determinations set forth in the Public Resources Code Section 21166 and CEQA Guidelines Section 15162 can be established and, thus, an Addendum to the PSP EIR shall be prepared pursuant to CEQA Guidelines Section 15164, as set forth below.

## 6.1 AESTHETICS

### *6.1.1 Summary of PSP EIR Findings*

The most visible distant features from the PSP area are Santa Ana Mountains to the south, Chino Hills to the west, and the San Gabriel Mountains to the north. Middle and foreground views in the Specific Plan area vary depending on vantage point, topography, and vegetation. For example, visibility in the southern half of the area is significantly reduced due to an increased level of vegetation but increases in the open dairy pastures and cropland portions of the area due to relative lack of structures and vegetation. The PSP EIR observed that positive visual resources in the Specific Plan area included dairies and related agricultural uses, and other open space that create a pleasant, rural setting. Negative features include a lack of adequate infrastructure and adequate space between dairies, such that there is a lack of gutters, curbs, and sidewalks, and the diaries are too close together, creating a visual density and intensity that is unpleasant.

Potential adverse impacts upon visual resources were considered in the PSP EIR, including the potential effect upon scenic resources such as existing drainage courses; potential effect upon distant views of the Santa Ana Mountains, San Gabriel Mountains, and Chino Hills; potential effect of the project upon the existing visual character as established by the area's dairy operations; and the potential effect of increased light and glare caused by proposed urban development.

The PSP EIR found that no significant impacts would occur as a result of the Specific Plan. Implementation of the Specific Plan will change the visual character for the area north or above the 566' elevation due to the transition in land use from agricultural and dairy related uses to urban uses. However, due to the lack of scenic resources in that area, this transition will not represent a significant adverse effect. The visual character for the balance of the area below elevation 566' will not significantly change due to proposed open space, recreational, and agricultural land uses that will not only maintain the existing visual characteristic but restrict urban development due to the potential for flooding from Chino Dam.

The PSP EIR noted that the quality of views from surrounding hills toward the Specific Plan area will not be significantly affected due to a number of factors, including the distance to the Specific Plan area, proposed building height limitations, the effect of existing intervening landscaping, and proposed landscaping along master planned roadways. The PSP EIR also noted that light and glare will occur, predominately in the northerly portion of the Specific Plan area

due to the urban design proposed in that portion of the Specific Plan. However, the use of landscaping, directional lighting, and building design will reduce the potential level of impact to less than significant.

**Mitigation Program**

The PSP EIR concluded that because impacts would be less than significant, no mitigation measures were required.

### *6.1.2 Impact Analysis of Proposed Project*

| Environmental Issues<br><br>Aesthetic Impacts - Except as provided in Public Resources Code Section 21099, would the project: | New Significant Impact | More Severe Impacts | New Ability to Substantially Reduce Significant Impact | No Substantial Change from Previous Analysis | No Impact |
|---|---|---|---|---|---|
| a) Have a substantial adverse effect on a scenic vista? | ☐ | ☐ | ☐ | X | ☐ |
| b) Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway? | ☐ | ☐ | ☐ | X | ☐ |
| c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality? | ☐ | ☐ | ☐ | X | ☐ |
| d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area? | ☐ | ☐ | ☐ | X | ☐ |

**No Substantial Change from Previous Analysis.** The Proposed Project contemplates the same type and intensity of use as studied in the Previous Environmental Documentation, and would have the same impacts for the below-described reasons. As noted in the PSP EIR, progress toward buildout of the Specific Plan has resulted in a transition from dairy and agricultural uses to urban uses. As seen in Figure 1, much of the SOP area has been developed consistent with the Previous Environmental Documentation and there are no remaining

agricultural uses on the Blocks in SOP planned for development. Block 9 is vacant and has been cleared of all prior structures and dairy/agriculture use.

As described in the Previous Environmental Documentation, the Proposed Project will continue to change visual character in the SOP portion of the PSP Area with the transition to urban uses. Given the lack of scenic resources in the area, this transition will not represent a significant adverse effect. The City of Chino acknowledges, in its General Plan EIR, that views of the San Gabriel Mountains to the north, Chino Hills to the southwest, and Santa Ana Mountains to the south "contribute to the City's unique sense of place." As noted in the Previous Environmental Documentation, such views would generally be preserved due to the distance and planned land uses, including the Proposed Project, which is consistent with the land uses and intensities analyzed in Previous Environmental Documentation.

No scenic resources, or significant natural features have been identified within the vicinity of the Proposed Project. There are no officially designated scenic highways in the Proposed Project area. The nearest State highway with identified scenic value is SR-71, the closest point of which is located approximately 1.8 miles to the southwest of the Proposed Project Area. SR-71 is acknowledged by the California Department of Transportation (Caltrans) Scenic Highway Mapping System as an "Eligible State Highway," but has not been officially designated as a scenic highway. Euclid Avenue (SR-83, located approximately 1 mile west of the Proposed Project Area) is not included in the State's listing of scenic highways.

Any visual changes that could result from the Proposed Project development would be subject to development standards established under the PSP and applicable design guidelines. These development standards require all development in the PSP to incorporate site design and architectural elements that act to reduce its potential visual impacts and maintain views of off-site scenic resources.

With regard to light and glare, as noted in the Previous Environmental Documentation, the use of landscaping, directional lighting, and building design will reduce the potential level of impact to less than significant. The Proposed Project will comply with all development standards and applicable design guidelines.

**Finding:** The Proposed Project would not result in aesthetics impacts beyond those analyzed in Previous Environmental Documentation. The Proposed Project also does not increase the total number of units allowed in the PSP Area and is entirely consistent with the PSP land use designations, development standards and design guidelines. The Proposed Project includes the same type of construction and development that was previously considered and analyzed for the Proposed Project Area. As such, the Proposed Project does not include substantial changes, and none have occurred with respect to the circumstances under which the Project is undertaken, that would require revisions to the Previous Environmental Documentation due to new significant environmental effects or a substantial increase in severity of previously identified significant effects. Therefore, the Proposed Project will not result in any new or more significant impacts as compared to the prior analysis.

## 6.2 AGRICULTURAL RESOURCES

### *6.2.1 Summary of PSP EIR Findings*

The PSP EIR observed that at the time of study, the predominant land use in the Specific Plan area was agriculture, comprising approximately 4,190 acres or about 77 percent of the Specific Plan area in a mosaic of uses that include dairies, pasture, and croplands in the northerly 2/3, and fallow fields, crops, and other open space within the southerly 1/3. Of the land classified per Department of Conservation categories, there were 2,268 acres of Prime Farmland, 72 acres of Farmland of Statewide Importance, 136 acres of Farmland of Local Importance, 442 acres of Grazing Land, 459 acres of Urban and Built-Up Land, and 2,058 acres of Other Land. The Specific Plan area is also in the San Bernardino Agricultural Preserve, and many acres of the Specific Plan area were under Williamson Act contracts, which remain in effect for 10 years and renew automatically each year unless the property owner files a notice of non-renewal with the County of San Bernardino or unless the landowner and local land use planning jurisdiction mutually agree upon a cancellation.

The PSP EIR concluded that the implementation of the Specific Plan would accelerate the conversion of prime agricultural land and prime farmland to urban uses, including through the acceleration of Williamson Act contract non-renewals and/or cancellation notices on the then-remaining 1,148 acres under contract within the Specific Plan area. It concluded that this is a significant and unavoidable impact of the Specific Plan and is also cumulatively significant within the greater Chino Basin Dairy Area. With regard to indirect impacts, without managed access, buffers, and other measures to protect remaining farmlands, land use conflicts may arise that would ultimately lead to the conversion of farmland to non-agricultural use. The PSP EIR estimated that buildout of the Specific Plan would result in the conversion of 1,256 acres of Prime Farmland to non-agricultural use, which is 56% of the Prime Farmland. The PSP EIR further concludes that loss of agricultural productivity would occur and be a significant impact, and cumulatively significant from a regional perspective. Despite the implementation of Mitigation Measures AG-1 Agricultural Land Preservation and AG-2 Agency Coordination and Planning for Agricultural Uses, impacts would remain significant and unavoidable.

**Mitigation Program**

The PSP EIR included Mitigation Measures AG-1 and AG-2 (see Appendix B). These Mitigation Measures are not applicable to the Proposed Project.

### *6.2.2 Impact Analysis of Proposed Project*

| Environmental Issues<br><br>Agricultural and Forestry Resources - In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are | New Significant Impact | More Severe Impacts | New Ability to Substantially Reduce Significant Impact | No Substantial Change from Previous Analysis | No Impact |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project: | | | | | |
| a) Convert prime farmland, unique farmland, or farmland of statewide importance (farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? | □ | □ | □ | X | □ |
| b) Conflict with existing zoning for agricultural use, or a Williamson Act contract? | □ | □ | □ | X | □ |
| c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))? | □ | □ | □ | X | □ |
| d) Result in the loss of forest land or conversion of forest land to non-forest use? | □ | □ | □ | X | □ |
| e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to nonagricultural use or conversion of forest land to non-forest use | □ | □ | □ | X | □ |

**No Substantial Change from Previous Analysis.** According to the California Department of Conservation's Farmland Mapping and Monitoring Program, portions of the Proposed Project Area are designated Prime Farmland, with the remainder designated Other Land.[3] The Proposed Project would allow for development of residential units on Block 9, which is entirely within the physical impact area evaluated in the PSP EIR. There are no active Williamson Act Land Conservation Contracts on Block 9 and that area is not located within lands covered by the former Agricultural Overlay. Furthermore, there are no active agricultural animal uses within 100 feet of Block 9. Development of all areas SOP and its impacts were specifically analyzed in the Previous Environmental Documentation. Development and land uses proposed by the Proposed Project are consistent with physical impact area, development, and uses analyzed under the Previous Environmental Documentation.

To offset conversion impacts to the extent feasible, the PSP EIR identified two mitigation measures--City participation in the Williamson Act Easement Exchange Program (Mitigation

[3] https://maps.conservation.ca.gov/DLRP/CIFF/

Measure AG-1), and City participation in a coordinated multi-agency planning program for sustainable agricultural uses within the Lower Chino/Prado Basin (Mitigation Measure AG-2). No additional feasible mitigation measures are available for the conversion of farmlands. Consistent with these measures, the City of Chino has participated in the Williamson Act Easement Exchange Program and conducted a coordinated multi-agency planning program for sustainable agricultural uses within the Lower Chino/Prado Basin.

No forest lands or timberlands within the meaning of Public Resources Code sections 12220(g), 4526 or Government Code section 51104(g) are impacted by the Proposed Project. The PSP is not zoned for forest land or timberland, and no forest land exists within or in the vicinity of the PSP. Therefore, the Proposed Project would not lead to substantial changes that would require revisions to the Previous Environmental Documentation due to new significant environmental effects.

**Finding:** The Proposed Project would not result in agricultural land use impacts beyond those analyzed in Previous Environmental Documentation. The Proposed Project does not involve any changes to zoning, allowable use, density, intensity of use, or physical impact area. The Proposed Project also does not increase the total number of units allowed in the PSP Area and is entirely consistent with the PSP land use designations and development standards. The Proposed Project includes the same type of construction and development that was previously considered and analyzed for the Proposed Project Area. As such, the Proposed Project does not include substantial changes, and none have occurred with respect to the circumstances under which the Project is undertaken, that would require revisions to the Previous Environmental Documentation due to new significant environmental effects or a substantial increase in severity of previously identified significant effects. Therefore, the Proposed Project will not result in any new or more significant impacts as compared to the prior analysis.

## 6.3 AIR QUALITY

### *6.3.1 Summary of PSP EIR Findings*

The PSP EIR notes that smog resulting from Chino's local climate conditions sometimes gives western San Bernardino County some of the worst air quality in California, and the PSP EIR concluded that the Specific Plan was expected to continue to experience some unhealthful air quality for at least two more decades. The PSP EIR specifically identified the dairy uses in the area as major contributors to elevated levels of PM10, reactive organic gases, ammonia, hydrogen sulfide and methane generated by manure decomposition, methane generated during digestion, equipment exhaust used in dairy operation, and on-road vehicle exhaust from dairy-related traffic.

To evaluate air quality impacts, the PSP EIR compared anticipated Specific Plan emissions against the South Coast Air Quality Management District (SCAQMD)'s relevant emission thresholds, in addition to also asking whether implementation of the Specific Plan would interfere with the attainment of federal or state ambient air quality standards by either violating or contributing to an existing or project air quality violation, whether it could result in population increases within the regional statistical area which would be in excess of that

projected in the relevant Air Quality Management Plan for the buildout year, and whether it could generate vehicle rips that cause a CO hot spot.

Construction Impacts

The PSP EIR concluded that construction activity impacts would include temporary emissions of fugitive dust from soil disturbance and combustion emissions from on-site construction equipment and from off-site trucks moving dirt, delivering construction materials, and from worker travel. While a successful dust control program undertaken per SCAQMD rules would reduce impacts between 50-80 percent, even with this reduction, the daily PM10 emissions would exceed the SCAQMD significance threshold. Achieving a less than significant impact would require limitation of the daily disturbance area to approximately 15 acres per day.

Exhaust emissions from on- and off-site heavy equipment usage and mobile source emissions from construction workers were determined to add additional emissions, but emissions would stay below SCAQMD significance thresholds for ROG, CO, and SOx, while the emissions for PM10 would continue to exceed thresholds, and emissions for NOx would also exceed thresholds per PSP EIR Table 5.9-6. The mobile nature of on-site construction equipment and off-site trucks would prevent localized violation of the NOx or other standards. Truck exhaust impacts can be minimized by controlling construction routes to reduce interferences with non-project traffic patterns and preclude truck queuing or idling near sensitive receptor sites. The PSP EIR concluded that with mitigation incorporated to keep equipment in good tune, average daily construction equipment emissions would be reduced, but not to a less than significant level during maximum daily grading activity.

Operational Impacts

The PSP EIR concludes that vehicle trips resulting from Specific Plan development would be the largest source of operational impacts, with 71,500 vehicle trips per day by 2010 and 192,500 daily trips by 2020 (Specific Plan buildout). With typical San Bernardino County trip lengths of 10 miles per trips, the PSP EIR estimated 766,000 vehicle miles traveled ("VMT") in 2010, and 2.4 million VMT per day in 2020. Impacts would also derive from energy consumption such as in power plants, on-site heaters, stoves, and water heaters, and while individual sources would not exceed emission thresholds, combined emissions from the Specific Plan area could be substantial. Operational impacts from combined vehicle trips and other sources were therefore concluded to be significant. The replacement of dairy operations with urban development would cause CO and NOx emissions to increase and cause ROG and PM10 emissions to decrease, as indicated in PSP EIR Table 5.9-8. The PSP EIR concluded that operational impacts level of significance after mitigation would be significant and unavoidable.

Odors

The development of urban uses near dairy uses would result in odor impacts for urban users, which would represent an impact of the environment on the project rather than the project on the environment. Odor impacts on sensitive uses are anticipated to be significant during the transition period to urban use.

Air Quality Plans

The PSP EIR evaluated the impact significance from growth-associated emissions with regard to both the size of the project (implementation of the Specific Plan) and magnitude of its emissions, and whether such growth had been properly anticipated in the regional air quality planning process. The growth assumptions in the 1994 Regional Comprehensive Plan called for an increase of over 1,000,000 residents in western San Bernardino County between 2000-2025 and an increase of 520,000 jobs. The PSP EIR therefore concluded that while the conversion of agricultural land to more transportation-intensive land use would result in increased emissions, this land use was regionally anticipated and planned for from an air quality perspective. Implementation of the Specific Plan was therefore considered to be consistent with regional jobs/housing balance and air quality goals and is superior to the no-project alternative in this regard.

With regard to the possibility for traffic congestion to contribute to localized air pollution standard violations (create a "CO hotspot"), the PSP EIR used a screening procedure based upon the California roadway dispersion model CALINE4, run on a large number of roadways surrounding the Specific Plan area. Intersections operating at LOS D or worse were analyzed, and the PSP EIR concluded that with the advent of cleaner cars during Specific Plan buildout and the construction of recommended roadway improvements, impacts would be incremental and less than significant.

Conclusion

The PSP EIR concluded that even with the incorporation of Mitigation Measures AQ-1 Mobile Source Emissions/Transit and AQ-2 Construction Emissions, construction-related emissions impacts would continue to be significant and unavoidable. The EIR further concluded that although implementation of the Specific Plan is consistent with regional growth projections, favorable with respect to jobs/housing balance goals, and includes a local transit system with significant potential air quality benefits, project-related emissions could not be reduced to levels considered less than significant by SCAQMD. Further, because implementation of the Specific Plan is in a non-attainment region, any significant release of air emissions would contribute to a cumulatively adverse impact on required air quality, and implementation of the Specific Plan would therefore have a cumulatively significant impact on air quality. The Chino City Council adopted findings that "specific economic, legal, social, technological or other considerations, including provision of employment opportunities for highly trained workers, make infeasible any additional mitigation measures or alternatives identified in the Final EIR."

**Mitigation Program**

The PSP EIR included mitigation measures AQ-1 and AQ-2 (see Appendix B). Mitigation AQ-2 is applicable to the Proposed Project.

### *6.3.2 Impact Analysis of Proposed Project*

| Environmental Issues<br><br>Air Quality - Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project: | New Significant Impact | More Severe Impacts | New Ability to Substantially Reduce Significant Impact | No Substantial Change from Previous Analysis | No Impact |
|---|---|---|---|---|---|
| a) Conflict with or obstruct implementation of the applicable air quality plan? | ☐ | ☐ | ☐ | X | ☐ |
| b) Result in cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard? | ☐ | ☐ | ☐ | X | ☐ |
| c) Expose sensitive receptors to substantial pollutant concentrations? | ☐ | ☐ | ☐ | X | ☐ |
| d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people? | ☐ | ☐ | ☐ | X | ☐ |

**No Substantial Change from Previous Analysis.** The Proposed Project does not propose any change in land use designations, nor any increase in development intensity beyond that currently anticipated for the Proposed Project Area. Because the land uses and development intensities proposed by the Proposed Project are consistent with the currently adopted City General Plan and applicable zoning standards, the Proposed Project is consistent with SCAQMD's Air Quality Management Plan.

The PSP EIR found that NOx and PM-10 construction emissions will exceed daily threshold levels, and operational emissions levels will exceed daily threshold levels for ROG, NOx, CO, and PM-10. The 2008 Addendum analyzed emissions of fine particulate matter with a diameter of 2.5 microns or less (PM2.5) and assessed localized impacts from on-site emissions based on SCAQMD's "localized significance thresholds" (LSTs) and concluded that construction would not result in any new or more significant impacts for both PM2.5 and LST. The Proposed Project would not increase the total number of units allowed in the PSP Area and is entirely consistent with the PSP land use designations. In addition, the construction impact area, construction activities, and construction equipment would not change. Further, construction equipment would be cleaner now as compared to what was analyzed in the Previous Environmental Documentation due to more stringent regulations now in effect. Therefore, there are no new or more significant impacts than those disclosed in previous CEQA analysis for the Proposed Project Area. As such, even though the construction emissions may be reduced, the previously identified impacts will remain consistent and adopted threshold levels referenced in the PSP EIR will be exceeded, and the impacts will remain significant and unavoidable.

Although the adopted mitigation measures will lessen the amount of construction-related air quality emissions, they will not reduce the level of impact to less than significant. This condition will remain since the proposed land uses are consistent with the adopted Specific Plan and construction activities have not changed. In addition to the mitigation measures in the PSP EIR, the Proposed Project will comply with the following voluntary condition of approval to further reduce construction emissions:

> (Construction Emissions) During grading activity, all equipment greater than 100 horsepower shall be, at a minimum, meet the CARB Tier 3 Certification or better and CARB Tier 4 Certified equipment shall be used, if such equipment is available.

A Traffic Study was prepared by LLG, included as Appendix E attached hereto, that indicates that the shift of residential units included in the Proposed Project (in addition to previously approved changes to commercial uses on Blocks 6 and 7) will result in 4,868 less total trips in the SOP area than what was analyzed in 2019 by the City (Block 4 Addendum) and 182 less total trips in the SOP area than what was analyzed in the 2008 Addendum.[4] Therefore, the operational air quality emission impacts resulting from the Proposed Project would be similar to or less than those disclosed in the Previous Environmental Documentation due to the reduction in vehicular emissions and would remain significant and unavoidable.

Finally, as explained in Section 6.7 below, the City adopted its 2020-2030 Climate Action Plan in November 2020. The Proposed Project will comply with the Climate Action Plan and its Implementing Ordinance (Municipal Code Chapter 15.45) which require increased energy efficiency and provisions for electric vehicle charging stations. As a result of these and other state mandated changes, the operational and construction air quality impacts of the Proposed Project would be less than those disclosed in the Previous Environmental Documentation, but would remain significant and unavoidable.

**Finding:** The Proposed Project would not result in air quality impacts beyond those analyzed in Previous Environmental Documentation. The Proposed Project does not involve any changes to zoning, allowable use, density, or intensity of use. The Proposed Project also does not increase the total number of units allowed in the PSP Area and is entirely consistent with the PSP land use designations and development standards. The Proposed Project includes the same type of construction and development that was previously considered and analyzed for the Proposed Project Area. As such, the Proposed Project does not include substantial changes, and none have occurred with respect to the circumstances under which the Project is undertaken, that would require revisions to the Previous Environmental Documentation due to new significant environmental effects or a substantial increase in severity of previously identified significant effects. Therefore, the Proposed Project will not result in any new or more significant impacts as compared to the prior analysis.

[4] The Block 4 Addendum and 2008 Addendum are discussed and described in further detail in Appendix A.

## 6.4 BIOLOGICAL RESOURCES

### *6.4.1 Summary of PSP EIR Findings*

The PSP EIR analyzed potential impacts to biological resources on a programmatic level and identified specific mitigation measures to be applied to individual projects proposed within the Master Plan area to reduce impacts to a less than significant level. Impacts concluded to be significant and unavoidable despite the incorporation of all feasible mitigation measures include: (1) Loss of burrowing owl habitat – the loss of burrowing owl nesting and foraging habitat within the Specific Plan area was determined to be significant at the project level and cumulatively significant at the regional level and (2) Loss of raptor habitat – the loss of raptor foraging habitat would contribute to a cumulatively significant adverse impact at the regional level. Proposed development will result in the loss of most of the remaining ruderal plant species within the northern portion of the Specific Plan area above the 566' line. Without adequate mitigation, additional impacts to sensitive biological resources below the 566' elevation line could occur from uncontrolled stormwater discharges from planned development above the 566' elevation.

Without resource protection and management measures, Specific Plan implementation could result in significant impacts to the following resources: Loss of Surface Water and Riparian Habitat, Least Bell's Vireo Critical Habitat, Southwestern Willow Flycatcher Habitat, Western Yellow-Billed Cuckoo Habitat, Windrows and Agricultural Fields, Migratory Corridors and Delhi Sands Flower-loving Fly Recovery Area. With the implementation of Mitigation Measures B-2 and B-3, the PSP EIR found these impacts less than significant.

Water bodies likely to fall under the jurisdiction of the U.S. Army Corps of Engineers and California Department of Fish and Game are included within a variety of Open Space plan designations. Any development activity proposed within wetlands and jurisdictional drainages would be mitigated to less than significant levels, or permits would not be issued.

**Mitigation Program**

The PSP EIR included mitigation measures B-1, B-2, and B-3 (see Appendix B). Mitigation Measure B-2 requires specific projects to prepare subsequent general or focused assessments of biological resources as appropriate, and as such, a focused biological assessment shall be performed prior to the issuance of any grading permit.

A primary mitigation measure for biological resources impacts is implementation of the Resource Management Plan (RMP) for The Preserve. Approved by the City of Chino with the certification of the PSP EIR, the RMP provides a detailed methodology for implementing the biological resources mitigation measures in the EIR, including reporting and monitoring of compliance with such measures. The Proposed Project will comply with the Approved RMP.

### *6.4.2 Impact Analysis of Proposed Project*

| Environmental Issues<br><br>Biological Resources - Would the project: | New Significant Impact | More Severe Impacts | New Ability to Substantially Reduce Significant Impact | No Substantial Change from Previous Analysis | No Impact |
|---|---|---|---|---|---|
| a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service? | ☐ | ☐ | ☐ | X | ☐ |
| b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service? | ☐ | ☐ | ☐ | X | ☐ |
| c) Have a substantial adverse effect on state or federally protected (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? | ☐ | ☐ | ☐ | X | ☐ |
| d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? | ☐ | ☐ | ☐ | X | ☐ |
| e) Conflict with any local policies or ordinances related to protecting biological resources, such as a tree preservation policy or ordinance? | ☐ | ☐ | ☐ | X | ☐ |
| f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan? | ☐ | ☐ | ☐ | X | ☐ |

**No Substantial Change from Previous Analysis.** The Proposed Project does not involve any changes to zoning, allowable use, density, or intensity of use, and the physical impact area of the Proposed Project remains unchanged. All development within the PSP is required to comply with all mitigation measures from the PSP EIR. There have been no changed circumstances surrounding the Proposed Project Area. With regard to protected species, all blocks in the Proposed Project Area that are proposed for development are located above the 566' elevation

line and are not in an area mapped for high biological resource sensitivity (see PSP EIR, Exhibit 5.4-2). PSP EIR Mitigation Measure B-2 requires biological assessment of each project site prior to the issuance of grading permits. The biological assessment, among other things, identifies habitat types present on the site and the potential to support sensitive species or habitat.

As noted above and as identified in Previous Environmental Documentation, the Proposed Project Area contains potential habitat for burrowing owls and raptor foraging land. Burrowing owls are known to occur at dairy properties, especially after operations cease and properties become vacant, or when features such as earthen mounds or berms can support burrows of sufficient size. PSP EIR Mitigation Measure B-2 requires a focused survey to be conducted if the potential for occurrence of a special status species is moderate or high. In addition, all development in the Proposed Project Area will comply with the City of Chino RMP (developed in compliance with PSP EIR Mitigation Measure B-3, which requires the City to develop an RMP to provide for implementation of measures to reduce impacts on biological resources in the Proposed Project Area, including for burrowing owls) and the 2012 CDFW Staff Report on Burrowing Owl Mitigation.

With regard to riparian habitat and protected wetlands, pursuant to the PSP EIR, there are no known jurisdictional waters in the Proposed Project Area, including waters of the United States subject to the jurisdiction of the Corps and Regional Board, or waters of the State subject to the jurisdiction of CDFW. There have been no changes to site conditions that would change this characterization and the physical impact area has not changed. In addition, the biological assessment required for each project site prior to the issuance of a grading permit pursuant to PSP EIR Mitigation Measure B-2 will confirm the absence of any jurisdictional waters prior to issuance of a grading permit. If waters of the U.S. are present, project developers will coordinate with USACE regarding permitting.

With regard to the movement of native resident or migratory species, as described in the PSP EIR, within the developed and agricultural areas above the 566' line, there are no significant wildlife movement corridors. Wildlife movement is predominantly limited to opportunistic species, and significant water bodies that would otherwise attract migratory waterfowl do not occur within the limits of the Proposed Project Area. The Proposed Project Site is also not within an area covered by a Habitat Conservation Plan or Natural Community Conservation Plan.

**Finding**: The Proposed Project would not result in impacts to biological resources beyond those analyzed in Previous Environmental Documentation. The Proposed Project does not involve any changes to zoning, allowable use, density, intensity of use, or physical impact area. The Proposed Project also does not increase the total number of units allowed in the PSP Area and is entirely consistent with the PSP land use designations and development standards. The Proposed Project includes the same type of construction and development that was previously considered and analyzed for the Proposed Project Area. As such, the Proposed Project does not include substantial changes, and none have occurred with respect to the circumstances under which the Project is undertaken, that would require revisions to the Previous Environmental Documentation due to new significant environmental effects or a substantial increase in severity of previously identified significant effects. Therefore, the Proposed Project will not result in any new or more significant impacts as compared to the prior analysis.

## 6.5 CULTURAL RESOURCES

### *6.5.1 Summary of PSP EIR Findings*

The PSP EIR concluded that without mitigation, proposed development of the Specific Plan area could have an adverse impact on as yet undiscovered significant archaeological resources. There is a significant potential that additional prehistoric materials will be encountered during earth-disturbance activities within planned development areas. Future recreational or agricultural uses within the planned open space system could also have the potential to disturb or destroy recorded or as yet undiscovered archaeological resources within these areas.

The PSP EIR identified forty-five (45) recorded historic sites within the Specific Plan area, with most of these located in the planned open space area. However, proposed development of the Specific Plan area could have an adverse impact on significant historic resources without mitigation, because additional as yet unrecorded historic resources could be encountered during earth-disturbing activities. Significant paleontological resources could also be encountered during earth-moving activities. Older alluvium in the region and within the Specific Plan area has a high paleontological sensitivity as a primary source of significant vertebrate fossils. Proposed development of the Specific Plan area could therefore have an adverse impact on significant paleontological resources without mitigation.

**Mitigation Program**

To reduce potential impacts to archaeological, historic, and paleontological resources to less than significant levels, the PSP EIR identified Mitigation Measures CR-1, CR-2, and CR-3 (see Appendix B). Mitigation Measure CR-1 requires a cultural resources survey prior to issuance of a grading permit. Mitigation Measures CR-1, CR-2, and CR-3 are applicable to the Proposed Project.

### *6.5.2 Impact Analysis of Proposed Project*

| Environmental Issues<br><br>Cultural Resources – Would the project: | New Significant Impact | More Severe Impacts | New Ability to Substantially Reduce Significant Impact | No Substantial Change from Previous Analysis | No Impact |
|---|---|---|---|---|---|
| a) Cause a substantial adverse change in the significance of a historical resource pursuant to CEQA Guidelines Section 15064.5? | ☐ | ☐ | ☐ | X | ☐ |
| b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5? | ☐ | ☐ | ☐ | X | ☐ |

| | | | | | |
|---|---|---|---|---|---|
| c) Disturb any human remains, including those interred outside of formal cemeteries? | □ | □ | □ | X | □ |

**No Substantial Change from Previous Analysis.** Mitigation Measure CR-1 requires that an archeological survey be conducted prior to all earth disturbing activities within the Specific Plan area. In compliance with PSP EIR Mitigation Measure CR-1, a Phase 1 Cultural Resources Investigation will be completed prior to any grading activities in the PSP Area. However, as the PSP EIR notes, the potential to encounter previously undiscovered resources during construction remains. Where recommended in culturally-sensitive areas, Mitigation Measure CR-2 requires archeological monitoring of earth-disturbing activities. The Proposed Project would implement Mitigation Measures CR-2 and recommendations in the required investigative report to ensure that impacts are less than significant. Therefore, the Proposed Project, which is within the physical impact area addressed in the PSP EIR, would not lead to substantial changes that would require revisions to the Previous Environmental Documentation due to new significant environmental effects. See further discussion of this issue under Tribal Cultural Resources.

**Finding:** The Proposed Project would not result in impacts to cultural resources beyond those analyzed in Previous Environmental Documentation. The Proposed Project does not involve any changes to zoning, allowable use, density, intensity of use, or physical impact area. The Proposed Project also does not increase the total number of units allowed in the PSP Area and is entirely consistent with the PSP land use designations and development standards. The Proposed Project includes the same type of construction and development that was previously considered and analyzed for the Proposed Project Area. As such, the Proposed Project does not include substantial changes, and none have occurred with respect to the circumstances under which the Project is undertaken, that would require revisions to the Previous Environmental Documentation due to new significant environmental effects or a substantial increase in severity of previously identified significant effects. Therefore, the Proposed Project will not result in any new or more significant impacts as compared to the prior analysis.

## 6.6 ENERGY

### *6.6.1 Summary of PSP EIR Findings*

The PSP EIR did not formally analyze potential energy impacts. State CEQA Guidelines Appendix G checklist thresholds were updated by the State Office of Planning and Research after publication of the PSP EIR. The current State CEQA Appendix G checklist contains separate thresholds for Energy, which are incorporated into this Addendum, and shown in the checklist below. The Previous Environmental Documentation included an energy discussion based on the CEQA requirements formerly contained in Appendix F.

With regard to electricity, the PSP EIR concluded that buildout would result in an electrical demand of 164,547,624 megawatts per hour per year, requiring the implementation of new service lines and support facilities. The PSP EIR indicated this demand would be 33

percent for residential use, 27 percent for industrial use, and 40 percent for commercial uses. However, because electrical demand and electrical provision to the PSP Area would be phased over 20 years and the City has the opportunity to coordinate for service with SCE during that time frame, it can ensure that adequate new facilities are provided. As noted above, the SCE 66kv Realignment is located within the PSP project area, would not represent an increase in transmission capacity, and would simply relocate existing transmission poles and lines to right-of-way/private property in disturbed areas adjacent to existing paved roads within the PSP Area.

The PSP EIR also noted that new development would be required to comply with Title 24 of the California Code of Regulations, regarding efficient use of energy resources, and all other State and/or City Regulations that address energy use. Further, Mitigation Measure U-E-1 is incorporated to encourage the use of energy efficient and natural lighting where practical. However, the PSP EIR indicated that buildout of the specific plan may cause cumulatively significant impacts because of then-current electrical shortfall in the western United States and the then-unknown nature of future demand.

### *6.6.2 Impact Analysis of Proposed Project*

| Energy Impacts- Would the project: | New Significant Impact | More Severe Impacts | New Ability to Substantially Reduce Significant Impact | No Substantial Change from Previous Analysis | No Impact |
|---|---|---|---|---|---|
| a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation? | ☐ | ☐ | ☐ | X | ☐ |
| b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency? | ☐ | ☐ | ☐ | X | ☐ |

**No Substantial Change from Previous Analysis.** The Proposed Project would not encourage activities resulting in large amounts of fuel, water, or energy that were not already studied in the Previous Environmental Documentation, nor would it result in wasteful energy use. First, the Proposed Project would result in growth and use types consistent with the land use plan analyzed in the Previous Environmental Documentation, and its energy demand would therefore fall within the amount assumed for residential development, development of the school, library, community center, and park. The Proposed Project would not increase the total number of dwelling units currently allowed within the PSP and is entirely consistent with the PSP land use designations. Therefore, the impacts of the Proposed Project are less than those disclosed in previous CEQA analysis for the PSP Area.

Second, Title 24 requirements have become far more stringent since the publication of the PSP EIR. Uses associated with the Proposed Project are subject to appliance, whole-

building, and construction material efficiency standards contained in both Title 20 and Title 24 of the California Code of Regulations. These include stringent energy efficiency requirements for items such as roofs/ceilings and insulation, walls, flooring, heating and cooling appliances, bathroom and kitchen appliances. With regard to fuel, the Proposed Project is accessible to public transit options, which will reduce fuel use. Further, state fuel efficiency requirements have become far more stringent since the publication of the PSP EIR. The Proposed Project must also comply with SCAQMD Rules, and CARB regulations for vehicles and equipment. For example, under existing law, diesel-fueled motor vehicles with a gross vehicle weight rating greater than 10,000 pounds must comply with a prohibition from idling for more than 5 minutes at any location. With regard to water use, Part 11 of Title 24 contains water efficient fixture requirements for all types of appliances, including showerheads, bathroom faucets, kitchen faucets, toilets, urinals, dishwashers, and clothes washers.

Finally, as explained above in Section 3.7, the Proposed Project will comply with the City's Climate Action Plan which mandates energy efficiency. The Proposed Project will not cause wasteful or excessive energy use, and the impact would be less than significant.

**Finding:** The Proposed Project would not result in energy impacts beyond those analyzed in Previous Environmental Documentation. The Proposed Project does not involve any changes to zoning, allowable use, density, or intensity of use. The Proposed Project also does not increase the total number of units allowed in the PSP Area and is entirely consistent with the PSP land use designations and development standards. The Proposed Project includes the same type of construction and development that was previously considered and analyzed for the Proposed Project Area. As such, the Proposed Project does not include substantial changes, and none have occurred with respect to the circumstances under which the Project is undertaken, that would require revisions to the Previous Environmental Documentation due to new significant environmental effects or a substantial increase in severity of previously identified significant effects. Therefore, the Proposed Project will not result in any new or more significant impacts as compared to the prior analysis.

## 6.7 GEOLOGY AND SOILS

### *6.7.1 Summary of PSP EIR Findings*

As noted in the PSP EIR, the Specific Plan area is underlain by Pleistocene and Holocene alluvium. With regard to the geotechnical properties of surficial geologic units, the PSP EIR concluded that no significant impacts will occur as a result of the implementation of the Specific Plan, provided that individual projects adhere to detailed geotechnical and soils studies and that grading operations will be conducted in accordance with a soils report specific to a development project.

With regard to faults and seismicity, the EIR noted the existence of a potential trace of the Central Avenue fault traversing the southwesterly portion of the Specific Plan area. However, this potential fault is located beyond the boundaries of PSP Area and is an area proposed for open space uses, so no significant impact is anticipated. Geomorphologic features ("lineaments") parallel to the Central Avenue and Chino faults were also observed south of Pine Avenue and are likely related to faulting. They indicate the potential for ground rupture from a

possible severe local earthquake on the Chino-Elsinore fault zone, severe ground shaking from a moderate-to-severe earthquake under the basin, and different movement and ground fissures from local subsidence and groundwater withdrawal.

As discussed in the PSP EIR, absent mitigation, a potentially significant impact for horizontal ground acceleration would occur because the accelerations for the Maximum Probable Earthquake on the site were measured at approximately 0.45 to 0.55 g, in excess of the 0.4 g threshold of significance. However, compliance with building codes and engineering investigation report requirements would reduce this impact to a less than significant level.

With regard to liquefaction, the PSP EIR concluded that potential impacts increase through the Specific Plan area from north to south, generally corresponding with reduced groundwater depth, and individual projects will require study. As explained in the PSP EIR, mitigation measures established for development in liquefaction-prone zones include excavation and removal or recompaction liquefiable soils, in situ ground densification, ground modification and improvements, deep foundations, reinforced shallow foundations, and reinforced structures to resist deformation during liquefaction. Incorporation of such measures would ensure less than significant impacts. However, the 2008 Addendum noted that the minor shifts in development use and density in the SOP area in that case would have no appreciable impact on geologic conditions.

With regard to subsidence, ground fissures near the California Institution for Men suggest that subsidence has occurred and that there is significant potential for further subsidence throughout the Specific Plan area. The PSP EIR suggests the incorporation of project-specific measures to mitigate any potential impacts.

With regard to groundwater, depths generally decrease from the northerly portion of the Specific Plan area to the southerly boundary of the adopted Specific Plan. Documentation prepared for the PSP EIR found depths ranging from 100 feet at the northeast corner of the Specific Plan area to less than 30 feet in the southern portions of the Specific Plan area. The PSP EIR suggests the incorporation of project-specific measures to mitigate any potential impacts.

In conclusion, the PSP EIR determined that numerous federal, state, and local laws, regulations, codes, and policies in effect to mitigation geologic and seismic hazards. While geologic and seismic hazards would be expected to be adverse and potentially cause significant impacts without mitigation, conformance with Mitigation Measure GS-1, standard measures, code requirements, and recommendations of detailed geotechnical and soils engineering studies required for subsequent development projects would reduce impacts to a less than significant level. Impacts to mineral resources were also evaluated and found to have no impact as there are no known mineral resources in the area.

**Mitigation Program**

The PSP EIR included Mitigation Measures GS-1, GS-2 and GS-3 (see Appendix B). In compliance with Mitigation Measure GS-1, a site specific geotechnical and soils engineering study must be prepared for all development in the PSP area prior to the issuance of a grading permit. The grading operations will comply with the geotechnical study, as required by

Mitigation Measure GS-3. Any further grading operations and construction will also comply with the geotechnical study, as required by Mitigation Measures GS-2 and GS-3.

### *6.7.2 Impact Analysis of Proposed Project*

| Environmental Issues<br><br>Geology and Soils - Would the project: | New Significant Impact | More Severe Impacts | New Ability to Substantially Reduce Significant Impact | No Substantial Change from Previous Analysis | No Impact |
|---|---|---|---|---|---|
| a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:<br><br>i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42<br>ii. Strong seismic ground shaking?<br>iii. Seismic-related ground failure, including liquefaction?<br>iv. Landslides? | ☐ | ☐ | ☐ | X | ☐ |
| b) Result in substantial erosion or loss of topsoil? | ☐ | ☐ | ☐ | X | ☐ |
| c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse? | ☐ | ☐ | ☐ | X | ☐ |
| d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code, creating substantial direct or indirect risks to life or property? | ☐ | ☐ | ☐ | X | ☐ |
| e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewer is not available for the disposal of waste water? | ☐ | ☐ | ☐ | X | ☐ |
| f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? | ☐ | ☐ | ☐ | X | ☐ |

**No Substantial Change from Previous Analysis.** The Proposed Project subsurface, surface, and soil conditions are as described in the PSP EIR, which stated that the area has been disturbed and underlain with fine-grained Holocene alluvium, which is considered moderately permeable to impermeable and moderately to slightly erodible. The physical impact area for the Proposed Project is entirely within the Proposed Project Area and would not include any areas that were not part of the area previously analyzed for development in the Previous Environmental Documentation. Accordingly, the determination in the Previous Environmental Documentation that impacts would be less than significant with compliance with federal, state, and local regulation and policies; incorporation of standard best practices; and compliance with recommendations contained in a project-specific study, applies to the Proposed Project. PSP EIR Mitigation Measure GS-1 requires applications for individual development projects to include a detailed Geotechnical and Soils Engineering Study which addresses potential hazards associated with fault rupture, seismicity and groundshaking, liquefaction, subsidence and near-surface groundwater. As such, all development within the Proposed Project Area, including development of Block 9, will be required to complete a site-specific Geotechnical and Soils Engineering Study prior to the issuance of a grading permit. In compliance with this requirement, the RMA Group prepared a Geotechnical Investigation Report for the residential portion of development on Block 9 in August 2020.[5] For informational purposes only a copy of that report is included as Appendix C attached hereto. RMA concluded, based on its investigation and its professional judgement, that the development of the residential portion of the Block 9 area is geologically and geotechnically feasible.

No soil or geological conditions were encountered in connection with the Proposed Project that would preclude development of the Proposed Project. A similar geotechnical and soils investigation will be prepared for any other development SOP, including the proposed school and library on Block 9, prior to commencement of grading operations. As noted above, the physical impact area for the Proposed Project is entirely within the Proposed Project Area and would not include any areas that were not part of the area previously analyzed for development in the Previous Environmental Documentation.

With respect to wastewater disposal systems, as described in the PSP EIR, the Proposed Project would use sewer for disposal of wastewater. For this reason, the Proposed Project would have no impact and the Proposed Project would not lead to substantial changes that would require revisions to the Previous Environmental Documentation due to new significant environmental effects.

**Finding:** The Proposed Project would not result in impacts to geology and soils beyond those analyzed in Previous Environmental Documentation. The Proposed Project does not involve any changes to zoning, allowable use, density, intensity of use, physical impact area, or proposed construction or operation activities. The Proposed Project also does not increase the total number of units allowed in the PSP Area and is entirely consistent with the PSP land use designations and development standards. The Proposed Project includes the same type of construction and development that was previously considered and analyzed for the Proposed Project Area. As such, the Proposed Project does not include substantial changes, and none have

[5] Geotechnical Investigation for Chino Rental Neighborhoods, the Preserve at Chino, Southwest Corner of Academy Street and East Preserve Loop, Chino, CA, prepared by RMA Group, dated August 14, 2020.

occurred with respect to the circumstances under which the Project is undertaken, that would require revisions to the Previous Environmental Documentation due to new significant environmental effects or a substantial increase in severity of previously identified significant effects. Therefore, the Proposed Project will not result in any new or more significant impacts as compared to the prior analysis.

## 6.8 GREENHOUSE GAS EMISSIONS

### *6.8.1 Summary of PSP EIR Findings*

The PSP EIR did not formally analyze potential greenhouse gas (GHG) impacts. Climate change does not constitute new information requiring a revision to or additional EIR, as discussed in more detail immediately below.

### *6.8.2 Impact Analysis of Proposed Project*

| Environmental Issues<br><br>Greenhouse Gas Impacts- Would the project: | New Significant Impact | More Severe Impacts | New Ability to Substantially Reduce Significant Impact | No Substantial Change from Previous Analysis | No Impact |
|---|---|---|---|---|---|
| a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? | ☐ | ☐ | ☐ | X | ☐ |
| b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases? | ☐ | ☐ | ☐ | X | ☐ |

**No Substantial Change from Previous Analysis.** Since certification of the PSP EIR in 2003, AB 32 was enacted in 2006, with the aim of reducing California's GHG emissions to 1990 levels by 2020 and 80% below 1990 levels by 2050. In 2015, Executive Order B-30-15 established a statewide reduction target of 40% below 1990 levels by 2030, which was codified in SB 32. The California Air Resources Board (CARB) was required to adopt a scoping plan for achieving the maximum technologically feasible and cost-effective reductions in GHG emissions to meet these GHG reduction goals.

Climate change itself is not significant new information requiring additional environmental analysis. The issue of climate change was widely known prior to the certification of the PSP EIR in 2003. In 1979, the first World Climate Conference was held in Geneva, was attended by a range of scientists and led to the established of the World Climate Program. The Montreal Protocol, a landmark international agreement design to protect the ozone layer by phasing out gases that deplete the ozone, was originally signed in 1987 and substantially amended in 1990 and 1992. The United Nations Framework Convention on Climate Change was established in 1992. Also in 1992, the United Nations Conference on Environment and

Development -- better known as the Earth Summit –was held in Rio de Janeiro and was attended by 172 countries. The regulation of GHG emissions to reduce climate change was debated and analyzed throughout the 1990s. For example, the Intergovernmental Panel on Climate Change (IPCC), a body established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO), has been publishing reports on the current state of climate change and its potential environmental and socio-economic consequences since the 1990s. These studies, along with others, resulted in the adoption of the Kyoto Protocol in 1997. The IPCC's Third Assessment Report, released in 2001, presented the consensus view of hundreds of scientists on key issues relating to climate change. *See also Center for Biological Diversity v. National Highway Traffic Safety Admin.* (9th Cir. 2009) 538 F.3d 1172, 1190 (National Environmental Policy Act case citing the IPCC 2001 Third Assessment Report); Kostka and Zischke, *Practice Under the California Quality Act,* Second Edition, Volume 2, §19.21 (stating that "a lead agency evaluating new information claims under [Guidelines] § 15162 could support a factual finding that climate change is not significant new information by reference to documents such as the 2001 Third Assessment Report of the Intergovernmental Panel on Climate Change"). Therefore, the impacts of GHG emissions were known at the time the PSP EIR was certified.

In addition, two superior court cases have concluded that information related to climate change does not constitute new information, in part because it is not specific to the Proposed Project. In *American Canyon Community United for Responsible Growth et al v. City of American Canyon et al,* the court held that subsequent environmental analysis of a Wal-Mart Supercenter was not required to analyze the project's GHG emissions and climate change impacts since AB 32 is not the type of "new information" requiring subsequent environmental review as it was not specific to the project. Napa County Superior Court, May 22, 2007, Case No. 26-27462. In *Natural Resources Defense Council et al v. Reclamation Board of the Resources Agency of the State of California,* the court held that climate change and the impact it may have on hydrology and flooding from fill and encroachment activities related to development within the Sacramento-San Joaquin Delta is not "new information" requiring subsequent environmental review as it was not specific to the project site itself. Sacramento County Superior Court, April 27, 2007, Case No. 06-CS 01228. See also: *Citizens Against Airport Pollution v City of San Jose* (2014) 227 CA4th 788; *Citizens for Responsible Equitable Envt'l Dev. v City of San Diego* (2011) 196 CA4th 515, 532.

Though the 2003 PSP EIR did not evaluate GHG emissions associated with implementation of the Specific Plan, the adoption of AB 32, SB 32 and subsequent greenhouse gas related regulations do not constitute the type of new information that requires a further EIR since the regulatory developments do not reveal new site-specific impacts and GHG impacts is an issue that was knowable and known in 2003.

Further noted in the Chino General Plan EIR at page 4.3-59: “It is important to note, throughout this impact discussion, that the majority of the development proposed in both the Proposed General Plan and the Focused Growth Plan has already been approved by the City of Chino as part of the College Park and The Preserve Specific Plans, including a recent amendment to The Preserve adding the Edgewater Communities project. The City of Chino has existing development agreements with the master developers of College Park and The Preserve, obligating the City to continue to approve development at specific densities and intensities

within these areas, as shown in the Proposed General Plan and Focused Growth Plan. This precludes the City from modifying land use and development patterns as a means to further mitigate greenhouse gas emissions within the two Specific Plan areas."

The City adopted its 2020-2030 Climate Action Plan and certified the associated EIR in November 2020. In addition, in 2020, SCAG adopted the 2020–2045 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) and referred to as Connect SoCal. The 2020-2045 RTP/SCS vision encompasses general principles and themes that collectively work to shape the Southern California region. The 2020-2045 RTP/SCS includes a strong commitment to reduce emissions from transportation sources to comply with Senate Bill 375, improve public health, and meet the National Ambient Air Quality Standards as set forth by the federal Clean Air Act.

While analysis of GHG is not required, for informational purposes, this Addendum considers whether the Proposed Project is consistent with the City's Climate Action Plan and the SCAG RTP/SCS.

The Proposed Project would be required to comply with applicable provisions of the Chino Climate Action Plan as codified at Municipal Code Chapter 15.45 – Climate Action Plan Implementation. This includes the following mandatory measures for new residential development (Section 15.45.030):

1. Electric Vehicle (EV) Charging. Dwellings shall comply with the following requirements for future installation of electric vehicle supply equipment (EVSE).

    a. One-and Two-family Dwellings. Install a listed raceway to accommodate a dedicated branch circuit. The raceway shall not be less than trade size 1. The raceway shall be securely fastened at the main service or subpanel and shall terminate in close proximity to the proposed location of the charging system into a listed cabinet, box, or enclosure. Raceways are required to be continuous at enclosed or concealed areas and spaces. A raceway may terminate in an attic or other approved location when it can be demonstrated that the area is accessible, and no removal of materials is necessary to complete the final installation.

        i. Exception: Other pre-installation methods that provide sufficient conductor sizing and service capacity to install Level 2 EVSE.

        ii. Labeling Requirement. A label stating "EV CAPABLE" shall be posted in a conspicuous place at the service panel or subpanel and next to the raceway termination point.

2. Appliance Rating. Each appliance provided by the builder must be a qualified ENERGY STAR appliance if an ENERGY STAR designation is applicable for that appliance.

3. Enhanced Construction Waste Reduction. Divert to recycle or salvage at least seventy percent of nonhazardous construction and demolition debris generated at the site.

In addition, section 15.45.070 requires all new development in the City to demonstrate consistency with the Climate Action Plan by implementing one or a combination of the following three options, and the Proposed Project shall be constructed to include one or more of the options:

1. Exceed by three percent the mandatory California Energy Code Title 24, Part 6 standards, in effect at the time of development application submittal for discretionary review: or

2. Achieve an equivalent reduction through voluntary measures in the California Green Building Standards Code, Title 24, Part 11 (CALGreen) in effect at the time of development application submittal for discretionary review; or

3. Provide other equivalent GHG reductions through measures including, but not limited to, non-vehicle transportation infrastructure, transit, ZEV (zero emission vehicle) infrastructure or other incentives, waste diversion, water conservation, tree planting, renewable energy option packages, or any combination of these or other measures such that GHG emissions are reduced by 0.04 MT CO2e per residential dwelling unit per year and/or 0.11 MT CO2e per thousand square feet of commercial/industrial development per year.

The Proposed Project is consistent with the goals of the 2020-2045 SCAG RTP/SCS because it provides an opportunity for a new high-quality housing, consistent with the PSP. The transportation network in the Proposed Project Area will be developed and maintained to meet the needs of local and regional transportation, and to ensure efficient mobility. The Proposed Project will be developed consistent with the vision of the Specific Plan, which was designed to facilitate transit use, as well as bicycle, equestrian, and pedestrian travel.

Finally, all development within the Proposed Project Area must legally comply with a host of greenhouse gas-related state and local requirements, such as SCAQMD Rules, CARB regulations for vehicles and equipment, California's Title 24 standards for energy savings and Title 20 standards for appliance efficiency.

**Finding:** The Proposed Project would not result in GHG emissions impacts beyond those analyzed in Previous Environmental Documentation. The Proposed Project does not involve any changes to zoning, allowable use, density, or intensity of use. The Proposed Project also does not increase the total number of units allowed in the PSP Area and is entirely consistent with the PSP land use designations and development standards. The Proposed Project includes the same type of construction and development that was previously considered and analyzed for the Proposed Project Area. As such, the Proposed Project does not include substantial changes, and none have occurred with respect to the circumstances under which the Project is undertaken, that would require revisions to the Previous Environmental Documentation due to new significant environmental effects or a substantial increase in severity of previously identified significant effects. Therefore, the Proposed Project will not result in any new or more significant impacts as compared to the prior analysis.

## 6.9 HAZARDS AND HAZARDOUS MATERIALS

### *6.9.1 Summary of PSP EIR Findings*

The Chino Airport is north of the Specific Plan area. As required by state law, an Airport Comprehensive Land Use Plan (ACLUP) was prepared and adopted in 1992 which delineates referral zones surrounding the airport and defines land use requirements, development limitations, and review procedures for projects in the operational sphere of the airport. The identified areas are the Runway Protection Zone (within and immediately outside the airport confines – severely restricted land uses), Safety Zone II (remainder of the approach and departure zones for planes, the remainder of the 70 CNEL noise contour area, and entire 65 CNEL noise contour area – variety of land use are conditionally permitted provided compliance with Airport Compatibility Matrix), Safety Zone III (oval area around the airport extending approximately 10,000 feet from it, in which aircraft accidents and exposure to noise is minimal – most land use types acceptable, with some development limitations), and Conical Surface (additional 4,000 feet from the perimeter of Safety Zone III where FAA Part 77 height restrictions still apply). With regard to the airport, potential impacts identified in the PSP EIR include conflicts between aircraft operations and waterfowl near airport runways, and the risk of placing greater numbers of people in close proximity to the airport and the potential for aircraft accidents. The land use plan in the Specific Plan was designed to ensure that implementation of the Specific Plan would not be adversely affected by airport operations, and the development of tall structures would not be allowed without FAA consultation. The development of schools within 2 miles of the airport would require review by Caltrans to ensure avoidance of potential impacts, and the Specific Plan does not include major proposed water features near the airport. With individual project design and the implementation of Mitigation Measures HM-1 and HM - 2, impacts with regard to the airport would be less than significant.

With regard to vector control issues, the PSP EIR observed that the stockpiling of manure in dairy operations creates an increased fly and mosquito population, for which chemical treatments are used. Implementation of the Specific Plan would reduce the volume of standing water and other sources that result in increased fly and mosquito populations, but issues of increased population and the need for chemical treatment may persist during use transition. Control can be achieved with non-chemical methods and the use of pesticides, and with proper vector control practices, health and safety impacts would be less than significant.

With regard to the hazardous materials at the Chino airport, all underground storage tanks have been removed and fuel storage is concentrated in the northwest corner of the airport. No significant airborne or waterborne health or safety risks are anticipated, and impacts would be less than significant.

With regard to hazardous building materials, the PSP EIR concluded that it is likely a number of existing buildings contain such materials, including asbestos and lead-based paints. Identification of such materials would be achieved by preliminary investigations of project-specific properties prior to demolition, and mitigation would be achieved by use of abatement technologies available to safely reduce or remove contamination and make the area suitable for development. With proper investigation and abatement procedures and implementation of Mitigation Measure HM-4, impacts would be less than significant.

With regard to electromagnetic fields, the PSP EIR notes that a number of overhead electrical lines traverse the Specific Plan area, but that the strength of electric fields greatly diminishes as the distance from the source increases. The proposed land use plan locates an element of the community paseo and open space system along the major SCE power line corridor, and this will create a corridor separating power transmission lines from other land uses, ensuring a less than significant impact.

The PSP EIR concluded that no significant impacts would occur as a result of Specific Plan implementation because design features and restrictions would be incorporated into future projects and because mitigation measures were incorporated, including HM-1, HM-2, HM-3, HM-4, and HM-5. The cumulative impacts evaluated included hazardous materials and airport operations. Neither issue was found to be cumulatively significant. With the implementation of mitigation measures, all impacts would be less than significant.

**Mitigation Program**

The PSP EIR identified Mitigation Measures HM-1, HM-2, HM-3, HM-4, and HM-5 (see Appendix B). In compliance with Mitigation Measure HM-3, Phase 1 Environmental Site Assessments will be prepared prior to issuance of grading permits. Mitigation Measures HM-2, HM-3, and HM-5 are also applicable to the Proposed Project.

### *6.9.2 Impact Analysis of Proposed Project*

| Environmental Issues<br><br>Hazards and Hazardous Materials - Would the project: | New Significant Impact | More Severe Impacts | New Ability to Substantially Reduce Significant Impact | No Substantial Change from Previous Analysis | No Impact |
|---|---|---|---|---|---|
| a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? | ☐ | ☐ | ☐ | X | ☐ |
| b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment? | ☐ | ☐ | ☐ | X | ☐ |
| c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? | ☐ | ☐ | ☐ | X | ☐ |
| d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and as a result, would create a significant hazard to the public or the environment? | ☐ | ☐ | ☐ | X | ☐ |

| | | | | | |
|---|---|---|---|---|---|
| e) Be located within an airport land use plan, or where such a plan has not been adopted, within two miles of a public airport or public use airport, result in a safety hazard or excessive noise for people residing or working in the project area? | □ | □ | □ | X | □ |
| f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? | □ | □ | □ | X | □ |
| g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires? | □ | □ | □ | X | □ |

**No Substantial Change from Previous Analysis.** Mitigation Measure HM-3 requires preparation and submittal of a completed Phase 1 Environmental Site Assessment prior to consideration of specific development within the Specific Plan area. Specifically, this assessment is required prior to the issuance of a grading permit. As noted above, a Phase I Environmental Site Assessment will be prepared for any development within the Proposed Project Area prior to the commencement of ground disturbing activities.

The Proposed Project would result in growth and land uses consistent with development assumed in the PSP and studied in the Previous Environmental Documentation. The Proposed Project would not increase the total number of units allowed in the PSP Area and is entirely consistent with the PSP land use designations. The uses associated with the Proposed Project are not anticipated to emit hazardous emissions or handle hazardous materials.

The Proposed Project would be located within the physical impact area analyzed in the Previous Environmental Documentation and land uses would be developed in a consistent pattern with what was assumed for the Specific Plan and studied in the Previous Environmental Documentation. As seen on Figure SAF-4 (Wildland Interface Threat to Community) of the General Plan, the Proposed Project Area is located in an area designated with little to no threat based on proximity to wildlands. For these reasons and the reasons described above, the Proposed Project would have no further impacts as compared with those studied in the Previous Environmental Documentation.

**Finding:** The Proposed Project would not result in impacts related to hazards or hazardous materials beyond those analyzed in Previous Environmental Documentation. The Proposed Project does not involve any changes to zoning, allowable use, density, intensity of use, or physical impact area analyzed in the Previous Environmental Documentation. The Proposed Project also does not increase the total number of units allowed in the PSP Area and is entirely consistent with the PSP land use designations and development standards. The Proposed Project includes the same type of construction and development that was previously considered and analyzed for the Proposed Project Area. As such, the Proposed Project does not include substantial changes, and none have occurred with respect to the circumstances under which the

Project is undertaken, that would require revisions to the Previous Environmental Documentation due to new significant environmental effects or a substantial increase in severity of previously identified significant effects. Therefore, the Proposed Project will not result in any new or more significant impacts as compared to the prior analysis.

## 6.10 HYDROLOGY AND WATER QUALITY

### *6.10.1 Summary of PSP EIR Findings*

The Specific Plan area is located in the alluvial plain of the Chino Basin, and the principal drainage course of such basin is the Santa Ana River, located south of the Specific Plan area within the Prado Flood Control Basin. Two principal tributaries flow through the Specific Plan area, Chino Creek and Mill Creek. The Specific Plan area is also traversed by several ephemeral and seasonal drainages and is subject to extensive sheet flow during major storm events. These flows are conveyed by either creek to the Santa Ana River. In existing conditions, flows combine to cause significant localized flooding of earthen swales, curbed roadways, and dairies within the Specific Plan area during moderate to severe storm events, and the result is numerous road closures, dairy livestock losses, and overtopping or breaches of dairy water retention ponds.

With regard to flooding and stormwater management, as noted in the PSP EIR, implementation of planned programs and projects would alleviate flooding conditions and water quality problems within the proposed Specific Plan area. The PSP EIR also concluded that buildout of the proposed Specific Plan would help alleviate existing problems associated with flooding of the dairies, lack of stormwater containment, and related pollution of downstream receiving waters with dairy wastes. With implementation of the Storm Drainage Plan and project-level detailed storm water management studies and Mitigation Measures HWQ-1 through HWQ-7, no significant storm water runoff impacts are anticipated from future urban development. Nor would it result in significant alteration of the principal streams and watercourses through the site. Impacts would be less than significant.

With regard to water quality, the PSP EIR concluded that without proper management and mitigation, proposed urban uses would have the potential to degrade surface waters through discharges of urban runoff, containing a variety of pollutants including but not limited to oils, greases, solvents, pesticides and urban debris. If uncontrolled, these contaminants could enter the storm drain system in the form of street runoff, indiscriminate household use or other sources. Without proper management, potentially significant project and cumulative water quality impacts would occur. Further, both Chino Creek and Mill Creek within the Plan area have been listed as impaired waters due to high nutrient, pathogen, salinity/TDS/chlorides and suspended solids concentrations caused by the existing dairy operations. Without proper management of runoff to protect water quality in Chino Creek and Mill Creek, potentially significant project and cumulative water quality impacts would occur. The PSP EIR lists a number of Best Management Practices (BMPs) available to the City of Chino to impose upon individual projects to ensure impacts are less than significant, including animal waste collection, exposure reduction, recycling/waste disposal, parking lot and street cleaning, infiltration devices, oil and grease traps, sand filters, filter strips, grass swales, and regular/routine maintenance.

Storm drain systems and BMPs for individual project must also confirm to non-point stormwater pollution control standards related to the County's Municipal Stormwater Permit under the NPDES program.

With the implementation of Mitigation Measures HWQ-1 through HWQ-7, the PSP EIR concluded that all potential adverse impacts would be reduced to a less than significant level, and there would be no cumulatively significant impacts.

**Mitigation Program**

The PSP EIR identified Mitigation Measures HWQ-1, HWQ-2, HWQ-3, HWQ-4, HWQ-5, HWQ-6 and HWQ-7 (see Appendix B).

### *6.10.2 Impact Analysis of Proposed Project*

| Environmental Issues<br><br>Hydrology and Water Quality - Would the project: | New Significant Impact | More Severe Impacts | New Ability to Substantially Reduce Significant Impact | No Substantial Change from Previous Analysis | No Impact |
|---|---|---|---|---|---|
| a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality? | ☐ | ☐ | ☐ | X | ☐ |
| b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin? | ☐ | ☐ | ☐ | X | ☐ |
| c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:<br><br>i. result in substantial erosion or siltation on- or off-site?<br><br>ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;<br><br>iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or<br><br>iv. impede or redirect flood flows? | ☐ | ☐ | ☐ | X | ☐ |

| | | | | | |
|---|---|---|---|---|---|
| d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation? | □ | □ | □ | X | □ |
| e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan? | □ | □ | □ | X | □ |

**No Substantial Change from Previous Analysis.** The Proposed Project does not involve any changes to zoning, allowable use, density, or intensity of use. All development within the PSP, including the development of Block 9, would be required to comply with all mitigation measures from the PSP EIR. The development of the Proposed Project would be consistent with land use types assumed for the PSP and studied in the Previous Environmental Documentation and the types of pollutants generated would be the same. The Proposed Project would not increase the total number of dwelling units allowed within the PSP and is entirely consistent with the PSP land use designations. The Proposed Project includes construction within the same physical impact area that was considered in the Previous Environmental Documentation.

All development within the Proposed Project Area is required to prepare a hydrology study prior to the commencement of grading activities. In September 2020, DRC Engineering, Inc. prepared a Preliminary Hydrology Study for the residential component of development on Block 9, which is included as Appendix D to this Addendum. A final hydrology and hydraulic report will be prepared in the future in conjunction with a storm drain improvement plan. Similar hydrology studies will be prepared for the remaining components of the Proposed Project prior to the commencement of grading activities.

Further, all development within the Proposed Project Area would comply with mitigation measures contained in the PSP EIR, including HWQ-1 requiring compliance with NPDES regulations, HWQ-2 and HWQ-3 requiring review by the City and imposition of appropriate BMPs to control stormwater discharges, protect water quality, and water pollution and urban runoff, likely as conditions of approval. All development within the Proposed Project Area will comply with any relevant site-specific water quality management plans. Because the Proposed Project would be consistent with development studied in the Previous Environmental Documentation, and with appropriate mitigation incorporated, the Proposed Project would have a less than significant impact, and no further analysis is necessary.

Because the Proposed Project is consistent with the PSP land use designations and development pattern, it would not change the amount of impervious area assumed in the Previous Environmental Documentation. As such, the impacts to groundwater supplies and recharge would therefore be similar to those disclosed in the Previous Environmental Documentation. Project water use impacts are further described in Section 6.16.

The Proposed Project would be located within the physical impact area analyzed in the Previous Environmental Documentation and land uses, as well as their construction areas and methods, would be developed in a pattern consistent with what was assumed for the PSP and

studied in the Previous Environmental Documentation. The Proposed Project would not alter the course of a stream or river, and the Proposed Project's runoff would be similar to what was studied in the Previous Environmental Documentation because it would contain the same general design, impervious area, and infrastructure.

**Finding:** The Proposed Project would not result in impacts related to hydrology and water quality beyond those analyzed in Previous Environmental Documentation. The Proposed Project does not involve any changes to zoning, allowable use, density, intensity of use, or the physical impact area. The Proposed Project also does not increase the total number of units allowed in the PSP Area and is entirely consistent with the PSP land use designations and development standards. The Proposed Project includes the same type of construction and development that was previously considered and analyzed for the Proposed Project Area. As such, the Proposed Project does not include substantial changes, and none have occurred with respect to the circumstances under which the Project is undertaken, that would require revisions to the Previous Environmental Documentation due to new significant environmental effects or a substantial increase in severity of previously identified significant effects. Therefore, the Proposed Project will not result in any new or more significant impacts as compared to the prior analysis.

## 6.11 LAND USE AND PLANNING

### *6.11.1 Summary of PSP EIR Findings*

The PSP is intended to meet local and regional needs through the development of attractive and vibrant neighborhoods, while providing an employment and commercial base that can respond to regional jobs-housing balance goals. The proposed land use plan includes design features that minimize potential land use impacts at plan buildout. These include, but are not limited to a compact urban form and community core; a gradation of land use intensity/density from the community core outward and from northerly portions south to the open space and sensitive resources; appropriate buffering and separation of potentially incompatible uses through application of linear open space; retention and consolidation of the major open space resources with a vast, management open space unit below the 566' elevation; and preserved opportunities for long-term agricultural use within agricultural units defined by the AG and AG/OS-N designations.

The PSP EIR noted that primary existing land uses within the Specific Plan area included agriculture and dairy-related uses, with a variety of recreation and open space uses in the southern portion of the Specific Plan area, some public facilities uses, and industrial uses. The Preserve Master Plan (adopted in 2003) provided an 'umbrella' General Plan Amendment, which linked The Preserve Specific Plan to the City's existing General Plan. The Master Plan/General Plan Amendment was intended to function as an Area Plan, as authorized by Government Code Sections 65301(b) and 65303. The SOP Master Plan project site lies within The Preserve Master Plan area and coinciding Preserve Specific Plan area. The Preserve Specific Plan document establishes the effective zoning for properties within the Specific Plan area.

With regard to the division of an established community, the PSP first analyzed the extent to which implementation of the Specific Plan would alter community character and concluded that project and cumulative impacts on the rural character of the Specific Plan area,

and the irretrievable loss of open space, would be significant and unavoidable, despite the original Specific Plan design that preserved 55 percent of the total Specific Plan area as open space and agricultural uses and phasing of the Specific Plan implementation which is intended to minimize physical disruption of rural uses to the extent practical. The PSP EIR also analyzed land use compatibility and concluded that urban use conflicts with adjacent agriculture could be potentially significant during the phased development, but that the application or right-to-farm provisions and other protections built into the Specific Plan would assure that impacts are less than significant at Specific Plan buildout, and that no significant long-term urban use conflicts would occur. All other land use compatibility impacts (with regard to the Correctional Institute for Women, the SCE Transmission Line Easement, Chino Airport Influence Area, and Prado Dam Inundation Influence Area) were identified as less than significant.

With regard to conflicts with applicable land use plans, policies, and regulations, the PSP EIR noted that implementation of the Specific Plan would require pre-zoning of the site to classifications consistent with the proposed Specific Plan and the City Zoning Ordinance, annexation to the City of Chino, adopted on a City General Plan amendment, and adoption of the Specific Plan to provide detailed standards and guidelines for future development of the Specific Plan area. The PSP EIR concluded that implementation of the Specific Plan would conflict with the existing County General Plan and Development Code Agriculture-Agriculture Preserve designations for the site, and site's agricultural status within the Chino Valley Dairy Preserve and West Valley Subregion Planning Area. However, master planning for the area and annexation to the City of Chino was specifically contemplated by LAFCO's inclusion of the area within the City's sphere in 1994, and the pattern of cancellation and non-renewal of Williamson Act contracts in the area dates back to 1992, precipitating a transition to urban uses. Therefore, implementation the Specific Plan and related actions do not represent a substantial adverse land use impact or conflict with applicable land use planning for the area. Similarly, and as discussed in other sections, the PSP EIR concluded that there would be no significant impact with regard to conflicts with the Chino ACLUP, the ACOE's Prado Flood Control Basin Master Plan, or other ACOE planning prerogatives within the Prado Dam inundation area.

Implementation of policies in the General Plan Amendment through policies of the Specific Plan would mitigate land use impacts to the extent feasible, and this include the application of various Specific Plan overlay zones to reduce potential land use impacts. The PSP EIR also identifies Mitigation Measures LU-1 and LU-2 to ensure potential impacts related to the airport and Correctional Institution for Women are less than significant.

**Mitigation Program**

The PSP EIR identified Mitigation Measures LU-1 and LU-2 (see Appendix B).

### *6.11.2 Impact Analysis of Proposed Project*

| Environmental Issues<br><br>Land Use - Would the project: | New Significant Impact | More Severe Impacts | New Ability to Substantially Reduce Significant Impact | No Substantial Change from Previous Analysis | No Impact |
|---|---|---|---|---|---|
| a) Physically divide an established community? | □ | □ | □ | X | □ |
| b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect? | □ | □ | □ | X | □ |

**No Substantial Change from Previous Analysis.** As described above, the PSP EIR analyzed the extent to which the Specific Plan would alter community character, have significant and cumulative impacts on the rural character of the Specific Plan area, as well as the loss of open space. The Proposed Project Area lies within the physical impact area analyzed in the Previous Environmental Documentation, and the Proposed Project would result in development consistent with the uses and assumptions of the Previous Environmental Documentation. The Proposed Project would not increase the total number of dwelling units currently allowed within the PSP and is entirely consistent with the PSP land use designations. The Proposed Project also would not physically divide an established community because the surrounding area is also being developed consistent with the PSP. As noted above, the Specific Plan document establishes the effective zoning for properties within the Specific Plan area. The land uses proposed are consistent with zoning established for these areas by the Specific Plan. The Proposed Project continues to include appropriate buffering and separation of potentially incompatible uses. As seen in Figure 2, uses on both sides of Main Street are compatible with each other and the minor modification to the configuration of Main Street that removes the center median park[6] does not result in any land use conflicts related to incompatible uses. All development within the Proposed Project Area must be consistent with and support The Preserve Specific Plan Development Concept, Development Plan, Design Guidelines, and Administration requirements. Moreover, the Proposed Project would be implemented in accordance with applicable Goals, Objectives, Policies, and Actions of the City's General Plan. As noted above, any changes resulting from the Proposed Project are minor and thus will not result in any new or more significant impacts as compared to the prior analysis. The Proposed Project would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Proposed Project adopted for the purpose of avoiding or mitigating an environmental effect.

[6] This minor modification is consistent with the PSP, as modified in SPA PL21-0026 that the Planning Commission recommended for approval on November 15. SPA PL21-0026 will be considered by the City Council on December 7, 2021.

General Plan Land Use designations for the Proposed Project are consistent with and reflect overlying land use designations of the PSP. The Developer Modifications to MSA 2006-2, including the shift of residential units, are consistent with the allowable zoning. With respect to the development proposed by the Proposed Project on Block 9, the General Plan Land Use designations are CC-16 and HDR-16. The residential development proposed for Block 9 has an average density of 16.6 du/ac, which is consistent with the average allowable density for the HDR-16 and CC-16 designations of 12-20 dwelling units per acre (du/ac). Since the certification of the EIR, the location of the land uses within Block 9 has shifted, but the uses allowed remain unchanged. As described in the Specific Plan, the CC-16 designation allows a variety of uses, including, but not limited to, residential, civic, institutional, educational, and recreational uses.

The Proposed Project's development of multi-family residential units on Block 9 is consistent with the above-described vision for the PSP designations and with permitted uses.

The Proposed Project will comply with all development standards and approval procedures laid out in the Specific Plan. The Proposed Project is also consistent with regional planning goals laid out in the SCAG 2016-2040 RTP/SCS. In addition, as described above, the Proposed Project is not within an area covered by a Habitat Conservation Plan or Natural Community Conservation Plan.

**Finding:** The Proposed Project would not result in land use impacts beyond those analyzed in Previous Environmental Documentation. The Proposed Project does not involve any changes to zoning, allowable use, density, or intensity of use. The Proposed Project also does not increase the total number of units allowed in the PSP Area and is entirely consistent with the PSP land use designations and development standards. The Proposed Project includes the same type of construction and development that was previously considered and analyzed for the Proposed Project Area. As such, the Proposed Project does not include substantial changes, and none have occurred with respect to the circumstances under which the Project is undertaken, that would require revisions to the Previous Environmental Documentation due to new significant environmental effects or a substantial increase in severity of previously identified significant effects. Therefore, the Proposed Project will not result in any new or more significant impacts as compared to the prior analysis.

## 6.12 NOISE

### *6.12.1 Summary of PSP EIR Findings*

With regard to construction noise, the PSP EIR found that activities related to Specific Plan buildout, especially the operation of heavy equipment, will create short-term noise increases within and near the Specific Plan area.

With regard to operational noise, prior to mitigation, potentially significant noise level differences are predicted to occur at twenty-five (25) roadway links at PSP buildout. This includes increases of +3 dB CNEL that are forecast to occur along 17 roadway links and measurable (+1 dB CNEL) increases along another 8 roadway links where existing levels already exceed 65 dB CNEL as far away as 100 feet from the roadway centerline. Without mitigation,

area roadways will experience potentially significant noise level increases due to cumulative traffic growth, including traffic from the Specific Plan area. The Specific Plan area is also adjacent to Chino Airport. The Specific Plan includes a Chino Airport Overlay (CAO) that conforms to the airport limits, based on the Airport Comprehensive Land Use Plan (ACLUP) adopted noise contours and safety zones. Near airports, even at noise exposures well outside the 65 dB CNEL contour, there may be single flyover events that are perceived as intrusive even if the 65 dB CNEL standard is met with a large margin of safety.

The Program EIR identified several mitigation measures to reduce the impacts of construction, roadway and airport noise to less than significant levels. Measures to reduce construction noise impacts contained in Mitigation Measure N-1 include limitations on hours of construction, use of properly operating mufflers on equipment, and locating construction truck access routes and staging areas away from dwellings and schools.

The principal measure to reduce roadway noise impacts, Mitigation Measure N-2, is a requirement to submit acoustical studies for subsequent tentative maps and noise-sensitive uses adjacent the principal roadways, with adherence to the recommendations of such studies. To ensure that noise exposure is considered in review of subsequent development projects within the ACLUP area, the EIR also requires Mitigation Measure N-3 which specifies that the City will provide notice of development applications in the airport safety zones to the Airport Land Use Commission to assure compatibility with airport operations, and requires that for all real estate transactions within 1 mile of the airport, advisory language will be communicated regarding potential airport noise impacts. With the incorporation of Mitigation Measures N-1 through N-3, individual project noise impacts would be less than significant. There are no private airstrips in the area, so there is no impact with regard to private airstrips.

**Mitigation Program**

The PSP EIR identified Mitigation Measures N-1, N-2, and N-3 (see Appendix B).

### *6.12.2 Impact Analysis of Proposed Project*

| Environmental Issues<br><br>Noise - Would the project result in: | New Significant Impact | More Severe Impacts | New Ability to Substantially Reduce Significant Impact | No Substantial Change from Previous Analysis | No Impact |
|---|---|---|---|---|---|
| a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? | ☐ | ☐ | ☐ | X | ☐ |
| b) Generation of, excessive groundborne vibration or groundborne noise levels? | ☐ | ☐ | ☐ | X | ☐ |

| | | | | | |
|---|---|---|---|---|---|
| c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? | □ | □ | □ | X | □ |

**No Substantial Change from Previous Analysis.** The location and types of land uses proposed for the Proposed Project Area are consistent with those in the approved PSP and analyzed in the Previous Environmental Documentation, and do not raise any substantive new noise issues that are not already addressed in the Previous Environmental Documentation. The Proposed Project would not increase the total number of dwelling units currently allowed within the PSP and is entirely consistent with the PSP land use designations, as amended. The Proposed Project does not include any changes to the physical impact area analyzed in the Previous Environmental Documentation or to the construction activities/methods.

In addition, any development within the Proposed Project Area requires preparation of an acoustical study for future residential uses adjacent to the principal area roadways in order to ensure compliance with applicable City noise standards, prior to issuance of a grading permit or building permit, as appropriate, pursuant to PSP EIR Mitigation Measure N-2.

As noted in the Previous Environmental Documentation, temporary ambient noise levels will occur with any construction activities for the Proposed Project, especially heavy equipment that creates short-term noise increases. Impacts of groundborne noise and vibration would be mitigated with compliance with PSP EIR Mitigation Measure N-1 (Construction Noise). The land uses associated with the Proposed Project are not of a type that would result in excessive groundborne noise or vibration following construction.

As noted in the PSP EIR, the land use plan for the Specific Plan will contribute noise level differences for multiple roadway and freeway segments. Although area roadways will experience potentially significant noise level increases absent mitigation, including as a result of Proposed Project traffic, this impact was identified in the Previous Environmental Documentation. The Proposed Project is not located within the vicinity of a private airstrip. The Proposed Project would have no additional impacts as compared with those studied in the Previous Environmental Documentation.

**Finding:** The Proposed Project would not result in noise impacts beyond those analyzed in Previous Environmental Documentation. The Proposed Project does not involve any changes to zoning, allowable use, density, intensity of use, physical impact area, or construction activities or methods. The Proposed Project also does not increase the total number of units allowed in the PSP Area and is entirely consistent with the PSP land use designations and development standards. The Proposed Project includes the same type of construction and development that was previously considered and analyzed for the Proposed Project Area. As such, the Proposed Project does not include substantial changes, and none have occurred with respect to the circumstances under which the Project is undertaken, that would require revisions to the Previous

Environmental Documentation due to new significant environmental effects or a substantial increase in severity of previously identified significant effects. Therefore, the Proposed Project will not result in any new or more significant impacts as compared to the prior analysis.

## 6.13 POPULATION & HOUSING

### *6.13.1 Summary of PSP EIR Findings*

The PSP EIR notes that the Specific Plan will represent a significant change in land uses as the area transitions from agricultural and dairy operations to urban uses. However, it also noted that significant development activity had already been and would be continuing to occur in the adjoining area and region. In addition, significant public facilities exist adjacent to and near the Specific Plan area that increase the development pressure on the area. The PSP EIR estimated that total employment generation from the proposed mix of non-residential commercial, industrial, and recreation activities would be 13,376 jobs, and that these could include both skills and unskilled commercial retail jobs, manufacturing and assembly positions, warehouse positions and commercial office jobs. These would ultimately displace jobs under current dairy use and agricultural zoning. This job growth is consistent with SCAG regional forecasts.

The PSP EIR concluded that employment growth would increase demand for housing the Specific Plan area and vicinity, at a rate consistent with SCAG regional forecasts. The Specific Plan area jobs/housing ratio in 2020 was projected to be 2.06, compared with a projected county ratio of 1.28, thereby furthering the region's jobs/housing balance objectives. The Specific Plan area ratio of 2.06 would be less than the SCAG 2020 projection of 4.14 for the City of Chino as a whole, but regions with employment to housing ratios which reflect the SCAG regional average are generally considered to be balanced.

The PSP EIR noted that proposed plan design including housing near employment and retail centers would result in a positive impact on local economy and the environment, because it would contribute to reduced reliance on the automobile and possible reductions in regional work trip commutes, with corollary air pollution and energy consumption reduction benefits.

**Mitigation Program**

The PSP EIR concluded that no significant impacts would occur related to housing and population as a result of Specific Plan implementation, and no mitigation is required.

### *6.13.2 Impact Analysis of Proposed Project*

| Environmental Issues<br><br>Population - Would the project: | New Significant Impact | More Severe Impacts | New Ability to Substantially Reduce Significant Impact | No Substantial Change from Previous Analysis | No Impact |
|---|---|---|---|---|---|
| | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| a) Induce substantial unplanned population growth in an area, either directly or indirectly? | □ | □ | □ | X | □ |
| b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere? | □ | □ | □ | X | □ |

**No Substantial Change from Previous Analysis.** With regard to inducement of substantial growth, this impact was evaluated in the Previous Environmental Documentation, and the Proposed Project would result in growth consistent with the land use plan analyzed in the Previous Environmental Documentation. The Proposed Project would not increase the total number of dwelling units currently allowed within the PSP and is entirely consistent with the PSP land use designations. As noted in the PSP EIR, the Specific Plan area is one of the last portions of the Chino Basin Dairy Area to transition away from dairy and agricultural use and toward urban use. Further, it is surrounded by transitioning uses and major public facilities that encourage growth in the area. These include the airport, State Routes 71, 60, and 91 and Interstate 5, which provide regional access to the area. However, this growth was anticipated by SCAG at the time of PSP EIR preparation, and is anticipated in Connect SoCal, the 2020-2045 RTP/SCS. As noted in the Previous Environmental Documentation, from a regional perspective the Proposed Project will not result in a substantial impact with regard to growth relative to anticipated growth in regional and local plans, and due to the substantial level of on-going and planned development activity in and surrounding the Proposed Project Area.

With regard to the displacement of housing and need to construct housing elsewhere, the PSP EIR notes that limited residential uses associated with dairy and other agricultural operations will be removed to provide for development contemplated in the Specific Plan. In addition, there is currently no housing on the Proposed Project site. As such, the Proposed Project will not involve the displacement of housing or people.

**Finding:** The Proposed Project would not result in impacts to population and housing beyond those analyzed in Previous Environmental Documentation. The Proposed Project does not involve any changes to zoning, allowable use, density, or intensity of use. The Proposed Project also does not increase the total number of units allowed in the PSP Area and is entirely consistent with the PSP land use designations and development standards. There would be no population growth beyond that anticipated in the Previous Environmental Documentation. The Proposed Project includes the same type of construction and development that was previously considered and analyzed for the Proposed Project Area. As such, the Proposed Project does not include substantial changes, and none have occurred with respect to the circumstances under which the Project is undertaken, that would require revisions to the Previous Environmental Documentation due to new significant environmental effects or a substantial increase in severity of previously identified significant effects. Therefore, the Proposed Project will not result in any new or more significant impacts as compared to the prior analysis.

## 6.14 PUBLIC SERVICES

### *6.14.1 Summary of PSP EIR Findings*

With regard to fire protection and emergency medical services, the PSP EIR concluded that without mitigation, increased development associated with buildout of the Specific Plan would create additional fire service needs and place a significant burden on the Fire District to maintain sufficient resources and response times. Per the Fire District, 1 additional fire station would be needed to reduce potential impacts to a less than significant level, along with the relocation of Station 3 closer to the Specific Plan area. The Fire District charges construction fees for development projects, which would be applicable. With the implementation of Mitigation Measures PS-F-1 through PS-F-6, the PSP EIR concluded that fire and emergency services impacts would be less than significant.

With regard to police protection, the PSP EIR found that absent mitigation, implementation of the proposed plan would significantly increase demands on police services within the Specific Plan area and use of the planned recreational areas will increase the need for police response, and that overall response time could increase by 2-3 minutes for emergency calls. The PSP EIR noted that the PSP includes a Community Core (125 acres) with areas available for civic uses, possibly including a future police substation. Until expansion of the existing department or creation of a new facility, the Police Department planned to establish a police sub-station housed at the Chino Airport, near the proposed Specific Plan area, with the potential to become a permanent sub-station serving the area. To mitigate the need for additional police resources in the Specific Plan area, the City of Chino and the Police Department have implemented long-term budgetary strategies to ensure availability of necessary resources, as the Specific Plan area develops. Pursuant to City requirements and standard conditions, the Chino Police Department will be consulted during site planning and design to ensure that adequate provisions for law enforcement protection/prevention are designed into future development pursuant to the PSP. Per Mitigation Measure PS-S-2, project developers shall pay statutory development impact fees. Because of Specific Plan design, and with mitigation incorporated, impacts would be less than significant.

With regard to schools, the 2003 EIR found that implementation of the Specific Plan would result in 9,779 new dwelling units (based on the original PSP) within the Chino Valley Unified School District boundaries at plan buildout, which would result in an additional 6,063 K-12 students in the district. Prior to mitigation, this would represent a significant impact. To address the increased need, three conceptual school sites were identified in the Specific Plan Land Use Plan to accommodate the student population growth estimate by the affected school district. Two 10-acre elementary schools (K-6) and one 15-acre K-8 school were estimated. A K-8 School Cal Aero Preserve Academy was constructed North of Pine Avenue to accommodate students in the northern half of The Preserve. The developers are now paying school fees to CVUSD to provide school mitigation CVUSD could acquire land and construct an additional K-8 School South of Pine Avenue which would accommodate all students in the PSP. Proposed plan development of approximately 695 acres of business uses, including commercial and industrial space, is also expected to result in an indirect increase in the District's student population (i.e., non-resident student population). These indirect impacts would be mitigated by

school impact fees. CVUSD will use the Developer fees to plan and build any additional school in the PSP to accommodate students based on enrollment numbers.

With regard to other library services, the PSP EIR concluded that without mitigation, buildout of the Specific Plan would result in substantial impacts on the Chino Library and services it provides because library space utilization was already deficient with 0.16 square feet per capita, which would yield a need for an additional 5,319 square space to serve the Specific Plan area's anticipated population. At a more desirable .35 square feet per capita, buildout of the Specific Plan would require 11,637 additional square footage to serve the population. The County Library also indicated they were unable to pay for a new branch library even if space was set aside in the Specific Plan area. Prior to mitigation, this impact is cumulatively significant. However, with the incorporation of Mitigation Measures PS-L-1 and PS-L-2 to require that project proponents address the need for library space by providing space, funding, or other financing mechanisms and by contributing impact fees toward expansion of existing facilities or construction of new facilities, impacts would be reduced to a less than significant level.

**Mitigation Program**

The PSP EIR identified Mitigation Measures PS-S-1, PS-S-2, and PS-S-3 (schools); PS-P-1 (police protection); PS-F-1, PS-F-2, PS-F-3, PS-F-4, PS-F-5, and PS-F-6 (Fire Service & Emergency Medical Service); PS-L-1 and PS-L-2 (Library Services); and PS-PR-1 and PS-PR-2 (Parks and Recreation). These Mitigation Measures are included in Appendix B.

### *6.14.2 Impact Analysis of Proposed Project*

| Environmental Issues<br><br>Public Services - Would the project: | New Significant Impact | More Severe Impacts | New Ability to Substantially Reduce Significant Impact | No Substantial Change from Previous Analysis | No Impact |
|---|---|---|---|---|---|
| a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for: fire protection, police protection, schools, parks, and other public facilities? | ☐ | ☐ | ☐ | X | ☐ |

**No Substantial Change from Previous Analysis.** The Proposed Project would not increase the total number of dwelling units currently allowed within the PSP and is entirely consistent with the PSP land use designations. The Proposed Project would be consistent with development contemplated in the PSP and analyzed in the Previous Environmental Documentation. Impacts are therefore consistent with those analyzed in Previous Environmental

Documentation and would be less than significant with implementation of mitigation, which, among other things, requires that project developers pay impact fees to cover capital costs associated with the creation of additional facilities and improvements to service the Proposed Project area. The requirements pertaining to impact fees have been implemented by the Preserve Development Impact Fees set forth in Chino Municipal Code Chapter 3.45. Therefore, the Proposed Project would not lead to substantial changes that would require revisions to the Previous Environmental Documentation due to new significant environmental effects.

With regard to fire protection and emergency medical services, the needed station identified in the PSP EIR has been constructed on the Chino Airport property. All development within the Proposed Project Area will comply with Mitigation Measure PS-F-1, which requires payment of impact fees for fire facilities, apparatus, and equipment, Mitigation Measures PS-F-1, PS-F-3, PS-F-4, and PS-F-5 regarding fire protection development requirements and project elements including fire hydrants and water lines.

With regard to police protection, the Chino Police Department's headquarters were previously moved from a 25,000-square foot facility to a facility of more than 102,000 square feet, and the City of Chino General Plan EIR (2010) indicates that this facility "would meet all future staffing requirements through the 2024 buildout [of the General Plan]." As noted above, the demand for police services generated by the Proposed Project would be consistent with that studied in the Previous Environmental Documentation because proposed development is consistent with the PSP. Impacts are therefore consistent with those analyzed in the Previous Environmental Documentation and would be less than significant with implementation of Mitigation Measure PS-P-1, which required that project developers shall pay police impact fees to cover capital costs associated with the creation of additional facilities and improvements to service the Proposed Project area. As noted above, this has been implemented by the Preserve Development Impact Fees set forth in Chino Municipal Code Chapter 3.45.

With regard to schools, a K-8 school called the Cal Aero Preserve Academy was built within the PSP since the PSP EIR was prepared. This is consistent with the buildout studied in the Previous Environmental Documentation. The demand for schools generated by the Proposed Project would be consistent with that studied in the Previous Environmental Documentation because, as noted above, the proposed development is consistent with the PSP. Impacts are therefore consistent with those analyzed in the district's Previous Environmental Documentation and would be less than significant with implementation of Mitigation Measure PS-S-2, which requires that project developers shall pay statutory development impact fees, and PS-S-1, which requires that developers within the Specific Plan area work with the CVUSD to plan school service for proposed development if enrollment numbers indicate more schools are needed. The Proposed Project allows for the future development of a 12-acre K-8 school and therefore partially implements Mitigation Measure PS-S-1. Future development of the K-8 school on Block 9 is consistent with what was analyzed in the 2008 Addendum. A conceptual third school site was shown as a potential site per a School Mitigation Agreement with Developer and CVUSD dated July 1, 2004. In January 2019 CVUSD terminated the Agreement and all requirements in the agreement to designate that site or any other in the PSP as a future third school site. If CVUSD later determines that a third site in the PSP is necessary, it may acquire such land as permitted by applicable laws. Current CVUSD enrollment numbers and projections indicate that a third school may not be needed in the Preserve. Moreover, removal of a potential

school from Block 3 (zoned ER) would not result in any new impacts because the number of units that can be developed in the PSP is capped by the Development Agreement and that maximum number of units was analyzed by the PSP EIR and subsequent addenda.

With regard to libraries, as noted in the PSP EIR, buildout is anticipated to result in demand that would create a significant impact prior to mitigation, because while land is set aside in the PSP for civic uses, the County Library has limited funding. The Proposed Project is consistent with development permitted in the PSP and assumed in the Previous Environmental Documentation and would therefore generate the same level of demand analyzed in the Previous Environmental Documentation. Further, the Proposed Project allows for future development of a community library. In addition, all development within the Proposed Project Area requires compliance with Mitigation Measure PS-L-1, which specifies that developers should address the need for additional library facilities and library services and provide space or funding for library construction. Mitigation Measure PS-L-1 also suggests that the construction of a joint use library shared by the County of San Bernardino and Chino Valley Unified School District may be an appropriate option. Development within the Proposed Project Area will also comply with Mitigation Measure PS-L-2, which involves the payment of impact fees. As noted above, these requirements have been implemented by the Preserve Development Impact Fees set forth in Chino Municipal Code Chapter 3.45.

**Finding:** The Proposed Project would not result in impacts to public services beyond those analyzed in Previous Environmental Documentation. The Proposed Project does not involve any changes to zoning, allowable use, density, intensity of use, physical impact area, or construction activities or methods. The Proposed Project also does not increase the total number of units allowed in the PSP Area and is entirely consistent with the PSP land use designations and development standards. The Proposed Project includes the same type of construction and development that was previously considered and analyzed for the Proposed Project Area. As such, the Proposed Project does not include substantial changes, and none have occurred with respect to the circumstances under which the Project is undertaken, that would require revisions to the Previous Environmental Documentation due to new significant environmental effects or a substantial increase in severity of previously identified significant effects. Therefore, the Proposed Project will not result in any new or more significant impacts as compared to the prior analysis.

## 6.15 RECREATION

### *6.15.1 Summary of PSP EIR Findings*

With regard to parks and recreation, the PSP EIR noted the existence of 16 parks maintained by the City of Chino, totaling 238 acres, of which 79.5 were undeveloped open space. The City's standard for parks and recreational facilities is 3 acres per 1000 residents, and the existing park space exceeded that standard with approximately 4 acres per 1000 residents devoted to parkland. The San Bernardino County Department of Public Works, Regional Parks Division, also operates and maintains the 2,200-acre Prado Regional Park adjacent to and partially in the Specific Plan Area. This park provides recreational opportunities including a golf course, Olympic shooting range, Prado stables, archery range, dog training facility, and air park, along with a network of recreational trails. Prado Park offers PV and camping, sports fields, an

equestrian center and trails, hiking trails, kids' playgrounds, picnic facilities, and seasonal fishing. The PSP EIR found that with the addition of approximately 33,249 residents, the Specific Plan would need to allocate approximately 100 acres of local park and recreational facilities based on the City's 3 acres of 1,000 resident standard. The Specific Plan accounts for this requirement by allocating 100 acres of community and neighborhood parks within the residential areas of the Specific Plan area, and planning for active recreational spaces. The City also charges an "Open Space" fee for commercial and industrial developments, and a park fee per the Quimby Act for all residential development. The PSP EIR therefore concluded that impacts would be less than significant. With Mitigation Measures PS-PR-1 and PS-PR-2 incorporated, all impacts, including cumulative impacts on Prado Regional Park, would be less than significant.

### *6.15.2 Impact Analysis of Proposed Project*

| Recreation | New Significant Impact | More Severe Impacts | New Ability to Substantially Reduce Significant Impact | No Substantial Change from Previous Analysis | No Impact |
|---|---|---|---|---|---|
| a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | ☐ | ☐ | ☐ | X | ☐ |
| b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment? | ☐ | ☐ | ☐ | X | ☐ |

**No Substantial Change from Previous Analysis.** With regard to parks and recreation, several parks have been constructed as part of development projects within the PSP. In addition, the Proposed Project allows for the future development of a 9-acre park. The remaining components of the Proposed Project are consistent with development permitted in the PSP and assumed in the Previous Environmental Documentation and would therefore generate the same level of demand analyzed in the Previous Environmental Documentation. Further, all development within the Proposed Project Area will be required to comply with Mitigation Measure PS-PR-1, which specifies that developers shall dedicate a portion of land, pay a fee, or a combination of both at the option of the City for the purpose of providing park and recreational facilities at the time and according to City standards. These requirements have been implemented by the Preserve Development Impact Fees set forth in Chino Municipal Code Chapter 3.45. The impact will therefore be less than significant with mitigation incorporated and the Proposed Project would not lead to substantial changes that would require revisions to the Previous Environmental Documentation due to new significant environmental effects.

**Finding:** The Proposed Project would not result in recreation impacts beyond those analyzed in Previous Environmental Documentation. The Proposed Project does not involve any changes to zoning, allowable use, density, or intensity of use. The Proposed Project also does not increase the total number of units allowed in the PSP Area and is entirely consistent with the PSP land use designations and development standards. The Proposed Project includes the same type of construction and development that was previously considered and analyzed for the Proposed Project Area. As such, the Proposed Project does not include substantial changes, and none have occurred with respect to the circumstances under which the Project is undertaken, that would require revisions to the Previous Environmental Documentation due to new significant environmental effects or a substantial increase in severity of previously identified significant effects. Therefore, the Proposed Project will not result in any new or more significant impacts as compared to the prior analysis.

## 6.16 TRANSPORTATION

### *6.16.1 Summary of PSP EIR Findings*

The PSP EIR traffic analysis was prepared consistent with the requirement of the City of Chino and the San Bernardino Association of Governments (SANBAG), which adopted a Congestion Management Program (CMP) to analyze traffic impacts. The CMP requires an analysis of selected roadways within 5 miles of the project boundaries – roadways, Freeways, and Expressways duly studied include SR-91, I-15 Freeway, SR-83, SR-60, SR-17, SR-142, Edison Avenue, Riverside Drive, Walnut Avenue, Central Avenue, and Archibald Avenue. Analysis timeframes included Existing Conditions 2001, Project Interim Year 2010, CMP Horizon Year 2020, and General Plan Buildout.

The analysis determined the level of service (LOS), which is a qualitative measure that describes operational conditions within a traffic stream, generally in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. The criteria used to evaluate the traffic flow vary based upon the type of roadway and whether the traffic flow is considered to be uninterrupted or interrupted. The City has determined that a LOS of D or better is acceptable and constitutes a less than significant impact for roadways, and a LOS of E or better is acceptable and constitute a less than significant impact for freeways.

The PSP EIR identified various intersection and roadway improvements necessary to bring LOS to acceptable levels. It also incorporates Mitigation Measures T-1 through T-9, which set forth requirements for the City such as that the City work cooperatively with SCAG and SANBAG to development regional/subregional projects and funding to minimize freeway deficiencies; participation in planning efforts to develop regional/subregional transportation facilities; provision of traffic operations and traffic systems management (TSM) improvements including signal system coordination, automated traffic control, Smart Corridors, intelligent transportation systems, and other measures; contacting appropriate transit agencies to encourage expansion of transit services for the Specific Plan area; and appropriate review of individual project impacts. The measures also carry requirements for individual project developers, including the required construction of all necessary internal project roadway improvements; the integration of trip reduction measures, travel demand management (TDM) strategies, and

alternative transportation modes, consistent with the Specific Plan; and the preparation of traffic studies as deemed necessary by the City Engineer, which will identify timing and extent of required improvements to adequately evaluate future traffic impacts of individual projects needed to mitigation the impacts of such development.

Despite the incorporation of all feasible mitigation measures, the PSP EIR concluded that impacts to roadways and freeways would remain cumulatively significant and unavoidable.

**Mitigation Program**

The PSP EIR identified Mitigation Measures T-1, T-2, T-3, T-4, T-5, T-6, T-7, T-8, and T-9 (see Appendix B). Consistent with Mitigation Measure T-9, a traffic study was prepared for the Proposed Project.

### *6.16.2 Impact Analysis of Proposed Project*

| Environmental Issues<br><br>Transportation - Would the project: | New Significant Impact | More Severe Impacts | New Ability to Substantially Reduce Significant Impact | No Substantial Change from Previous Analysis | No Impact |
|---|---|---|---|---|---|
| a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities? | ☐ | ☐ | ☐ | X | ☐ |
| b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)? | ☐ | ☐ | ☐ | X | ☐ |
| c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? | ☐ | ☐ | ☐ | X | ☐ |
| d) Result in inadequate emergency access? | ☐ | ☐ | ☐ | X | ☐ |

**No Substantial Change from Previous Analysis.** Linscott, Law & Greenspan (LLG) prepared a Trip Generation and Qualitative VMT Assessment for the Master Site Approval for The Preserve Specific Plan in September 2021, included as Appendix E (Traffic Report). The Traffic Report compares the traffic generated by the Proposed Project to that generated by the units as configured in the Block 4 Addendum, which contained the most recent traffic analysis conducted by the City in 2019 that included the SOP Area. The Block 4 Addendum is further described and discussed in Appendix A.

The Proposed Project (SOP Master Plan) is forecast to generate 34,281 daily trips, with 2,821 trips (1,002 inbound, 1,819 outbound) produced in the AM peak hour and 3,263 trips (1,921 inbound, 1,342 outbound) produced in the PM peak hour.[7]

A comparison of the trip generation potential of the configuration of units included in the Proposed Project with that which was analyzed in the Block 4 Addendum indicates that the Proposed Project would result in 4,868 less total trips in the Proposed Project Area than what was analyzed in the Block 4 Addendum (this also accounts for changes in the commercial developments on Block 6 and 7 that were approved by the City in April 2021), and 182 less total trips in the Proposed Project Area than what was analyzed in the 2008 Addendum. Therefore, the impacts of the Proposed Project are not greater than those disclosed in Previous Environmental Documentation for the Proposed Project Area.

As described in the Project Traffic Report, recent changes to CEQA require analysis of impacts related to Vehicle Miles Traveled (VMT), not LOS. Because an analysis of VMT was only recently added to the CEQA Guidelines, the Previous Environmental Documentation does not provide a framework for considering the Proposed Project's impacts to VMT. However, the use of VMT does not constitute new information requiring a revision to previous CEQA analysis or a subsequent or supplemental EIR, because analysis based on VMT metrics was available prior to the certification of the 2003 EIR (for example, VMT is routinely used to calculate impacts related to air quality and greenhouse gas emissions). In addition, the overall reduction in trips found in the Traffic Report would result in reduction in VMT as well.

The Traffic Report concluded that because the Proposed Project includes the same land uses on the same site, it would not result in any new or more severe VMT impacts as compared to buildout of the Proposed Project Area as analyzed in the Previous Environmental Documentation. The Proposed Project is not related to airport traffic or uses, and does not impact air traffic patterns. For the reasons described herein, the Proposed Project would have impacts less than those disclosed in Previous Environmental Documentation, and thus would have no additional impacts as compared with those studied in the Previous Environmental Documentation.

**Finding:** The Proposed Project would not result in transportation impacts beyond those analyzed in Previous Environmental Documentation. The Proposed Project does not involve any changes to zoning, allowable use, density, or intensity of use. The Proposed Project also does not increase the total number of units allowed in the PSP Area and is entirely consistent with the PSP land use designations and development standards. The Proposed Project includes the same type of construction and development that was previously considered and analyzed for the Proposed Project Area. As such, the Proposed Project does not include substantial changes, and none have occurred with respect to the circumstances under which the Project is undertaken, that would require revisions to the Previous Environmental Documentation due to new significant environmental effects or a substantial increase in severity of previously identified significant

[7] The Traffic Report included 210 units on Block 9 and 305 units on Block 11 (instead of 209 units on Block 9 and 306 units on Block 11 in the Proposed Project.) This minor shift does not impact the conclusions of the Traffic Report.

effects. Therefore, the Proposed Project will not result in any new or more significant impacts as compared to the prior analysis.

## 6.17 TRIBAL CULTURAL RESOURCES

### 6.17.1 *Summary of PSP EIR Findings*

The PSP EIR analyzed potential impacts to Tribal Cultural Resources under the Cultural Resources impact category. Since the certification of the PSP EIR, Assembly Bill 52 (AB 52) added various provisions to the California Public Resources Code (PRC) that concern Tribal Cultural Resources, including § 21080.3.1(d). The adoption of AB 52 established the tribal cultural resources environmental factor and related thresholds for to Appendix G of the CEQA Guidelines. On July 30, 2016, the California Natural Resources Agency adopted the final text for the tribal cultural resources update to Appendix G of the CEQA Guidelines, which was approved by the Office of Administrative Law on September 27, 2016. The addition of Tribal Cultural Resources as a separate category from Cultural Resources does not constitute new information requiring a revision to or additional EIR.

### 6.17.2 *Impact Analysis of the Proposed Project*

| Environmental Issues<br><br>Tribal Cultural Resources - Would the project: | New Significant Impact | More Severe Impacts | New Ability to Substantially Reduce Significant Impact | No Substantial Change from Previous Analysis | No Impact |
|---|---|---|---|---|---|
| a) Cause a substantial adverse change in the significance of a tribal cultural resource that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)? | ☐ | ☐ | ☐ | X | ☐ |
| b) Cause a substantial adverse change in the significance of a tribal cultural resource that is a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe? | ☐ | ☐ | ☐ | X | ☐ |

**No Substantial Change from Previous Analysis.** As noted above in Section 6.5 – Cultural Resources, Mitigation Measure CR-1 requires that an archeological survey be conducted prior to all earth disturbing activities within the PSP area. In compliance with PSP EIR

Mitigation Measure CR-1, a Phase 1 Cultural Resources Investigation will be completed prior to any grading activities in the Proposed Project Area. In addition, where recommended in culturally-sensitive areas, Mitigation Measure CR-2 requires archeological monitoring of earth-disturbing activities. The Proposed Project would implement Mitigation Measures CR-1 and 2 and recommendations in the required investigative report to ensure that impacts to tribal cultural resources are less than significant. The Proposed Project will be consistent with the development, physical impact area, and construction methods analyzed in the Previous Environmental Documentation. Therefore, the Proposed Project would not lead to substantial changes that would require revisions to the Previous Environmental Documentation due to new significant environmental effects.

**Finding**: The Proposed Project would not result in impacts to tribal cultural resources beyond those analyzed in Previous Environmental Documentation. The Proposed Project does not involve any changes to zoning, allowable use, density, intensity of use, physical impact area, construction activities or methods. The Proposed Project also does not increase the total number of units allowed in the PSP Area and is entirely consistent with the PSP land use designations and development standards. The Proposed Project includes the same type of construction and development that was previously considered and analyzed for the Proposed Project Area. As such, the Proposed Project does not include substantial changes, and none have occurred with respect to the circumstances under which the Project is undertaken, that would require revisions to the Previous Environmental Documentation due to new significant environmental effects or a substantial increase in severity of previously identified significant effects. Therefore, the Proposed Project will not result in any new or more significant impacts as compared to the prior analysis.

## 6.18 UTILITIES & SERVICE SYSTEMS

### *6.18.1 Summary of PSP EIR Findings*

With regard to water supply, the PSP EIR included a detailed Water Supply Assessment (WSA) which provided an analysis of water supply and source reliability, which is discussed above. The WSA indicated that the City of Chino, with the PSP buildout, was expected to meet future water demands through multiple, reliable sources up to 2022. Based upon the amount of water available from groundwater, desalinated groundwater, imported supplies, and recycled water sources/supplies, the City has the ability to provide adequate domestic and irrigation water supplies to the Proposed Project up to the Year 2022. At the time of PSP EIR preparation, Chino received water from naturally recharged groundwater (38 percent), imported water (40 percent), desalted water (20 percent), and recycled water (2 percent). Planned improvements to the desalting and water reclamation facilities were anticipated to increase the availability of recycled and desalted water. The PSP EIR concluded that all current water sources were sufficient to continue serving the population's needs into the future. Overall demand and supply projections consider land use, development of groundwater programs, desalter expansion and development, and connection to recycled water sources. Demand projections also consider water savings resulting from plumbing codes, price effects, and actual and projected implementation of water conservation Best Management Practices. During FY 2021/22, the City's water supply consisted of groundwater (28%), imported water (22%), desalted groundwater (24%), and recycled water (26%).

Although the WSA contained projections out to 2022, as explained in Threshold (d) below, the City has since prepared several water studies that have included the PSP Area. As explained in further detail below, the City's Urban Water Management Plan (UWMP), most recently updated in 2015 and 2020, explicitly accounts for the PSP Area, including the Proposed Project Site, and has extended the projected demand horizon to 2045. Both the 2015 and 2020 UWMP conclude that there are sufficient water supplies to meet projected demand under various normal and dry year scenarios. Additionally, the City maintains a Water Master Plan which includes infrastructure improvements needed to meet future demands which are based on per capita demand projections and anticipated growth. The City's Water Master Plan incorporates the entire water system, including the PSP area.

The City did not supply water to the PSP area at the time of PSP EIR preparation. PSP design includes potable and recycled water distribution systems to conserve potable water and make best use of available supplies. The PSP EIR concluded that with implementation of the PSP, current and projected water supply and current and planned water facilities would be adequate for planned development including the PSP through the expanded use of desalted ground water and recycled water. Further, the PSP EIR incorporates Mitigation Measures U-W-1 through U-W-8 to ensure impacts are less than significant. Impacts on water supply and facilities demand would be less than significant.

With regard to wastewater, the PSP EIR observed that the PSP area did not already have a system for wastewater collection, treatment, and disposal, but rather was accomplished by private sewage disposal systems including septic tanks and subsurface disposal fields. However, with annexation to the City of Chino, sewer pipelines for the collection of wastewater would be constructed to serve new developments including the Specific Plan, in compliance with City policy to require financing and implementation plans for sewage system improvements as a condition of development approval. In anticipation of the proposed Specific Plan, the City prepared a preliminary Sewer Master Plan for the area, which outlined all planned sewer infrastructure additions, based on flow rates and growth projections, including estimated costs for construction, to accommodate the proposed Specific Plan area. The PSP EIR concluded that with implementation of planned improvements, Mitigation Measures U-WW-1 and U-WW-2 which require City assurance that required sewer improvements are implemented and developer payment of fees for construction, and increased reliance on the beneficial reuse of water resources, there would be sufficient capacity for implementation of the Specific Plan and impacts would be less than significant.

The PSP EIR identified Mitigation Measures U-W-1, U-W-2, U-W-3, U-W-4, U-W-5, U-W-6, U-W-7, and U-W-8 (Water Supply); U-WW-1 and U-WW-2 (Wastewater); U-E-1 (Electricity); U-SW-1 (Waste Management). These Mitigation Measures are included in Appendix B.

### *6.18.2 Impact Analysis of Proposed Project*

| Environmental Issues<br><br>Utilities - Would the project: | New Significant Impact | More Severe Impacts | New Ability to Substantially Reduce Significant Impact | No Substantial Change from Previous Analysis | No Impact |
|---|---|---|---|---|---|
| a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects? | ☐ | ☐ | ☐ | X | ☐ |
| b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years? | ☐ | ☐ | ☐ | X | ☐ |
| c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? | ☐ | ☐ | ☐ | X | ☐ |
| d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals? | ☐ | ☐ | ☐ | X | ☐ |
| e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste? | ☐ | ☐ | ☐ | X | ☐ |

**No Substantial Change from Previous Analysis.** The Proposed Project would result in growth and land use types consistent with the land use plan analyzed in the Previous Environmental Documentation. The Proposed Project would not increase the total number of dwelling units currently allowed within the PSP and is entirely consistent with the PSP land use designations. Because the Proposed Project is consistent with the development studied in the Previous Environmental Documentation, the infrastructure to serve the Proposed Project and the impacts from the installation of the onsite infrastructure is consistent with what has been analyzed in the Previous Environmental Documentation.

With regard to wastewater treatment, it is typically expanded at an incremental pace to meet verified need. The PSP EIR indicated that the Inland Empire Utilities Agency (IEUA) will provide sufficient sewage disposal capacity to meet the demands of PSP buildout, which would include the Proposed Project, since it is consistent with the land use plan contemplated in the Environmental Previous Environmental Documentation. In addition, the 2020 Urban Water Management Plan (UWMP) includes planned improvements to existing facilities by the City and

IEUA to improve water supply, including expansion of the Eastside Water Treatment Facility and State Street Water Treatment Facility, for which environmental review was separately conducted by the City. These improvements are currently underway and are expected to be complete in 2025.

With respect to storm water drainage facilities, because the Proposed Project is consistent with what was analyzed in the Previous Environmental Documentation, the Proposed Project will not result in any further or more significant impacts. Storm water is further discussed above in Section 6.10 – Hydrology and Water Quality.

With respect to water supply, as explained above, the PSP EIR included a WSA that concluded there was sufficient water supplies available to serve buildout of the Specific Plan area. Since publication of the PSP EIR, during progress toward PSP buildout, the City has consistently and reliably met water demand, and there is every indication that it will be able to do so for the Proposed Project. The Proposed Project would not increase the total number of dwelling units currently allowed within the PSP and is entirely consistent with the PSP land use designations. The Proposed Project will comply with PSP EIR mitigation measures related to water conservation, groundwater replenishment, onsite retention, and wastewater reuse (Mitigation Measures U-W-3, U-W-4, U-W-5, U-W-6, and U-W-7) and would also comply with all applicable policies and regulations in regard to water conservation.

Since the City certified the PSP EIR in 2003, the City has approved several updates to its UWMP, most recently in 2015[8] and 2020.[9] The 2015 UWMP population growth projections are based on the 2025 General Plan and SCAG population growth assumptions within the City's service area through 2035. (WSA § 3.4). The 2015 UWMP indicates that the City obtains water from four primary sources: (1) groundwater from the adjudicated Chino Groundwater Basin managed by the Chino Basin Watermaster; (2) imported State Water Project (SWP) water from the Municipal Water District through IEUA and treated by the Water Facilities Authority; (3) desalted groundwater from the Chino Basin Desalter Authority; and (4) recycled water supplied by the IEUA. As noted by the 2015 UWMP, these sources are sufficient to meet the City's current and projected water demands. The 2015 UWMP also finds that the City is able to meet 100% of its dry year demand under every scenario. For normal years, the projected supply exceeds demand for 2020-2040. Because the PSP is consistent with the General Plan, the 2015 UWMP assumes development of the PSP as part of planned future development. Therefore, adequate water supply would be available to serve the proposed project, since it is included in the PSP and consistent with PSP land use and growth assumptions.

The 2020 UWMP population growth projections are projected through 2045 and based on the City's Master Plan. Land uses assumed in the 2020 UWMP are based on the City's General Plan 2025, and **specifically notes that "[a]reas within the City's service area continue to be**

[8] Available online at https://www.cityofchino.org/UserFiles/Servers/Server_10382578/Image/City%20Hall/Departments/Public%20Works/Environmental/2015%20UWMP_final_errata%20012618.pdf (last accessed 5/14/2021).

[9] Available online at https://p1cdn4static.civiclive.com/UserFiles/Servers/Server_10382578/Image/City%20Hall/Departments/Public%20Works/Environmental/UWMP%202021%20Combined.pdf.

**developed (including the Preserve)**" and "[a]s a result, the City's service area is anticipated to increase. The 2020 UWMP indicates that the City's total water demands have ranged from 18,054 AFY to 25,125 AFY over the past ten years. It goes on to note that the "City reviewed its historical water demands to determine projected water demands and the City is able to provide sufficient water supplies to meet the projected demands of its customers, including in long-term drought periods." The 2020 UWMP projects water demands through FY 2044-45. It includes water use projections in five-year increments for a normal year, single dry year, and five-year consecutive drought. The 2020 UWMP notes that the City's primary source of water is groundwater pumped from the Chino basin, but also includes treated groundwater from the Chino Basin produced by Chino Basin Desalter Authority; imported surface water from Metropolitan Water District of Southern California through the IEUA, treated and purchased through Water Facilities Authority; and recycled water purchased from IEUA. As noted above, these sources are sufficient to meet the City's current and projected water demands.

Table 2 below updates Table 3-1 of the WSA with data from the 2020 UWMP to extend the projected supply and demand horizons to 2045. The table demonstrates, as explained above, that the City continues to have sufficient supply to meet all of its water demands, including full build out of the PSP, as approved.

As explained above, the 2020 UWMP finds that the City would be able to meet the projected water demands, which include the buildout of the PSP, for a normal year, single dry year, and five-year consecutive drought through 2045.

Therefore, the impacts of the Proposed Project are similar to those disclosed in Previous Environmental Documentation for the SOP area and the Proposed Project would have a less than significant impact. There are no new impacts not already identified in the Previous Environmental Documentation.

Table 2
Current and Project Water Demand and Supply
City of Chino, including the PSP Area (af)[10]

| Water Sources | 2022 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|
| DEMAND | | | | | | |
| Potable City[11] | 13,088 | 16,343 | 17,810 | 19,087 | 20,164 | 21,308 |
| Subarea 2 | 5,132 | | | | | |
| Recycled City | 3,060 | 4,500 | 4,500 | 4,000 | 3,800 | 3,800 |
| Subarea 2 | 2,330 | | | | | |
| Total Water Demand | 23,610 | 20,843 | 22,310 | 23,087 | 23,964 | 25,108 |
| SUPPLY | | | | | | |
| Groundwater | 11,557 | 5,990 | 7,457 | 8,734 | 9,811 | 10,955 |
| Desalted | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| Imported | 5,357 | 5,353 | 5,353 | 5,353 | 5,353 | 5,353 |
| Recycled | 5,534 | 4,500 | 4,500 | 4,000 | 3,800 | 3,800 |
| Total Water Supply | 27,448 | 20,843 | 22,310 | 23,087 | 23,964 | 25,108 |
| Surplus Supply | 3,838 | 0 | 0 | 0 | 0 | 0 |

With respect to wastewater treatment, the PSP EIR indicated that the IEUA will provide sufficient sewage disposal treatment capacity to meet the demands of PSP buildout. As such, IEUA will provide sufficient sewage disposal treatment capacity to meet the demands of the Proposed Project because it is consistent with the land use plan contemplated in the Previous Environmental Documentation.

With respect to solid waste, the PSP EIR indicated that there was sufficient landfill capacity to accommodate the solid waste generation anticipated as a result of the buildout of the PSP. As such, there is sufficient landfill capacity to accommodate the solid waste generated by the Proposed Project because it is consistent with the land use plan contemplated in the Previous Environmental Documentation.

In addition, the Proposed Project would be required to comply with all Federal, State and local statutes and regulations related to solid waste management as a matter of course, and these regulations are more stringent than those in place with the PSP EIR was prepared. Therefore, the Proposed Project would not lead to substantial changes that would require revisions to the Previous Environmental Documentation due to new significant environmental effects.

**Finding:** The Proposed Project would not result in impacts to utilities and service systems beyond those analyzed in Previous Environmental Documentation. The Proposed Project does not involve any changes to zoning, allowable use, density, or intensity of use. The Proposed Project also does not increase the total number of units allowed in the PSP Area and is entirely

[10] Demand and supply information for 2022 is based on the WSA, which included the PSP Area as "Subarea 2." Demand and supply information for 2025-2045 is based on the City's demand and supply included in the 2020 UWMP, which, as noted herein, includes the PSP Area.
[11] The 2020 UWMP has a single value for potable and non-potable water in tables 4-2 and 4-3.

consistent with the PSP land use designations and development standards. The Proposed Project includes the same type of construction and development that was previously considered and analyzed for the Proposed Project Area. As such, the Proposed Project does not include substantial changes, and none have occurred with respect to the circumstances under which the Project is undertaken, that would require revisions to the Previous Environmental Documentation due to new significant environmental effects or a substantial increase in severity of previously identified significant effects. Therefore, the Proposed Project will not result in any new or more significant impacts as compared to the prior analysis.

## 6.19 WILDFIRE

### *6.19.1 Summary of PSP EIR Findings*

The PSP EIR did not formally analyze potential wildfire impacts. Wildfire risk does not constitute new information requiring a revision to or additional EIR, as discussed in more detail immediately below.

### *6.19.2 Impact Analysis of Proposed Project*

| Environmental Issues<br><br>Wildfire: If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:<br><br>: | New Significant Impact | More Severe Impacts | New Ability to Substantially Reduce Significant Impact | No Substantial Change from Previous Analysis | No Impact |
|---|---|---|---|---|---|
| a) Substantially impair an adopted emergency response plan or emergency evacuation plan? | ☐ | ☐ | ☐ | X | ☐ |
| b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire? | ☐ | ☐ | ☐ | X | ☐ |
| c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment? | ☐ | ☐ | ☐ | X | ☐ |
| d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes? | ☐ | ☐ | ☐ | X | ☐ |

**No Substantial Change from Previous Analysis.** As noted in the PSP EIR, "The portion of the plan area designated as a State Responsibility Area (SRA) for wildland fire protection will transition from State to local jurisdiction upon annexation into the City of Chino. The City of Chino would then contract with the State Department of Forestry & Fire Protection to maintain existing levels of wildland fire protection through the continuing availability of specialized equipment and resources such as fire crews and aircraft. No significant wildland fire protection impact is anticipated." The PSP is not located in a high wildfire risk area. Because the Proposed Project is consistent with the land uses, physical impact area, and development pattern analyzed in the Previous Environmental Documentation, the Proposed Project will not have any additional or more severe impacts as compared to those analyzed in the Previous Environmental Documentation.

**Finding:** The Proposed Project would not result in wildfire impacts beyond those analyzed in Previous Environmental Documentation. The Proposed Project does not involve any changes to zoning, allowable use, density, physical impact area, or intensity of use. The Proposed Project also does not increase the total number of units allowed in the PSP Area and is entirely consistent with the PSP land use designations and development standards. The Proposed Project includes the same type of construction and development that was previously considered and analyzed for the Proposed Project Area. As such, the Proposed Project does not include substantial changes, and none have occurred with respect to the circumstances under which the Project is undertaken, that would require revisions to the Previous Environmental Documentation due to new significant environmental effects or a substantial increase in severity of previously identified significant effects. Therefore, the Proposed Project will not result in any new or more significant impacts as compared to the prior analysis.

**Appendix A:** Summary of Prior Project Approvals and Environmental Review Applicable to the Proposed Project.

**Appendix B:** Mitigation Measures from the Preserve Specific Plan EIR

**Appendix C:** Example Site Specific Geotechnical Report, prepared by RMA Group, dated August 2020

**Appendix D:** Example Preliminary Hydrology Study, prepared by DRC Engineering, Inc., dated September 2020

**Appendix E:** Trip Generation and Qualitative VMT Assessment for the Master Site Approval for The Preserve Specific Plan, prepared by Linscott Law & Greenspan, dated September 2021

**Appendix F:** Example Site Specific Water Quality Management Plan, prepared by DRC Engineering, Inc.

**Appendix A:** Summary of Prior Project Approvals and Environmental Review Applicable to the Proposed Project.

### *The Preserve Specific Plan*

The Proposed Project is located within the PSP Area. In March 2003, the City approved the PSP, which covers an area of 5,435 acres. At the same time, the City certified The Preserve – Chino Sphere of Influence – Sub-Area 2 Environmental Impact Report ("PSP EIR") (State Clearinghouse [SCH] No. 2000121036). The PSP EIR is a "program" EIR and was prepared in accordance with the California Environmental Quality Act (CEQA, California Public Resources Code, Sections 21000, et seq.) and the State CEQA Guidelines (California Code of Regulations, Title 14, Sections 15000, et seq.). In certifying the PSP EIR, the City Council found that it adequately addressed the potential environmental impacts associated with planned buildout of the PSP Area, inclusive of the Proposed Project Site that is the subject of evaluation in this document. The PSP EIR analyzed a Land Use Plan containing variety of land use designations containing: a range of residential land uses including estate, low density, medium density, high density, and mixed use, with maximum of 9,779 dwelling units; over 10 million square feet of non-residential uses including neighborhood and regional commercial, light industrial, airport, and airport-related uses; and public facilities, parks, schools, open space, and right-of-way. The PSP EIR identified six significant and unavoidable environmental impacts that would result from implementation of the PSP: Agricultural Resources, Air Quality, Biology Resources, Land Use, Transportation and Traffic, and Utilities.

### *South of Pine Master Plan*

In March 2008, the City approved an Addendum to the PSP EIR for General Plan and Specific Plan Amendment 2007-02 (South of Pine Master Plan). That Addendum (referred to as the 2008 Addendum) was prepared to review the environmental impacts associated with minor land use changes to the PSP project description that resulted from minor roadway realignments within the 540-acre SOP Master Plan area. Also included was a Master Site Approval to plan for the future development of Neighborhood Commercial, Community Core (residential and nonresidential), and Open Space Recreational land use designations and to accommodate the allowed number of residential dwelling units per PSP at varying densities within the Estate, Low-, Medium-, and High-Density Residential land use designations. Additional project approvals included revisions to the Preserve Design Guidelines and approval of the Community Core Master Plan and Overall Design Concept. As noted above, the 2008 Addendum analyzed the impacts of the Proposed Project: the Project Site in that document contained a school, a library, a community center, a park, and 230 residential units (the "2008 Block 9 Project") rather than the 210 residential units contained in the Proposed Project.

### *South of Pine and Flores Project*

In 2016, the City approved a change in the land use designations for various lots in the SOP Master Plan area (Blocks 1, 2, 4, 8, 10, and 11), modifying the LDR (Low Density Residential), MDR (Medium Density Residential), and HDR (High Density Residential) in the

area around the Community Core and changing the MDR land use designation at the northwest corner of Pine and Mill Creek Avenue (Flores Project) to NC (Neighborhood Commercial) to allow for retail development. These changes resulted in a 4.33 acre increase of LDR, a 12.40 acre decrease of MDR, and a 4.59 acre increase in HDR. The total number of units in the SOP Master Plan area), and in the Blocks subject to the proposed changes remained unchanged.

The City analyzed these changes in the 2016 Addendum to the PSP EIR, which concluded that there would be no new significant impacts or changes to the severity of the impacts as a result of these changes.

***Van Vliet Project***

In 2019, the City approved minor changes to the residential unit count in the North of Pine area to allow for subdivision of 44.13 adjusted gross acres of land (portion of Tract 16418 known as Van Vliet), and a Master Site Approval for four residential product types at an overall density of 11.19 dwelling units per acre located south of Bickmore Avenue, east of Mayhew Avenue, west of Rincon Meadows Avenue, and north of Pine Avenue within the Medium Density Residential (MDR) land use designation of The Preserve Specific Plan. PA-6 of the Van Vliet site was approved for construction of 57 residential units, and PA-7 was approved for construction of 96 residential units. This was analyzed in an addendum to the PSP EIR (NOP Addendum).

***Block 4 Project***

In 2019, the City approved minor changes to the residential unit counts in the SOP area, the relocation of a planned park, and the realignment of transmission poles and lines. The project approvals in that case were Master Site Approval and multiple Tentative Tract Maps for development of 388 residential units on the 55.86 acre site. These changes resulted in the overall unit count within the SOP area decreasing from 4,676 units to 4,600[1] units.

The City analyzed these changes in the 2019 Addendum to the PSP EIR (Block 4 Addendum), which concluded that there would be no new significant impacts or changes to the severity of the impacts as a result of these changes. After approval of the Block 4 Project, the unit counts for Blocks 1-11 in the SOP area were as shown in Table 1 below.

**Table 1:** South of Pine Unit Counts After 2019 Approval of Block 4.

| **SOP Block No.** | **Entitled Residential Units After Block 4 Approval** |
|---|---|
| Block 1 Total | 347 |

[1] The Block 4 Addendum included two typographical errors that resulted in inaccurate units counts for Block 4 and Block 9 and, as such, an inaccurate total. The correct unit counts for Block 4 at the time of the Block 4 Addendum was 842, rather than 843 and the correct count for Block 9 was 169 rather than 155, resulting in a total of 4,600 units rather than 4,587. These errors have been corrected in this Table 1.

| | |
|---|---|
| Block 2 Total | 572 |
| Block 3 Total | 160 |
| Block 4 Total | 842 |
| Block 5 Total | 799 |
| Block 6 Total | 145 |
| Block 7 Total | 208 |
| Block 8 Total | 794 |
| Block 9 Total | 169 |
| Block 10 Total | 282 |
| Block 11 Total | 282 |
| **Total SOP Units** | **4,600** |

The Block 4 Addendum contained the last comprehensive traffic analysis for all Blocks in the SOP area conducted by the City. As such, this document compares against the unit counts and impacts identified therein where appropriate.

***The Preserve Development Agreement***

The City and Chino Development Corporation ("CDC") and Chino Preserve Development Corporation ("CPDC") entered into The Preserve Development Agreement (City of Chino Contract No. 2004-073) on July 1, 2004. The Development Agreement provided for the right to transfer dwelling units or densities throughout the PSP Area for properties under CDC and CPDC's ownership, provided the total maximum allowable number of units (7,274) was not exceeded. The First Development Agreement Amendment dated December 2, 2008 allowed for an additional 600 units to be constructed on CDC and CPDC land holdings within the PSP Area, making the limit 7,874 units. The environmental review of the Specific Plan Amendment and the First Development Agreement were tiered off the PSP EIR through a Mitigated Negative Declaration ("2008 MND").

In January 2014, an Addendum to the PSP EIR was approved for the Second Amendment to The Preserve Development Agreement ("Second DA Amendment") which includes provisions regarding environmental impacts, changed zoning/land use designation and added more property and the units on that new property increased the total number of dwelling units allowed by the DA from 7,874 to 8,104.

In August 2016, the City Council approved a Third Amendment to the Development Agreement that adjusted land ownership within the Master Plan. The City found that this Third Amendment to the Development Agreement was exempt from CEQA pursuant to CEQA section 15061(b)(3) because it merely allowed for a transfer of ownership to facilitate more logical development boundaries for future development, and it has no potential for having a significant impact on the environment.

As amended, the Development Agreement provides the right to transfer dwelling units or densities throughout the PSP Area for properties under Lewis' ownership with certain restrictions, provided the total maximum allowable number of units does not exceed 8,129.[2] Not including the Proposed Project, on Lewis properties, as of May 2021, Lewis has entitled 4,989 units (3,920 of which have certificates of occupancy) and has 4,209 units left out of a total of 8,129 units. Therefore, there is sufficient development capacity within Lewis' ownership and the Master Plan to approve the Proposed Project.

[2] Since the approval of the Development Agreement, Lewis acquired an additional 2.5 acres of MDR zoned property. This allows for development of an additional 25 units, bringing the total to 8,129.

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| **5.1 Land Use** | **LU-1. Chino Airport Influence Area.** The City of Chino shall provide notice of development applications within adopted airport noise and safety zones to the Airport Land Use Commission (ALUC), in compliance with the Chino Airport Comprehensive Land Use Plan (ACLUP). The City will coordinate with the ALUC to assure specific development projects' compatibility with Chino Airport operations. | Written evidence of notification | Development Application Review and Plan Check | Community Development Director |
| | **LU-2. Correctional Institution for Women (CIW-Chino).** Special attention should be focused during subsequent review of specific development projects on providing an adequate buffer and separation between the existing CIW-Chino and planned residential uses immediately to the east. The planned linear Community Paseo along Chino-Corona Road separating these uses should include some combination of landscape screening, berms and/or walls, and setbacks to achieve an adequate physical and visual separation between these uses. | Plan Check | Development Application Review and Prior to Issuance of Grading Permit | Community Development Director |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| **5.2 Agriculture** | **AG-1. Agricultural Land Preservation.** The City of Chino will propose to participate in the Williamson Act Easement Exchange Program (WAEEP) and any plan that may be adopted pursuant to SB 831. | Written or other evidence of participation | Ongoing (Following implementation of a plan for Chino Basin pursuant to SB 831) | Community Development Director |
| | **AG-2. Agency Coordination and Planning for Agricultural Uses.** The City of Chino shall participate in a coordinated multi-agency planning program for sustainable agricultural uses within the Lower Chino/Prado Basin. This program should involve the principal public landowners within the basin, including but not limited to the U.S. Army Corps of Engineers, Orange County Flood Control District, and County of San Bernardino. Components of this program may include an agricultural feasibility study, acquisitions plan, and management plan for sustainable agricultural uses within the basin. | Written or other evidence of participation/ coordination | Ongoing | Community Development Director |
| | Also see Biological Resources Measure B-3(4), **RMP-Urban Buffer/Transition Area** | Plan Check | Prior to Issuance of Grading Permit | Community Development Director |
| **5.3 Hydrology and Water Quality** | **HWQ-1. NPDES.** All development shall comply with the National Pollutant Discharge Elimination System (NPDES) regulations. Prior to the issuance of a grading permit, applicants shall demonstrate compliance with NPDES Stormwater Permit requirements to the satisfaction of the City of Chino. Applicable | Plan Check | Prior to Issuance of Grading Permit | City Engineer |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | BMP provisions shall be incorporated into the NPDES Permit. | | | |
| | **HWQ-6. Storm Drain Outlets.** The City of Chino shall assure that storm drain facilities and outlets to Prado Regional Park and the natural open space system are designed in a manner that minimizes disruption of park operations and protects park and open space resources. Specific drainage facility designs at outlets to the major open space system below the 566' elevation shall be made available for review by the County of San Bernardino Flood Control District and U.S. Army Corps of Engineers, as appropriate. | Plan Check | Development Review/Prior to Issuance of Grading Permit | City Engineer |
| | **HWQ-7. Urban Runoff Management Plan.** Prior to any development approvals, a plan for managing urban runoff to protect sensitive drainages within the open space system shall be approved by the City of Chino. This Urban Runoff Management Plan (URMP) will be integrated with the project Storm Drain Plan, and provide the framework and mechanism for:<br>1) Phased implementation of structural and non-structural best management practices (BMP's) to control stormwater discharges and protect water quality; | Plan Check and approved Urban Runoff Management Plan | URMP approval prior to subsequent development project approvals<br>Review of subsequent projects for compliance with URMP prior to issuance of Grading Permit | City Engineer |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | 2) Review of subsequent projects for inclusion of 'mini-basins' for detention, filtration and recharge to groundwater;<br><br>3) The design and location of Natural Treatment Systems (NTS) for water quality purposes within drainages; and<br><br>4) Implementation of a water quality monitoring program at storm drain outlets to Prado Lake, Chino Creek and Mill Creek.<br><br>The URMP shall be made available for review and comment by the Flood Control Districts of the counties of San Bernardino and Orange, the U.S. Army Corps of Engineers, and Orange County Water District during the City of Chino's review and approval process. The URMP shall assure to the satisfaction of the City of Chino that project development that drains into Chino Creek and Mill Creek will not unacceptably contribute to flooding, scour and erosion, or water quality degradation of these environmentally sensitive drainages. | | | |
| | **HWQ-2. Best Management Practices.** Individual projects within the specific plan area shall be reviewed by the City of Chino for the inclusion of appropriate structural and non-structural Best Management Practices (BMPs) to control stormwater discharges and protect water quality. Structural controls may include, | Plan Check (for NPDES Permit Compliance) | Prior to Issuance of Grading Permit | City Engineer |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | but are not limited to filtration, common area efficient irrigation, common area runoff-minimizing landscape design, velocity dissipation devices, oil/grease separators, inlet trash racks, and catch basin stenciling. Non-structural BMPs can include education for property owners, tenants and occupants, activity restrictions, common area landscape management, litter control, and catch basin inspection, BMP maintenance; and street sweeping.<br><br>The following are examples of BMPs that may be included within NPDES permit requirements for individual projects:<br>• Use of sand bags and temporary desilting basins during project grading and construction during the rainy season (October through April) to prevent discharge of sediment-laden runoff into stormwater facilities.<br>• Installation of landscaping as soon as paracticable after completion of grading to reduce sediment transport during storms.<br>• Hydroseeding, soil binders or other measures to retain soil on graded building pads if they are not built upon before the onset of the rainy season. | | | |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | • Incorporation of structural BMPs (e.g., grease traps, debris screens, continuous deflection separators, oil/water separators, drain inlet inserts) into the project design to provide detention and filtering of contaminants in urban runoff from the developed site prior to discharge to stormwater facilities.<br>• Stenciling of catch basins and other publicly visible flood control facilities with the phrase "No Dumping-Drains to the Ocean."<br><br>**HWQ-3. Best Management Practices.** The City shall review subsequent development projects within the specific plan area for the application of Best Management Practices (BMPs) to reduce water pollution from urban runoff. Among the source-reduction BMPs that may be required by the City for application to such projects are the following:<br>• Animal waste reduction<br>• Exposure reduction<br>• Recycling/waste disposal<br>• Parking lot and street cleaning<br>• Infiltration (exfiltration) devices<br>• Oil and grease traps<br>• Sand traps | Plan Check | Prior to Issuance of Grading Permit | City Engineer |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | • Filter strips<br>• Regular/routine maintenance<br><br>The specific measures to be applied shall be determined in conjunction with review of required project hydrology and hydraulic studies, and shall conform to City standards and the standards of the County's Municipal Stormwater Permit, under the NPDES program.<br><br>**HWQ-4. Water Quality Monitoring.** A water quality monitoring program should be implemented to regularly test the water quality at the project storm drainage outlets to Prado Lake, Chino Creek and Mill Creek. The program should be devised to differentiate the pollutant contributions of project development from dairies during the transitional period. If test results determine that the water quality standards established by the RWQCB are not being met, corrective actions acceptable to the RWQCB would be taken to improve the quality of surface runoff discharged from the outlets to a level in compliance with the adopted RWQCB standards. | Water quality samples | Annual Monitoring Report | City Engineer |
| **5.4 Biological Resources** | **B-1. Zoning and Land Use Regulation.**<br><br>1. All areas below the 566-foot dam inundation line, except such areas located north of Pine | Review of requests for changes in Land Use | Prior to Planning Commission action on | Community Development Director |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | Avenue, will be retained within an open space or agricultural land use designation in order to provide protection for existing wildlife habitat values found in such areas and those to be created by the habitat enhancement activities described under mitigation B-3, below, as well as to avoid any new impacts. | Designations utilizing the Zoning and Land Use Regulations Checklist (RMP Table 4-2) | requests for changes in Land Use Designations | |
| | 2. Any new development or expansions of existing land uses within the open space designations of The Preserve Specific Plan (i.e., Agriculture, Agriculture/Open Space-Natural, Open Space-Recreation, Open space-Natural and Open Space-Water) shall comply with the requirements and provisions of the Resource Management Plan (see Mitigation No. B-3, below) in order to mitigate potential adverse project-specific impacts on biological resources. | Development Application Review ( see Zoning and Land Use Regulations Checklist--RMP Table 4-2) | Prior to Issuance of Permit | Community Development Director |
| | **B-2. Required Biological Studies** | | | |
| | 1. Conduct a biological assessment of each specific project site to characterize the habitat types and the potential for the site to support any sensitive species or habitat.<br>2. Where a sensitive species has the potential to occur, determine the level of potential for occurrence as low, moderate, or high. Provide scientific justification for this determination. | Development Application Review (see Required Biological Surveys Checklist--RMP Table 4-3) | Prior to Approval of Development Projects or the Issuance of Grading Permits, as appropriate | Community Development Director |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | 3. If the potential for occurrence is moderate or high (e.g., the required habitat elements for this species are present and/or there has been a sighting of this species in the vicinity of the project site), conduct focused surveys within suitable habitat to determine the presence or absence of the species on the project site.<br><br>4 Any surveys deemed necessary must be conducted by a biologist qualified to perform the needed survey(s). The City of Chino, or its consultant, will review and approve the personnel and methodology for any such proposed surveys.<br><br>5. If a sensitive species or habitat is found to occur on a proposed project site, or occupies habitat that may be impacted directly or indirectly by the proposed project, this must be called to the City's immediate attention and documented in the biological assessment for the project.<br><br>6. Mitigation measures to offset any potential impact to sensitive species and habitats must comply with the RMP and shall be included in the biological assessment. All lands set aside for conservation and/or other mitigation measures must be clearly documented in the final biological assessment. | | | |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | **B-3. Resources Management Plan**<br><br>A Resources Management Plan (RMP) shall be prepared by the City of Chino to provide for the implementation of the mitigation measures described below, in order to avoid, lessen and reduce impacts on the biological resources within the Preserve Specific Plan Area. The Resources Management Plan will be approved by the Chino City Council at the time of certification of the Final EIR. The RMP will formalize the City's balanced approach to land use and resource management, and provides the framework for coordinating the City's actions with other agencies, such as County of San Bernardino, CDFG, USFWS, USACE, OCFWD, and OCWD with regard to specific conservation measures and resource management initiatives within The Preserve. The RMP will focus on the development and implementation of wildlife habitat enhancement and restoration activities, primarily funded by a mitigation fee imposed on all urban development within the Project Area. The RMP will specifically address the following mitigation measures:<br><br>**1. 300-acre Conservation Area**<br><br>Provision will be made for the creation, enhancement, expansion and perpetuation of | Approved RMP<br><br>Feasibility Study of Potential Conservation | With Certification of Program EIR<br><br>Study Complete within 12 Months of Program | Community Development Director<br><br>Community Development Director |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | high quality wildlife habitat in a 300-acre Conservation Area to be located generally below the 566-foot inundation line and within the boundaries of the project area. The more specific location of the conservation area will be determined through the preparation of the RMP and will depend on availability of such lands for mitigation purposes, and the suitability of land for the enhancements envisioned. Such habitat will be designed to address the impacts that will occur as the result of development of The Preserve (i.e., raptor, waterfowl and burrowing owl habitat). Key enhancements that will be provided comprise the following:<br><br>a.) A weed removal program and replanting of native vegetation within the 300-acre Conservation Area shall be implemented to create high quality raptor and burrowing owl foraging habitat.<br><br>b.) Installation and maintenance of twenty (20) artificial burrowing owl nesting sites to mitigate for the loss of burrowing owl habitat. An illustrative example of an artificial burrow is provided in Exhibit 5.4.4). Nesting sites will be located and designed to facilitate use by burrowing owls.<br><br>c.) Stands of trees shall be planted at a minimum of five (5) locations within the 300- | Areas (see Conservation Area Checklist—RMP Table 4-4)<br><br>Enhancement/Restoration Checklist—RMP Table 4-5 | EIR Certification<br><br>Annual Report for first 5 years (RMP Table 4-5) | Community Development Director |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | acre Conservation Area to mitigate for the loss of raptor nesting/foraging habitat. Specifics regarding enhancements (i.e., location of tree stands, placement of artificial owl burrows, plant and tree species, long-term maintenance and management, etc.) will be detailed in the RMP.<br><br>d.) The City shall obtain agreements with the landowners in the 300-acre Conservation Area in the form of an irrevocable license, conservation easement, right of entry, or other legally enforceable instrument to install and maintain the above habitat enhancements and to provide the City with a perpetual right to control uses which would conflict with the land's use as wildlife habitat.<br><br>**2. Alternate Location for the 300-acre Conservation Area (if needed)**<br><br>If the City is unable, or it is infeasible, to obtain the onsite mitigation agreements from property owners for all or a portion of the 300-acre conservation area, the City may acquire and enhance, or make other arrangements securing the right to permanently protect/preserve and enhance, land off-site within the Prado Basin (including Chino Hills). Such land must have similar biological value to land on-site within the areas planned for urban | Feasibility Study of Potential Conservation Areas (see Conservation Area Checklist—RMP Table 4-4) | Annual Report for first 5 years (RMP Table 4-5) | Community Development Director |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | development (generally above the 566-foot elevation line). In addition, provisions shall be made to provide enhancements/restoration similar to the measure described in Section B-3(1), above.<br><br>**3. Burrowing Owls**<br><br>a.) If burrowing owls are found on an individual development site, development, including the expansion of existing land uses or other land use activities that could disrupt the owls, will be required to follow the CDFG burrowing owl relocation protocols, including the creation of artificial burrows (Exhibit 5.4.4). Key components of this protocol presently include:<br>i. Occupied burrows should not be disturbed during the nesting season, from February 1 through August 31.<br>ii. If owls must be moved away from the disturbance area, passive relocation is preferable to trapping.<br>iii. A time period of at least one week is recommended to allow owls to move and acclimate to the alternate burrows.<br>iv. Passive relocation involves encouraging owls to move from occupied burrows to alternate natural or artificial burrows that are at least 50 meters from the impact zone with a | Development Application Review and Burrowing Owl Mitigation Checklist (see RMP Table 4-6) (Measure to be implemented in accordance with the RMP.) | Prior to Issuance of Permit related to development, expansion of existing land uses, or other land use activities | Community Development Director |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | minimum of 6.5 acres of suitable foraging habitat for each pair of relocated owls (see Exhibit 5.4.4).<br>v. Owls should be excluded from burrows in the immediate impact zone and within a 50-meter buffer zone by installing one-way doors in burrow entrances.<br>vi. One-way door should be left in place for at least 48 hours to insure that owls have left the burrow before excavating the burrow.<br>vii. One alternate burrow (natural or artificial) should be provided for each burrow that will be excavating in the project impact zone.<br>viii. The project areas should be monitored daily for at least one week to confirm no owl use before excavating burrows in the immediate impact zone.<br>ix. When excavating burrows, hand tools should be used and the burrows should be refilled to prevent reoccupation.<br>x. Sections of flexible plastic pipe or burlap bags should be inserted into the tunnels during excavation to maintain an escape route for any animals that may still be located inside the burrow.<br>b.) In order to provide supplemental mitigation beyond the standard CDFG protocol | | | |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | requirements for relocation of owls, the 300-acre Conservation Area will be made available for the relocation of burrowing owls that would be displaced by development, including the creation of 20 artificial burrows. The feasibility of relocating owls from development sites to the conservation area will be reviewed on a case-by-case basis for individual development projects, subject to the evaluation and recommendations of the biological study prepared for a given site.<br><br>**4. Urban Buffer/Transition Area**<br><br>In order to limit urban intrusion into areas with habitat value that are below the 566-foot dam inundation line, a buffer area will be provided along the southern edge of urban development within the Preserve Specific Plan project area. The buffer will be designed to provide for limited access to habitat areas and will include provisions for the logical transition between urban structures/uses and habitat areas. Such provisions may address without limit measures regarding: location and type of land uses, lighting, vegetation and tree plantings. Specific features regarding the design, conceptual location, buffer width and/or setback requirements, timing and other features | Plan Check for Conformance with RMP Urban Buffer/Transition Area design guidelines (all Development Applications adjacent 566' Elevation Line) | Prior to approval of development project (Buffer/transition area improvements to be installed prior to issuance of Certificate of Occupancy.) | Community Development Director |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | of the buffer shall be included as part of the Resources Management Plan (RMP).<br><br>While every reasonable effort will be made to seek such a buffer, this mitigation measure does not require land acquisition or obtaining any agreements with landowners in the form of an irrevocable license, conservation easement, right of entry, or other legally enforceable instrument for the purposes of providing the buffer, or for purposes of providing any of enhancements or features described under Mitigation Measure B-3(1).<br><br>**5. Surface Water and Riparian Habitat** | | | |
| | a.) All development will be required to satisfy any applicable requirements of USACE, Regional Water Quality Control Board and CDFG for Section 404 Clean Water Act permits and streambed alteration agreements. | Development Application Review (see Surface Waters Checklist—RMP Table 4-7) | Prior to Issuance of Grading Permit | Community Development Director |
| | b.) Drainage Area B (see, Exhibit 5.4.5) will be designed as a naturalized drainage course and enhanced to provide riparian habitat values, including plantings of appropriate native species of plants and trees. It is anticipated that these enhancements will be provided in conjunction with drainage facilities and constructed "Natural Treatment Systems" (NTS) designed to improve water quality. | Development Application Review and Plan Check | Prior to Issuance of 1,800$^{th}$ Building Permit | Community Development Director |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | Exhibit 5.4.6 provides an illustrative example of how the drainage area may be designed. Specific features related to habitat values will be addressed as part of the RMP. | | | |
| | c.) A minimum of 10 acres of marsh and or riparian habitats shall be constructed in conjunction with drainage facilities and/or Natural Treatment Systems for water quality purposes, in order to provide mitigation for loss of the low-quality habitat values of the agricultural detention basins, as well as other surface water areas that support waterfowl. | Plan Check (tabulation) | Prior to Issuance of the 1,800$^{th}$ Building Permit | Community Development Director |
| | **6. Existing Windrows** | | | |
| | Existing windrows that provide viable raptor habitat shall be retained and incorporated into the design of individual development projects where practical. If retention is not practical, the developer shall provide for the replacement of the windrow trees in a manner supportive of raptor habitat. The biological study prepared for the development project shall include an analysis by an ornithologist specializing in raptor biology. Such analysis shall include recommendations on the number of trees, tree specifications and location of replacement areas for windrows or stands of trees. The recommendations shall be based on biological values, as determined by the ornithologist, and | Development Application Plan Check (see Review and Windrow Checklist—RMP Table 4-8) | Prior to Issuance of Grading Permit | Community Development Director |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
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| | in consultation with the City and the wildlife agencies. Replacement trees may be located within the 300-acre conservation area or other suitable areas located outside of the project site if consistent with the recommendations of the ornithologist.<br><br>**7. Agricultural Easements**<br><br>Under Mitigation Measure AG-1 (see Section 5.2 in the Draft EIR), which addresses mitigation for loss of prime agricultural land, the City has committed to participate in the Williamson Act Easement Exchange Program (WAEEP) and any plan that may be adopted pursuant to SB 831 for acquisition of agricultural easements or other conservation easements for the purpose of permanent agricultural land preservation. These easements will also provide mitigation for identified impacts on biological resources in that they will preserve areas in agriculture and prevent the future development of recreational or other non-agricultural uses that could be detrimental to biological resources.<br><br>**8. Mitigation Fee**<br><br>A mitigation fee shall be imposed on new development for the purpose of implementing the Biological Resource mitigation measures as | Written or other evidence of participation<br><br>Plan Check (verification of payment of fee) | Following Implementation of a plan for Chino Basin pursuant to SB 831<br><br>Fee adoption Prior to Issuance of any Grading Permit (as described | Community Development Director<br><br>Community Development Director |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | described in the Resources Management Plan. The fee shall be adopted by the City Council prior to the issuance of grading permits for new residential, commercial, office, industrial development, or public facilities; provided grading permits may be issued prior to final adoption of the fee upon developer's deposit with the City of adequate cash or other form of security in excess of the proposed fee, as approved by the City Council for the City. The fee shall be structured to cover the estimated cost of the identified mitigation measures, including:<br><br>a.) Costs associated with obtaining agreements for the 300-acre conservation area with landowners in the form of conservation easements or other legally enforceable instruments as described under mitigation measures B-3-1 and B-3-2, above;<br><br>b.) Costs associated with the design, installation, and maintenance of the various enhancements and improvements described above, including such appropriate refinements/adjustments as may be identified by the RMP. | | under Mitigation B-3-8).<br><br>Payment of fee once the fee is adopted to be prior to the issuance of grading permits. | |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
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| | c.) Administration, management and monitoring of the 300-acre conservation area and other mitigation measures as appropriate, including adaptive management.<br><br>Costs that form the basis for the mitigation fee may, at the discretion of the City, be defrayed through the use of grants or other government or private funding sources as such sources become available in the future.<br><br>Costs for wetlands/riparian enhancements shall be structured in conjunction with costs for such improvements that also serve water quality and drainage purposes, which may be funded by project drainage and/or water quality fees.<br><br>**9. Participation in Regional Efforts**<br><br>The City has had ongoing involvement with various regional conservation-related efforts. The City will continue to be involved in and coordinate with such efforts within The Preserve. These efforts include, without limitation:<br><br>a.) USACE and Orange County Water District's Prado Basin Master Plan;<br><br>b.) IEUA's Chino Creek Habitat Restoration Program; | Written or other evidence of participation | Ongoing | Community Development Director |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | c.) Orange County Water District's Santa Ana River Watershed program;<br>d.) USACE's Santa Ana River Mainstem Project;<br>e.) Lower Chino Basin Working Group (Santa Ana River Working Group MOU) Resources Management Planning;<br>f.) Chino Basin Center for Organic Materials (Santa Ana River Working Group MOU); Wildlife, Wetlands and Recreation Resource Conservation Program (Santa Ana River Working Group MOU);<br>g.) Urban Transition Planning Smart Growth Program (Santa Ana River Working Group MOU);<br>h.) Conjunctive Groundwater Management, Replenishment and Conservation Program (Santa Ana River Working Group MOU).<br>i.) Chino Hills State Park General Plan (February 1999).<br>**10. Administration and Monitoring**<br>The City shall use a conservancy or land trust, or other similar, qualified entity to oversee and implement the Resources Management Plan and principally manage the 300-acre conservation area. Such an entity shall have | Execution of an agreement or similar instrument. | Concurrent with the City's cessation of RMP management | Community Development Director |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
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| | expertise in the management of land and biological resources. The chosen entity may also jointly provide a similar function to adjacent jurisdictions, provided that effective implementation of the mitigation measures described herein can be achieved. The City Council shall use its best efforts to select and enter in to necessary agreements with the chosen entity prior to acquisition of any property through an irrevocable license, conservation easement, right of entry, or other legally enforceable instrument. | | | |
| **5.5 Geology and Soils** | **GS-1. Geotechinical and Soils Engineering Study.** All applications for individual development projects shall include a detailed Geotechnical and Soils Engineering Study which addresses potential hazards associated with fault rupture, seismicity and groundshaking, liquefaction, subsidence and near-surface groundwater. Such studies shall:<br>• Conform to code requirements, and standards and guidelines established by the City of Chino;<br>• Fully and accurately reflect site conditions regarding the possible hazards identified herein; and | Development Application Review and Plan Check | Prior to Issuance of Grading Permit | City Engineer |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
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| | • Include all mitigation measures necessary for reducing risks posed by geologic hazards on the project site. | | | |
| | **GS-2. Conformance with Geological Study Requirements.** All individual developments shall be constructed according to requirements established in geologic studies pertaining to the project site, and general engineering practices established by the City of Chino. | Plan Check | Prior to Issuance of Grading Permit | Building Official |
| | **GS-3. Soils Report – Dairy Lands.** Grading operations on all former dairy lands and other agricultural properties will be conducted in accordance with the soils report prepared by a registered soils engineer approved by the City of Chino. The soils engineer will make recommendations concerning removal of any organic material or the proper handling of such material during grading. All manure from dairy corrals and other surface areas shall be stripped and removed prior to grading operations, in accordance with applicable codes and regulations. The potential for methane in remaining soils shall be specifically addressed in soils reports on all former dairy lands and other agricultural properties. Where the potential for methane accumulation or release is identified, soils testing shall occur with | Plan Check and Monitoring of construction | Prior to Issuance of Grading Permit and During Construction | City Engineer and Soils Engineer |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | results and remedial measures identified in the soils report. | | | |
| **5.6 Hazards** | **HM-1. Aircraft/Waterfowl Hazards.** To minimize aircraft/wildlife hazards, sizeable water features that might attract waterfowl should be prohibited in the plan area east of the Airport. | Development Application Review Plan Check | Prior to Issuance of Grading Permit | Community Development Director |
| | **HM-2. Maximum Building Height.** The maximum building heights outside of the runway protection zones may not exceed 160 feet to prevent any conflict with adopted flight patterns. | development Application Review Plan Check | Prior to Issuance of Building Permit | Community Development Director |
| | **HM-3. Environmental Site Assessments.** Prior to City consideration of any specific development projects within the plan area, developers will be required by the City to submit a completed Phase 1 Environmental Site Assessment (ESAs), which at a minimum, meets with the requirements of the most current standards of investigation established by the American Society of Testing and Materials (ASTM Standard E 1527). The recommendations of such ESAs, including testing and soil remediation, if necessary, shall be adhered to reduce any identified hazards to acceptable levels. | Development Application Review | Prior to Issuance of Grading Permit | City Engineer |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
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| | **HM-4. Asbestos and Lead-Based Paint.** Prior to issuance of permits by the City of Chino for major renovation or demolition of any pre-1979 structure within the project area, the project developer will be required to submit documentation to the City Building Department that asbestos and lead-based paint issues are not applicable to their property, or that appropriate actions will be taken to correct any asbestos or lead-based paint issues prior to development of the site. | Development Application Review | Prior to Issuance of Grading, Building or Demolition Permits as appropriate. | Building Official |
| | **HM-5. Compliance with Laws and Regulations.** In order to minimize risks to life and property, projects within the plan area will be required to demonstrate compliance with all applicable federal, state and local laws and regulations governing the handling, transport, treatment, generation and storage of hazardous materials. | Measure HM-3 and written evidence of Compliance | Prior to Issuance of Grading and/or Use Permits (or any state, federal or local permits, approvals or licenses related to the handling, transport, treatment, generation and storage of hazardous materials | Community Development Director and the City Engineer |
| **5.7 Transportation and Circulation** | A cumulative listing of all project related roadway and signal improvements to be provided for post-2020 buildout conditions, including the proposed project, is contained in RDEIR Table 5.7-5. | | | |
| | **T-1. Notification**: Since the project contributes significant traffic to a State Highway (I-15 | Documentation of Notification and CMP | Following approval of CMP | City Transportation Manager |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | Freeway, SR-71 Freeway, SR-60 Freeway, and SR-91 Freeway), and it also contributes significant traffic to roadway segments serving CMP intersections within the jurisdictions of the City of Chino Hills, City of Ontario, County of San Bernardino, City of Norco, City of Corona, and the County of Riverside, the City of Chino shall notify the Congestion Management Agency (SANBAG), the California Department of Transportation (Caltrans), the City of Chino Hills, City of Ontario, County of San Bernardino, City of Norco, City of Corona, and the County of Riverside in accordance with CMP requirements. Each of these agencies must be provided with a copy of the CMP traffic study, once the document is accepted by the City of Chino. | Transmittal | | |
| | **T-2. Internal Roadway Improvements.** The proposed project shall construct or otherwise provide for all internal roadway improvements. The provision of such improvements shall be phased to address the incremental impacts of individual development projects. | Plan Check and Measure T-9 | Development Application Review and Prior to Issuance of Grading Permit and construction | City Transportation Manager and Building Official |
| | **T-3. Regional/Subregional Project Participation.** The City of Chino shall work cooperatively through SCAG and SANBAG to develop regional/subregional projects and identify regional transportation funding needed | Written or other evidence of participation | Ongoing | City Transportation Manager |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | to minimize future freeway deficiencies. The City will actively participate in other future regional and/or subregional efforts to reduce freeway congestion. | | | |
| | **T-4. Regional/Subregional Transportation Planning.** The City of Chino shall participate in planning efforts to develop subregional and/or regional transportation facilities based on equitable cost sharing programs among cities and counties. | Written or other evidence of planning coordination | Ongoing | City Transportation Manager |
| | **T-5. Traffic Operations and System Management.** The City of Chino shall provide traffic operations and traffic systems management (TSM) improvements, including signal system coordination, automated traffic control, Smart Corridors, intelligent transportation systems, and other measures. | Plan Check and Measure T-9 | Ongoing | City Transportation Manager |
| | **T-6. Project Review for Trip Reduction and Travel Demand Management.** Individual development projects shall be reviewed by the City for integration of trip reduction measures, travel demand management (TDM) strategies and alternative transportation modes, consistent with the Specific Plan. | Development Application Review | Development Application Review and Prior to Issuance of Permits | City Transportation Manager |
| | **T-7. Transit Feasibility Study.** In the initial phases of development, the City of Chino shall require that a Transit Feasibility Study be | Acceptance of Transit Feasibility Study | Initial development phase (i.e. within 24 months of Issuance of | City Transportation Manager |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
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| | prepared of the proposed project transit system. The feasibility study should address the timing of transit development vis-a-vis development phasing, and the interface with future regional transit works. To respond to potential issues related to the development of such a system, the following actions must be undertaken:<br>• Identify the various funding mechanisms associated with the construction and operation of the system.<br>• Require each proposed project to provide adequate right of way for such a system and construct the required infrastructure.<br>• Establish design criteria and an evaluation process for determining transit stop locations that ensure pedestrian access prior to tentative map approval.<br>• Operational issues, such as the future management of the system, may be deferred until the appropriate time, based upon discussions with current regional transit providers. | | Initial Grading Permits) | |
| | **T-8. Transit Service Extensions.** The City of Chino shall contact appropriate transit agencies to encourage an expansion of transit services up to and within the project area. | Evidence of Contact | Ongoing | City Transportation Manager |
| | **T-9. Project Traffic Studies.** Traffic studies shall be required as deemed necessary by the | Development Application | Prior to Issuance of | City Transportation |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | City Engineer. Each study will identify the timing, and extent of required improvements to adequately evaluate future traffic impacts of individual projects needed to mitigate the impacts of such development. | Review | Grading Permit | Manager |
| **5.8 Noise** | **N-1. Construction Noise.** The following construction noise reduction measures will be implemented:<br>All construction activities conducted within 500 feet of any occupied dwelling shall not occur from 7 P.M. to 7 A.M. the following day, and at any time on Sundays or universally observed holidays.<br>• All construction equipment will use properly operating mufflers.<br>• All staging areas shall be located away from occupied dwellings and schools where feasible.<br>• The City of Chino will approve construction truck access routes that minimize noise intrusion into sensitive areas, such as neighborhoods, schools, and parks. | Plan Check and Monitoring of Construction | Prior to Issuance of Grading Permit | Community Development Director |
| | **N-2. Roadway Noise.** Developers/builders shall submit acoustical studies to the City of Chino for subsequent tentative maps and noise-sensitive uses (e.g. residences, schools, medical facilities) adjacent the principal area roadways. | Development Application Review and Plan Check | Prior to Issuance of Grading Permit or Building Permit as appropriate | Community Development Director |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
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| | Such studies shall assure that:<br>• Usable exterior space meets noise standards of 65 dB CNEL through a combination of setback or barriers.<br>• Habitable interior rooms along any project perimeter near noise-impacted roadways meet the interior standard of 45 dB CNEL through dual-paned windows, central air conditioning and other structural upgrades.<br>**N-3. Airport Noise.** In order to ensure that noise exposure is considered in review of subsequent development projects within the plan area, and in acknowledgement of possible single-event aircraft audibility even if standards are not exceeded, the following measures will be implemented: | | | |
| | • The City of Chino shall provide notice of development applications within adopted airport noise and safety zones to the Airport Land Use Commission (ALUC), in compliance with the Airport Comprehensive Land Use Plan (ACLUP). The City will coordinate with the ALUC to assure the compatibility of specific development projects with Chino Airport Operations (same as Mitigation Measure LU-1). | Development Application Review and Plan Check (Airport Overlay Zone) and Evidence of Notification | Prior to Issuance of Grading Permit | Community Development Director |
| | • All real estate transactions within Subarea 2 within 1.0 mile of the airport boundary will | Evidence of Notification | Certificate of Occupancy | Community |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | contain advisory language that aircraft may be periodically audible even though the subject property is exposed to noise levels due to aviation activities that are well within State guidelines. | | | Development Director |
| **5.9 Air Quality** | **AQ-2. Construction Emissions**. Per SCAQMD Rule 403, the City shall enforce the following measures:<br>• During all construction activities, construction contractors shall use low emission mobile construction equipment where feasible to reduce the release of undesirable emissions.<br>• During all construction activities, construction contractors shall encourage rideshare and transit programs for project construction personnel to reduce automobile emissions.<br>• During all grading and site disturbance activities, construction contractors shall water active grading sites at least twice a day, and clean construction equipment in the morning and/or evening to reduce particulate emissions and fugitive dust.<br>• During all construction activities, construction contractors shall, as necessary, wash truck tires leaving the site to reduce the amount of particulate matter transferred to | Plan Check | Prior to Issuance of Grading Permit | Community Development Director and City Engineer |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
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| | paved streets as required by SCAQMD Rule 403.<br>• During all construction activities, construction contractors shall sweep on and off site streets if silt is carried over to adjacent public thoroughfares, as determined by the City Engineer to reduce the amount of particulate matter on public streets.<br>• During all construction activities, construction contractors shall limit traffic speeds on all unpaved road surfaces to 15 miles per hour or less to reduce fugitive dust.<br>• During grading and all site disturbance activities, at the discretion of the City's Planning Director, construction contractors shall suspend grading operations during first and second stage smog alerts to reduce fugitive dust.<br>• During grading and all site disturbance activities, at the discretion of the City's Planning Director, construction contractors shall suspend all grading operations when wind speeds (including instantaneous gusts) exceed 25 miles per hour to reduce fugitive dust.<br>• During all construction activities, the construction contractors shall maintain | | | |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
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| | construction equipment engines by keeping them tuned.<br>• During all construction activities, the construction contractors shall use low sulfur fuel for stationary construction equipment as required by AQMD Rules 431.1 and 431.2 to reduce the release of undesirable emissions.<br>• During all construction activities, the construction contractors shall use existing on site electrical power sources to the maximum extent practicable. Where such power is not available, the Contractor shall use clean fuel generators during the early stages of construction to minimize or eliminate the use of portable generators and reduce the release of undesirable emissions.<br>• During all construction activities, the construction contractors shall use low emission, on site stationary equipment (e.g., clean fuels) to the maximum extent practicable to reduce emissions, as determined by the City Engineer.<br>• During all construction activities, the construction contractors, in conjunction with the City Engineer, shall locate construction parking to minimize traffic interference on local roads.<br>• During all construction activities, the construction contractors shall ensure that all | | | |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
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| | trucks hauling dirt, sand, soil or other loose materials are covered or should maintain at least two feet of freeboard (i.e. minimum vertical distance between top of the load and the top of the trailer) in accordance with the requirements of the California Vehicle Code Section 23114 to reduce spilling of material on area roads. | | | |
| | **AQ-1**. **Mobile Source Emissions/Transit.** The City of Chino shall contact appropriate transit agencies to encourage an expansion of transit services up to and within the project area. The City will coordinate with such agencies and other jurisdictions to promote express transit access from the Chino area to other regional employment centers. | Evidence of Contact (see Measure T-8) | Ongoing | City Transportation Manager |
| **5.10 Population and Housing** | **[No Mitigation Measures are necessary.]** | | | |
| **5.11.1 Schools** | **PS-S-1. Planning for School Services.** Developers/builders within the plan area shall work with the CVUSD to plan school service for the proposed development. | Written or other evidence of fee payment, mitigation agreement or other compliance in accordance with state law | Ongoing | Community Development Director |
| | **PS-S-2. School Fees.** Prior to issuance of a building permit, project developers shall pay statutory developer fees to the CVUSD, form a Communities Facilities District, or provide | Plan Check (evidence of fee payment, mitigation agreement or other compliance in accordance | Prior to Issuance of Building Permit | Community Development Director |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | land and improvements pursuant to the requirements established in SB 50. The amount of fees or special taxes to be paid or land and improvements to be provided will be determined based on the established state formula for determining construction costs. | with state law) | | |
| | **PS-S-3. Construction Activity Notification.** To reduce potential safety hazards during construction, the City shall require developer notification to Chino Valley Unified School District of pending construction activity adjacent or near operating schools. Evidence of notification shall be provided to the City prior to issuance of grading and building permits for projects within any Master Plan, Tentative Map or Site Plan inclusive of, or immediately adjacent to, an operating school site. | Plan Check (evidence of Notification) | Prior to Issuance of Grading and Building Permits | Community Development Director |
| **5.11.2 Policy Protection** | **PS-P-1. Police Services Impact Fees.** Police impact fees shall be paid to cover capital costs associated with the creation of additional facilities and improvements to service The Preserve area. The City of Chino may allow credit toward impact fees for any police facilities constructed by the developer. | Plan Check (evidence of fee payment or other compliance) | Prior to Issuance of Building Permit | Community Development Director |
| **5.11.3 Fire Service & Emergency Medical Service** | **PS-F-1. Fire Service Impact Fees.** Developer impact fees shall be paid to contribute to the cost of new fire facilities, apparatus, and | Plan Check (evidence of fee payment or other compliance) | Prior to Issuance of Building Permit | Community Development Director |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
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| | equipment to offset the increase in fire services demand created by the project. | | | |
| | **PS-F-2. Fire Station.** The City of Chino shall coordinate with the Fire District to assure construction of a new fire station site to serve the proposed project. The fire station shall be constructed and ready for Fire District occupancy prior to the issuance of the 1,350$^{th}$ building permit for the proposed project. The station location may either be within the project site or at Chino Airport, subject to agreement by San Bernardino County Department of Airports. The station shall be adequately attenuated from noise effects of airport operations. | Plan Check (and Evidence of Compliance from CVIFD) | Prior to Issuance of the 1,350$^{th}$ Building Permit | Community Development Director |
| | **PS-F-3. Fire Protection Requirements.** Prior to construction, the developer shall contact the Fire District for verification of current fire protection development requirements. All new construction shall comply with all applicable statutes, codes, ordinances, and/or Fire District standards. | Plan Check | Prior to Issuance of Grading Permit | Community Development Director and Fire Division Chief (CVIFD) |
| | **PS-F-4. Water Lines.** Water lines within the project site shall be designed to meet the fire requirements. | Plan Check | Prior to Issuance of Grading Permit | City Engineer and Fire Division Chief (CVIFD) |
| | **PS-F-5. Fire Hydrants.** Fire hydrants shall be designed and placement specified by the Fire | Development Application Review and Plan Check | Prior to Issuance of Grading Permit | City Engineer and Fire Division Chief (CVIFD) |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
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| | District at the time water lines to the project area are built or as a condition of development project approval. | | | |
| | **PS-F-6. Wild Land Fire Protection Services.** Upon annexation of the plan area, the City will be responsible for payment of services to the State Department of Forestry & Fire Protection in conformance with rules and standards for wild land fire areas still receiving State protection. | Written Evidence of Fire Protection Service from (SDFFP or CVIFD) | Upon Annexation of State Responsibility Area (SRA) | Community Development Director |
| **5.11.4 Library Services** | **PS-L-1. Library Facilities.** The proposed project should address the need for additional library facilities and library services, and provide space or funding for library construction. The construction of a joint use library shared by the County of San Bernardino and Chino Valley Unified School District may be an appropriate option. | Ongoing review of Development Applications and coordination with County of San Bernardino (libraries) and the Chino Valley Unified School District | Ongoing | Community Services Director |
| | **PS-L-2. Library Impact Fees.** Project developers should contribute impact fees either toward expansion of existing library facilities or construction of new facilities, if such fees or requirements are adopted for general application by the County. | Plan Check (subject to adopted City or County Fee requirement) | Prior to Issuance of Building Permit (if a fee is adopted) | Community Development Director |
| **5.11.5 Parks and Recreation** | **PS-PR-1. City Park Requirements.** As Per the City of Chino, every residential developer or person who develops land for residential | Development Application Review and Plan Check | Prior to Issuance of Building Permit (fees or dedication) | Community Development Director |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | purposes shall dedicate a portion of such land, pay a fee, or a combination of both at the option of the city for the purpose of providing park and recreational facilities at the time and according to City standards outlined in Chapter 18.04, "Land Dedication Requirements Generally." | | | |
| | **PS-PR-2. Prado Regional Park.** The City of Chino will coordinate with San Bernardino County to assure that traffic, access control and safety needs of Prado Regional Park are met, and that the impacts of implementation of the proposed project on Prado Regional Park facilities are minimized to the extent practical. A Traffic and Access Control plan may be a component of this collaboration. The City will also assure through subsequent development reviews, that project-related drainage does not adversely affect the park and Prado Lake. | Development Application Review and Plan Check | Ongoing | Community Development Director |
| **5.12.1 Water Supply** | **U-W-1. Water Supply Availability.** Consistent with SB 221, subsequent development projects within the plan area shall be reviewed by the City to confirm the availability of sufficient water supplies to meet project water needs. | Plan Check | Tentative Map | City Engineer |
| | **U-W-2. Urban Water Management Plan.** Consistent with requirements of AB 2838, the City shall periodically review and update its | Verification per Requirements of AB | Periodically (or per AB 2838 Requirements) | City Engineer |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | urban water management plan to ensure that adequate water supplies and facilities are available to meet future growth. | 2838 | | |
| | **U-W-3. Groundwater Replenishment.** Subsequent development projects should be designed to incorporate features that encourage and promote groundwater replenishment. | Development Application Review and Plan Check | Prior to Issuance of Grading Permit | City Engineer |
| | **U-W-4. Onsite Retention.** Retention of precipitation and runoff on-site should be encouraged in development designs where appropriate. | Development Application Review and Plan Check | Prior to Issuance of Grading Permit | City Engineer |
| | **U-W-5. Water Conservation Techniques.** The City shall continue to support efforts to develop the water supply and to encourage water conservation. Water conservation techniques appropriate for new and existing development include:<br>• Installing flow restrictors in showers.<br>• Repairing leaky water fixtures.<br>• Promoting drought resistant low maintenance vegetation. | Plan Check | Prior to Issuance of Building Permits | Community Development Department |
| | **U-W-6. Wastewater Re-use.** The City shall coordinate its efforts with the IEUA to expand the re-use of wastewater for such uses as the irrigation of parkways, golf courses, | Urban Water Management Plan review | Periodically (or per AB 2838 Requirements) | City Engineer |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | landscaped areas, and parks, and, if feasible, for industrial processes. | | | |
| | **U-W-7. Water Conservation Programs.** The City shall engage in water conservation programs and activities, including but not limited to, participation in the following water conservation practices:<br>• Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers<br>• Residential Plumbing Retrofits<br>• System Water Audits, Leak Detectors and Repair<br>• Large Landscape Conservation Programs and Incentives<br>• High Efficiency Washing Machine Programs<br>• Public Information and School Education Programs<br>• Conservation Programs for Commercial, Industrial and Institutional Accounts<br>• Wholesale Agency Technical Assistance Program<br>• Conservation Pricing | Plan Check (for new development) and written or other verification f engagement in water conservation programs and activities | Prior to Issuance of Building Permits | City Engineer |
| | **U-W-8. On-site Water Recharge.** Where erosion or water runoff is not a problem, | Development Application Review and Plan Check | Prior to Issuance of Grading Permit | City Engineer |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | encourage use of on-site water recharge, such as dry wells. | | | |
| **5.12.2 Wastewater** | **U-WW-1. Compliance with Sewer Master Plan.** The City shall assure that required backbone sewer lines, or an equivalent system recommended by the City Engineer are implemented pursuant to the Sewer Master Plan. | Development Application Review and Plan Check | Prior to Issuance of Grading Permit | City Engineer |
| | **U-WW-2. Sewer Impact Fees.** Developers shall pay required sewage facilities development fees and system collection fees to cover City costs to construct master planned sewer mains. | Plan Check | Prior to Issuance of Buidling Permit | Community Development Director |
| **5.12.3 Electricity** | **U-E-1. Energy Efficient Lighting.** Energy efficient lighting and natural lighting should be encouraged and utilized where practical. | Plan Check | Prior to Issuance of Building Permit | Community Development Director |
| **5.12.4 Natural Gas** | [No Mitigation Measures are necessary.] | | | |
| **5.12.5 Waste Management** | **U-SW-1. Waste Container Storage Space.** Future developments should be reviewed by the City for the provision of outside building space to accommodate the storage of large waste containers (e.g. 3 containers of 96-gallons). This system reduces waste production by encouraging recycling of material. | Development Application Review and Plan Check | Prior to Issuance of Building Permit | Community Development Director |
| **5.12.6 Telecommunication** | **[No Mitigation Measures are necessary.]** | | | |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| **5.13 Cultural Resources** | **CR-1. Archaeological Survey and Mitigation Report.** Phase 1 field surveys (surface survey and collection) by a certified archaeologist should be conducted prior to all earth disturbing activities within the plan area. Existing natural open space, agricultural open space and dairy sites are included in this survey requirement. Excluded would be heavily disturbed areas, lagoons and detention ponds, and paved areas. The archaeologist will identify all prehistoric and historic resources observed during the field survey, complete a preliminary evaluation of the resources, and recommend appropriate measures for the disposition and treatment of significant resources. A technical report shall be prepared including discussion of cultural site significance (depth, nature, condition, and extent of the resources), final mitigation recommendations, and cost estimates. Excavated finds shall be offered to the City of Chino, or its designee on a first refusal basis. Final mitigation shall be carried out based upon the report recommendations and a determination as to site disposition by the City. Possible determinations include, but are not limited to, preservation, salvage, partial salvage, or no mitigation necessary. | Development Application Review | Prior to Issuance of Grading Permit | Archaeologist and Community Development Director |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| | **CR-2. Archaeological Monitoring.** Where recommended in culturally-sensitive areas pursuant to Survey and Mitigation Reports (CR-1 above), archeological monitoring of earth-disturbing activities shall be conducted. The monitoring certified archaeologist will identify any prehistoric or historic resources exposed, complete a preliminary evaluation of the resource, and recommend appropriate resource management for the treatment of the resource. If additional or unexpected archaeological features are discovered, the archaeologist shall report such findings to the City. If the resources are found to be significant, the archaeologist shall determine, in consultation with the City, appropriate actions for further exploration and/or salvage recovery. | Plan Check and Construction Monitoring | Prior to Issuance of Grading Permit and During Construction | Archaeologist and Community Development Director |
| | **CR-3. Paleontological Monitoring.** Monitoring for fossil material should be conducted by a qualified paleontologist during construction grading activities within older alluvium (Pleistocene), in order to avoid any disturbances to possible unknown or unidentified paleontological resources. | Plan Check and During Construction [Only within older alluvium (Pleistocene) indicated by the letters Qpf on EIR Exhibit 5.5-1 Geology] | Prior to Issuance of Grading Permit and during construction | Community Development Director |
| **5.14 Aesthetics** | [No Mitigation Measures are necessary.] | | | |

**CHINO SUBAREA 2 ('THE PRESERVE')**
**MITIGATION MONITORING PROGRAM (Cont.)**

| EIR Section | Mitigation Measures | Method of Verification | Timing of Verification | Responsible Party |
|---|---|---|---|---|
| **5.15 General Plan Consistency** | [No Mitigation Measures are necessary.] | | | |

**ATTACHMENT TO MITIGATION MONITORING PROGRAM**
**CHINO SUBAREA 2 RESOURCE MANAGEMENT PLAN CHECKLISTS**

**TABLE 4-2**
**ZONING AND LAND USE REGULATIONS CHECKLIST**

| | |
|---|---|
| ☐ | Verify location of proposed use, improvement or activity within Specific Plan designated Open Space. |
| ☐ | Confirm proposed use as allowable open space use under Specific Plan and Section 20.11.030 of the Zoning Ordinance (see Appendix E). |
| ☐ | Verify jurisdictional authority of other public agencies, if any (i.e., USACE, San Bernardino County, etc.). |
| ☐ | Confirm compliance with Biological Study submittal requirements (EIR Mitigation Measure B-2 and RMP Table 4-3 Checklist). |
| ☐ | Identify location and proximity of proposed Open Space use, improvement or activity with respect to identified sensitive habitat areas. Sensitive habitat areas include, but may not be limited to the following:<br>– High Sensitivity Areas identified in Program EIR Exhibit 5.4-2;<br>– Least bell's vireo (LBV) Critical Habitat (below elevation of 543 feet);<br>– Habitat of other federal- or State-listed Endangered and Threatened Species;<br>– Riparian Woodland;<br>– Conservation Areas(s) designated in the RMP; and<br>– Burrowing owl relocation areas established pursuant to the RMP.<br>Proposed improvements or the location of any land uses proposed to be changed from their current use shall be designed to avoid and/or minimize impacts to these areas. |
| ☐ | Verify location of proposed use with respect to Specific Plan Dam Inundation Overlay (DIO) and notify U.S. Army Corps of Engineers if included within DIO. |
| ☐ | Review proposed use, improvement or activity for compliance with applicable requirements of USACE, RWQCB and CDFG for Section 404 Clean Water Act permits and streambed alteration agreements. |
| ☐ | Review location of proposed use with respect to current ownership map and assessor's parcel information for OS designated areas below the 566-foot line; identify any additional agency and landowner notification requirements. |
| ☐ | Review proposed use, improvement or activity for conformance with other RMP checklist requirements and criteria. |
| ☐ | Review proposed use, improvement or activity status with respect to CEQA compliance; complete Environmental Checklist as necessary, and identify additional documentation requirements, if any. |
| ☐ | Evaluate need for special design requirements and/or setbacks for Open Space uses, improvements or activities proposed in proximity to identified sensitive habitat areas (e.g., within 100 feet). |
| ☐ | Prepare and adopt CEQA findings, as necessary. |
| ☐ | Process required City approvals and issue permit(s). |

**TABLE 4-3**
**REQUIRED BIOLOGICAL SURVEYS CHECKLIST**

| | |
|---|---|
| ☐ | Conduct a biological survey of the project site and document habitat present, including surface waters and windrows. |
| ☐ | Determine potential for sensitive species to occur, including but not limited to:<br>– Least Bell's vireo;<br>– Southwestern willow flycatcher;<br>– Yellow-billed cuckoo; and<br>– Burrowing owls, raptors, and migratory birds and waterfowl. |
| ☐ | Determine potential for impacts to Waters of the U.S. or Waters of the State. |
| ☐ | Subcontract with a USFWS and/or CDFG permitted biologist qualified to perform any needed survey(s), if required. |
| ☐ | Conduct needed focused surveys during the following timeframes:<br>Least Bell's vireo — April 10 – July 31<br>Southwestern willow flycatcher — May 5 – July 10<br>Yellow-billed cuckoo — May 5 – July 10<br>Burrowing owl — December 1 – January 31 or April 15 – July 15<br>Raptors — February 1 – August 31<br>Migratory birds and waterfowl — February 1 – August 31 |
| ☐ | Conduct Jurisdictional Delineation on all potential Waters of the U.S. or Waters of the State, if needed. |
| ☐ | Determine if impacts to non-jurisdictional surface water and/or windrows on a project site require mitigation. |
| ☐ | Review potential impacts and recommended mitigation against conservation measures initiated in compliance with the RMP. |
| ☐ | Evaluate need for additional mitigation measures beyond those already initiated under the RMP. |
| ☐ | Prepare and submit technical reports for all biological surveys to the City as part of the application review process. |
| ☐ | Acquire any needed take permits under the Federal Endangered Species Act and the California Endangered Species Act. |
| ☐ | If Waters of the U.S. are present, coordinate with USACE regarding need for Nationwide Permit. |
| ☐ | If Waters of the State are present, obtain a Streambed Alteration Agreement from CDFG. |
| ☐ | Prepare and adopt CEQA findings, as necessary. |
| ☐ | Process required City approvals and issue permit(s). |

**TABLE 4-4**
**CONSERVATION AREA CHECKLIST**

| |
|---|
| ☐ Identify large, contiguous parcels of land within the Prado Basin meeting one or more of the following criteria:<br>– Agricultural land or natural open space with short, native, or non-native grassland;<br>– Site supporting native habitats such as riparian woodlands and oak woodlands;<br>– Proximity to wildlife corridors;<br>– Connectivity to regional open space;<br>– Availability of the land for conservation purposes; and<br>– Preference to feasible onsite areas within the 566-foot flood inundation area. |
| ☐ Retain a biologist experienced with conservation ecology to conduct a general biological inventory of potential sites with emphasis on assessing the suitability to serve as a conservation site for foraging and nesting raptors and migratory bird and waterfowl species and to support regional wildlife movement. |
| ☐ The biologist will prepare a technical report documenting his findings, evaluation, and recommendations on whether a property could serve as a Conservation Area based on the above criteria. |
| ☐ Submit the biological report to the City of Chino for review and concurrence. |
| ☐ Once an appropriate site is identified, the City will retain a conservation biologist to prepare implementing procedures specific to that site. Procedures will address all issues needed to ensure the site is permanently conserved and provides all necessary elements for supporting foraging or nesting raptors, migratory birds and waterfowl, and/or regional wildlife movement. Issues to be addressed should include:<br>– Site description, such as location, physical features, and biological habitats;<br>– Species presence;<br>– Potential for site to support foraging or nesting raptor species, migratory birds, and/or regional wildlife movement;<br>– Establish a biological monitoring program to document wildlife use of the site; and<br>– Reporting requirements. |
| ☐ Work with an existing agency or conservancy to establish a management program for the long-term management and maintenance of the Conservation Area. |

**TABLE 4-5**
**ENHANCEMENT/RESTORATION CHECKLIST**

| |
|---|
| ☐ Once a conservation site has been identified, the City will retain a biologist/restoration specialist to inspect the site and prepare Enhancement/Restoration recommendations specific to that site. Recommendations will address all improvements needed to a candidate site to ensure the site provides good quality habitat for both short-term and long-term occupation by burrowing owls, raptors, migratory birds, and other wildlife species as appropriate. Issues to be considered include:<br>– A weed removal program and replanting of native vegetation to create high-quality raptor foraging, burrowing owl nesting and foraging, and migrating bird habitats;<br>– Installation and maintenance of twenty (20) artificial burrowing owl nesting sites, if appropriate, to mitigate for the loss of burrowing owl habitat. Nesting sites will be located and designed to facilitate use by burrowing owls; and<br>– Planting stands of trees within the proposed Conservation Areas to mitigate for the loss of raptor nesting/foraging habitat. |
| ☐ Contract with a restoration, landscaping, or planting services company to implement needed Enhancement/Restoration efforts. |
| ☐ The biologist/restoration specialist will monitor the installation of improvements for compliance with the Implementation Plan. |
| ☐ Prepare an annual report for the first 5 years to document the successful implementation of the Enhancement/Restoration efforts. |

**TABLE 4-6**
**BURROWING OWL MITIGATION CHECKLIST**

| | |
|---|---|
| ☐ | A general biological and any required focus surveys for each development application shall determine if burrowing owls are nesting on the development site (see Section 4.3.2, Required Biological Surveys). |
| ☐ | If surveys confirm that the site is occupied by burrowing owls, mitigation measures to minimize impacts to burrowing owls, their burrows, and foraging habitat should be incorporated into subsequent, project-level CEQA documents as enforceable conditions. Projects and situations vary and mitigation measures should be adapted to fit specific circumstances. |
| ☐ | For sites occupied by burrowing owl, a report for the development project should be prepared for the City of Chino. The report should include the following information:<br>– Date and time of visit(s) including name of the qualified biologist conducting surveys, weather and visibility conditions, and survey methodology;<br>– Description of the site including location, size, topography, vegetation communities, and animals observed during visit(s);<br>– Maps and photographs of the site;<br>– Results of focused surveys for burrowing owls, including a map showing the location of all burrow(s) (natural or artificial) and owl(s), as well as the numbers at each burrow, if present, and tracks, feathers, pellets, or other items (e.g., prey remains, animal scat);<br>– Behavior of owls during the surveys; and<br>– Any historical information (Natural Diversity Database, Department region files/Breeding Bird Survey data, American Birds records, Audubon Society, local bird club, other biologists, etc.) regarding the presence of burrowing owls on the site. |
| ☐ | If avoidance is feasible[(1)], then no disturbance should occur within 50 meters (approximately 160 feet) of occupied burrows during the nonbreeding season of September 1 through January 31 or within 75 meters (approximately 250 feet) during the breeding season of February 1 through August 31. |
| ☐ | If avoidance is not feasible, passive relocation shall be employed; owls should be excluded from burrows in the immediate impact zone and within a 50-meter (approximately 160-foot) buffer zone by installing one-way doors in burrow entrances. One-way doors (e.g., modified dryer vents) should be left in place 48 hours to ensure owls have left the burrow before excavation. Two natural or artificial burrows should be provided in the Conservation Area or within a City-approved Candidate Relocation Area for each occupied burrow that will be rendered biologically unsuitable by a given development project. The affected portion of the project site should be *monitored daily for one week* to confirm owl use of burrows before excavating burrows in the immediate impact zone. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe should be inserted into the tunnels during excavation to maintain an escape route for any animals inside the burrow. |
| ☐ | Occupied burrows should not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist approved by CDFG verifies through non-invasive methods that either: 1) the birds have not begun egg-laying and incubation; or 2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival. |
| ☐ | Pre-construction surveys of suitable habitat at the project site(s) and buffer zone(s) should be conducted within the 30 days prior to construction to ensure no additional burrowing owls have established territories since the initial surveys. If ground-disturbing activities are delayed or suspended for more than 30 days after the pre-construction survey, the site should be resurveyed. |
| ☐ | When destruction of occupied burrows is unavoidable, existing unsuitable burrows should be enhanced (enlarged or cleared of debris) or new burrows created (by installing artificial burrows) at a ratio of 2:1 within the Conservation Area or a Candidate Relocation Area. One example of an artificial burrow design is provided in Exhibit 9. |
| Note: | [(1)] For the purposes of this Section "feasible" refers to location of nests in open space or other areas not proposed for development or other invasive use. |

**TABLE 4-7**
**SURFACE WATERS CHECKLIST**

| | |
|---|---|
| ☐ | All development applications will include in the general biological survey conducted for a proposed project, a review of surface waters on the project site. |
| ☐ | If it is determined that jurisdictional waters (Waters of the U.S. or Waters of the State) may be present, a jurisdictional delineation must be conducted and submitted to the City for review. |
| ☐ | If any impacts to jurisdictional waters are identified based on the jurisdictional delineation and proposed project design, the appropriate wetland permits will be acquired including a wetlands permit under Section 404 of the Clean Water Act and a Streambed Alternation Agreement under CDFG code. |

**TABLE 4-8**
**WINDROW CHECKLIST**

| | |
|---|---|
| ☐ | All development applications will include, in the general biological survey conducted for a proposed project, a discussion of existing windrows on the project site. |
| ☐ | If windrows are present, a tree replacement program for all trees slated for removal for the project site must be submitted to the City for review and approved by a certified arborist in consultation with an ornithologist specializing in raptor biology. The program will include post-planting monitoring requirements, including germination/survival rates and expected growth rates of trees over a 5-year period. |
| ☐ | Completion of a nesting bird survey prior to tree removal, if tree will be removed during the breeding season (February 1 through August 31). |
| ☐ | Removal of trees outside the nesting season (February 1 through August 31) if birds are determined to be nesting in trees slated for removal. |
| ☐ | Submittal to the City of annual reports for a 5-year period documenting germination/survival rates and growth rates for all newly planted trees. Recommended germination/survival rates and growth rates will be approved by the City as part of their review and approval of a tree replacement program for a project. |

**TABLE 4-9**
**BIOLOGICAL RESOURCES MITIGATION MILESTONES**

| Mitigation Measure | Timing | Responsible Party | Coordinating Agency | Reference RMP |
|---|---|---|---|---|
| ***Required Biological Surveys:*** | | | | |
| General Survey | Concurrent with submitting Development Application | Applicant/Landowner | City of Chino | Pg. 4-14 – 4-16 |
| Focused Survey(s), if needed: | | | | |
| Burrowing Owl | Prior to Entitlement | Applicant/Landowner | City of Chino and CDFG | Pg. 4-14 – 4-16 |
| Migratory Birds and Waterfowl | Prior to Entitlement | Applicant/Landowner | City of Chino and USFWS | Pg. 4-14 – 4-16 |
| Least Bell's Vireo | Prior to Entitlement | Applicant/Landowner | City of Chino and USFWS | Pg. 4-14 – 4-16 |
| Southwestern willow flycatcher | Prior to Entitlement | Applicant/Landowner | City of Chino and USFWS | Pg. 4-14 – 4-16 |
| Delhi sands flower-loving fly Habitat Assessment | Prior to Entitlement | Applicant/Landowner | City of Chino and USFWS | Pg. 4-14 – 4-16 |
| Jurisdictional Delineation | Prior to Entitlement | Applicant/Landowner | City of Chino and USACOE | Pg. 4-14 – 4-16 |
| Pre-construction Survey, if needed | Within 30 days Prior to Construction | Applicant/Landowner | City of Chino | Pg. 4-14 – 4-16 |
| ***Biological Permits, if needed:*** | | | | |
| USFWS Endangered Species | Prior to Entitlement | Applicant/Landowner | USFWS | Pg. 4-14 – 4-16 |
| CDFG Endangered Species; 1603 Streambed Alteration Agreement | Prior to Entitlement | Applicant/Landowner | CDFG | Pg. 4-14 – 4-16 |
| USACE 404 Nationwide | Prior to Entitlement | Applicant/Landowner | USACOE | Pg. 4-14 – 4-16 |
| WQCB 401 Water Certification | Prior to Entitlement | Applicant/Landowner | WQCB | Pg. 4-14 – 4-16 |

**TABLE 4-9 (Cont.)**
**BIOLOGICAL RESOURCES MITIGATION MILESTONES**

| Mitigation Measure | Timing | Responsible Party | Coordinating Agency | Reference RMP |
|---|---|---|---|---|
| ***RMP Programs:*** | | | | |
| 300-acre Conservation Area | As Funding becomes Available | City of Chino | City of Chino | Pg. 4-16 – 4-19 |
| Enhancement/Restoration | As Funding becomes Available | City of Chino | City of Chino | Pg. 4-19 – 4-20 |
| Burrowing Owl Mitigation – Passive Relocation | Prior to Issuance of Grading Permit | Applicant/Landowner | City of Chino | Pg. 4-21 – 4-27 |
| Burrowing Owl Mitigation – 40-acre Relocation Area | Prior to Issuance of the 1800$^{th}$ Building Permit | Applicant/Landowner | City of Chino | Pg. 4-21 – 4-27 |
| Burrowing Owl Mitigation – Additional Relocation Sites | As needed | Applicant/Landowner | City of Chino | Pg. 4-21 – 4-27 |
| Urban Buffer/Transition Area | Concurrent with Adjacent Development | City of Chino | City of Chino | Pg. 4-26 – 4-32 |
| Surface Water | Prior to Issuance of the 1800$^{th}$ Building Permit | Applicant/Landowner | City of Chino | Pg. 4-32 – 4-34 |
| Windrows | Prior to Issuance of Grading Permit | Applicant/Landowner | City of Chino | Pg. 4-33 – 4-35 |
| ***Mitigation Fees:*** | | | | |
| Establish Fee | Prior to Issuance of First Building Permit | City of Chino | City of Chino | Pg. 4-39 – 4-44 |
| Payment of Fee | With Submittal of Development Application | Applicant/Landowner | City of Chino | Pg. 4-39 – 4-44 |

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August 14, 2020 RMA Project Number 20G-0406-0

Lewis Management Corp
1156 N. Mountain Avenue P.O. Box 670
Upland, CA 91785-0670

Attention: Mr. Gerardo Garduno

Subject: Geotechnical Investigation
Chino Rental Neighborhoods
The Preserve at Chino
S/W Corner of Academy Street and East Preserve Loop
Chino, CA

Dear Mr. Garduno:

In accordance with your request, a geotechnical investigation has been completed for the above referenced site. The report addresses both engineering geologic and geotechnical conditions. The results of the investigation are presented in the accompanying report, which includes a description of site conditions, results of our field exploration and laboratory testing, conclusions and recommendations.

We appreciate this opportunity to be of service to you. If you have any questions regarding this report, please do not hesitate to contact us at your convenience.

Respectfully submitted,

RMA GeoScience







Haiyan Liu, P.E.
Project Engineer
C81463

Mary Beth Kile, PG, CEG
Project Geologist
CEG1844

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# GEOTECHNICAL INVESTIGATION
# CHINO RENTAL NEIGHBORHOODS,
# THE PRESERVE AT CHINO
# S/W CORNER OF ACADEMY STREET AND EAST PRESERVE LOOP
# CHINO, CALIFORNIA

For

Lewis Management Corp
1156 N. Mountain Avenue P.O. Box 670
Upland, CA 91785-0670

August 14, 2020

Project No. 20G-0406-0

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## Table of Contents


**1.0 INTRODUCTION ..... 1**

1.01 PURPOSE ..... 1
1.02 SCOPE OF THE INVESTIGATION ..... 1
1.03 SITE LOCATION AND DESCRIPTION ..... 1
1.04 PAST LAND USAGE ..... 2
1.05 PLANNED DEVELOPMENT ..... 2
1.06 INVESTIGATION METHODS ..... 2

**2.00 FINDINGS ..... 3**

2.01 GEOLOGIC SETTING ..... 3
2.02 EARTH MATERIALS ..... 3
2.03 EXPANSIVE SOILS ..... 4
2.04 SURFACE AND GROUNDWATER CONDITIONS ..... 4
2.05 FAULTS ..... 4
2.06 LANDSLIDES ..... 4
2.07 LIQUEFACTION ..... 4
2.08 REGIONAL LAND SUBSIDENCE AND FISSURE POTENTIAL ..... 5
2.09 HISTORIC SEISMICITY ..... 5

**3.00 CONCLUSIONS AND RECOMMENDATIONS ..... 6**

3.01 GENERAL CONCLUSION ..... 6
3.02 GENERAL EARTHWORK AND GRADING ..... 6
3.03 EARTHWORK SHRINKAGE AND SUBSIDENCE ..... 6
3.04 SEISMIC DESIGN PARAMETERS ..... 6
3.05 LIQUEFACTION AND SECONDARY EARTHQUAKE HAZARDS ..... 7
3.06 LIQUEFACTION SCREENING EVALUATION RESULTS ..... 8
3.07 TOTAL AND DIFFERENTIAL SETTLEMENT ..... 9
3.08 REMOVAL RECOMMENDATIONS ..... 9
3.09 FOUNDATION ..... 10
3.10 RETAINING WALL FOUNDATIONS ..... 11
3.11 MOISTURE VAPOR BARRIER ..... 11
3.12 MISCELLANEOUS CONCRETE FLATWORK ..... 12
3.13 FOUNDATION EXCAVATION ..... 12
3.14 LATERAL LOAD RESISTANCE ..... 13
3.15 CEMENT TYPE AND CORROSION POTENTIAL ..... 14
3.16 PRELIMINARY PAVEMENT SECTIONS ..... 15
3.17 UTILITY TRENCH BACKFILL ..... 15
3.18 TEMPORARY EXCAVATIONS ..... 16
3.19 DRAINAGE ..... 16
3.20 PLAN REVIEW ..... 16

**4.00 CLOSURE ..... 16**

**FIGURES**


| | |
|---|---|
| Figure 1 | Site Vicinity Map |
| Figure 2 | Site Map |
| Figure 3 | Geologic Map |
| Figure 4 | Site Map January 2006 |
| Figure 5 | Site Map March 2013 |
| Figure 6 | The Preserve at Chino Concept |
| Figure 7 | Chino Rental Neighborhoods Concept |
| Figure 8 | Regional Geologic Map |
| Figure 9 | California Earthquake Activity Map |


**APPENDICES**


| | |
|---|---|
| Appendix A | Field Investigation |
| Appendix B | Laboratory Test Results |
| Appendix C | General Earthwork and Grading |
| Appendix D | Liquefaction Analysis Results |
| Appendix E | References |

# 1.0 INTRODUCTION

## 1.01 Purpose

A geotechnical investigation has been completed for a proposed residential development to be constructed at the subject site. The purpose of the investigation was to summarize geotechnical and geologic conditions at the site, to assess their potential impact on the proposed development, and to develop geotechnical and engineering geologic design parameters to provide recommendations for the planned grading and development. Information obtained during our previous site investigation work was reviewed and utilized to prepare this report.

## 1.02 Scope of the Investigation

The general scope of this investigation included the following:

- Review of published and unpublished geologic, seismic, ground water and geotechnical literature.
- Examination of aerial photographs.
- Logging and sampling of 11 exploratory trenches excavated and backfilled with a backhoe.
- Logging, sampling and backfilling of 3 exploratory borings drilled with model CME-55 and hollow stem auger drill rig.
- Geotechnical evaluation of the compiled data.
- Preparation of this report presenting our findings, conclusions and recommendations.

Our scope of work did not include a Phase I environmental site assessment for the potential of hazardous materials onsite.

## 1.03 Site Location and Description

The subject property is an approximately 12.3 acre undeveloped parcel located in Chino, California (Site Vicinity Map – Figure 1). It is bounded on the east by the extension of East Preserve Loop and vacant land, on the north and south by vacant land and on the west by Comet Avenue and by agricultural property (Site Map – Figure 2). The site is elevated from the east and western properties with heights of 12 feet on the northeast, eight feet on the southeast, up to 25 feet on the southwest and six feet on the northwest (Geologic Map – Figure 3). Water basins with depths of 15 feet are located within the northeast segment of the stie. Corrugated metal collection devises are located in both basins. Drainage varies across the site with some areas of ponding on the most elevated southern half and on the lower elevation pad near Test Pit 7. Most of the metal storage bins and trash debris shown on the aerial Site Map, Figure 2, have been removed from site. At the time of our field work, July 20 and 23, 2020, 14 scrapers were parked on site along the eastern end of the site adjacent to the top of slope.

A central geographic position of 33.953165° north latitude and -117.621272° west longitude was obtained from Google Earth, 2020.

### 1.04 Past Land Usage

Based on our research and review of historic aerial photographs, topographic maps, and more recent topography, the site is currently vacant and being use as a soil stockpile site. Starting in 2005 manure and other light color soil was placed on the west side of two water retention basins as shown on the Site Map January 2006 – Figure 4. The fill area is approximately 130 feet wide and extends from the north facing fill slope, within the vicinity of Boring B3 (Figure 3) southward and offsite for an approximate length of 800 feet. Between 2011 and 2013 another water retention basin was constructed on the northeast corner of the site extending northeast and then northward (Figure 5). Between 2015 and 2017 the western most water retention basin (total of 2) located between Test Pit 7 and Boring 3 (Figure 4), was filled in with imported artificial fill. By the end of 2017, the eastern most water retention basin was filled and a significant amount of the fill that currently exists on site and southern offsite property was placed. It appears a considerable amount of fill originated from the grading project located northeast of the site and north of Academy Street, The Discovery Village. Prior to December 2017, the eastern three fifth's of the site was part of a heifer ranch to the time period between 1967 and 1994. From the time period of 1967 and 1994 back to 1931, the entire site was utilized as agricultural property.

### 1.05 Planned Development

The site is part of a large master plan development, The Preserve at Chino, Figure 6, which is divided into numerous residential neighborhoods, school sites, non residential commercial areas and parks. Planned development for the project site is a 110 two story duplex buildings for a total of 220 units site named the Chino Rental Neighborhoods, Figure 7. No grading plan is available for review at this time. The property currently has six to 25 feet of artificial fill some of which appears to have been generated from recently developed sites located to the northeast. Based on the community plan and the Chino Rental neighborhoods plan, we assume that most of the existing site's artificial fill will be removed achieving grades of the adjacent west and eastern most properties. To aid in preparation of this report we utilized the following assumptions:

- Foundation loads of 2-3 kips per linear foot for continuous footings and 60 kips for spread footings.
- Most of existing fill will be exported from the site to achieve elevations relative to adjacent east and west offsite properties.
- Cuts and fills will be less than 15 feet.

### 1.06 Investigation Methods

Our investigation consisted of office and outside research, review of previous reports, review of the compiled data, and preparation of this report. It has been performed in a manner consistent with generally accepted engineering and geologic principles and practices, and has incorporated applicable requirements of California Buildings Code. Definitions of technical terms and symbols used in this report include those of

the ASTM International, the California Building Code, and commonly used geologic nomenclature.

Technical supporting data are presented in the attached appendices. Appendix A presents a description of the methods and equipment used in performing the field exploration and logs of our recent subsurface exploration. Laboratory Test Results are included in Appendix B. General Earthwork and Grading Specifications are presented in Appendix C. Engineering Liquefaction Analyses are included in Appendix D. References are presented in Appendix E.

## 2.00 FINDINGS

### 2.01 Geologic Setting

The site is located on a broad, coalescing alluvial fan that emanates from the San Gabriel Mountains to the north. These sediments fill the western portion of a deep structural depression known as the upper Santa Ana River Valley. According to Fife and others (1976), the alluvial deposits beneath the site are approximately 700 to 800 feet thick and rest on a basement of crystalline bedrock. Regional geologic mapping of the area indicated that the site is underlain by older alluvium (see Figure 8).

The upper Santa Ana River Valley is bordered by the San Gabriel Mountains and the active Cucamonga fault to the north, and the Puente Hills and potentially active Chino fault to the west. To the south are the Jurupa Mountains and other resistant granitic and metamorphic hills. The eastern boundary of the valley is the San Bernardino Mountains and the active San Andreas fault.

### 2.02 Earth Materials

Artificial Fill (af):

Artificial fill was encountered in all the test pits TP1 through TP11 and boring B1 through B3 at depths of 1.5 to 18 feet. Based on comparison of the adjacent grades of the eastern and western properties, fills of up to 25 feet are located on the southwest portion of the site. Artificial fill materials consist of silty sand with gravel, silt, and sandy silt. These soils were typically porous, dry and loose in a blocky condition, moist with depth. The silts were medium stiff to stiff and the silty sand medium dense. In test pit 4 at a depth of 5.5 to 9.5 feet below existing surface, reworked topsoil with manure was encountered.

Agricultural Fill (af) and/or Topsoil:

Agricultural Fill and Topsoil was encountered within boring B1 at a depth of 6 feet and was one foot thick. This material consisted of silty sand with minor organics.

Older Alluvial Fan Deposits (Qvof):

Older alluvial fan deposits were composed of medium dense to dense or medium stiff sandy silts, silts, clayey silts, silty sands, sands and gravelly sands. In general, the upper 18 feet (25 foot depth) to 20 feet (35 foot depth) of the alluvial soils were found to be medium dense or stiff and typically slightly porous with

localized moderately porous areas. Below this depth the alluvium generally becomes dense or stiff and non-to-slightly porous.

The above materials are described in greater detail on the logs contained in Appendix A

### 2.03 Expansive Soils

It is anticipated that the soils at the site will be re-distributed during grading of the building pad. Based on our preliminary testing, we anticipate that the soils that will ultimately support the proposed foundations will have an expansion index in the low range. Additional expansion index and plasticity index testing will be required at the completion of rough grading to verify the properties of the near surface soils prior to the final design and construction of the foundation system for the proposed structures.

### 2.04 Surface and Groundwater Conditions

Groundwater was encountered in Boring 1 during our subsurface exploration at a depth of 44.5 feet below the existing ground surface or at an approximate elevation of 543 feet above mean sea level. Near surface groundwater is not expected to exist within the site boundaries. Groundwater contour mapping prepared by Chino Basin Watermaster (2019) shows the groundwater elevations beneath the site at approximate 545 feet in 2000, and 535 feet in 2016 and 2018. Based on abundant calcium carbonate deposits found at a 15 to 20 foot depths or 10 to 15 feet as measured from the top of the native topsoil, historic groundwater high can be assumed at an elevation of 572 feet.

### 2.05 Faults

The site is not located within the boundaries of an Earthquake Fault Zone for fault-rupture hazard as defined by the Alquist-Priolo Earthquake Fault Zoning Act. The nearest earthquake fault zone is located about 3.4 miles to the southwest of the site along the Chino fault. No faults are known to pass through the property.

The nearest mapped fault is the inferred subsurface trace of the Central Avenue fault located approximately 2.5 miles to the west. The accompanying Fault Map (Figure 9) illustrates the location of the site with respect to major faults in the region.

### 2.06 Landslides

According to the Regional Geologic Map Figure 8, there are no mapped landslides within the site boundaries. Additionally, the site is relatively flat. Therefore, in our opinion, earthquake-induced land sliding is not considered to be a hazard to proposed development. Further, as the site is relatively flat and no significant slopes are planned, the potential for slope instability can be considered insignificant.

### 2.07 Liquefaction

Groundwater was encountered within boring B1 at a depth of 44.5 feet below existing grade. Based on calcium carbonate deposits within native soils, historic groundwater is anticipated to be at a depth of 15

feet as measured from the top of native soils. Therefore, liquefaction and related phenomena (i.e. lateral spreading, lateral flows, bearing strength loss, sand boils, etc.) are anticipated to impact the site. Liquefaction screening is presented in Section 3.06 of this report.

### 2.08 Regional Land Subsidence and Fissure Potential

Regional land subsidence that has resulted in the formation of fissures has been documented in several areas of southern California. Ground fissures have also occurred within the large residential development approximately 2 miles to the east of the site, apparently as a result of method of compaction, organic content in fill and perhaps other factors.

California Division of Mines and Geology Special Report 113 report a north-south trending fissure immediately north of the California Institution for Men that has been attributed to ground water withdrawal. The Institution is located approximately 5 miles to the northwest of the site.

Surface or subsurface fissures suggestive of land subsidence within the site were not observed or found during our field investigation, nor during our research did we find were any documented mention of fissures within the site. The past historic use of the site as a heifer ranch indicates organic matter in the upper the 3 feet of native soil could be a concern with respect to the potential for the formation of near surface ground cracking if manure or high amounts of organic matter are incorporated into compacted fills. Therefore, detrimental amounts of manure and/or organic matter should not be incorporated into compacted fills. A representative soil sample has been tested for organic matter contents. The test was performed in general accordance with ASTM D2974 and the test results are presented in Appendix B.

### 2.09 Historic Seismicity

The region of the subject site has experienced shaking from several earthquakes recorded back to 1812. Historic earthquakes with magnitudes of greater than or equal to 6.0 and have been epicentered within approximately 50 miles of the site, are summarized in the table below.

**Large Historic Earthquakes**

| FILE CODE | LAT. NORTH | LONG. WEST | DATE | TIME (UTC) H M Sec | DEPTH (km) | QUAKE MAG. | SITE ACC. g | SITE MM INT. | APPROX. DISTANCE mi [km] |
|---|---|---|---|---|---|---|---|---|---|
| MGI | 34.0000 | 117.5000 | 12/16/1858 | 10 0 0.0 | 0.0 | 7.00 | 0.407 | X | 7.7( 12.3) |
| DMG | 34.0000 | 117.2500 | 07/23/1923 | 73026.0 | 0.0 | 6.25 | 0.071 | VI | 21.5( 34.6) |
| DMG | 33.7000 | 117.4000 | 05/15/1910 | 1547 0.0 | 0.0 | 6.00 | 0.058 | VI | 21.6( 34.8) |
| DMG | 34.3000 | 117.6000 | 07/30/1894 | 512 0.0 | 0.0 | 6.00 | 0.049 | VI | 24.0( 38.6) |
| DMG | 33.9000 | 117.2000 | 12/19/1880 | 0 0 0.0 | 0.0 | 6.00 | 0.048 | VI | 24.4( 39.3) |
| DMG | 34.3000 | 117.5000 | 07/22/1899 | 2032 0.0 | 0.0 | 6.50 | 0.068 | VI | 24.9( 40.1) |
| DMG | 34.3700 | 117.6500 | 12/08/1812 | 15 0 0.0 | 0.0 | 7.00 | 0.080 | VII | 28.8( 46.4) |
| MGI | 34.1000 | 118.1000 | 07/11/1855 | 415 0.0 | 0.0 | 6.30 | 0.046 | VI | 29.2( 47.0) |
| DMG | 33.6170 | 117.9670 | 03/11/1933 | 154 7.8 | 0.0 | 6.30 | 0.043 | VI | 30.5( 49.1) |
| DMG | 34.2000 | 117.1000 | 09/20/1907 | 154 0.0 | 0.0 | 6.00 | 0.028 | V | 34.3( 55.3) |
| DMG | 33.8000 | 117.0000 | 12/25/1899 | 1225 0.0 | 0.0 | 6.40 | 0.034 | V | 37.1( 59.8) |
| DMG | 33.7500 | 117.0000 | 04/21/1918 | 223225.0 | 0.0 | 6.80 | 0.044 | VI | 38.3( 61.6) |
| GSN | 34.2030 | 116.8270 | 06/28/1992 | 150530.7 | 5.0 | 6.70 | 0.028 | V | 48.6( 78.2) |

# 3.00 CONCLUSIONS AND RECOMMENDATIONS

## 3.01 General Conclusion

Based on specific data and information contained in this report, our understanding of the project and our general experience in engineering geology and geotechnical engineering, it is our professional judgment that the proposed development is geologically and geotechnically feasible. This is provided that the recommendations presented below are fully implemented during design, grading and construction.

## 3.02 General Earthwork and Grading

All grading should be performed in accordance with the General Earthwork and Grading Specifications outlined in Appendix C, unless specifically revised or amended below. Recommendations contained in Appendix C are general specifications for typical grading projects and may not be entirely applicable to this project.

It is also recommended that all earthwork and grading be performed in accordance with the 2019 California Building Code and all applicable governmental agency requirements.

## 3.03 Earthwork Shrinkage and Subsidence

Shrinkage is the decrease in volume of soil upon removal and recompaction expressed as a percentage of the original in-place volume. Subsidence occurs as natural ground is densified to receive fill. These factors account for changes in earth volumes that will occur during grading. Our estimates are as follows:

- Shrinkage factor = 10-20% for soil removed and replaced as compacted fill.
- Subsidence factor = 0.2 foot

The degree to which fill soils are compacted and variations in the in-situ density of existing soils will influence earth volume changes. Consequently, some adjustments in grades near the completion of grading could be required to balance the earthwork.

## 3.04 Seismic Design Parameters

Mapped Spectral Accelerations were obtained by using the online ATC Calculator (ASCE 7-16 Standard) and a site class D-default was used for the project site. Since the mapped risk-targeted maximum considered earth quake ($MCE_R$) spectral response acceleration parameter at a period of 1 second ($S_1$) is greater than 0.2, a ground motion hazard analysis is required per ACSE/SEI 7-16 to be performed in accordance with Section 21.2 for structures on Site Class D. However, instead of performing the ground motion hazard analysis, a long period coefficient ($F_V$) of 1.7 was used for calculation of $S_{M1}$ and $S_{D1}$. The parameters generated for the subject site are presented in the following table:

**2019 California Building Code (CBC) Seismic Parameters**

| Parameter | Value |
|---|---|
| Site Location | Latitude = 33.953165 degrees<br>Longitude = -117.621272 degrees |
| Site Class | Site Class = D-default |
| Mapped Spectral Accelerations | $S_s$ (0.2- second period) = 1.651g<br>$S_1$ (1-second period) = 0.6g |
| Site Coefficients<br>(Site Class D-default) | $F_a$ = 1.2<br>$F_v$ = 1.7 |
| Maximum Considered Earthquake<br>Spectral Accelerations (Site Class D-default) | $S_{MS}$ (0.2- second period) = 1.981g<br>$S_{M1}$ (1-second period) = 1.02g |
| Design Earthquake<br>Spectral Accelerations (Site Class D-default) | $S_{DS}$ (0.2- second period) = 1.321g<br>$S_{D1}$ (1-second period) = 0.68g |

For Risk Category II structures with mapped spectral response acceleration parameter at 1-s period ($S_1$) is less than 0.75, the Seismic Design Category is D (ASCE 7-16 Section 11.6).

Peak earthquake ground acceleration adjusted for site class effects (PGAM) has been determined in accordance with ASCE 7-10 Section 11.8.3 as follows: $PGA_M = F_{PGA} \times PGA = 1.2 \times 0.672g = 0.806g$.

### 3.05 Liquefaction and Secondary Earthquake Hazards

Potential secondary seismic hazards that can affect land development projects include liquefaction, tsunamis, seiches, seismically induced settlement, seismically induced flooding and seismically induced landsliding.

Liquefaction

Liquefaction hazard potential for the site is discussed in Section 2.07 and Section 3.06 of this report.

Tsunamis and Seiches

Tsunamis are sea waves that are generated in response to large-magnitude earthquakes. When these waves reach shorelines, they sometimes produce coastal flooding. Seiches are the oscillation of large bodies of standing water, such as lakes, that can occur in response to ground shaking. Tsunamis and seiches do not pose hazards due to the inland location of the site and lack of nearby bodies of standing water.

Seismically Induced Settlement

Seismically induced settlement occurs most frequently in areas underlain by loose, granular sediments. Damage as a result of seismically induced settlement is most dramatic when differential settlement occurs in areas with large variations in the thickness of underlying sediments. Settlement caused by ground shaking is often non-uniformly distributed, which can result in differential settlement.

A seismic settlement analysis was performed using LiquefyPro Version 5 (2015 Edition) for this project. A summary of the input data and the results of the seismic settlement analysis are provided in Appendix D.

Seismically Induced Flooding

According to Federal Emergency Management Agency (Flood Insurance Rate Map #06071C9375 with a revised date of August 28, 2008), the site is located in an area of Flood Zone X, which is outside the 0.2 annual chance floodplain. In addition there are no water reservoirs in the vicinity of the site. Based on the aforementioned the potential for seismic induced flooding is unlikely.

Seismically Induced Landsliding

According to the California Geological Survey Seismic Hazard Zones Map of the El Monte Quadrangle (2017) the site does not lie in a landslide hazard zone. Since the site is relatively flat earthquake-induced landsliding does not appear to be a hazard to proposed development.

### 3.06 Liquefaction Screening Evaluation Results

Liquefaction describes a phenomenon where cyclic stresses, which are produced by earthquake-induced ground motions, create excess pore pressures in cohessionless soils. As a result, the soils may acquire a high degree of mobility, which can lead to lateral spreading, consolidation and settlement of loose sediments, ground oscillation, flow failure, loss of bearing strength, ground fissuring, sand boils, and other damaging deformations. This phenomenon occurs only below the water table, but after liquefaction has developed, it can propagate upward into overlying, non-saturated soil as excess pore water escapes. Descriptions of each of the phenomena associated with liquefaction are described below:

Research has shown that saturated, loose sands with a silt content less than about 25 percent are most susceptible to liquefaction, whereas other soil types are generally considered to have a low susceptibility. According to the California Geological Survey (CGS) Special Publication SP-117A (2008), "Guidelines for Evaluating and Mitigating Seismic Hazards in California," any materials with a PI > 12 and moisture content < 85% of the liquid limit were considered not subject to liquefaction. Liquefaction susceptibility is related to numerous factors, and the following conditions must exist for liquefaction to occur:

- Sediments must be relatively young in age and must not have developed large amounts of cementation
- Sediments must consist mainly of cohessionless sands and silts
- The sediment must not have a high relative density
- Free groundwater must exist in the sediment; and
- The site must be exposed to seismic events of a magnitude large enough to induce straining of soil particles

Static groundwater was encountered at a depth of 44.5 feet in boring No. 1. Based on the accumulation of an abundant calcium carbonate deposit rich zone within some of the borings, the historical high

groundwater table may be approximately 15 feet below planned grade. Therefore, RMA GeoScience considered the potential for groundwater to be at this depth below the projects planned grades in the liquefaction screening evaluation.

For the PGA corresponding to two-thirds of the $PGA_M$ and predominant earthquake magnitude corresponding to a 10% probability of exceedance in 50 years, potential seismic-induced settlement was determined when the safety factor was less than 1.1. Calculations of liquefaction potential, presented in Appendix D, indicate that there are discrete layers of sandy alluvial soils that will be susceptible to liquefaction during a design-level earthquake. The seismic settlement from Boring B-1 is 2.85 inches.

### 3.07 Total and Differential Settlement

The above seismically induced settlement should be combined with the anticipated total static settlement in order to obtain an estimate of the amount of differential settlement that may affect the site. The maximum total static settlement is not expected to exceed ½ inch under the recommended bearing pressure.

We assume the seismic differential settlement is half of the total seismic settlement and static differential settlement is half of the total static settlement. Thus, total settlement (static and seismic) is expected to be less than 3.35 inches with differential settlement (static and seismic) of less than 2.15 inches in a 40 feet span.

### 3.08 Removal Recommendations

All vegetation, trash and debris should be cleared from the grading area and removed from the site. Prior to placement of compacted fills, all non-engineered fills and loose, porous, or compressible soils will need to be removed down to competent ground. Removal and requirements will also apply to cut areas, if the depth of cut is not sufficient to reach competent ground. Removed and/or overexcavated soils may be moisture- conditioned and recompacted as engineered fill, except for soils containing detrimental amounts of organic material. Estimated depths of removals are as follows:

- Non-engineered fill ranging from 1.5 up to 25 feet deep can be anticipated and were observed in the exploration excavations. Complete removal of these fills and underlying compressible native soils will need to be performed. If other non-engineered fills are encountered during grading, they will also need to be removed along with any underlying compressible native soils.
- Loose, porous and compressible native soils were encountered to depths of about 7 to 10 feet below *planned* grades ((below artificial fill or Topsoil)/Old Alluvium Deposits contact).

In addition to the above requirements, over excavation will also need to meet the following criteria for the building pads, concrete flatwork and pavement areas:

- All footing areas, both continuous and spread, shall be undercut, moistened, and compacted as necessary to produce soils compacted to a minimum of 90% relative compaction to a depth equal to the width of the footing below the bottom of the footing or to a depth of 3 feet below

the bottom of the footing, whichever is less. Footing areas shall be defined as the area extending from the edge of the footing for a distance of 5 feet.

- All floor slabs, concrete flatwork and paved areas shall be underlain by a minimum of 12 inches of soil compacted to a minimum of 90% relative compaction.

Following the over-excavation indicated above, a designated representative for the Project Geotechnical Engineer must review the exposed ground surface and determine if any additional over-excavation is required. The over-excavated ground surface in all areas determined to be satisfactory for the support of fills must be scarified to a minimum depth of 6 inches. Scarification should continue until the soils are broken down and free from lumps or clods and until the scarified zone is uniform. The moisture content of the scarified zone shall be adjusted to within 2% of the optimum moisture content. The scarified zone must then be uniformly compacted to at least 90% relative compaction

Fill material should be placed in nearly horizontal layers, uniformly moisture conditioned to within 2% of optimum moisture content, and then compacted in layers that do not exceed approximately 6 inches in thickness. Thicker lifts may be placed if testing indicates the compaction procedures are such that the required compaction is being achieved and the geotechnical consultant approves their use. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to insure uniformity of material in each layer. Engineered fill must be compacted to achieve a relative compaction of at least 90 percent.

The above recommendations are based on the assumption that soils encountered during field exploration are representative of soils throughout the site. However, there can be unforeseen and unanticipated variations in soils between points of subsurface exploration. Hence, over-excavation depths must be verified, and adjusted if necessary, at the time of grading.

### 3.09 Foundation

The expansion index results of the on-site soils had low expansion potential. However, considering the total and differential settlements from static and seismic conditions, the site may be considered suitable for the support of the anticipated structures using mat foundation systems.

If mat foundations were used to support the proposed structures, an allowable soil bearing pressure of 3,000 psf are recommended under the proposed mat foundations. The total combined differential settlement (seismic plus static) is 2.15 inches. The modulus of subgrade reaction shall be calculated as follows:

$$K = K_1 \left(\frac{B+1}{2B}\right)^2$$

Where $k_1$ = 150 pci, coefficient of subgrade reaction of foundations measuring 1 ft by 1 ft.

B = foundation width in ft.

A foundation design engineer experienced in the field of mat foundation design should undertake the design of the foundations. The designer should provide estimates of the anticipated deflection of the mat

to the design architect and structural engineer for use in the design of the structure. If the anticipated design deflection exceeds that which the design architect and or structural engineer can accommodate then the slab should be re-designed by the slab designer to reduce the total deflection.

### 3.10 Retaining Wall Foundations

Footings for retaining walls should be founded supported on 3 feet of compacted fill with a minimum depth of 12 inches and have a minimum width of 12 inches. Footings may be designed using the allowable bearing capacity of 1,500 psf and the same lateral resistance values recommended for building footings. However, when calculating passive resistance, the upper 6 inches of the footings should be ignored in areas where the footings will not be covered with concrete flatwork.

In view of the seismic setting, a nominal reinforcement consisting of at least two #4 bars placed within 3 inches of the top of footings and another two placed within 3 inches of the bottom of footings is recommended. Reinforcement of wide footings should be determined by the structural engineer who may also require heavier reinforcement.

### 3.11 Moisture Vapor Barrier

A moisture vapor retarder/barrier is recommended beneath all floor slabs that will be covered by moisture-sensitive flooring materials such as vinyl, linoleum, wood, carpet, rubber, rubber-backed carpet, tile, impermeable floor coatings, adhesives, or where moisture-sensitive equipment, products, or environments will exist. We recommend that design and construction of the vapor retarder or barrier conform to Section 1805 of the 2019 California Building Code (CBC) and pertinent sections of American Concrete Institute (ACI) guidance documents 302.1R-04, 302.2R-06 and 360R-10.

The moisture vapor retarder/barrier should consist of a minimum 10 mils thick polyethylene with a maximum perm rating of 0.3 in accordance with ASTM E 1745. Seams in the moisture vapor retarder/barrier should be overlapped no less than 6 inches or in accordance with the manufacturer's recommendations. Joints and penetrations should be sealed with the manufacturer's recommended adhesives, pressure-sensitive tape, or both. The contractor must avoid damaging or puncturing the vapor retarder/barrier and repair any punctures with additional polyethylene properly lapped and sealed.

ACI guidelines allow for the placement of moisture vapor retarder/barriers either directly beneath floor slabs or below an intermediate granular soil layer.

Placing the moisture retarder/barrier directly beneath the floor slab will provide improved curing of the slab bottom and will eliminate potential problems caused by water being trapped in a granular fill layer. Concrete slabs poured directly on a vapor retarder/barrier can experience shrinkage cracking and curling due to differential rates of curing through the thickness of the slab. Therefore, for concrete placed directly on the vapor retarded, we recommend a maximum water cement ratio of 0.45 and the use of water-reducing admixtures to increase workability and decrease bleeding.

If granular soil is placed over the vapor retarder/barrier, we recommend that the layer be at least 2 inches thick in accordance with traditional practice in southern California. Granular fill should consist of

clean fine graded materials with 10 to 30% passing the No. 100 sieve and free from clay or silt. The granular layer should be uniformly compacted and trimmed to provide the full design thickness of the proposed slab. The granular fill layer should not be left exposed to rain or other sources of water such as wet-grinding, power washing, pipe leaks or other processes, and should be dry at the time of concrete placement. Granular fill layers that become saturated should be removed and replaced prior to concrete placement.

An additional layer of sand may be placed beneath the vapor retarder/barrier at the developer's discretion to minimize the potential of the retarder/barrier being punctured by underlying soils.

### 3.12 Miscellaneous Concrete Flatwork

Miscellaneous concrete flatwork and walkways may be designed with a minimum thickness of 4 inches. Miscellaneous flatwork and walkways, should be reinforced with #3 bars, 18 inches on center, each direction at the mid-height of the slab. Control joints should be constructed to create squares or rectangles with a maximum spacing of 15 feet.

Walkways should be separated from foundations with a thick expansion joint filler and reinforced with a minimum of 6X6-10/10 welded wire mesh place at mid height in the slab. Control joints should be constructed into non-reinforced walkways at a maximum of 5 feet spacing.

The subgrade soils beneath all miscellaneous concrete flatwork should be compacted to a minimum of 95 percent relative compaction for a minimum depth of 12 inches. The geotechnical engineer should monitor the compaction of the subgrade soils and perform testing to verify that proper compaction has been obtained.

### 3.13 Foundation Excavation

All foundation excavations should be observed by the geotechnical consultant to verify that they have been excavated into competent soils. The foundation excavations should be observed prior to the placement of forms, reinforcement steel, or concrete. These excavations should be evenly trimmed and level. Prior to concrete placement, any loose or soft soils should be removed. Excavated soils should not be placed on slab or footing areas unless properly compacted.

Prior to the placement of the moisture barrier and sand, the subgrade soils underlying the slab should be observed by the geotechnical consultant to verify that all under-slab utility trenches have been properly backfilled and compacted, that no loose or soft soils are present, and that the slab subgrade has been properly compacted to a minimum of 95 percent relative compaction within the upper 12 inches.

Footings may experience and overall loss in bearing capacity or an increased potential to settle where located in close proximity to existing or future utility trenches. Furthermore, stresses imposed by the footings on the utility lines may cause cracking, collapse and/or a loss of serviceability. To reduce this risk, footings should extend below a 1:1 plane projected upward from the closest bottom of the trench.

Subgrade soils beneath slabs on grade and walkways moist prior to the placement of concrete. The geotechnical consultant should verify that the appropriate moisture content has been achieved a maximum

of 24 hours prior to the placement of concrete or moisture barriers.

### 3.14 Lateral Load Resistance

Lateral loads may be resisted by soil friction and the passive resistance of the soil. The following parameters are recommended.

- Passive Earth Pressure = 400 pcf (equivalent fluid weight).

  We recommend neglecting passive soil resistance from the upper foot of soil unless protected by a concrete slab or pavement.

- Coefficient of Friction (soil to footing) = 0.42
- Retaining structures should be designed to resist the following lateral active earth pressures:

| Surface Slope of Retained Materials (Horizontal:Vertical) | Equivalent Fluid Weight (pcf) |
|---|---|
| Level | 32 |
| 5:1 | 34 |
| 4:1 | 35 |
| 3:1 | 38 |
| 2:1 | 47 |

  These active earth pressures are only applicable if the retained earth is allowed to strain sufficiently to achieve the active state. The required minimum horizontal strain to achieve the active state is approximately 0.0025H. Retaining structures should be designed to resist an at-rest lateral earth pressure if this horizontal strain cannot be achieved.

- At-rest Lateral Earth Pressure = 51 pcf (equivalent fluid weight)

The Mononobe-Okabe method is commonly utilized for determining seismically induced active and passive lateral earth pressures and is based on the limit equilibrium Coulomb theory for static stress conditions. This method entails three fundamental assumptions (e.g., Seed and Whitman, 1970): Wall movement is sufficient to ensure either active or passive conditions, the driving soil wedge inducing the lateral earth pressures is formed by a planar failure surface starting at the heel of the wall and extending to the free surface of the backfill, and the driving soil wedge and the retaining structure act as rigid bodies, and therefore, experiences uniform accelerations throughout the respective bodies (U.S. Army Corps of Engineers, 2003, Engineering and Design - Stability Analysis of Concrete Structures).

- Seismic Lateral Earth Pressure for level backfill = 21 pcf (equivalent fluid weight).

The seismic lateral earth pressure should be incorporate into design of retaining walls supporting more than 6 feet of backfill height. The seismic lateral earth pressure given above is a increasing with depth, and the resultant of this pressure is a increment of force which should be applied to the back of the wall at ⅓ of the wall height from the wall base. The seismic increment of earth pressure should be added to the static active earth pressure. Even for the at-rest ($K_O$) condition, the seismic increment of earth pressure should be added

to the static active earth pressure, not to the at-rest static earth pressure (SEAOC Seismology Committee 2019).

Per 2019 CBC Section 1803.5.12 dynamic seismic lateral earth pressures shall be applied to foundation walls and retaining walls supporting more than 6 feet of backfill. Dynamic seismic lateral earth pressures may also be applied to shorter walls at the discretion of the structural engineer.

### 3.15 Cement Type and Corrosion Potential

A soluble sulfate test performed on a shallow sample of soil indicates that concrete at the subject site will have a negligible exposure to water-soluble sulfate in the soil. Our recommendations for concrete exposed to sulfate-containing soils are presented in the following table.

**Recommendations for Concrete exposed to Sulfate-containing Soils**

| Sulfate Exposure | Water Soluble Sulfate ($SO_4$) in Soil (% by Weight) | Sulfate ($SO_4$) in Water (ppm) | Cement Type (ASTM C150) | Maximum Water-Cement Ratio (by Weight) | Minimum Compressive Strength (psi) |
|---|---|---|---|---|---|
| Negligible | 0.00 - 0.10 | 0-150 | -- | -- | 2,500 |
| Moderate | 0.10 - 0.20 | 150-1,500 | II | 0.50 | 4,000 |
| Severe | 0.20 - 2.00 | 1,500-10,000 | V | 0.45 | 4,500 |
| Very Severe | Over 2.00 | Over 10,000 | V plus pozzolan or slag | 0.45 | 4,500 |

Use of alternate combinations of cementitious materials may be permitted if the combinations meet design recommendations contained in American Concrete Institute guideline ACI 318-11.

The soils were also tested for soil reactivity (pH) and electrical resistivity (ohm-cm). The test results indicate that the on-site soils have a soil reactivity of 8.8 and an electrical resistivity of 500 ohm-cm. A neutral or non-corrosive soil has a reactivity value ranging from 5.5 to 8.4. Generally, soils that could be considered moderately corrosive to ferrous metals have resistivity values of about 3,000 ohm-cm to 10,000 ohm-cm. Soils with resistivity values less than 3,000 ohm-cm can be considered corrosive and soils with resistivity values less than 1,000 ohm-cm can be considered extremely corrosive.

Based on our analysis, underlying onsite soils are extremely corrosive to ferrous metals. Protection of buried pipes utilizing coatings on all underground pipes; clean backfills and a cathodic protection system can be effective in controlling corrosion. A qualified corrosion engineer may be consulted to further assess the corrosive properties of the soil.

### 3.16 Preliminary Pavement Sections

Based on the soil profiles at the subject project, a subgrade R-value of 5 has been used to develop the preliminary pavement sections given below. The structural section recommendations (AC over processed miscellaneous base materials (with a minimum R-value of 78)) given herein were developed using the procedures outlined in Chapter 630 of the California Highway Design Manual (Caltrans, 2012). This procedure uses the principle that the pavement structural section must be of adequate thickness to distribute the load from the design TI to the subgrade soils in such a manner that the stresses from the applied loads do not exceed the strength of the soil (R-value). We would recommend the following preliminary structural sections:

| TRAFFIC INDEX | ASPHALT THICKNESS, IN. | BASE THICKNESS, IN. |
|---|---|---|
| 5.0 | 5.0 | 6.0 |
| 6.0 | 6.0 | 8.0 |

At a minimum, the upper 12 inches of subgrade soils should be at or no more than 2% over optimum moisture content and compacted to a minimum of 90% relative compaction prior to placement of base. All aggregate base courses should also be at or no more than 2% over optimum moisture and compacted to a minimum of 95% relative compaction.

### 3.17 Utility Trench Backfill

The onsite fill soils will not be suitable for use as pipe bedding for buried utilities. All pipes should be bedded in a sand, gravel or crushed aggregate imported material complying with the requirements of the Standard Specifications for Public Works Construction (Greenbook) Section 306-1.2.1. Crushed rock products that do not contain appreciable fines should not be utilized as pipe bedding and/or backfill. Bedding materials should be densified to at least 90% relative compaction (ASTM D1557). The geotechnical consultant should review and approve of proposed bedding materials prior to use.

The on-site soils are expected to be suitable as trench backfill provided they are screened of organic matter, boulders and cobbles over 6 inches in diameter. Trench backfill should be densified to at least 90% relative compaction (ASTM D1557). On-site granular soils with a sand equivalent value of 15 or greater may be water densified initially per Greenbook Specifications. Supplemental mechanical compaction methods will be required to attain the required 90% relative compaction.
All utility trench backfill within street right of way, utility easements, under or adjacent to sidewalks, driveways, or building pads should be observed and tested by the geotechnical consultant to verify proper compaction. Trenches excavated adjacent to foundations should not extend within the footing influence zone defined as the area within a line projected at a 1:1 drawn from the bottom edge of the footing. Trenches crossing perpendicular to foundations should be excavated and backfilled prior to the construction of the foundations. The excavations should be backfilled in the presence of the geotechnical engineer and tested to verify adequate compaction beneath the proposed footing.

Cal/OSHA construction safety orders should be observed during all underground work.

### 3.18 Temporary Excavations

Based on the recommended removal depths as described in Section 3.06, temporary excavations within the limits of grading are expected to be 5 feet. Excavations may be cut vertically to a maximum height of 4 feet. Cuts above 4 feet may be laid back at a gradient of 1:1.

### 3.19 Drainage

Surface drainage should be directed away from the proposed structures into suitable drainage devices. Neither excess irrigation nor rainwater should be allowed to collect or pond against building foundations or within low-lying or level areas of the lot. Surface waters should be diverted away from the tops of slopes and prevented from draining over the top of slopes and down the slope face.

### 3.20 Plan Review

Once formal plans are prepared for the subject property, this office should review the plans from a geotechnical viewpoint, comment on changes from the plan used during preparation of this report and revise the recommendations of this report where necessary.

## 4.00 CLOSURE

The findings, conclusions and recommendations in this report were prepared in accordance with generally accepted engineering and geologic principles and practices. No other warranty, either expressed or implied, is made. This report has been prepared for Lewis Management Corp. to be used solely for design purposes. Anyone using this report for any other purpose must draw their own conclusions regarding required construction procedures and subsurface conditions.

The geotechnical and geologic consultant should be retained during the earthwork and foundation phases of construction to monitor compliance with the design concepts and recommendations and to provide additional recommendations as needed. Should subsurface conditions be encountered during construction that are different from those described in this report, this office should be notified immediately so that our recommendations may be re-evaluated.

**FIGURES**




RMA GeoScience

# Site Vicinity Map

South West Corner of East Preserve Loop and Academy Street,
Chino, California

Figure 1

| | |
|---|---|
| RMA Job No: | 20G-0406-0 |
| Report Date: | 8/2020 |
| Prepared By: | mbk |




0 100' 200'

Ref: Google Earth 2020: Image 5/2/2019

# Site Map

South West Corner of East Preserve Loop and Academy Street,
Chino, California

Figure 1

| | |
|---|---|
| RMA Job No: | 20G-0406-0 |
| Report Date: | 8/2020 |
| Prepared By: | mbk |

RMA GeoScience

## Explanation

- af/Qvola — Artificial Fill over Very Old Fan Deposits
- B3 — Approximate Location of Hollow Stem Auger Boring
- B6 RMA Group — Hollow Stem Auger Boring by RMA Group (Note drilled before artificial fill placement)
- TP11 — Approximate Location of Test Pit
- 10.5 — Depth of Artificial Fill (feet)
- Approximate Location of Water Well

SCALE 1"= 40'
40' 0 40' 80' 120'
CONTOUR INTERVAL 1'

Approximate Property Line

TP3 10.5
TP1 1.5
TP5 7
TP2 11.5
TP4 9.5
B1 7
TP7 3
B6 RMA Group
TP6 7
B3 18
TP10 >13
TP9 >13
B2 7
TP8 7
TP11 >13
B3 RMA
af/Qvola
BRUSH
TILLED FIELD
CONC
DEBRIS
CONTAINERS
PIPE
Approximate Property Line

# Geologic Map

Chino Rental Neighborhoods - The Preserve at Chino
16600 Hellman
Chino, CA

Figure 3

| | |
|---|---|
| RMA Job No: | 20G-0406 |
| Report Date: | 8/2020 |
| Prepared By: | mbk |

RMA GeoScience




Ref: Google Earth 2020: Image 1/2006

# Site Map January 2006

South West Corner of East Preserve Loop and Academy Street,
Chino, California

Figure 4

| | |
|---|---|
| RMA Job No: | 20G-0406-0 |
| Report Date: | 8/2020 |
| Prepared By: | mbk |

RMA GeoScience




0 100' 200'

Ref: Google Earth 2020: Image 3/2013

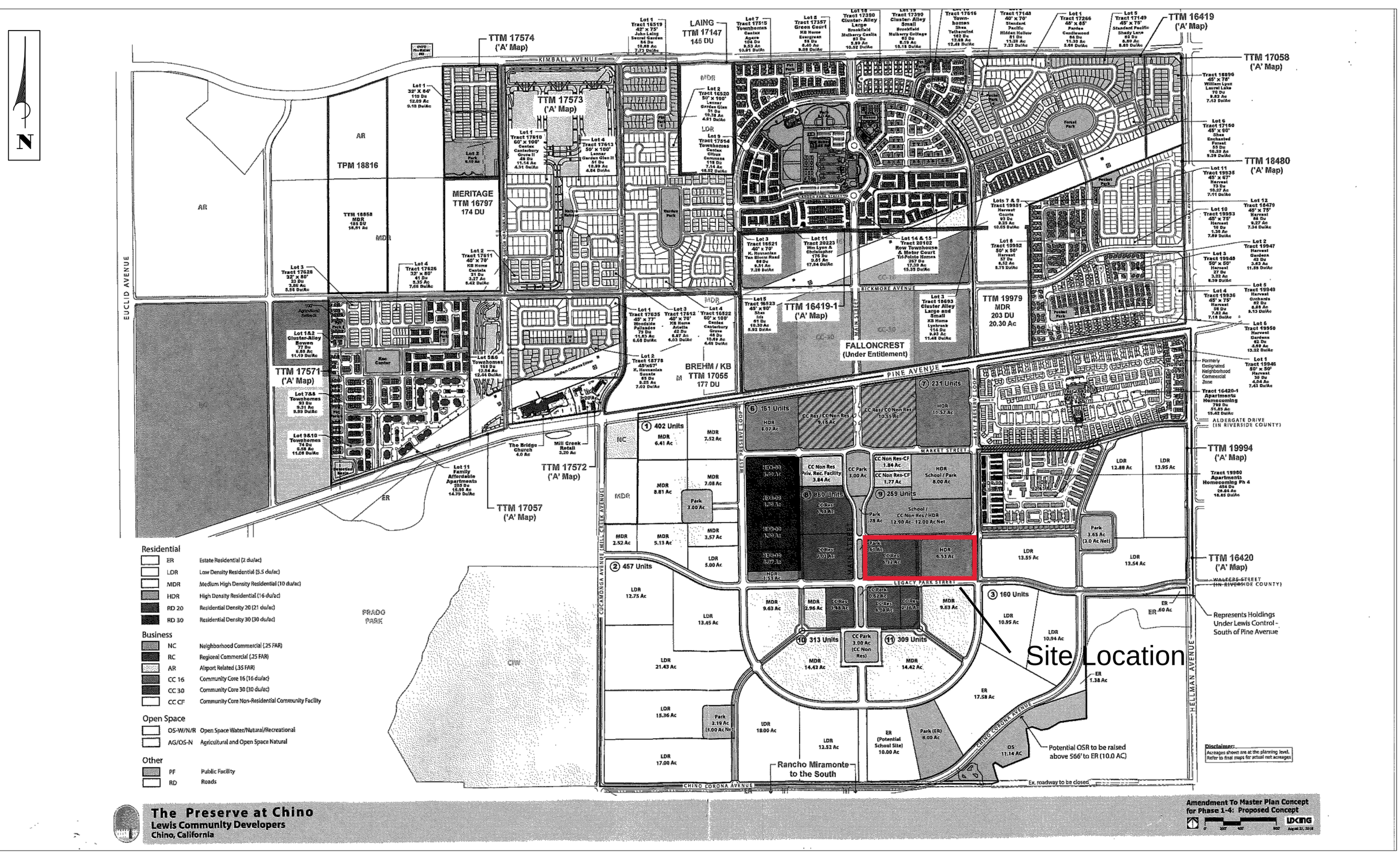
RMA GeoScience

# Site Map March 2013

South West Corner of East Preserve Loop and Academy Street,
Chino, California

Figure 5

| | |
|---|---|
| RMA Job No: | 20G-0406-0 |
| Report Date: | 8/2020 |
| Prepared By: | mbk |



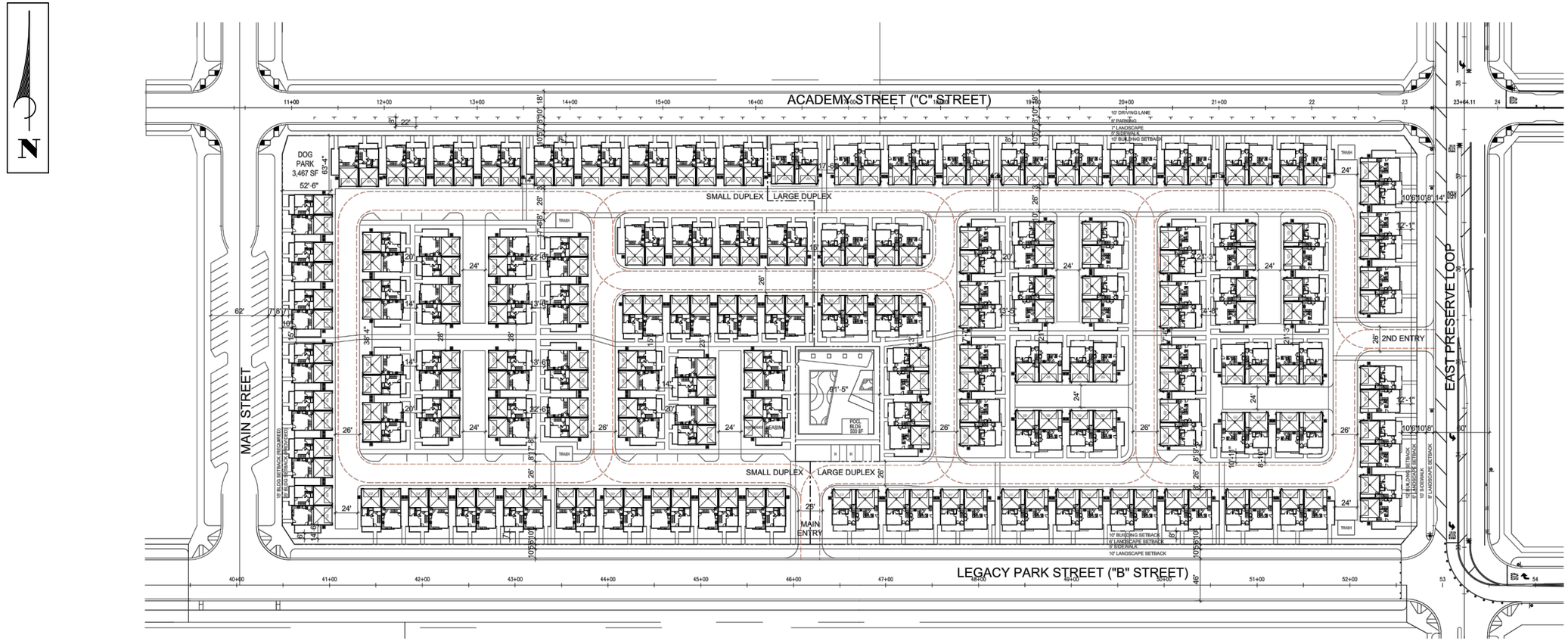

# The Preserve at Chino Concept

South West Corner of East Preserve Loop and Academy Street,
Chino, California

Figure 6

| | |
|---|---|
| RMA Job No: | 20G-0406-0 |
| Report Date: | 8/2020 |
| Prepared By: | mbk |

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## PROJECT DATA

**SMALL DUPLEX SUMMARY (ZONED H-20)**

| | | |
|---|---|---|
| 1. | P1 (1,265 SF) | 55 UNITS (50%) |
| | P2 (1,338 SF) | 55 UNITS (50%) |
| | TOTAL | 110 UNITS (100%) |
| 2. | PARCEL ACRES | 5.64 ACRES |
| 3. | DENSITY | 19.50 DU/AC |
| 4. | PRIVATE OPEN SPACE | P1 (111 SF) |
| | | P2 (222 SF) |

**LARGE DUPLEX SUMMARY (ZONED H-16)**

| | | |
|---|---|---|
| 1. | P3 (1,447 SF) | 55 UNITS (50%) |
| | P4 (1,656 SF) | 55 UNITS (50%) |
| | TOTAL | 110 UNITS (100%) |
| 2. | PARCEL ACRES | 6.45 ACRES |
| 3. | DENSITY | 17.05 DU/AC |
| 4. | PRIVATE OPEN SPACE | P3 (154 SF) |
| | | P4 (202 SF) |

**AMENITY AREA SUMMARY**

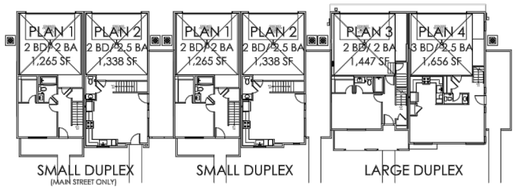
| | | |
|---|---|---|
| 1. | POOL BUILDING | (500 SF) |
| 2. | PARCEL ACRES | 0.26 ACRES |

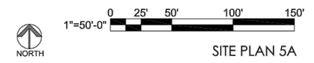
## PROJECT DATA

**OVERALL PROJECT SUMMARY**

| | | |
|---|---|---|
| 1. | SMALL DUPLEX - P1 (1,265 SF) | 55 UNITS (25%) |
| | SMALL DUPLEX - P2 (1,338 SF) | 55 UNITS (25%) |
| | LARGE DUPLEX - P3 (1,447 SF) | 55 UNITS (25%) |
| | LARGE DUPLEX - P4 (1,656 SF) | 55 UNITS (25%) |
| | TOTAL | 220 UNITS (100%) |
| 2. | PARCEL ACRES | 12.33 ACRES |
| 3. | DENSITY | 17.84 DU/AC |
| 4. | PARKING RATIO | 2.37 STALLS/DU |
| | | 1.05 STALLS/ BD |
| 5. | PRIVATE OPEN SPACE | |
| | SMALL DUPLEX - P1 (111 SF) | |
| | SMALL DUPLEX - P2 (222 SF) | |
| | LARGE DUPLEX - P3 (154 SF) | |
| | LARGE DUPLEX - P4 (202 SF) | |
| 6. | PARKING: | |
| | 2 CAR GARAGE | 440 STALLS |
| | GUEST 220 X 0.33 = | 73 STALLS |
| | TOTAL REQUIRED | 513 STALLS |
| | TOTAL PROVIDED | |
| | 2 CAR GARAGE | 440 STALLS |
| | Guest on Academy St. | 52 STALLS |
| | Guest on Main St. | 20 STALLS |
| | Internal Guest Parking | 20 STALLS |
| | TOTAL PROVIDED | 532 STALLS |

**KEY PLAN**




SITE PLAN 5A

DATE: 02-26-2020
JOB NO.: 2019-445

# CHINO RENTAL NEIGHBORHOODS

CHINO, CA

LEWIS MANAGEMENT CORPORATION
1156 NORTH MOUNTAIN AVE I UPLAND, CA 91786

AO ARCHITECTS
144 NORTH ORANGE ST., ORANGE, CA 92866
(714) 639-9860

Architecture. Design. Relationships.

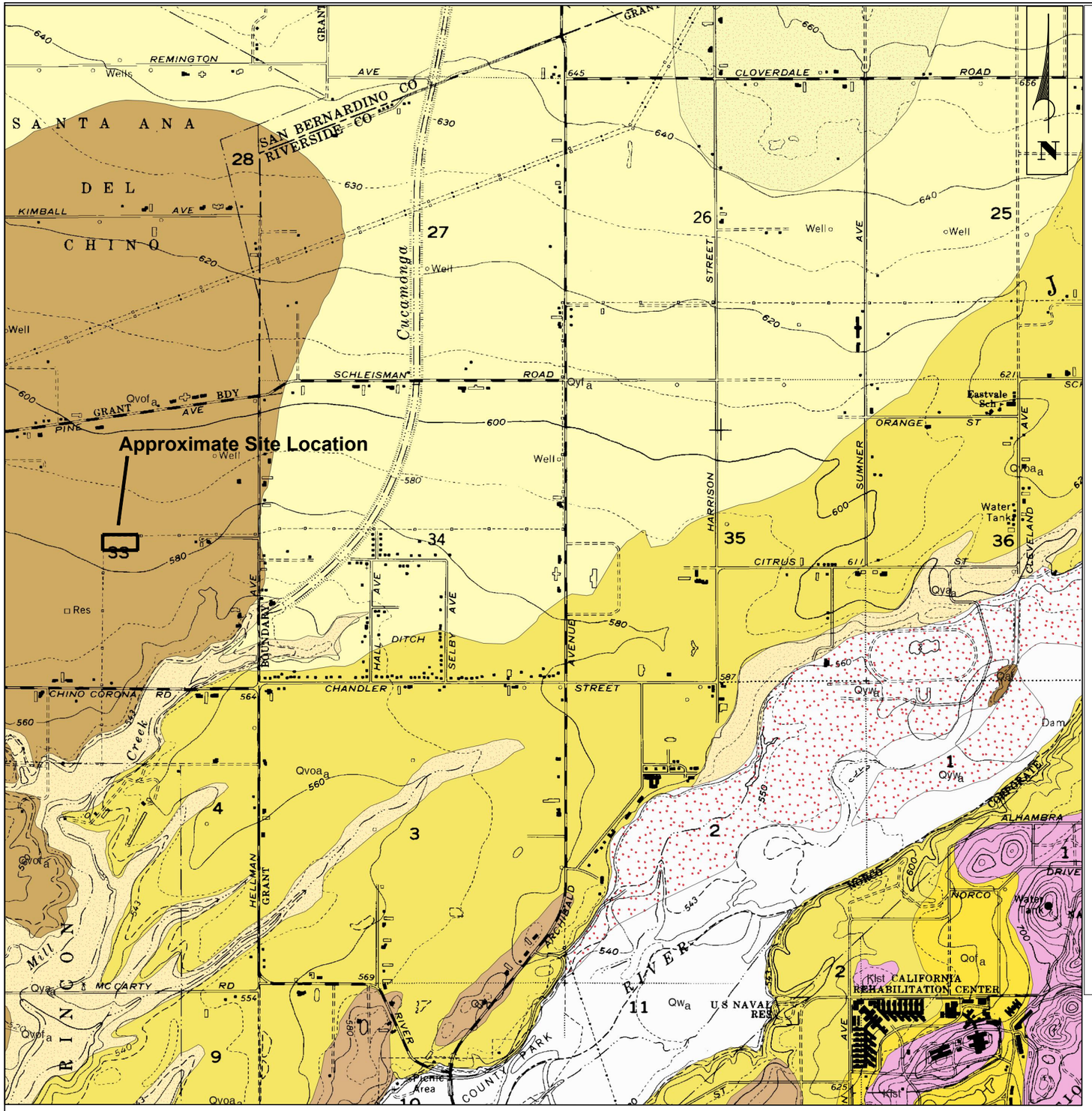
Figure 7

# Chino Rental Neighborhoods Concept

South West Corner of East Preserve Loop and Academy Street, Chino, California

| | |
|---|---|
| RMA Job No: | 20G-0406-0 |
| Report Date: | 8/2020 |
| Prepared By: | mbk |

RMA GeoScience




## DESCRIPTION OF MAP UNITS
### Partial Explanation

**MODERN SURFICIAL DEPOSITS**—Sediment recently transported and deposited in channels and washes, on surfaces of alluvial fans and alluvial plains, and on hillslopes. Soil-profile development is non-existent. Includes:

Qaf — **Artificial fill (late Holocene)**—Deposits of fill resulting from human construction or mining activities; restricted to three noncontiguous areas (1) south of 91 Freeway, (2) on Norco Navel Reservation, and (3) sand and gravel mining in Santa Ana River channel

Qw — **Very young wash deposits (Holocene)**—Deposits of active alluvium; confined to main channel of Santa Ana River. Consists mostly of unconsolidated sand and gravel in river channel. Sediment subject to localized reworking mainly during winter months.

**YOUNG SURFICIAL DEPOSITS**—Sedimentary units that are slightly consolidated to cemented and slightly to moderately dissected. Alluvial fan deposits (Qyf series) typically have high coarse:fine clast ratios. Younger surficial units have upper surfaces that are capped by slight to moderately developed pedogenic-soil profiles (A/C to A/AC/B/$C_{ox}$ profiles). Includes:

Qyw — **Young wash deposits (Holocene and late Pleistocene)**—Sand, gravel and boulder deposits.

Qyf — **Young alluvial fan deposits (Holocene and late Pleistocene)**—Gray-hued sand and cobble- and gravel-sand deposits derived from lithic diverse sedimentary units. Deposits north of Santa Ana River ($Qyf_a$) consist of gray-hued, unconsolidated, arkosic sand derived from varied metamorphic and granitic lithologies in San Gabriel and San Bernardino Mountains north and east of quadrangle. May contain lesser interdigitated sedimentary wedges from Peninsular Ranges sources to south. Unit shows slight coarsening toward mountains to north. South of Temescal Wash, unit is mostly cobble- to granule- sized gravel. Locally, young alluvial fan deposits are divided into subunits based on sequential terrace development and other factors; one such unit is found in quadrangle:

$Qyf_1$ — **Young alluvial fan deposits, Unit 1 (Holocene and late Pleistocene)**—Consists of pale-gray, unconsolidated, cobble- to granule- sized gravel. Restricted to single fan flanked by two younger Qyf fans in southern part of quadrangle. Forms older part of Qyf unit

Qya — **Young alluvial channel deposits (Holocene and late Pleistocene)**—Gray, unconsolidated alluvium consisting of medium- to fine-grained sand and lesser silt flooring Temescal Wash and several of its tributaries in the southwestern part of quadrangle. North of Santa Ana River, includes sediments in Mill Creek drainage

Qye — **Young colian deposits (Holocene and late Pleistocene)**—Sand dune deposits, inactive except for very minor amount of sediment movement during Santa Ana wind storms. Chiefly unconsolidated, moderately well sorted, fine- to medium-grained sand

**OLD SURFICIAL DEPOSITS**—Sedimentary units that are moderately consolidated and slightly to moderately dissected. Older surficial deposits have upper surfaces that are capped by moderately to well-developed pedogenic soils (A/AB/B/$C_{ox}$ profiles and Bt horizons as much as 1 to 2 m thick and maximum hues in the range of 10YR 5/4 and 6/4 through 7.5YR 6/4 to 4/4 and mature Bt horizons reaching 5YR 5/6). Includes:

Qow — **Old wash deposits (late to middle Pleistocene)**—Consists chiefly of sand. Gray to reddish-brown, unconsolidated to slightly indurated. Restricted to single occurrence flanking north side of Santa Ana River southwest of Mira Loma

Qof — **Old alluvial fan deposits (late to middle Pleistocene)**—Indurated, sandy alluvial fan deposits, except south of 91 Freeway in south-central part of quadrangle where unit is predominantly gravel. Covers extensive areas south of Santa Ana River, commonly at base of steep bedrock slopes. North of Santa Ana River, found in and east of Mira Loma. Most of unit is slightly to moderately dissected and reddish-brown. Some Qof includes thin, discontinuous surface layer of Holocene alluvial fan material. Includes:

$Qof_1$ — **Old alluvial fan deposits, Unit 1 (middle Pleistocene)**—Indurated, gravely alluvial fan deposits. Most are slightly to moderately dissected; reddish-brown. Some deposits include thin, discontinuous surface layer of Holocene alluvial fan material. In quadrangle, restricted to single 5 $km^2$ fan west of Corona

Qoa — **Old alluvial channel deposits (late to middle Pleistocene)**—Alluvial deposits consisting mainly of sand, but containing minor gravel and silt. Gray to reddish-brown, unconsolidated to indurated. Generally slightly dissected. Restricted to two isolated occurrences east and west of Mira Loma on north side of Santa Ana River

Qov — **Old alluvial valley deposits (late to middle Pleistocene)**—Fluvial deposits along valley floors. Consists of moderately indurated, commonly slightly dissected sandy alluvium, containing lesser silt, and clay-bearing alluvium. Some deposits include thin alluvial deposits of Holocene age. Restricted to area between La Sierra and Home Gardens in southeastern part of quadrangle

**VERY OLD SURFICIAL DEPOSITS**—Sediments that are slightly to well consolidated to indurated, and moderately to well dissected. Upper surfaces are capped by moderate to well developed pedogenic soils (A/AB/B/$C_{ox}$ profiles having Bt horizons as much as 2 to 3 m thick and maximum hues in the range 7.5YR 6/4 and 4/4 to 2.5YR 5/6)

Qvof — **Very old alluvial fan deposits (early Pleistocene)**—Mostly well-dissected, well-indurated, reddish-brown sand deposits. Commonly contains duripans and locally silcretes. Forms large area east of Norco generally flanking steep bedrock slopes. North of Santa Ana River, forms broad area that is part of fans emanating from Puente Hills west of quadrangle

Qvoa — **Very old alluvial channel deposits (early Pleistocene)**—Gravel, sand, and silt; reddish-brown, well-indurated, surfaces well-dissected. Underlies large area between Santa Ana River and Temescal Wash

QTn — **Late Cenozoic sedimentary rocks in Norco area (early Pleistocene to late Pliocene?)**—Moderately indurated sandstone, conglomeratic sandstone, and conglomerate. In Norco area, unit includes locally derived clasts as well as clasts derived from San Bernardino Mountains. Found in and west of Norco, on both sides of Santa Ana River

Tns — **Sandstone of Norco area (Pliocene)**—Poorly exposed, unnamed, marine sandstone. Forms isolated areas of outcrop south of Norco and north of Temescal Wash. Unconsolidated, greenish-yellow sandstone having sparse conglomerate lenses. Locally contains abundant, poorly preserved shallow marine fossils including *Anadara* cf. *A. trilineata* (Conrad), *Chione* sp., *Lucinoma* cf. *L. annulata* (Reeve), and *Diodora* sp. (J.D. Mount, per. commun., 1973). Unit may represent shallow-water eastward extension of Fernando Formation. Sparse conglomerate lenses include clasts of exotic silicic volcanic rocks. In places, ash of Taylor Canyon (per. commun., A.M. Sarna-Wojcicki, 1990) at base of formation is nonconformably buttressed against granitic rock. Ash deposited on granite are interpreted be tide pool deposits. Age of ash is 2.6 Ma

**Puente Formation (early Pliocene and Miocene)**—Marine sandstone, siltstone, and shale. Named by Eldrige and Arnold (1907) for exposures in Puente Hills. English (1926) extended distribution of Puente Formation to area south of Puente Hills, subdividing three units, from youngest to oldest, (1) shale, sandstone, and conglomerate (2) sandstone, and (3) shale. Daviess and Woodford (1949) subdivided Puente Formation in northwestern Puente Hills into four members, from youngest to oldest, (1) Sycamore Canyon Member, (2) upper siltstone ember, (3) sandstone member, and (4) lower siltstone member. Schoellhamer and others (1954) later designated formalized member names that are in current usage. Only Sycamore Canyon Member found in quadrangle; restricted to single locality in southwestern corner:

Tpsc — **Sycamore Canyon Member (early Pliocene and Miocene)**—Predominantly sandstone and pebble conglomerate. Sycamore Canyon Member is laterally variable, composed of varying amounts of pale gray, thick-bedded to massive, medium- to coarse-grained, friable sandstone; pale gray, thin-bedded, siliceous siltstone; pale gray, poorly bedded siltstone, and brownish-gray, massive conglomerate. Elsewhere contains bathyal depth foraminiferal fauna (Yerkes, 1972)

Tvs — **Vaqueros and Sespe Formations, undifferentiated (early Miocene, Oligocene, and late Eocene)**—Interbedded marine and nonmarine sandstone and conglomerate assigned to the Vaqueros and Sespe Formations. Occurs only in southwestern corner of quadrangle. In Santa Ana Mountains to southwest, marine fossil-bearing strata of Vaqueros Formation are bed-by-bed interlayered with nonmarine rocks of Sespe Formation to degree that formations cannot be mapped as separate units. Undifferentiated unit locally includes boulder conglomerate (Woodford and others, 1973)

Kmp — **Micropegmatite granite of Gavilan Ring Complex (Cretaceous)**—Fine-grained, pink-tinted, leucocratic granite having distinctive micropegmatitic texture. Restricted almost entirely to Corona North quadrangle. Forms elongate band of outcrops between Corona and Norco. Underlies about 3 $km^2$

Kmpc — **Micropegmatite and granodiorite of Cajalco pluton, undifferentiated (Cretaceous)**—Mixed unit of micropegmatite and massive granodiorite to monzogranite. Micropegmatite is fine grained and granodiorite to monzogranite is medium to coarse grained. Found southwest and southeast of Norco. Rocks probably related to, but not mapped as part of Cretaceous Cajalco pluton

Krg — **Granite of the Riverside area (Cretaceous)**—Medium- to coarse-grained, massive- to faintly-foliated, leucocratic biotite granite. Contains about 1 to 3 percent biotite. Inclusions are sparse or absent except locally in western part of body where granite contains 2 to 8 percent biotite and sparse to abundant inclusions of quartz diorite, granodiorite, and fine-grained mafic rock. At Mount Rubidoux, east of quadrangle, rocks contain sparse hypersthene and fayalitic olivine and moderately abundant equant inclusions of dark-gray fine-grained rock. Rock at Mount Rubidoux termed "fine leucogranite of Rubidoux Mountain" by Larsen (1948). Restricted to a single outcrop at east edge of quadrangle south of La Sierra Heights

1 — 1/2 — 0 — 1 MILE

1 — .5 — 0 — 1 KILOMETER

Ref: Morton, D.M. and Gray, C.H., 2002

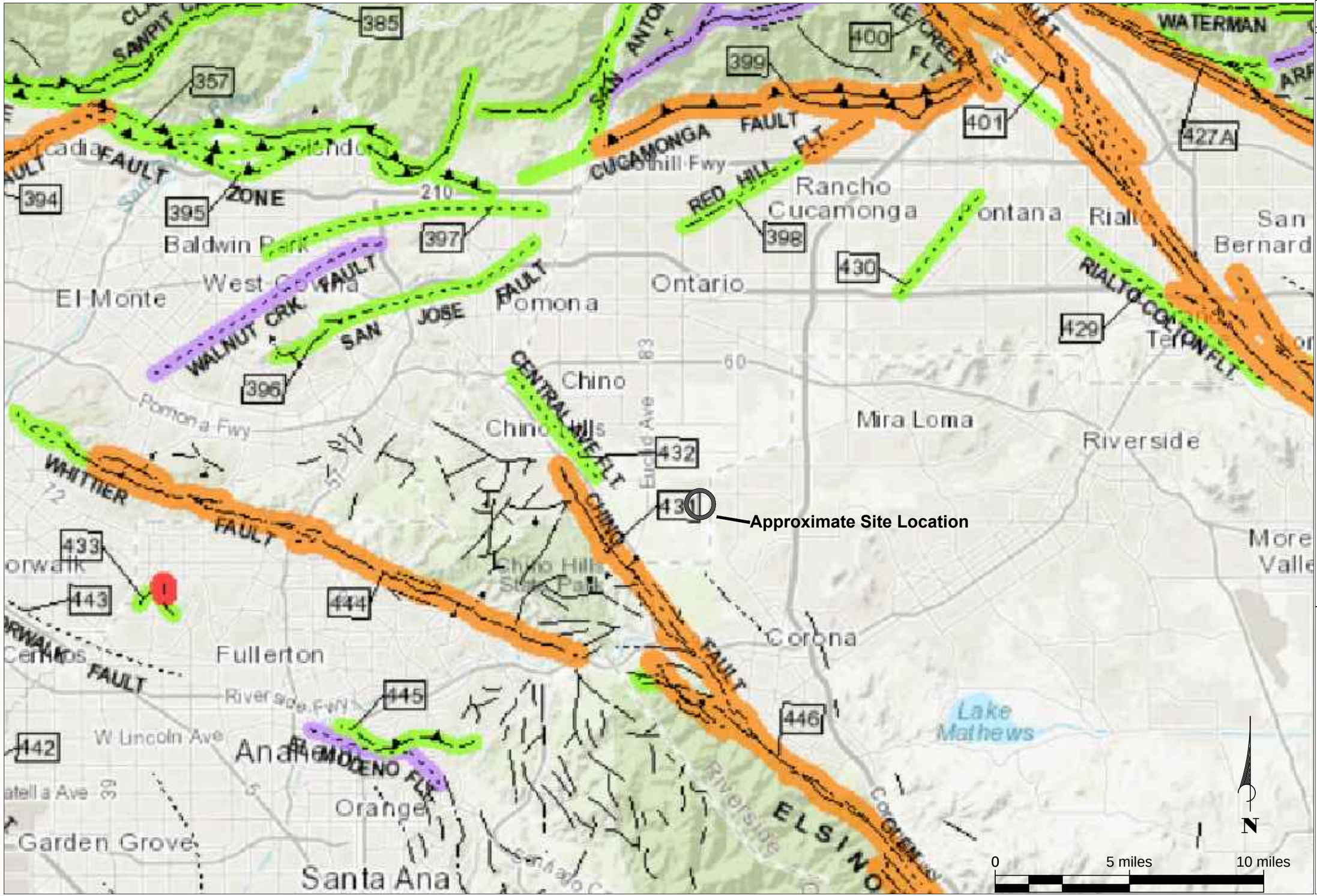
RMA GeoScience

# Regional Geology Map

South West Corner of East Preserve Loop and Academy Street, Chino, California

Figure 8

| | |
|---|---|
| RMA Job No: | 20G-0091-0 |
| Report Date: | 8/2020 |
| Prepared By: | mbk |




California Geological Survey, Geologic Data Map No. 6

Compilation and Interpretation by: Charles W. Jennings and William A. Bryant

Graphics by: Milind Patel, Ellen Sander, Jim Thompson, Barbara Wanish and Milton Fonseca

**SYMBOL EXPLANATION**

Fault traces on land are indicated by solid lines where well located, by dashed lines where approximately located or inferred, and by dotted lines where concealed by younger rocks or by lakes or bays. Fault traces are queried where continuation or existence is uncertain. All offshore faults based on seismic reflection profile records are shown as solid lines where well defined, dashed where inferred, queried where uncertain.

FAULT CLASSIFICATION COLOR CODE
(Indicating Recency of Movement)

Fault along which historic (last 200 years) displacement has occurred.

A triangle to the right or left of the date indicates termination point of observed surface displacement. Solid red triangle indicates known location of rupture termination point. Open black triangle indicates uncertain or estimated location of rupture termination point.

Date bracketed by triangles indicates local fault break.

No triangle by date indicates an intermediate point along faultbreak.

Fault that exhibits fault creep slippage. Hachures indicate linear extent of fault creep. Annotation (creep with leader) indicates representative locations where fault creep has been observed and recorded.

Square on fault indicates where fault creep slippage has occured that has been triggered by an earthquake on some other fault. Date of causative earthquake indicated. Squares to right and left of date indicate terminal points between which triggered creep slippage has occurred (creep either continuous or intermittent between these end points).

Holocene fault displacement (during past 11,700 years) without historic record.

Late Quaternary fault displacement (during past 700,000 years).

Quaternary fault (age undifferentiated).

Pre-Quaternary fault (older that 1.6 million years) or fault without recognized Quaternary displacement.

ADDITIONAL FAULT SYMBOLS

Bar and ball on downthrown side (relative or apparent).

Arrows along fault indicate relative or apparent direction of lateral movement.

Arrow on fault indicates direction of dip.

Low angle fault (barbs on upper plate).

OTHER SYMBOLS

Numbers refer to annotations listed in the appendices of the accompanying report.

Structural discontinuity (offshore) separating differing Neogene

RMA GeoScience

# Califonria Fault Activity Map

South West Corner of East Preserve Loop and Academy Street, Chino, California

Figure 9

| | |
|---|---|
| RMA Job No: | 20G-0406-0 |
| Report Date: | 8/2020 |
| Prepared By: | mbk |

**APPENDIX A**

**FIELD INVESTIGATION**

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# APPENDIX A

## FIELD INVESTIGATION

## A-1.00 FIELD EXPLORATION

### A-1.01 Number of Borings

Our subsurface investigation consisted of three (3) hollow stem boring auger to depths of up to 50 feet and eleven (11) test pits t dug with a backhoe to a maximum depth of 137 feet.

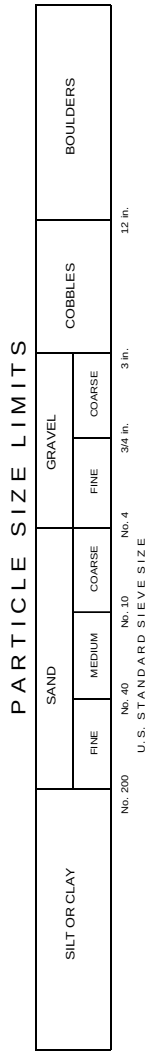
### A-1.02 Location of Borings/Test Pits

Geotechnical Maps showing the approximate locations of the boring are included in the map pocket of this report.

### A-1.03 Boring/Test Pit Logs

Logs of borings and test pits were prepared by one of our staff and are attached in this appendix. The logs contain factual information and interpretation of subsurface conditions between samples. The strata indicated on these logs represent the approximate boundary between earth units and the transition may be gradual. The logs show subsurface conditions at the dates and locations indicated, and may not be representative of subsurface conditions at other locations and times.

Identification of the soils encountered during the subsurface exploration was made using the field identification procedure of the Unified Soils Classification System (ASTM D2488). A legend indicating the symbols and definitions used in this classification system and a legend defining the terms used in describing the relative compaction, consistency or firmness of the soil are attached in this appendix. Bag samples of the major earth units were obtained for laboratory inspection and testing, and the in-place density of the various strata encountered in the exploration was determined




| MAJOR DIVISIONS | | | GROUP SYMBOLS | TYPICAL NAMES |
|---|---|---|---|---|
| COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size) | GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size. | CLEAN GRAVELS (Little or no fines) | GW | Well graded gravel, gravel-sand mixtures. little or no fines. |
| | | | GP | Poorly graded gravel or gravel-sand mixtures, little or no fines. |
| | | GRAVELS WITH FINES (Appreciable amt. of fines) | GM | Silty gravels, gravel-sand-silt mixtures. |
| | | | GC | Clayey gravels, gravel-sand-clay mixtures. |
| | SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size) | CLEAN SANDS (Little or no fines) | SW | Well graded sands, gravelly sands, little or no fines. |
| | | | SP | Poorly graded sands or gravelly sands, little or no fines. |
| | | SANDS WITH FINES (Appreciable amount of fines) | SM | Silty sands, sand-silt mixtures. |
| | | | SC | Clayey sands, sand-clay mixtures. |
| FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size) | SILTS AND CLAYS (Liquid limit LESS than 50) | | ML | Inorganic silts and very fine sands, rock flour silty or clayey fine sands or clayey silts with slight plasticity |
| | | | CL | Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays. |
| | | | OL | Organic silts and organic silty clays of low plasticity. |
| | SILTS AND CLAYS (Liquid limit GREATER than 50) | | MH | Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts. |
| | | | CH | Inorganic clays of high plasticity, fat clays. |
| | | | OH | Organic clays of medium to high plasticity, organic silts. |
| HIGHLY ORGANIC SOILS | | | Pt | Peat and other highly organic soils. |

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

**UNIFIED SOIL CLASSIFICATION SYSTEM**

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## I. SOIL STRENGTH/DENSITY

### BASED ON STANDARD PENETRATION TESTS

| Compactness of sand | | Consistency of clay | |
|---|---|---|---|
| Penetration Resistance N (blows/Ft) | Compactness | Penetration Resistance N (blows/ft) | Consistency |
| 0-4 | Very Loose | <2 | Very Soft |
| 4-10 | Loose | 2-4 | Soft |
| 10-30 | Medium Dense | 4-8 | Medium Stiff |
| 30-50 | Dense | 8-15 | Stiff |
| >50 | Very Dense | 15-30 | Very Stiff |
| | | >30 | Hard |

N = Number of blows of 140 lb. weight falling 30 in. to drive 2-in OD sampler 1 ft.

### BASED ON RELATIVE COMPACTION

| Compactness of sand | | Consistency of clay | |
|---|---|---|---|
| % Compaction | Compactness | % Compaction | Consistency |
| <75 | Loose | <80 | Soft |
| 75-83 | Medium Dense | 80-85 | Medium Stiff |
| 83-90 | Dense | 85-90 | Stiff |
| >90 | Very Dense | >90 | Very Stiff |

## II. SOIL MOISTURE

| Moisture of sands | | Moisture of clays | |
|---|---|---|---|
| % Moisture | Description | % Moisture | Description |
| <5% | Dry | <12% | Dry |
| 5-12% | Moist | 12-20% | Moist |
| >12% | Very Moist | >20% | Very Moist, wet |

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**TEST PIT AND BORING LOGS**

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# BORING NUMBER 1



Client: Lewis Management Corp.

Project Name: Chino Rental Neighborhoods - The Preserve

Project Number: 20G-0406-0

Project Location: The Preservein Chino, California

Date Started: 7/23/2020 Completed: 7/23/2020

Ground Elevation: 587.8 ft Boring Diameter: 9"

Excavation Method: Hollow Stem Auger

Ground Water Levels: 44.5 feet (543.0 elev.)

Drilling Contractor: 2R Drilling Inc. (Evan and Cameron)

Notes: 140 lb Auto Hammer with 30" drop

Logged By: mbk Checked By: hl

| Depth (ft) | Drive Sample | Blow Count (N Value) | Bulk Sample | Moisture Content (%) | Dry Unit Weight (pcf) | Wet Unit Weight (pcf) | Liquid Limit | Plastic Limit | Plasticity Index | Material Description | <#200 | $D_{50}$ | USCS Classification |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | **Artificial Fill (af):** Very light brown gray fine Sandy SILT with trace Gravel, roots and rootlets, porous, dry to slightly moist, medium stiff. | | | ML |
| | | | | | | | | | | @ 3 feet, moderate olive gray SILT with trace Gravel, white caliche along | | | |
| | | 4,7,8 | | 20.4 | | | | | | root pathways oriented in every direction, minor porous, dry to slightly moist medium stiff | | | ML |
| 5 | | 4,7,10 | | 20.2 | | | | | | @ 5 feet, same as above, dry to slightly moist, medium stiff | | | ML |
| | | | | | | | | | | **Agricultural Fill/Topsoil (af) (580.7 Elev.):** Dark yellow brown fine Silty SAND | | | SM |
| | | 7,7,7 | | 16.0 | | | | | | with minor organics, porous, dry to slightly moist, medium dense | | | |
| | | | | | | | | | | **Very Old Alluvium Fan Deposits (Qvola)(580.*):** Medium yellow brown fine | 73.1 | | ML |
| 10 | | | | | | | | | | Sandy SILT with vertical rootlet casts, slightly porous, dry to slightly moist, medium stiff | | | |
| | | 11,15,21 | | 16.8 | | 125.2 | | | | @ 11 feet, very light brown SILT with minor rootlet pathways, slightly porous, moist, medium stiff | | | ML |
| | | 3,12,9 | | 19.1 | | | | | | @ 12.5 feet, same as above, slightly moist, medium stiff | | | ML |
| 15 | | 5,10,15 | | 17.4 | 108.1 | 126.9 | | | | @ 15 feet, same as above, Sandy SILT with abundant calcium carbonate nodules up to 3/4 inch diameter, slightly moist, medium dense | 55.0 | | ML |
| | | | | | | | | | | | 47.1 | | |
| | | 4,6,8 | | 30.0 | | | | | | @ 17.5 feet, same as above, moist, medium stiff | | | ML |
| 20 | | 3,5,6 | | | | | | | | @ 20 feet, same as above, Sandy Silt with clay | | | ML |
| | | | | 34.0 | 83.8 | 112.4 | | | | and abundant calcium carbonate filled roots pathways up to 3/8 diameter x 1.5 inches, slightly micaceous, moist, medium stiff | | | |
| | | 1,1,1 | | 28.7 | | | | | | @ 22.5 feet, same as above, less calcium carbonate then above, minor black charcoal flecks 1-2 millimeters diameter, moist, soft | 85.7 | | ML |
| 25 | | 3,6,1 | | 25.5 | 95.6 | 120.0 | | | | @ 25 feet, same as above, increase in calcium carbonate nodules and root casts, minor pores, moist, medium stiff | | | ML |
| | | 3,4,7 | | 28.4 | | | | | | @ 27.5 feet, same as above, mottled light olve gray and orange gray iron oxide staining, minor black charcoal flecks, slightly moist, stiff | | | ML |
| 30 | | 5,12,13 | | 28.4 | 93.6 | 120.2 | | | | @ 30 feet, same as above, mottled, charcoal flecks, slightly moist, stiff | | | ML |
| | | | | | | | | | | @ 32.5 feet, same as above with layers of fine to medium Silty SAND slighlty | | | |
| | | 8,5,12 | | 19.4 | | | | | | moist, very stiff | 47.3 | | |
| | | | | | | | | | | Light yellow gray with orange iron oxide staining, fine to medium Silty | | | ML&SM |
| | | | | | | | | | | SAND with fine Gravel, slightly moist, medium dense | | | SM |

Material Description

Thin Wall Tube | 2.5" Ring Sample | Bulk Sample | Standard Split Spoon Sample | Static Water Table

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# BORING NUMBER 1



Client: Lewis Management Corp.
Project Name: Chino Rental Neighborhoods - The Preserve
Project Number: 20G-0406-0
Project Location: The Preserve in Chino, Califonria
Date Started: 7/23/2020 Completed 7/23/2020
Ground Elevation: 587.8 ft. Boring Diameter: 9"
Excavation Method: Hollow Stem Auger
Ground Water Levels: 44.5 feet (543.0 elev.)
Drilling Contractor: 2R Drilling Inc. (Evan and Cameron)
Notes: 140 lb Auto Hammer with 30" drop
Logged By: mbk Checked By: hi

| Depth (ft) | Drive Sample | Blow Count (N Value) | Bulk Sample | Moisture Content (%) | Dry Unit Weight (pcf) | Wet Unit Weight (pcf) | Liquid Limit | Plastic Limit | Plasticity Index | Material Description | <#200 | $D_{50}$ | USCS Classification |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Thin Wall Tube; 2.5" Ring Sample; Bulk Sample; Standard Split Spoon Sample; Static Water Table | | | |
| | ☒ | 19,21,50 | | 11.7 | 122.4 | 136.7 | | | | @ 35 feet, very light yellow gray with orange iron oxide staining fine to coarse Silty SAND with minor fine Gravel, slightly moist, dense | | | SM |
| | ▭ | 16,24,39 | | 8.9 | | | | | | @ 37.5 feet, very light yellowish gray Gravelly SAND with Silt, friable, slightly moist, dense | | | SW |
| 40 | ☒ | 17,50/6" | | 8.1 | 122.3 | 132.3 | | | | @ 40 feet, same as above with Clay, slightly moist, dense | | | SW |
| | ▭ | 18,29,35 | | 12.2 | | | | | | @ 42.5 feet, light orange gray fine to medium SAND with Silt, wet, dense | | | SP |
| 45 | ☒ | 50/5" | | 10.7 | 113.0 | 125.1 | | | | @ 45 feet, light orange gray fine to coarse Gravelly SAND with minor Silt and fine Silty SAND layers, wet, dense | | | SW& SM |
| | ▭ | 45,50/3" | | 15.1 | | | | | | @ 47.5 feet, Light orange gray and light yellow gray thin beds of fine to coarse SAND, Silty SAND and Gravelly SAND, wet, dense | 13 | | SW & SM |
| 50 | ☒ | 5,50/5" | | 14.1 | 113.5 | 124.6 | | | | Very light yellow gray and orange iron oxide staining fine to medium SAND with Gravel and Silt and fine to coarse Silty SAND with Gravel, wet, dense | | | SW& SM |
| 55 | | | | | | | | | | **Total Depth 51.5 feet**<br>**Backfilled 7/23/20 with cuttings**<br>**Groundwater at 44.5'** | | | |
| 60 | | | | | | | | | | | | | |
| 65 | | | | | | | | | | | | | |

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# BORING NUMBER 2



Client: Lewis Management Corp.
Project Name: Chino Rental Neighborhoods - The Preserve
Project Number: 20G-0406-0
Project Location: The Preserve in Chino, California
Date Started: 7/23/2020 Completed: 7/23/2020
Ground Elevation: 584.0 ft. Boring Diameter: 9"
Excavation Method: Hollow Stem Auger
Ground Water Levels: Not Encountered
Drilling Contractor: 2R Drilling Inc. (Evan and Cameron)
Notes: 140 lb Auto Hammer with 30" drop
Logged By: mbk Checked By: hl

| Depth (ft) | Drive Sample | Blow Count (N Value) | Bulk Sample | Moisture Content (%) | Dry Unit Weight (pcf) | Wet Unit Weight (pcf) | Liquid Limit | Plastic Limit | Plasticity Index | Material Description | <#200 | $D_{50}$ | USCS Classification |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | **Artificial Fill (af):** Very light gray fine Sandy SILT with import Gravel, dry to slightly moist, medium dense | | | ML |
| | | 7,10,11 | | 11.2 | | | | | | @ 3 feet, very light grfay fine Silty SAND with Gravel, slighlty moist, dense | | | SM |
| 5 | | 8,9,10 | | 9.0 | | | | | | @ 5 feet, very light orange gray fine Silty SAND and fine to coarse Silty SAND with Gravel chunks, calcium carbonate nodules, dry to slightly moist, dense | | | SM |
| | | 4,19,27 | | 6.8 | 107.6 | 114.9 | | | | **Very Old Alluvium Fan Deposits (Qvola)(577 Elev.):** Very light orange medium SAND with Silt and minor Gravel, minor orange iron oxide layers in places, friable, slightly moist, dense | | | SW |
| 10 | | 8,16,19 | | 5.0 | | | | | | @ 10 ft., same as above, Gravelly fine to coarse SAND with Silt, slightly moist, dense | | | SW |
| | | 20,50/3" | | 1.7 | 121.9 | 124.1 | | | | @ 12.5 feet., same as above, dry to slightly moist, dense | | | SW |
| 15 | | 21,25,50/3" | | 4.7 | | | | | | @ 15 feet., same as above, dry to slighlty moist, dense | | | SW |
| | | 43,50/2.5" | | 21.9 | 101.7 | 124.0 | | | | 17.5 feet., same as above with thin layers of fine to medium SAND with Silt, friable, slightly moist, dense | | | SW |
| 20 | | 20,21,23 | | 6.3 | | | | | | @ 20 feet, same as above, slighlty moist, medium dense | | | SW |
| | | 17,48,50/4" | | 4.3 | 114.1 | 119.0 | | | | 22.5 feet, same as above with thin beds of fine to medium SAND with Silt, and fine to coarse SAND with Silt, friable, slightly moist, dense | | | SW |
| 25 | | 13,18,24 | | 3.9 | | | | | | @ 25 feet, same as above, decrease in fine to coarse SAND beds, dry to slightly moist, medium dense | | | SW |
| | | 7,20,22 | | 21.4 | 101.7 | 124.0 | | | | @ 27.5 feet, light olive gray fine SAND with Silt and fine Silty SAND with trace Gravel, micaceous and olive gray fine Sandy SILT and SILT, micaceous, thin interbeds, slightly moist, medium dense or stiff | | | SP,SM & ML |
| 30 | | 5,9,12 | | 27.2 | | | | | | @ 30 feet, olive gray fine Sandy SILT to SILT with depth, micaceous, calcium carbonate along root pathways, Gravel @ 31', slightly moist, very stiff | | | ML |
| | | 8,12,42 | | 24.3 | 104.6 | 130.0 | | | | @ 32.5 feet,same as above with layer of fine Clayey SAND, micaceous, millimeters diameter, black charcoal flecks 1-2, slightly moist, hard | | | ML& SC |

Material Description
Thin Wall Tube
2.5" Ring Sample
Bulk Sample
Standard Split Spoon Sample
Static Water Table

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# BORING NUMBER 2



Client: Lewis Management Corp.

Project Name: Chino Rental Neighborhoods - The Preserve

Project Number: 20G-0406-0

Project Location: The Preserve in Chino, California

Date Started: 7/23/2020 Completed: 7/23/2020

Ground Elevation: 584.0 ft. Boring Diameter: 9"

Excavation Method: Hollow Stem Auger

Ground Water Levels: Not Encountered

Drilling Contractor: 2R Drilling Inc. (Evan and Cameron)

Notes: 140 lb Auto Hammer with 30" drop

Logged By: mbk Checked By: hi

| Depth (ft) | Drive Sample | Blow Count (N Value) | Bulk Sample | Moisture Content (%) | Dry Unit Weight (pcf) | Wet Unit Weight (pcf) | Liquid Limit | Plastic Limit | Plasticity Index | Material Description | <#200 | $D_{50}$ | USCS Classification |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Thin Wall Tube; 2.5" Ring Sample; Bulk Sample; Standard Split Spoon Sample; Static Water Table | | | |
| | | 5,8,11 | | 29.9 | | | | | | @ 35 feet, same as above, olive gray SILT, micaceous, black charcoal flecks, 1-2 millimeters diameter, slightly moist, stiff | | | ML |
| | | 6,18/50" | | 21.1 | 104.1 | 126.0 | | | | @ 37.5 feet, same as above and Clayey SAND layers, abundant calcium carbonate along root pathways, slightly moist, hard | | | ML& SC |
| 40 | | 7,10,16 | | 18.0 | | | | | | @ 40 feet, same as above, slightly moist, very stiff | | | ML |
| | | 16,48,50/3" | | 20.3 | 108 | 129.3 | | | | @ 42.5 feet, same as above and fine Silty SAND layers, slightly moist, hard | | | M |
| 45 | | | | | | | | | | | | | ML |
| | | 4,18,23 | | 17.1 | | | | | | @ 45 feet, same as above, slighlty moist, hard | | | SM |
| | | 16,46,50/3" | | 15.5 | 115 | 133.2 | | | | @ 45.25 feet, very light olive gray and orange gray iron oxide stains fine Silty SAND, micaceous, slightly moist, medium dense | | | SM |
| | | | | | | | | | | @ 47.5 feet, same as above, slightly moist, very dense | | | ML |
| 50 | | 10,17,24 | | 14.3 | | | | | | @ 48.5 feet, light olive gray SILT, slightly moist, hard<br>@ 50 feet, very light olive gray fine Silty SAND, micaeous, with orange iron oxide staining in places, thin laminations of dark gray, heavy minerals through out, slightly moist, medium dense | | | SM |
| 55 | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | |
| 65 | | | | | | | | | | | | | |

**Total Depth Drilled 51.5 feet**

**Backfilled 7/23/20 with cuttings**

**No Groundwater Encountered**

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# BORING NUMBER 3



Client: Lewis Management Corp.
Project Name: Chino Rental Neighborhoods - The Preserve
Project Number: 20G-0406-0
Project Location: Chino Preserve, California
Date Started: 7/23/2020 Completed 7/23/2020
Ground Elevation: 596.5 ft. Boring Diameter: 9"
Excavation Method: Hollow Stem Auger
Ground Water Levels: Not Encountered
Drilling Contractor: 2R Drilling Inc. (Evan and Cameron)
Notes: 140 lb Auto Hammer with 30" drop
Logged By: mbk Checked By: hl

| Depth (ft) | Drive Sample | Blow Count (N Value) | Bulk Sample | Moisture Content (%) | Dry Unit Weight (pcf) | Wet Unit Weight (pcf) | Liquid Limit | Plastic Limit | Plasticity Index | Material Description | <#200 | $D_{50}$ | USCS Classification |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | **Artificial Fill (af):** Light olive gray fine SILT with minor Gravel, roots, dry to slightly moist, intact, loose | | | ML |
| 5 | | 5,6,5 | | 25.1 | | | | | | @ 5 feet, Light brown gray SILT with irregular oriented calcium carbonate filled root and rootlet pathways, slightly porous, slightly moist, stiff | | | ML |
| 10 | | 10,12,19 | | 9.2 | | | | | | @ 10 feet, mottled medium brown with orange brown iron oxide staining, SILT and Sandy SILT chunks, dry to slightly moist, hard | | | ML |
| 15 | | 7,9,15 | | 21.0 | | | | | | @ 15 feet, dark yellow brown fine Silty SAND with minor chunks of light gray brown SILT, dry to slightly moist, medium dense or very stiff | | | SM |
| | | | | | | | | | | **Very Old Alluvium Fan Deposits (Qvola)(578.5 Elev.):** Light yellow gray SILT with calcium carbonate nodules and filled root pathways, slightly porous, dry to slightly moist, very stiff | | | ML |
| 20 | | 15,17,17 | | 16.6 | 100.7 | 117.4 | | | | | | | |
| | | 32,16,10 | | 9,2 | | | | | | @ 22.5 feet, same as above, with 9 inch layer of calcium carbonate rich nodules, dry to slightly moist, very stiff | | | ML |
| 25 | | 7,10,15 | | | | | | | | @ 25 feet, same as above, slightly moist, very stiff | | | ML |
| | | | | 16.0 | 103.8 | 120.4 | | | | | | | |
| | | 6,6,6 | | 27.4 | | | | | | @ 27.5 feet, same as above, slighlty moist, stiff | | | ML |
| 30 | | 6,11,14 | | 25.6 | 100.6 | 126.4 | | | | @ 30 feet, same as above, 3/4 inch calcium carbonate nodules, slighlty moist, very stiff | | | ML |
| | | 3,5,7 | | 27.0 | | | | | | @ 32.5 feet, same as above, slightly moist, stiff | | | ML |

Material Description: Thin Wall Tube; 2.5" Ring Sample; Bulk Sample; Standard Split Spoon Sample; Static Water Table

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BORING NUMBER 3



Client: Lewis Management Corp.

Project Name: Chino Rental Neighborhoods - The Preserve

Project Number: 20G-0406-0

Project Location: The Preserve in Chino, Californiia

Date Started: 7/23/2020 Completed: 7/23/2020

Ground Elevation: 596.5 ft. Boring Diameter: 9"

Excavation Method: Hollow Stem Auger

Ground Water Levels: Not Encountered

Drilling Contractor: 2R Drilling Inc. (Evan and Cameron)

Notes: 140 lb Auto Hammer with 30" drop

Logged By: mbk Checked By: hi

| Depth (ft) | Drive Sample | Blow Count (N Value) | Bulk Sample | Moisture Content (%) | Dry Unit Weight (pcf) | Wet Unit Weight (pcf) | Liquid Limit | Plastic Limit | Plasticity Index | Material Description | <#200 | $D_{50}$ | USCS Classification |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Thin Wall Tube; 2.5" Ring Sample; Bulk Sample; Standard Split Spoon Sample; Static Water Table | | | |
| | | 12,32,50/6" | | 6.6 | 99.5 | 106.1 | | | | @ 35 feet, light yellow gray and orange iron oxide staining, fine to medium Silty SAND and fine to coarse Silty SAND interbeds, slightly moist, very dense | | | SM |
| | | 9,15,17 | | 10.8 | | | | | | @ 37.5 feet, interbedded light yellow gray, light orange gray fine SAND with Grav and fine to coarse Silty SAND with Gravel, slightly moist, dense | | | SW/SM |
| 40 | | 8,15,21 | | 32.6 | 90.4 | 124.4 | | | | @ 40 feet, same as above, slighlty moist, dense | | | SW/SM |
| | | 6,9,13 | | 24.5 | | | | | | @ 40.75 feet, light yellow gray fine Silty SAND, micaceous, with black charcoal flecks 1-2, millimeters diameter, dry to slightly moist, medium dense | | | SM |
| | | | | | | | | | | @ 42.5 feet, same as above and thin beds of Sandy SILT, micaceous, slighlty moist, medium dense and very stiff | | | SM&ML |
| 45 | | 19,32,50/3" | | 19.3 | 111.0 | 132.4 | | | | @ 45 feet, very light yellow gray and orange iron oxide stains, fine Silty SAND, moist, very dense | | | SM |
| | | 12,28.40 | | 14.8 | | | | | | @ 47.5 feet, Very light yellow gray fine to coarse SAND with Gravel and interbeds fine SAND, dry to slightly moist, dense | | | SW |
| 50 | | 30,50/3" | | 9.5 | 102.5 | 112.3 | | | | @ 50 feet, very light yellow gray fine to coarse SAND with Gravel, moist, dense | | | SW |
| 55 | | | | | | | | | | **Total Depth 51.5 feet**<br>**No Groundwater Encountered**<br>**Backfilled 7/23/20 with cuttings** | | | |
| 60 | | | | | | | | | | | | | |
| 65 | | | | | | | | | | | | | |

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# Exploratory Boring Log

**Boring No. B-3**

Sheet 1 of 2

| | | | |
|---|---|---|---|
| Date Drilled: | 4-29-04 | Drilling Equipment: | CME -55 |
| Logged By: | 520 DKR | Boring Hole Diameter: | 8" |
| Location: | See Plot Plan | Drive Weights: | 140 lbs. |
| Elevation (ft): | 582.5 | Drop: | 30" |

| Depth (ft) | Samples: Sample Type | Samples: Blows (blows/ft) | Samples: Bulk Sample | Moisture Content (%) | Dry Density (pcf) | USCS | Graphic Symbol | Material Description |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | This log contains factual information and interpretation of the subsurface conditions between the samples. The stratum indicated on this log represent the approximate boundary between earth units and the transition may be gradual. The log show subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times. |
| | R | 61 | | 16.7 | 113.1 | ML | | Older Alluvium (Qoa): Brown silt: fine grained, moist, slightly porous (pin-hole size pore spaces), non-cohesive to slightly cohesive, medium dense. |
| | | | | | | ML | | Light brown silt: fine grained, moist, non-porous, trace of small carbonate nodules, dense. |
| 5 | R | 30 | | 19.1 | 98.7 | CL | | Light brown silty clay: fine grained, moist, moderately cohesive to cohesive, non-porous, stiff. |
| 10 | R | 23 | | 23.2 | 101.1 | | | Becomes brown in color with a slight increase in silt content. |
| | | | | | | ML | | Brown clayey silt: fine grained, moist, non-porous, moderately cohesive, dense. |
| 15 | R | 22 | | 17.9 | 107.4 | | | |
| | | | | | | SM | | Mottled brown, grayish-brown and reddish brown silty sand: fine to medium sand with a trace of clay, moist, non-porous, non-cohesive to slightly cohesive, dense. |
| 20 | R | 52 | | 14.3 | 118.6 | | | |
| 25 | S | 14 | | 23.8 | | | | Becomes light brown to medium brown in color. |

Sample Types:

R - Ring Sample  - Bulk Sample

T - Tube Sample  S - SPT Sample

Geologic Attitudes:

B - Bedding  C - Contact

J - Joint  F - Fault

S - Shear

- Groundwater

- End of Boring

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# Exploratory Boring Log

**Boring No. B-3**
Sheet 2 of 2

| | | | |
|---|---|---|---|
| Date Drilled: | 4-29-04 | Drilling Equipment: | CME -55 |
| Logged By: | 520 DKR | Boring Hole Diameter: | 8" |
| Location: | See Plot Plan | Drive Weights: | 140 lbs. |
| Elevation (ft): | 582.5 | Drop: | 30" |

| Depth (ft) | Sample Type | Blows (blows/ft) | Bulk Sample | Moisture Content (%) | Dry Density (pcf) | USCS | Graphic Symbol | Material Description |
|---|---|---|---|---|---|---|---|---|
| | S | 25 | | 15.2 | | CL | | Light brown to medium brown silty sand: continued. |
| 35 | S | 29 | | 27.0 | | | | At 35 feet in a thin reddish-brown fine to coarse sand layer with minor fine gravel.<br>At 36 feet is a thin brown silt layer. |
| 40 | S | 17 | | 23.8 | | | | |
| | | | | | | CL | | Light brown sandy clay with a trace of gravel: fine to coarse sand, moist, cohesive, stiff to very stiff. |
| 45 | S | 29 | | 16.2 | | | | |
| | | | | | | SC | | Light brown clayey sand: fine to medium grained, moist, dense. |
| 50 | S | 28 | | 14.2 | | | | Total depth 52 feet<br>No ground water encountered<br>Moderate drilling<br>Hole backfilled |

Sample Types:
R - Ring Sample
Bulk Sample
T - Tube Sample
S - SPT Sample

Geologic Attitudes:
B - Bedding
C - Contact
J - Joint
F - Fault
S - Shear

- Groundwater
- End of Boring

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# Exploratory Boring Log

**Boring No. B-6**

Sheet 1 of 2

| | | | |
|---|---|---|---|
| Date Drilled: | 4-30-04 | Drilling Equipment: | CME -55 |
| Logged By: | 520 CAX | Boring Hole Diameter: | 8" |
| Location: | See Plot Plan | Drive Weights: | 140 lbs. |
| Elevation (ft): | 573 | Drop: | 30" |

| Depth (ft) | Samples: Sample Type | Samples: Blows (blows/ft) | Samples: Bulk Sample | Moisture Content (%) | Dry Density (pcf) | USCS | Graphic Symbol | Material Description |
|---|---|---|---|---|---|---|---|---|
| | | | | | | SM | | Artificial fill (afu): Brown silty sand: fine grained with a trace of fine gravel, moist. |
| | | | | | | ML | | Older Alluvium (Qoa): Brown to grayish brown silt: fine grained, slightly moist to moist, non-porous, non-cohesive to slightly cohesive, medium dense. |
| | R | 18 | | 30.1 | 80.5 | | | |
| 5 | | | | | | CL | | Brown silty clay: fine grained, moist, moderately cohesive to cohesive, non-porous, stiff. |
| | R | 17 | | 23.6 | 99.9 | | | |
| 10 | | | | | | | | |
| | R | 17 | | 24.4 | 101.0 | | | Becomes greenish-brown to brown in color with a decrease in silt content. |
| 15 | | | | | | | | |
| | R | 12 | | 41.5 | 77.9 | | | Brown in color. |
| 20 | | | | | | | | |
| | R | 9 | | 40.0 | 82.0 | | | |
| 25 | | | | | | | | |
| | S | 12 | | 12.4 | | | | |

Material Description

This log contains factual information and interpretation of the subsurface conditions between the samples. The stratum indicated on this log represent the approximate boundary between earth units and the transition may be gradual. The log show subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times.

Sample Types:

[R] - Ring Sample [ ] - Bulk Sample

[T] - Tube Sample [S] - SPT Sample

Geologic Attitudes:

B - Bedding C - Contact

J - Joint F - Fault

S - Shear

- Groundwater

- End of Boring

RMA Group

# Exploratory Boring Log

**Boring No. B-6**
Sheet 2 of 2

| | | | |
|---|---|---|---|
| Date Drilled: | 4-30-04 | Drilling Equipment: | CME -55 |
| Logged By: | 520 CAX | Boring Hole Diameter: | 8" |
| Location: | See Plot Plan | Drive Weights: | 140 lbs. |
| Elevation (ft): | 573 | Drop: | 30" |

| Depth (ft) | Sample Type | Blows (blows/ft) | Bulk Sample | Moisture Content (%) | Dry Density (pcf) | USCS | Graphic Symbol | Material Description |
|---|---|---|---|---|---|---|---|---|
| | | | | | | SC | | Light brown clayey sand: fine to coarse grained, moist, slightly cohesive, dense. |
| | S | 11 | | 21.9 | | | | |
| 35 | | | | | | CL | | Reddish-brown clay with a trace of fine sand and gravel: fine grained, moist, moderately cohesive, non-porous, stiff. |
| | S | 14 | | 19.2 | | | | |
| 40 | | | | | | | | Increase in moisture content. |
| | S | 24 | | 14.6 | | | | Increase in gravel content, slight increase in density. |
| 45 | | | | | | CL | | Grayish-brown silty clay: fine grained with trace of carbonate nodules and occasional gravel, moist, non-porous, cohesive, stiff. |
| | S | 23 | | 14.9 | | | | |
| 50 | | | | | | | | Total depth 49 feet<br>No ground water<br>Moderate drilling<br>Hole backfilled |

Material Description

This log contains factual information and interpretation of the subsurface conditions between the samples. The stratum indicated on this log represent the approximate boundary between earth units and the transition may be gradual. The log show subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times.

Sample Types:
R - Ring Sample
Bulk Sample
T - Tube Sample
S - SPT Sample

Geologic Attitudes:
B - Bedding
C - Contact
J - Joint
F - Fault
S - Shear

- Groundwater
- End of Boring

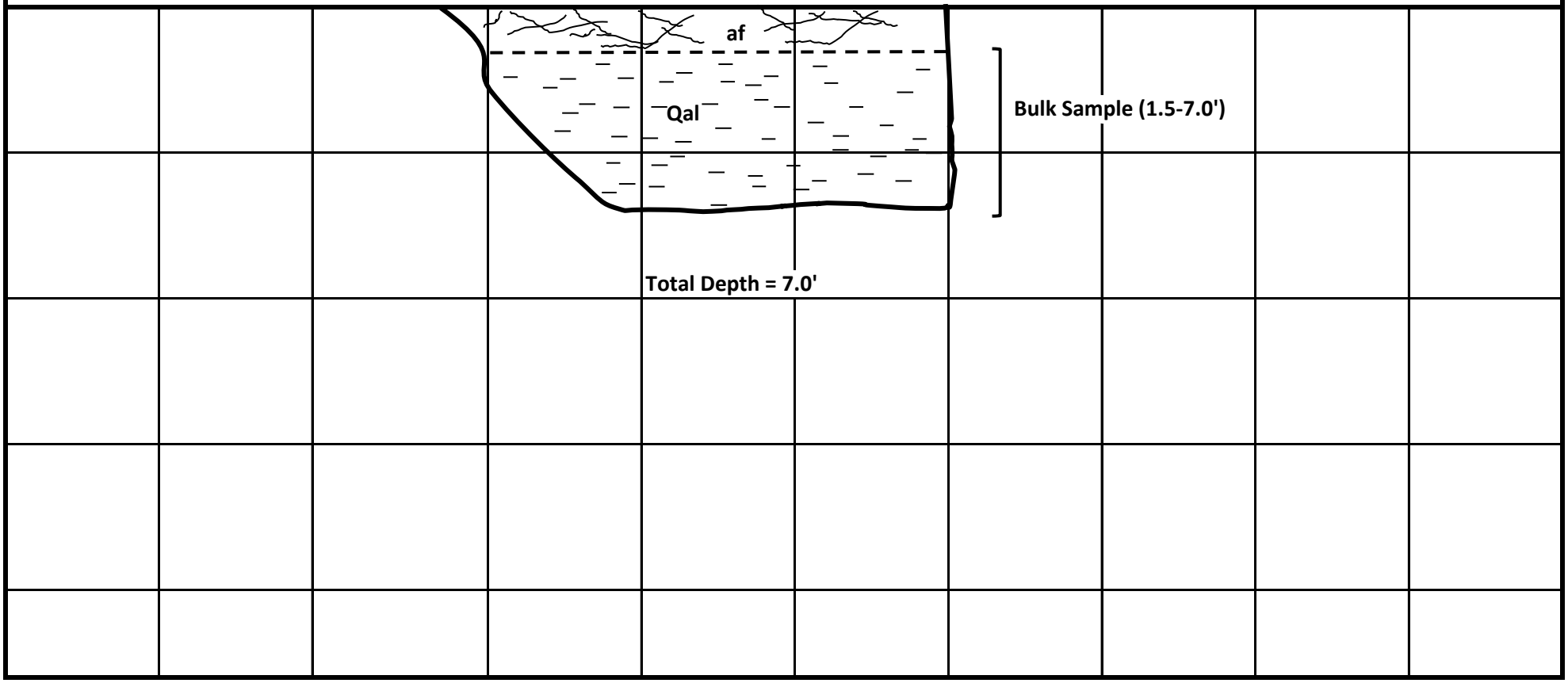
# Log of Exploratory Test Pit

Project Name: The Preserve (Chino, CA)
Project No: 20G-406-0
Equipment: Case 580 Super N Backhoe (36" Bucket)
Logged By: JAR Elevation: 571 (ft)

Test Pit Number: 1 Date: July 20, 2020
Location: Bottom of Basin located approx. to North P/L
Notes: Bulk Sample: (1.5-7.0') [**20-227-M]**
7' x15'x 3' Trench oriented N-S

| USCS | Material Description |
|---|---|
| SM | 0-1.5' **Artificial Fill (Af):** v. light gray to brown silty **SAND**, roots in top 6.0 inches, slightly moist, loose but intact. |
| ML | 1.5-7.0' **Quaternary Alluvium (Qal):** light yellow to gray brown **SILT**, porous with root casts and rootlets, slightly moist, medium stiff. |

1 inch = 5 foot



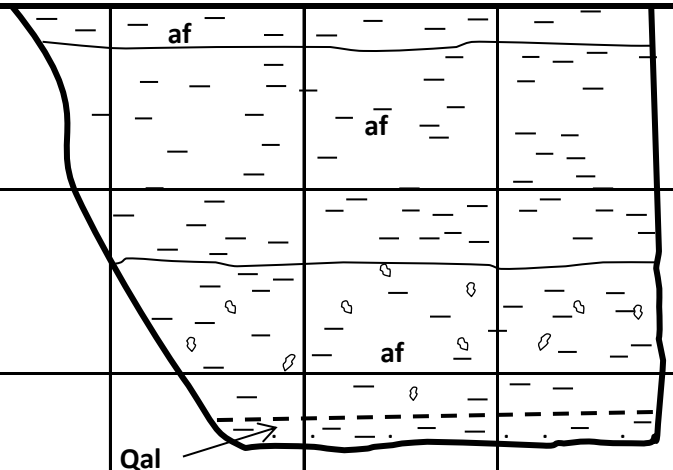
# Log of Exploratory Test Pit

Project Name: The Preserve (Chino, CA)
Project No: 20G-406-0
Equipment: Case 580 Super N Backhoe (36" Bucket)
Logged By: JAR Elevation: 587.4 (ft)

Test Pit Number: 2 Date: July 20, 2020
Location:
Notes: 12' x15'x 3' Trench oriented N-S

| USCS | Material Description |
|---|---|
| SM | 0-1.0' **Artificial Fill (Af):** v. light gray to brown silty **SAND** to silt, roots in top 6.0 inches, dry, loose but intact. |
| ML | 1.0-7.0': olive gray to brown **SILT**, porous, slightly moist, moderately stiff. |
| ML | 7.0-11.5': v.gray to brown **SILT**, few subangular cobbles (<3"), locally porous, root casts and rootlet structures, slightly moist, medium stiff. |
| SM | 11.5-12.0' **Quaternary Alluvium (Qal):** light yellow to olive gray, silty **SAND**, porous, slightly moist, medium dense. |

1 inch = 5 foot



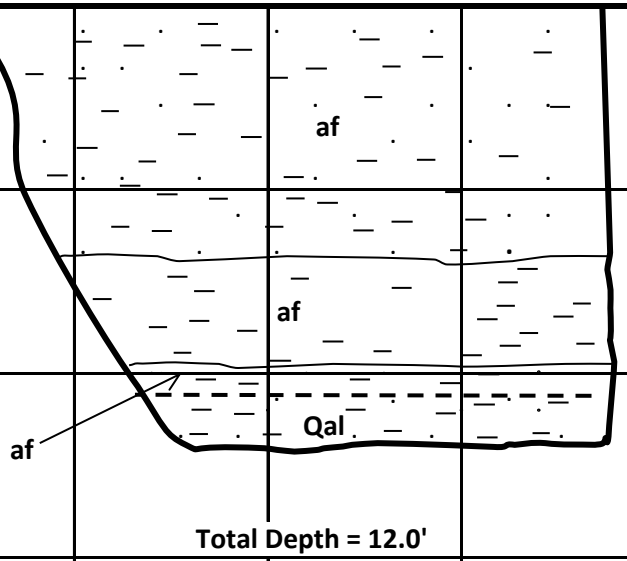
# Log of Exploratory Test Pit

Project Name: The Preserve (Chino, CA)
Project No: 20G-406-0
Equipment: Case 580 Super N Backhoe (36" Bucket)
Logged By: JAR Elevation: 587 (ft)

Test Pit Number: 3 Date: July 20, 2020
Location:
Notes: Bulk Sample: (0-7.0') [**20-231-M]**
12' x15'x 3' Trench oriented E-W

| USCS | Material Description |
|---|---|
| SM | 0-10.5' **Artificial Fill (Af):** v. light gray to brown silty **SAND**, roots in top 6.0 inches, slightly moist, loose but intact. |
| ML | 7.0': dark brown **SILT**, clean silt grades down to sandy silt at depth, roots and rootlets, slightly porous topsoil or agricultural fill, slightly moist medium stiff. |
| SM | 10.0': dark brown to yellow silty **SAND**, porous, dry to slightly moist, medium dense. |
| SM | 10.5-12.0' **Quaternary Alluvium (Qal):** v.light gray to brown silty **SAND**, root casts and rootlets, very porous (pin size pores to 2-3mm), iron oxidation, dense. |

1 inch = 5 foot



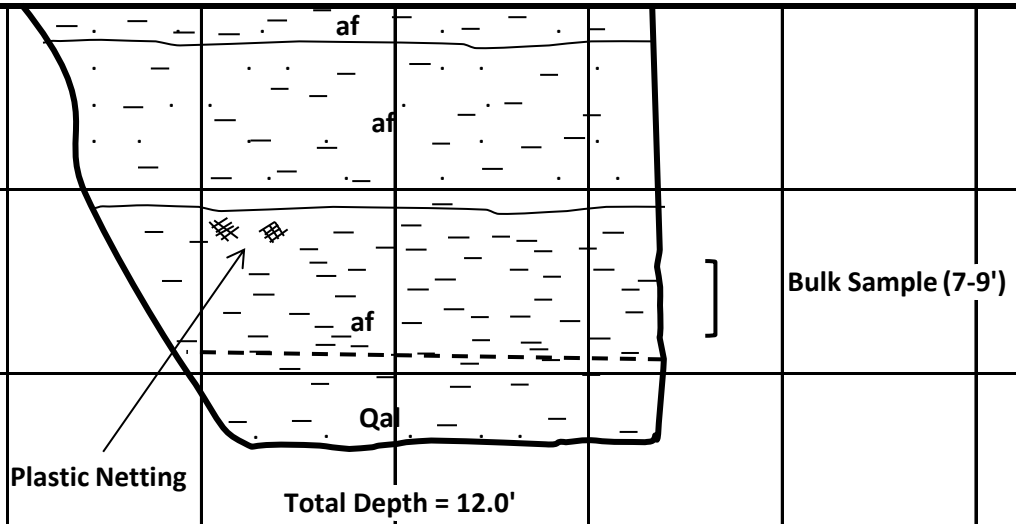
# Log of Exploratory Test Pit

Project Name: The Preserve (Chino, CA)
Project No: 20G-406-0
Equipment: Case 580 Super N Backhoe (36" Bucket)
Logged By: JAR Elevation: 586.8 (ft)

Test Pit Number: 4 Date: July 20, 2020
Location: Along center road at base of slope
Notes: 10' x15'x 3' Trench oriented E-W

| USCS | Material Description |
|---|---|
| SM | 0-1.2' **Artificial Fill (Af):** v. light gray to brown silty coarse **SAND**, roots in top 6.0 inches, slightly moist, loose but intact. |
| SM | 1.2-5.5': dark brown to orange mottled silty coarse **SAND**, minor clay, slightly moist, medium stiff. |
| ML | 5.5-9.5': dark brown **SILT,** topsoil with potent manure smell @ 7.0', plastic netting observed from 6.5-7.5', porous, slightly moist, medium stiff. |
| SM | 9.5-12.0' **Quaternary Alluvium (Qal):** v.light gray to brown silty **SAND,** porous, slightly moist, medium dense. |

1 inch = 5 foot



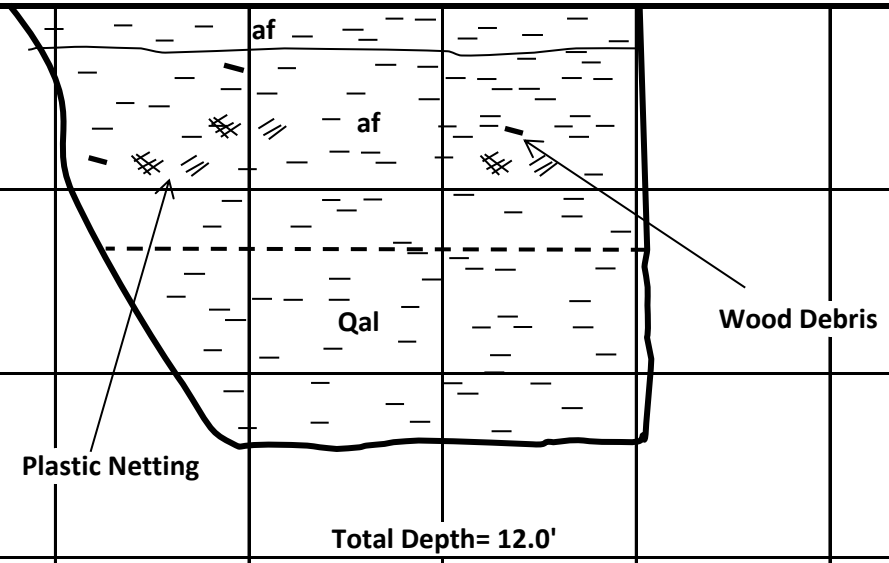
# Log of Exploratory Test Pit

Project Name: The Preserve (Chino, CA)
Project No: 20G-406-0
Equipment: Case 580 Super N Backhoe (36" Bucket)
Logged By: JAR Elevation: 587 (ft)

Test Pit Number: 5 Date: July 20, 2020
Location:
Notes: 10' x15'x 3' Trench oriented N-S

| USCS | Material Description |
|---|---|
| ML | 0-1.0' **Artificial Fill (Af):** v. light gray to brown **SILT** , roots in upper 6 inches, dry, loose but intact. |
| ML | 1.0-7.0': dark brown **SILT**, wood debris and plastic netting present at 5.0', slightly moist, slightly porous, medium stiff. |
| ML | 7.0-12.0' **Quaternary Alluvium (Qal):** v.light brown gray **SILT**, slightly micaceous, calcium carbonate nodules present in lower 2 feet (9.5-11.5') medium stiff. |

1 inch = 5 foot



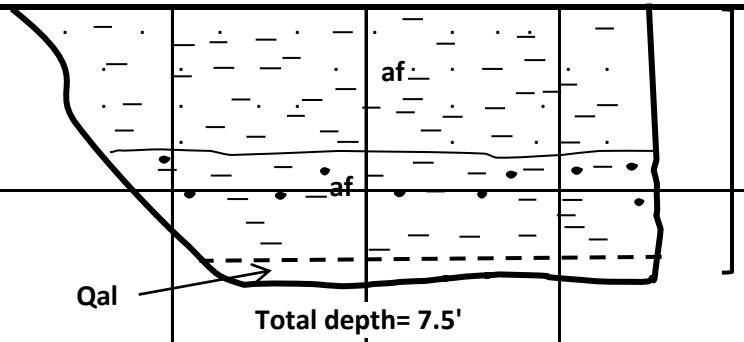
# Log of Exploratory Test Pit

Project Name: The Preserve (Chino, CA)
Project No: 20G-406-0
Equipment: Case 580 Super N Backhoe (36" Bucket)
Logged By: JAR Elevation: 584.6 (ft)

Test Pit Number: 6 Date: July 20, 2020
Location: 20 ft West of Scrapers
Notes: Bulk Sample: (0-7.0') [**20-229-M**]
7' x15'x 3' Trench oriented N-S

| USCS | Material Description |
|---|---|
| SM | 0-4.0' **Artificial Fill (Af):** medium brown to dark brown silty coarse **SAND**, gravels on surface, slightly moist, medium dense. |
| ML | 4.0-7.0': light brown to gray gravelly **SILT**, slightly moist, medium stiff. |
| ML | 7.0-7.5' **Quaternary Alluvium (Qal):** v.light brown gray **SILT**, slightly moist, medium stiff. |

1 inch = 5 foot



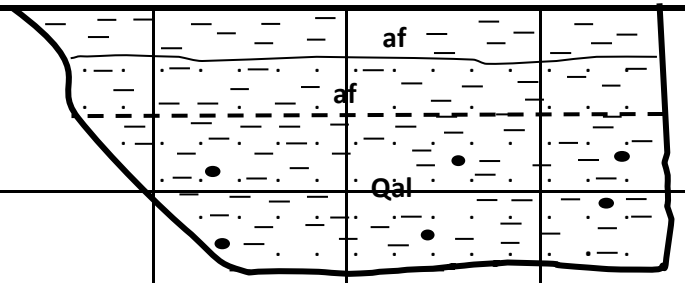
# Log of Exploratory Test Pit

Project Name: The Preserve (Chino, CA)
Project No: 20G-406-0
Equipment: Case 580 Super N Backhoe (36" Bucket)
Logged By: JAR Elevation: 571 (ft)

Test Pit Number: 7 Date: July 20, 2020
Location:
Notes: 10' x15'x 3' Trench oriented N-S

| USCS | Material Description |
|---|---|
| | 0-1.5' **Artificial Fill (Af):** v. light gray to medium brown **SILT** , slightly porous, dry, loose but intact.<br>1.5-3.0': light gray to white mottled silty **SAND**, porous, slightly moist, medium stiff.<br>3.0-10.0' **Quaternary Alluvium (Qal):** olive gray to yellow silty **SAND**, few cobbles ranging from 3-5", slightly moist, medium dense. |

1 inch = 5 foot




**Total Depth= 10.0'**

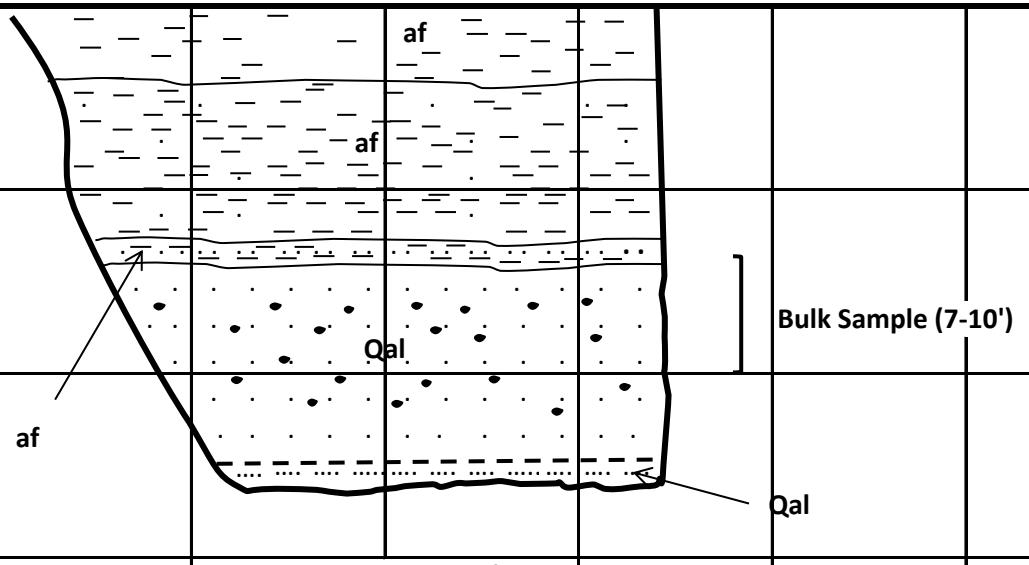
# Log of Exploratory Test Pit

Project Name: The Preserve (Chino, CA)
Project No: 20G-406-0
Equipment: Case 580 Super N Backhoe (36" Bucket)
Logged By: JAR Elevation: 584 (ft)

Test Pit Number: 8 Date: July 20, 2020
Location:
Notes: Bulk Sample: (7.0-10.0') [**20-228-M]**
13' x15'x 3' Trench oriented N-S

| USCS | Material Description |
|---|---|
| ML | 0-2.0' **Artificial Fill (Af):** v. light gray to brown **SILT** , plastic fabric and wood debris, brick pieces present @ 2.0', rootlets in upper foot, dry, loose. |
| ML | 2.0-6.5': tan to light brown sandy **SILT**, slightly moist, medium stiff. |
| SM | 6.5-7.0': light brown silty **SAND**, some cobbles less than 3", moist, dense. |
| SW | 7.0-13.0' **Quaternary Alluvium (Qal)**: tan to light brown gravelly **SAND**, few rounded cobbles, slightly moist, loose to medium dense. |
| SW | 12.8': orange/maroon, grades from coarse to fine **SAND** with depth, slightly micaceous, iron oxide staining, dense. |

1 inch = 5 foot



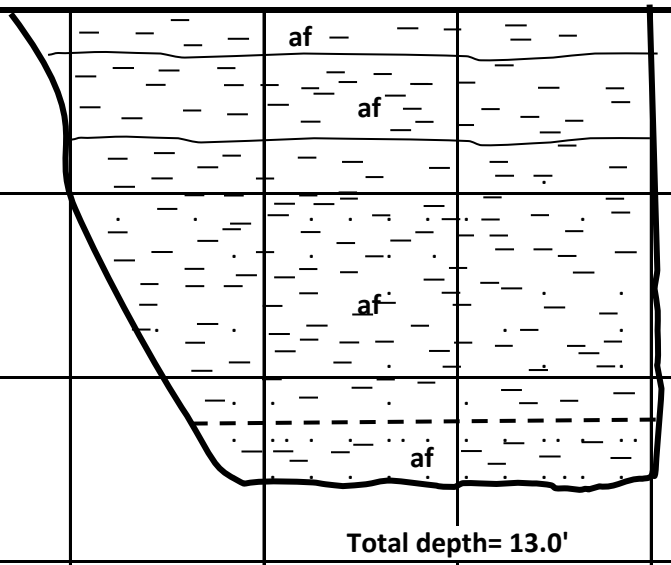
# Log of Exploratory Test Pit

Project Name: The Preserve (Chino, CA)
Project No: 20G-406-0
Equipment: Case 580 Super N Backhoe (36" Bucket)
Logged By: JAR Elevation: 593.5 (ft)

Test Pit Number: 9 Date: July 20, 2020
Location:
Notes: 13' x15'x 3' Trench oriented N-S

| USCS | Material Description |
|---|---|
| | 0-1.0' **Artificial Fill (Af):** v. light gray to brown **SILT** , roots and rootlets , dry, loose but intact. |
| | 1.0-3.5': medium brown **SILT** with minor clay, slightly moist, medium stiff.<br>3.5-11.0': light brown to olive gray sandy **SILT,** roots and rootlets, slightly moist, medium stiff<br>11.0-13.0': v.light gray to brown silty **SAND**, porous, slightly moist, medium dense. |

1 inch = 5 foot



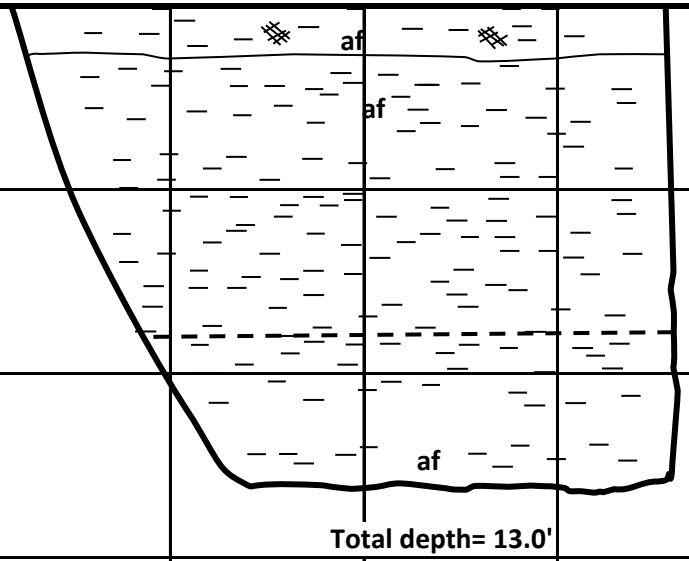
# Log of Exploratory Test Pit

Project Name: The Preserve (Chino, CA)
Project No: 20G-406-0
Equipment: Case 580 Super N Backhoe (36" Bucket)
Logged By: JAR Elevation: 606.6 (ft)

Test Pit Number: 10 Date: July 20, 2020
Location: Along Southern P/L approx. 418 ft from Street
Notes: 13' x15'x 3' Trench oriented N-S

| USCS | Material Description |
|---|---|
| SM | 0-1.5' **Artificial Fill (af):** medium brown sandy **SILT**, plastic netting @ 2.0', slightly porous, dry, loose but intact. |
| ML | 1.5-9.0: light to medium brown **SILT**, root casts and rootlets @ 6.8' root casts and rootlets, slightly porous, moist, medium stiff. |
| ML | 9.0-13.0': light to medium gray brown **SILT**, slightly porous, moist, stiff. |

1 inch = 5 foot



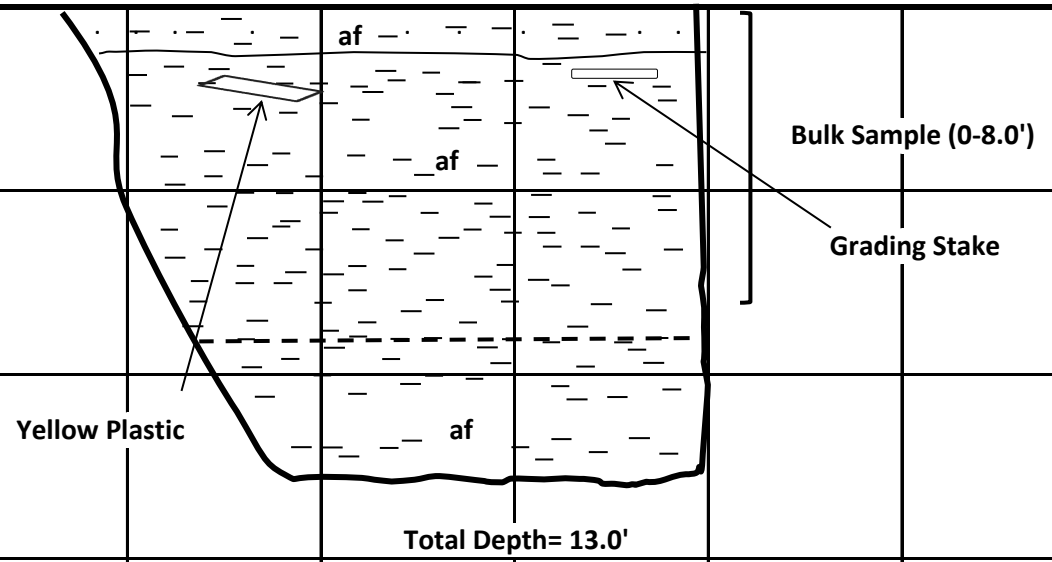
# Log of Exploratory Test Pit

Project Name: The Preserve (Chino, CA)
Project No: 20G-406-0
Equipment: Case 580 Super N Backhoe (36" Bucket)
Logged By: JAR Elevation: 594.5 (ft)

Test Pit Number: 11 Date: July 20, 2020
Location: Center of Site
Notes: Bulk Sample: (0-8.0') [**20-230-M]**
13' x15'x 3' Trench oriented N-S

| USCS | Material Description |
|---|---|
| SM | 0-1.2' **Artificial Fill (af):** medium brown sandy **SILT**, slightly porous, dry, loose but intact. |
| ML | 1.5-9.0': light gray to olive brown **SILT**, yellow plastic @ 2.0', grading stake debris @ 2.2', slightly porous, slightly moist, medium stiff. |
| ML | 9.0-13.0' : light to medium gray brown **SILT**, slightly porous, moist, stiff. |

1 inch = 5 foot



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**APPENDIX B**

**LABORATORY TESTS**

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# APPENDIX B

## B-1.00 LABORATORY TESTS

### B-1.01 Maximum Density

Maximum density - optimum moisture relationships for the major soil types encountered during the field exploration were performed in the laboratory using the standard procedures of ASTM D1557.

### B-1.02 Particle Size Analysis

Particle size analysis was performed on a representative sample of the on-site soils in accordance with the standard test methods of the ASTM D422. The test results are included in this Appendix B.

### B-1.03 Materials Finer than #200

Particle size analysis was performed on representative samples of the on-site soils in accordance with the standard test methods of the ASTM D1140. The test results are presented on the boring logs in Appendix A.

### B-1.04 Expansion Test

Expansion index tests were performed on representative samples of the major soil types encountered by the test methods outlined in ASTM D4829.

### B-1.05 Soluble Sulfates

A test was performed on representative sample encountered during the investigation using the California Test Method 417.

### B-1.06 Soil Reactivity (pH) and Minimum Resistivity

A near-surface soil samples were tested for soil reactivity (pH) and minimum electrical resistivity using California Test Method 643. The pH measurement determines the degree of acidity or alkalinity in the soils. The minimum resistivity is used as an indicator of how corrosive the soil is relative to buried metallic items.

### B-1.07 Moisture Determination

Moisture content of the soil samples was performed in accordance to standard method for determination of water content of soil by drying oven, ASTM D2216. The mass of material remaining after oven drying is used as the mass of the solid particles.

### B-1.08 Density of Split-Barrel Samples

The density of ring and tube samples, which were obtained using a split-barrel sampler, were determined in accordance with ASTM D2937. The results of these tests are provided on the boring logs in Appendix A.

### B-1.09 Consolidation (One-Dimensional)

One-dimensional consolidation test was performed on a ring sample using the standard test method of ASTM D2435. The rate of consolidation of the tested samples was not determined and the applied loading increments are indicated on the summary of the test results. The result of the test is shown in this appendix.

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**B-1.10 Organic Matter Contents**

Soil samples were tested in conformance to ASTM D2974. The test results are included in this appendix.

**B-1.11 Test Results**

Test results for all laboratory tests performed on the subject project are presented in this appendix. For a sample-by-sample description, see the logs presented in Appendix A.

MAXIMUM DENSITY - OPTIMUM MOISTURE

(Test Method: ASTM D1557)

| Sample Number | Optimum Moisture (Percent) | Maximum Density (lbs/ft$^3$) |
|---|---|---|
| TP6 @ 0-7 ft | 13.9 | 114.4 |
| TP11 @0-8 ft | 11.5 | 118.2 |

EXPANSION INDEX

(Test Method: ASTM D4829)

| Sample Number | Expansion Index | Classification |
|---|---|---|
| TP1 @ 1.5-7 ft | 45 | Low |

SOLUBLE SULFATES

(California Test Methods: 417 & 422)

| Sample Number | Soluble Sulfate (ppm) | Chloride Content (ppm) |
|---|---|---|
| B-2 @ 0-3 ft | 622 | 425 |

SOIL REACTIVITY (pH) AND MINIMUM RESISTIVITY

(California Test Method: 643)

| Sample Number | pH | Minimum Resistivity (Ohm-cm) |
|---|---|---|
| B-2 @ 0-3 ft | 8.8 | 500 |

ORGANIC MATTER CONTENT

(Test Method: ASTM D2974)

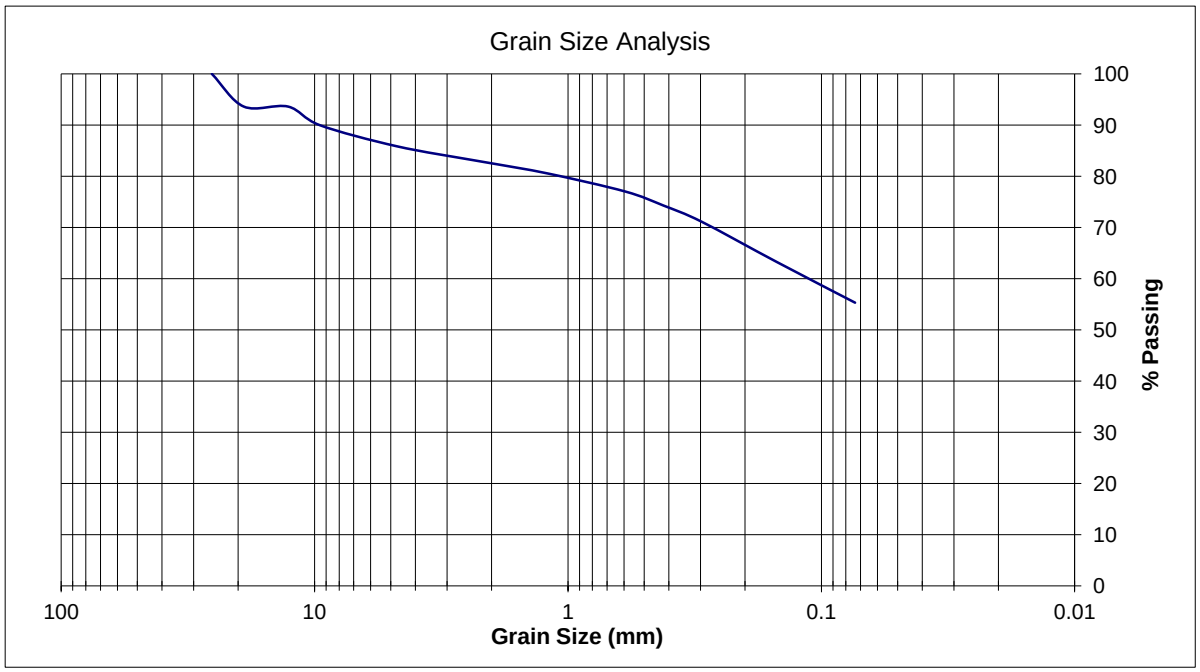
| Sample Number | Description | Moisture | Ash Method | Organic Matter Content (%) |
|---|---|---|---|---|
| TP#4@7-9 ft. | Silt w/Manure | 13.4 | C | 5.1 |

# PARTICLE SIZE ANALYSIS
## ASTM D422

Project ID: 20G-0406-0
Location: B1
Depth: 15 feet
Soil Description: Sandy Silt with clay and rocks

Fraction A Dry Net Weight (gms): 926.4

| Fraction A: Screen Size | Net Retained Weight (gms) | Net Passing Weight (gms) | % Passing |
|---|---|---|---|
| 1" | 0 | 926.4 | 100 |
| 3/4" | 59.2 | 867.2 | 94 |
| 1/2" | 59.2 | 867.2 | 94 |
| 3/8" | 92.8 | 833.6 | 90 |
| #4 | 130.8 | 795.6 | 86 |
| #8 | 156.1 | 770.3 | 83 |
| #10 | 161.8 | 764.6 | 83 |
| #16 | 180.5 | 745.9 | 81 |
| #30 | 212.7 | 713.7 | 77 |
| #40 | 238.1 | 688.3 | 74 |
| #50 | 267.3 | 659.1 | 71 |
| #100 | 340.3 | 586.1 | 63 |
| #200 | 413.8 | 512.6 | 55 |



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# APPENDIX C

## GENERAL EARTHWORK
## AND
## GRADING SPECIFICATIONS

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# GENERAL EARTHWORK AND GRADING SPECIFICATIONS

## C-1.00 GENERAL DESCRIPTION

### C-1.01 Introductions

These specifications present our general recommendations for earthwork and grading as shown on the approved grading plans for the subject project. These specifications shall cover all clearing and grubbing, removal of existing structures, preparation of land to be filled, filling of the land, spreading, compaction and control of the fill, and all subsidiary work necessary to complete the grading of the filled areas to conform with the lines, grades and slopes as shown on the approved plans.

The recommendations contained in the geotechnical report of which these general specifications are a part of shall supersede the provisions contained hereinafter in case of conflict.

### C-1.02 Laboratory Standard and Field Test Methods

The laboratory standard used to establish the maximum density and optimum moisture shall be ASTM D1557.

The insitu density of earth materials (field compaction tests) shall be determined by the sand cone method (ASTM D1556), direct transmission nuclear method (ASTM D2922) or other test methods as considered appropriate by the geotechnical consultant.

Relative compaction is defined, for purposes of these specifications, as the ratio of the in-place density to the maximum density as determined in the previously mentioned laboratory standard.

## C-2.00 Clearing

### C-2.01 Surface Clearing

All structures marked for removal, timber, logs, trees, brush and other rubbish shall be removed and disposed of off the site. Any trees to be removed shall be pulled in such a manner so as to remove as much of the root system as possible.

### C-2.02 Subsurface Removals

A thorough search should be made for possible underground storage tanks and/or septic tanks and cesspools. If found, tanks should be removed and cesspools pumped dry.

Any concrete irrigation lines shall be crushed in place and all metal underground lines shall be removed from the site.

### C-2.03 Backfill of Cavities

All cavities created or exposed during clearing and grubbing operations or by previous use of the site shall be cleared of deleterious material and backfilled with native soils or other materials approved by the soil engineer. Said backfill shall be compacted to a minimum of 90% relative compaction.

## C-3.00 ORIGINAL GROUND PREPARATION

### C-3.01 Stripping of Vegetation

After the site has been properly cleared, all vegetation and topsoil containing the root systems of former vegetation shall be stripped from areas to be graded. Materials removed in this stripping process may be used as fill in areas designated by the soil engineer, provided the vegetation is mixed with a sufficient amount of soil to assure that no appreciable settlement or other detriment will occur due to decaying of the organic matter. Soil materials containing more than 3% organics shall not be used as structural fill.

### C-3.02 Removals of Non-Engineered Fills

Any non-engineered fills encountered during grading shall be completely removed and the underlying ground shall be prepared in accordance to the recommendations for original ground preparation contained in this section. After cleansing of any organic matter the fill material may be used for engineered fill.

### C-3.03 Overexcavation of Fill Areas

The existing ground in all areas determined to be satisfactory for the support of fills shall be scarified to a minimum depth of 6 inches. Scarification shall continue until the soils are broken down and free from lumps or clods and until the scarified zone is uniform. The moisture content of the scarified zone shall be adjusted to within 2% of optimum moisture. The scarified zone shall then be uniformly compacted to 90% relative compaction.

Where fill material is to be placed on ground with slopes steeper than 5:1 (H:V) the sloping ground shall be benched. The lowermost bench shall be a minimum of 15 feet wide, shall be a minimum of 2 feet deep, and shall expose firm material as determined by the geotechnical consultant. Other benches shall be excavated to firm material as determined by the geotechnical consultant and shall have a minimum width of 4 feet.

Existing ground that is determined to be unsatisfactory for the support of fills shall be overexcavated in accordance to the recommendations contained in the geotechnical report of which these general specifications are a part.

## C-4.00 FILL MATERIALS

### C-4.01 General

Materials for the fill shall be free from vegetable matter and other deleterious substances, shall not contain rocks or lumps of a greater dimension than is recommended by the geotechnical consultant, and shall be approved by the geotechnical consultant. Soils of poor gradation, expansion, or strength properties shall be placed in areas designated by the geotechnical consultant or shall be mixed with other soils providing satisfactory fill material.

### C-4.02 Oversize Material

Oversize material, rock or other irreducible material with a maximum dimension greater than 12 inches, shall not be placed in fills, unless the location, materials, and disposal methods are specifically approved by the geotechnical consultant. Oversize material shall be placed in such a manner that nesting of oversize material does not occur and in such a manner that the oversize material is completely surrounded by fill material compacted to a minimum of

90% relative compaction. Oversize material shall not be placed within 10 feet of finished grade without the approval of the geotechnical consultant.

**C-4.03 Import**

Material imported to the site shall conform to the requirements of Section 4.01 of these specifications. Potential import material shall be approved by the geotechnical consultant prior to importation to the subject site.

## C-5.00 PLACING AND SPREADING OF FILL

**C-5.01 Fill Lifts**

The selected fill material shall be placed in nearly horizontal layers which when compacted will not exceed approximately 6 inches in thickness. Thicker lifts may be placed if testing indicates the compaction procedures are such that the required compaction is being achieved and the geotechnical consultant approves their use.
Each layer shall be spread evenly and shall be thoroughly blade mixed during the spreading to insure uniformity of material in each layer.

**C-5.02 Fill Moisture**

When the moisture content of the fill material is below that recommended by the soils engineer, water shall then be added until he moisture content is as specified to assure thorough bonding during the compacting process.

When the moisture content of the fill material is above that recommended by the soils engineer, the fill material shall be aerated by blading or other satisfactory methods until the moisture content is as specified.

**C-5.03 Fill Compaction**

After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted to not less than 90% relative compaction. Compaction shall be by sheepsfoot rollers, multiple-wheel pneumatic tired rollers, or other types approved by the soil engineer.

Rolling shall be accomplished while the fill material is at the specified moisture content. Rolling of each layer shall be continuous over its entire area and the roller shall make sufficient trips to insure that the desired density has been obtained.

**C-5.04 Fill Slopes**

Fill slopes shall be compacted by means of sheepsfoot rollers or other suitable equipment. Compacting of the slopes may be done progressively in increments of 3 to 4 feet in fill height. At the completion of grading, the slope face shall be compacted to a minimum of 90% relative compaction. This may require track rolling or rolling with a grid roller attached to a tractor mounted side-boom.

Slopes may be over filled and cut back in such a manner that the exposed slope faces are compacted to a minimum of 90% relative compaction.

The fill operation shall be continued in six inch (6") compacted layers, or as specified above, until the fill has been brought to the finished slopes and grades as shown on the accepted plans.

**C-5.05 Compaction Testing**

Field density tests shall be made by the geotechnical consultant of the compaction of each layer of fill. Density tests shall be made at locations selected by the geotechnical consultant.

Frequency of field density tests shall be not less than one test for each 2.0 feet of fill height and at least every one thousand cubic yards of fill. Where fill slopes exceed four feet in height their finished faces shall be tested at a frequency of one test for each 1000 square feet of slope face.

Where sheepsfoot rollers are used, the soil may be disturbed to a depth of several inches. Density reading shall be taken in the compacted material below the disturbed surface. When these readings indicate that the density of any layer of fill or portion thereof is below the required density, the particular layer or portion shall be reworked until the required density has been obtained.

## C-6.00 SUBDRAINS

**C-6.01 Subdrain Material**

Subdrains shall be constructed of a minimum 4-inch diameter pipe encased in a suitable filter material. The subdrain pipe shall be Schedule 40 Acrylonitrile Butadiene Styrene (ABS) or Schedule 40 Polyvinyl Chloride Plastic (PVC) pipe or approved equivalent. Subdrain pipe shall be installed with perforations down. Filter material shall consist of 3/4" to 1 1/2" clean gravel wrapped in an envelope of filter fabric consisting of Mirafi 140N or approved equivalent.

**C-6.02 Subdrain Installation**

Subdrain systems, if required, shall be installed in approved ground to conform the approximate alignment and details shown on the plans or herein. The subdrain locations shall not be changed or modified without the approval of the geotechnical consultant. The geotechnical consultant may recommend and direct changes in the subdrain line, grade or material upon approval by the design civil engineer and the appropriate governmental agencies.

## C-7.00 EXCAVATIONS

**C-7.01 General**

Excavations and cut slopes shall be examined by the geotechnical consultant. If determined necessary by the geotechnical consultant, further excavation or overexcavation and refilling of overexcavated areas shall be performed, and/or remedial grading of cut slopes shall be performed.

**C-7.02 Fill-Over-Cut Slopes**

Where fill-over-cut slopes are to be graded the cut portion of the slope shall be made and approved by the geotechnical consultant prior to placement of materials for construction of the fill portion of the slope.

## C-8.00 TRENCH BACKFILL

### C-8.01 General

Trench backfill within street right of ways shall be compacted to 90% relative compaction as determined by the ASTM D1557 test method. Backfill may be jetted as a means of initial compaction; however, mechanical compaction will be required to obtain the required percentage of relative compaction. If trenches are jetted, there must be a suitable delay for drainage of excess water before mechanical compaction is applied.

## C-9.00 SEASONAL LIMITS

### C-9.01 General

No fill material shall be placed, spread or rolled while it is frozen or thawing or during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations shall not be resumed until field tests by the soils engineer indicate that the moisture content and density of the fill are as previously specified.

## C-10.00 SUPERVISION

### C-10.01 Prior to Grading

The site shall be observed by the geotechnical consultant upon completion of clearing and grubbing, prior to the preparation of any original ground for preparation of fill.

The supervisor of the grading contractor and the field representative of the geotechnical consultant shall have a meeting and discuss the geotechnical aspects of the earthwork prior to commencement of grading.

### C-10.02 During Grading

Site preparation of all areas to receive fill shall be tested and approved by the geotechnical consultant prior to the placement of any fill.

The geotechnical consultant or his representative shall observe the fill and compaction operations so that he can provide an opinion regarding the conformance of the work to the recommendations

**APPENDIX D**

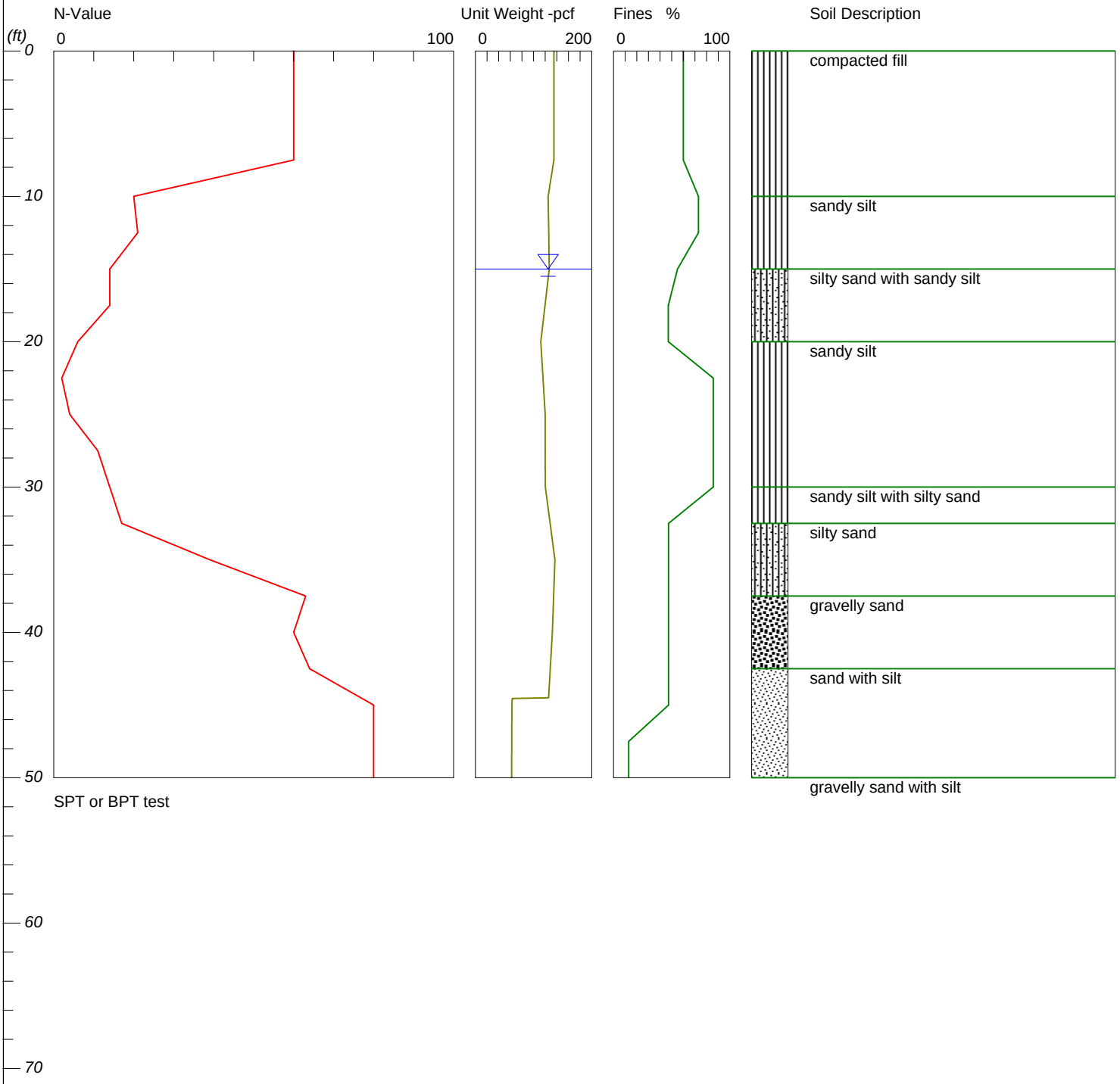
**LIQUIFACTION AND SEISMIC SETTLEMENT ANALYSIS**
**(Figures and Analysis Summary)**

# LIQUEFACTION ANALYSIS

## The Preserve at Chino

***Hole No.=B-1  Water Depth=15 ft  Surface Elev.=587.8***

***Magnitude=6.67***
***Acceleration=0.537g***



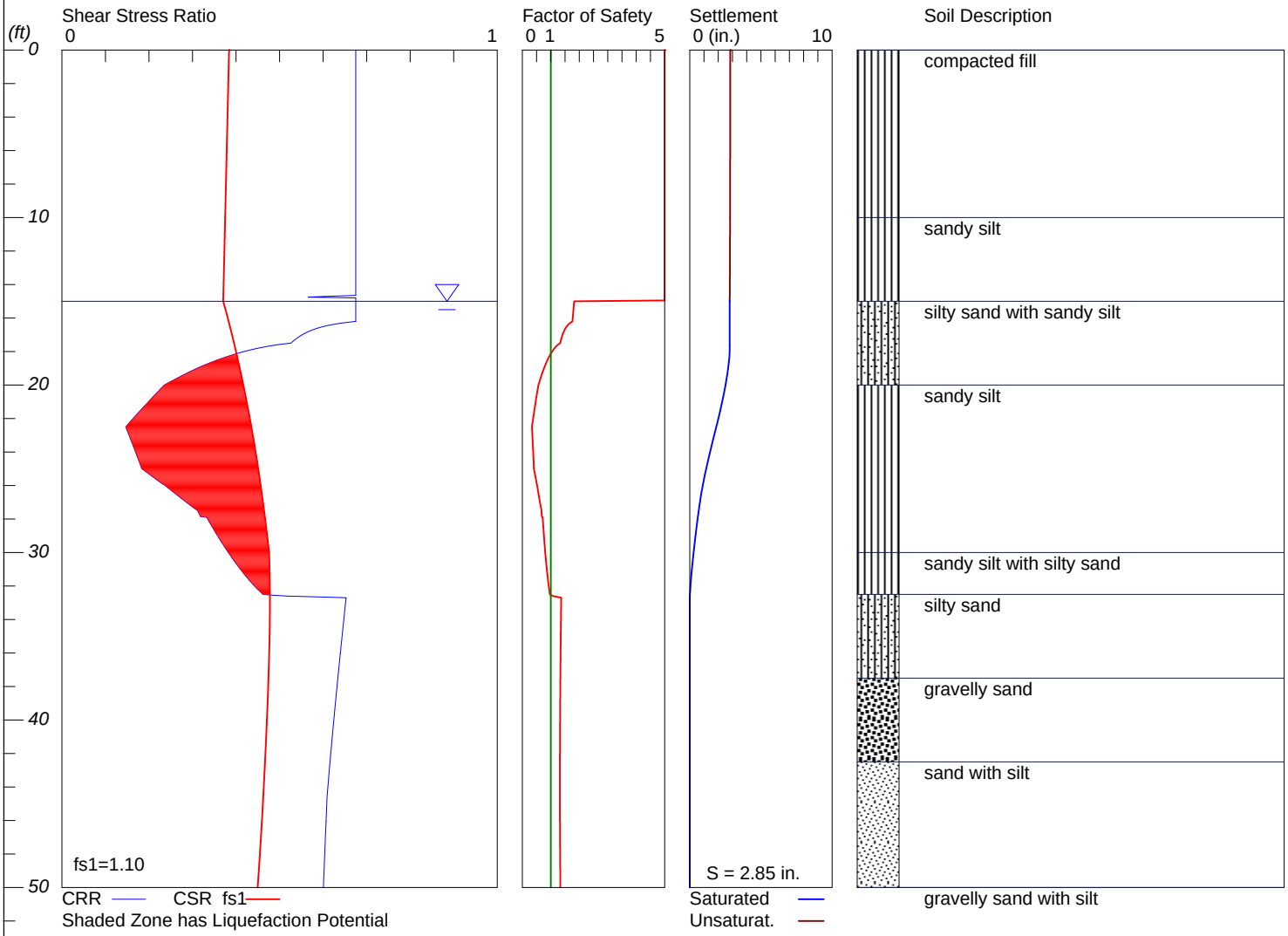

LiquefyPro CivilTech Software USA www.civiltech.com

# LIQUEFACTION ANALYSIS

## The Preserve at Chino

***Hole No.=B-1  Water Depth=15 ft  Surface Elev.=587.8***

***Magnitude=6.67***
***Acceleration=0.537g***




LiquefyPro CivilTech Software USA www.civiltech.com

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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: G:_Projects\2020\20G-0406\liquefaction analysis\20G-0406 B1.liq
Title: The Preserve at Chino
Subtitle: 20G-0406-0

Surface Elev.=587.8
Hole No.=B-1
Depth of Hole= 50.00 ft
Water Table during Earthquake= 15.00 ft
Water Table during In-Situ Testing= 44.50 ft
Max. Acceleration= 0.54 g
Earthquake Magnitude= 6.67

Input Data:
Surface Elev.=587.8
Hole No.=B-1
Depth of Hole=50.00 ft
Water Table during Earthquake= 15.00 ft
Water Table during In-Situ Testing= 44.50 ft
Max. Acceleration=0.54 g
Earthquake Magnitude=6.67
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.1
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

| Depth ft | SPT | gamma pcf | Fines % |
|---|---|---|---|
| 0.00 | 60.00 | 135.00 | 60.00 |
| 2.50 | 60.00 | 135.00 | 60.00 |
| 5.00 | 60.00 | 135.00 | 60.00 |
| 7.50 | 60.00 | 135.00 | 60.00 |
| 10.00 | 20.00 | 125.00 | 73.00 |
| 12.50 | 21.00 | 126.10 | 73.00 |
| 15.00 | 14.00 | 126.90 | 55.00 |
| 17.50 | 14.00 | 119.70 | 47.10 |
| 20.00 | 6.00 | 112.40 | 47.10 |
| 22.50 | 2.00 | 116.20 | 85.70 |

| | | | |
|---|---|---|---|
| 25.00 | 4.00 | 120.00 | 85.70 |
| 27.50 | 11.00 | 120.00 | 85.70 |
| 30.00 | 14.00 | 120.20 | 85.70 |
| 32.50 | 17.00 | 128.50 | 47.30 |
| 35.00 | 39.00 | 136.70 | 47.30 |
| 37.50 | 63.00 | 134.50 | 47.30 |
| 40.00 | 60.00 | 132.30 | 47.30 |
| 42.50 | 64.00 | 128.70 | 47.30 |
| 45.00 | 80.00 | 125.10 | 47.30 |
| 47.50 | 80.00 | 124.90 | 13.00 |
| 50.00 | 80.00 | 124.60 | 13.00 |

Output Results:

Settlement of Saturated Sands=2.81 in.
Settlement of Unsaturated Sands=0.04 in.
Total Settlement of Saturated and Unsaturated Sands=2.85 in.
Differential Settlement=1.423 to 1.878 in.

| Depth ft | CRRm | CSRfs | F.S. | S_sat. in. | S_dry in. | S_all in. |
|---|---|---|---|---|---|---|
| 0.00 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.85 |
| 0.05 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.85 |
| 0.10 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.85 |
| 0.15 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.85 |
| 0.20 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.85 |
| 0.25 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.85 |
| 0.30 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.85 |
| 0.35 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.85 |
| 0.40 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.85 |
| 0.45 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.85 |
| 0.50 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.84 |
| 0.55 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.84 |
| 0.60 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.84 |
| 0.65 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.84 |
| 0.70 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.84 |
| 0.75 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.84 |
| 0.80 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.84 |
| 0.85 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.84 |
| 0.90 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.84 |
| 0.95 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.84 |
| 1.00 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.84 |
| 1.05 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.84 |
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| 1.75 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.84 |
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| 1.90 | 0.67 | 0.38 | 5.00 | 2.81 | 0.04 | 2.84 |
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| 5.70 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
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| 5.85 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 5.90 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 5.95 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
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| 6.45 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 6.50 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 6.55 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 6.60 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 6.65 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 6.70 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 6.75 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 6.80 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 6.85 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 6.90 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 6.95 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 7.00 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 7.05 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 7.10 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 7.15 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 7.20 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 7.25 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 7.30 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 7.35 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 7.40 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 7.45 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 7.50 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 7.55 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 7.60 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 7.65 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 7.70 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 7.75 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 7.80 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 7.85 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 7.90 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 7.95 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 8.00 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 8.05 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 8.10 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 8.15 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 8.20 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 8.25 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |
| 8.30 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.84 |

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|---|---|---|---|---|---|---|
| 8.35 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 8.40 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 8.45 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 8.50 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 8.55 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 8.60 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 8.65 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 8.70 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 8.75 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 8.80 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 8.85 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 8.90 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 8.95 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 9.00 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 9.05 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 9.10 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 9.15 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 9.20 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 9.25 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 9.30 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 9.35 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 9.40 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 9.45 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 9.50 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 9.55 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 9.60 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 9.65 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 9.70 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 9.75 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 9.80 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 9.85 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 9.90 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 9.95 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 10.00 | 0.67 | 0.38 | 5.00 | 2.81 | 0.03 | 2.83 |
| 10.05 | 0.67 | 0.37 | 5.00 | 2.81 | 0.03 | 2.83 |
| 10.10 | 0.67 | 0.37 | 5.00 | 2.81 | 0.03 | 2.83 |
| 10.15 | 0.67 | 0.37 | 5.00 | 2.81 | 0.03 | 2.83 |
| 10.20 | 0.67 | 0.37 | 5.00 | 2.81 | 0.03 | 2.83 |
| 10.25 | 0.67 | 0.37 | 5.00 | 2.81 | 0.03 | 2.83 |
| 10.30 | 0.67 | 0.37 | 5.00 | 2.81 | 0.03 | 2.83 |
| 10.35 | 0.67 | 0.37 | 5.00 | 2.81 | 0.03 | 2.83 |
| 10.40 | 0.67 | 0.37 | 5.00 | 2.81 | 0.03 | 2.83 |
| 10.45 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 10.50 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 10.55 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 10.60 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 10.65 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 10.70 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 10.75 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 10.80 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 10.85 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 10.90 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 10.95 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 11.00 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 11.05 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 11.10 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 11.15 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 11.20 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 11.25 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 11.30 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 11.35 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 11.40 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 11.45 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |

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|---|---|---|---|---|---|---|
| 11.50 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 11.55 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 11.60 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 11.65 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 11.70 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 11.75 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 11.80 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 11.85 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 11.90 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 11.95 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 12.00 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 12.05 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.83 |
| 12.10 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 12.15 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 12.20 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 12.25 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 12.30 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 12.35 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 12.40 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 12.45 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 12.50 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 12.55 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 12.60 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 12.65 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 12.70 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 12.75 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 12.80 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 12.85 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 12.90 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 12.95 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 13.00 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 13.05 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 13.10 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 13.15 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 13.20 | 0.67 | 0.37 | 5.00 | 2.81 | 0.02 | 2.82 |
| 13.25 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.82 |
| 13.30 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.82 |
| 13.35 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.82 |
| 13.40 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.82 |
| 13.45 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.82 |
| 13.50 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.82 |
| 13.55 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.82 |
| 13.60 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.82 |
| 13.65 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.82 |
| 13.70 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.82 |
| 13.75 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.82 |
| 13.80 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.82 |
| 13.85 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.82 |
| 13.90 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.82 |
| 13.95 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.82 |
| 14.00 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.82 |
| 14.05 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.81 |
| 14.10 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.81 |
| 14.15 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.81 |
| 14.20 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.81 |
| 14.25 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.81 |
| 14.30 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.81 |
| 14.35 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.81 |
| 14.40 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.81 |
| 14.45 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.81 |
| 14.50 | 0.67 | 0.37 | 5.00 | 2.81 | 0.01 | 2.81 |
| 14.55 | 0.67 | 0.37 | 5.00 | 2.81 | 0.00 | 2.81 |
| 14.60 | 0.67 | 0.37 | 5.00 | 2.81 | 0.00 | 2.81 |

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|---|---|---|---|---|---|---|
| 14.65 | 0.67 | 0.37 | 5.00 | 2.81 | 0.00 | 2.81 |
| 14.70 | 0.61 | 0.37 | 5.00 | 2.81 | 0.00 | 2.81 |
| 14.75 | 0.57 | 0.37 | 5.00 | 2.81 | 0.00 | 2.81 |
| 14.80 | 0.67 | 0.37 | 5.00 | 2.81 | 0.00 | 2.81 |
| 14.85 | 0.67 | 0.37 | 5.00 | 2.81 | 0.00 | 2.81 |
| 14.90 | 0.67 | 0.37 | 5.00 | 2.81 | 0.00 | 2.81 |
| 14.95 | 0.67 | 0.37 | 5.00 | 2.81 | 0.00 | 2.81 |
| 15.00 | 0.67 | 0.37 | 1.82 | 2.81 | 0.00 | 2.81 |
| 15.05 | 0.67 | 0.37 | 1.82 | 2.81 | 0.00 | 2.81 |
| 15.10 | 0.67 | 0.37 | 1.82 | 2.81 | 0.00 | 2.81 |
| 15.15 | 0.67 | 0.37 | 1.81 | 2.81 | 0.00 | 2.81 |
| 15.20 | 0.67 | 0.37 | 1.81 | 2.81 | 0.00 | 2.81 |
| 15.25 | 0.67 | 0.37 | 1.81 | 2.81 | 0.00 | 2.81 |
| 15.30 | 0.67 | 0.37 | 1.81 | 2.81 | 0.00 | 2.81 |
| 15.35 | 0.67 | 0.37 | 1.80 | 2.81 | 0.00 | 2.81 |
| 15.40 | 0.67 | 0.37 | 1.80 | 2.81 | 0.00 | 2.81 |
| 15.45 | 0.67 | 0.38 | 1.80 | 2.81 | 0.00 | 2.81 |
| 15.50 | 0.67 | 0.38 | 1.80 | 2.81 | 0.00 | 2.81 |
| 15.55 | 0.67 | 0.38 | 1.79 | 2.81 | 0.00 | 2.81 |
| 15.60 | 0.67 | 0.38 | 1.79 | 2.81 | 0.00 | 2.81 |
| 15.65 | 0.67 | 0.38 | 1.79 | 2.81 | 0.00 | 2.81 |
| 15.70 | 0.67 | 0.38 | 1.79 | 2.81 | 0.00 | 2.81 |
| 15.75 | 0.67 | 0.38 | 1.78 | 2.81 | 0.00 | 2.81 |
| 15.80 | 0.67 | 0.38 | 1.78 | 2.81 | 0.00 | 2.81 |
| 15.85 | 0.67 | 0.38 | 1.78 | 2.81 | 0.00 | 2.81 |
| 15.90 | 0.67 | 0.38 | 1.78 | 2.81 | 0.00 | 2.81 |
| 15.95 | 0.67 | 0.38 | 1.77 | 2.81 | 0.00 | 2.81 |
| 16.00 | 0.67 | 0.38 | 1.77 | 2.81 | 0.00 | 2.81 |
| 16.05 | 0.67 | 0.38 | 1.77 | 2.81 | 0.00 | 2.81 |
| 16.10 | 0.67 | 0.38 | 1.77 | 2.81 | 0.00 | 2.81 |
| 16.15 | 0.67 | 0.38 | 1.76 | 2.81 | 0.00 | 2.81 |
| 16.20 | 0.67 | 0.38 | 1.76 | 2.81 | 0.00 | 2.81 |
| 16.25 | 0.66 | 0.38 | 1.72 | 2.81 | 0.00 | 2.81 |
| 16.30 | 0.64 | 0.38 | 1.67 | 2.81 | 0.00 | 2.81 |
| 16.35 | 0.63 | 0.38 | 1.64 | 2.81 | 0.00 | 2.81 |
| 16.40 | 0.62 | 0.38 | 1.61 | 2.81 | 0.00 | 2.81 |
| 16.45 | 0.61 | 0.39 | 1.58 | 2.81 | 0.00 | 2.81 |
| 16.50 | 0.60 | 0.39 | 1.56 | 2.81 | 0.00 | 2.81 |
| 16.55 | 0.59 | 0.39 | 1.54 | 2.81 | 0.00 | 2.81 |
| 16.60 | 0.59 | 0.39 | 1.52 | 2.81 | 0.00 | 2.81 |
| 16.65 | 0.58 | 0.39 | 1.50 | 2.81 | 0.00 | 2.81 |
| 16.70 | 0.58 | 0.39 | 1.49 | 2.81 | 0.00 | 2.81 |
| 16.75 | 0.57 | 0.39 | 1.47 | 2.81 | 0.00 | 2.81 |
| 16.80 | 0.57 | 0.39 | 1.46 | 2.81 | 0.00 | 2.81 |
| 16.85 | 0.56 | 0.39 | 1.45 | 2.81 | 0.00 | 2.81 |
| 16.90 | 0.56 | 0.39 | 1.43 | 2.81 | 0.00 | 2.81 |
| 16.95 | 0.56 | 0.39 | 1.42 | 2.81 | 0.00 | 2.81 |
| 17.00 | 0.55 | 0.39 | 1.41 | 2.81 | 0.00 | 2.81 |
| 17.05 | 0.55 | 0.39 | 1.40 | 2.81 | 0.00 | 2.81 |
| 17.10 | 0.55 | 0.39 | 1.39 | 2.81 | 0.00 | 2.81 |
| 17.15 | 0.54 | 0.39 | 1.38 | 2.81 | 0.00 | 2.81 |
| 17.20 | 0.54 | 0.39 | 1.38 | 2.81 | 0.00 | 2.81 |
| 17.25 | 0.54 | 0.39 | 1.37 | 2.81 | 0.00 | 2.81 |
| 17.30 | 0.53 | 0.39 | 1.36 | 2.81 | 0.00 | 2.81 |
| 17.35 | 0.53 | 0.39 | 1.35 | 2.81 | 0.00 | 2.81 |
| 17.40 | 0.53 | 0.39 | 1.34 | 2.81 | 0.00 | 2.81 |
| 17.45 | 0.53 | 0.39 | 1.34 | 2.81 | 0.00 | 2.81 |
| 17.50 | 0.53 | 0.40 | 1.33 | 2.81 | 0.00 | 2.81 |
| 17.55 | 0.51 | 0.40 | 1.28 | 2.81 | 0.00 | 2.81 |
| 17.60 | 0.49 | 0.40 | 1.25 | 2.81 | 0.00 | 2.81 |
| 17.65 | 0.48 | 0.40 | 1.21 | 2.81 | 0.00 | 2.81 |
| 17.70 | 0.47 | 0.40 | 1.18 | 2.80 | 0.00 | 2.80 |
| 17.75 | 0.46 | 0.40 | 1.16 | 2.80 | 0.00 | 2.80 |

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|---|---|---|---|---|---|---|
| 17.80 | 0.45 | 0.40 | 1.13 | 2.80 | 0.00 | 2.80 |
| 17.85 | 0.44 | 0.40 | 1.11 | 2.80 | 0.00 | 2.80 |
| 17.90 | 0.43 | 0.40 | 1.09 | 2.80 | 0.00 | 2.80 |
| 17.95 | 0.43 | 0.40 | 1.07 | 2.80 | 0.00 | 2.80 |
| 18.00 | 0.42 | 0.40 | 1.05 | 2.80 | 0.00 | 2.80 |
| 18.05 | 0.41 | 0.40 | 1.03 | 2.80 | 0.00 | 2.80 |
| 18.10 | 0.40 | 0.40 | 1.01 | 2.80 | 0.00 | 2.80 |
| 18.15 | 0.40 | 0.40 | 0.99* | 2.79 | 0.00 | 2.79 |
| 18.20 | 0.39 | 0.40 | 0.98* | 2.79 | 0.00 | 2.79 |
| 18.25 | 0.39 | 0.40 | 0.96* | 2.79 | 0.00 | 2.79 |
| 18.30 | 0.38 | 0.40 | 0.94* | 2.78 | 0.00 | 2.78 |
| 18.35 | 0.37 | 0.40 | 0.93* | 2.78 | 0.00 | 2.78 |
| 18.40 | 0.37 | 0.40 | 0.91* | 2.77 | 0.00 | 2.77 |
| 18.45 | 0.36 | 0.40 | 0.90* | 2.77 | 0.00 | 2.77 |
| 18.50 | 0.36 | 0.40 | 0.88* | 2.76 | 0.00 | 2.76 |
| 18.55 | 0.35 | 0.40 | 0.87* | 2.76 | 0.00 | 2.76 |
| 18.60 | 0.35 | 0.41 | 0.86* | 2.75 | 0.00 | 2.75 |
| 18.65 | 0.34 | 0.41 | 0.84* | 2.74 | 0.00 | 2.74 |
| 18.70 | 0.34 | 0.41 | 0.83* | 2.74 | 0.00 | 2.74 |
| 18.75 | 0.33 | 0.41 | 0.82* | 2.73 | 0.00 | 2.73 |
| 18.80 | 0.33 | 0.41 | 0.81* | 2.72 | 0.00 | 2.72 |
| 18.85 | 0.32 | 0.41 | 0.80* | 2.72 | 0.00 | 2.72 |
| 18.90 | 0.32 | 0.41 | 0.78* | 2.71 | 0.00 | 2.71 |
| 18.95 | 0.32 | 0.41 | 0.77* | 2.70 | 0.00 | 2.70 |
| 19.00 | 0.31 | 0.41 | 0.76* | 2.69 | 0.00 | 2.69 |
| 19.05 | 0.31 | 0.41 | 0.75* | 2.69 | 0.00 | 2.69 |
| 19.10 | 0.30 | 0.41 | 0.74* | 2.68 | 0.00 | 2.68 |
| 19.15 | 0.30 | 0.41 | 0.73* | 2.67 | 0.00 | 2.67 |
| 19.20 | 0.29 | 0.41 | 0.72* | 2.66 | 0.00 | 2.66 |
| 19.25 | 0.29 | 0.41 | 0.71* | 2.65 | 0.00 | 2.65 |
| 19.30 | 0.29 | 0.41 | 0.70* | 2.64 | 0.00 | 2.64 |
| 19.35 | 0.28 | 0.41 | 0.69* | 2.64 | 0.00 | 2.64 |
| 19.40 | 0.28 | 0.41 | 0.68* | 2.63 | 0.00 | 2.63 |
| 19.45 | 0.28 | 0.41 | 0.67* | 2.62 | 0.00 | 2.62 |
| 19.50 | 0.27 | 0.41 | 0.66* | 2.61 | 0.00 | 2.61 |
| 19.55 | 0.27 | 0.41 | 0.65* | 2.60 | 0.00 | 2.60 |
| 19.60 | 0.26 | 0.41 | 0.64* | 2.59 | 0.00 | 2.59 |
| 19.65 | 0.26 | 0.41 | 0.63* | 2.58 | 0.00 | 2.58 |
| 19.70 | 0.26 | 0.41 | 0.62* | 2.57 | 0.00 | 2.57 |
| 19.75 | 0.25 | 0.41 | 0.61* | 2.56 | 0.00 | 2.56 |
| 19.80 | 0.25 | 0.42 | 0.60* | 2.55 | 0.00 | 2.55 |
| 19.85 | 0.25 | 0.42 | 0.59* | 2.54 | 0.00 | 2.54 |
| 19.90 | 0.24 | 0.42 | 0.58* | 2.53 | 0.00 | 2.53 |
| 19.95 | 0.24 | 0.42 | 0.57* | 2.52 | 0.00 | 2.52 |
| 20.00 | 0.24 | 0.42 | 0.56* | 2.51 | 0.00 | 2.51 |
| 20.05 | 0.23 | 0.42 | 0.56* | 2.50 | 0.00 | 2.50 |
| 20.10 | 0.23 | 0.42 | 0.55* | 2.49 | 0.00 | 2.49 |
| 20.15 | 0.23 | 0.42 | 0.55* | 2.48 | 0.00 | 2.48 |
| 20.20 | 0.23 | 0.42 | 0.54* | 2.47 | 0.00 | 2.47 |
| 20.25 | 0.23 | 0.42 | 0.54* | 2.45 | 0.00 | 2.45 |
| 20.30 | 0.22 | 0.42 | 0.53* | 2.44 | 0.00 | 2.44 |
| 20.35 | 0.22 | 0.42 | 0.53* | 2.43 | 0.00 | 2.43 |
| 20.40 | 0.22 | 0.42 | 0.53* | 2.42 | 0.00 | 2.42 |
| 20.45 | 0.22 | 0.42 | 0.52* | 2.41 | 0.00 | 2.41 |
| 20.50 | 0.22 | 0.42 | 0.52* | 2.40 | 0.00 | 2.40 |
| 20.55 | 0.22 | 0.42 | 0.51* | 2.39 | 0.00 | 2.39 |
| 20.60 | 0.21 | 0.42 | 0.51* | 2.37 | 0.00 | 2.37 |
| 20.65 | 0.21 | 0.42 | 0.50* | 2.36 | 0.00 | 2.36 |
| 20.70 | 0.21 | 0.42 | 0.50* | 2.35 | 0.00 | 2.35 |
| 20.75 | 0.21 | 0.42 | 0.49* | 2.34 | 0.00 | 2.34 |
| 20.80 | 0.21 | 0.42 | 0.49* | 2.33 | 0.00 | 2.33 |
| 20.85 | 0.20 | 0.42 | 0.48* | 2.31 | 0.00 | 2.31 |
| 20.90 | 0.20 | 0.42 | 0.48* | 2.30 | 0.00 | 2.30 |

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|---|---|---|---|---|---|---|
| 20.95 | 0.20 | 0.42 | 0.47* | 2.29 | 0.00 | 2.29 |
| 21.00 | 0.20 | 0.42 | 0.47* | 2.28 | 0.00 | 2.28 |
| 21.05 | 0.20 | 0.42 | 0.46* | 2.26 | 0.00 | 2.26 |
| 21.10 | 0.20 | 0.43 | 0.46* | 2.25 | 0.00 | 2.25 |
| 21.15 | 0.19 | 0.43 | 0.45* | 2.24 | 0.00 | 2.24 |
| 21.20 | 0.19 | 0.43 | 0.45* | 2.23 | 0.00 | 2.23 |
| 21.25 | 0.19 | 0.43 | 0.45* | 2.21 | 0.00 | 2.21 |
| 21.30 | 0.19 | 0.43 | 0.44* | 2.20 | 0.00 | 2.20 |
| 21.35 | 0.19 | 0.43 | 0.44* | 2.19 | 0.00 | 2.19 |
| 21.40 | 0.18 | 0.43 | 0.43* | 2.17 | 0.00 | 2.17 |
| 21.45 | 0.18 | 0.43 | 0.43* | 2.16 | 0.00 | 2.16 |
| 21.50 | 0.18 | 0.43 | 0.42* | 2.15 | 0.00 | 2.15 |
| 21.55 | 0.18 | 0.43 | 0.42* | 2.13 | 0.00 | 2.13 |
| 21.60 | 0.18 | 0.43 | 0.41* | 2.12 | 0.00 | 2.12 |
| 21.65 | 0.18 | 0.43 | 0.41* | 2.11 | 0.00 | 2.11 |
| 21.70 | 0.17 | 0.43 | 0.40* | 2.09 | 0.00 | 2.09 |
| 21.75 | 0.17 | 0.43 | 0.40* | 2.08 | 0.00 | 2.08 |
| 21.80 | 0.17 | 0.43 | 0.40* | 2.07 | 0.00 | 2.07 |
| 21.85 | 0.17 | 0.43 | 0.39* | 2.05 | 0.00 | 2.05 |
| 21.90 | 0.17 | 0.43 | 0.39* | 2.04 | 0.00 | 2.04 |
| 21.95 | 0.17 | 0.43 | 0.38* | 2.02 | 0.00 | 2.02 |
| 22.00 | 0.16 | 0.43 | 0.38* | 2.01 | 0.00 | 2.01 |
| 22.05 | 0.16 | 0.43 | 0.37* | 1.99 | 0.00 | 1.99 |
| 22.10 | 0.16 | 0.43 | 0.37* | 1.98 | 0.00 | 1.98 |
| 22.15 | 0.16 | 0.43 | 0.37* | 1.97 | 0.00 | 1.97 |
| 22.20 | 0.16 | 0.43 | 0.36* | 1.95 | 0.00 | 1.95 |
| 22.25 | 0.16 | 0.43 | 0.36* | 1.94 | 0.00 | 1.94 |
| 22.30 | 0.15 | 0.43 | 0.35* | 1.92 | 0.00 | 1.92 |
| 22.35 | 0.15 | 0.43 | 0.35* | 1.91 | 0.00 | 1.91 |
| 22.40 | 0.15 | 0.43 | 0.35* | 1.89 | 0.00 | 1.89 |
| 22.45 | 0.15 | 0.43 | 0.34* | 1.88 | 0.00 | 1.88 |
| 22.50 | 0.15 | 0.44 | 0.34* | 1.86 | 0.00 | 1.86 |
| 22.55 | 0.15 | 0.44 | 0.34* | 1.85 | 0.00 | 1.85 |
| 22.60 | 0.15 | 0.44 | 0.34* | 1.83 | 0.00 | 1.83 |
| 22.65 | 0.15 | 0.44 | 0.34* | 1.82 | 0.00 | 1.82 |
| 22.70 | 0.15 | 0.44 | 0.34* | 1.80 | 0.00 | 1.80 |
| 22.75 | 0.15 | 0.44 | 0.34* | 1.79 | 0.00 | 1.79 |
| 22.80 | 0.15 | 0.44 | 0.35* | 1.77 | 0.00 | 1.77 |
| 22.85 | 0.15 | 0.44 | 0.35* | 1.76 | 0.00 | 1.76 |
| 22.90 | 0.15 | 0.44 | 0.35* | 1.74 | 0.00 | 1.74 |
| 22.95 | 0.15 | 0.44 | 0.35* | 1.73 | 0.00 | 1.73 |
| 23.00 | 0.15 | 0.44 | 0.35* | 1.71 | 0.00 | 1.71 |
| 23.05 | 0.16 | 0.44 | 0.35* | 1.70 | 0.00 | 1.70 |
| 23.10 | 0.16 | 0.44 | 0.35* | 1.68 | 0.00 | 1.68 |
| 23.15 | 0.16 | 0.44 | 0.36* | 1.67 | 0.00 | 1.67 |
| 23.20 | 0.16 | 0.44 | 0.36* | 1.65 | 0.00 | 1.65 |
| 23.25 | 0.16 | 0.44 | 0.36* | 1.64 | 0.00 | 1.64 |
| 23.30 | 0.16 | 0.44 | 0.36* | 1.62 | 0.00 | 1.62 |
| 23.35 | 0.16 | 0.44 | 0.36* | 1.61 | 0.00 | 1.61 |
| 23.40 | 0.16 | 0.44 | 0.36* | 1.60 | 0.00 | 1.60 |
| 23.45 | 0.16 | 0.44 | 0.36* | 1.58 | 0.00 | 1.58 |
| 23.50 | 0.16 | 0.44 | 0.37* | 1.57 | 0.00 | 1.57 |
| 23.55 | 0.16 | 0.44 | 0.37* | 1.55 | 0.00 | 1.55 |
| 23.60 | 0.16 | 0.44 | 0.37* | 1.54 | 0.00 | 1.54 |
| 23.65 | 0.16 | 0.44 | 0.37* | 1.52 | 0.00 | 1.52 |
| 23.70 | 0.16 | 0.44 | 0.37* | 1.51 | 0.00 | 1.51 |
| 23.75 | 0.17 | 0.44 | 0.37* | 1.50 | 0.00 | 1.50 |
| 23.80 | 0.17 | 0.44 | 0.37* | 1.48 | 0.00 | 1.48 |
| 23.85 | 0.17 | 0.44 | 0.38* | 1.47 | 0.00 | 1.47 |
| 23.90 | 0.17 | 0.44 | 0.38* | 1.45 | 0.00 | 1.45 |
| 23.95 | 0.17 | 0.44 | 0.38* | 1.44 | 0.00 | 1.44 |
| 24.00 | 0.17 | 0.44 | 0.38* | 1.43 | 0.00 | 1.43 |
| 24.05 | 0.17 | 0.45 | 0.38* | 1.41 | 0.00 | 1.41 |

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|---|---|---|---|---|---|---|
| 24.10 | 0.17 | 0.45 | 0.38* | 1.40 | 0.00 | 1.40 |
| 24.15 | 0.17 | 0.45 | 0.38* | 1.38 | 0.00 | 1.38 |
| 24.20 | 0.17 | 0.45 | 0.39* | 1.37 | 0.00 | 1.37 |
| 24.25 | 0.17 | 0.45 | 0.39* | 1.36 | 0.00 | 1.36 |
| 24.30 | 0.17 | 0.45 | 0.39* | 1.34 | 0.00 | 1.34 |
| 24.35 | 0.17 | 0.45 | 0.39* | 1.33 | 0.00 | 1.33 |
| 24.40 | 0.18 | 0.45 | 0.39* | 1.31 | 0.00 | 1.31 |
| 24.45 | 0.18 | 0.45 | 0.39* | 1.30 | 0.00 | 1.30 |
| 24.50 | 0.18 | 0.45 | 0.39* | 1.29 | 0.00 | 1.29 |
| 24.55 | 0.18 | 0.45 | 0.40* | 1.27 | 0.00 | 1.27 |
| 24.60 | 0.18 | 0.45 | 0.40* | 1.26 | 0.00 | 1.26 |
| 24.65 | 0.18 | 0.45 | 0.40* | 1.25 | 0.00 | 1.25 |
| 24.70 | 0.18 | 0.45 | 0.40* | 1.23 | 0.00 | 1.23 |
| 24.75 | 0.18 | 0.45 | 0.40* | 1.22 | 0.00 | 1.22 |
| 24.80 | 0.18 | 0.45 | 0.40* | 1.21 | 0.00 | 1.21 |
| 24.85 | 0.18 | 0.45 | 0.40* | 1.19 | 0.00 | 1.19 |
| 24.90 | 0.18 | 0.45 | 0.40* | 1.18 | 0.00 | 1.18 |
| 24.95 | 0.18 | 0.45 | 0.41* | 1.17 | 0.00 | 1.17 |
| 25.00 | 0.18 | 0.45 | 0.41* | 1.15 | 0.00 | 1.15 |
| 25.05 | 0.19 | 0.45 | 0.41* | 1.14 | 0.00 | 1.14 |
| 25.10 | 0.19 | 0.45 | 0.42* | 1.13 | 0.00 | 1.13 |
| 25.15 | 0.19 | 0.45 | 0.42* | 1.11 | 0.00 | 1.11 |
| 25.20 | 0.19 | 0.45 | 0.43* | 1.10 | 0.00 | 1.10 |
| 25.25 | 0.20 | 0.45 | 0.44* | 1.09 | 0.00 | 1.09 |
| 25.30 | 0.20 | 0.45 | 0.44* | 1.08 | 0.00 | 1.08 |
| 25.35 | 0.20 | 0.45 | 0.45* | 1.06 | 0.00 | 1.06 |
| 25.40 | 0.20 | 0.45 | 0.45* | 1.05 | 0.00 | 1.05 |
| 25.45 | 0.21 | 0.45 | 0.46* | 1.04 | 0.00 | 1.04 |
| 25.50 | 0.21 | 0.45 | 0.46* | 1.03 | 0.00 | 1.03 |
| 25.55 | 0.21 | 0.45 | 0.47* | 1.01 | 0.00 | 1.01 |
| 25.60 | 0.22 | 0.45 | 0.47* | 1.00 | 0.00 | 1.00 |
| 25.65 | 0.22 | 0.45 | 0.48* | 0.99 | 0.00 | 0.99 |
| 25.70 | 0.22 | 0.45 | 0.48* | 0.98 | 0.00 | 0.98 |
| 25.75 | 0.22 | 0.46 | 0.49* | 0.97 | 0.00 | 0.97 |
| 25.80 | 0.23 | 0.46 | 0.50* | 0.96 | 0.00 | 0.96 |
| 25.85 | 0.23 | 0.46 | 0.50* | 0.95 | 0.00 | 0.95 |
| 25.90 | 0.23 | 0.46 | 0.51* | 0.93 | 0.00 | 0.93 |
| 25.95 | 0.23 | 0.46 | 0.51* | 0.92 | 0.00 | 0.92 |
| 26.00 | 0.24 | 0.46 | 0.52* | 0.91 | 0.00 | 0.91 |
| 26.05 | 0.24 | 0.46 | 0.52* | 0.90 | 0.00 | 0.90 |
| 26.10 | 0.24 | 0.46 | 0.53* | 0.89 | 0.00 | 0.89 |
| 26.15 | 0.24 | 0.46 | 0.53* | 0.88 | 0.00 | 0.88 |
| 26.20 | 0.25 | 0.46 | 0.54* | 0.87 | 0.00 | 0.87 |
| 26.25 | 0.25 | 0.46 | 0.54* | 0.86 | 0.00 | 0.86 |
| 26.30 | 0.25 | 0.46 | 0.55* | 0.85 | 0.00 | 0.85 |
| 26.35 | 0.25 | 0.46 | 0.55* | 0.84 | 0.00 | 0.84 |
| 26.40 | 0.26 | 0.46 | 0.56* | 0.83 | 0.00 | 0.83 |
| 26.45 | 0.26 | 0.46 | 0.56* | 0.82 | 0.00 | 0.82 |
| 26.50 | 0.26 | 0.46 | 0.57* | 0.81 | 0.00 | 0.81 |
| 26.55 | 0.26 | 0.46 | 0.57* | 0.80 | 0.00 | 0.80 |
| 26.60 | 0.27 | 0.46 | 0.58* | 0.79 | 0.00 | 0.79 |
| 26.65 | 0.27 | 0.46 | 0.58* | 0.78 | 0.00 | 0.78 |
| 26.70 | 0.27 | 0.46 | 0.59* | 0.77 | 0.00 | 0.77 |
| 26.75 | 0.27 | 0.46 | 0.59* | 0.76 | 0.00 | 0.76 |
| 26.80 | 0.28 | 0.46 | 0.60* | 0.75 | 0.00 | 0.75 |
| 26.85 | 0.28 | 0.46 | 0.60* | 0.74 | 0.00 | 0.74 |
| 26.90 | 0.28 | 0.46 | 0.61* | 0.73 | 0.00 | 0.73 |
| 26.95 | 0.28 | 0.46 | 0.61* | 0.72 | 0.00 | 0.72 |
| 27.00 | 0.29 | 0.46 | 0.62* | 0.71 | 0.00 | 0.71 |
| 27.05 | 0.29 | 0.46 | 0.62* | 0.70 | 0.00 | 0.70 |
| 27.10 | 0.29 | 0.46 | 0.63* | 0.70 | 0.00 | 0.70 |
| 27.15 | 0.29 | 0.46 | 0.63* | 0.69 | 0.00 | 0.69 |
| 27.20 | 0.30 | 0.46 | 0.64* | 0.68 | 0.00 | 0.68 |

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|---|---|---|---|---|---|---|
| 27.25 | 0.30 | 0.46 | 0.65* | 0.67 | 0.00 | 0.67 |
| 27.30 | 0.30 | 0.46 | 0.65* | 0.66 | 0.00 | 0.66 |
| 27.35 | 0.30 | 0.46 | 0.66* | 0.65 | 0.00 | 0.65 |
| 27.40 | 0.31 | 0.46 | 0.66* | 0.64 | 0.00 | 0.64 |
| 27.45 | 0.31 | 0.46 | 0.67* | 0.64 | 0.00 | 0.64 |
| 27.50 | 0.31 | 0.46 | 0.67* | 0.63 | 0.00 | 0.63 |
| 27.55 | 0.31 | 0.46 | 0.67* | 0.62 | 0.00 | 0.62 |
| 27.60 | 0.31 | 0.46 | 0.67* | 0.61 | 0.00 | 0.61 |
| 27.65 | 0.31 | 0.47 | 0.68* | 0.60 | 0.00 | 0.60 |
| 27.70 | 0.32 | 0.47 | 0.68* | 0.60 | 0.00 | 0.60 |
| 27.75 | 0.32 | 0.47 | 0.68* | 0.59 | 0.00 | 0.59 |
| 27.80 | 0.32 | 0.47 | 0.68* | 0.58 | 0.00 | 0.58 |
| 27.85 | 0.32 | 0.47 | 0.68* | 0.57 | 0.00 | 0.57 |
| 27.90 | 0.33 | 0.47 | 0.71* | 0.56 | 0.00 | 0.56 |
| 27.95 | 0.33 | 0.47 | 0.72* | 0.56 | 0.00 | 0.56 |
| 28.00 | 0.33 | 0.47 | 0.72* | 0.55 | 0.00 | 0.55 |
| 28.05 | 0.34 | 0.47 | 0.72* | 0.54 | 0.00 | 0.54 |
| 28.10 | 0.34 | 0.47 | 0.72* | 0.53 | 0.00 | 0.53 |
| 28.15 | 0.34 | 0.47 | 0.72* | 0.53 | 0.00 | 0.53 |
| 28.20 | 0.34 | 0.47 | 0.73* | 0.52 | 0.00 | 0.52 |
| 28.25 | 0.34 | 0.47 | 0.73* | 0.51 | 0.00 | 0.51 |
| 28.30 | 0.34 | 0.47 | 0.73* | 0.50 | 0.00 | 0.50 |
| 28.35 | 0.34 | 0.47 | 0.73* | 0.50 | 0.00 | 0.50 |
| 28.40 | 0.34 | 0.47 | 0.73* | 0.49 | 0.00 | 0.49 |
| 28.45 | 0.35 | 0.47 | 0.74* | 0.48 | 0.00 | 0.48 |
| 28.50 | 0.35 | 0.47 | 0.74* | 0.47 | 0.00 | 0.47 |
| 28.55 | 0.35 | 0.47 | 0.74* | 0.47 | 0.00 | 0.47 |
| 28.60 | 0.35 | 0.47 | 0.74* | 0.46 | 0.00 | 0.46 |
| 28.65 | 0.35 | 0.47 | 0.74* | 0.45 | 0.00 | 0.45 |
| 28.70 | 0.35 | 0.47 | 0.75* | 0.45 | 0.00 | 0.45 |
| 28.75 | 0.35 | 0.47 | 0.75* | 0.44 | 0.00 | 0.44 |
| 28.80 | 0.35 | 0.47 | 0.75* | 0.43 | 0.00 | 0.43 |
| 28.85 | 0.35 | 0.47 | 0.75* | 0.42 | 0.00 | 0.42 |
| 28.90 | 0.36 | 0.47 | 0.75* | 0.42 | 0.00 | 0.42 |
| 28.95 | 0.36 | 0.47 | 0.76* | 0.41 | 0.00 | 0.41 |
| 29.00 | 0.36 | 0.47 | 0.76* | 0.40 | 0.00 | 0.40 |
| 29.05 | 0.36 | 0.47 | 0.76* | 0.40 | 0.00 | 0.40 |
| 29.10 | 0.36 | 0.47 | 0.76* | 0.39 | 0.00 | 0.39 |
| 29.15 | 0.36 | 0.47 | 0.77* | 0.38 | 0.00 | 0.38 |
| 29.20 | 0.36 | 0.47 | 0.77* | 0.38 | 0.00 | 0.38 |
| 29.25 | 0.36 | 0.47 | 0.77* | 0.37 | 0.00 | 0.37 |
| 29.30 | 0.36 | 0.47 | 0.77* | 0.36 | 0.00 | 0.36 |
| 29.35 | 0.37 | 0.47 | 0.77* | 0.36 | 0.00 | 0.36 |
| 29.40 | 0.37 | 0.47 | 0.78* | 0.35 | 0.00 | 0.35 |
| 29.45 | 0.37 | 0.47 | 0.78* | 0.34 | 0.00 | 0.34 |
| 29.50 | 0.37 | 0.47 | 0.78* | 0.34 | 0.00 | 0.34 |
| 29.55 | 0.37 | 0.47 | 0.78* | 0.33 | 0.00 | 0.33 |
| 29.60 | 0.37 | 0.47 | 0.78* | 0.32 | 0.00 | 0.32 |
| 29.65 | 0.37 | 0.47 | 0.79* | 0.32 | 0.00 | 0.32 |
| 29.70 | 0.37 | 0.47 | 0.79* | 0.31 | 0.00 | 0.31 |
| 29.75 | 0.38 | 0.47 | 0.79* | 0.30 | 0.00 | 0.30 |
| 29.80 | 0.38 | 0.48 | 0.79* | 0.30 | 0.00 | 0.30 |
| 29.85 | 0.38 | 0.48 | 0.80* | 0.29 | 0.00 | 0.29 |
| 29.90 | 0.38 | 0.48 | 0.80* | 0.28 | 0.00 | 0.28 |
| 29.95 | 0.38 | 0.48 | 0.80* | 0.28 | 0.00 | 0.28 |
| 30.00 | 0.38 | 0.48 | 0.80* | 0.27 | 0.00 | 0.27 |
| 30.05 | 0.38 | 0.48 | 0.81* | 0.26 | 0.00 | 0.26 |
| 30.10 | 0.39 | 0.48 | 0.81* | 0.26 | 0.00 | 0.26 |
| 30.15 | 0.39 | 0.48 | 0.81* | 0.25 | 0.00 | 0.25 |
| 30.20 | 0.39 | 0.48 | 0.81* | 0.24 | 0.00 | 0.24 |
| 30.25 | 0.39 | 0.48 | 0.82* | 0.24 | 0.00 | 0.24 |
| 30.30 | 0.39 | 0.48 | 0.82* | 0.23 | 0.00 | 0.23 |
| 30.35 | 0.39 | 0.48 | 0.82* | 0.23 | 0.00 | 0.23 |

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|---|---|---|---|---|---|---|
| 30.40 | 0.39 | 0.48 | 0.83* | 0.22 | 0.00 | 0.22 |
| 30.45 | 0.39 | 0.48 | 0.83* | 0.21 | 0.00 | 0.21 |
| 30.50 | 0.40 | 0.48 | 0.83* | 0.21 | 0.00 | 0.21 |
| 30.55 | 0.40 | 0.48 | 0.83* | 0.20 | 0.00 | 0.20 |
| 30.60 | 0.40 | 0.48 | 0.84* | 0.19 | 0.00 | 0.19 |
| 30.65 | 0.40 | 0.48 | 0.84* | 0.19 | 0.00 | 0.19 |
| 30.70 | 0.40 | 0.48 | 0.84* | 0.18 | 0.00 | 0.18 |
| 30.75 | 0.40 | 0.48 | 0.85* | 0.18 | 0.00 | 0.18 |
| 30.80 | 0.40 | 0.48 | 0.85* | 0.17 | 0.00 | 0.17 |
| 30.85 | 0.41 | 0.48 | 0.85* | 0.16 | 0.00 | 0.16 |
| 30.90 | 0.41 | 0.48 | 0.85* | 0.16 | 0.00 | 0.16 |
| 30.95 | 0.41 | 0.48 | 0.86* | 0.15 | 0.00 | 0.15 |
| 31.00 | 0.41 | 0.48 | 0.86* | 0.15 | 0.00 | 0.15 |
| 31.05 | 0.41 | 0.48 | 0.86* | 0.14 | 0.00 | 0.14 |
| 31.10 | 0.41 | 0.48 | 0.87* | 0.14 | 0.00 | 0.14 |
| 31.15 | 0.41 | 0.48 | 0.87* | 0.13 | 0.00 | 0.13 |
| 31.20 | 0.42 | 0.48 | 0.87* | 0.12 | 0.00 | 0.12 |
| 31.25 | 0.42 | 0.48 | 0.88* | 0.12 | 0.00 | 0.12 |
| 31.30 | 0.42 | 0.48 | 0.88* | 0.11 | 0.00 | 0.11 |
| 31.35 | 0.42 | 0.48 | 0.88* | 0.11 | 0.00 | 0.11 |
| 31.40 | 0.42 | 0.48 | 0.89* | 0.10 | 0.00 | 0.10 |
| 31.45 | 0.42 | 0.48 | 0.89* | 0.10 | 0.00 | 0.10 |
| 31.50 | 0.43 | 0.48 | 0.89* | 0.09 | 0.00 | 0.09 |
| 31.55 | 0.43 | 0.48 | 0.89* | 0.09 | 0.00 | 0.09 |
| 31.60 | 0.43 | 0.48 | 0.90* | 0.08 | 0.00 | 0.08 |
| 31.65 | 0.43 | 0.48 | 0.90* | 0.08 | 0.00 | 0.08 |
| 31.70 | 0.43 | 0.48 | 0.91* | 0.08 | 0.00 | 0.08 |
| 31.75 | 0.43 | 0.48 | 0.91* | 0.07 | 0.00 | 0.07 |
| 31.80 | 0.44 | 0.48 | 0.91* | 0.07 | 0.00 | 0.07 |
| 31.85 | 0.44 | 0.48 | 0.92* | 0.06 | 0.00 | 0.06 |
| 31.90 | 0.44 | 0.48 | 0.92* | 0.06 | 0.00 | 0.06 |
| 31.95 | 0.44 | 0.48 | 0.92* | 0.05 | 0.00 | 0.05 |
| 32.00 | 0.44 | 0.48 | 0.93* | 0.05 | 0.00 | 0.05 |
| 32.05 | 0.44 | 0.48 | 0.93* | 0.04 | 0.00 | 0.04 |
| 32.10 | 0.45 | 0.48 | 0.93* | 0.04 | 0.00 | 0.04 |
| 32.15 | 0.45 | 0.48 | 0.94* | 0.04 | 0.00 | 0.04 |
| 32.20 | 0.45 | 0.48 | 0.94* | 0.03 | 0.00 | 0.03 |
| 32.25 | 0.45 | 0.48 | 0.95* | 0.03 | 0.00 | 0.03 |
| 32.30 | 0.45 | 0.48 | 0.95* | 0.03 | 0.00 | 0.03 |
| 32.35 | 0.46 | 0.48 | 0.95* | 0.02 | 0.00 | 0.02 |
| 32.40 | 0.46 | 0.48 | 0.96* | 0.02 | 0.00 | 0.02 |
| 32.45 | 0.46 | 0.48 | 0.96* | 0.01 | 0.00 | 0.01 |
| 32.50 | 0.46 | 0.48 | 0.97* | 0.01 | 0.00 | 0.01 |
| 32.55 | 0.48 | 0.48 | 1.01 | 0.01 | 0.00 | 0.01 |
| 32.60 | 0.52 | 0.48 | 1.08 | 0.01 | 0.00 | 0.01 |
| 32.65 | 0.59 | 0.48 | 1.23 | 0.00 | 0.00 | 0.00 |
| 32.70 | 0.65 | 0.48 | 1.37 | 0.00 | 0.00 | 0.00 |
| 32.75 | 0.65 | 0.48 | 1.37 | 0.00 | 0.00 | 0.00 |
| 32.80 | 0.65 | 0.48 | 1.37 | 0.00 | 0.00 | 0.00 |
| 32.85 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 32.90 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 32.95 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 33.00 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 33.05 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 33.10 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 33.15 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 33.20 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 33.25 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 33.30 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 33.35 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 33.40 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 33.45 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 33.50 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |

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|---|---|---|---|---|---|---|
| 33.55 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 33.60 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 33.65 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 33.70 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 33.75 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 33.80 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 33.85 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 33.90 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 33.95 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 34.00 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 34.05 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 34.10 | 0.65 | 0.48 | 1.36 | 0.00 | 0.00 | 0.00 |
| 34.15 | 0.65 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 34.20 | 0.65 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 34.25 | 0.65 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 34.30 | 0.65 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 34.35 | 0.65 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 34.40 | 0.65 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 34.45 | 0.65 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 34.50 | 0.65 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 34.55 | 0.65 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 34.60 | 0.65 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 34.65 | 0.65 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 34.70 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 34.75 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 34.80 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 34.85 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 34.90 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 34.95 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 35.00 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 35.05 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 35.10 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 35.15 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 35.20 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 35.25 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 35.30 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 35.35 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 35.40 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 35.45 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 35.50 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 35.55 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 35.60 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 35.65 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 35.70 | 0.64 | 0.48 | 1.35 | 0.00 | 0.00 | 0.00 |
| 35.75 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 35.80 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 35.85 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 35.90 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 35.95 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 36.00 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 36.05 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 36.10 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 36.15 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 36.20 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 36.25 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 36.30 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 36.35 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 36.40 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 36.45 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 36.50 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 36.55 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 36.60 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 36.65 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |

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|---|---|---|---|---|---|---|
| 36.70 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 36.75 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 36.80 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 36.85 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 36.90 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 36.95 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 37.00 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 37.05 | 0.64 | 0.48 | 1.34 | 0.00 | 0.00 | 0.00 |
| 37.10 | 0.64 | 0.47 | 1.34 | 0.00 | 0.00 | 0.00 |
| 37.15 | 0.64 | 0.47 | 1.34 | 0.00 | 0.00 | 0.00 |
| 37.20 | 0.63 | 0.47 | 1.34 | 0.00 | 0.00 | 0.00 |
| 37.25 | 0.63 | 0.47 | 1.34 | 0.00 | 0.00 | 0.00 |
| 37.30 | 0.63 | 0.47 | 1.34 | 0.00 | 0.00 | 0.00 |
| 37.35 | 0.63 | 0.47 | 1.34 | 0.00 | 0.00 | 0.00 |
| 37.40 | 0.63 | 0.47 | 1.34 | 0.00 | 0.00 | 0.00 |
| 37.45 | 0.63 | 0.47 | 1.34 | 0.00 | 0.00 | 0.00 |
| 37.50 | 0.63 | 0.47 | 1.34 | 0.00 | 0.00 | 0.00 |
| 37.55 | 0.63 | 0.47 | 1.34 | 0.00 | 0.00 | 0.00 |
| 37.60 | 0.63 | 0.47 | 1.34 | 0.00 | 0.00 | 0.00 |
| 37.65 | 0.63 | 0.47 | 1.34 | 0.00 | 0.00 | 0.00 |
| 37.70 | 0.63 | 0.47 | 1.34 | 0.00 | 0.00 | 0.00 |
| 37.75 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 37.80 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 37.85 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 37.90 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 37.95 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 38.00 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 38.05 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 38.10 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 38.15 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 38.20 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 38.25 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 38.30 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 38.35 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 38.40 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 38.45 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 38.50 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 38.55 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 38.60 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 38.65 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 38.70 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 38.75 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 38.80 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 38.85 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 38.90 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 38.95 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 39.00 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 39.05 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 39.10 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 39.15 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 39.20 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 39.25 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 39.30 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 39.35 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 39.40 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 39.45 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 39.50 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 39.55 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 39.60 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 39.65 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 39.70 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 39.75 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 39.80 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |

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|---|---|---|---|---|---|---|
| 39.85 | 0.63 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 39.90 | 0.62 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 39.95 | 0.62 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 40.00 | 0.62 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 40.05 | 0.62 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 40.10 | 0.62 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 40.15 | 0.62 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 40.20 | 0.62 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 40.25 | 0.62 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 40.30 | 0.62 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 40.35 | 0.62 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 40.40 | 0.62 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 40.45 | 0.62 | 0.47 | 1.33 | 0.00 | 0.00 | 0.00 |
| 40.50 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 40.55 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 40.60 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 40.65 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 40.70 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 40.75 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 40.80 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 40.85 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 40.90 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 40.95 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 41.00 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 41.05 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 41.10 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 41.15 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 41.20 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 41.25 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 41.30 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 41.35 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 41.40 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 41.45 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 41.50 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 41.55 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 41.60 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 41.65 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 41.70 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 41.75 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 41.80 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 41.85 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 41.90 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 41.95 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 42.00 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 42.05 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 42.10 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 42.15 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 42.20 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 42.25 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 42.30 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 42.35 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 42.40 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 42.45 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 42.50 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 42.55 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 42.60 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 42.65 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 42.70 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 42.75 | 0.62 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 42.80 | 0.61 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 42.85 | 0.61 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 42.90 | 0.61 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 42.95 | 0.61 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |

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|---|---|---|---|---|---|---|
| 43.00 | 0.61 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 43.05 | 0.61 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 43.10 | 0.61 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 43.15 | 0.61 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 43.20 | 0.61 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 43.25 | 0.61 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 43.30 | 0.61 | 0.47 | 1.32 | 0.00 | 0.00 | 0.00 |
| 43.35 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 43.40 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 43.45 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 43.50 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 43.55 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 43.60 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 43.65 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 43.70 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 43.75 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 43.80 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 43.85 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 43.90 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 43.95 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 44.00 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 44.05 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 44.10 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 44.15 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 44.20 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 44.25 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 44.30 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 44.35 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 44.40 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 44.45 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 44.50 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 44.55 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 44.60 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 44.65 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 44.70 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 44.75 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 44.80 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 44.85 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 44.90 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 44.95 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 45.00 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 45.05 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 45.10 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 45.15 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 45.20 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 45.25 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 45.30 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 45.35 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 45.40 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 45.45 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 45.50 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 45.55 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 45.60 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 45.65 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 45.70 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 45.75 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 45.80 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 45.85 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 45.90 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 45.95 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 46.00 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 46.05 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 46.10 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 46.15 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 46.20 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 46.25 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 46.30 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 46.35 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 46.40 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 46.45 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 46.50 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 46.55 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 46.60 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 46.65 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 46.70 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 46.75 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 46.80 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 46.85 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 46.90 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 46.95 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 47.00 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 47.05 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 47.10 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 47.15 | 0.61 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 47.20 | 0.60 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 47.25 | 0.60 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 47.30 | 0.60 | 0.46 | 1.32 | 0.00 | 0.00 | 0.00 |
| 47.35 | 0.60 | 0.46 | 1.33 | 0.00 | 0.00 | 0.00 |
| 47.40 | 0.60 | 0.46 | 1.33 | 0.00 | 0.00 | 0.00 |
| 47.45 | 0.60 | 0.46 | 1.33 | 0.00 | 0.00 | 0.00 |
| 47.50 | 0.60 | 0.46 | 1.33 | 0.00 | 0.00 | 0.00 |
| 47.55 | 0.60 | 0.46 | 1.33 | 0.00 | 0.00 | 0.00 |
| 47.60 | 0.60 | 0.46 | 1.33 | 0.00 | 0.00 | 0.00 |
| 47.65 | 0.60 | 0.46 | 1.33 | 0.00 | 0.00 | 0.00 |
| 47.70 | 0.60 | 0.46 | 1.33 | 0.00 | 0.00 | 0.00 |
| 47.75 | 0.60 | 0.46 | 1.33 | 0.00 | 0.00 | 0.00 |
| 47.80 | 0.60 | 0.46 | 1.33 | 0.00 | 0.00 | 0.00 |
| 47.85 | 0.60 | 0.46 | 1.33 | 0.00 | 0.00 | 0.00 |
| 47.90 | 0.60 | 0.46 | 1.33 | 0.00 | 0.00 | 0.00 |
| 47.95 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 48.00 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 48.05 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 48.10 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 48.15 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 48.20 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 48.25 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 48.30 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 48.35 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 48.40 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 48.45 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 48.50 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 48.55 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 48.60 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 48.65 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 48.70 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 48.75 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 48.80 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 48.85 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 48.90 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 48.95 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 49.00 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 49.05 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 49.10 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 49.15 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 49.20 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 49.25 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 49.30 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 49.35 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 49.40 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 49.45 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 49.50 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 49.55 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 49.60 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 49.65 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 49.70 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 49.75 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 49.80 | 0.60 | 0.45 | 1.33 | 0.00 | 0.00 | 0.00 |
| 49.85 | 0.60 | 0.45 | 1.34 | 0.00 | 0.00 | 0.00 |
| 49.90 | 0.60 | 0.45 | 1.34 | 0.00 | 0.00 | 0.00 |
| 49.95 | 0.60 | 0.45 | 1.34 | 0.00 | 0.00 | 0.00 |
| 50.00 | 0.60 | 0.45 | 1.34 | 0.00 | 0.00 | 0.00 |

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

**APPENDIX E**

**REFERENCES**

RMA GeoScience
Every Project Matters | www.rmacompanies.com

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**AERIAL PHOTOGRAPHS UTILIZED**

| Source | Flight Date | Flight No. | Photograph No. |
|---|---|---|---|
| 1 | 6-15-2001 | C-541 | 39, 40 |
| 1 | 4-22-1996 | C-528 | 36 |
| 1 | 7-1-1991 | C-487 | 29, 30 |
| 2 | 10-13-1986 | --- | K21 |
| 1 | 2-25-1986 | C-450 | 16, 17 |
| 1 | 1-21-1978 | C-279 | 14 |
| 1 | 2-1969 | C-295 | 113 |
| 1 | 1-30-1969 | C-293 | 1 |
| 1 | 11-8-1955 | F-34 | 2-25, 2-37 |
| 1 | 1938 | W-67 | A-2-8 |
| 1 | 5-30-1938 | AXL-40 | 22 |
| 3 | 5-31-1937 | C-4542 | 56 |
| 3 | 1931 | C-1740 | 339 |

Sources:

1. – San Bernardino County Flood Control District
2. – Rupp Aerial Photography, Inc.
3. – Santa Barbara Aerial Photography Library (https://mil.library.ucsb.edu/ap_indexes/FrameFinder/)

# PRELIMINARY HYDROLOGY STUDY

FOR

**Chino Rental Neighborhood**

**SWC Academy Street & East Preserve Loop**

**Chino, CA**

*Prepared for Owner/Developer:*

**Chino Holding Company, LLC**

**1156 North Mountain Avenue**

**Upland, CA 91786**

*Prepared By:*


**DRC ENGINEERING, INC.**
**160 S. Old Springs Road, Suite 210**
**Anaheim Hills, CA 92808**
**(714) 685-6860**





Ronald W. Sklepko RCE 46216 Exp.12-31-20

2020-09-29

DRC Job No. 19-360

# TABLE OF CONTENTS


| | |
|---|---|
| Section I | Introduction |
| Section II | Existing Site Condition |
| Section III | Project Description |
| Section IV | Rational Method Hydrologic Analysis |
| Section V | Hydraulic Analysis |
| Section VI | WQMP Calculations |
| Section VII | Conclusion |

| | |
|---|---|
| Appendix A | Vicinity Map |
| Appendix B | Precipitation, Soil Map |
| Appendix C | Rational Method Calculations - Existing Condition |
| Appendix D | Rational Method Calculations – Proposed Condition |
| Appendix E | Hydraulic Calculations |
| Appendix F | Approval to Add Mill Creek Wetlands as a Regional BMP |
| Appendix G | Reference Plans |
| Appendix H | Hydrology Maps |

## Section I Introduction

This preliminary hydrology study has been prepared for the Chino Rental Neighborhood project located in the City of Chino, County of San Bernardino, State of California. The project site is located on the southwest corner of proposed Academy Street and East Preserve Loop (Ref. Appendix A).

## Section II Existing Site Condition

The project site encompasses an area of approximately 12.33 acres and the site is currently vacant. The site is part of Tract No. 16420-4 mass grading plans prepared by LD King, Inc. The stormwater runoff from the site is divided between two discharge points. The west half (approx. 6.2 acres) of the site flow to a temp. riser which ultimately discharges to the proposed 36" storm drain (Line F4) along the proposed Legacy Park Street. The East half (approx. 6.1 acres) of the site flow to a temp. riser which ultimately discharges to the 24" storm drain (Line F9) along the proposed Legacy Park Street. Refer to the "Existing Hydrology Map" in **Appendix H** for an illustration of the existing drainage condition. Per "The Preserve" Storm Drain DIF, the stormwater will ultimately discharge to Mill Creek Water Quality Basin which was previously approved by State Waterboard to address both hydraulic conditions of concern (HCOC) and regional LID structural treatment control best management practice (BMP) potentially caused by certain new developments proposed in the cities of Ontario and Chino. See **Appendix G** for reference plans.

## Section III Project Description

The site is within The Preserve Specific Plan. The proposed site is consisting of 210 units of condominium residential, pool, and amenities. In the proposed condition, the drainage pattern is consistent with existing site condition. The site can be divided into two distinctive drainage areas. There are two backbone private storm drain system with lateral and inlets collects stormwater generated from the site. Both storm drain system will connect to the 24" diameter stubouts which ultimate discharge to storm drain Line F4 and storm drain Line F9 described earlier. Refer to the "Proposed Hydrology Map" in **Appendix H** for an illustration of the existing drainage condition.

## Section IV Rational Method Hydrologic Analysis

The Rational Method hydrologic analysis was completed in accordance with the 1986 San Bernardino County Hydrology Manual and 2010 Hydrology Manual Addendum. The rational method analysis was used to calculate the following using Advanced Engineering Software (AES) software programs:

- the peak flow rates of 10-year frequency, existing condition
- the peak flow rates of 10-year frequency, proposed condition
- the peak flow rates of 100-year frequency, existing condition
- the peak flow rates of 100-year frequency, proposed condition

The 1-hour rainfall intensities for 10-year and 100-year storm frequencies are from NOAA Atlas 14, see Appendix B. The slope of intensity duration curve is 0.6, per County of San Bernardino Hydrology Manual Section D.4. The Web Soil Survey indicates the project site is situated within an area comprised of Chino Silt Loam and Chualar Clay Loam, which is identified as hydrologic soil type "C" in the Hydrology Manual.

The following table summarize the 10-year and 100-year peak discharge rates for the existing condition and the proposed condition.

| EXISTING CONDITION DRAINAGE SUMMARY | | | | |
|---|---|---|---|---|
| | **SUBAREA** | **AREA Acres** | **$Q_{10}$ (cfs)** | **$Q_{100}$ (cfs)** |
| **Drainage Area A** | A1 | 2.35 | 4.07 | 6.79 |
| | A2 | 3.86 | 6.18 | 10.42 |
| | TOTAL: | 6.21 | 10.25 | 17.21 |
| **Drainage Area B** | B1 | 2.49 | 4.51 | 7.49 |
| | B2 | 3.63 | 5.60 | 9.56 |
| | TOTAL: | 6.12 | 10.11 | 17.05 |
| **Total:** | | **12.33** | **20.36** | **34.26** |

| ROOPOSED CONDITION DRAINAGE SUMMARY | | | | |
|---|---|---|---|---|
| | **SUBAREA** | **AREA Acres** | **$Q_{10}$ (cfs)** | **$Q_{100}$ (cfs)** |
| **Drainage Area A** | A1 | 0.85 | 1.63 | 2.67 |
| | A2 | 2.04 | 3.01 | 5.11 |
| | A3 | 3.90 | 6.10 | 10.28 |
| | TOTAL: | 6.79 | 10.74 | 18.06 |
| **Drainage Area B** | B1 | 0.31 | 0.82 | 1.34 |
| | B2 | 1.58 | 3.68 | 6.07 |
| | B3 | 3.65 | 7.88 | 13.12 |
| | TOTAL: | 5.54 | 12.38 | 20.53 |
| **Total:** | | **12.33** | **23.12** | **38.59** |

## Section V Hydraulic Analysis

The on-site inlets and on-site private storm drain system will be designed for a 100-year storm event. Per the proposed public storm drain Improvement Plan by LD King, there are two stubout identified as Lateral F4.1 and Line F9 designed to accept the runoff from the proposed development. The 24" storm drain stubout (Lateral F4.1) is designed to accept 18.8 cfs from the project site in the 100-year condition. The second 24" storm drain stubout (Line F9 ) is designed to accept 18.3 cfs from the project site in the 100-year condition. The flow rates generated by the proposed development are comparable to the designed flow rates and no downstream impacts. There are two backbone private storm drain system with lateral and inlets collects stormwater generated from the site. For the purpose of preliminary hydraulic analysis, Manning's equation with roughness of 0.012 for HDPE pipe is used to estimate sizes of the proposed on-site private storm drains.

## Section VI WQMP Calculations

On November 14, 2016, Santa Ana Regional Water Quality Control Board approved the use of MCW (Mill Creek Wetlands) for use as a regional LID structural treatment control BMP. See Appendix G for the location of the Wetlands and the approval of State Water Boards.

The following table, extracted from the County's WQMP template, shows the calculations of the design capture volume for the project site.

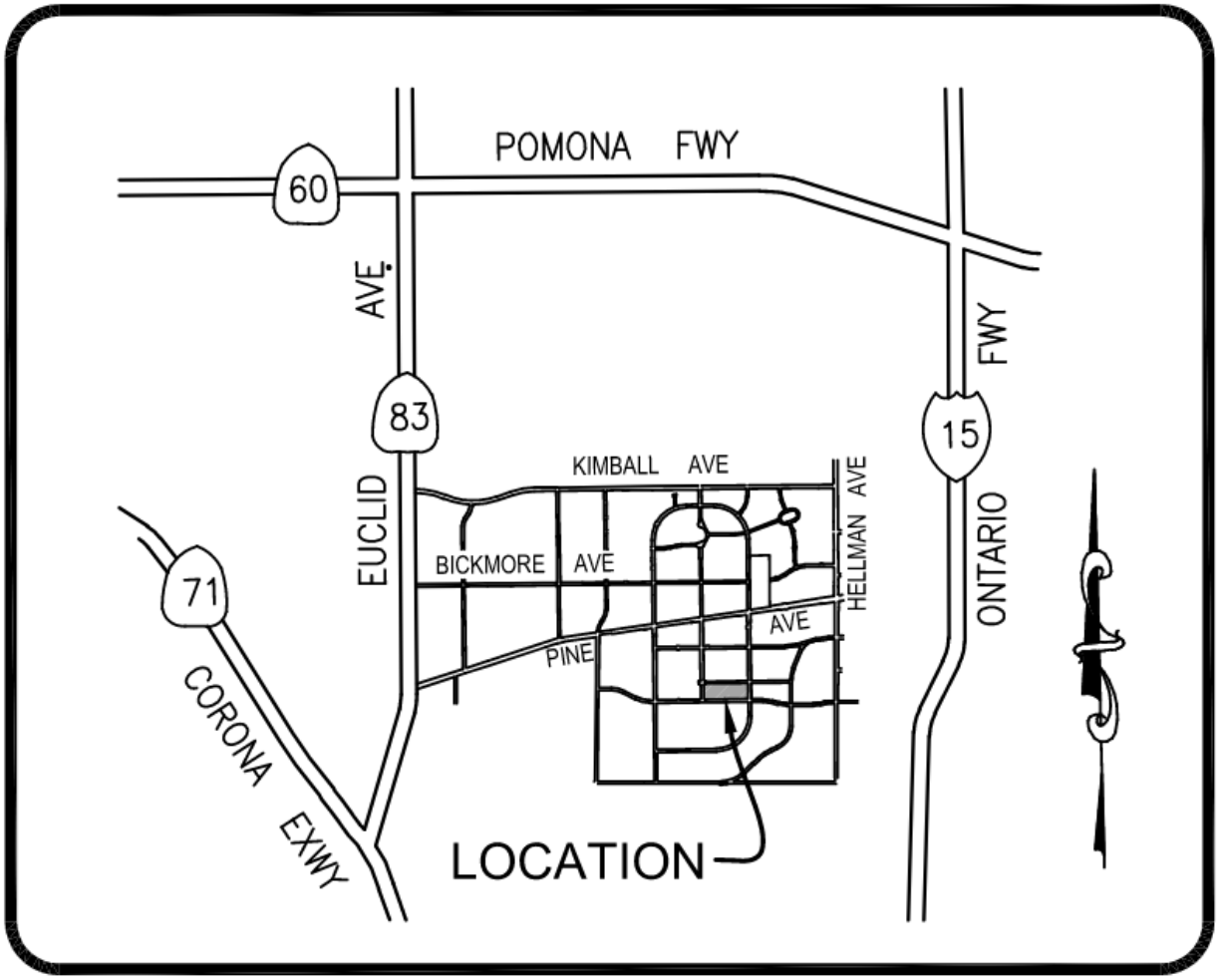
| **Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume** | | |
|---|---|---|
| **1** Project area ($ft^2$): 1,146,083 | **2** Imperviousness after applying preventative site design practices (Imp%): 90% | **3** Runoff Coefficient (Rc): 0.73<br>*$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$* |
| **4** Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.548 *http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html* | | |
| **5** Compute $P_6$, Mean 6-hr Precipitation (inches): 0.811<br>*$P_6$ = Item 4 *$C_1$, where $C_1$ is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)* | | |
| **6** Drawdown Rate<br>*Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.* | | 24-hrs ☐<br>48-hrs ☒ |
| **7** Compute design capture volume, DCV ($ft^3$): 110,994<br>*DCV = 1/12 * [Item 1* Item 3 *Item 5 * $C_2$], where $C_2$ is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)*<br>*Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2* | | |

## Section VII Conclusion

In conclusion, the proposed development will not adversely affect the existing drainage pattern in the area and will provide adequate protection for the proposed on-site improvements and structures for up to the 100-year storm event. The storm water from the project will be mitigated by the regional basin facilities south of the site.

## APPENDIX A

VICINITY MAP



# APPENDIX B

PRECIPITATION

SOIL MAP

**NOAA Atlas 14, Volume 6, Version 2**
**Location name: Chino, California, USA***
**Latitude: 33.9577°, Longitude: -117.6236°**
**Elevation: 596.83 ft****
* source: ESRI Maps
** source: USGS

## POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

# PF tabular

**PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]**

| Duration | Average recurrence interval (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 |
| 5-min | **0.113** (0.094-0.137) | **0.149** (0.124-0.180) | **0.196** (0.163-0.238) | **0.235** (0.194-0.287) | **0.288** (0.229-0.365) | **0.330** (0.257-0.427) | **0.372** (0.283-0.495) | **0.417** (0.307-0.571) | **0.478** (0.338-0.684) | **0.526** (0.359-0.781) |
| 10-min | **0.162** (0.135-0.196) | **0.213** (0.178-0.258) | **0.281** (0.234-0.341) | **0.336** (0.278-0.412) | **0.413** (0.329-0.524) | **0.473** (0.368-0.613) | **0.534** (0.405-0.710) | **0.598** (0.441-0.818) | **0.685** (0.484-0.980) | **0.755** (0.514-1.12) |
| 15-min | **0.196** (0.164-0.237) | **0.258** (0.215-0.312) | **0.340** (0.283-0.412) | **0.407** (0.336-0.498) | **0.499** (0.398-0.633) | **0.571** (0.445-0.741) | **0.645** (0.490-0.858) | **0.723** (0.533-0.990) | **0.829** (0.585-1.19) | **0.912** (0.621-1.35) |
| 30-min | **0.285** (0.238-0.344) | **0.375** (0.313-0.454) | **0.494** (0.411-0.600) | **0.592** (0.489-0.725) | **0.727** (0.579-0.922) | **0.832** (0.648-1.08) | **0.939** (0.713-1.25) | **1.05** (0.776-1.44) | **1.21** (0.852-1.73) | **1.33** (0.904-1.97) |
| 60-min | **0.416** (0.348-0.503) | **0.548** (0.457-0.663) | **0.722** (0.601-0.876) | **0.865** (0.714-1.06) | **1.06** (0.846-1.35) | **1.22** (0.946-1.58) | **1.37** (1.04-1.83) | **1.54** (1.13-2.10) | **1.76** (1.24-2.52) | **1.94** (1.32-2.88) |
| 2-hr | **0.620** (0.518-0.749) | **0.814** (0.679-0.985) | **1.07** (0.888-1.30) | **1.27** (1.05-1.56) | **1.55** (1.24-1.97) | **1.76** (1.37-2.29) | **1.98** (1.50-2.64) | **2.20** (1.63-3.02) | **2.51** (1.77-3.59) | **2.75** (1.87-4.07) |
| 3-hr | **0.774** (0.646-0.935) | **1.01** (0.847-1.23) | **1.33** (1.11-1.61) | **1.58** (1.31-1.94) | **1.92** (1.53-2.44) | **2.18** (1.70-2.83) | **2.45** (1.86-3.26) | **2.72** (2.01-3.73) | **3.09** (2.18-4.42) | **3.37** (2.30-5.00) |
| 6-hr | **1.09** (0.907-1.31) | **1.43** (1.19-1.73) | **1.87** (1.55-2.27) | **2.22** (1.83-2.72) | **2.70** (2.15-3.42) | **3.06** (2.38-3.96) | **3.42** (2.60-4.55) | **3.79** (2.80-5.20) | **4.30** (3.03-6.15) | **4.68** (3.19-6.95) |
| 12-hr | **1.42** (1.19-1.72) | **1.88** (1.57-2.27) | **2.47** (2.06-3.00) | **2.95** (2.43-3.61) | **3.59** (2.86-4.55) | **4.08** (3.18-5.28) | **4.57** (3.47-6.07) | **5.07** (3.74-6.94) | **5.74** (4.05-8.21) | **6.26** (4.26-9.28) |
| 24-hr | **1.87** (1.66-2.16) | **2.51** (2.22-2.89) | **3.33** (2.93-3.85) | **3.99** (3.49-4.66) | **4.89** (4.14-5.89) | **5.57** (4.62-6.85) | **6.26** (5.07-7.89) | **6.97** (5.49-9.02) | **7.93** (6.00-10.7) | **8.66** (6.34-12.1) |
| 2-day | **2.28** (2.02-2.63) | **3.10** (2.74-3.58) | **4.17** (3.68-4.83) | **5.05** (4.42-5.89) | **6.25** (5.29-7.53) | **7.17** (5.95-8.82) | **8.11** (6.57-10.2) | **9.09** (7.16-11.8) | **10.4** (7.89-14.1) | **11.5** (8.39-16.0) |
| 3-day | **2.45** (2.17-2.83) | **3.37** (2.98-3.89) | **4.59** (4.04-5.31) | **5.59** (4.88-6.52) | **6.96** (5.89-8.39) | **8.03** (6.66-9.88) | **9.13** (7.40-11.5) | **10.3** (8.10-13.3) | **11.9** (8.97-16.0) | **13.1** (9.58-18.3) |
| 4-day | **2.66** (2.35-3.07) | **3.68** (3.25-4.25) | **5.03** (4.43-5.82) | **6.15** (5.37-7.17) | **7.69** (6.51-9.26) | **8.89** (7.37-10.9) | **10.1** (8.20-12.8) | **11.4** (8.99-14.8) | **13.2** (9.98-17.8) | **14.6** (10.7-20.4) |
| 7-day | **3.05** (2.70-3.52) | **4.24** (3.74-4.89) | **5.81** (5.12-6.73) | **7.11** (6.22-8.30) | **8.91** (7.54-10.7) | **10.3** (8.56-12.7) | **11.8** (9.53-14.8) | **13.3** (10.5-17.2) | **15.4** (11.6-20.7) | **17.0** (12.4-23.7) |
| 10-day | **3.32** (2.93-3.82) | **4.61** (4.07-5.32) | **6.34** (5.58-7.33) | **7.77** (6.79-9.06) | **9.75** (8.25-11.8) | **11.3** (9.37-13.9) | **12.9** (10.5-16.3) | **14.6** (11.5-18.9) | **16.9** (12.8-22.8) | **18.7** (13.7-26.1) |
| 20-day | **3.96** (3.50-4.56) | **5.54** (4.90-6.40) | **7.69** (6.78-8.91) | **9.50** (8.31-11.1) | **12.0** (10.2-14.5) | **14.0** (11.6-17.3) | **16.1** (13.1-20.3) | **18.4** (14.5-23.8) | **21.5** (16.2-28.9) | **23.9** (17.5-33.4) |
| 30-day | **4.69** (4.15-5.41) | **6.58** (5.82-7.60) | **9.18** (8.09-10.6) | **11.4** (9.96-13.3) | **14.5** (12.3-17.5) | **17.1** (14.1-21.0) | **19.7** (16.0-24.8) | **22.6** (17.8-29.2) | **26.6** (20.1-35.8) | **29.8** (21.8-41.6) |
| 45-day | **5.54** (4.90-6.39) | **7.77** (6.86-8.97) | **10.9** (9.58-12.6) | **13.5** (11.8-15.8) | **17.4** (14.7-21.0) | **20.5** (17.0-25.3) | **23.9** (19.3-30.1) | **27.5** (21.7-35.6) | **32.7** (24.8-44.1) | **37.0** (27.1-51.6) |
| 60-day | **6.39** (5.66-7.37) | **8.91** (7.87-10.3) | **12.5** (11.0-14.4) | **15.5** (13.6-18.1) | **20.0** (17.0-24.1) | **23.7** (19.7-29.2) | **27.7** (22.5-34.9) | **32.1** (25.3-41.5) | **38.4** (29.0-51.8) | **43.6** (31.9-60.8) |

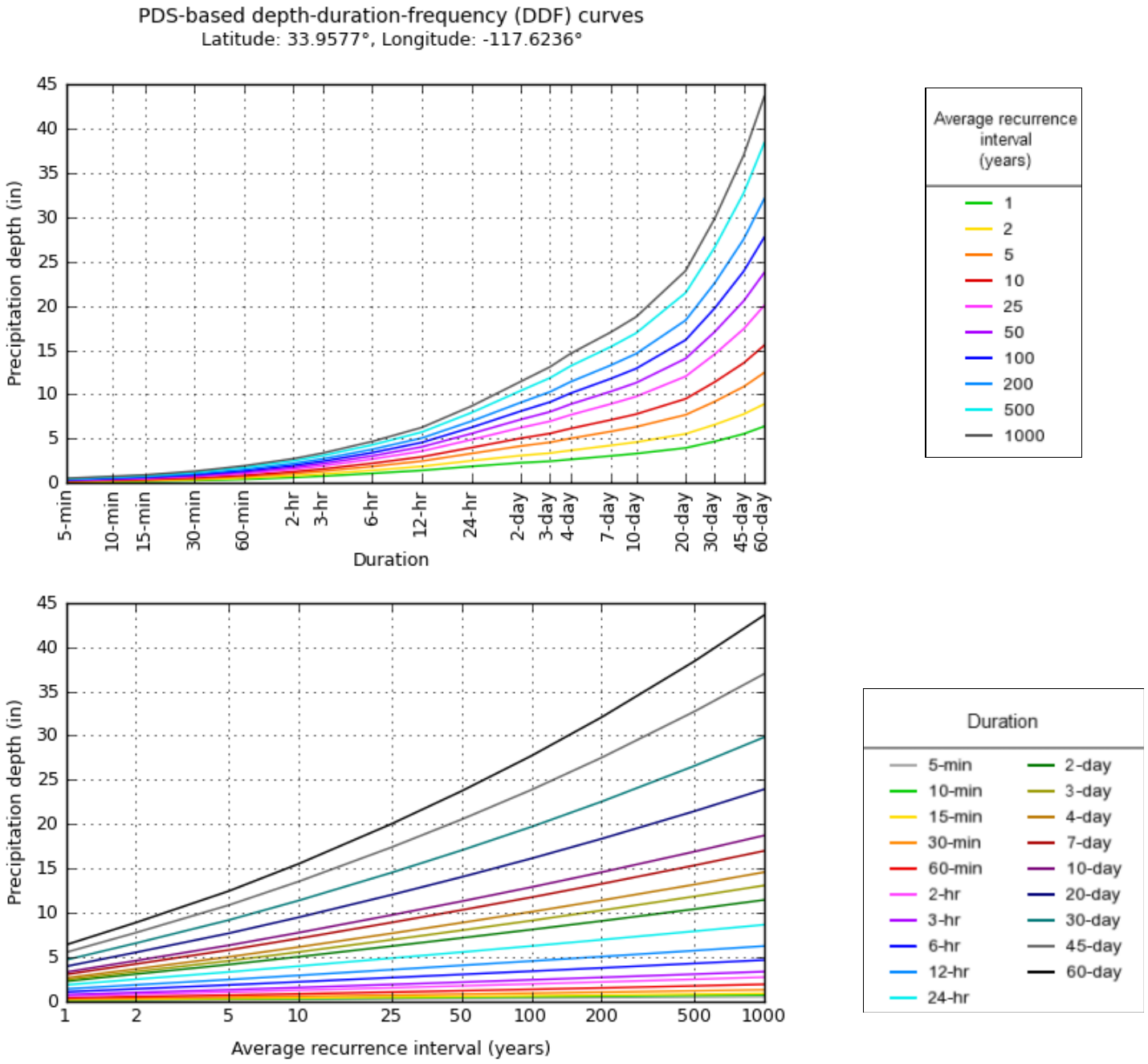
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

## PF graphical



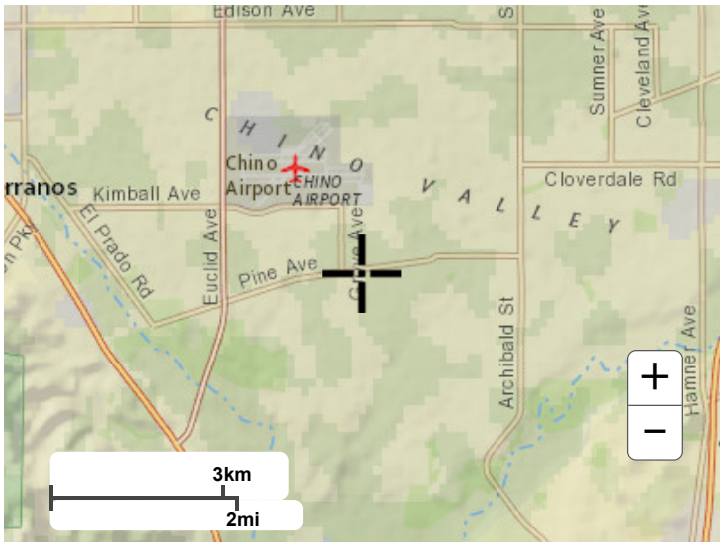

NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Tue Aug 27 15:47:07 2019

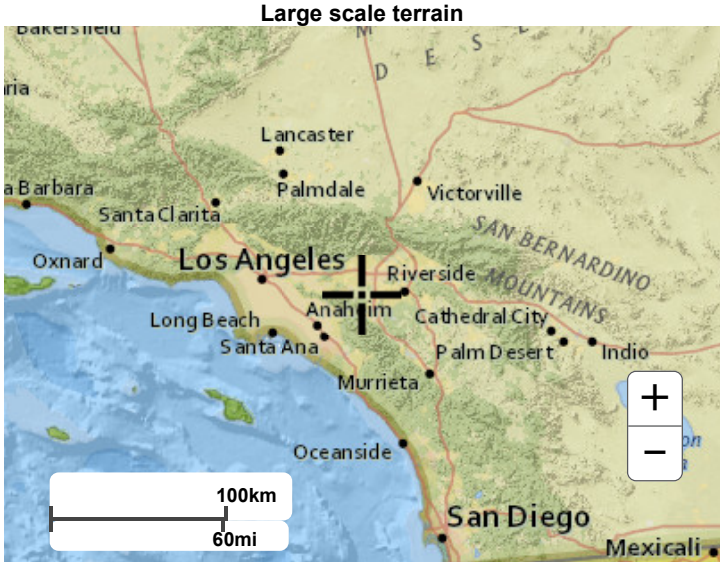
Back to Top

## Maps & aerials

**Small scale terrain**



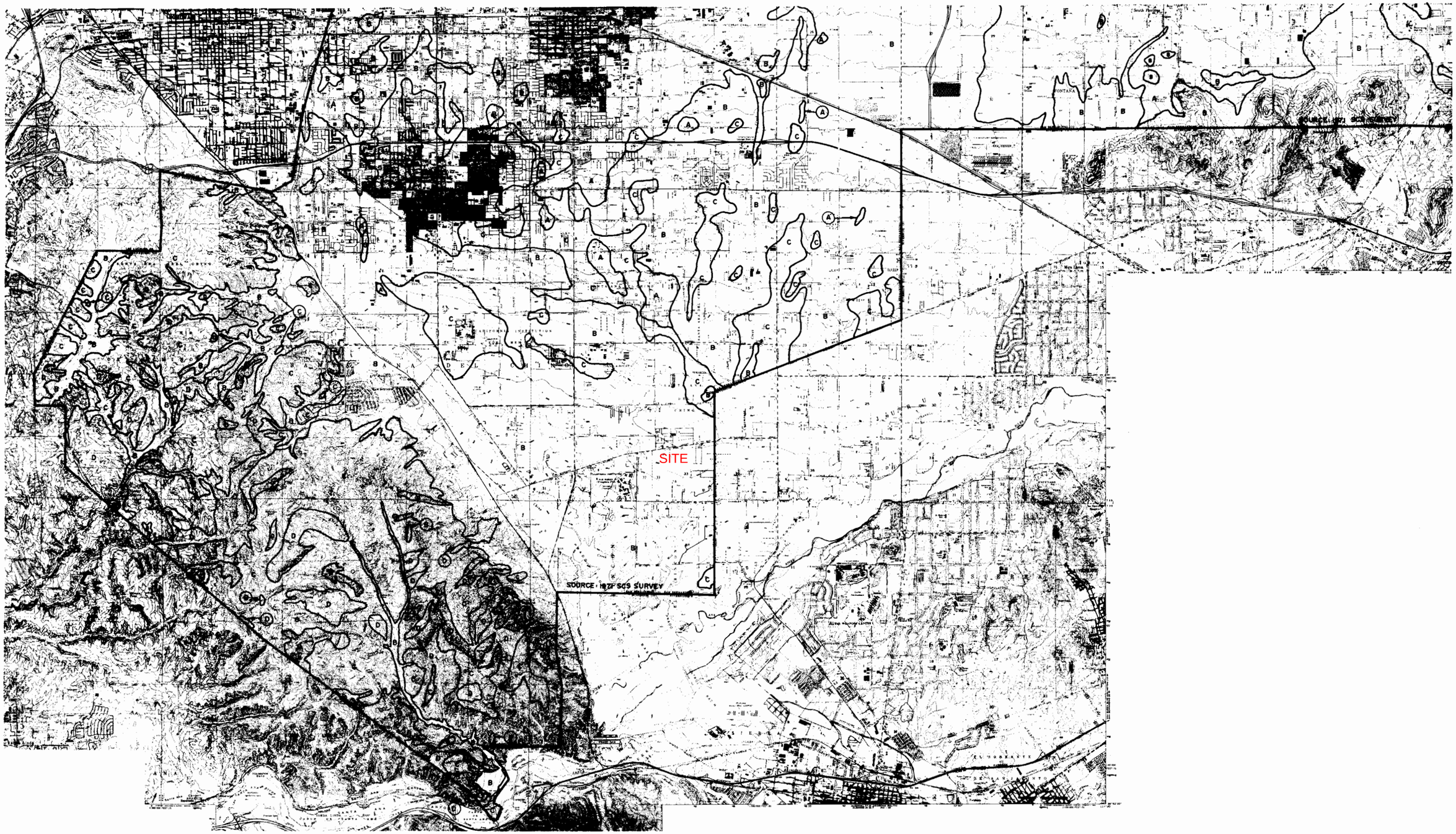

**Large scale terrain**




**Large scale map**




**Large scale aerial**




**SAN BERNARDINO COUNTY**
HYDROLOGY MANUAL

**SCALE REDUCED BY 1/2**

HYDROLOGIC SOILS GROUP MAP
FOR
SOUTHWEST-C AREA



FIGURE C-15

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for San Bernardino County Southwestern Part, California




October 1, 2020

# Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# Contents

**Preface**.....2
**How Soil Surveys Are Made**.....5
**Soil Map**.....8
Soil Map.....9
Legend.....10
Map Unit Legend.....12
Map Unit Descriptions.....12
San Bernardino County Southwestern Part, California.....14
Cb—Chino silt loam.....14
CkA—Chualar clay loam, 0 to 2 percent slopes.....15

# How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

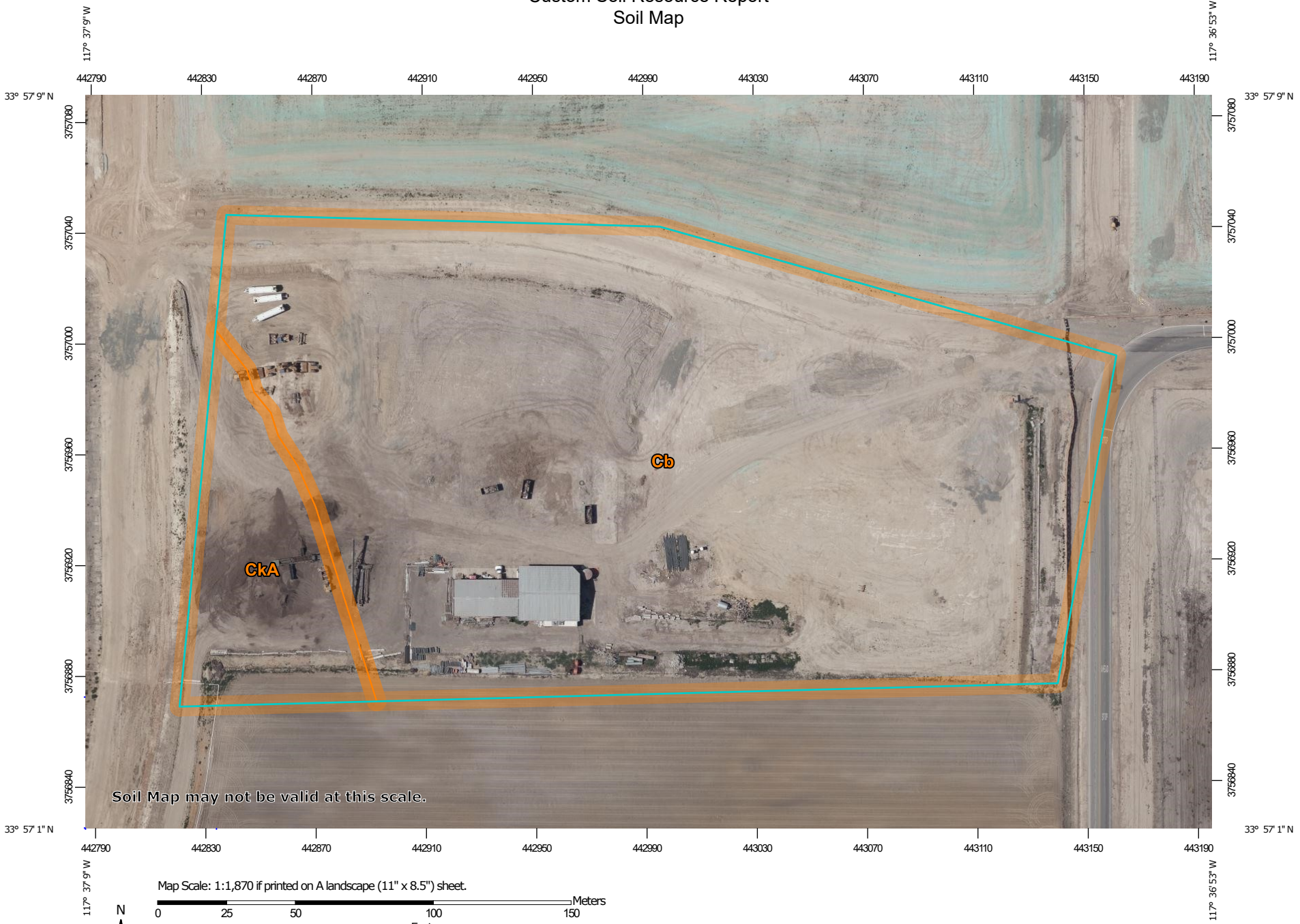
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report
## Soil Map




Map Scale: 1:1,870 if printed on A landscape (11" x 8.5") sheet.

N

0 25 50 100 150 Meters

0 50 100 200 300 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**
- Area of Interest (AOI)

**Soils**
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

**Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

**Water Features**
- Streams and Canals

**Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**
- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Bernardino County Southwestern Part, California
Survey Area Data: Version 12, May 27, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 10, 2018—Jun 5, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

## MAP LEGEND

## MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| Cb | Chino silt loam | 11.3 | 89.2% |
| CkA | Chualar clay loam, 0 to 2 percent slopes | 1.4 | 10.8% |
| **Totals for Area of Interest** | | **12.7** | **100.0%** |

# Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

# San Bernardino County Southwestern Part, California

## Cb—Chino silt loam

### Map Unit Setting

*National map unit symbol:* hcjg
*Elevation:* 20 to 3,100 feet
*Mean annual precipitation:* 8 to 20 inches
*Mean annual air temperature:* 61 to 64 degrees F
*Frost-free period:* 230 to 340 days
*Farmland classification:* Prime farmland if irrigated

### Map Unit Composition

*Chino and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Chino

#### Setting

*Landform:* Basin floors, flood plains
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from mixed

#### Typical profile

*H1 - 0 to 16 inches:* silt loam
*H2 - 16 to 60 inches:* silty clay loam

#### Properties and qualities

*Slope:* 0 to 2 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Somewhat poorly drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* Rare
*Frequency of ponding:* Rare
*Calcium carbonate, maximum content:* 10 percent
*Maximum salinity:* Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
*Sodium adsorption ratio, maximum:* 5.0
*Available water capacity:* High (about 11.2 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 1
*Land capability classification (nonirrigated):* 3e
*Hydrologic Soil Group:* C
*Hydric soil rating:* No

### Minor Components

#### Merrill, silt loam

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

**Unnamed**

*Percent of map unit:* 5 percent
*Landform:* Fan remnants
*Hydric soil rating:* Yes

**Hanford**

*Percent of map unit:* 5 percent
*Hydric soil rating:* No

## CkA—Chualar clay loam, 0 to 2 percent slopes

**Map Unit Setting**

*National map unit symbol:* hcjh
*Elevation:* 600 to 1,100 feet
*Mean annual precipitation:* 12 to 16 inches
*Mean annual air temperature:* 63 degrees F
*Frost-free period:* 230 to 300 days
*Farmland classification:* Prime farmland if irrigated

**Map Unit Composition**

*Chualar and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Chualar**

**Setting**

*Landform:* Alluvial fans
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from mixed

**Typical profile**

*H1 - 0 to 11 inches:* clay loam
*H2 - 11 to 36 inches:* clay loam
*H3 - 36 to 67 inches:* loam

**Properties and qualities**

*Slope:* 0 to 2 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 10 percent
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Available water capacity:* High (about 10.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 1
*Land capability classification (nonirrigated):* 3c
*Hydrologic Soil Group:* C
*Hydric soil rating:* No

**Minor Components**

**Chino, silt loam**

*Percent of map unit:* 5 percent
*Hydric soil rating:* No

**Hanford**

*Percent of map unit:* 5 percent
*Hydric soil rating:* No

**Sorrento, clay loam**

*Percent of map unit:* 3 percent
*Hydric soil rating:* No

**Unnamed**

*Percent of map unit:* 2 percent
*Landform:* Fan remnants
*Hydric soil rating:* Yes

# APPENDIX C

RATIONAL METHOD CALCULATIONS - EXISTING CONDITION

10-YEAR AND 100-YEAR STORM EVENTS

# RATIONAL METHOD CALCULATION
# EXISTING CONDITION - 10-YEAR

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2012 Version 7.2
Rational Hydrology Study Date: 10/13/20

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19-360 CHINO RENTAL NEIGHBORHOOD
EXISTING CONDTION RATIONAL METHOD CALCULATION
10-YEAR STORM EVENT

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Program License Serial Number 6310

---

********* Hydrology Study Control Information **********

---

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.865 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

---

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 86.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.265(In/Hr)
Initial subarea data:
Initial area flow distance = 300.000(Ft.)
Top (of initial area) elevation = 588.900(Ft.)
Bottom (of initial area) elevation = 585.700(Ft.)
Difference in elevation = 3.200(Ft.)
Slope = 0.01067 s(%)= 1.07
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.747 min.
Rainfall intensity = 2.191(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.791
Subarea runoff = 4.074(CFS)
Total initial stream area = 2.350(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.265(In/Hr)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 2.000 to Point/Station 3.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

---

Estimated mean flow rate at midpoint of channel = 0.000(CFS)

```
Depth of flow =   0.872(Ft.), Average velocity =   3.781(Ft/s)
!!Warning: Water is above left or right bank elevations
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              0.00
      2              5.00              1.00
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------
Sub-Channel flow  =      7.194(CFS)
  '     '    flow top width =      4.362(Ft.)
  '     '     velocity=    3.781(Ft/s)
  '     '    area =      1.903(Sq.Ft)
  '     '    Froude number =     1.009

Upstream point elevation =   585.700(Ft.)
Downstream point elevation =   583.000(Ft.)
Flow length =   215.000(Ft.)
Travel time  =    0.95 min.
Time of concentration =   13.69 min.
Depth of flow =   0.872(Ft.)
Average velocity =   3.781(Ft/s)
Total irregular channel flow =     7.194(CFS)
Irregular channel normal depth above invert elev. =   0.872(Ft.)
Average velocity of channel(s) =   3.781(Ft/s)
!!Warning: Water is above left or right bank elevations
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 86.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.265(In/Hr)
Rainfall intensity =      2.099(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.786
Subarea runoff =      6.175(CFS) for    3.860(Ac.)
Total runoff =     10.249(CFS)
Effective area this stream =        6.21(Ac.)
Total Study Area (Main Stream No. 1) =        6.21(Ac.)
Area averaged Fm value =    0.265(In/Hr)
Depth of flow =   0.996(Ft.), Average velocity =   4.131(Ft/s)
!!Warning: Water is above left or right bank elevations


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       20.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 86.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.265(In/Hr)
Initial subarea data:
Initial area flow distance =   300.000(Ft.)
```

```
Top (of initial area) elevation =   585.600(Ft.)
Bottom (of initial area) elevation =   581.200(Ft.)
Difference in elevation =     4.400(Ft.)
Slope =    0.01467  s(%)=       1.47
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.960 min.
Rainfall intensity =      2.276(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.795
Subarea runoff =      4.507(CFS)
Total initial stream area =        2.490(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.265(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       30.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   0.842(Ft.), Average velocity =   4.139(Ft/s)
!!Warning: Water is above left or right bank elevations
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              0.00
      2              5.00              1.00
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------
Sub-Channel flow  =      7.341(CFS)
  '     '    flow top width =      4.212(Ft.)
  '     '     velocity=    4.139(Ft/s)
  '     '    area =      1.774(Sq.Ft)
  '     '    Froude number =     1.124

Upstream point elevation =   581.200(Ft.)
Downstream point elevation =   574.500(Ft.)
Flow length =   425.000(Ft.)
Travel time  =    1.71 min.
Time of concentration =   13.67 min.
Depth of flow =   0.842(Ft.)
Average velocity =   4.139(Ft/s)
Total irregular channel flow =     7.341(CFS)
Irregular channel normal depth above invert elev. =   0.842(Ft.)
Average velocity of channel(s) =   4.139(Ft/s)
!!Warning: Water is above left or right bank elevations
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 86.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.265(In/Hr)
Rainfall intensity =      2.101(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.786
Subarea runoff =      5.604(CFS) for    3.630(Ac.)
Total runoff =     10.112(CFS)
Effective area this stream =        6.12(Ac.)
```

```
Total Study Area (Main Stream No. 1) =       12.33(Ac.)
Area averaged Fm value =    0.265(In/Hr)
Depth of flow =   0.950(Ft.), Average velocity =   4.484(Ft/s)
!!Warning: Water is above left or right bank elevations
End of computations, Total Study Area =           12.33 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number =  86.0
```

# RATIONAL METHOD CALCULATION
# EXISTING CONDITION - 100-YEAR

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2012 Version 7.2
Rational Hydrology Study Date: 10/13/20

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19-360 CHINO RENTAL NEIGHBORHOOD
EXISTING CONDTION RATIONAL METHOD CALCULATION
100-YEAR STORM EVENT

---

Program License Serial Number 6310

---

********* Hydrology Study Control Information **********

---

Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.370 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

---

UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 86.00
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.265(In/Hr)
Initial subarea data:
Initial area flow distance = 300.000(Ft.)
Top (of initial area) elevation = 588.900(Ft.)
Bottom (of initial area) elevation = 585.700(Ft.)
Difference in elevation = 3.200(Ft.)
Slope = 0.01067 s(%)= 1.07
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.747 min.
Rainfall intensity = 3.470(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.831
Subarea runoff = 6.779(CFS)
Total initial stream area = 2.350(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.265(In/Hr)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 2.000 to Point/Station 3.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

---

Estimated mean flow rate at midpoint of channel = 0.000(CFS)

```
Depth of flow =   1.047(Ft.), Average velocity =   4.399(Ft/s)
!!Warning: Water is above left or right bank elevations
      ******* Irregular Channel Data ***********
------------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00               0.00
      2              5.00               1.00
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------------
Sub-Channel flow  =     12.038(CFS)
  '     '     flow top width =      5.000(Ft.)
  '     '    velocity=    4.399(Ft/s)
  '     '     area =      2.737(Sq.Ft)
  '     '     Froude number =     1.048

Upstream point elevation =   585.700(Ft.)
Downstream point elevation =   583.000(Ft.)
Flow length =   215.000(Ft.)
Travel time  =    0.81 min.
Time of concentration =   13.56 min.
Depth of flow =   1.047(Ft.)
Average velocity =   4.399(Ft/s)
Total irregular channel flow =    12.038(CFS)
Irregular channel normal depth above invert elev. =   1.047(Ft.)
Average velocity of channel(s) =   4.399(Ft/s)
!!Warning: Water is above left or right bank elevations
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 86.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.265(In/Hr)
Rainfall intensity =      3.344(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.829
Subarea runoff =     10.427(CFS) for    3.860(Ac.)
Total runoff =     17.206(CFS)
Effective area this stream =        6.21(Ac.)
Total Study Area (Main Stream No. 1) =        6.21(Ac.)
Area averaged Fm value =    0.265(In/Hr)
Depth of flow =   1.178(Ft.), Average velocity =   5.075(Ft/s)
!!Warning: Water is above left or right bank elevations


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       20.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 86.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.265(In/Hr)
Initial subarea data:
Initial area flow distance =   300.000(Ft.)
Top (of initial area) elevation =   585.600(Ft.)
Bottom (of initial area) elevation =   581.200(Ft.)
Difference in elevation =     4.400(Ft.)
Slope =    0.01467  s(%)=       1.47
TC = k(0.525)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.960 min.
Rainfall intensity =      3.606(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.834
```

```
Subarea runoff =      7.486(CFS)
Total initial stream area =        2.490(Ac.)
Pervious area fraction = 1.000
Initial area Fm value =    0.265(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       30.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.000(CFS)
Depth of flow =   1.018(Ft.), Average velocity =   4.752(Ft/s)
!!Warning: Water is above left or right bank elevations
       ******* Irregular Channel Data ***********
------------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
       1              0.00              0.00
       2              5.00              1.00
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------------
Sub-Channel flow  =     12.312(CFS)
  '     '     flow top width =      5.000(Ft.)
  '     '    velocity=    4.752(Ft/s)
  '     '     area =      2.591(Sq.Ft)
  '     '     Froude number =     1.163

Upstream point elevation =   581.200(Ft.)
Downstream point elevation =   574.500(Ft.)
Flow length =   425.000(Ft.)
Travel time  =    1.49 min.
Time of concentration =   13.45 min.
Depth of flow =   1.018(Ft.)
Average velocity =   4.752(Ft/s)
Total irregular channel flow =    12.312(CFS)
Irregular channel normal depth above invert elev. =   1.018(Ft.)
Average velocity of channel(s) =   4.752(Ft/s)
!!Warning: Water is above left or right bank elevations
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 86.00
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.265(In/Hr)
Rainfall intensity =      3.360(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.829
Subarea runoff =      9.562(CFS) for    3.630(Ac.)
Total runoff =     17.048(CFS)
Effective area this stream =        6.12(Ac.)
Total Study Area (Main Stream No. 1) =       12.33(Ac.)
Area averaged Fm value =    0.265(In/Hr)
Depth of flow =   1.130(Ft.), Average velocity =   5.413(Ft/s)
!!Warning: Water is above left or right bank elevations
End of computations, Total Study Area =           12.33 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number =  86.0
```

# APPENDIX D

RATIONAL METHOD CALCULATIONS - PROPOSED CONDITION

10-YEAR AND 100-YEAR STORM EVENTS

# RATIONAL METHOD CALCULATION
# PROPOSED CONDITION - 10-YEAR

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2012 Version 7.2
Rational Hydrology Study Date: 10/13/20

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19-360 CHINO RENTAL NEIGHBORHOOD
PROPOSED CONDITION RATIONAL METHOD CALCUILATIONS
10-YEAR STORM EVENT

---

Program License Serial Number 6310

---

********* Hydrology Study Control Information **********

---

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.865 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

---

CONDOMINIUM subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Pervious ratio(Ap) = 0.3500 Max loss rate(Fm)= 0.192(In/Hr)
Initial subarea data:
Initial area flow distance = 300.000(Ft.)
Top (of initial area) elevation = 587.700(Ft.)
Bottom (of initial area) elevation = 586.900(Ft.)
Difference in elevation = 0.800(Ft.)
Slope = 0.00267 s(%)= 0.27
TC = k(0.360)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.533 min.
Rainfall intensity = 2.327(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.826
Subarea runoff = 1.633(CFS)
Total initial stream area = 0.850(Ac.)
Pervious area fraction = 0.350
Initial area Fm value = 0.192(In/Hr)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 2.000 to Point/Station 3.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

---

Upstream point/station elevation = 582.900(Ft.)

```
Downstream point/station elevation =   581.000(Ft.)
Pipe length  =   615.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.633(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     1.633(CFS)
Normal flow depth in pipe =    8.31(In.)
Flow top width inside pipe =   11.08(In.)
Critical Depth =    6.52(In.)
Pipe flow velocity =      2.82(Ft/s)
Travel time through pipe =    3.64 min.
Time of concentration (TC) =    15.17 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        3.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
CONDOMINIUM subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.3500     Max loss rate(Fm)=     0.192(In/Hr)
Time of concentration =    15.17 min.
Rainfall intensity =      1.974(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.813
Subarea runoff =      3.002(CFS) for    2.040(Ac.)
Total runoff =      4.635(CFS)
Effective area this stream =        2.89(Ac.)
Total Study Area (Main Stream No. 1) =        2.89(Ac.)
Area averaged Fm value =    0.192(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        4.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   581.000(Ft.)
Downstream point/station elevation =   576.000(Ft.)
Pipe length  =   165.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.635(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.635(CFS)
Normal flow depth in pipe =    7.73(In.)
Flow top width inside pipe =   11.49(In.)
Critical Depth =   10.75(In.)
Pipe flow velocity =      8.66(Ft/s)
Travel time through pipe =    0.32 min.
Time of concentration (TC) =    15.49 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        4.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
CONDOMINIUM subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
```

```
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.3500     Max loss rate(Fm)=     0.192(In/Hr)
Time of concentration =    15.49 min.
Rainfall intensity =      1.949(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.811
Subarea runoff =      6.105(CFS) for    3.900(Ac.)
Total runoff =     10.740(CFS)
Effective area this stream =        6.79(Ac.)
Total Study Area (Main Stream No. 1) =        6.79(Ac.)
Area averaged Fm value =    0.192(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       20.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
CONDOMINIUM subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.3500     Max loss rate(Fm)=     0.192(In/Hr)
Initial subarea data:
Initial area flow distance =   170.000(Ft.)
Top (of initial area) elevation =   587.200(Ft.)
Bottom (of initial area) elevation =   585.400(Ft.)
Difference in elevation =     1.800(Ft.)
Slope =    0.01059  s(%)=       1.06
TC = k(0.360)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.975 min.
Rainfall intensity =      3.146(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.845
Subarea runoff =      0.824(CFS)
Total initial stream area =        0.310(Ac.)
Pervious area fraction = 0.350
Initial area Fm value =    0.192(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       30.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   581.400(Ft.)
Downstream point/station elevation =   575.400(Ft.)
Pipe length  =   355.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     0.824(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     0.824(CFS)
Normal flow depth in pipe =    3.87(In.)
Flow top width inside pipe =    8.91(In.)
Critical Depth =    4.97(In.)
Pipe flow velocity =      4.55(Ft/s)
Travel time through pipe =    1.30 min.
Time of concentration (TC) =     8.28 min.
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       30.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
CONDOMINIUM subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.3500     Max loss rate(Fm)=     0.192(In/Hr)
Time of concentration =     8.28 min.
Rainfall intensity =      2.839(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.839
Subarea runoff =      3.679(CFS) for    1.580(Ac.)
Total runoff =      4.504(CFS)
Effective area this stream =        1.89(Ac.)
Total Study Area (Main Stream No. 1) =        8.68(Ac.)
Area averaged Fm value =    0.192(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       30.000 to Point/Station       40.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   575.400(Ft.)
Downstream point/station elevation =   568.000(Ft.)
Pipe length  =   375.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.504(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.504(CFS)
Normal flow depth in pipe =    8.91(In.)
Flow top width inside pipe =   10.50(In.)
Critical Depth =   10.64(In.)
Pipe flow velocity =      7.21(Ft/s)
Travel time through pipe =    0.87 min.
Time of concentration (TC) =     9.14 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       30.000 to Point/Station       40.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
CONDOMINIUM subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.3500     Max loss rate(Fm)=     0.192(In/Hr)
Time of concentration =     9.14 min.
Rainfall intensity =      2.675(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.835
Subarea runoff =      7.876(CFS) for    3.650(Ac.)
Total runoff =     12.380(CFS)
Effective area this stream =        5.54(Ac.)
Total Study Area (Main Stream No. 1) =       12.33(Ac.)
Area averaged Fm value =    0.192(In/Hr)
```

End of computations, Total Study Area = 12.33 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.350
Area averaged SCS curve number = 69.0

# RATIONAL METHOD CALCULATION
# PROPOSED CONDITION - 100-YEAR

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2012 Version 7.2
Rational Hydrology Study Date: 10/13/20

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19-360 CHINO RENTAL NEIGHBORHOOD
PROPOSED CONDITION RATIONAL METHOD CALCUILATIONS
100-YEAR STORM EVENT

---

Program License Serial Number 6310

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********* Hydrology Study Control Information **********

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Rational hydrology study storm event year is 100.0
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.370 (In.)
Slope used for rainfall intensity curve b = 0.6000
Soil antecedent moisture condition (AMC) = 2

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 1.000 to Point/Station 2.000
**** INITIAL AREA EVALUATION ****

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CONDOMINIUM subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 69.00
Pervious ratio(Ap) = 0.3500 Max loss rate(Fm)= 0.192(In/Hr)
Initial subarea data:
Initial area flow distance = 300.000(Ft.)
Top (of initial area) elevation = 587.700(Ft.)
Bottom (of initial area) elevation = 586.900(Ft.)
Difference in elevation = 0.800(Ft.)
Slope = 0.00267 s(%)= 0.27
TC = k(0.360)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.533 min.
Rainfall intensity = 3.685(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.853
Subarea runoff = 2.672(CFS)
Total initial stream area = 0.850(Ac.)
Pervious area fraction = 0.350
Initial area Fm value = 0.192(In/Hr)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station 2.000 to Point/Station 3.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

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Upstream point/station elevation = 582.900(Ft.)

```
Downstream point/station elevation =   581.000(Ft.)
Pipe length  =   615.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.672(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     2.672(CFS)
Normal flow depth in pipe =    9.64(In.)
Flow top width inside pipe =   14.37(In.)
Critical Depth =    7.86(In.)
Pipe flow velocity =      3.21(Ft/s)
Travel time through pipe =    3.20 min.
Time of concentration (TC) =    14.73 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station        3.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
CONDOMINIUM subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.3500     Max loss rate(Fm)=     0.192(In/Hr)
Time of concentration =    14.73 min.
Rainfall intensity =      3.182(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.846
Subarea runoff =      5.105(CFS) for    2.040(Ac.)
Total runoff =      7.777(CFS)
Effective area this stream =        2.89(Ac.)
Total Study Area (Main Stream No. 1) =        2.89(Ac.)
Area averaged Fm value =    0.192(In/Hr)


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Process from Point/Station        3.000 to Point/Station        4.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   581.000(Ft.)
Downstream point/station elevation =   576.000(Ft.)
Pipe length  =   165.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.777(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     7.777(CFS)
Normal flow depth in pipe =    9.18(In.)
Flow top width inside pipe =   14.62(In.)
Critical Depth =   13.25(In.)
Pipe flow velocity =      9.89(Ft/s)
Travel time through pipe =    0.28 min.
Time of concentration (TC) =    15.01 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station        4.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
CONDOMINIUM subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
```

```
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.3500     Max loss rate(Fm)=     0.192(In/Hr)
Time of concentration =    15.01 min.
Rainfall intensity =      3.146(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.845
Subarea runoff =     10.278(CFS) for    3.900(Ac.)
Total runoff =     18.056(CFS)
Effective area this stream =        6.79(Ac.)
Total Study Area (Main Stream No. 1) =        6.79(Ac.)
Area averaged Fm value =    0.192(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       20.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
CONDOMINIUM subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.3500     Max loss rate(Fm)=     0.192(In/Hr)
Initial subarea data:
Initial area flow distance =   170.000(Ft.)
Top (of initial area) elevation =   587.200(Ft.)
Bottom (of initial area) elevation =   585.400(Ft.)
Difference in elevation =     1.800(Ft.)
Slope =    0.01059  s(%)=       1.06
TC = k(0.360)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.975 min.
Rainfall intensity =      4.983(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.865
Subarea runoff =      1.337(CFS)
Total initial stream area =        0.310(Ac.)
Pervious area fraction = 0.350
Initial area Fm value =    0.192(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       30.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   581.400(Ft.)
Downstream point/station elevation =   575.400(Ft.)
Pipe length  =   355.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.337(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.337(CFS)
Normal flow depth in pipe =    5.14(In.)
Flow top width inside pipe =    8.91(In.)
Critical Depth =    6.39(In.)
Pipe flow velocity =      5.13(Ft/s)
Travel time through pipe =    1.15 min.
Time of concentration (TC) =     8.13 min.
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       30.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
CONDOMINIUM subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.3500     Max loss rate(Fm)=     0.192(In/Hr)
Time of concentration =     8.13 min.
Rainfall intensity =      4.546(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.862
Subarea runoff =      6.070(CFS) for    1.580(Ac.)
Total runoff =      7.407(CFS)
Effective area this stream =        1.89(Ac.)
Total Study Area (Main Stream No. 1) =        8.68(Ac.)
Area averaged Fm value =    0.192(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       30.000 to Point/Station       40.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   575.400(Ft.)
Downstream point/station elevation =   568.000(Ft.)
Pipe length  =   375.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.407(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     7.407(CFS)
Normal flow depth in pipe =   10.30(In.)
Flow top width inside pipe =   13.91(In.)
Critical Depth =   13.01(In.)
Pipe flow velocity =      8.24(Ft/s)
Travel time through pipe =    0.76 min.
Time of concentration (TC) =     8.89 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       30.000 to Point/Station       40.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
CONDOMINIUM subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2)  = 69.00
Pervious ratio(Ap) = 0.3500     Max loss rate(Fm)=     0.192(In/Hr)
Time of concentration =     8.89 min.
Rainfall intensity =      4.309(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.860
Subarea runoff =     13.123(CFS) for    3.650(Ac.)
Total runoff =     20.529(CFS)
Effective area this stream =        5.54(Ac.)
Total Study Area (Main Stream No. 1) =       12.33(Ac.)
Area averaged Fm value =    0.192(In/Hr)
```

End of computations, Total Study Area = 12.33 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.350
Area averaged SCS curve number = 69.0

# APPENDIX E

HYDRAULIC CALCULATIONS

# Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Oct 13 2020

## LINE A

**Circular**

| | |
|---|---|
| Diameter (ft) | = 2.00 |
| Invert Elev (ft) | = 576.00 |
| Slope (%) | = 2.00 |
| N-Value | = 0.012 |

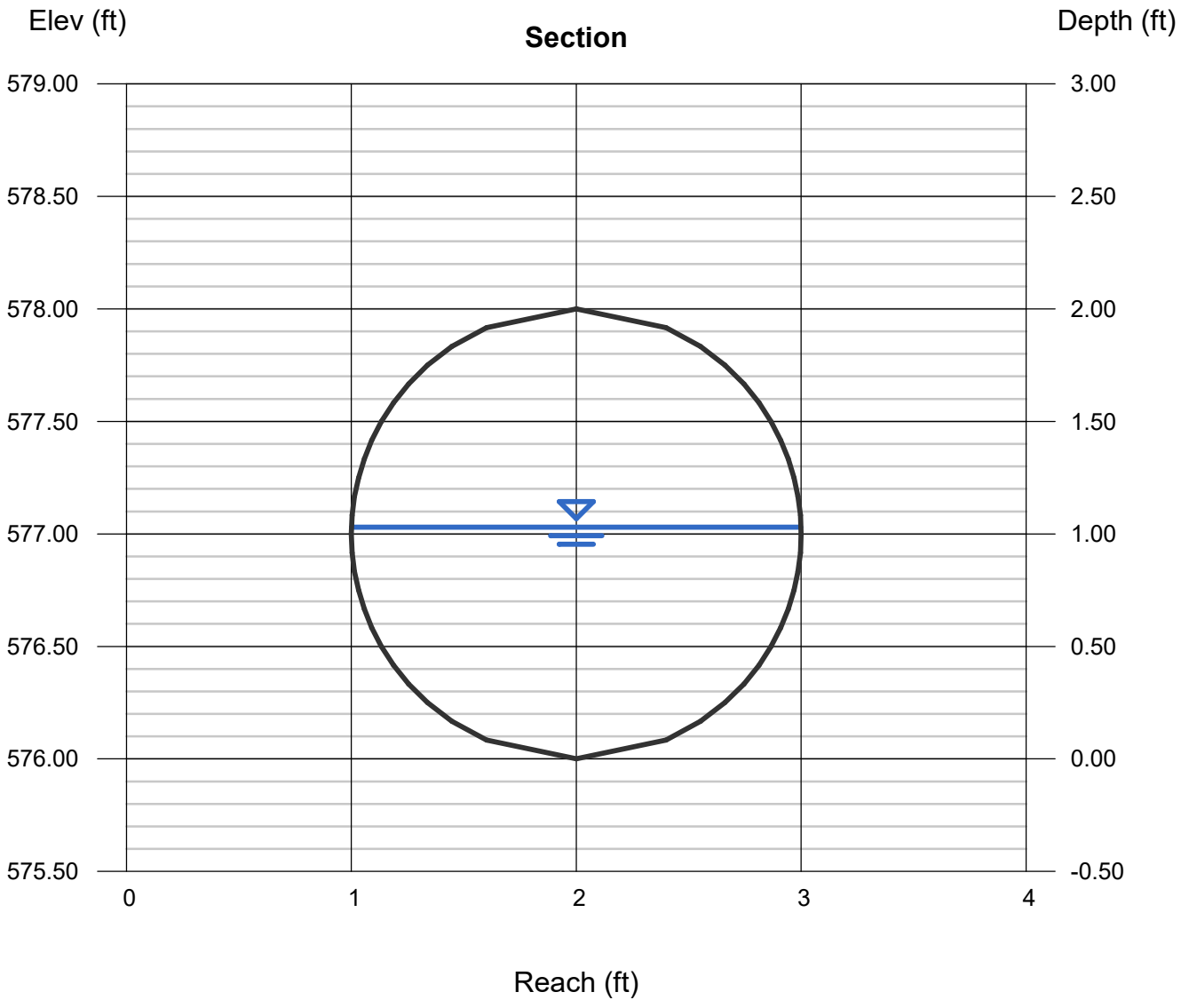
**Calculations**

| | |
|---|---|
| Compute by: | Known Q |
| Known Q (cfs) | = 18.06 |

Q100 for Drainage A

**Highlighted**

| | |
|---|---|
| Depth (ft) | = 1.03 |
| Q (cfs) | = 18.06 |
| Area (sqft) | = 1.64 |
| Velocity (ft/s) | = 11.02 |
| Wetted Perim (ft) | = 3.21 |
| Crit Depth, Yc (ft) | = 1.54 |
| Top Width (ft) | = 2.00 |
| EGL (ft) | = 2.92 |



# Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Oct 13 2020

## LINE B

**Circular**

| | |
|---|---|
| Diameter (ft) | = 2.00 |
| Invert Elev (ft) | = 568.00 |
| Slope (%) | = 2.00 |
| N-Value | = 0.012 |

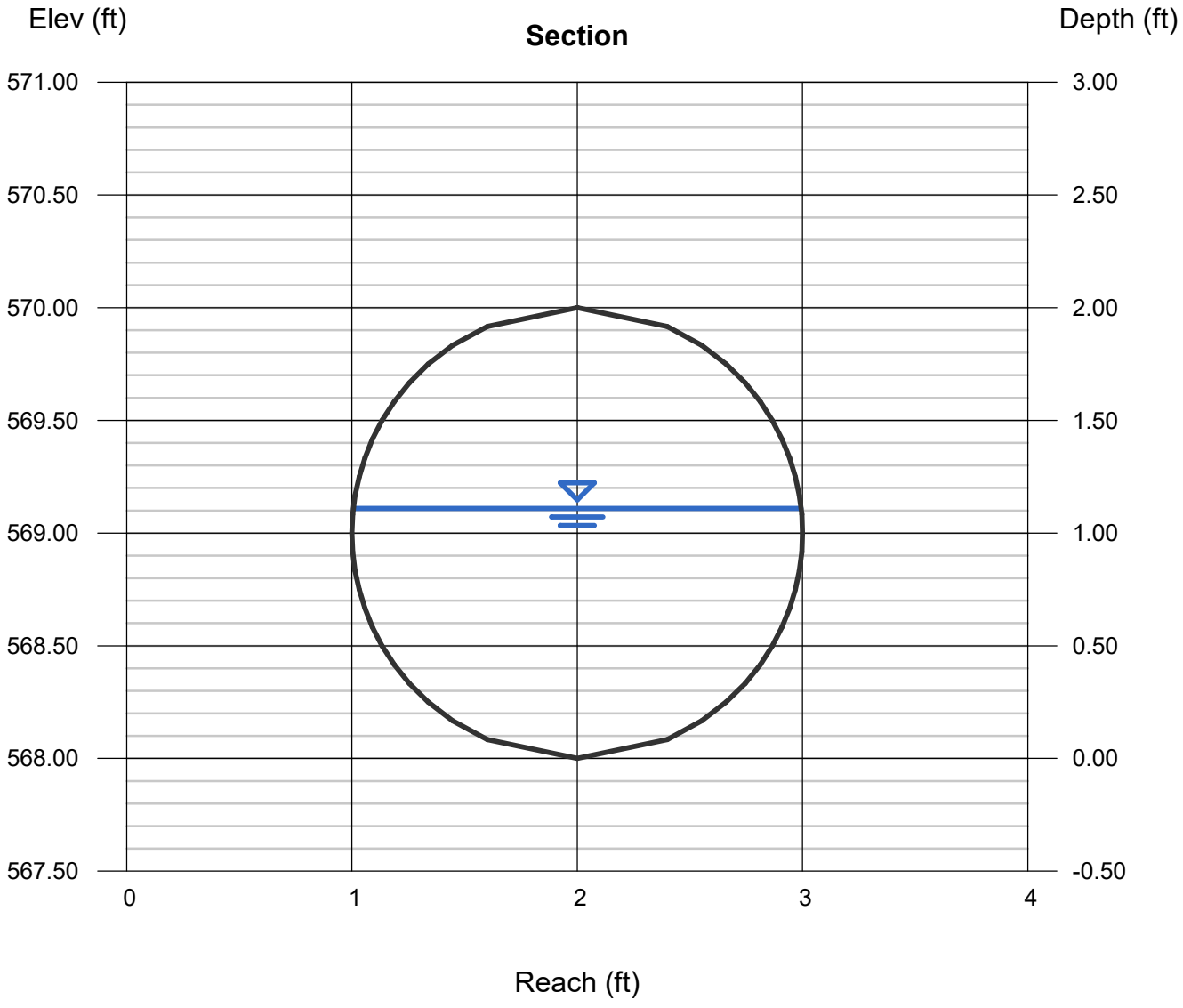
**Calculations**

| | |
|---|---|
| Compute by: | Known Q |
| Known Q (cfs) | = 20.53 |

Q100 for Drainage B

**Highlighted**

| | |
|---|---|
| Depth (ft) | = 1.11 |
| Q (cfs) | = 20.53 |
| Area (sqft) | = 1.80 |
| Velocity (ft/s) | = 11.42 |
| Wetted Perim (ft) | = 3.37 |
| Crit Depth, Yc (ft) | = 1.63 |
| Top Width (ft) | = 1.99 |
| EGL (ft) | = 3.14 |



# APPENDIX F

APPROVAL TO ADD MILL CREEK WETLANDS AS REGIONAL BMP

November 14, 2016

Al C. Boling
City Manager
City of Ontario
303 East "B" Street
Ontario, CA 91764-4105

**APPROVAL TO ADD THE CUCAMONGA CREEK WATERSHED REGIONAL WATER QUALITY PROJECT (MILL CREEK WETLANDS) AS A REGIONAL BEST MANAGEMENT PRACTICE (BMP) TO THE SAN BERNARDINO COUNTY WATERSHED ACTION PLAN FOR DESIGN CAPTURE VOLUME**

Dear Mr. Boling:

On August 12, 2014, I issued a letter approving the Mill Creek Wetlands (MCW) as a regional BMP to address hydraulic conditions of concern (HCOC) potentially caused by certain new developments proposed in the cities of Ontario and Chino. The August 12, 2014 letter did not approve the MCW as satisfying requirements for low-impact development (LID) structural treatment controls for those new developments according to Provision XI.E.4 of the *Waste Discharge Requirements for the San Bernardino County Flood Control District, the County of San Bernardino, and the Incorporated Cities of San Bernardino County within the Santa Ana Region, Area-Wide Urban Storm Water Runoff Management Program*, Order No. R8-2010-0036, NPDES Permit No. CAS618036 (MS4 Permit). These requests for approvals were submitted by the City of Ontario in a letter dated October 2, 2013 in accordance with Provision XI.B.3.b.vi. of the MS4 Permit.

On June 20, 2016, the City of Ontario submitted another request that the Regional Board approve Mill Creek Wetlands as a regional LID structural treatment control for certain new developments in the cities of Ontario and Chino. This second request included new treatment control performance information collected, in part, to satisfy Performance and Bioassessment Monitoring and Reporting requirements under the State Water Resources Control Board (State Board) and Department of Water Resources (DWR) grants. The new information is contained in the technical report, *Water Quality Performance of Mill Creek Wetlands, Technical Documentation Validating Alternative Compliance for Treatment Control*, prepared by Geosyntec Consultants and dated May 2016 (Technical Documentation).

After careful consideration of the City's request, the Technical Documentation, and subsequent discussions between new development project proponent representatives and Regional Board staff, I am hereby approving the use of MCW for use as a regional LID structural treatment control best management practice (BMP) for certain new developments in the cities of Ontario and Chino. This approval is issued pursuant to the

authority contained in Provisions XI.B, XI.E.4, XI.E.9, XI.E.10, XI.G, XI.LXX.F and other applicable portions of the MS4 Permit and in Resolution No. R8-2010-0037. Consequently, those projects within the subject 3,000 acres of the 4,000 acre New Model Colony (NMC) and Chino Preserve (CP) developments who are authorized by the cities to use its Design Capture Volume do not have to disprove the feasibility of on-site LID structural treatment controls in order to discharge into the Mill Creek Wetlands.

The background, scope, and limitations of this approval are as follows:

I. Background

The Mill Creek Wetlands (MCW) are located near the southeast corner of Chino-Corona Road and East County Road in the City of Chino in San Bernardino County. The MCW are located along Mill Creek/Cucamonga Creek, upstream of Prado Dam in the Santa Ana River Basin. Cucamonga Creek, along with the upstream County Line Channel, convey urban runoff and treated wastewater from an approximate 77 square mile watershed that includes the cities of Ontario, Chino, Rancho Cucamonga and Upland in San Bernardino County and the city of Eastvale in Riverside County.

Cucamonga Creek and the upstream County Line Channel are engineered, hardened, and regularly-maintained channels. South of the Hellman Avenue Bridge and north of Chino Corona Road, Cucamonga Creek transitions to a rip-rap lined channel. The name of the creek changes to Mill Creek at this location. Mill Creek continues in a southwesterly direction as a vegetated unlined channel, until it's confluence with the Santa Ana River within Prado Basin.

The following reaches are tributary to the Mill Creek Wetlands and are on the Clean Water Act Section 303(d) list of impaired waters[1] for the specified pollutants of concern (POCs):

- Cucamonga Creek Reach 1 (Valley Ranch) is listed as impaired for metals (cadmium, copper, lead and zinc) and *Coliform Bacteria*.
- Mill Creek (Prado Area) is listed as impaired for nutrients, pathogens, and Total Suspended Solids (TSS).
- Middle Santa Ana River, Reach 3, is listed as impaired for metals (copper and lead) and Pathogens.

A small portion of flow from the entire 77 square mile watershed in Cucamonga Creek is allowed to flow past the diversion structure to maintain downstream wildlife habitat and other in-stream beneficial uses. The remaining flow is diverted to the Mill Creek Wetlands where it is routed through a series of cascading basins that combine

[1] 2010 California 303(d) list of Water Quality Limited Segments (category 5), US EPA Final Approval: October 11,2011 http://www.waterboards.ca.gov/water_issues/programs/tmdl/2010state_ir_reports/category5_report.shtml

constructed wetlands and wet extended detention basin treatment features prior to returning treated flows back to Mill Creek at a location 0.67 mile downstream of the diversion.[2]

Geosyntec's Technical Documentation indicates that:

- During wet weather, some pollutants in the Design Capture Volume (DCV) (2-year, 24-hour storm runoff) are removed in structural treatment controls located in the 4,000 acres of new development area as depicted in Figure 1. The DCV and other runoff are then discharged to Cucamonga Creek and the upstream County Line Channel where they comingle with runoff from the remainder of the watershed. The amount of runoff diverted from Cucamonga Creek to the MCW is the equivalent volume of the DCV from 3,000 acres of new residential development. Consequently, MCW does not treat the entire DCV from the 4,000 acres of new development. The comingled flow entering the MCW does not likely have the same characteristics as the original DCV leaving the new development sites.

- During dry-weather conditions, Cucamonga Channel typically has flow for diversion into the MCW which is composed of nuisance flow from urban areas in the watershed and waste water treatment plant discharges. Therefore, the MCW will continuously be treating flows. Because the MCW treats greater dry-weather volumes, it is expected to provide greater long-term capture of urban runoff volume and greater pollutant load reductions than on-site treatment systems.

- Due to modern landscaping practices and other source and the site design controls, new development projects are expected to generate little to no dry-weather runoff. The installation of nutrient separating baffle boxes and Contech CDS hydrodynamic separator units as required by the NMC WQMP satisfies the onsite source control and pre-treatment requirements of the applicable MS4 Permit. Also, in accordance with the NMC Water Quality Management Plan, on-site LID structural treatment control BMPs will be placed to treat any flow from commercial and industrial projects within the NMC and CP developments prior to reaching waters of the U.S., as depicted in Figure 1.

- The MCW has also been constructed ahead of the completion of the new development projects for which it has been sized. Therefore, additional reductions in pollutant loads from existing development have been achieved by the MCW with year-round capacity.

The Phase I MS4 permit (R8-2010-0036) for San Bernardino County has the following requirements that have been considered as part of this approval:

1. Section XI.B.3.b.vi lists information required for approval of regional treatment control BMPs. This list includes the demonstration of the BMPs effectiveness in reducing the target Pollutants of Concern (POCs).

[2] Geosyntec, Cucamonga Creek Watershed Regional Water Quality Project (Mill Creek Wetlands) Water Quality Design Report, Revision 2: August 13, 2012, Section 2.1

2. Section XI.D.7 states that "pollutant removal should be accomplished prior to discharge to Waters of the U.S. Regional treatment control BMPs shall be completed and operational prior to occupation of any of the priority project sites tributary to the regional treatment BMP."

3. Sections XI.E.4, XI.E.9 and XI.E.10 address the WQMP, alternatives to onsite compliance and the Executive Officer's approval authority.
4. Section XI.G.3. of the MS4 Permit reflects the Regional Board's intent to provide an alternative integrated approach to project-level analysis for new development projects and the Executive Officer's authority to approve such approaches.

5. Section XI.L of the MS4 Permit notes the Regional Board's recognition that full implementation of all permit requirements may not be feasible for certain projects which have received tentative tract or parcel map or other approvals prior to the approval of the updated WQMP."

6. Section XX.F provided that upon "approval by the Executive Officer or the Regional Board, all plans, reports and subsequent amendments required by this Order shall be implemented and shall become an enforceable part of this Order."

In addition, the Phase I MS4 Permit (R8-2002-0012) for San Bernardino County, that was effective at the time of the development of MCW, has the following relevant requirements:

1. Section XII.B.2 of the MS4 Permit provides that "[t]he permittees are encouraged to include in the WQMP the development and implementation of regional and/or watershed management programs that address runoff from new development and significant re-development."

2. Section XII.B.2 of the MS4 Permit further provides that "[t]he goal of the WQMP is to develop and implement programs and policies to minimize the effects of urbanization on site hydrology, urban runoff flow rates or velocities and pollutant loads. This goal may be achieved through watershed-based structural treatment controls, in combination with site-specific BMPs."

II. Scope

The MCW is hereby approved as a regional structural LID treatment control for 3,000 acres within the 4,000 acre New Model Colony (NMC) and Chino Preserve (CP) developments. This acreage includes part of the New Model Colony - East within the City of Ontario, as well as a portion of Planning Area B and all of Planning Areas F & G of the Chino Preserve within the City of Chino. An additional 1,000 acres of the NMC and CP developments may be approved subsequent to expansion of the Mill Creek Wetlands. This expansion is not within the scope of this approval letter.

This letter also confirms that the portion of this 3,000 acre area covered by the approved NMC Water Quality Management Plan satisfies the requirements of Provision XI.L of the MS4 Permit, subject to the conditions of this letter.

Based on a July 11, 2016 telephone conversation with Scott Crawford with Lewis Management, it is Regional Board staff's understanding that only a certain percentage of each Specific Plan area (i.e., all of the colored areas shown in Figure 1), and not the entire New Model Colony-East, will be captured and treated by the Mill Creek Wetlands. The exact acreage depends on the allocation described in a construction agreement between each developer and the New Model Colony Builders, LLC. Roughly, the allocation will be 2,000 acres for New Model Colony-East, 500 acres for streets and parkways, and 500 acres for portions of the Chino Preserve. The City of Ontario will be responsible for keeping track of the number of the acres allotted to each developer to ensure no more than 3,000 acres of new development claims the use of the MCW's Design Capture Volume to meet the projects' obligations for treating urban runoff using LID structural treatment controls.

III. Limitations

Based on the above, the Cities of Ontario and Chino are authorized to consider the Mill Creek Wetlands as an off-site Regional Treatment Facility for 3,000 of the 4,000 acre new development project discussed above. The MCW is approved for use as a regional LID structural treatment control to remove pollutants from the Design Capture Volume produced by those projects in addition to addressing Hydrologic Conditions of Concern, not to exceed the MCW's design capacity. Please be aware of the following requirements specified in the permit or grant documents[3]:

1) Unless projects are confirmed in accordance with this letter as being within the 3,000 acres, the cities of Ontario and Chino must continue to ensure that projects within the footprint of the New Development meet onsite source control pre-treatment prior to discharging into Waters of the U.S. for the 24 hour, 85th percentile storm event design capture volume and other applicable requirements of the MS4 Permit (Section XI.D.6). The cities of Ontario and Chino must continue to ensure that projects outside the 3,000 acres within the New Development satisfy or have satisfied these requirements through properly approved Water Quality Management Plans under the MS4 Permit.

2) If the monitoring data and performance assessment submitted as part of the reporting requirements in the monitoring program do not continue to demonstrate regional water quality benefits the City must re-evaluate the Mill Creek Wetland's designation as a Regional Treatment BMP in the WAP (Section XI.D.7).

3) The City is obligated to monitor water quality in Cucamonga Creek and influent and effluent flows to and from Mill Creek Wetlands to validate the Wetland's wet and dry-weather performance. The City must report this as part of BMP performance assessment. The City shall also track and provide a summary of the number of acres, name of the developers, as well as an updated tract map showing the new

[3] This is not a comprehensive list and the actual permit and grant documents should be reviewed for additional requirements.

development areas that have received approval to discharge into the Mill Creek Wetlands. The above information shall be provided in the City's annual report required under the MS4 Permit at a minimum until after the first reporting period following completion of construction and storm drain connections for the 3,000 acre development (Section XI.G.3).

4) Monitoring will be conducted according to the Mill Creek Wetlands Regional Monitoring Program (RMP) consistent with the grant agreements and regulatory permits issued by various agencies for this project. The Bioassessment Monitoring specified in the RMP does not include monitoring for benthic macroinvertebrates. Therefore, in addition to the Bioassessment Monitoring in the RMP, please implement bioassessment monitoring and reporting consistent with the Methods for Conducting Bioassessments in Freshwater Streams and Rivers as described in the State Water Resources Control Board (SWRCB) website[4]. This methodology is consistent with the regional bioassessment monitoring procedures being conducted pursuant to the MS4 permit (Section II.T.5).

5) Section XI.B.3.b.vi of the MS4 Permit requires that BMP effectiveness monitoring and other design and operation maintenance information be included for all regional treatment control BMPs that are submitted for Regional Board approval. Approved regional BMPs must demonstrate effectiveness in reducing the target Pollutants of Concern. If the monitoring data and performance assessment submitted as part of the reporting requirements in the RMP and as specified in this letter do not continue to demonstrate regional water quality benefits the City must re-evaluate the Mill Creek Wetland's designation as a Regional Treatment BMP in the WAP.

6) Please submit the monitoring results and performance assessment as part of the City of Ontario's Annual Report according to the MS4 Permit (Section VII.E.7). Within 30 days of completion of all the required Performance and Bioassessment Monitoring and Reporting required under the State Water Resources Control Board (SWRCB) and Department of Water Resources (DWR) grants, the City must propose a revised monitoring and reporting plan and describe the basis for the revision. At a minimum, post-grant monitoring shall provide information on long term BMP effectiveness, demonstrate regional benefits and/or determine need for operational adjustment

[4] Collecting Benthic Macroinvertebrate Samples & Associated Physical and Chemical Data for Ambient Bioassessments in California - Standard Operating Procedures Manual - February 2007; http://www. waterboards.ca.gov/water issues/programs/swamp/docs/swamp sop bio.pdf.

If you have any questions, please contact Adam Fischer at afischer@waterboards.ca.gov, 951-320-6363 or Keith Elliott at kelliott@waterboards.ca.gov 951-782-4925.

Sincerely,

Kurt V. Berchtold
Executive Officer
Santa Ana Regional Water Quality Control Board

Enclosure: Figure 1, New Model Colony (East) Diagram
Figure 2, Water Quality Overall Drainage Areas - Chino

cc: Mathew Ballantyne, Chino City Manager, mballantyne@cityofchino.org
Louis Abi-younes, Ontario City Engieer; labi-younes@ontarioca.gov
Shawn Haggerty, Best Best & Krieger; Shawn.Hagerty@bbklaw.com
Scott Crawford; Lewis Management Corp. scott.crawford@lewismc.com

**Figure 2.2-1**
Project Regional Location

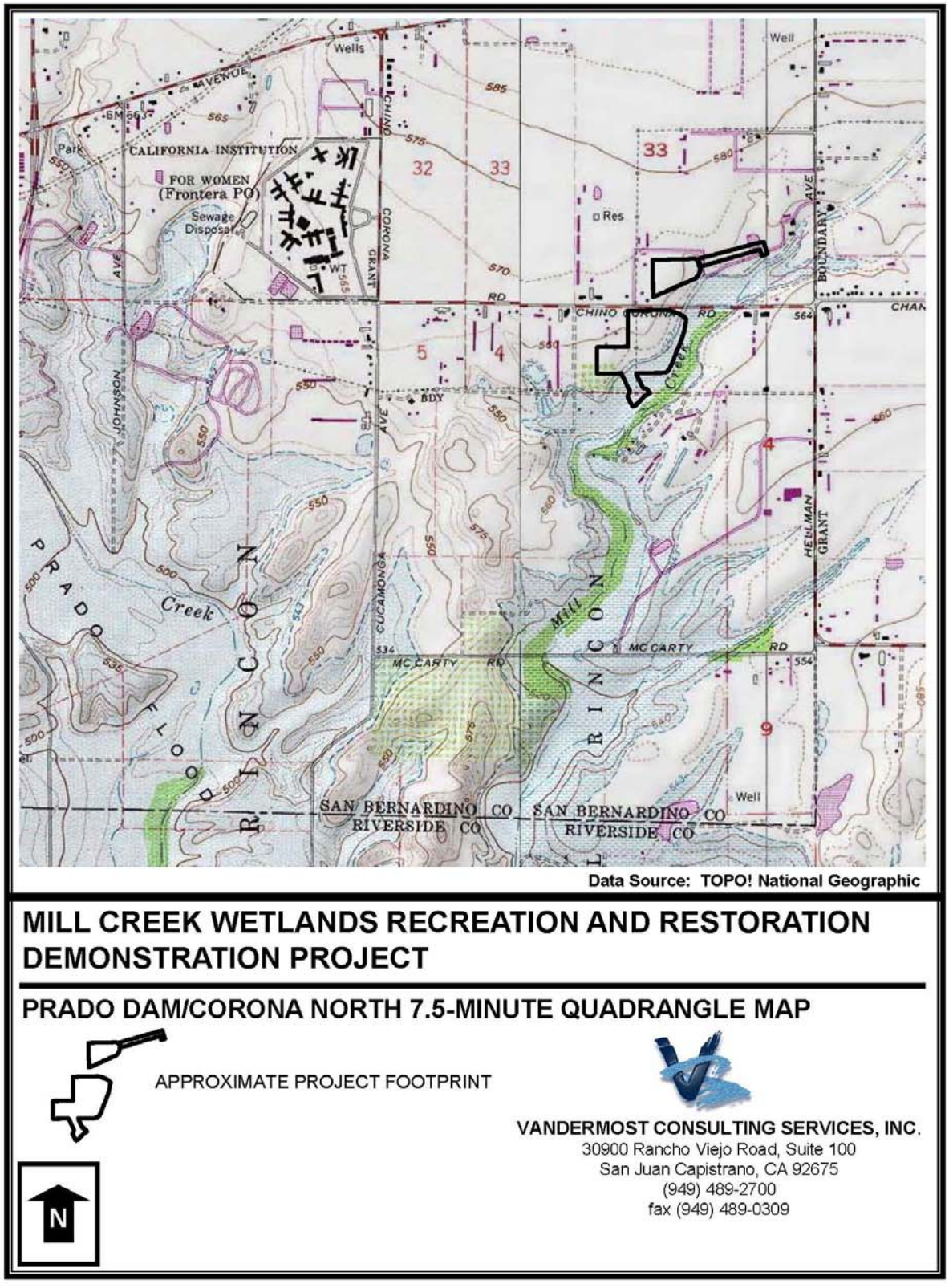
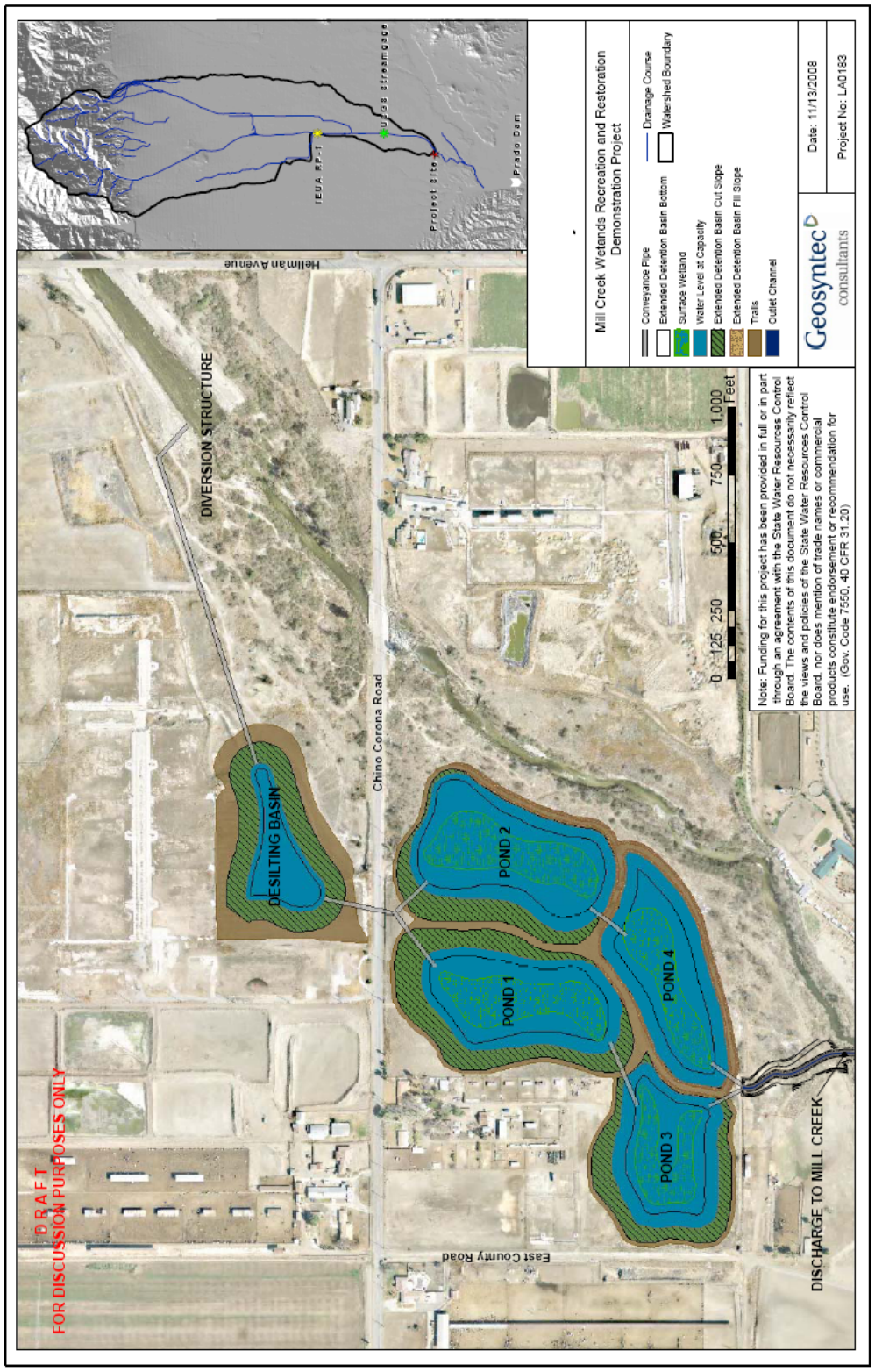


**Figure 2.2-2**
Project Aerial Photograph



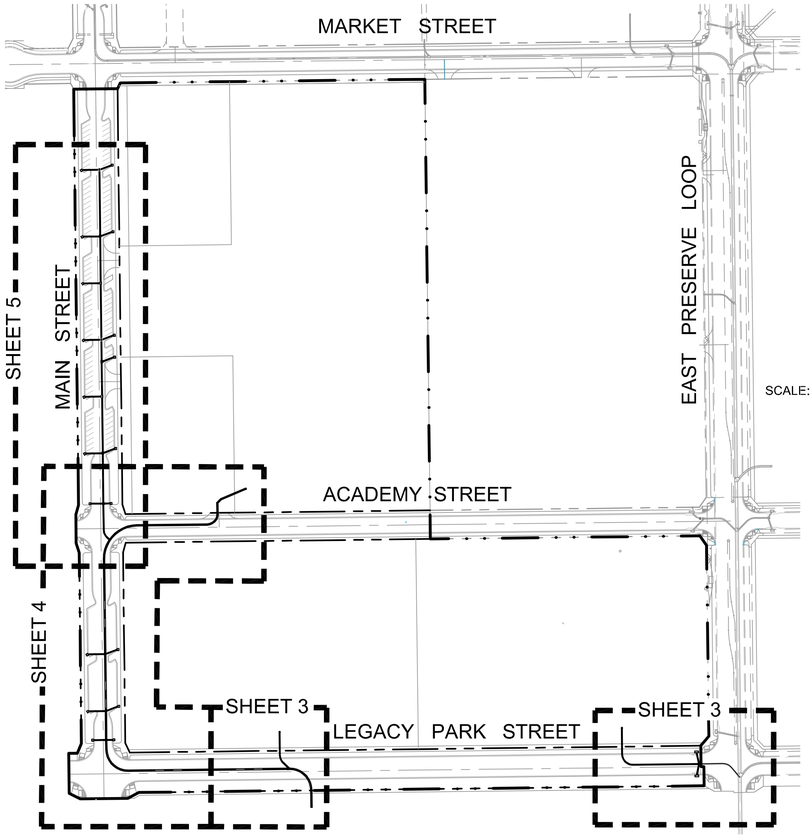
# APPENDIX G

Reference Plans

# STORM DRAIN IMPROVEMENT PLANS
FOR
# TRACT NO. 16420-4
IN THE
# CITY OF CHINO

## GENERAL NOTES

1. THESE DRAWINGS AND THE DATA HEREIN ARE MADE PART OF THE SPECIFICATIONS.
2. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF CHINO STANDARD SPECIFICATIONS AND STANDARD DRAWINGS, STANDARD SPECIAL PROVISIONS, SPECIAL PROJECT PROVISIONS, AND THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (GREENBOOK), LATEST EDITION WITH SUPPLEMENTS. ANY VARIATION FROM, OR EXCEPTION TO, THE STANDARDS OR THESE NOTES SHALL BE APPROVED BY THE CITY ENGINEER.
3. MATERIALS AND METHODS SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER.
4. HOURS OF OPERATION SHALL BE FROM 7:00 A.M. TO 3:30 P.M., MONDAY THROUGH FRIDAY. OTHER HOURS SHALL REQUIRE WRITTEN AUTHORIZATION FROM THE CITY ENGINEER OR THE BUILDING OFFICIAL. ROAD/LANE CLOSURES SHALL BE LIMITED TO THE HOURS OF 8:30 AM TO 3:30 PM WEEKDAYS.
5. THE PUBLIC WORKS INSPECTOR SHALL BE NOTIFIED AT (909) 334-6250 AT LEAST 24 HOURS IN ADVANCE OF REQUIRED INSPECTIONS.
6. PRIOR TO CONSTRUCTION WORK, ALL CONTRACTORS, INCLUDING SUBCONTRACTORS, SHALL OBTAIN A CITY BUSINESS LICENSE AND AN ENCROACHMENT PERMIT.
7. STATE LAW SB 3019 REQUIRES THE CONTRACTOR TO OBTAIN AN IDENTIFICATION NUMBER FROM UNDERGROUND SERVICE ALERT PRIOR TO THE ISSUANCE OF A CITY ENCROACHMENT PERMIT. THE CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT TWO FULL WORKING DAYS (48 HOURS MINIMUM) IN ADVANCE OF ANY CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL ASCERTAIN THE SIZE AND TRUE VERTICAL AND HORIZONTAL LOCATIONS OF ALL UNDERGROUND UTILITIES AND SHALL BE RESPONSIBLE FOR ANY REPAIRS TO ANY DAMAGED PUBLIC AND/OR PRIVATE UTILITIES, SHOWN OR NOT SHOWN HEREON.
8. ANY CONTRACTOR PERFORMING WORK ON THIS PROJECT SHALL FAMILIARIZE HIMSELF/HERSELF WITH THE SITE AND SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING FACILITIES RESULTING DIRECTLY OR INDIRECTLY FROM HIS/HER OPERATIONS, WHETHER OR NOT SUCH FACILITIES ARE SHOWN ON THE PLANS.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND IDENTIFYING UNDERGROUND UTILITY LINES AND SUBSTRUCTURES AND SHALL PROTECT THEM FROM DAMAGE.
10. PRIOR TO ANY CONSTRUCTION WORK WHICH COULD DAMAGE OR CONFLICT WITH UNDERGROUND STRUCTURES OR UTILITIES, THE CONTRACTOR SHALL EXCAVATE INSPECTION HOLES TO DETERMINE THE LOCATION AND DEPTH OF SAID STRUCTURES AND UTILITIES IN THE VICINITY OF, OR WHICH MAY BE AFFECTED BY THE PROPOSED IMPROVEMENT WORK.
11. IF EXISTING UTILITIES OR OTHER FACILITIES CONFLICT WITH THE PROPOSED IMPROVEMENTS, WORK SHALL STOP AND THE CITY ENGINEER SHALL BE NOTIFIED IMMEDIATELY.
12. THE CONTRACTOR SHALL REPAIR OR REPLACE ANY DAMAGE OR ALTERED EXISTING IMPROVEMENTS WITHIN THE PUBLIC RIGHT-OF-WAY AS DIRECTED BY THE CITY ENGINEER.
13. THE CONTRACTOR SHALL MAINTAIN DUST CONTROL AT ALL TIMES.
14. PRIOR TO TAKING WATER FROM A HYDRANT, THE CONTRACTOR SHALL MAKE ARRANGEMENTS TO OBTAIN A CITY HYDRANT, WATER METER.
15. EXISTING IRRIGATION LINES SHALL BE REMOVED, RELOCATED OR RECONSTRUCTED AS SHOWN OR AS DIRECTED BY THE CITY ENGINEER.
16. NEW AND EXISTING MANHOLES SHALL BE DOUBLE ADJUSTED TO GRADE.
17. ALL CONSTRUCTION DEBRIS INCLUDING DUST, DIRT, AND ANY OTHER TYPE OF SCRAP MUST BE DISPOSED THROUGH THE SOLID WASTE SYSTEM. IT IS STRICTLY PROHIBITED TO WASH ANY DUST, DIRT, SCRAP, OR OTHER MATERIAL TO THE STREET AND/OR STORM DRAIN SYSTEM.
18. NO TRENCH BACKFILL SHALL TAKE PLACE PRIOR TO APPROVAL FROM THE CITY INSPECTOR AND SHALL BE DONE IN ACCORDANCE WITH STANDARD DRAWING 109.
19. THE CONTRACTOR SHALL NOT ORDER OR PLACE ANY CONCRETE UNTIL FORMS AND REINFORCING STEEL HAVE BEEN INSPECTED AND APPROVED BY THE CITY ENGINEER.
20. "AS-BUILT" RECORD DRAWINGS SHALL BE FURNISHED TO THE CITY UPON COMPLETION OF CONSTRUCTION.
21. APPROVAL OF THESE PLANS BY THE CITY OR ITS AGENTS SHALL NOT RELIEVE THE CONTRACTOR OR THE APPLICANT FROM THE RESPONSIBILITY FOR THE CORRECTION OF ERRORS OR OMISSIONS DISCOVERED DURING CONSTRUCTION. UPON REQUEST, THE APPROPRIATE REVISIONS SHALL BE SUBMITTED TO THE CITY ENGINEER FOR REVIEW AND APPROVAL.
22. RECYCLED WATER SHALL BE USED FOR ALL CONSTRUCTION PURPOSES, WHERE FEASIBLE.
23. PIPE TO BE VIDEO INSPECTED PRIOR TO FINAL ACCEPTANCE BY THE CITY.




SCALE: 1"=150'

## INDEX MAP

GRAPHIC SCALE

150 0 75 150 300 600

( IN FEET )
1 inch = 150 ft.

## CONSTRUCTION NOTES

## ESTIMATED QUANTITIES

| | | PRIVATE | PUBLIC |
|---|---|---|---|
| 1 | CONSTRUCT 24" RCP, BEDDING & BACKFILL PER CITY OF CHINO STD. DWG. NO. 109 | | 1,618 L.F. |
| 2 | CONSTRUCT 36" RCP, BEDDING & BACKFILL PER CITY OF CHINO STD. DWG. NO. 109 | | 1,207 L.F. |
| 3 | CONSTRUCT CONCRETE COLLAR PER SPPWC STD PLAN NO 380-4 | | |
| 4 | CONSTRUCT CURB OPENING CATCH BASIN PER SPPWC STD. PLAN NO. 300-3 AND STORM DRAIN CURB MARKER PER CITY STD. DWG. NO. 341 | | 21 EA. |
| 5 | CONSTRUCT MANHOLE PIPE-TO-PIPE (MAIN LINE ID=36" OR LARGER) PER SPPWC STD PLAN 320-2 MANHOLE FRAME AND COVER PER CITY STD. DWG. NO. 385 | | 5 EA. |
| 6 | CONSTRUCT MANHOLE PIPE-TO-PIPE PER (MAIN LINE ID-33" OR SMALLER) SPPWC STD PLAN 321-2 MANHOLE FRAME AND COVER PER CITY STD. DWG. NO. 385 | | 8 EA. |
| 7 | CONSTRUCT TRANSITION STRUCTURE PIPE TO PIPE PER SPPWC STD PLAN 340-2 | | 3 EA. |
| 8 | CONSTRUCT TEMPORARY 24" CSP, 14 GAUGE, CSP BEDDING & BACKFILL PER CITY OF CHINO STD. DWG. NO. 109 | | |
| 9 | CONSTRUCT TEMPORARY 36" CSP, 14 GAUGE, CSP BEDDING & BACKFILL PER CITY OF CHINO STD. DWG. NO. 109 | | |
| 10 | CONSTRUCT 36" CMP RISER, 14 GAUGE, PER CITY STD 355 AND DETAIL 'A' SHEET 3 | 2 EA. | |
| 11 | CONSTRUCT 42" CMP RISER, 14 GAUGE, PER CITY STD 355 AND DETAIL 'A' SHEET 3 | 1 EA. | |
| 12 | CONSTRUCT CLASS "BACKING #2" RIPRAP, MEDTHOD B PLACEMENT PER CALTRANS SPECIFICATIONS & DETAIL HEREON | | |

## SHEET INDEX


SHEET 1 – TITLE SHEET
SHEET 2 – SYSTEM MAP
SHEET 3 – PLAN & PROFILE, LINE F9 FROM STATION 10+00.00 TO STATION 13+25.91
PLAN & PROFILE, LINE F4 FROM STATION 30+70.00 TO STATION 33+50.00
SHEET 4 – PLAN & PROFILE, LINE F4 FROM STATION 33+50.00 TO STATION 43+23.16
SHEET 5 – PLAN & PROFILE, LATERAL F4.10 FROM STATION 10+00.00 TO STATION 17+83.41
SHEET 6 – LATERAL PROFILES


## LEGEND

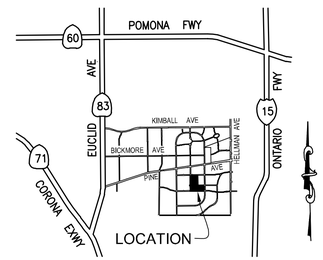
- EXISTING CURB AND GUTTER
- SD EXISTING STORM DRAIN
- W EXISTING WATER LINE
- RW EXISTING RECYCLED WATER LINE
- S EXISTING SEWER LINE
- ℄ CENTER LINE
- PROPOSED RIGHT OF WAY
- PROPOSED CURB AND GUTTER
- SD PROPOSED STORM DRAIN
- S PROPOSED SEWER LINE
- RW PROPOSED RECYCLED WATER LINE
- W PROPOSED WATER LINE
- EXISTING FIRE HYDRANTS
- PROPOSED FIRE HYDRANTS
- PROPOSED GATE VALVE
- PROPOSED STREET LIGHTS
- PROPOSED STORM DRAIN MANHOLE
- PROPOSED STORM DRAIN CATCH BASIN
- PROPOSED SEWER MANHOLE
- PROPOSED BLOW-OFF
- PROPOSED AIR-VAC

## ABBREVIATIONS

BC–BEGINNING OF CURVATURE
BEG–BEGIN
BOT–BOTTOM OF PIPE
C/L–CENTER LINE
CLR–CLEARANCE
DEF ANG–DEFLECTION ANGLE
DIA–DIAMETER
DWG–DRAWING
EC–END OF CURVATURE
EG–EXISTING GROUND
EX–EXISTING
FG–FINISHED GRADE
FS–FINISHED SURFACE
GB–GRADE BREAK
HORIZ–HORIZONTAL
INV–INVERT
LAT–LATERAL
LF–LINEAL FEET
MAX–MAXIMUM
MH–MANHOLE
MIN–MINIMUM
PROP–PROPOSED
R/W–RIGHT OF WAY
RCP–REINFORCED CONCRETE PIPE
RW–RECYCLED WATER
SD–STORM DRAIN
SHT–SHEET
S–SEWER
SPPWC–STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION
ST–STREET
STD–STANDARD
W–WATER

## OWNER/DEVELOPER

MR. PAT LOY
CHINO PRESERVE DEVELOPMENT CORP.
1156 N. MOUNTAIN AVE.
UPLAND, CALIFORNIA 91785
(909) 946-7513




## VICINITY MAP

NOT TO SCALE

SEAL

REGISTERED PROFESSIONAL ENGINEER
CARLA E. BERARD
No. 45183
CIVIL
STATE OF CALIFORNIA

811 Know what's below. Call before you dig.

## BASIS OF BEARINGS

THE BASIS OF BEARING IS THE CENTERLINE OF PINE AVE. BETWEEN GROVE AVE. AND HELLMAN AVE. HAVING A BEARING OF N81°43'43"E PER PARCEL MAP NO. 15657 FILED IN BOOK 193, PAGES 1 AND 2 OF PARCEL MAPS, RECORDS OF SAN BERNARDINO COUNTY, CALIFORNIA.

## NOTICE TO CONTRACTORS

CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL. ALL CONTRACTORS AND SUBCONTRACTORS PERFORMING WORK SHOWN ON OR RELATED TO THESE PLANS SHALL CONDUCT THEIR OPERATIONS SO THAT EMPLOYEES ARE PROVIDED A SAFE PLACE TO WORK AND THE PUBLIC IS PROTECTED. ALL CONTRACTORS AND SUBCONTRACTORS SHALL COMPLY WITH THE "OCCUPATIONAL SAFETY AND HEALTH REGULATIONS" OF THE U.S. DEPARTMENT OF INDUSTRIAL RELATIONS "CONSTRUCTION SAFETY ORDERS." THE CIVIL ENGINEER SHALL NOT BE RESPONSIBLE IN ANY WAY FOR THE CONTRACTOR'S OR SUBCONTRACTOR'S COMPLIANCE WITH SAID REGULATIONS AND ORDERS.

## ENGINEER'S NOTICE TO CONTRACTORS

1. THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. LOCATIONS ARE APPROXIMATE AND SHALL BE CONFIRMED IN THE FIELD BY THE CONTRACTOR, SO THAT ANY NECESSARY ADJUSTMENT CAN BE MADE IN ALIGNMENT AND/OR GRADE OF THE PROPOSED IMPROVEMENT. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURE TO PROTECT ANY UTILITY LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THESE PLANS.
2. RECYCLED WATER SHALL BE USED FOR ALL CONSTRUCTION PURPOSES. THIS REQUIRES ADVANCE APPROVAL. CONTACT MIKE HORNOCK AT (909) 334-3442

| PREPARED BY | REVISIONS | MADE BY | MADE DATE | RECOMMENDED BY | RECOMMENDED DATE | BENCH MARK DATA | REFERENCE DRAWINGS | REVIEWED BY STAFF | BY | DATE | CITY ENGINEER'S STAFF | BY | DATE | RECOMMENDED BY: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FIRM: L.D. KING, INC. | 1 | | | | | NO. 157/71 ELEV. 595.256 | | WATER: | | | DRAWN: | | | |
| ADDRESS: 975 N. Haven Avenue, Suite 200 | 2 | | | | | LOCATION: | | SEWER: | | | | | | |
| Ontario, CA. 91764 | 3 | | | | | A 2 1/2" brass disk stamped "157/71" set in a traffic signal concrete base located at a northwest intersection of Euclid Avenue and Kimball Avenue | | FIRE: | | | DESIGNED: | | | |
| TELEPHONE: (909)945-0526 | 4 | | | | | | | PLANNING: | | | CHECKED: | | | |
| | 5 | | | | | | | TRAFFIC: | | | RECOMMENDED: | | | CITY ENGINEER |
| SIGNATURE RCE 45183 DATE | 6 | | | | | | | ENVIRONMENTAL: | | | | | | DATE: |

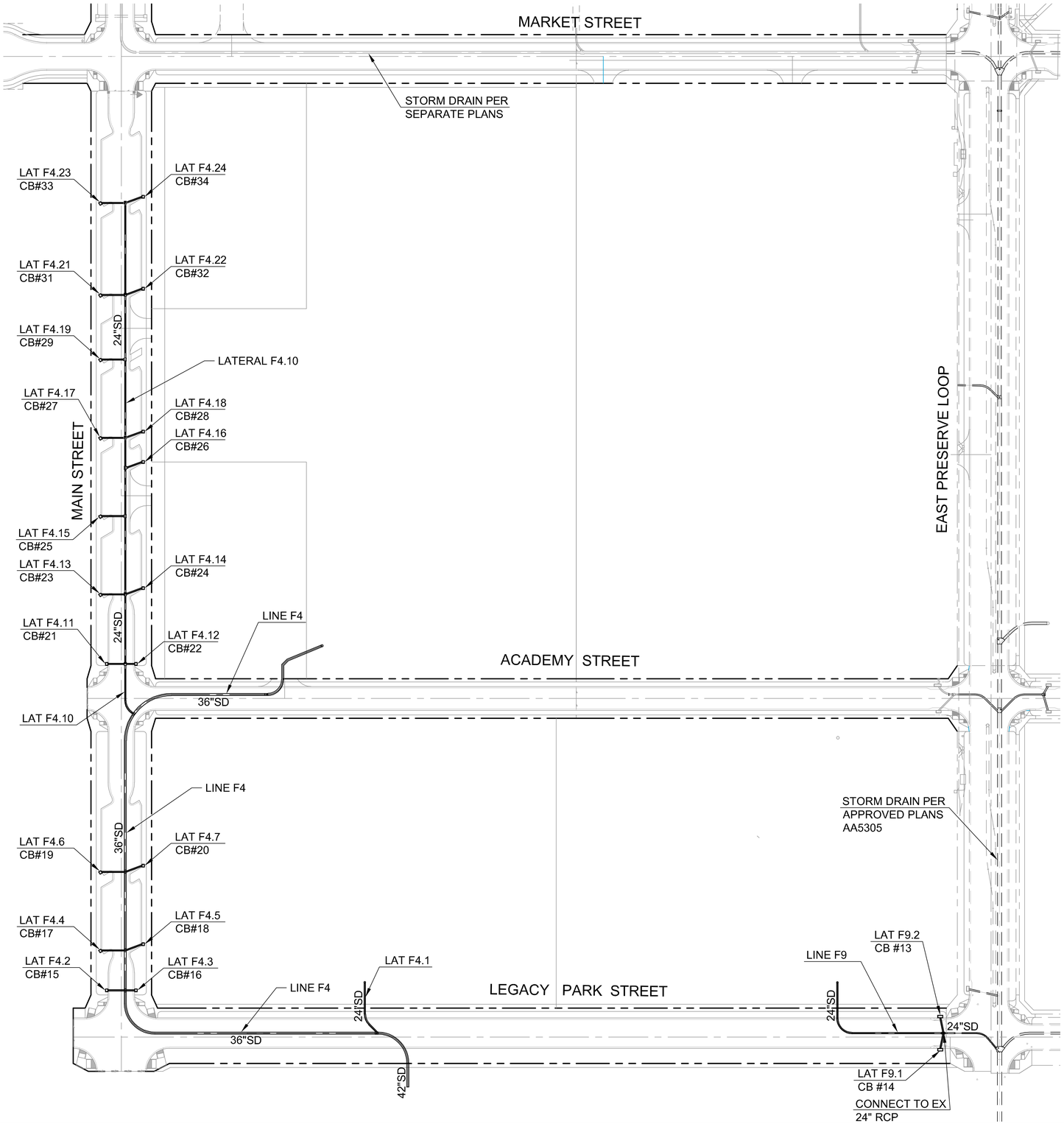
**CITY OF CHINO ENGINEERING DIVISION**

STORM DRAIN IMPROVEMENT PLANS
TITLE SHEET

PROJECT NO. TR 16420-4
SHEET 1 OF 6
DRAWING NO. AA

1st CHECK: 12/2019

JN 481-261 Lewis Operating Corp E:\400-499\481\0481-261\Plans\Storm Drain\481261sd01.dwg, Plotted: Sep 23, 2020 - 11:11am




## LEGEND

- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- PROPOSED STORM DRAIN MANHOLE

GRAPHIC SCALE

80 0 40 80 160 320

( IN FEET )
1 inch = 80 ft.

**SEAL**

REGISTERED PROFESSIONAL ENGINEER
CARLA E. BERARD
No. 45183
CIVIL
STATE OF CALIFORNIA

811 Know what's below. Call before you dig.

| PREPARED BY | REVISIONS | MADE BY / DATE | RECOMMENDED BY / DATE | BENCH MARK DATA | REFERENCE DRAWINGS | REVIEWED BY STAFF | BY | DATE | CITY ENGINEER'S STAFF | BY | DATE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FIRM: L.D. KING, INC. | | | | NO. 157/71 ELEV. 595.256 | AA5305 | WATER: | | | DRAWN: | | |
| ADDRESS: 975 N. Haven Avenue, Suite 200 | | | | LOCATION: | | SEWER: | | | DESIGNED: | | |
| Ontario, CA. 91764 | | | | A 2 1/2" brass disk stamped "157/71" set in a traffic signal concrete base located at a northwest intersection of Euclid Avenue and Kimball Avenue | | FIRE: | | | CHECKED: | | |
| TELEPHONE: (909) 945-0526 | | | | | | PLANNING: | | | RECOMMENDED: | | |
| | | | | | | TRAFFIC: | | | | | |
| SIGNATURE RCE 45183 DATE | | | | | | ENVIRONMENTAL: | | | | | |

**RECOMMENDED BY:**

CITY ENGINEER

DATE: _____

# CITY OF CHINO ENGINEERING DIVISION

STORM DRAIN IMPROVEMENT PLANS

## SYSTEM MAP

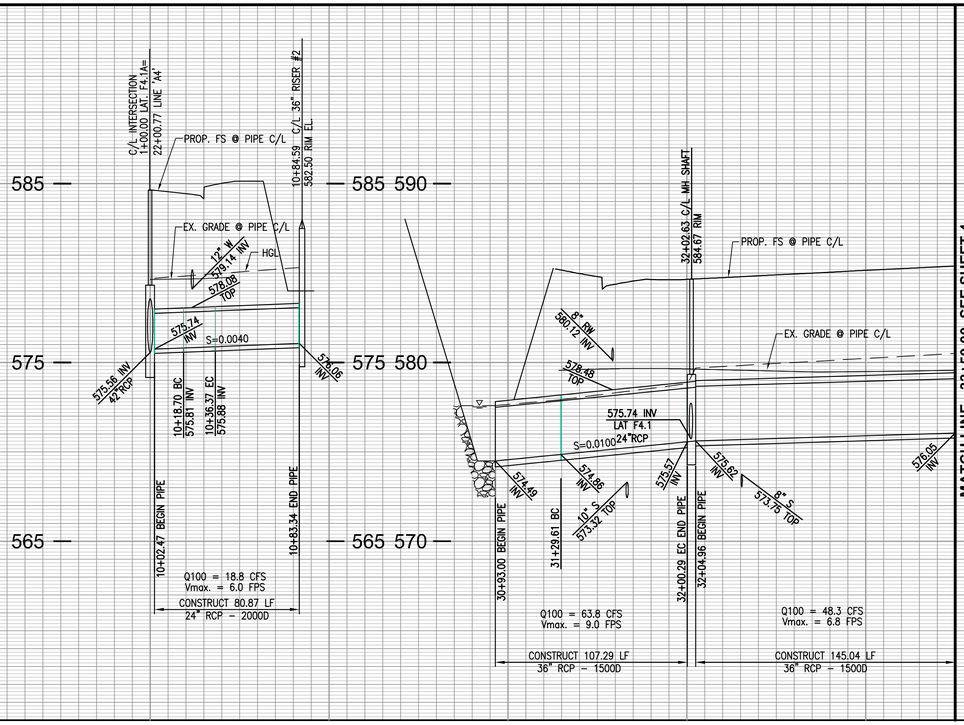
PROJECT NO. **TR 16420-4**

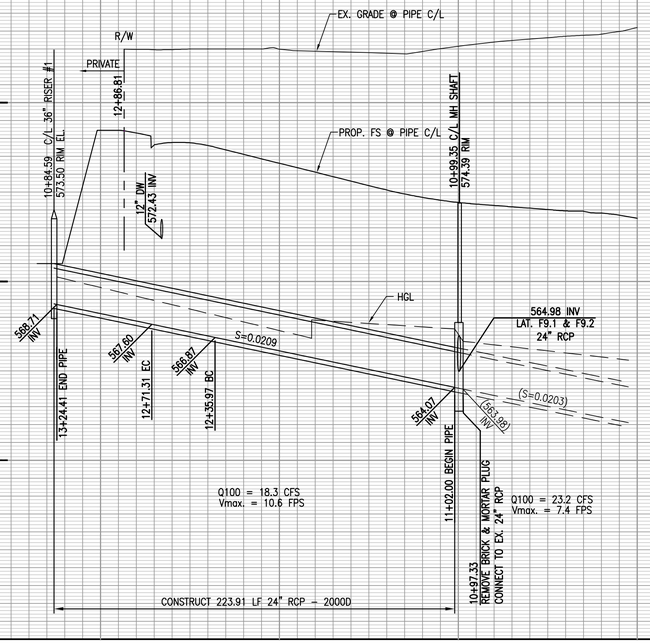
SHEET 2 OF 6

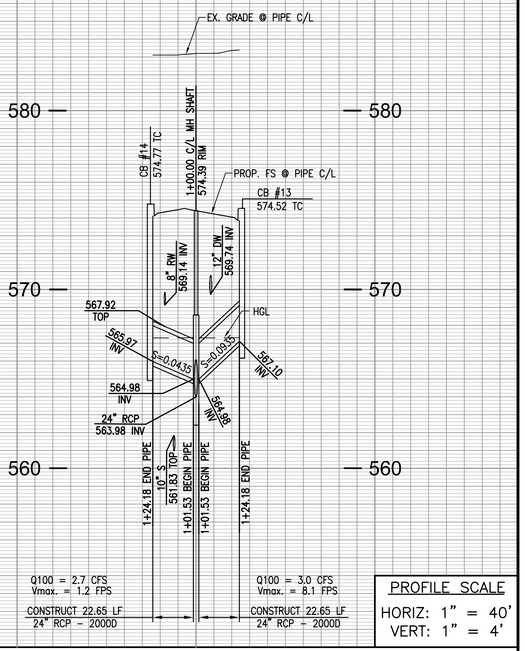
DRAWING NO. **AA**

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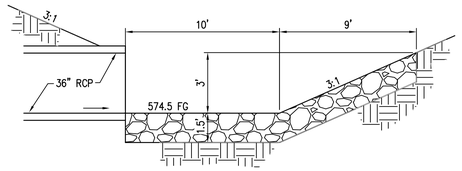
1st CHECK: 12/2019



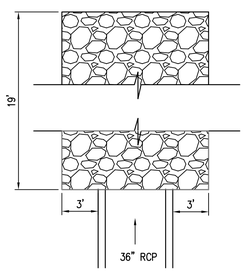




PROFILE SCALE
HORIZ: 1" = 40'
VERT: 1" = 4'

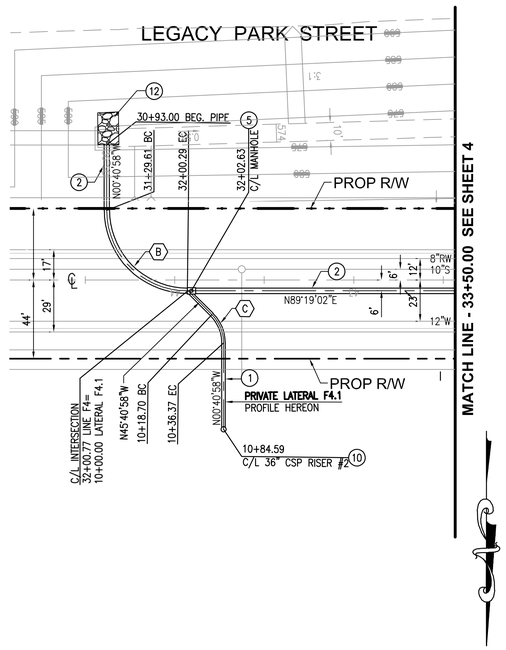


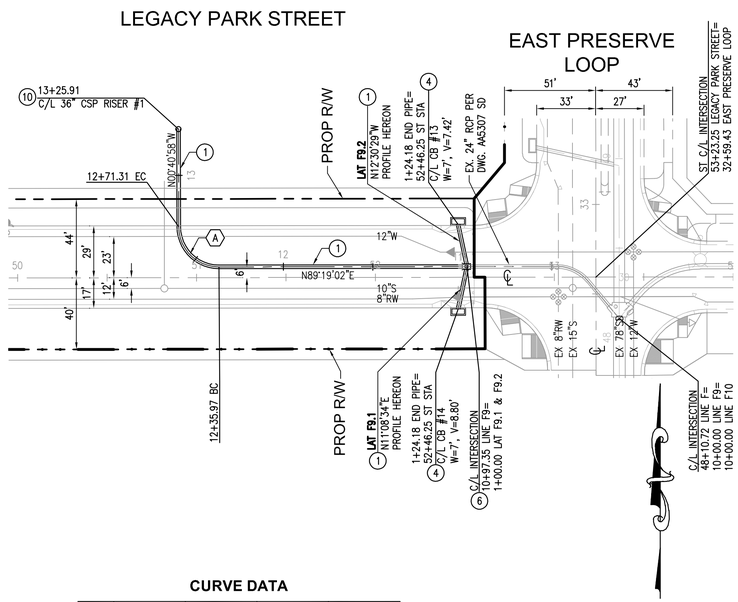

ELEVATION




PLAN

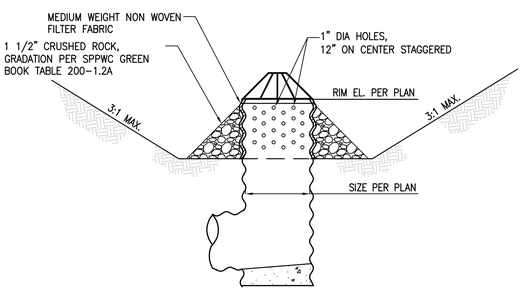
## (12) RIP-RAP DETAIL
NOT TO SCALE




## CONSTRUCTION NOTES

1. CONSTRUCT 24" RCP, BEDDING & BACKFILL PER CITY OF CHINO STD. DWG. NO. 109
2. CONSTRUCT 36" RCP, BEDDING & BACKFILL PER CITY OF CHINO STD. DWG. NO. 109
4. CONSTRUCT CURB OPENING CATCH BASIN PER SPPWC STD. PLAN NO. 300-3 AND STORM DRAIN CURB MARKER PER CITY STD. DWG. NO. 341
5. CONSTRUCT MANHOLE PIPE-TO-PIPE (MAIN LINE ID=36" OR LARGER) PER SPPWC STD PLAN 320-2 MANHOLE FRAME AND COVER PER CITY STD. DWG. NO. 385
6. CONSTRUCT MANHOLE PIPE-TO-PIPE PER (MAIN LINE ID=33" OR SMALLER) SPPWC STD PLAN 321-2 MANHOLE FRAME AND COVER PER CITY STD. DWG. NO. 385
10. CONSTRUCT 36" CMP RISER, 14 GAUGE, PER CITY STD 355 AND DETAIL 'A' SHEET 3
12. CONSTRUCT CLASS "BACKING #2" RIPRAP, MEDTHOD B PLACEMENT PER CALTRANS SPECIFICATIONS & DETAIL HEREON




## DETAIL 'A' CSP RISER
NOT TO SCALE

GRAPHIC SCALE
40 0 20 40 80 160
( IN FEET )
1 inch = 40 ft.

### CURVE DATA

| ⬡ | R | △ | L | T |
|---|---|---|---|---|
| A | 22.50' | 90°00'00" | 35.34' | 09.32' |
| B | 45.00' | 90°00'00" | 70.69' | 45.00' |
| C | 22.50' | 45°00'00" | 17.67' | 13.44' |

SEAL

REGISTERED PROFESSIONAL ENGINEER CARLA E. BERARD No. 45183 CIVIL STATE OF CALIFORNIA

811 Know what's below. Call before you dig.

| PREPARED BY | |
|---|---|
| FIRM: | L.D. KING, INC. |
| ADDRESS: | 975 N. Haven Avenue, Suite 200 |
| | Ontario, CA. 91764 |
| TELEPHONE: | (909) 945-0526 |
| | SIGNATURE RCE 45183 DATE |

| REVISIONS | MADE BY | MADE DATE | RECOMMENDED BY | RECOMMENDED DATE |
|---|---|---|---|---|
| △ | | | | |
| △ | | | | |
| △ | | | | |
| △ | | | | |
| △ | | | | |

**BENCH MARK DATA**
NO. 157/71 ELEV. 595.256
LOCATION:
A 2 1/2" brass disk stamped "157/71" set in a traffic signal concrete base located at a northwest intersection of Euclid Avenue and Kimball Avenue

**REFERENCE DRAWINGS**
AA 5307 SD

| REVIEWED BY STAFF | BY | DATE |
|---|---|---|
| WATER: | | |
| SEWER: | | |
| FIRE: | | |
| PLANNING: | | |
| TRAFFIC: | | |
| ENVIRONMENTAL: | | |

| CITY ENGINEER'S STAFF | BY | DATE |
|---|---|---|
| DRAWN: | | |
| DESIGNED: | | |
| CHECKED: | | |
| RECOMMENDED: | | |

**RECOMMENDED BY:**

CITY ENGINEER

DATE: _____

# CITY OF CHINO ENGINEERING DIVISION

STORM DRAIN IMPROVEMENT PLANS

LINE F4 FROM STATION 20+70.00 TO STATION 23+50.00

LINE F9 FROM STATION 10+00.00 TOSTATION 13+25.91

PROJECT NO. TR 16420-4

SHEET 3 OF 6

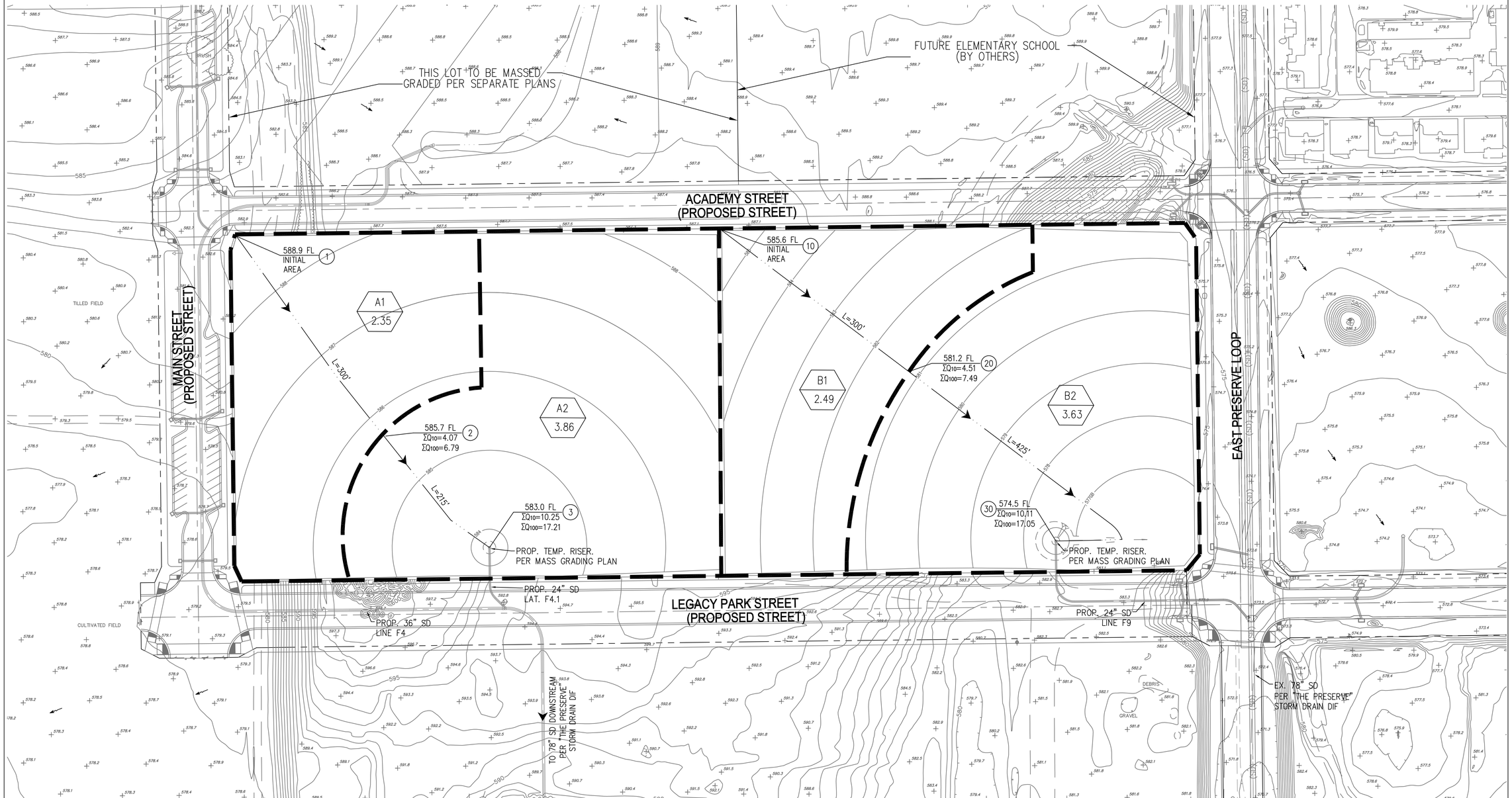
DRAWING NO. AA

JN 481-261 Lewis Operating Corp E:\400-499\481\0481-261\Plans\Storm Drain\481261sd03.dwg, Plotted: Sep 23, 2020 - 11:29am

1st CHECK: 12/2019

# APPENDIX H

HYDROLOGY MAPS




LEGEND:

- D1 / 0.73 AC — SUBAREA / ACREAGE
- 1 — NODE
- 1 $T_{10}$=10.21 / $Q_{10}$=9.11 / $Q_{100}$=15.21 — TIME OF CONCENTRATION IN MINUTES / RUNOFF FOR 10 YEAR STORM EVENT IN CFS / RUNOFF FOR 100 YEAR STORM EVENT IN CFS
- 849.0 FL — ELEVATION
- FLOW PATH
- SUBAREA BOUNDARY
- DRAINAGE AREA BOUNDARY

60' 0' 60' 120' 180'

GRAPHIC SCALE: 1"=60'

NOT FOR CONSTRUCTION


160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860

DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning

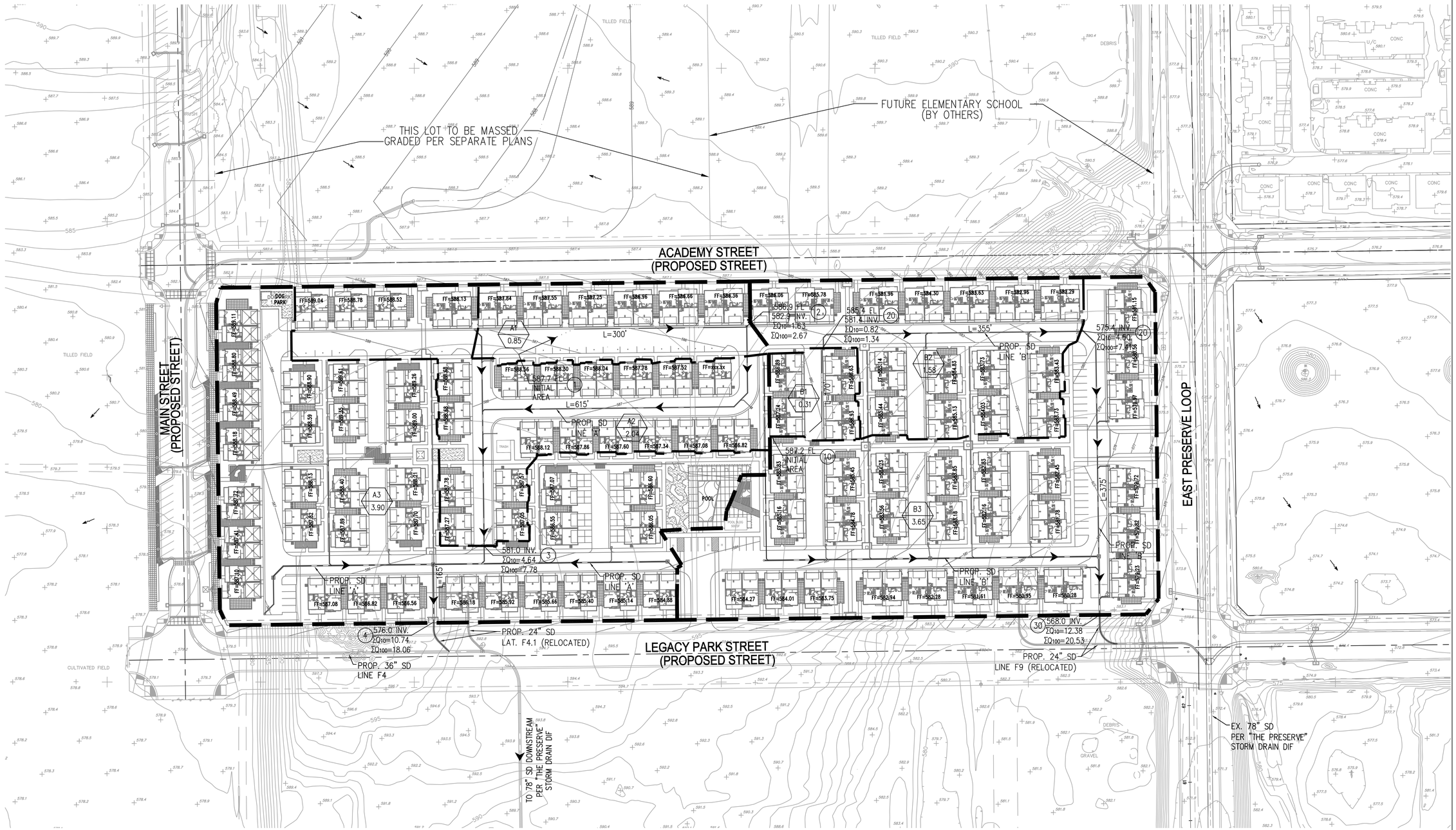

| NO.: | REVISION: | DATE: |
|---|---|---|
| | | |

PROJECT: **CHINO RENTAL NEIGHBORHOOD**
**SWC ACADEMY & E. PRESERVE LOOP**
**CHINO, CA**

DRAWING NAME: **HYDROLOGY MAP - EXISTING**

| | |
|---|---|
| ISSUE: | **CONCEPTUAL** |
| DATE: | **OCT. 2020** |
| CHECKED: **DRC** | DRAWN: **DRC** |
| DRAWING FILE: | **19360EXHM** |
| PROJECT NO.: | **19-360** |
| SHEET NUMBER: | **1** |
| OF | **1** SHEETS |
| SCALE: | **AS SHOWN** |

FILENAME: M:\2019\19-360 Lewis Chino Rental Neighborhood\HM\19360 hm ex.dwg, LAST SAVED ON: Oct 13 2020 9:28pm PLOTTED BY: YANG, ON: Oct 13 2020 9:40pm, CFC




LEGEND:

- D1 / 0.73 AC — SUBAREA / ACREAGE
- 1 — NODE
- 1 $T_{10}$=10.21 / $Q_{10}$=9.11 / $Q_{100}$=15.21 — TIME OF CONCENTRATION IN MINUTES / RUNOFF FOR 10 YEAR STORM EVENT IN CFS / RUNOFF FOR 100 YEAR STORM EVENT IN CFS
- 849.0 FL — ELEVATION
- FLOW PATH
- SUBAREA BOUNDARY
- DRAINAGE AREA BOUNDARY

60' 0' 60' 120' 180'

GRAPHIC SCALE: 1"=60'

NOT FOR CONSTRUCTION


DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning
160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860


| NO.: | REVISION: | DATE: |
|---|---|---|
| | | |

PROJECT: CHINO RENTAL NEIGHBORHOOD
SWC ACADEMY & E. PRESERVE LOOP
CHINO, CA

DRAWING NAME: HYDROLOGY MAP - PROPOSED

| | |
|---|---|
| ISSUE: | CONCEPTUAL |
| DATE: | OCT. 2020 |
| CHECKED: DRC | DRAWN: DRC |
| DRAWING FILE: | 19360PHM |
| PROJECT NO.: | 19-360 |
| SHEET NUMBER: | 1 |
| OF | 1 SHEETS |
| SCALE: | AS SHOWN |

FILENAME: M:\2019\19-360 Lewis Chino Rental Neighborhood\HM\19360 hm prop.dwg, LAST SAVED ON: Oct 13 2020 10:04pm PLOTTED BY: YANG, ON: Oct 13 2020 10:12pm, CFG:

LINSCOTT
LAW &
GREENSPAN
engineers

**Engineers & Planners**
Traffic
Transportation
Parking

**Linscott, Law & Greenspan, Engineers**
2 Executive Circle
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Irvine, CA 92614
**949.825.6175** T
949.825.6173 F
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Pasadena
Irvine
San Diego
Woodland Hills

September 3, 2021

Pat Loy
Vice President – Regional Planned Communities
Lewis Management Corp.
1156 N. Mountain Avenue
Upland, CA 91786

LLG Reference: 2.21.4404.1

Subject: **Revised Trip Generation and Qualitative VMT Assessment for the Master Site Approval for The Preserve Specific Plan**
Chino, California

Dear Mr. Loy:

Linscott, Law & Greenspan, Engineers (LLG) is pleased to submit this Trip Generation and Qualitative Vehicle Miles Traveled (VMT) Assessment for Master Site Approval (MSA) of The Preserve Specific Plan (hereinafter referred to as "Project"). Modifications are proposed within the South of Pine (SOP) component of the Preserve Specific Plan area which is generally located south of Pine Avenue, east of Chino Corona Road (N/S), west of Hellman Avenue and north of Chino Corona Road (E/W).

Based on our understanding of the proposed Project, Lewis Management Corp proposes to transfer units between Blocks within the Lewis Master Plan holdings in the South of Pine (SOP) component of the Preserve Specific Plan. In addition, a nominal amount of unit transfers within the Lewis Master Plan holdings between the North of Pine (NOP) and SOP components of the Preserve Specific Plan is also proposed. These unit transfers would then allow for development of Block 9 with up to 210 dwelling units (DU), among other Blocks in the South of Pine component of the Preserve Specific Plan with additional units while subtracting units from other Blocks. The total Lewis unit count in The Preserve SOP will increase by an additional 4 units for a total of 4,604 DU, while The Preserve NOP will decrease by a total of 4 units (Van Vliet PA-6 and PA-7) for a total of 3,525 DU. However, the total combined unit count of The Preserve NOP and SOP components will remain unchanged at 8,129 DU.

As a result of shifting units between the SOP blocks as well as between the SOP and NOP components, Block 1 is proposing a decrease of 65 DU from what was identified as part of the Master Plan from the Block 4 EIR Addendum. Similarly, Block 2 has a decrease of 60 DU, Block 3 has an increase of 8 DU, Blocks 4 and 5 have no change, Block 6 has an increase of 70 DU, Block 7 has a decrease of 30 DU, Block 8 has an increase of 83 DU, Block 9 has an increase of 41 DU, Block 10 has a

Philip M. Linscott, PE (1924-2000)
Jack M. Greenspan, PE (Ret.)
William A. Law, PE (Ret.)
Paul W. Wilkinson, PE
John P. Keating, PE
David S. Shender, PE
John A. Boarman, PE
Clare M. Look-Jaeger, PE
Richard E. Barretto, PE
Keil D. Maberry, PE

An LG2WB Company Founded 1966

decrease of 66 DU and Block 11 has an increase of 23 DU for a combined total change of an additional 4 units. The 4 units transferred from NOP to SOP Block 9 and Block 10 originated from Van Vliet PA-6 (-1 DU) and Van Vliet PA-7 (-3 DU), respectively.

This letter summarizes the traffic generation forecast potential for the proposed changes as summarized above.

## PROJECT LOCATION

The Preserve (SOP) Specific Plan area is generally located south of Pine Avenue, east of Chino Corona Road (N/S), west of Hellman Avenue and north of Chino Corona Road (E/W). All major access points to the area have already been analyzed as part of the Block 4 EIR Addendum. ***Figure 1***, located at the rear of this letter report, presents a Vicinity Map, which illustrates the general location of the project and the surrounding street system. ***Figure 2*** is an existing aerial photograph of the Project site inclusive of the existing shopping center**.**

## PRESERVE (SOP) DEVELOPMENT TOTALS

***Table 1*** at the end of the report following the figures includes a comparison between the current approved Master Plan to what is being proposed. As noted earlier, swapping of units has occurred between blocks and between the SOP and NOP components, resulting in an increase of an additional 4 units for the SOP component. ***Tables 2*** through ***10*** presents a block-by-block development comparison between the current approved Master Plan to what is being proposed. ***Figures 3*** presents the proposed Master Plan.

Relative to Block 1 and Block 2 SOP, as shown in ***Table 2*** and ***Table 3***, the Block 1 and Block 2 SOP properties are currently entitled for the development of up to 347 DU and 572 DU, respectively. With the proposed modifications, the residential units in Block 1 will be reduced to 282 DU and the residential units in Block 2 will be reduced to 512 DU but a 3-acre neighborhood park will be added. For Block 3, as shown in ***Table 4***, the residential unit count is proposed to be increased from 160 DU to 168 DU. No Changes are proposed for Block 4 and Block 5.

As shown in ***Table 5*** and ***Table 6***, the Block 6 and Block 7 SOP properties show an increase of 70 DU and a decrease of 30 DU, respectively, but overall shows a significant decrease of 298,600 SF from what was identified in the current approved Master Plan.

With the proposed Project, the residential units in Block 8, Block 9, and Block 11 will be increased by 83 DU, 41 DU and 23 DU to a total of 877 DU, 210 DU and 305 DU,

respectively, while Block 9 is proposed to be developed with 210 DU, 41 more than currently entitled (See ***Tables 7, 8,*** and ***10***).

As shown in ***Table 9****,* the residential units in Block 10 will be reduced by 66 DU to a total of 216 DU but a 3-acre neighborhood park will be added.

It is noted that the residential unit count for Block 9 and Block 10, as reported above, includes the 4 units transferred from NOP Van Vliet PA-6 (-1 DU) and Van Vliet PA-7 (-3 DU), respectively.

## PROJECT TRAFFIC GENERATION FORECAST

Traffic generation is expressed in vehicle trip ends, defined as one-way vehicular movements, either entering or exiting the generating land use. Generation factors and/or equations used in this analysis are based on information found in the 10th Edition of *Trip Generation,* published by the Institute of Transportation Engineers (ITE) [Washington, D.C., 2017]. ***Table 11*** presents the trip generation rates used to forecasting trips.

***Tables 12*** through ***20*** *s*ummarizes the trip generation potential on a block-by-block basis and compares it between the current approved Master Plan to what is being proposed. ***Table 21*** presents the total trips for each block as presented in *Tables 12* through *20*. Review of the upper portion of *Table 21* presents the current Master Plan trips by block. As shown, the current Master Plan is forecast to generate 39,149 daily trips, with 3,135 trips (1,235 inbound, 1,900 outbound) produced in the AM peak hour and 3,782 trips (2,123 inbound, 1,659 outbound) produced in the PM peak hour.

Review of the middle portion of *Table 21* presents the proposed Master Plan trips by block. As shown, the proposed Project is forecast to generate 34,281 daily trips, with 2,821 trips (1,002 inbound, 1,819 outbound) produced in the AM peak hour and 3,263 trips (1,921 inbound, 1,342 outbound) produced in the PM peak hour.

Comparison of the trips generated by the proposed Master Plan to the trips generated by the current approved Master Plan uses shows that the proposed Master Plan would generate 4,868 fewer daily trips, 314 fewer AM peak hour trips and 519 fewer PM peak hour trips. It should be noted that the current approved Master Plan is based on the Block 4 EIR Addendum. However, the proposed Master Plan compared to the 2008 Entitlements results in the proposed Master Plan generating 182 fewer daily trips.

**SB743 COMPLIANCE**

**VMT Screening Assessment**

On December 28, 2018, the California Natural Resources Agency adopted revised CEQA Guidelines. Among the changes to the guidelines was the removal of vehicle delay and LOS from consideration for transportation impacts under CEQA. With the adopted guidelines, transportation impacts are to be evaluated based on a project's effect on vehicle miles traveled. Lead agencies are allowed to continue using their current impact criteria, or to opt into the revised transportation guidelines. However, the new guidelines must be used starting July 1, 2020, as required in CEQA section 15064.3.

The City of Chino has adopted VMT Impact Thresholds via Resolution No. 2020-0019 on June 16, 2020, which are consistent with the criteria identified by San Bernardino County Transportation Authority (SBCTA) in the *Recommended Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment,* prepared by Fehr & Peers in February 2020. The Preserve SOP area was environmentally cleared as part of the Block 4 EIR Addendum. Based on the trip generation identified earlier in this letter, the proposed Master Plan would result in fewer trips ultimately reducing its Green House Gas (GHG) emissions. As such, the proposed Master Plan VMT impacts can be presumed to be similar to or less than that of the currently approved Master Plan and thus have a less than significant impact. Because the proposed Master Plan includes the same land uses on the same site, it would not result in any new or more severe VMT impacts as compared to buildout of the SOP area as analyzed in the 2003 EIR, 2008 EIR Addendum, and the Block 4 EIR Addendum.

**CONCLUSION**

Based on the information above, the proposed Master Plan is forecast to generate 4,868 fewer daily trips, 314 fewer AM peak hour trips and 519 fewer PM peak hour trips when compared to the current approved Master Plan trips generated. Hence, it is concluded that no additional traffic analysis would be needed and further yet, the potential impact of the Project would be insignificant.

In addition, as a result of the proposed Master Plan generating fewer trips than the currently approved Master Plan it can be presumed that proposed Master Plan VMT impacts would be similar to or less than that of the currently approved Master Plan and thus have a less than significant impact.

* * * * * * * * * *

We appreciate the opportunity to prepare this investigation for proposed Project and the City of Chino. Should you have any questions or need additional assistance, please do not hesitate to call me at (949) 825-6175.

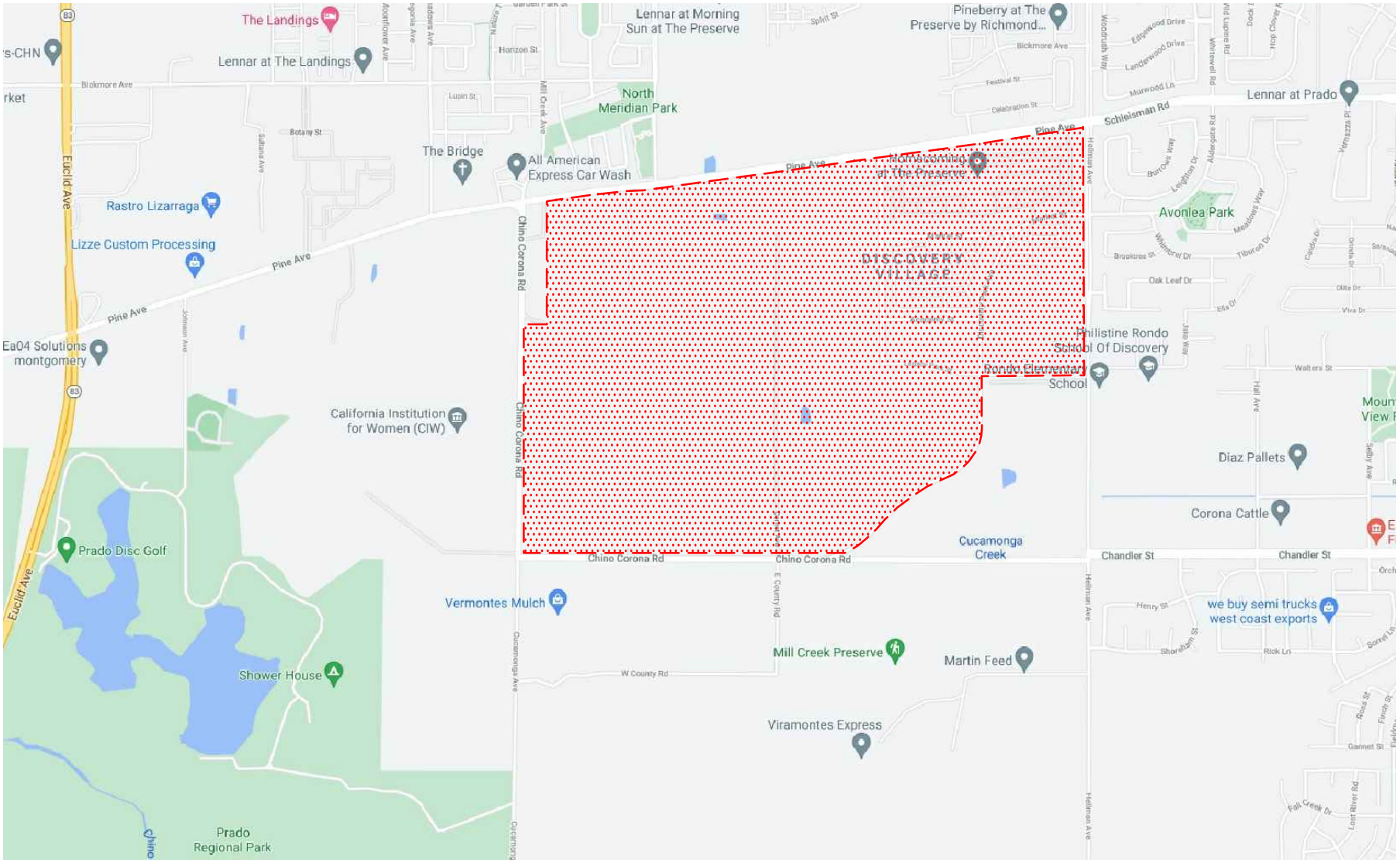
Sincerely,

**Linscott, Law & Greenspan, Engineers**

Richard E. Barretto, P.E.
Principal

Cc. Shane S. Green, P.E., LLG

Attachments




n:\4400\2214404 - the preserve specific plan at chino msa traffic support\dwg\4404 f-1.dwg LDP 14:24:19 05-18-2021 aguilar

LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

SOURCE: GOOGLE

KEY

= SOUTH OF PINE

# FIGURE 1

## VICINITY MAP

THE PRESERVE (SOP) SPECIFIC PLAN AT CHINO MSA, CHINO




n:\4400\2214404 - the preserve specific plan at chino msa traffic support\dwg\4404 f-2.dwg LDP 14:23:01 05-18-2021 aguilar

LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

SOURCE: GOOGLE

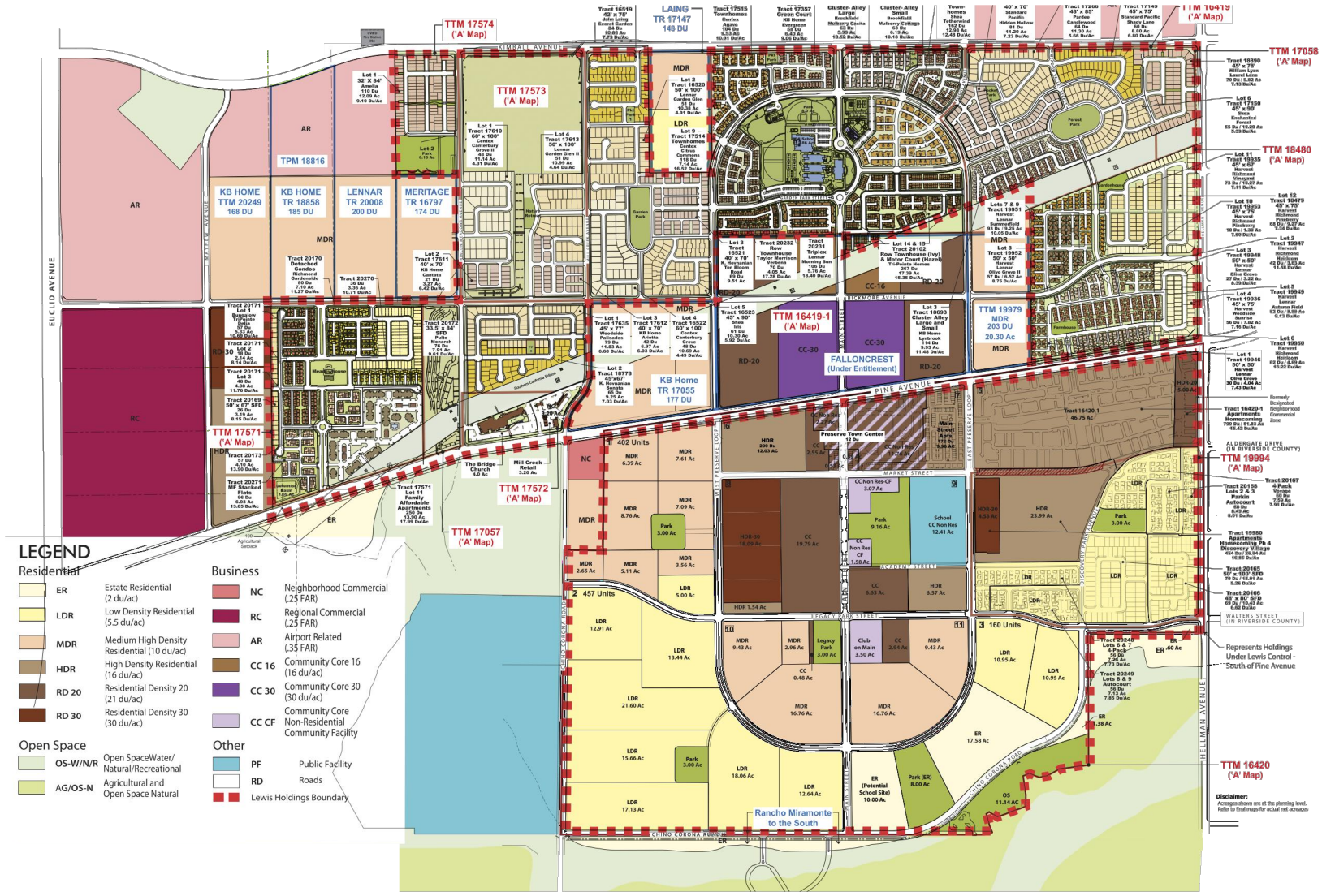
KEY

= SOUTH OF PINE

# FIGURE 2

## EXISTING SITE AERIAL

THE PRESERVE (SOP) SPECIFIC PLAN AT CHINO MSA, CHINO




n:\4400\2214404 - the preserve specific plan at chino msa traffic support\dwg\4404 f-3.dwg LDP 14:28:25 05-18-2021 aguilar

LINSCOTT LAW & GREENSPAN engineers

N NO SCALE

SOURCE: LDKINGWHA

# FIGURE 3

## PROPOSED MASTER PLAN

THE PRESERVE (SOP) SPECIFIC PLAN AT CHINO MSA, CHINO

LINSCOTT LAW & GREENSPAN engineers

## TABLE 1
## PROJECT DEVELOPMENT SUMMARY[1]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| SOP Block Numbers | Master Planned Residential Units per the Block 4 EIR Addendum | Proposed Residential Units | Difference |
|---|---|---|---|
| Block 1 | 347 | 282 | -65 |
| Block 2 | 572 | 512 | -60 |
| Block 3 | 160 | 168 | +8 |
| Block 4 | 842 | 842 | 0 |
| Block 5 | 799 | 799 | 0 |
| Block 6 | 145 | 215 | +70 |
| Block 7 | 208 | 178 | -30 |
| Block 8 | 794 | 877 | +83 |
| Block 9 | 169 | 210 | +41 |
| Block 10 | 282 | 216 | -66 |
| Block 11 | 282 | 305 | +23 |
| **Total SOP Units** | **4,600** | **4,604** | **+4** |
| Van Vliet PA-6 | 57 | 56 | -1 |
| Van Vliet PA-7 | 96 | 93 | -3 |
| **Total NOP Units** | **3,529** | **3,525** | **-4** |
| **Total Units** | **8,129** | **8,129** | **0** |

[1] Source: Lewis Operating Corp.

LINSCOTT LAW & GREENSPAN engineers

## TABLE 2
## BLOCK 1 PROJECT DEVELOPMENT SUMMARY[2]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| Land Use / Project Description | Entitled Land Use/Development Totals | Proposed Land Use/Development Totals |
|---|---|---|
| *Block 1 South of Pine – Current Master Plan* | | |
| ▪ Existing MDR/LDR – Single Family Residential | 347 DU | -- |
| ▪ Existing Neighborhood Park | 3.00 AC | -- |
| *Block 1 South of Pine – Proposed Master Plan* | | |
| ▪ Proposed MDR/LDR – Single Family Residential | -- | 282 DU |
| ▪ Proposed Neighborhood Park | -- | 3.00 AC |
| **Total Development** | **347 DU and 3.00 AC** | **282 DU and 3.00 AC** |

Notes:

- DU = dwelling unit
- AC = acres

[2] Source: Lewis Operating Corp.

LINSCOTT LAW & GREENSPAN engineers

## TABLE 3
## BLOCK 2 PROJECT DEVELOPMENT SUMMARY[3]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| Land Use / Project Description | Entitled Land Use/Development Totals | Proposed Land Use/Development Totals |
|---|---|---|
| *Block 2 South of Pine – Current Master Plan* | | |
| ▪ Existing LDR – Single Family Residential | 572 DU | -- |
| *Block 2 South of Pine – Proposed Master Plan* | | |
| ▪ Proposed LDR – Single Family Residential | -- | 512 DU |
| ▪ Proposed Neighborhood Park | -- | 3.00 AC |
| **Total Development** | **572 DU** | **512 DU and 3.00 AC** |

Notes:
- DU = dwelling unit
- AC = acres

[3] Source: Lewis Operating Corp.

LINSCOTT LAW & GREENSPAN engineers

## TABLE 4
## BLOCK 3 PROJECT DEVELOPMENT SUMMARY[4]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| Land Use / Project Description | Entitled Land Use/Development Totals | Proposed Land Use/Development Totals |
|---|---|---|
| *Block 3 South of Pine – Current Master Plan* | | |
| ▪ Existing ER/LDR – Single Family Residential | 160 DU | -- |
| ▪ Existing ER – City Park | 8.00 AC | -- |
| *Block 3 South of Pine – Proposed Master Plan* [5] | | |
| ▪ Proposed ER/LDR – Single Family Residential | -- | 168 DU |
| ▪ Proposed ER – City Park | -- | 11.15 AC |
| **Total Development** | **160 DU and 8.00 AC** | **168 DU and 11.15 AC** |

Notes:
- DU = dwelling unit
- AC = acres

[4] Source: Lewis Operating Corp.

[5] Proposed master plan development totals for Block 3 consider the most current development plans based on information provided by Lewis Operating Corp. However, review of the current approved master plan indicates the following approved land uses (not including the residential component):
- Proposed ER – City Park (8.00 AC)
- Proposed ER – School Site (10.00 AC)

LINSCOTT LAW & GREENSPAN engineers

## TABLE 5
## BLOCK 6 PROJECT DEVELOPMENT SUMMARY[6]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| Land Use / Project Description | Entitled Land Use/Development Totals | Proposed Land Use/Development Totals |
|---|---|---|
| *Block 6 South of Pine – Current Master Plan* | | |
| ▪ Existing HDR – Multifamily Residential (Low Rise) | 145 DU | -- |
| ▪ Existing CC Non-Res – General Office | 74,000 SF | -- |
| ▪ Existing CC Non-Res – Retail | 149,000 SF | -- |
| *Block 6 South of Pine – Proposed Master Plan* | | |
| ▪ Proposed HDR – Multifamily Residential (Low Rise) | -- | 215 DU |
| ▪ Proposed CC Non-Res – General Office | -- | 7,300 SF |
| ▪ Proposed CC Non-Res – Retail | -- | 22,700 SF |
| **Total Development** | **145 DU and 223,000 SF** | **215 DU and 30,000 SF** |

Notes:
- DU = dwelling unit
- SF = square feet

6 Source: Lewis Operating Corp.

LINSCOTT LAW & GREENSPAN engineers

## TABLE 6
## BLOCK 7 PROJECT DEVELOPMENT SUMMARY[7]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| Land Use / Project Description | Entitled Land Use/Development Totals | Proposed Land Use/Development Totals |
|---|---|---|
| *Block 7 South of Pine – Prior Master Plan* | | |
| ▪ Existing HDR – Multifamily Residential (Low Rise) | 208 DU | -- |
| ▪ Existing CC Non-Res – General Office | 74,000 SF | -- |
| ▪ Existing CC Non-Res – Retail | 149,000 SF | -- |
| *Block 7 South of Pine – Approved Master Plan* | | |
| ▪ Proposed HDR – Multifamily Residential (Low Rise) | -- | 178 DU |
| ▪ Proposed CC Non-Res – General Office | -- | 9,000 SF |
| ▪ Proposed CC Non-Res – Retail | | 108,400 SF |
| **Total Development** | **208 DU and 223,000 SF** | **178 DU and 117,400 SF** |

Notes:
- DU = dwelling unit
- SF = square feet

[7] Source: Lewis Operating Corp.

LINSCOTT LAW & GREENSPAN engineers

## TABLE 7
## BLOCK 8 PROJECT DEVELOPMENT SUMMARY[8]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| Land Use / Project Description | Entitled Land Use/Development Totals | Proposed Land Use/Development Totals |
|---|---|---|
| *Block 8 South of Pine – Current Master Plan* | | |
| ▪ Existing CC Res/HDR – Multifamily Residential (Low Rise) | 794 DU | -- |
| *Block 8 South of Pine – Proposed Master Plan* | | |
| ▪ Proposed CC Res/HDR – Multifamily Residential (Low Rise) | -- | 877 DU |
| ▪ Proposed Neighborhood Park | -- | 0.33 AC |
| **Total Development** | **794 DU** | **877 DU and 0.33 AC** |

Notes:
- DU = dwelling unit
- AC = acres

[8] Source: Lewis Operating Corp.

LINSCOTT LAW & GREENSPAN engineers

## TABLE 8
## BLOCK 9 PROJECT DEVELOPMENT SUMMARY[9]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| Land Use / Project Description | Entitled Land Use/Development Totals | Proposed Land Use/Development Totals |
|---|---|---|
| *Block 9 South of Pine – Current Master Plan* | | |
| ▪ Existing CC Res/HDR – Multifamily Residential (Low Rise) | 169 DU | -- |
| ▪ Existing CC Non-Res CF – Recreational Community Center | 31,000 SF | -- |
| ▪ Existing CC Non-Res CF – Library | 20,000 SF | -- |
| ▪ Existing CC Non-Res – Elementary School | 1,000 Students | -- |
| ▪ Existing CC Non-Res – City Park | 8.00 AC | -- |
| ▪ Existing CC Non-Res – Neighborhood Park | 1.50 AC | -- |
| *Block 9 South of Pine – Proposed Master Plan* | | |
| ▪ Proposed CC Res/HDR – Multifamily Residential (Low Rise) | -- | 210 DU |
| ▪ Proposed CC Non-Res CF – Recreational Community Center | -- | 31,000 SF |
| ▪ Proposed CC Non-Res CF – Library | -- | 20,000 SF |
| ▪ Proposed CC Non-Res – Elementary School | -- | 900 Students[10] |
| ▪ Proposed CC Non-Res – City Park | -- | 8.00 AC |
| ▪ Proposed CC Non-Res – Neighborhood Park | -- | 1.16 AC |
| **Total Development** | **169 DU, 51,000 SF, 1,000 students, and 9.50 AC** | **210 DU, 51,000 SF, 900 students, and 9.16 AC** |

Notes:

- DU = dwelling unit
- SF = square feet
- AC = acres

9 Source: Lewis Operating Corp.

10 The school operates on a dual cycle track with a total of 1200 students, however, the actual peak number of students at any given time is 900 students.

## TABLE 9
## BLOCK 10 PROJECT DEVELOPMENT SUMMARY[11]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| Land Use / Project Description | Entitled Land Use/Development Totals | Proposed Land Use/Development Totals |
|---|---|---|
| *Block 10 South of Pine – Current Master Plan* | | |
| ▪ Existing CC Res/MDR – Single Family Residential | 197 DU | -- |
| ▪ Existing MDR – Multifamily Residential (Low Rise) | 85 DU | -- |
| *Block 10 South of Pine – Proposed Master Plan* | | |
| ▪ Proposed CC Res/MDR – Single Family Residential | -- | 151 DU |
| ▪ Existing MDR – Multifamily Residential (Low Rise) | -- | 65 DU |
| ▪ Proposed Neighborhood Park | -- | 3.00 AC |
| **Total Development** | **282 DU** | **216 DU and 3.00 AC** |

Notes:
- DU = dwelling unit
- AC = acres

[11] Source: Lewis Operating Corp.

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## TABLE 10
## BLOCK 11 PROJECT DEVELOPMENT SUMMARY[12]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| Land Use / Project Description | Entitled Land Use/Development Totals | Proposed Land Use/Development Totals |
|---|---|---|
| *Block 11 South of Pine – Current Master Plan* | | |
| ▪ Existing CC Res/MDR – Single Family Residential | 203 DU | -- |
| ▪ Existing MDR – Multifamily Residential (Low Rise) | 79 DU | -- |
| *Block 11 South of Pine – Proposed Master Plan* | | |
| ▪ Proposed CC Res/MDR – Single Family Residential | -- | 220 DU |
| ▪ Existing MDR – Multifamily Residential (Low Rise) | -- | 85 DU |
| ▪ Proposed Recreational Community Center | -- | 16,000 SF |
| **Total Development** | **282 DU** | **305 DU and 16,000 SF** |

Notes:
- DU = dwelling unit
- SF = square feet

[12] Source: Lewis Operating Corp.

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## TABLE 11
## TRIP GENERATION RATES[13]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| ITE Land Use | Daily | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | Enter | Exit | Total | Enter | Exit | Total |
| ***Trip Generation Rates:*** | | | | | | | |
| ▪ 210: Single-Family Detached Housing (TE/DU) | 9.44 | 25% | 75% | 0.74 | 63% | 37% | 0.99 |
| ▪ 220: Multifamily (Low Rise) Residential (TE/DU) | 7.32 | 23% | 77% | 0.46 | 63% | 37% | 0.56 |
| ▪ 495: Recreational Community Center (TE/1000 SF) | 28.82 | 66% | 34% | 1.76 | 47% | 53% | 2.31 |
| ▪ 520: Elementary School (TE/Student) | 1.89 | 54% | 46% | 0.67 | 48% | 52% | 0.17 |
| ▪ 590: Library (TE/1000 SF) | 72.05 | 71% | 29% | 1.00 | 48% | 52% | 8.16 |
| ▪ 710: General Office Building (TE/1000 SF) | 9.74 | 86% | 14% | 1.16 | 16% | 84% | 1.15 |
| ▪ 820: Shopping Center (TE/1000 SF) | 37.75 | 62% | 38% | 0.94 | 48% | 52% | 3.81 |
| ▪ City Park (TE/Acre)[14] | 50.00 | 50% | 50% | 6.50 | 50% | 50% | 4.50 |
| ▪ Neighborhood Park (TE/Acre)[14] | 5.00 | 50% | 50% | 0.20 | 50% | 50% | 0.40 |

[13] Unless otherwise noted, source*: Trip Generation, 10th Edition*, Institute of Transportation Engineers, (ITE) [Washington, D.C. (2017)].

[14] Source: *San Diego Traffic Generators*, published by San Diego Association of Governments (SANDAG), dated April 2002.

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## TABLE 12
## BLOCK 1 TRIP GENERATION FORECAST[15]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| ITE Land Use / Project Description | Daily | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | Enter | Exit | Total | Enter | Exit | Total |
| *Block 1 South of Pine – Current Master Plan* | | | | | | | |
| ▪ 210: Single Family Residential (347 DU) | 3,276 | 64 | 193 | 257 | 217 | 127 | 344 |
| ▪ Neighborhood Park (3.00 AC) | 15 | 1 | 0 | 1 | 1 | 0 | 1 |
| **Current Master Plan Trip Generation** | **3,291** | **65** | **193** | **258** | **218** | **127** | **345** |
| *Block 1 South of Pine – Proposed Master Plan* | | | | | | | |
| ▪ 210: Single Family Residential (282 DU) | 2,662 | 52 | 157 | 209 | 176 | 103 | 279 |
| ▪ Neighborhood Park (3.00 AC) | 15 | 1 | 0 | 1 | 1 | 0 | 1 |
| **Proposed Master Plan Trip Generation** | **2,677** | **53** | **157** | **210** | **177** | **103** | **280** |
| **Difference in Trip Generation: Proposed Master Plan Minus Current Master Plan** | **-614** | **-12** | **-36** | **-48** | **-41** | **-24** | **-65** |

[15] Unless otherwise noted, source*: Trip Generation, 10th Edition*, Institute of Transportation Engineers, (ITE) [Washington, D.C. (2017)].

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## TABLE 13
## BLOCK 2 TRIP GENERATION FORECAST[16]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| ITE Land Use / Project Description | Daily | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | Enter | Exit | Total | Enter | Exit | Total |
| *Block 2 South of Pine – Current Master Plan* | | | | | | | |
| ▪ 210: Single Family Residential (572 DU) | 5,400 | 106 | 317 | 423 | 357 | 209 | 566 |
| *Block 2 South of Pine – Proposed Master Plan* | | | | | | | |
| ▪ 210: Single Family Residential (512 DU) | 4,833 | 95 | 284 | 379 | 319 | 188 | 507 |
| ▪ Neighborhood Park (3.00 AC) | 15 | 1 | 0 | 1 | 1 | 0 | 1 |
| **Proposed Master Plan Trip Generation** | **4,848** | **96** | **284** | **380** | **320** | **188** | **508** |
| **Difference in Trip Generation: Proposed Master Plan Minus Current Master Plan** | **-552** | **-10** | **-33** | **-43** | **-37** | **-21** | **-58** |

[16] Unless otherwise noted, source*: Trip Generation, 10th Edition*, Institute of Transportation Engineers, (ITE) [Washington, D.C. (2017)].

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## TABLE 14
## BLOCK 3 TRIP GENERATION FORECAST[17]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| ITE Land Use / Project Description | Daily | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | Enter | Exit | Total | Enter | Exit | Total |
| *Block 3 South of Pine – Current Master Plan* | | | | | | | |
| ▪ 210: Single Family Residential (160 DU) | 1,510 | 30 | 88 | 118 | 100 | 58 | 158 |
| ▪ City Park (8.00 AC) | 400 | 26 | 26 | 52 | 18 | 18 | 36 |
| **Current Master Plan Trip Generation** | **1,910** | **56** | **114** | **170** | **118** | **76** | **194** |
| *Block 3 South of Pine – Proposed Master Plan* | | | | | | | |
| ▪ 210: Single Family Residential (168 DU) | 1,586 | 31 | 93 | 124 | 105 | 61 | 166 |
| ▪ City Park (11.15 AC) | 558 | 36 | 36 | 72 | 25 | 25 | 50 |
| **Proposed Master Plan Trip Generation** | **2,144** | **67** | **129** | **196** | **130** | **86** | **216** |
| **Difference in Trip Generation: Proposed Master Plan Minus Current Master Plan** | **234** | **11** | **15** | **26** | **12** | **10** | **22** |

[17] Unless otherwise noted, source*: Trip Generation, 10th Edition*, Institute of Transportation Engineers, (ITE) [Washington, D.C. (2017)].

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## TABLE 15
## BLOCK 6 TRIP GENERATION FORECAST[18]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| ITE Land Use / Project Description | Daily | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | Enter | Exit | Total | Enter | Exit | Total |
| *Block 6 South of Pine – Current Master Plan* | | | | | | | |
| ▪ 220: Multifamily Residential (Low Rise) (145 DU) | 1,061 | 15 | 52 | 67 | 51 | 30 | 81 |
| ▪ 710: General Office (74,000 SF) | 721 | 74 | 12 | 86 | 14 | 71 | 85 |
| ▪ 820: Retail (149,000 SF) | 5,625 | 87 | 53 | 140 | 273 | 295 | 568 |
| Passby Reduction[19] | -1,913 | 0 | 0 | 0 | -93 | -100 | -193 |
| Subtotal | 3,712 | 87 | 53 | 140 | 180 | 195 | 375 |
| **Current Master Plan Trip Generation** | **5,494** | **176** | **117** | **293** | **245** | **296** | **541** |
| *Block 6 South of Pine – Proposed Master Plan* | | | | | | | |
| ▪ 220: Multifamily Residential (Low Rise) (215 DU) | 2,030 | 40 | 119 | 159 | 134 | 79 | 213 |
| ▪ 710: General Office (7,300 SF) | 71 | 7 | 1 | 8 | 1 | 7 | 8 |
| ▪ 820: Retail (22,700 SF) | 857 | 13 | 8 | 21 | 41 | 45 | 86 |
| Passby Reduction[19] | -291 | 0 | 0 | 0 | -14 | -15 | -29 |
| Subtotal | 566 | 13 | 8 | 21 | 27 | 30 | 57 |
| **Proposed Master Plan Trip Generation** | **2,667** | **60** | **128** | **188** | **162** | **116** | **278** |
| **Difference in Trip Generation: Proposed Master Plan Minus Current Master Plan** | **-2,827** | **-116** | **11** | **-105** | **-83** | **-180** | **-263** |

[18] Unless otherwise noted, source*: Trip Generation, 10th Edition*, Institute of Transportation Engineers, (ITE) [Washington, D.C. (2017)].

[19] Consistent with the findings in the *Traffic Impact Analysis "South of Pine" (Tentative Tract Map No. 16420) The Preserve Phase 3 and 4 Areas External Evaluation, prepared by LLG, dated January 2008*, a pass-by reduction factor of 34% was applied to the PM peak hour, and the same factor was used to estimate the daily pass-by percentage.

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## TABLE 16
## BLOCK 7 TRIP GENERATION FORECAST[20]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| ITE Land Use / Project Description | Daily | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | Enter | Exit | Total | Enter | Exit | Total |
| *Block 7 South of Pine – Prior Master Plan* | | | | | | | |
| ▪ 220: Multifamily Residential (Low Rise) (208 DU) | 1,964 | 39 | 115 | 154 | 130 | 76 | 206 |
| ▪ 710: General Office (74,000 SF) | 721 | 74 | 12 | 86 | 14 | 71 | 85 |
| ▪ 820: Retail (149,000 SF) | 5,625 | 87 | 53 | 140 | 273 | 295 | 568 |
| Pass-by Reduction[21] | -1,913 | 0 | 0 | 0 | -93 | -100 | -193 |
| Subtotal | 3,712 | 87 | 53 | 140 | 180 | 195 | 375 |
| **Current Master Plan Trip Generation** | **6,397** | **200** | **180** | **380** | **324** | **342** | **666** |
| *Block 7 South of Pine – Approved Master Plan* | | | | | | | |
| ▪ 220: Multifamily Residential (Low Rise) (178 DU) | 1,680 | 33 | 99 | 132 | 111 | 65 | 176 |
| ▪ 710: General Office (9,000 SF) | 88 | 9 | 1 | 10 | 2 | 8 | 10 |
| ▪ 820: Shopping Center (108,400 SF) | 4,092 | 63 | 39 | 102 | 198 | 215 | 413 |
| Pass-By Reduction[21] | -1,391 | 0 | 0 | 0 | -67 | -73 | -140 |
| Subtotal | 2,701 | 63 | 39 | 102 | 131 | 142 | 273 |
| **Proposed Master Plan Trip Generation** | **4,469** | **105** | **139** | **244** | **244** | **215** | **459** |
| **Difference in Trip Generation: Approved Master Plan Minus Prior Master Plan** | **-1,928** | **-95** | **-41** | **-136** | **-80** | **-127** | **-207** |

[20] Unless otherwise noted, source*: Trip Generation, 10th Edition*, Institute of Transportation Engineers, (ITE) [Washington, D.C. (2017)].

[21] Consistent with the findings in the *Traffic Impact Analysis "South of Pine" (Tentative Tract Map No. 16420) The Preserve Phase 3 and 4 Areas External Evaluation, prepared by LLG, dated January 2008*, a pass-by reduction factor of 34% was applied to the PM peak hour, and the same factor was used to estimate the daily pass-by percentage.

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## TABLE 17
## BLOCK 8 TRIP GENERATION FORECAST[22]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| ITE Land Use / Project Description | Daily | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | Enter | Exit | Total | Enter | Exit | Total |
| *Block 8 South of Pine – Current Master Plan* | | | | | | | |
| ▪ 220: Multifamily Residential (Low Rise) (794 DU) | 5,812 | 84 | 281 | 365 | 280 | 165 | 445 |
| *Block 8 South of Pine – Proposed Master Plan* | | | | | | | |
| ▪ 220: Multifamily Residential (Low Rise) (877 DU) | 6,420 | 93 | 310 | 403 | 309 | 182 | 491 |
| ▪ Neighborhood Park (0.33 AC) | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Proposed Master Plan Trip Generation** | **6,422** | **93** | **310** | **403** | **309** | **182** | **491** |
| **Difference in Trip Generation: Proposed Master Plan Minus Current Master Plan** | **610** | **9** | **29** | **38** | **29** | **17** | **46** |

[22] Unless otherwise noted, source*: Trip Generation, 10th Edition*, Institute of Transportation Engineers, (ITE) [Washington, D.C. (2017)].

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## TABLE 18
## BLOCK 9 TRIP GENERATION FORECAST[23]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| ITE Land Use / Project Description | Daily | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | Enter | Exit | Total | Enter | Exit | Total |
| *Block 9 South of Pine – Current Master Plan* | | | | | | | |
| ▪ 220: Multifamily Residential (Low Rise) (169 DU) | 1,237 | 18 | 60 | 78 | 60 | 35 | 95 |
| ▪ 495: Recreational Community Center (31,000 SF) | 893 | 36 | 19 | 55 | 34 | 38 | 72 |
| ▪ 590: Library (20,000 SF) | 1,441 | 14 | 6 | 20 | 78 | 85 | 163 |
| ▪ 520: Elementary School (1,000 students) | 1,890 | 362 | 308 | 670 | 82 | 88 | 170 |
| ▪ City Park (8.00 AC) | 400 | 26 | 26 | 52 | 18 | 18 | 36 |
| ▪ Neighborhood Park (1.50 AC) | 8 | 0 | 0 | 0 | 1 | 0 | 1 |
| **Current Master Plan Trip Generation** | **5,869** | **456** | **419** | **875** | **273** | **264** | **537** |
| *Block 9 South of Pine – Proposed Master Plan* | | | | | | | |
| ▪ 220: Multifamily Residential (Low Rise) (210 DU) | 1,537 | 22 | 75 | 97 | 74 | 44 | 118 |
| ▪ 495: Recreational Community Center (31,000 SF) | 893 | 36 | 19 | 55 | 34 | 38 | 72 |
| ▪ 590: Library (20,000 SF) | 1,441 | 14 | 6 | 20 | 78 | 85 | 163 |
| ▪ 520: Elementary School (900 students) | 1,701 | 326 | 277 | 603 | 73 | 80 | 153 |
| ▪ City Park (8.00 AC) | 400 | 26 | 26 | 52 | 18 | 18 | 36 |
| ▪ Neighborhood Park (1.16 AC) | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Proposed Master Plan Trip Generation** | **5,978** | **424** | **403** | **827** | **277** | **265** | **542** |
| **Difference in Trip Generation: Proposed Master Plan Minus Current Master Plan** | **109** | **-32** | **-16** | **-48** | **4** | **1** | **5** |

[23] Unless otherwise noted, source*: Trip Generation, 10th Edition*, Institute of Transportation Engineers, (ITE) [Washington, D.C. (2017)].

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## TABLE 19
## BLOCK 10 TRIP GENERATION FORECAST[24]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| ITE Land Use / Project Description | Daily | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | Enter | Exit | Total | Enter | Exit | Total |
| *Block 10 South of Pine – Current Master Plan* | | | | | | | |
| ▪ 210: Single Family Residential (197 DU) | 1,860 | 37 | 109 | 146 | 123 | 72 | 195 |
| ▪ 220: Multifamily Residential (Low Rise) (85 DU) | 622 | 9 | 30 | 39 | 30 | 18 | 48 |
| **Current Master Plan Trip Generation** | **2,482** | **46** | **139** | **185** | **153** | **90** | **243** |
| *Block 10 South of Pine – Proposed Master Plan* | | | | | | | |
| ▪ 210: Single Family Residential (151 DU) | 1,425 | 28 | 84 | 112 | 94 | 55 | 149 |
| ▪ 220: Multifamily Residential (Low Rise) (65 DU) | 476 | 7 | 23 | 30 | 23 | 13 | 36 |
| ▪ Neighborhood Park (3.00 AC) | 15 | 1 | 0 | 1 | 1 | 0 | 1 |
| **Proposed Master Plan Trip Generation** | **1,916** | **36** | **107** | **143** | **118** | **68** | **186** |
| **Difference in Trip Generation: Proposed Master Plan Minus Current Master Plan** | **-566** | **-10** | **-32** | **-42** | **-35** | **-22** | **-57** |

[24] Unless otherwise noted, source*: Trip Generation, 10th Edition*, Institute of Transportation Engineers, (ITE) [Washington, D.C. (2017)].

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## TABLE 20
## BLOCK 11 TRIP GENERATION FORECAST[25]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| ITE Land Use / Project Description | Daily | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | Enter | Exit | Total | Enter | Exit | Total |
| *Block 11 South of Pine – Current Master Plan* | | | | | | | |
| ▪ 210: Single Family Residential (203 DU) | 1,916 | 38 | 112 | 150 | 127 | 74 | 201 |
| ▪ 220: Multifamily Residential (Low Rise) (79 DU) | 578 | 8 | 28 | 36 | 28 | 16 | 44 |
| **Current Master Plan Trip Generation** | **2,494** | **46** | **140** | **186** | **155** | **90** | **245** |
| *Block 11 South of Pine – Proposed Master Plan* | | | | | | | |
| ▪ 210: Single Family Residential (220 DU) | 2,077 | 41 | 122 | 163 | 137 | 81 | 218 |
| ▪ 220: Multifamily Residential (Low Rise) (85 DU) | 622 | 9 | 30 | 39 | 30 | 18 | 48 |
| ▪ 495: Recreational Community Center (16,000 SF) | 461 | 18 | 10 | 28 | 17 | 20 | 37 |
| **Proposed Master Plan Trip Generation** | **3,160** | **68** | **162** | **230** | **184** | **119** | **303** |
| **Difference in Trip Generation: Proposed Master Plan Minus Current Master Plan** | **666** | **22** | **22** | **44** | **29** | **29** | **58** |

[25] Unless otherwise noted, source*: Trip Generation, 10th Edition*, Institute of Transportation Engineers, (ITE) [Washington, D.C. (2017)].

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## TABLE 21
## TOTAL (SOP) TRIP GENERATION FORECAST COMPARISON SUMMARY[26]
## THE PRESERVE SPECIFIC PLAN MSA, CHINO

| Project Description | Daily | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | Enter | Exit | Total | Enter | Exit | Total |
| *South of Pine – Current Master Plan* | | | | | | | |
| ▪ Block 1 | 3,291 | 65 | 193 | 258 | 218 | 127 | 345 |
| ▪ Block 2 | 5,400 | 106 | 317 | 423 | 357 | 209 | 566 |
| ▪ Block 3 | 1,910 | 56 | 114 | 170 | 118 | 76 | 194 |
| ▪ Block 6 | 5,494 | 176 | 117 | 293 | 245 | 296 | 541 |
| ▪ Block 7 (Prior Master Plan) | 6,397 | 200 | 180 | 380 | 324 | 342 | 666 |
| ▪ Block 8 | 5,812 | 84 | 281 | 365 | 280 | 165 | 445 |
| ▪ Block 9 | 5,869 | 456 | 419 | 875 | 273 | 264 | 537 |
| ▪ Block 10 | 2,482 | 46 | 139 | 185 | 153 | 90 | 243 |
| ▪ Block 11 | 2,494 | 46 | 140 | 186 | 155 | 90 | 245 |
| **Current Master Plan Total Trip Generation** | **39,149** | **1,235** | **1,900** | **3,135** | **2,123** | **1,659** | **3,782** |
| *South of Pine – Proposed Master Plan* | | | | | | | |
| ▪ Block 1 | 2,677 | 53 | 157 | 210 | 177 | 103 | 280 |
| ▪ Block 2 | 4,848 | 96 | 284 | 380 | 320 | 188 | 508 |
| ▪ Block 3 | 2,144 | 67 | 129 | 196 | 130 | 86 | 216 |
| ▪ Block 6 | 2,667 | 60 | 128 | 188 | 162 | 116 | 278 |
| ▪ Block 7 (Approved Master Plan) | 4,469 | 105 | 139 | 244 | 244 | 215 | 459 |
| ▪ Block 8 | 6,422 | 93 | 310 | 403 | 309 | 182 | 491 |
| ▪ Block 9 | 5,978 | 424 | 403 | 827 | 277 | 265 | 542 |
| ▪ Block 10 | 1,916 | 36 | 107 | 143 | 118 | 68 | 186 |
| ▪ Block 11 | 3,160 | 68 | 162 | 230 | 184 | 119 | 303 |
| **Proposed Master Plan Total Trip Generation** | **34,281** | **1,002** | **1,819** | **2,821** | **1,921** | **1,342** | **3,263** |
| **Difference in Trip Generation: Proposed Master Plan Minus Current Master Plan** | **-4,868** | **-233** | **-81** | **-314** | **-202** | **-317** | **-519** |

[26] Unless otherwise noted, source*: Trip Generation, 10th Edition*, Institute of Transportation Engineers, (ITE) [Washington, D.C. (2017)].

# Preliminary Water Quality Management Plan

**For:**

## Chino Rental Neighborhood

## E. Preserve Loop and Academy Street, Chino, CA

**GRADING PERMIT NO. XXXXXX**

**Prepared for:**

**Chino Holding Company, LLC**

**1156 North Mountain Avenue**

**Upland, CA 91786**

**(909) 949-0971**

**Prepared by:**

**DRC Engineering, Inc.**

**160 South Old Springs Road, Suite 210**

**Anaheim Hills, CA 92808**

**(714) 685-6860**

**Submittal Date: _____**

**Revision Date: _____**

**Approval Date:_____**

**DRC Project No. 19-360**

# Project Owner's Certification

This Preliminary Water Quality Management Plan (WQMP) has been prepared for Chino Holding Company, LLC by DRC Engineering, Inc. The Preliminary WQMP is intended to comply with the requirements of the City of Chino and the NPDES Areawide Stormwater Program requiring the preparation of a WQMP. The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with San Bernardino County's Municipal Storm Water Management Program and the intent of the NPDES Permit for San Bernardino County and the incorporated cities of San Bernardino County within the Santa Ana Region. Once the undersigned transfers its interest in the property, its successors in interest and the city/county shall be notified of the transfer. The new owner will be informed of its responsibility under this WQMP. A copy of the approved WQMP shall be available on the subject site in perpetuity.

"I certify under a penalty of law that the provisions (implementation, operation, maintenance, and funding) of the WQMP have been accepted and that the plan will be transferred to future successors."

.

| Project Data | | | |
|---|---|---|---|
| Permit/Application Number(s): | TBD | Grading Permit Number(s): | TBD |
| Tract/Parcel Map Number(s): | Tract Map No. 20380 | Building Permit Number(s): | TBD |
| CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract): | | | 1057-181-35, 36 |

| Owner's Signature | | |
|---|---|---|
| **Owner Name:** Jennifer Ward | | |
| Title | Project Manager | |
| Company | Chino Holding Company, LLC | |
| Address | 1156 Noth Mountain Avenue, Upland, CA 91786 | |
| Email | Jen.Ward@lewismc.com | |
| Telephone # | (909) 579-1209 | |
| Signature | Date | |

# Preparer's Certification

| Project Data | | | |
|---|---|---|---|
| Permit/Application Number(s): | TBD | Grading Permit Number(s): | TBD |
| Tract/Parcel Map Number(s): | Tract Map No. 20380 | Building Permit Number(s): | TBD |
| CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract): | | | 1057-181-35, 36 |

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan were prepared under my oversight and meet the requirements of Regional Water Quality Control Board Order No. R8-2010-0036."

| **Engineer:** Ronald W. Sklepko | | PE Stamp Below |
|---|---|---|
| Title | Project Manager | |
| Company | DRC Engineering, Inc. | |
| Address | 160 South Old Springs Road, Suite 210 | |
| Email | rsklepko@drc-eng.com | |
| Telephone # | (714) 685-6860 x307 | |
| Signature | | |
| Date | | |



# Table of Contents

**Section 1 Discretionary Permits** ..... 1-1

**Section 2 Project Description** ..... 2-1

**2.1 Project Information** ..... 2-1
**2.2 Property Ownership / Management** ..... 2-2
**2.3 Potential Stormwater Pollutants** ..... 2-3
**2.4 Water Quality Credits** ..... 2-4

**Section 3 Site and Watershed Description** ..... 3-1

**Section 4 Best Management Practices** ..... 4-1

**4.1 Source Control BMP** ..... 4-1
**4.1.1 Pollution Prevention** ..... 4-1
**4.1.2 Preventative LID Site Design Practices** ..... 4-6
**4.2 Project Performance Criteria** ..... 4-7
**4.3 Project Conformance Analysis** ..... 4-12
**4.3.1 Site Design Hydrologic Source Control BMP** ..... 4-14
**4.3.2 Infiltration BMP** ..... 4-16
**4.3.3 Harvest and Use BMP** ..... 4-18
**4.3.4 Biotreatment BMP** ..... 4.19
**4.3.5 Conformance Summary** ..... 4-23
**4.3.6 Hydromodification Control BMP** ..... 4-24
**4.4 Alternative Compliance Plan (if applicable)** ..... 4-25

**Section 5 Inspection & Maintenance Responsibility Post Construction BMPs** ..... 5-1

**Section 6 Site Plan and Drainage Plan** ..... 6-1

**6.1. Site Plan and Drainage Plan** ..... 6-2
**6.2 Electronic Data Submittal** ..... 6-3
**6.3 Post Construction** ..... 6-4
**6.4 Other Supporting Documentation** ..... 6-5

# Forms

**Form 1-1 Project Information** ..... 1-1
**Form 2.1-1 Description of Proposed Project** ..... 2-1
**Form 2.2-1 Property Ownership/Management** ..... 2-2
**Form 2.3-1 Pollutants of Concern** ..... 2-3
**Form 2.4-1 Water Quality Credits** ..... 2-4
**Form 3-1 Site Location and Hydrologic Features** ..... 3-1
**Form 3-2 Hydrologic Characteristics** ..... 3-2
**Form 3-3 Watershed Description** ..... 3-3
**Form 4.1-1 Non-Structural Source Control BMP** ..... 4-2
**Form 4.1-2 Structural Source Control BMP** ..... 4-4
**Form 4.1-3 Site Design Practices Checklist** ..... 4-6
**Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume** ..... 4-7

**Form 4.2-2 Summary of HCOC Assessment** ..... 4-8
**Form 4.2-3 HCOC Assessment for Runoff Volume** ..... 4-9
**Form 4.2-4 HCOC Assessment for Time of Concentration** ..... 4-10
**Form 4.2-5 HCOC Assessment for Peak Runoff** ..... 4-11
**Form 4.3-1 Infiltration BMP Feasibility** ..... 4-13
**Form 4.3-2 Site Design Hydrologic Source Control BMP** ..... 4-14
**Form 4.3-3 Infiltration LID BMP** ..... 4-17
**Form 4.3-4 Harvest and Use BMP** ..... 4-18
**Form 4.3-5 Selection and Evaluation of Biotreatment BMP** ..... 4-19
**Form 4.3-6 Volume Based Biotreatment – Bioretention and Planter Boxes w/Underdrains** 4-20
**Form 4.3-7 Volume Based Biotreatment- Constructed Wetlands and Extended Detention** 4-21
**Form 4.3-8 Flow Based Biotreatment** ..... 4-22
**Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate** ..... 4-23
**Form 4.3-10 Hydromodification Control BMP** ..... 4-24
**Form 5-1 BMP Inspection and Maintenance** ..... 5-1

**Appendix A - Vicinity Map, Exhibits, Calculations**

**Appendix B - Alternative Compliance Materials**

**Appendix C - Education Materials, BMP Fact Sheets**

# Section 1 Discretionary Permit(s)

| Form 1-1 Project Information | | | | | |
|---|---|---|---|---|---|
| Project Name | Chino Rental Neighborhoods | | | | |
| Project Owner Contact Name: | Jennifer Ward | | | | |
| Mailing Address: | 1156 North Mountain Avenue, Upland, CA 91786 | E-mail Address: | Jen.Ward@lewismc.com | Telephone: | (909) 579-1209 |
| Permit/Application Number(s): | TBD | | Tract/Parcel Map Number(s): | Tract Map No. 20380 | |
| Additional Information/ Comments: | | | | | |
| Description of Project: | The existing site consists of 12.33 acres of vacant, undeveloped land. The site is part of Tract No. 16420-4 mass grading plans prepared by LD King, Inc. The proposed site is consisting of 210 units of condominium residential, pool, and amenities. The proposed stormwater will flow to the two 24" dia. stubouts which discharge to the 60" / 78" RCP along East Preserve Loop (Line 'A', City Drawing No. AA5305). Per "The Preserve" Storm Drain DIF, the stormwater will ultimately discharge to Mill Creek Water Quality Basin which was previously approved by State Waterboard to address both hydraulic conditions of concern (HCOC) and regional LID structural treatment control best management practice (BMP) potentially caused by certain new developments proposed in the cities of Ontario and Chino. Refer to **Appendix B** for more details. | | | | |
| Provide summary of Conceptual WQMP conditions (if previously submitted and approved). Attach complete copy. | | | | | |

# Section 2 Project Description

## 2.1 Project Information

This section of the WQMP should provide the information listed below. The information provided for Conceptual/ Preliminary WQMP should give sufficient detail to identify the major proposed site design and LID BMPs and other anticipated water quality features that impact site planning. Final Project WQMP must specifically identify all BMP incorporated into the final site design and provide other detailed information as described herein.

The purpose of this information is to help determine the applicable development category, pollutants of concern, watershed description, and long-term maintenance responsibilities for the project, and any applicable water quality credits. This information will be used in conjunction with the information in Section 3, Site Description, to establish the performance criteria and to select the LID BMP or other BMP for the project or other alternative programs that the project will participate in, which are described in Section 4.

**Form 2.1-1 Description of Proposed Project**

**1** Development Category (Select all that apply):

| | | | |
|---|---|---|---|
| ☐ Significant re-development involving the addition or replacement of 5,000 ft² or more of impervious surface on an already developed site | ☒ New development involving the creation of 10,000 ft² or more of impervious surface collectively over entire site | ☐ Automotive repair shops with standard industrial classification (SIC) codes 5013, 5014, 5541, 7532- 7534, 7536-7539 | ☐ Restaurants (with SIC code 5812) where the land area of development is 5,000 ft² or more |
| ☐ Hillside developments of 5,000 ft² or more which are located on areas with known erosive soil conditions or where the natural slope is 25 percent or more | ☐ Developments of 2,500 ft² of impervious surface or more adjacent to (within 200 ft) or discharging directly into environmentally sensitive areas or waterbodies listed on the CWA Section 303(d) list of impaired waters. | ☒ Parking lots of 5,000 ft² or more exposed to storm water | ☐ Retail gasoline outlets that are either 5,000 ft² or more, or have a projected average daily traffic of 100 or more vehicles per day |

☐ Non-Priority / Non-Category Project *May require source control LID BMPs and other LIP requirements. Please consult with local jurisdiction on specific requirements*.

| | | | | | |
|---|---|---|---|---|---|
| **2** Project Area (ft2): | 528,210 (excluding lettered lots) | **3** Number of Dwelling Units: | 210 | **4** SIC Code: | 1522 |

**5** Is Project going to be phased? Yes ☐ No ☒ *If yes, ensure that the WQMP evaluates each phase as a distinct DA, requiring LID BMPs to address runoff at time of completion.*

**6** Does Project include roads? Yes ☐ No ☒ *If yes, ensure that applicable requirements for transportation projects are addressed (see Appendix A of TGD for WQMP)*

# 2.2 Property Ownership/Management

Describe the ownership/management of all portions of the project and site. State whether any infrastructure will transfer to public agencies (City, County, Caltrans, etc.) after project completion. State if a homeowners or property owners association will be formed and be responsible for the long-term maintenance of project stormwater facilities. Describe any lot-level stormwater features that will be the responsibility of individual property owners.

## Form 2.2-1 Property Ownership/Management

Describe property ownership/management responsible for long-term maintenance of WQMP stormwater facilities:

The site is being developed by the owner, Chino Holding Company, LLC. Stormwater facilities and source control measures on the proposed development will be operated and maintained by the owner.

Refer to section 5.0 of this WQMP for entities that will be responsible for implementing this WQMP.

# 2.3 Potential Stormwater Pollutants

Determine and describe expected stormwater pollutants of concern based on land uses and site activities (refer to Table 3-3 in the TGD for WQMP).

| Form 2.3-1 Pollutants of Concern | | | |
|---|---|---|---|
| Pollutant | Please check: E=Expected, N=Not Expected | | Additional Information and Comments |
| Pathogens (Bacterial / Virus) | E ☒ | N ☐ | Bacteria and viruses are ubiquitous microorganisms 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. |
| Nutrients - Phosphorous | E ☒ | N ☐ | Nutrients are inorganic substances. Excessive discharge of nutrients to water bodies and streams causes entrophication, where aquatic plants and algae growth can 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 depth of aquatic organisms. Primary sources of nutrients in urban runoff are fertilizers and eroded soils. |
| Nutrients - Nitrogen | E ☒ | N ☐ | (See Nutrients - Phosphorous) |
| Noxious Aquatic Plants | E ☒ | N ☐ | Not Applicable |
| Sediment | E ☒ | N ☐ | Sediments are solid materials that are eroded from the land surface. Sediments can increase turbidity, clog fish gills, reduce spawning habitat, lower survival rates of young aquatic organisms, smother botthem dwelling organisms, and suppress aquatic vegetation growth. |
| Metals | E ☐ | N ☒ | Not expected until thThe primary source of metal pollution in stormwater is typically commercially available metals and metal products, as well as emissions from brake pad and tire tread wear associated with driving. |
| Oil and Grease | E ☒ | N ☐ | Oil and grease in water bodies decreases the aesthetic value of the water body, as well as the water quality. Primary sources of oil and grease are petroleum hydrocarbon products, motor products from leaking vehicles, esters, oils, fats, waxes, and high molecular-weight fatty acids. |
| Trash/Debris | E ☒ | N ☐ | 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. Trash also impacts water quality by increasing biochemical oxygen demand. |
| Pesticides / Herbicides | E ☒ | N ☐ | Pesticides and herbicides are organic compounds used to destroy, prevent, mitigate insects, rodents, fungi, weeds, and other undesirable pests. Pesticides and herbicides can be washed off urban landscapes and buildings during storm events. |
| Organic Compounds | E ☒ | N ☐ | Organic compounds are carbon-based. Commercially available or nautrally occurring organic compounds are found in 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 can be discharged to storm drains. Dirt, grease, and grime retained in the cleaning fluid or rinse water may also absorb levels of organic compounds that are harmful or hazardous to aquatic life. Sources of organic compounds may include waste handling areas and vehicle or landscape maintenance areas. |
| Other: | E ☐ | N ☐ | |
| Other: | E ☐ | N ☐ | |
| Other: | E ☐ | N ☐ | |
| Other: | E ☐ | N ☐ | |
| Other: | E ☐ | N ☐ | |

# 2.4 Water Quality Credits

A water quality credit program is applicable for certain types of development projects if it is not feasible to meet the requirements for on-site LID. Proponents for eligible projects, as described below, can apply for water quality credits that would reduce project obligations for selecting and sizing other treatment BMP or participating in other alternative compliance programs. Refer to Section 6.2 in the TGD for WQMP to determine if water quality credits are applicable for the project.

## Form 2.4-1 Water Quality Credits

**1** Project Types that Qualify for Water Quality Credits: *Select all that apply*

| | | | |
|---|---|---|---|
| ☐ Redevelopment projects that reduce the overall impervious footprint of the project site. [Credit = % impervious reduced] | Higher density development projects<br>☐ Vertical density [20%]<br>☐ 7 units/ acre [5%] | ☐ Mixed use development, (combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that demonstrate environmental benefits not realized through single use projects) [20%] | ☐ Brownfield redevelopment (redevelop real property complicated by presence or potential of hazardous contaminants) [25%] |
| ☐ Redevelopment projects in established historic district, historic preservation area, or similar significant core city center areas [10%] | ☐ Transit-oriented developments (mixed use residential or commercial area designed to maximize access to public transportation) [20%] | ☐ In-fill projects (conversion of empty lots & other underused spaces < 5 acres, substantially surrounded by urban land uses, into more beneficially used spaces, such as residential or commercial areas) [10%] | ☐ Live-Work developments (variety of developments designed to support residential and vocational needs) [20%]<br><br>*Applies to DA 2 only (See Form 3-1) |

**2** Total Credit % 0 *(Total all credit percentages up to a maximum allowable credit of 50 percent)*

| | |
|---|---|
| Description of Water Quality Credit Eligibility (if applicable) | N/A |

# Section 3 Site and Watershed Description

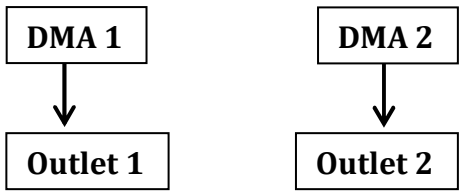
Describe the project site conditions that will facilitate the selection of BMP through an analysis of the physical conditions and limitations of the site and its receiving waters. Identify distinct drainage areas (DA) that collect flow from a portion of the site and describe how runoff from each DA (and sub-watershed DMAs) is conveyed to the site outlet(s). Refer to Section 3.2 in the TGD for WQMP. The form below is provided as an example. Then complete Forms 3.2 and 3.3 for each DA on the project site. ***If the project has more than one drainage area for stormwater management, then complete additional versions of these forms for each DA / outlet.***

## Form 3-1 Site Location and Hydrologic Features

| Site coordinates *take GPS measurement at approximate center of site* | Latitude 33.95244° | Longitude -117.62135° | Thomas Bros Map page 712 |
|---|---|---|---|

**1** San Bernardino County climatic region: ☒ Valley ☐ Mountain

**2** Does the site have more than one drainage area (DA): Yes☒ No☐ *If no, proceed to Form 3-2. If yes, then use this form to show a conceptual schematic describing DMAs and hydrologic feature connecting DMAs to the site outlet(s). An example is provided below that can be modified for proposed project or a drawing clearly showing DMA and flow routing may be attached*




| | |
|---|---|
| Conveyance | Briefly describe on-site drainage features to convey runoff that is not retained within a DMA |
| DMA 1 | Storm water will be collected through roof drains and grate inlets/catch basins. All flow will be collected by a private storm drain system, and will confluence into a 36" public storm drain, Line F4 along Legacy Park Street. |
| DMA 2A | Storm water will be collected through roof drains and grate inlets/catch basins. All flow will be collected by a private storm drain system, and will confluence into a 24" public storm drain, Line F9 along Legacy Park Street. |
| | |

| Form 3-2a Existing Hydrologic Characteristics for Drainage Area 1 | | |
|---|---|---|
| For Drainage Area 1's sub-watershed DMA, provide the following characteristics | DMA 1 | |
| **1** DMA drainage area ($ft^2$) | 270,943 | |
| **2** Existing site impervious area ($ft^2$) | 0 | |
| **3** Antecedent moisture condition *For desert areas, use* http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf | I | |
| **4** Hydrologic soil group *Refer to Watershed Mapping Tool –* http://permitrack.sbcounty.gov/wap/ | C | |
| **5** Longest flowpath length (ft) | 515 | |
| **6** Longest flowpath slope (ft/ft) | 0.0115 | |
| **7** Current land cover type(s) *Select from Fig C-3 of Hydrology Manual* | Barren | |
| **8** Pre-developed pervious area condition: *Based on the extent of wet season vegetated cover good >75%; Fair 50-75%; Poor <50% Attach photos of site to support rating* | Poor | |

| Form 3-2b Existing Hydrologic Characteristics for Drainage Area 2 | | |
|---|---|---|
| For Drainage Area 1's sub-watershed DMA, provide the following characteristics | DMA 2 | |
| **1** DMA drainage area ($ft^2$) | 266,587 | |
| **2** Existing site impervious area ($ft^2$) | 0 | |
| **3** Antecedent moisture condition *For desert areas, use* *http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf* | I | |
| **4** Hydrologic soil group *Refer to Watershed Mapping Tool –* *http://permitrack.sbcounty.gov/wap/* | C | |
| **5** Longest flowpath length (ft) | 725 | |
| **6** Longest flowpath slope (ft/ft) | 0.017 | |
| **7** Current land cover type(s) *Select from Fig C-3 of Hydrology Manual* | Barren | |
| **8** Pre-developed pervious area condition: *Based on the extent of wet season vegetated cover good >75%; Fair 50-75%; Poor <50% Attach photos of site to support rating* | Poor | |

## Form 3-3 Watershed Description for Drainage Area

| | |
|---|---|
| Receiving waters<br>*Refer to Watershed Mapping Tool - http://permitrack.sbcounty.gov/wap/ See 'Drainage Facilities" link at this website* | • Mill Creek (Prado Area)<br>• Chino Creek Reach 1A<br>• Santa Ana River Reach 3 |
| Applicable TMDLs<br>*Refer to Local Implementation Plan* | • Indicator Bacteria |
| 303(d) listed impairments<br>*Refer to Local Implementation Plan and Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/ and State Water Resources Control Board website – http://www.waterboards.ca.gov/santaana/water_issues/programs/tmdl/index.shtml* | • Mill Creek (Prado Area): Nutrients, Indicator Bacteria, Total Suspended Solids (TSS)<br>• Chino Creek Reach 1A: Nutrients, Indicator Bacteria<br>• Santa Ana River Reach 3: Copper, Lead, Indicator Bacteria |
| Environmentally Sensitive Areas (ESA)<br>*Refer to Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/* | • N/A |
| Unlined Downstream Water Bodies<br>*Refer to Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/* | • Mill Creek (Prado)<br>• Chino Creek, Reach 1A<br>• Santa Ana River, Reach 3 |
| Hydrologic Conditions of Concern | ☐ Yes *Complete Hydrologic Conditions of Concern (HCOC) Assessment. Include Forms 4.2-2 through Form 4.2-5 and Hydromodification BMP Form 4.3-10 in submittal*<br>☒ No |
| Watershed–based BMP included in a RWQCB approved WAP | ☒ Yes *Attach verification of regional BMP evaluation criteria in WAP*<br>• *More Effective than On-site LID*<br>• *Remaining Capacity for Project DCV*<br>• *Upstream of any Water of the US*<br>• *Operational at Project Completion*<br>• *Long-Term Maintenance Plan*<br>☐ No |

See Appendix B for WAP approval.

# Section 4 Best Management Practices (BMP)

## 4.1 Source Control BMP

### 4.1.1 Pollution Prevention

Non-structural and structural source control BMP are required to be incorporated into all new development and significant redevelopment projects. Form 4.1-1 and 4.1-2 are used to describe specific source control BMPs used in the WQMP or to explain why a certain BMP is not applicable. Table 7-3 of the TGD for WQMP provides a list of applicable source control BMP for projects with specific types of potential pollutant sources or activities. The source control BMP in this table must be implemented for projects with these specific types of potential pollutant sources or activities.

The preparers of this WQMP have reviewed the source control BMP requirements for new development and significant redevelopment projects. The preparers have also reviewed the specific BMP required for project as specified in Forms 4.1-1 and 4.1-2. All applicable non-structural and structural source control BMP shall be implemented in the project.

## Form 4.1-1 Non-Structural Source Control BMPs

| Identifier | Name | Check One | | Describe BMP Implementation OR, if not applicable, state reason |
|---|---|---|---|---|
| | | Included | Not Applicable | |
| N1 | Education of Property Owners, Tenants and Occupants on Stormwater BMPs | ☒ | ☐ | Property operators shall be responsible to provide HOA education materials to residents. These BMPs are available in Section 6.4, Appendix C. |
| N2 | Activity Restrictions | ☒ | ☐ | Property operators to provide and enforce activity restrictions to prevent discharge of stormwater pollutants. |
| N3 | Landscape Management BMPs | ☒ | ☐ | Project owners shall require landscape management to be implemented by operators per CASQA BMP SC-73. |
| N4 | BMP Maintenance | ☒ | ☐ | Project owners shall require all BMPs (on-site) to be maintained per inspection/maintenance procedures in Form 5-1 |
| N5 | Title 22 CCR Compliance (How development will comply) | ☐ | ☒ | Not anticipated |
| N6 | Local Water Quality Ordinances | ☒ | ☐ | All activities at this site shall be done in accordance with the City of Chino's stormwater ordinance. |
| N7 | Spill Contingency Plan | ☒ | ☐ | Spill contingency plan to be developed by operators per CASQA BMP SC-11 |
| N8 | Underground Storage Tank Compliance | ☐ | ☒ | Not anticipated |
| N9 | Hazardous Materials Disclosure Compliance | ☐ | ☒ | Not anticipated |

## Form 4.1-1 Non-Structural Source Control BMPs

| Identifier | Name | Check One | | Describe BMP Implementation OR, if not applicable, state reason |
|---|---|---|---|---|
| | | Included | Not Applicable | |
| N10 | Uniform Fire Code Implementation | ☒ | ☐ | Compliance with Article 80 of the Uniform Fire Code to be enforced by Chino Valley Independent Fire District |
| N11 | Litter/Debris Control Program | ☒ | ☐ | Property owners shall require litter control to be implemented by operators per CASQA BMP SC-60 |
| N12 | Employee Training | ☒ | ☐ | Owners shall require operators to provide appropriate employee training in BMPs and shall also train their staff and contractors with BMP literature in Section 6.4. |
| N13 | Housekeeping of Loading Docks | ☐ | ☒ | No loading docks anticipated |
| N14 | Catch Basin Inspection Program | ☒ | ☐ | The property operators shall inspect all on-site catch basins on a quarterly frequency for accumulation of sediment, trash, debris, and for evidence of illegal dumping. All catch basins shall be cleaned annually or whenever debris accumulates to a level greater than 25% of sump capacity. |
| N15 | Vacuum Sweeping of Private Streets and Parking Lots | ☒ | ☐ | Operators shall be responsible for vacuum sweeping all paved areas of site on a weekly frequency per CASQA BMPs SC-43 and SC-70. |
| N16 | Other Non-structural Measures for Public Agency Projects | ☐ | ☒ | Not anticipated |
| N17 | Comply with all other applicable NPDES permits | ☒ | ☐ | The developer (owner) shall comply with all requirements of the California General Construction Stormwater Permit during the entire period of construction of this project. |

## Form 4.1-2 Structural Source Control BMPs

| Identifier | Name | Check One | | Describe BMP Implementation OR, If not applicable, state reason |
|---|---|---|---|---|
| | | Included | Not Applicable | |
| S1 | Provide storm drain system stencilling and signage (CASQA New Development BMP Handbook SD-13) | ☒ | ☐ | Site owners to provide storm drain stenciling and signage per CASQA BMP SD-13 |
| S2 | Design and construct outdoor material storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-34) | ☐ | ☒ | Not anticipated |
| S3 | Design and construct trash and waste storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-32) | ☒ | ☐ | Trash enclosures to be designed/constructed per CASQA BMP SD-32 with a solid canopy-style roof. |
| S4 | Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control (Statewide Model Landscape Ordinance; CASQA New Development BMP Handbook SD-12) | ☒ | ☐ | Irrigation practices to comply with CASQA BMP SD-12 |
| S5 | Finish grade of landscaped areas at a minimum of 1-2 inches below top of curb, sidewalk, or pavement | ☒ | ☐ | Landscaped areas to be designed and maintained to be 1-2 inches below impervious surfaces |
| S6 | Protect slopes and channels and provide energy dissipation (CASQA New Development BMP Handbook SD-10) | ☐ | ☒ | Not anticipated |
| S7 | Covered dock areas (CASQA New Development BMP Handbook SD-31) | ☐ | ☒ | Not anticipated |
| S8 | Covered maintenance bays with spill containment plans (CASQA New Development BMP Handbook SD-31) | ☐ | ☒ | Not anticipated |
| S9 | Vehicle wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33) | ☐ | ☒ | Not anticipated |
| S10 | Covered outdoor processing areas (CASQA New Development BMP Handbook SD-36) | ☐ | ☒ | Not anticipated |

## Form 4.1-2 Structural Source Control BMPs

| Identifier | Name | Check One | | Describe BMP Implementation OR, If not applicable, state reason |
|---|---|---|---|---|
| | | Included | Not Applicable | |
| S11 | Equipment wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33) | ☐ | ☒ | Not anticipated |
| S12 | Fueling areas (CASQA New Development BMP Handbook SD-30) | ☐ | ☒ | Not anticipated |
| S13 | Hillside landscaping (CASQA New Development BMP Handbook SD-10) | ☐ | ☒ | Not anticipated |
| S14 | Wash water control for food preparation areas | ☐ | ☒ | Not anticipated |
| S15 | Community car wash racks (CASQA New Development BMP Handbook SD-33) | ☐ | ☒ | Not anticipated |

### 4.1.2 Preventative LID Site Design Practices

Site design practices associated with new LID requirements in the MS4 Permit should be considered in the earliest phases of a project. Preventative site design practices can result in smaller DCV for LID BMP and hydromodification control BMP by reducing runoff generation. Describe site design and drainage plan including:

- A narrative of site design practices utilized or rationale for not using practices
- A narrative of how site plan incorporates preventive site design practices
- Include an attached Site Plan layout which shows how preventative site design practices are included in WQMP

Refer to Section 5.2 of the TGD for WQMP for more details.

**Form 4.1-3 Preventative LID Site Design Practices Checklist**

| Site Design Practices<br>*If yes, explain how preventative site design practice is addressed in project site plan. If no, other LID BMPs must be selected to meet targets* |
|---|
| Minimize impervious areas: Yes ☒ No ☐<br>Explanation: Site design implements use of shortened driveways. Landscape areas are maximized to the largest extent practical. |
| Maximize natural infiltration capacity: Yes ☐ No ☒<br>Explanation: On-site infiltration is not proposed as means of addressing water quality and hydrologic impacts. Landscape islands will still allow for natural infiltration in certain areas. |
| Preserve existing drainage patterns and time of concentration: Yes ☒ No ☐<br>Explanation: Drainage patterns is essentially the same as existing condition. |
| Disconnect impervious areas: Yes ☒ No ☐<br>Explanation: Roof drains to discharge into landscape areas before entering area drains. |
| Protect existing vegetation and sensitive areas: Yes ☐ No ☒<br>Explanation: The site contains minimal vegetation. |
| Re-vegetate disturbed areas: Yes ☒ No ☐<br>Explanation: Pervious areas to be landscaped |
| Minimize unnecessary compaction in stormwater retention/infiltration basin/trench areas: Yes ☐ No ☒<br>Explanation: No on-site retentions/infiltration basin/trench areas are proposed. |
| Utilize vegetated drainage swales in place of underground piping or imperviously lined swales: Yes ☐ No ☒<br>Explanation: Site design prohibits the use and practicality of unlined drainage swales. |
| Stake off areas that will be used for landscaping to minimize compaction during construction: Yes ☒ No ☐<br>Explanation: Contractor to be informed to stake off landscaping areas and minimize machinery/equipment use over landscape areas during construction phase. |

# 4.2 Project Performance Criteria

The purpose of this section of the Project WQMP is to establish targets for post-development hydrology based on performance criteria specified in the MS4 Permit. These targets include runoff volume for water quality control (referred to as LID design capture volume), and runoff volume, time of concentration, and peak runoff for protection of any downstream waterbody segments with a HCOC. ***If the project has more than one outlet for stormwater runoff, then complete additional versions of these forms for each DA / outlet.***

Methods applied in the following forms include:

- For LID BMP Design Capture Volume (DCV), the San Bernardino County Stormwater Program requires use of the $P_6$ method (MS4 Permit Section XI.D.6a.ii) – Form 4.2-1
- For HCOC pre- and post-development hydrologic calculation, the San Bernardino County Stormwater Program requires the use of the Rational Method (San Bernardino County Hydrology Manual Section D). Forms 4.2-2 through Form 4.2-5 calculate hydrologic variables including runoff volume, time of concentration, and peak runoff from the project site pre- and post-development using the Hydrology Manual Rational Method approach. For projects greater than 640 acres (1.0 $mi^2$), the Rational Method and these forms should not be used. For such projects, the Unit Hydrograph Method (San Bernardino County Hydrology Manual Section E) shall be applied for hydrologic calculations for HCOC performance criteria.

Refer to Section 4 in the TGD for WQMP for detailed guidance and instructions.

**Form 4.2-1a LID BMP Performance Criteria for Design Capture Volume (Residential DMA 1)**

| | | |
|---|---|---|
| **1** Project area DA 1 ($ft^2$): 296,822 | **2** Imperviousness after applying preventative site design practices (Imp%): 0.809 | **3** Runoff Coefficient (Rc): 0.610<br>*$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$* |
| **4** Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.545 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html | | |
| **5** Compute $P_6$, Mean 6-hr Precipitation (inches): 0.807<br>*$P_6$ = Item 4 *$C_1$, where $C_1$ is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)* | | |
| **6** Drawdown Rate<br>*Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.* | | 24-hrs ☐<br>48-hrs ☒ |
| **7** Compute design capture volume, DCV ($ft^3$): 23,902<br>*DCV = 1/12 * [Item 1* Item 3 *Item 5 * $C_2$], where $C_2$ is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)*<br>*Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2* | | |

## Form 4.2-1b LID BMP Performance Criteria for Design Capture Volume (Live/Work DMA 2A)

| | | |
|---|---|---|
| **1** Project area DA 2A ($ft^2$): 240,965 | **2** Imperviousness after applying preventative site design practices (Imp%): 0.804 | **3** Runoff Coefficient (Rc): 0.604<br>*$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$* |
| **4** Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.545 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html | | |
| **5** Compute $P_6$, Mean 6-hr Precipitation (inches): 0.807<br>*$P_6$ = Item 4 *$C_1$, where $C_1$ is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)* | | |
| **6** Drawdown Rate<br>*Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.* | | 24-hrs ☐<br>48-hrs ☒ |
| **7** Compute design capture volume, DCV ($ft^3$): 19,213<br>*DCV = 1/12 * [Item 1* Item 3 *Item 5 * $C_2$], where $C_2$ is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)*<br>*Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2* | | |

**Total DCV**

| | |
|---|---|
| **Total DCV per Form 4.2-1 (CF)** | 23,902+19,213 = **43,115** |

## Form 4.2-2 Summary of HCOC Assessment

Does project have the potential to cause or contribute to an HCOC in a downstream channel: Yes ☐ No ☒

*Go to*: *http://permitrack.sbcounty.gov/wap/*

If "Yes", then complete HCOC assessment of site hydrology for 2yr storm event using Forms 4.2-3 through 4.2-5 and insert results below

*(Forms 4.2-3 through 4.2-5 may be replaced by computer software analysis based on the San Bernardino County Hydrology Manual)*

If "No," then proceed to Section 4.3 Project Conformance Analysis

| Condition | Runoff Volume ($ft^3$) | Time of Concentration (min) | Peak Runoff (cfs) |
|---|---|---|---|
| Pre-developed | **1** *Form 4.2-3 Item 12* | **2** *Form 4.2-4 Item 13* | **3** *Form 4.2-5 Item 10* |
| Post-developed | **4** *Form 4.2-3 Item 13* | **5** *Form 4.2-4 Item 14* | **6** *Form 4.2-5 Item 14* |
| Difference | **7** *Item 4 – Item 1* | **8** *Item 2 – Item 5* | **9** *Item 6 – Item 3* |
| Difference (as % of pre-developed) | **10** % *Item 7 / Item 1* | **11** % *Item 8 / Item 2* | **12** % *Item 9 / Item 3* |

## Form 4.2-3 HCOC Assessment for Runoff Volume

| **Weighted Curve Number Determination for: Pre-developed DA** | DMA A | DMA B | DMA C | DMA D | DMA E | DMA F | DMA G | DMA H |
|---|---|---|---|---|---|---|---|---|
| **1a** Land Cover type | | | | | | | | |
| **2a** Hydrologic Soil Group (HSG) | | | | | | | | |
| **3a** DMA Area, $ft^2$ *sum of areas of DMA should equal area of DA* | | | | | | | | |
| **4**a Curve Number (CN) *use Items 1 and 2 to select the appropriate CN from Appendix C-2 of the TGD for WQMP* | | | | | | | | |
| **Weighted Curve Number Determination for: Post-developed DA** | DMA A | DMA B | DMA C | DMA D | DMA E | DMA F | DMA G | DMA H |
| **1b** Land Cover type | | | | | | | | |
| **2b** Hydrologic Soil Group (HSG) | | | | | | | | |
| **3b** DMA Area, $ft^2$ *sum of areas of DMA should equal area of DA* | | | | | | | | |
| **4b** Curve Number (CN) *use Items 5 and 6 to select the appropriate CN from Appendix C-2 of the TGD for WQMP* | | | | | | | | |

| | | |
|---|---|---|
| **5** Pre-Developed area-weighted CN: | **7** Pre-developed soil storage capacity, S (in): *S = (1000 / Item 5) - 10* | **9** Initial abstraction, $I_a$ (in): *$I_a$ = 0.2 * Item 7* |
| **6** Post-Developed area-weighted CN: | **8** Post-developed soil storage capacity, S (in): *S = (1000 / Item 6) - 10* | **10** Initial abstraction, $I_a$ (in): *$I_a$ = 0.2 * Item 8* |

**11** Precipitation for 2 yr, 24 hr storm (in):
*Go to: http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html*

**12** Pre-developed Volume ($ft^3$):
*$V_{pre}$ =(1 / 12) * (Item sum of Item 3) * [(Item 11 – Item 9)^2 / ((Item 11 – Item 9 + Item 7)*

**13** Post-developed Volume ($ft^3$):
*$V_{pre}$ =(1 / 12) * (Item sum of Item 3) * [(Item 11 – Item 10)^2 / ((Item 11 – Item 10 + Item 8)*

**14** Volume Reduction needed to meet HCOC Requirement, ($ft^3$):
*$V_{HCOC}$ = (Item 13 * 0.95) – Item 12*

# Form 4.2-4 HCOC Assessment for Time of Concentration

Compute time of concentration for pre and post developed conditions for each DA *(For projects using the Hydrology Manual complete the form below)*

| Variables | Pre-developed DA1 *Use additional forms if there are more than 4 DMA* | | | | Post-developed DA1 *Use additional forms if there are more than 4 DMA* | | | |
|---|---|---|---|---|---|---|---|---|
| | DMA A | DMA B | DMA C | DMA D | DMA A | DMA B | DMA C | DMA D |
| **1** Length of flowpath (ft) *Use Form 3-2 Item 5 for pre-developed condition* | | | | | | | | |
| **2** Change in elevation (ft) | | | | | | | | |
| **3** Slope (ft/ft), $S_o$ *= Item 2 / Item 1* | | | | | | | | |
| **4** Land cover | | | | | | | | |
| **5** Initial DMA Time of Concentration (min) *Appendix C-1 of the TGD for WQMP* | | | | | | | | |
| **6** Length of conveyance from DMA outlet to project site outlet (ft) *May be zero if DMA outlet is at project site outlet* | | | | | | | | |
| **7** Cross-sectional area of channel ($ft^2$) | | | | | | | | |
| **8** Wetted perimeter of channel (ft) | | | | | | | | |
| **9** Manning's roughness of channel (n) | | | | | | | | |
| **10** Channel flow velocity (ft/sec) $V_{fps}$ *= (1.49 / Item 9) * (Item 7/Item 8)^0.67 * (Item 3)^0.5* | | | | | | | | |
| **11** Travel time to outlet (min) $T_t$ *= Item 6 / (Item 10 * 60)* | | | | | | | | |
| **12** Total time of concentration (min) $T_c$ *= Item 5 + Item 11* | | | | | | | | |
| **13** Pre-developed time of concentration (min): *Minimum of Item 12 pre-developed DMA* | | | | | | | | |
| **14** Post-developed time of concentration (min): *Minimum of Item 12 post-developed DMA* | | | | | | | | |
| **15** Additional time of concentration needed to meet HCOC requirement (min): $T_{C\text{-}HCOC}$ *= (Item 13 * 0.95) – Item 14* | | | | | | | | |

# Form 4.2-5 HCOC Assessment for Peak Runoff

Compute peak runoff for pre- and post-developed conditions

| Variables | | Pre-developed DA to Project Outlet (*Use additional forms if more than 3 DMA)* | | | Post-developed DA to Project Outlet (*Use additional forms if more than 3 DMA)* | | |
|---|---|---|---|---|---|---|---|
| | | DMA A | DMA B | DMA C | DMA A | DMA B | DMA C |
| **1** Rainfall Intensity for storm duration equal to time of concentration<br>*$I_{peak}$ = 10^(LOG Form 4.2-1 Item 4 - 0.6 LOG Form 4.2-4 Item 5 /60)* | | | | | | | |
| **2** Drainage Area of each DMA (Acres)<br>*For DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)* | | | | | | | |
| **3** Ratio of pervious area to total area<br>*For DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)* | | | | | | | |
| **4** Pervious area infiltration rate (in/hr)<br>*Use pervious area CN and antecedent moisture condition with Appendix C-3 of the TGD for WQMP* | | | | | | | |
| **5** Maximum loss rate (in/hr)<br>*$F_m$ = Item 3 * Item 4*<br>*Use area-weighted $F_m$ from DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)* | | | | | | | |
| **6** Peak Flow from DMA (cfs)<br>*$Q_p$ =Item 2 * 0.9 * (Item 1 - Item 5)* | | | | | | | |
| **7** Time of concentration adjustment factor for other DMA to site discharge point<br>*Form 4.2-4 Item 12 DMA / Other DMA upstream of site discharge point (If ratio is greater than 1.0, then use maximum value of 1.0)* | DMA A | *n/a* | | | *n/a* | | |
| | DMA B | | *n/a* | | | *n/a* | |
| | DMA C | | | *n/a* | | | *n/a* |

| | | |
|---|---|---|
| **8** Pre-developed $Q_p$ at $T_c$ for DMA A:<br>*$Q_p$ = Item $6_{DMAA}$ + [Item $6_{DMAB}$ * (Item $1_{DMAA}$ - Item $5_{DMAB}$)/(Item $1_{DMAB}$ - Item $5_{DMAB}$)* Item $7_{DMAA/2}$] + [Item $6_{DMAC}$ * (Item $1_{DMAA}$ - Item $5_{DMAC}$)/(Item $1_{DMAC}$ - Item $5_{DMAC}$)* Item $7_{DMAA/3}$]* | **9** Pre-developed $Q_p$ at $T_c$ for DMA B:<br>*$Q_p$ = Item $6_{DMAB}$ + [Item $6_{DMAA}$ * (Item $1_{DMAB}$ - Item $5_{DMAA}$)/(Item $1_{DMAA}$ - Item $5_{DMAA}$)* Item $7_{DMAB/1}$] + [Item $6_{DMAC}$ * (Item $1_{DMAB}$ - Item $5_{DMAC}$)/(Item $1_{DMAC}$ - Item $5_{DMAC}$)* Item $7_{DMAB/3}$]* | **10** Pre-developed $Q_p$ at $T_c$ for DMA C:<br>*$Q_p$ = Item $6_{DMAC}$ + [Item $6_{DMAA}$ * (Item $1_{DMAC}$ - Item $5_{DMAA}$)/(Item $1_{DMAA}$ - Item $5_{DMAA}$)* Item $7_{DMAC/1}$] + [Item $6_{DMAB}$ * (Item $1_{DMAC}$ - Item $5_{DMAB}$)/(Item $1_{DMAB}$ - Item $5_{DMAB}$)* Item $7_{DMAC/2}$]* |
| **10** Peak runoff from pre-developed condition confluence analysis (cfs): | *Maximum of Item 8, 9, and 10 (including additional forms as needed)* | |
| **11** Post-developed $Q_p$ at $T_c$ for DMA A:<br>*Same as Item 8 for post-developed values* | **12** Post-developed $Q_p$ at $T_c$ for DMA B:<br>*Same as Item 9 for post-developed values* | **13** Post-developed $Q_p$ at $T_c$ for DMA C:<br>*Same as Item 10 for post-developed values* |
| **14** Peak runoff from post-developed condition confluence analysis (cfs): | *Maximum of Item 11, 12, and 13 (including additional forms as needed)* | |
| **15** Peak runoff reduction needed to meet HCOC Requirement (cfs): | $Q_{p\text{-}HCOC}$ = *(Item 14 * 0.95) – Item 10* | |

# 4.3 Project Conformance Analysis

Complete the following forms for each project site DA to document that the proposed LID BMPs conform to the project DCV developed to meet performance criteria specified in the MS4 Permit (WQMP Template Section 4.2). For the LID DCV, the forms are ordered according to hierarchy of BMP selection as required by the MS4 Permit (see Section 5.3.1 in the TGD for WQMP). The forms compute the following for on-site LID BMP:

- Site Design and Hydrologic Source Controls (Form 4.3-2)
- Retention and Infiltration (Form 4.3-3)
- Harvested and Use (Form 4.3-4) or
- Biotreatment (Form 4.3-5).

At the end of each form, additional fields facilitate the determination of the extent of mitigation provided by the specific BMP category, allowing for use of the next category of BMP in the hierarchy, if necessary.

The first step in the analysis, using Section 5.3.2.1 of the TGD for WQMP, is to complete Forms 4.3-1 and 4.3-3) to determine if retention and infiltration BMPs are infeasible for the project. For each feasibility criterion in Form 4.3-1, if the answer is "Yes," provide all study findings that includes relevant calculations, maps, data sources, etc. used to make the determination of infeasibility.

Next, complete Forms 4.3-2 and 4.3-4 to determine the feasibility of applicable HSC and harvest and use BMPs, and, if their implementation is feasible, the extent of mitigation of the DCV.

If no site constraints exist that would limit the type of BMP to be implemented in a DA, evaluate the use of combinations of LID BMPs, including all applicable HSC BMPs to maximize on-site retention of the DCV. If no combination of BMP can mitigate the entire DCV, implement the single BMP type, or combination of BMP types, that maximizes on-site retention of the DCV within the minimum effective area.

If the combination of LID HSC, retention and infiltration, and harvest and use BMPs are unable to mitigate the entire DCV, then biotreatment BMPs may be implemented by the project proponent. If biotreatment BMPs are used, then they must be sized to provide sufficient capacity for effective treatment of the remainder of the volume-based performance criteria that cannot be achieved with LID BMPs (TGD for WQMP Section 5.4.4.2). **Under no circumstances shall any portion of the DCV be released from the site without effective mitigation and/or treatment**.

See Section 4.4 for Alternative Compliance (Approved Regional BMP).

## Form 4.3-1 Infiltration BMP Feasibility (DA 1)

Feasibility Criterion – Complete evaluation for each DA on the Project Site

[1] Would infiltration BMP pose significant risk for groundwater related concerns? Yes ☐ No ☐
*Refer to Section 5.3.2.1 of the TGD for WQMP*

If Yes, Provide basis: (attach)

[2] Would installation of infiltration BMP significantly increase the risk of geotechnical hazards? Yes ☐ No ☐
(Yes, if the answer to any of the following questions is yes, as established by a geotechnical expert):

- The location is less than 50 feet away from slopes steeper than 15 percent
- The location is less than eight feet from building foundations or an alternative setback.
- A study certified by a geotechnical professional or an available watershed study determines that stormwater infiltration would result in significantly increased risks of geotechnical hazards.

If Yes, Provide basis: (attach)

[3] Would infiltration of runoff on a Project site violate downstream water rights? Yes ☐ No ☐

If Yes, Provide basis: (attach)

[4] Is proposed infiltration facility located on hydrologic soil group (HSG) D soils or does the site geotechnical investigation indicate presence of soil characteristics, which support categorization as D soils? Yes ☐ No ☐

If Yes, Provide basis: (attach)

[5] Is the design infiltration rate, after accounting for safety factor of 2.0, below proposed facility less than 0.3 in/hr (accounting for soil amendments)? Yes ☐ No ☐

If Yes, Provide basis: (attach)

[6] Would on-site infiltration or reduction of runoff over pre-developed conditions be partially or fully inconsistent with watershed management strategies as defined in the WAP, or impair beneficial uses? Yes ☐ No ☐
*See Section 3.5 of the TGD for WQMP and WAP*

If Yes, Provide basis: (attach)

[7] Any answer from Item 1 through Item 3 is "Yes": Yes ☐ No ☐
*If yes, infiltration of any volume is not feasible onsite. Proceed to Form 4.3-4, Harvest and Use BMP. If no, then proceed to Item 8 below.*

[8] Any answer from Item 4 through Item 6 is "Yes": Yes ☐ No ☐
*If yes, infiltration is permissible but is not required to be considered. Proceed to Form 4.3-2, Hydrologic Source Control BMP.*
*If no, then proceed to Item 9, below.*

[9] All answers to Item 1 through Item 6 are "No":
*Infiltration of the full DCV is potentially feasible, LID infiltration BMP must be designed to infiltrate the full DCV to the MEP.*
*Proceed to Form 4.3-2, Hydrologic Source Control BMP.*

## 4.3.1 Site Design Hydrologic Source Control BMP

Section XI.E. of the Permit emphasizes the use of LID preventative measures; and the use of LID HSC BMPs reduces the portion of the DCV that must be addressed in downstream BMPs. Therefore, all applicable HSC shall be provided except where they are mutually exclusive with each other, or with other BMPs. Mutual exclusivity may result from overlapping BMP footprints such that either would be potentially feasible by itself, but both could not be implemented. Please note that while there are no numeric standards regarding the use of HSC, if a project cannot feasibly meet BMP sizing requirements or cannot fully address HCOCs, feasibility of all applicable HSC must be part of demonstrating that the BMP system has been designed to retain the maximum feasible portion of the DCV. Complete Form 4.3-2 to identify and calculate estimated retention volume from implementing site design HSC BMP. Refer to Section 5.4.1 in the TGD for more detailed guidance.

**Form 4.3-2 Site Design Hydrologic Source Control BMPs (DA 1)**

| | | | |
|---|---|---|---|
| **1** Implementation of Impervious Area Dispersion BMP (i.e. routing runoff from impervious to pervious areas), excluding impervious areas planned for routing to on-lot infiltration BMP: Yes ☐ No ☒ *If yes, complete Items 2-5; If no, proceed to Item 6* | DA DMA BMP Type | DA DMA BMP Type | DA DMA BMP Type *(Use additional forms for more BMPs)* |
| **2** Total impervious area draining to pervious area ($ft^2$) | | | |
| **3** Ratio of pervious area receiving runoff to impervious area | | | |
| **4** Retention volume achieved from impervious area dispersion ($ft^3$) *V = Item2 * Item 3 * (0.5/12), assuming retention of 0.5 inches of runoff* | | | |
| **5** Sum of retention volume achieved from impervious area dispersion ($ft^3$): | | $V_{retention}$ *=Sum of Item 4 for all BMPs* | |
| **6** Implementation of Localized On-lot Infiltration BMPs (e.g. on-lot rain gardens): Yes ☐ No ☒ *If yes, complete Items 7-13 for aggregate of all on-lot infiltration BMP in each DA; If no, proceed to Item 14* | DA DMA BMP Type | DA DMA BMP Type | DA DMA BMP Type *(Use additional forms for more BMPs)* |
| **7** Ponding surface area ($ft^2$) | | | |
| **8** Ponding depth (ft) | | | |
| **9** Surface area of amended soil/gravel ($ft^2$) | | | |
| **10** Average depth of amended soil/gravel (ft) | | | |
| **11** Average porosity of amended soil/gravel | | | |
| **12** Retention volume achieved from on-lot infiltration ($ft^3$) $V_{retention}$ *= (Item 7 *Item 8) + (Item 9 * Item 10 * Item 11)* | | | |
| **13** Runoff volume retention from on-lot infiltration ($ft^3$): | | $V_{retention}$ *=Sum of Item 12 for all BMPs* | |

## Form 4.3-2 cont. Site Design Hydrologic Source Control BMPs

| | | | |
|---|---|---|---|
| **14** Implementation of evapotranspiration BMP (green, brown, or blue roofs): Yes ☐ No ☒<br>*If yes, complete Items 15-20. If no, proceed to Item 21* | DA DMA<br>BMP Type | DA DMA<br>BMP Type | DA DMA<br>BMP Type<br>*(Use additional forms for more BMPs)* |
| **15** Rooftop area planned for ET BMP ($ft^2$) | | | |
| **16** Average wet season ET demand (in/day)<br>*Use local values, typical ~ 0.1* | | | |
| **17** Daily ET demand ($ft^3$/day)<br>*Item 15 * (Item 16 / 12)* | | | |
| **18** Drawdown time (hrs)<br>*Copy Item 6 in Form 4.2-1* | | | |
| **19** Retention Volume ($ft^3$)<br>*$V_{retention}$ = Item 17 * (Item 18 / 24)* | | | |
| **20** Runoff volume retention from evapotranspiration BMPs ($ft^3$): *$V_{retention}$ =Sum of Item 19 for all BMPs* | | | |
| **21** Implementation of Street Trees: Yes ☐ No ☒<br>*If yes, complete Items 22-25. If no, proceed to Item 26* | DA DMA<br>BMP Type | DA DMA<br>BMP Type | DA DMA<br>BMP Type<br>*(Use additional forms for more BMPs)* |
| **22** Number of Street Trees | | | |
| **23** Average canopy cover over impervious area ($ft^2$) | | | |
| **24** Runoff volume retention from street trees ($ft^3$)<br>*$V_{retention}$ = Item 22 * Item 23 * (0.05/12) assume runoff retention of 0.05 inches* | | | |
| **25** Runoff volume retention from street tree BMPs ($ft^3$): *$V_{retention}$ = Sum of Item 24 for all BMPs* | | | |
| **26** Implementation of residential rain barrel/cisterns: Yes ☐ No ☒ *If yes, complete Items 27-29; If no, proceed to Item 30* | DA DMA<br>BMP Type | DA DMA<br>BMP Type | DA DMA<br>BMP Type<br>*(Use additional forms for more BMPs)* |
| **27** Number of rain barrels/cisterns | | | |
| **28** Runoff volume retention from rain barrels/cisterns ($ft^3$)<br>*$V_{retention}$ = Item 27 * 3* | | | |
| **29** Runoff volume retention from residential rain barrels/Cisterns (ft3): *$V_{retention}$ =Sum of Item 28 for all BMPs* | | | |
| **30** Total Retention Volume from Site Design Hydrologic Source Control BMPs: 0 *Sum of Items 5, 13, 20, 25 and 29* | | | |

### 4.3.2 Infiltration BMPs

Use Form 4.3-3 to compute on-site retention of runoff from proposed retention and infiltration BMPs. Volume retention estimates are sensitive to the percolation rate used, which determines the amount of runoff that can be infiltrated within the specified drawdown time. The infiltration safety factor reduces field measured percolation to account for potential inaccuracy associated with field measurements, declining BMP performance over time, and compaction during construction. Appendix D of the TGD for WQMP provides guidance on estimating an appropriate safety factor to use in Form 4.3-3.

If site constraints limit the use of BMPs to a single type and implementation of retention and infiltration BMPs mitigate no more than 40% of the DCV, then they are considered infeasible and the Project Proponent may evaluate the effectiveness of BMPs lower in the LID hierarchy of use (Section 5.5.1 of the TGD for WQMP)

If implementation of infiltrations BMPs is feasible as determined using Form 4.3-1, then LID infiltration BMPs shall be implemented to the MEP (section 4.1 of the TGD for WQMP).

## Form 4.3-3 Infiltration LID BMP - including underground BMPs

**1** Remaining LID DCV not met by site design HSC BMP ($ft^3$): *$V_{unmet}$ = Form 4.2-1 Item 7 - Form 4.3-2 Item 30*

| BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs* | DA DMA BMP Type | DA DMA BMP Type | DA DMA BMP Type *(Use additional forms for more BMPs)* |
|---|---|---|---|
| **2** Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix D of the TGD for WQMP for minimum requirements for assessment methods* | | | |
| **3** Infiltration safety factor *See TGD Section 5.4.2 and Appendix D* | | | |
| **4** Design percolation rate (in/hr) *$P_{design}$ = Item 2 / Item 3* | | | |
| **5** Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1* | | | |
| **6** Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details* | | | |
| **7** Ponding Depth (ft) *$d_{BMP}$ = Minimum of (1/12*Item 4*Item 5) or Item 6* | | | |
| **8** Infiltrating surface area, *$SA_{BMP}$* ($ft^2$) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP* | | | |
| **9** Amended soil depth, *$d_{media}$* (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details* | | | |
| **10** Amended soil porosity | | | |
| **11** Gravel depth, *$d_{media}$* (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details* | | | |
| **12** Gravel porosity | | | |
| **13** Duration of storm as basin is filling (hrs) *Typical ~ 3hrs* | | | |
| **14** Above Ground Retention Volume ($ft^3$) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]* | | | |
| **15** Underground Retention Volume ($ft^3$) *Volume determined using manufacturer's specifications and calculations* | | | |

**16** Total Retention Volume from LID Infiltration BMPs: *(Sum of Items 14 and 15 for all infiltration BMP included in plan)*

**17** Fraction of DCV achieved with infiltration BMP: % *Retention% = Item 16 / Form 4.2-1 Item 7*

**18** Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes ☐ No ☐

*If yes, demonstrate conformance using Form 4.3-10; If no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.*

### 4.3.3 Harvest and Use BMP

Harvest and use BMP may be considered if the full LID DCV cannot be met by maximizing infiltration BMPs. Use Form 4.3-4 to compute on-site retention of runoff from proposed harvest and use BMPs.

Volume retention estimates for harvest and use BMPs are sensitive to the on-site demand for captured stormwater. Since irrigation water demand is low in the wet season, when most rainfall events occur in San Bernardino County, the volume of water that can be used within a specified drawdown period is relatively low. The bottom portion of Form 4.3-4 facilitates the necessary computations to show infeasibility if a minimum incremental benefit of 40 percent of the LID DCV would not be achievable with MEP implementation of on-site harvest and use of stormwater (Section 5.5.4 of the TGD for WQMP).

**Form 4.3-4 Harvest and Use BMPs**

| | | | |
|---|---|---|---|
| **1** Remaining LID DCV not met by site design HSC or infiltration BMP ($ft^3$): *$V_{unmet}$ = Form 4.2-1 Item 7 - Form 4.3-2 Item 30 – Form 4.3-3 Item 16* | | | |
| BMP Type(s) *Compute runoff volume retention from proposed harvest and use BMP (Select BMPs from Table 5-4 of the TGD for WQMP) - Use additional forms for more BMPs* | DA DMA BMP Type | DA DMA BMP Type | DA DMA BMP Type *(Use additional forms for more BMPs)* |
| **2** Describe cistern or runoff detention facility | | | |
| **3** Storage volume for proposed detention type ($ft^3$) *Volume of cistern* | | | |
| **4** Landscaped area planned for use of harvested stormwater ($ft^2$) | | | |
| **5** Average wet season daily irrigation demand (in/day) Use local values, typical ~ 0.1 in/day | | | |
| **6** Daily water demand ($ft^3$/day) *Item 4 * (Item 5 / 12)* | | | |
| **7** Drawdown time (hrs) *Copy Item 6 from Form 4.2-1* | | | |
| **8** Retention Volume ($ft^3$) *$V_{retention}$ = Minimum of (Item 3) or (Item 6 * (Item 7 / 24))* | | | |
| **9** Total Retention Volume ($ft^3$) from Harvest and Use BMP *Sum of Item 8 for all harvest and use BMP included in plan* | | | |
| **10** Is the full DCV retained with a combination of LID HSC, retention and infiltration, and harvest & use BMPs? Yes ☐ No ☐ *If yes, demonstrate conformance using Form 4.3-10. If no, then re-evaluate combinations of all LID BMP and optimize their implementation such that the maximum portion of the DCV is retained on-site (using a single BMP type or combination of BMP types). If the full DCV cannot be mitigated after this optimization process, proceed to Section 4.3.4.* | | | |

## 4.3.4 Biotreatment BMP

Biotreatment BMPs may be considered if the full LID DCV cannot be met by maximizing retention and infiltration, and harvest and use BMPs. A key consideration when using biotreatment BMP is the effectiveness of the proposed BMP in addressing the pollutants of concern for the project (see Table 5-5 of the TGD for WQMP).

Use Form 4.3-5 to summarize the potential for volume based and/or flow based biotreatment options to biotreat the remaining unmet LID DCV w. Biotreatment computations are included as follows:

- Use Form 4.3-6 to compute biotreatment in small volume based biotreatment BMP (e.g. bioretention w/underdrains);
- Use Form 4.3-7 to compute biotreatment in large volume based biotreatment BMP (e.g. constructed wetlands);
- Use Form 4.3-8 to compute sizing criteria for flow-based biotreatment BMP (e.g. bioswales)

### Form 4.3-5 Selection and Evaluation of Biotreatment BMP (DA 1)

| | | |
|---|---|---|
| **1** Remaining LID DCV not met by site design HSC, infiltration, or harvest and use BMP for potential biotreatment ($ft^3$): *Form 4.2-1 Item 7 - Form 4.3-2 Item 30 – Form 4.3-3 Item 16- Form 4.3-4 Item 9* | List pollutants of concern *Copy from Form 2.3-1.* | |
| **2** Biotreatment BMP Selected *(Select biotreatment BMP(s) necessary to ensure all pollutants of concern are addressed through Unit Operations and Processes, described in Table 5-5 of the TGD for WQMP)* | Volume-based biotreatment *Use Forms 4.3-6 and 4.3-7 to compute treated volume* | Flow-based biotreatment *Use Form 4.3-8 to compute treated volume* |
| | ☐ Bioretention with underdrain<br>☐ Planter box with underdrain<br>☐ Constructed wetlands<br>☐ Wet extended detention<br>☐ Dry extended detention | ☐ Vegetated swale<br>☐ Vegetated filter strip<br>☐ Proprietary biotreatment |
| **3** Volume biotreated in volume based biotreatment BMP ($ft^3$): *Form 4.3-6 Item 15 + Form 4.3-7 Item 13* | **4** Compute remaining LID DCV with implementation of volume based biotreatment BMP ($ft^3$): *Item 1 – Item 3* | **5** Remaining fraction of LID DCV for sizing flow based biotreatment BMP: % *Item 4 / Item 1* |
| **6** Flow-based biotreatment BMP capacity provided (cfs): *Use Figure 5-2 of the TGD for WQMP to determine flow capacity required to provide biotreatment of remaining percentage of unmet LID DCV (Item 5), for the project's precipitation zone (Form 3-1 Item 1)* | | |
| **7** Metrics for MEP determination:<br>• Provided a WQMP with the portion of site area used for suite of LID BMP equal to minimum thresholds in Table 5-7 of the TGD for WQMP for the proposed category of development: ☐ *If maximized on-site retention BMPs is feasible for partial capture, then LID BMP implementation must be optimized to retain and infiltrate the maximum portion of the DCV possible within the prescribed minimum effective area. The remaining portion of the DCV shall then be mitigated using biotreatment BMP.* | | |

## Form 4.3-6 Volume Based Biotreatment (DA 1) – Bioretention and Planter Boxes with Underdrains

| Biotreatment BMP Type *(Bioretention w/underdrain, planter box w/underdrain, other comparable BMP)* | DA DMA BMP Type | DA DMA BMP Type | DA DMA BMP Type *(Use additional forms for more BMPs)* |
|---|---|---|---|
| **1** Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP* | | | |
| **2** Amended soil infiltration rate *Typical ~ 5.0* | | | |
| **3** Amended soil infiltration safety factor *Typical ~ 2.0* | | | |
| **4** Amended soil design percolation rate (in/hr) $P_{design}$ *= Item 2 / Item 3* | | | |
| **5** Ponded water drawdown time (hr) *Copy Item 6 from Form 4.2-1* | | | |
| **6** Maximum ponding depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details* | | | |
| **7** Ponding Depth (ft) $d_{BMP}$ *= Minimum of (1/12 * Item 4 * Item 5) or Item 6* | | | |
| **8** Amended soil surface area ($ft^2$) | | | |
| **9** Amended soil depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details* | | | |
| **10** Amended soil porosity, *n* | | | |
| **11** Gravel depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details* | | | |
| **12** Gravel porosity, *n* | | | |
| **13** Duration of storm as basin is filling (hrs) *Typical ~ 3hrs* | | | |
| **14** Biotreated Volume ($ft^3$) $V_{biotreated}$ *= Item 8 * [(Item 7/2) + (Item 9 * Item 10) +(Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]* | | | |
| **15** Total biotreated volume from bioretention and/or planter box with underdrains BMP: *Sum of Item 14 for all volume-based BMPs included in this form* | | | |

# Form 4.3-7 Volume Based Biotreatment (DA 1) – Constructed Wetlands and Extended Detention

| Biotreatment BMP Type<br>*Constructed wetlands, extended wet detention, extended dry detention, or other comparable proprietary BMP. If BMP includes multiple modules (e.g. forebay and main basin), provide separate estimates for storage and pollutants treated in each module.* | DA DMA BMP Type | | DA DMA BMP Type<br>*(Use additional forms for more BMPs)* | |
|---|---|---|---|---|
| | Forebay | Basin | Forebay | Basin |
| **1** Pollutants addressed with BMP forebay and basin<br>*List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP* | | | | |
| **2** Bottom width (ft) | | | | |
| **3** Bottom length (ft) | | | | |
| **4** Bottom area ($ft^2$) $A_{bottom}$ = *Item 2 * Item 3* | | | | |
| **5** Side slope (ft/ft) | | | | |
| **6** Depth of storage (ft) | | | | |
| **7** Water surface area ($ft^2$)<br>$A_{surface}$ =*(Item 2 + (2 * Item 5 * Item 6)) * (Item 3 + (2 * Item 5 * Item 6))* | | | | |
| **8** Storage volume ($ft^3$) *For BMP with a forebay, ensure fraction of total storage is within ranges specified in BMP specific fact sheets, see Table 5-6 of the TGD for WQMP for reference to BMP design details*<br>V =*Item 6 / 3 * [Item 4 + Item 7 + (Item 4 * Item 7)^0.5]* | | | | |
| **9** Drawdown Time (hrs) *Copy Item 6 from Form 2.1* | | | | |
| **10** Outflow rate (cfs) $Q_{BMP}$ = *(Item* $8_{forebay}$ *+ Item* $8_{basin}$*) / (Item 9 * 3600)* | | | | |
| **11** Duration of design storm event (hrs) | | | | |
| **12** Biotreated Volume ($ft^3$)<br>$V_{biotreated}$ = *(Item* $8_{forebay}$ *+ Item* $8_{basin}$*) +( Item 10 * Item 11 * 3600)* | | | | |
| **13** Total biotreated volume from constructed wetlands, extended dry detention, or extended wet detention :<br>*(Sum of Item 12 for all BMP included in plan)* | | | | |

## Form 4.3-8 Flow Based Biotreatment (DA 1)

| Biotreatment BMP Type<br>*Vegetated swale, vegetated filter strip, or other comparable proprietary BMP* | DA DMA<br>BMP Type | DA DMA<br>BMP Type | DA DMA<br>BMP Type<br>*(Use additional forms for more BMPs)* |
|---|---|---|---|
| **1** Pollutants addressed with BMP<br>*List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in TGD Table 5-5* | | | |
| **2** Flow depth for water quality treatment (ft)<br>*BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details* | | | |
| **3** Bed slope (ft/ft)<br>*BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details* | | | |
| **4** Manning's roughness coefficient | | | |
| **5** Bottom width (ft)<br>$b_w$ *= (Form 4.3-5 Item 6 * Item 4) / (1.49 * Item 2^1.67 * Item 3^0.5)* | | | |
| **6** Side Slope (ft/ft)<br>*BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details* | | | |
| **7** Cross sectional area ($ft^2$)<br>*A = (Item 5 * Item 2) + (Item 6 * Item 2^2)* | | | |
| **8** Water quality flow velocity (ft/sec)<br>*V = Form 4.3-5 Item 6 / Item 7* | | | |
| **9** Hydraulic residence time (min)<br>*Pollutant specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details* | | | |
| **10** Length of flow based BMP (ft)<br>*L = Item 8 * Item 9 * 60* | | | |
| **11** Water surface area at water quality flow depth ($ft^2$)<br>$SA_{top}$ *= (Item 5 + (2 * Item 2 * Item 6)) * Item 10* | | | |

## 4.3.5 Conformance Summary

Complete Form 4.3-9 to demonstrate how on-site LID DCV is met with proposed site design hydrologic source control, infiltration, harvest and use, and/or biotreatment BMP. The bottom line of the form is used to describe the basis for infeasibility determination for on-site LID BMP to achieve full LID DCV, and provides methods for computing remaining volume to be addressed in an alternative compliance plan. If the project has more than one outlet, then complete additional versions of this form for each outlet.

### Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate

**1** Total LID DCV for the Project DA-1 ($ft^3$): 43,115 *Copy Item 7 in Form 4.2-1*

**2** On-site retention with site design hydrologic source control LID BMP ($ft^3$): N/A *Copy Item 30 in Form 4.3-2*

**3** On-site retention with LID infiltration BMP ($ft^3$): N/A *Copy Item 16 in Form 4.3-3*

**4** On-site retention with LID harvest and use BMP ($ft^3$): N/A *Copy Item 9 in Form 4.3-4*

**5** On-site biotreatment with volume based biotreatment BMP ($ft^3$): N/A *Copy Item 3 in Form 4.3-5*

**6** Flow capacity provided by flow based biotreatment BMP (cfs): N/A *Copy Item 6 in Form 4.3-5*

**7** LID BMP performance criteria are achieved if answer to any of the following is "Yes":

- Full retention of LID DCV with site design HSC, infiltration, or harvest and use BMP: Yes ☐ No ☒
  *If yes, sum of Items 2, 3, and 4 is greater than Item 1*
- Combination of on-site retention BMPs for a portion of the LID DCV and volume-based biotreatment BMP that address all pollutants of concern for the remaining LID DCV: Yes ☐ No ☒
  *If yes, a) sum of Items 2, 3, 4, and 5 is greater than Item 1, and Items 2, 3 and 4 are maximized; or b) Item 6 is greater than Form 4.3--5 Item 6 and Items 2, 3 and 4 are maximized*
- On-site retention and infiltration is determined to be infeasible and biotreatment BMP provide biotreatment for all pollutants of concern for full LID DCV: Yes ☐ No ☒
  *If yes, Form 4.3-1 Items 7 and 8 were both checked yes*

**8** If the LID DCV is not achieved by any of these means, then the project may be allowed to develop an alternative compliance plan. Check box that describes the scenario which caused the need for alternative compliance:

- Combination of HSC, retention and infiltration, harvest and use, and biotreatment BMPs provide less than full LID DCV capture: ☐
  *Checked yes for Form 4.3-5 Item 7, Item 6 is zero, and sum of Items 2, 3, 4, and 5 is less than Item 1. If so, apply water quality credits and calculate volume for alternative compliance,* $V_{alt}$ *= (Item 1 – Item 2 – Item 3 – Item 4 – Item 5) * (100 - Form 2.4-1 Item 2)%*
- An approved Watershed Action Plan (WAP) demonstrates that water quality and hydrologic impacts of urbanization are more effective when managed in at an off-site facility: ☒
  *Attach appropriate WAP section, including technical documentation, showing effectiveness comparisons for the project site and regional watershed*
  See Section 4.4

## 4.3.6 Hydromodification Control BMP

Use Form 4.3-10 to compute the remaining runoff volume retention, after LID BMP are implemented, needed to address HCOC, and the increase in time of concentration and decrease in peak runoff necessary to meet targets for protection of waterbodies with a potential HCOC. Describe hydromodification control BMP that address HCOC, which may include off-site BMP and/or in-stream controls. Section 5.6 of the TGD for WQMP provides additional details on selection and evaluation of hydromodification control BMP.

### Form 4.3-10 Hydromodification Control BMPs

| | |
|---|---|
| **1** Volume reduction needed for HCOC performance criteria ($ft^3$): *(Form 4.2-2 Item 4 * 0.95) – Form 4.2-2 Item 1* | **2** On-site retention with site design hydrologic source control, infiltration, and harvest and use LID BMP ($ft^3$): *Sum of Form 4.3-9 Items 2, 3, and 4 Evaluate option to increase implementation of on-site retention in Forms 4.3-2, 4.3-3, and 4.3-4 in excess of LID DCV toward achieving HCOC volume reduction* |
| **3** Remaining volume for HCOC volume capture ($ft^3$): *Item 1 – Item 2* | **4** Volume capture provided by incorporating additional on-site or off-site retention BMPs ($ft^3$): *Existing downstream BMP may be used to demonstrate additional volume capture (if so, attach to this WQMP a hydrologic analysis showing how the additional volume would be retained during a 2-yr storm event for the regional watershed)* |

**5** If Item 4 is less than Item 3, incorporate in-stream controls on downstream waterbody segment to prevent impacts due to hydromodification ☐ *Attach in-stream control BMP selection and evaluation to this WQMP*

**6** Is Form 4.2-2 Item 11 less than or equal to 5%: Yes ☐ No ☐

*If yes, HCOC performance criteria is achieved. If no, select one or more mitigation options below:*

- Demonstrate increase in time of concentration achieved by proposed LID site design, LID BMP, and additional on-site or off-site retention BMP ☐
  *BMP upstream of a waterbody segment with a potential HCOC may be used to demonstrate increased time of concentration through hydrograph attenuation (if so, show that the hydraulic residence time provided in BMP for a 2-year storm event is equal or greater than the addition time of concentration requirement in Form 4.2-4 Item 15)*
- Increase time of concentration by preserving pre-developed flow path and/or increase travel time by reducing slope and increasing cross-sectional area and roughness for proposed on-site conveyance facilities ☐
- Incorporate appropriate in-stream controls for downstream waterbody segment to prevent impacts due to hydromodification, in a plan approved and signed by a licensed engineer in the State of California ☐

**7** Form 4.2-2 Item 12 less than or equal to 5%: Yes ☐ No ☐

*If yes, HCOC performance criteria is achieved. If no, select one or more mitigation options below:*

- Demonstrate reduction in peak runoff achieved by proposed LID site design, LID BMPs, and additional on-site or off-site retention BMPs ☐
  *BMPs upstream of a waterbody segment with a potential HCOC may be used to demonstrate additional peak runoff reduction through hydrograph attenuation (if so, attach to this WQMP, a hydrograph analysis showing how the peak runoff would be reduced during a 2-yr storm event)*
- Incorporate appropriate in-stream controls for downstream waterbody segment to prevent impacts due to hydromodification, in a plan approved and signed by a licensed engineer in the State of California ☐

# 4.4 Alternative Compliance Plan (if applicable)

Describe an alternative compliance plan (if applicable) for projects not fully able to infiltrate, harvest and use, or biotreat the DCV via on-site LID practices. A project proponent must develop an alternative compliance plan to address the remainder of the LID DCV. Depending on project type some projects may qualify for water quality credits that can be applied to reduce the DCV that must be treated prior to development of an alternative compliance plan (see Form 2.4-1, Water Quality Credits). Form 4.3-9 Item 8 includes instructions on how to apply water quality credits when computing the DCV that must be met through alternative compliance. Alternative compliance plans may include one or more of the following elements:

- On-site structural treatment control BMP - All treatment control BMP should be located as close to possible to the pollutant sources and should not be located within receiving waters;
- Off-site structural treatment control BMP - Pollutant removal should occur prior to discharge of runoff to receiving waters;
- Urban runoff fund or In-lieu program, if available

Depending upon the proposed alternative compliance plan, approval by the executive officer may or may not be required (see Section 6 of the TGD for WQMP).

The project is part of The Preserve Master Plan in the City of Chino. Per approval letter from the Santa Ana Regional Water Quality Control Board titled "*Approval to Add the Cucamonga Creek Watershed Regional Water Quality Project (Mill Creek Wetlands) as a Regional Best Management Practice (BMP) to the San Bernardino County Watershed Action Plan for Design Capture Volume*", developments within The Preserve are authorized to use its Design Capture Volume, and do not have to disprove the feasibility of on-site LID structural treatment controls in order to discharge into the Mill Creek Wetlands. Mill Creek Wetlands has been approved as a regional structural LID treatment control for 500 acres of new development within The Preserve, which includes the TTM 16420 land area. **See Appendix B** for said approval letter and master plan drainage exhibit.

# Section 5 Inspection and Maintenance Responsibility for Post Construction BMP

All BMP included as part of the project WQMP are required to be maintained through regular scheduled inspection and maintenance (refer to Section 8, Post Construction BMP Requirements, in the TGD for WQMP). Fully complete Form 5-1 summarizing all BMP included in the WQMP. Attach additional forms as needed. The WQMP shall also include a detailed Operation and Maintenance Plan for all BMP and may require a Maintenance Agreement (consult the jurisdiction's LIP). If a Maintenance Agreement is required, it must also be attached to the WQMP.

## Form 5-1 BMP Inspection and Maintenance (use additional forms as necessary)

| BMP | Reponsible Party(s) | Inspection/ Maintenance Activities Required | Minimum Frequency of Activities |
|---|---|---|---|
| S1 – Provide storm drain system stenciling and signage<br><br>(CASQA BMP SD-13) | Owner | Replace when the stenciling and signage fades to maintain legibility. | Biannually as necessary |
| S3 – Design and construct trash and waste storage areas including a solid canopy-style roof to reduce pollution introduction<br><br>(CASQA BMP SD-32) | Owner | Routine inspection of the trash area should be provided by the owner's representative. | Weekly |
| | | A sign shall be posted requiring that trash container lids be closed after depositing trash | Daily |
| | | Debris shall be swept or wiped clean and deposited into trash receptacles. | Weekly |
| | | Regular trash dumpster pickup | Weekly |
| S4 – Use efficient irrigation systems and landscape design, water conservation, smart controllers, and source control<br><br>(CASQA BMP SD-12) | Owner | Inspect irrigation equipment for proper operation. | Monthly |
| | | Check water sensors and adjust irrigation heads and timing as necessary | Monthly |
| S5 – Finish grade of landscaped areas at a minimum of 1-2 inches below top of curb, sidewalk, or pavement | Owner | Inspect landscaped areas to assure that the landscaped areas are a minimum of 1-2 inches below top of curb, sidewalk, or pavement. | Monthly |
| N14 – Catch Basin Inspection Program | Owner | The site owners shall inspect all on-site catch basins on a quarterly frequency for accumulation of sediment, trash, debris, and for evidence of illegal dumping. All catch basins shall be cleaned annually or whenever debris accumulates to a level greater than 25% of sump capacity. | Quarterly |
| N15 – Vacuum Sweeping of Private Streets and Parking Lots<br><br>(CASQA BMPs SC-43 and SC-70) | Owner | All paved areas of the site shall be vacuum swept by owner's contractor. | Weekly |

# Section 6 WQMP Attachments

## 6.1. Site Plan and Drainage Plan

Include a site plan and drainage plan sheet set containing the following minimum information:

- Project location
- Site boundary
- Land uses and land covers, as applicable
- Suitability/feasibility constraints
- Structural Source Control BMP locations
- Site Design Hydrologic Source Control BMP locations
- LID BMP details
- Drainage delineations and flow information
- Drainage connections

## 6.2 Electronic Data Submittal

Minimum requirements include submittal of PDF exhibits in addition to hard copies. Format must not require specialized software to open. If the local jurisdiction requires specialized electronic document formats (as described in their local Local Implementation Plan), this section will describe the contents (e.g., layering, nomenclature, geo-referencing, etc.) of these documents so that they may be interpreted efficiently and accurately.

## 6.3 Post Construction

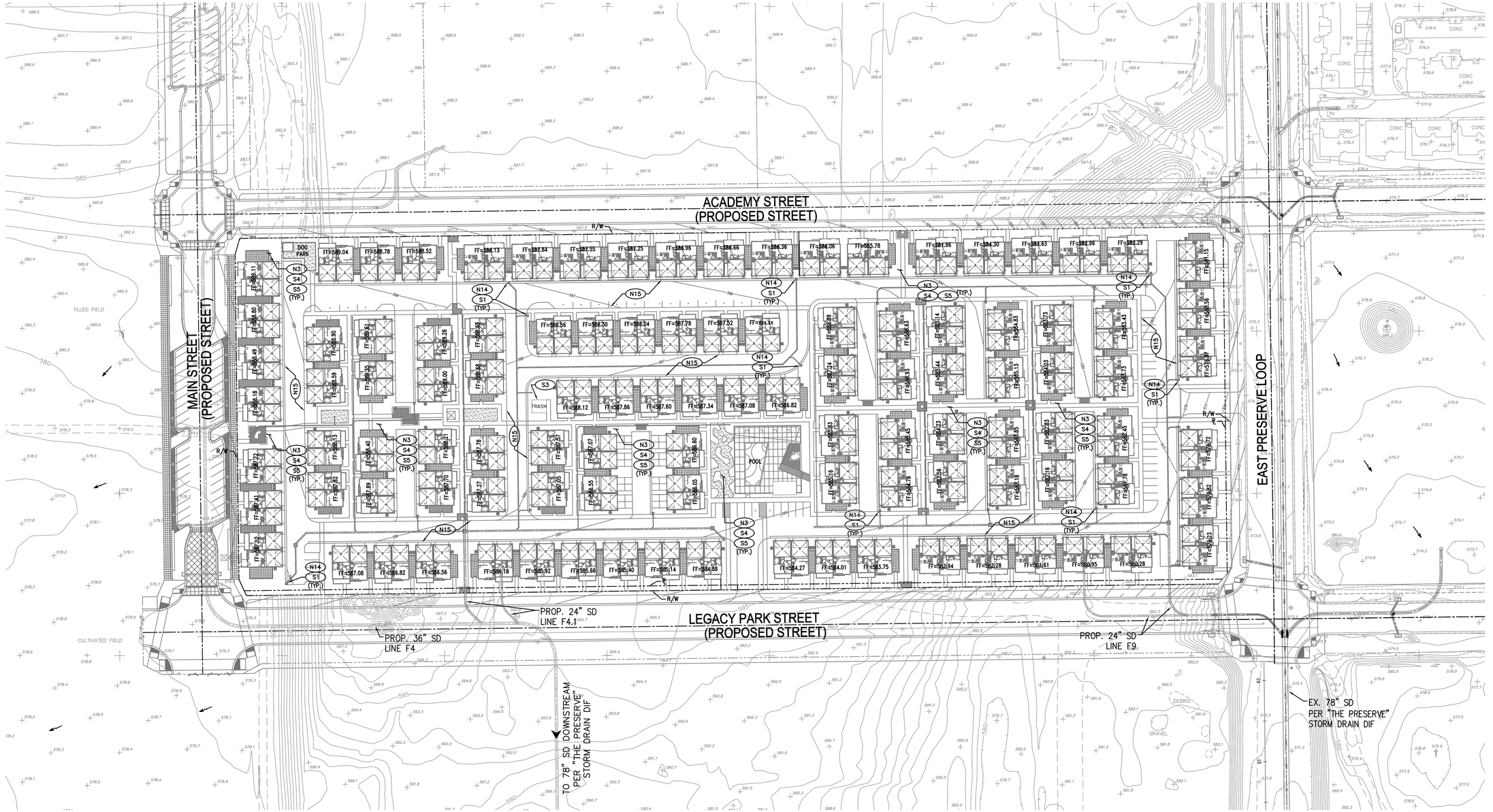
Attach all O&M Plans and Maintenance Agreements for BMP to the WQMP.

## 6.4 Other Supporting Documentation

- BMP Educational Materials
- Activity Restriction – C, C&R's & Lease Agreement

# Section 6.1

## Site Plan and Drainage Plan




## NON-STRUCTURAL SOURCE CONTROL BMPs

- (N3) — LANDSCAPE MANAGEMENT BMPs PER CASQA BMP SC-73
- (N14) — CATCH BASIN INSPECTION PROGRAM
- (N15) — VACUUM SWEEPING OF PARKING LOTS/PAVED AREAS PER BMPs SC-43 AND SC-70

## SOURCE CONTROL STRUCTURAL BMPs

- (S1) — PROVIDE STORM DRAIN STENCILING AND SIGNAGE PER CASQA BMP SD-13
- (S3) — ROOFED TRASH AND WASTE STORAGE ENCLOSURES PER CASQA BMP SD-32
- (S4) — EFFICIENT IRRIGATION SYSTEMS AND LANDSCAPE DESIGN PER CASQA BMP SD-12
- (S5) — FINISH GRADE OF LANDSCAPED AREAS AT A MINIMUM OF 1-2 INCHES BELOW TOP OF CURB, SIDEWALK, OR PAVEMENT

N

50' 0' 50' 100' 150'

GRAPHIC SCALE: 1"=50'


160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860

DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning

R.C.E. 39478
GREGORY R. COOKE
DATE


NOT FOR CONSTRUCTION

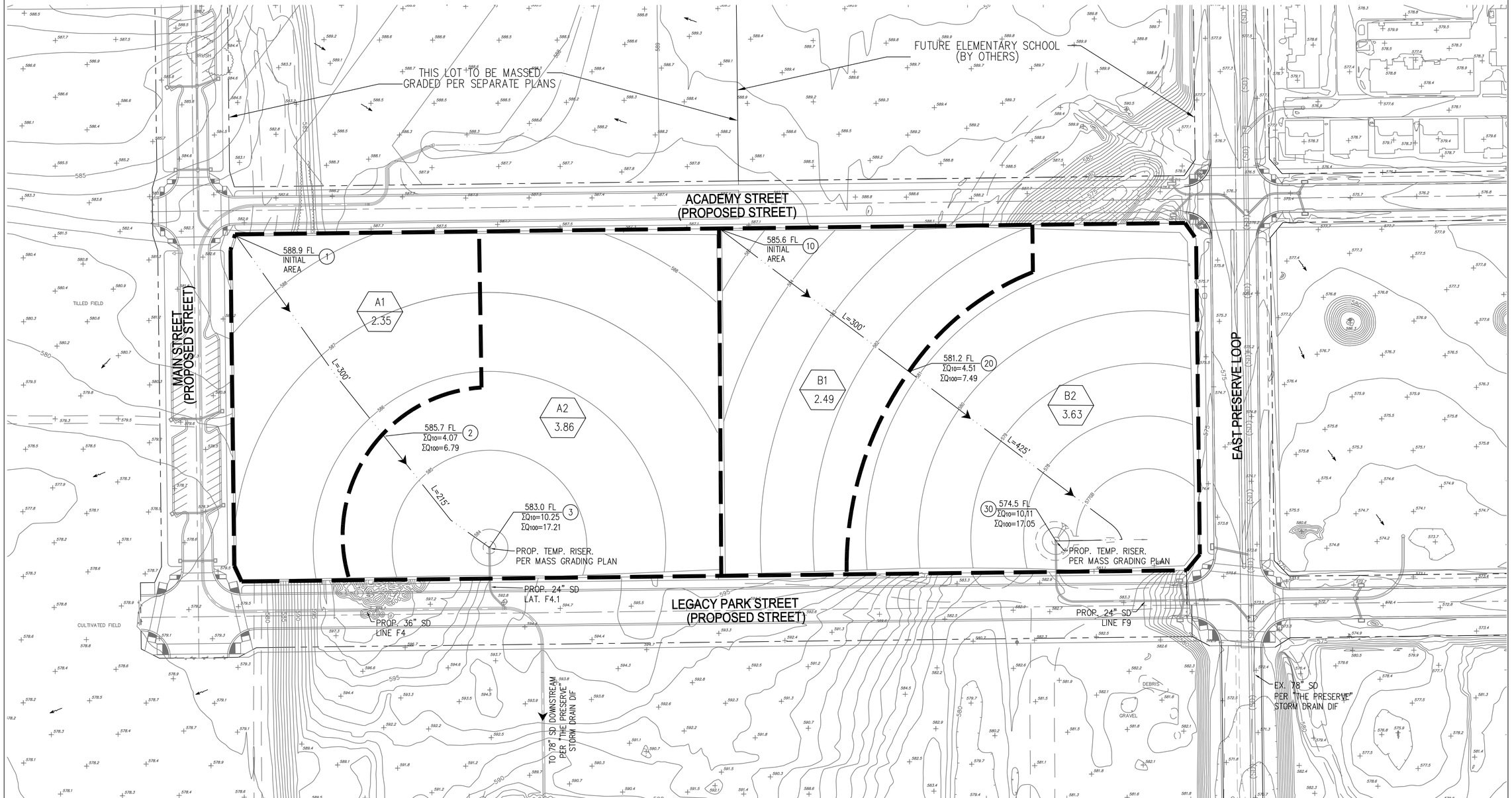
| NO.: | REVISION: | DATE: |
|---|---|---|
| | | |

PROJECT:
**CHINO RENTAL NEIGHBORHOOD**
**SWC ACADEMY & E PRESERVE LOOP**
**CHINO, CA**

DRAWING NAME:
# PROPOSED LID BMP

| | |
|---|---|
| ISSUE: | SWPPP |
| DATE: | 12/04/2019 |
| CHECKED: CM | DRAWN: NS |
| DRAWING FILE: | 19215SWPPP |
| PROJECT NO.: | 19-215 |
| SHEET NUMBER: | 1 |
| OF | 1 SHEETS |
| SCALE: | 1"=50' |

FILENAME: M:\2019\19-360 Lewis Chino Rental Neighborhood\WQMP\CAD\19-360 BMP Site Map.dwg, LAST SAVED ON: Oct 13 2020 1:13pm PLOTTED BY: YANG, ON: Oct 13 2020 1:29pm, CFG:




LEGEND:

- D1 / 0.73 AC — SUBAREA / ACREAGE
- 1 — NODE
- 1 $T_{10}$=10.21 / $Q_{10}$=9.11 / $Q_{100}$=15.21 — TIME OF CONCENTRATION IN MINUTES / RUNOFF FOR 10 YEAR STORM EVENT IN CFS / RUNOFF FOR 100 YEAR STORM EVENT IN CFS
- 849.0 FL — ELEVATION
- FLOW PATH
- SUBAREA BOUNDARY
- DRAINAGE AREA BOUNDARY

60' 0' 60' 120' 180'

GRAPHIC SCALE: 1"=60'

NOT FOR CONSTRUCTION


160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860

DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning

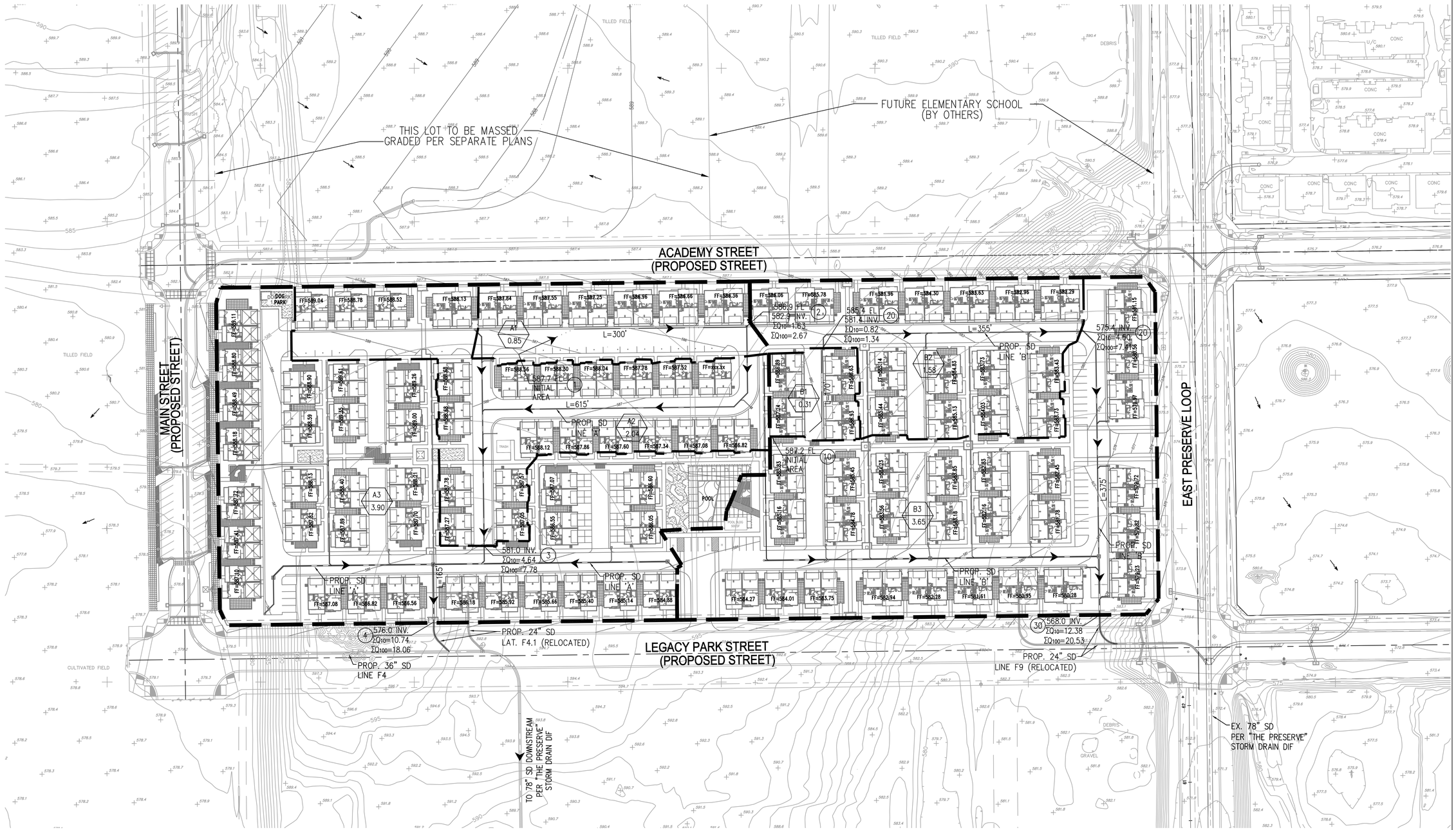

| NO.: | REVISION: | DATE: |
|---|---|---|
| | | |

PROJECT: **CHINO RENTAL NEIGHBORHOOD**
**SWC ACADEMY & E. PRESERVE LOOP**
**CHINO, CA**

DRAWING NAME: **HYDROLOGY MAP - EXISTING**

| | |
|---|---|
| ISSUE: | **CONCEPTUAL** |
| DATE: | **OCT. 2020** |
| CHECKED: **DRC** | DRAWN: **DRC** |
| DRAWING FILE: | **19360EXHM** |
| PROJECT NO.: | **19-360** |
| SHEET NUMBER: | **1** |
| OF | **1** SHEETS |
| SCALE: | **AS SHOWN** |

FILENAME: M:\2019\19-360 Lewis Chino Rental Neighborhood\HM\19360 hm ex.dwg, LAST SAVED ON: Oct 13 2020 9:28pm PLOTTED BY: YANG, ON: Oct 13 2020 9:40pm, CFC




LEGEND:

- D1 / 0.73 AC — SUBAREA / ACREAGE
- 1 — NODE
- 1 $T_{10}$=10.21 / $Q_{10}$=9.11 / $Q_{100}$=15.21 — TIME OF CONCENTRATION IN MINUTES / RUNOFF FOR 10 YEAR STORM EVENT IN CFS / RUNOFF FOR 100 YEAR STORM EVENT IN CFS
- 849.0 FL — ELEVATION
- FLOW PATH
- SUBAREA BOUNDARY
- DRAINAGE AREA BOUNDARY

60' 0' 60' 120' 180'

GRAPHIC SCALE: 1"=60'

NOT FOR CONSTRUCTION


DRC Engineering, Inc.
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714-685-6860


| NO.: | REVISION: | DATE: |
|---|---|---|
| | | |

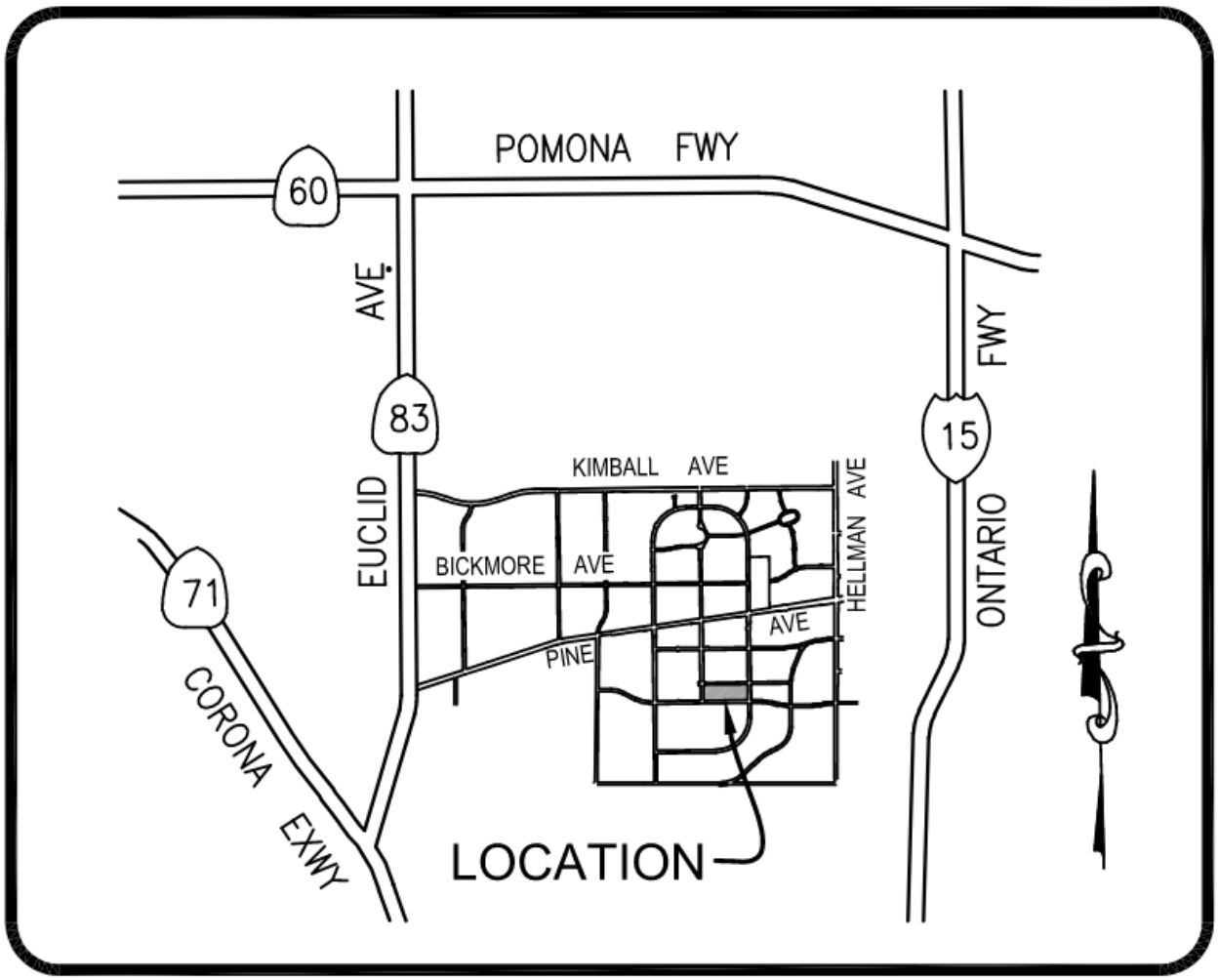
PROJECT: CHINO RENTAL NEIGHBORHOOD
SWC ACADEMY & E. PRESERVE LOOP
CHINO, CA

DRAWING NAME: HYDROLOGY MAP - PROPOSED

| | |
|---|---|
| ISSUE: | CONCEPTUAL |
| DATE: | OCT. 2020 |
| CHECKED: DRC | DRAWN: DRC |
| DRAWING FILE: | 19360PHM |
| PROJECT NO.: | 19-360 |
| SHEET NUMBER: | 1 |
| OF | 1 SHEETS |
| SCALE: | AS SHOWN |

FILENAME: M:\2019\19-360 Lewis Chino Rental Neighborhood\HM\19360 hm prop.dwg, LAST SAVED ON: Oct 13 2020 10:04pm PLOTTED BY: YANG, ON: Oct 13 2020 10:12pm, CFG:

# Vicinity Map



**NOAA Atlas 14, Volume 6, Version 2**
**Location name: Chino, California, USA***
**Latitude: 33.9573°, Longitude: -117.6199°**
**Elevation: 598.72 ft****
* source: ESRI Maps
** source: USGS

**POINT PRECIPITATION FREQUENCY ESTIMATES**

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

## PF tabular

**PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]**

| Duration | Average recurrence interval (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 |
| 5-min | 0.112 (0.093-0.135) | 0.147 (0.123-0.178) | 0.194 (0.162-0.236) | 0.233 (0.192-0.285) | 0.285 (0.227-0.362) | 0.327 (0.254-0.423) | 0.369 (0.280-0.490) | 0.413 (0.304-0.565) | 0.473 (0.334-0.677) | 0.521 (0.355-0.772) |
| 10-min | 0.160 (0.134-0.194) | 0.211 (0.176-0.256) | 0.278 (0.232-0.338) | 0.333 (0.275-0.408) | 0.409 (0.326-0.519) | 0.468 (0.365-0.607) | 0.529 (0.401-0.703) | 0.591 (0.436-0.810) | 0.678 (0.479-0.970) | 0.746 (0.508-1.11) |
| 15-min | 0.194 (0.162-0.234) | 0.255 (0.213-0.309) | 0.337 (0.280-0.409) | 0.403 (0.333-0.494) | 0.495 (0.394-0.627) | 0.566 (0.441-0.734) | 0.639 (0.485-0.850) | 0.715 (0.528-0.980) | 0.820 (0.579-1.17) | 0.902 (0.615-1.34) |
| 30-min | 0.283 (0.236-0.342) | 0.372 (0.311-0.451) | 0.491 (0.408-0.596) | 0.588 (0.485-0.720) | 0.721 (0.575-0.915) | 0.825 (0.643-1.07) | 0.932 (0.708-1.24) | 1.04 (0.769-1.43) | 1.20 (0.844-1.71) | 1.32 (0.896-1.95) |
| 60-min | 0.413 (0.345-0.500) | 0.545 (0.454-0.659) | 0.718 (0.597-0.871) | 0.860 (0.709-1.05) | 1.06 (0.840-1.34) | 1.21 (0.940-1.56) | 1.36 (1.03-1.81) | 1.53 (1.13-2.09) | 1.75 (1.23-2.50) | 1.92 (1.31-2.85) |
| 2-hr | 0.615 (0.514-0.743) | 0.807 (0.674-0.977) | 1.06 (0.881-1.29) | 1.26 (1.04-1.55) | 1.54 (1.23-1.95) | 1.75 (1.36-2.27) | 1.97 (1.49-2.61) | 2.19 (1.61-3.00) | 2.49 (1.76-3.56) | 2.72 (1.85-4.04) |
| 3-hr | 0.766 (0.640-0.926) | 1.01 (0.840-1.22) | 1.32 (1.10-1.60) | 1.57 (1.29-1.92) | 1.91 (1.52-2.42) | 2.16 (1.69-2.81) | 2.43 (1.84-3.23) | 2.70 (1.99-3.69) | 3.06 (2.16-4.38) | 3.34 (2.28-4.95) |
| 6-hr | 1.08 (0.899-1.30) | 1.41 (1.18-1.71) | 1.85 (1.54-2.25) | 2.20 (1.82-2.70) | 2.67 (2.13-3.39) | 3.03 (2.36-3.93) | 3.39 (2.58-4.51) | 3.76 (2.77-5.15) | 4.26 (3.01-6.09) | 4.64 (3.16-6.89) |
| 12-hr | 1.41 (1.17-1.70) | 1.86 (1.55-2.25) | 2.45 (2.04-2.98) | 2.92 (2.41-3.58) | 3.56 (2.84-4.51) | 4.04 (3.15-5.24) | 4.53 (3.44-6.03) | 5.03 (3.71-6.89) | 5.69 (4.02-8.15) | 6.21 (4.23-9.21) |
| 24-hr | 1.86 (1.64-2.14) | 2.49 (2.20-2.87) | 3.30 (2.91-3.83) | 3.96 (3.47-4.63) | 4.85 (4.11-5.85) | 5.53 (4.59-6.81) | 6.22 (5.04-7.83) | 6.92 (5.45-8.96) | 7.86 (5.95-10.6) | 8.59 (6.29-12.0) |
| 2-day | 2.26 (2.00-2.61) | 3.08 (2.72-3.55) | 4.14 (3.65-4.80) | 5.01 (4.38-5.85) | 6.20 (5.25-7.47) | 7.11 (5.90-8.75) | 8.05 (6.52-10.1) | 9.01 (7.10-11.7) | 10.3 (7.81-13.9) | 11.3 (8.30-15.8) |
| 3-day | 2.43 (2.15-2.80) | 3.34 (2.96-3.86) | 4.55 (4.01-5.27) | 5.55 (4.85-6.47) | 6.91 (5.85-8.33) | 7.97 (6.61-9.80) | 9.05 (7.33-11.4) | 10.2 (8.02-13.2) | 11.7 (8.88-15.8) | 13.0 (9.48-18.1) |
| 4-day | 2.63 (2.33-3.04) | 3.65 (3.22-4.21) | 4.99 (4.40-5.78) | 6.10 (5.34-7.12) | 7.63 (6.46-9.20) | 8.82 (7.31-10.8) | 10.0 (8.13-12.6) | 11.3 (8.91-14.6) | 13.1 (9.89-17.6) | 14.4 (10.6-20.2) |
| 7-day | 3.03 (2.68-3.49) | 4.21 (3.72-4.86) | 5.77 (5.09-6.69) | 7.07 (6.18-8.25) | 8.86 (7.50-10.7) | 10.3 (8.51-12.6) | 11.7 (9.47-14.7) | 13.2 (10.4-17.1) | 15.3 (11.5-20.6) | 16.9 (12.4-23.6) |
| 10-day | 3.29 (2.91-3.79) | 4.57 (4.04-5.28) | 6.29 (5.55-7.29) | 7.72 (6.75-9.01) | 9.69 (8.21-11.7) | 11.2 (9.32-13.8) | 12.8 (10.4-16.2) | 14.5 (11.4-18.8) | 16.8 (12.7-22.7) | 18.6 (13.6-26.0) |
| 20-day | 3.92 (3.47-4.52) | 5.50 (4.86-6.35) | 7.64 (6.73-8.85) | 9.44 (8.25-11.0) | 12.0 (10.1-14.4) | 14.0 (11.6-17.2) | 16.1 (13.0-20.2) | 18.3 (14.4-23.7) | 21.4 (16.2-28.8) | 23.8 (17.4-33.3) |
| 30-day | 4.64 (4.11-5.35) | 6.52 (5.77-7.53) | 9.11 (8.03-10.5) | 11.3 (9.89-13.2) | 14.4 (12.2-17.4) | 16.9 (14.1-20.8) | 19.6 (15.9-24.7) | 22.4 (17.7-29.0) | 26.4 (20.0-35.6) | 29.7 (21.7-41.4) |
| 45-day | 5.49 (4.86-6.33) | 7.70 (6.81-8.89) | 10.8 (9.50-12.5) | 13.4 (11.7-15.7) | 17.3 (14.6-20.8) | 20.4 (16.9-25.1) | 23.7 (19.2-29.9) | 27.3 (21.5-35.4) | 32.5 (24.6-43.8) | 36.7 (26.9-51.2) |
| 60-day | 6.33 (5.60-7.30) | 8.83 (7.81-10.2) | 12.4 (10.9-14.3) | 15.4 (13.5-18.0) | 19.9 (16.8-24.0) | 23.6 (19.5-29.0) | 27.5 (22.3-34.7) | 31.8 (25.1-41.2) | 38.1 (28.8-51.3) | 43.3 (31.6-60.3) |

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

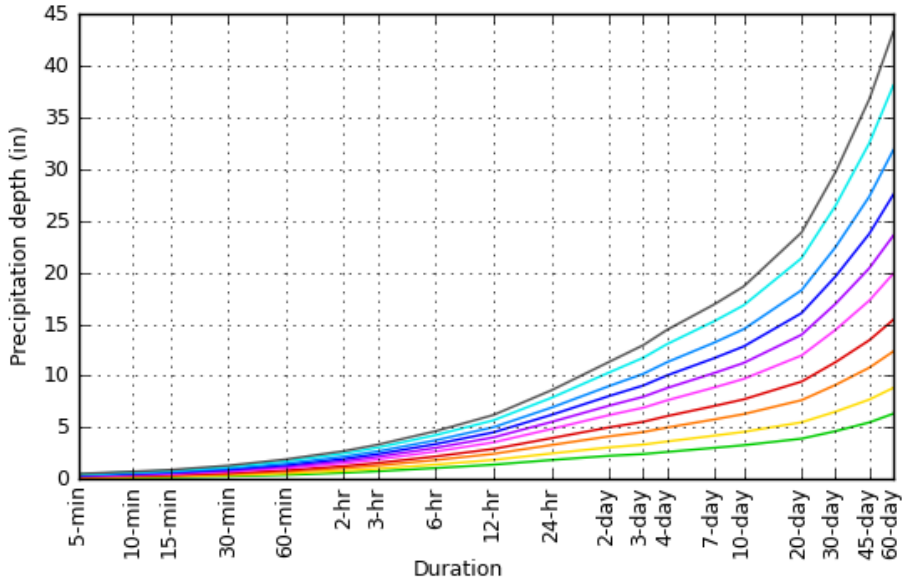
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

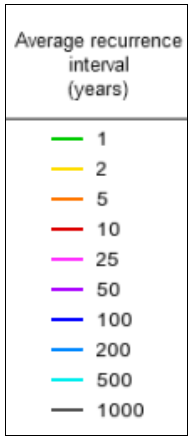
Please refer to NOAA Atlas 14 document for more information.

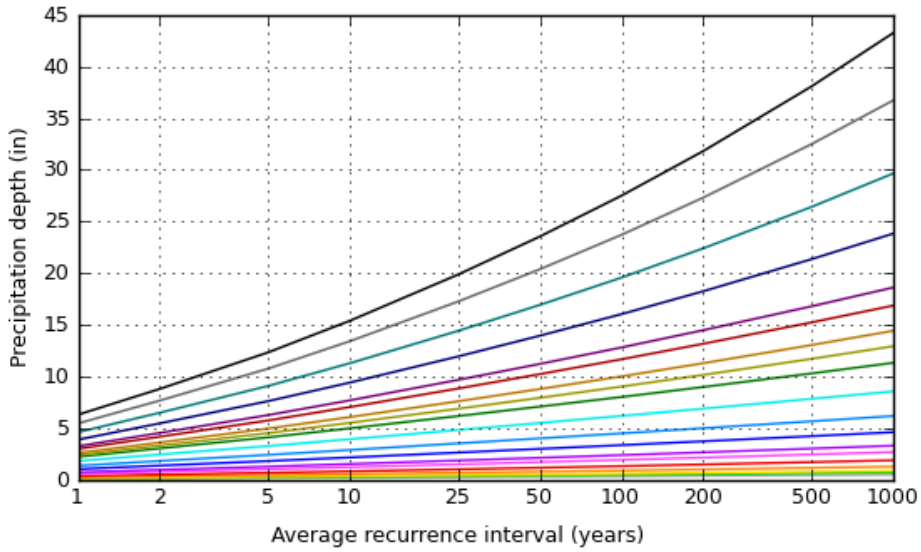
Back to Top

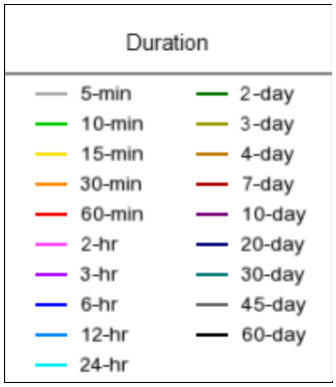
## PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 33.9573°, Longitude: -117.6199°



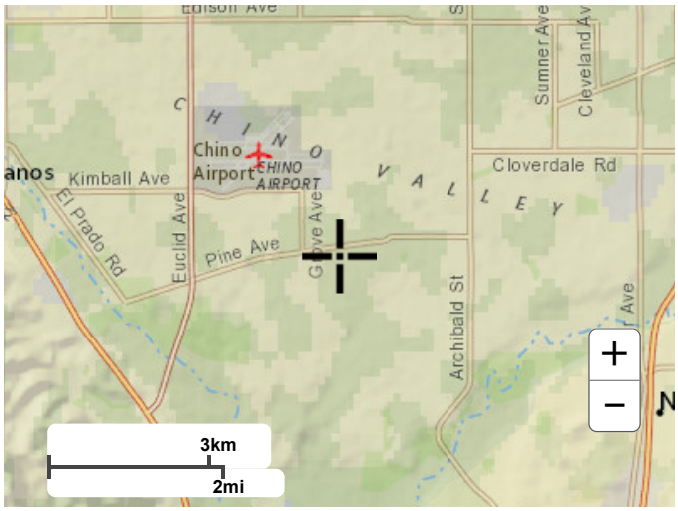




NOAA Atlas 14, Volume 6, Version 2 Created (GMT): Fri Dec 6 01:37:37 2019

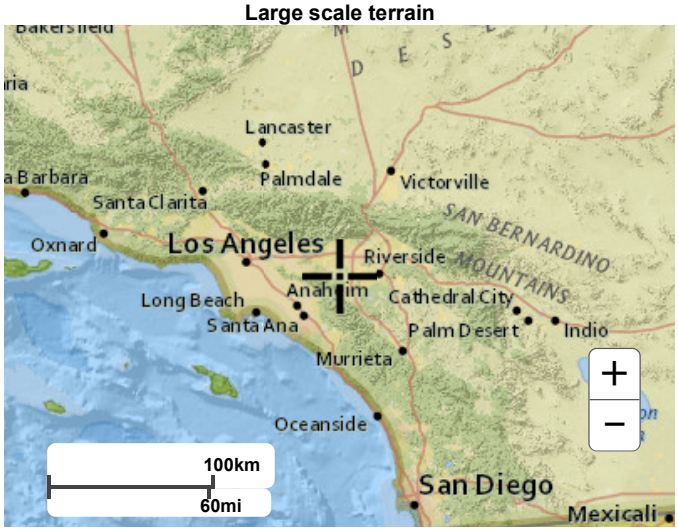
Back to Top

## Maps & aerials

**Small scale terrain**



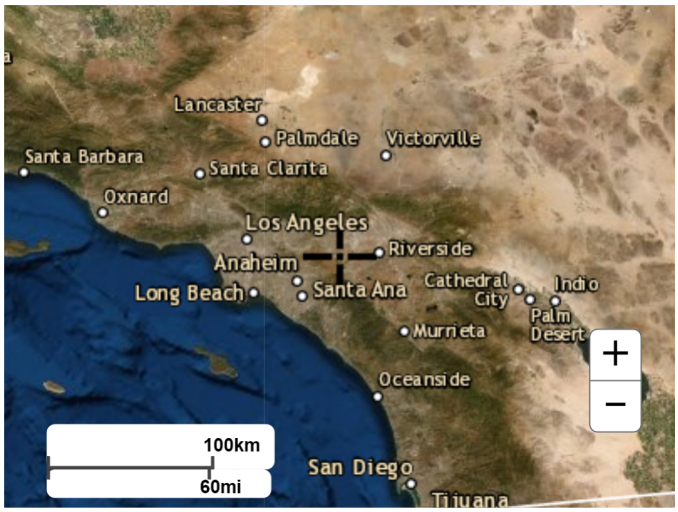

**Large scale terrain**




**Large scale map**




**Large scale aerial**

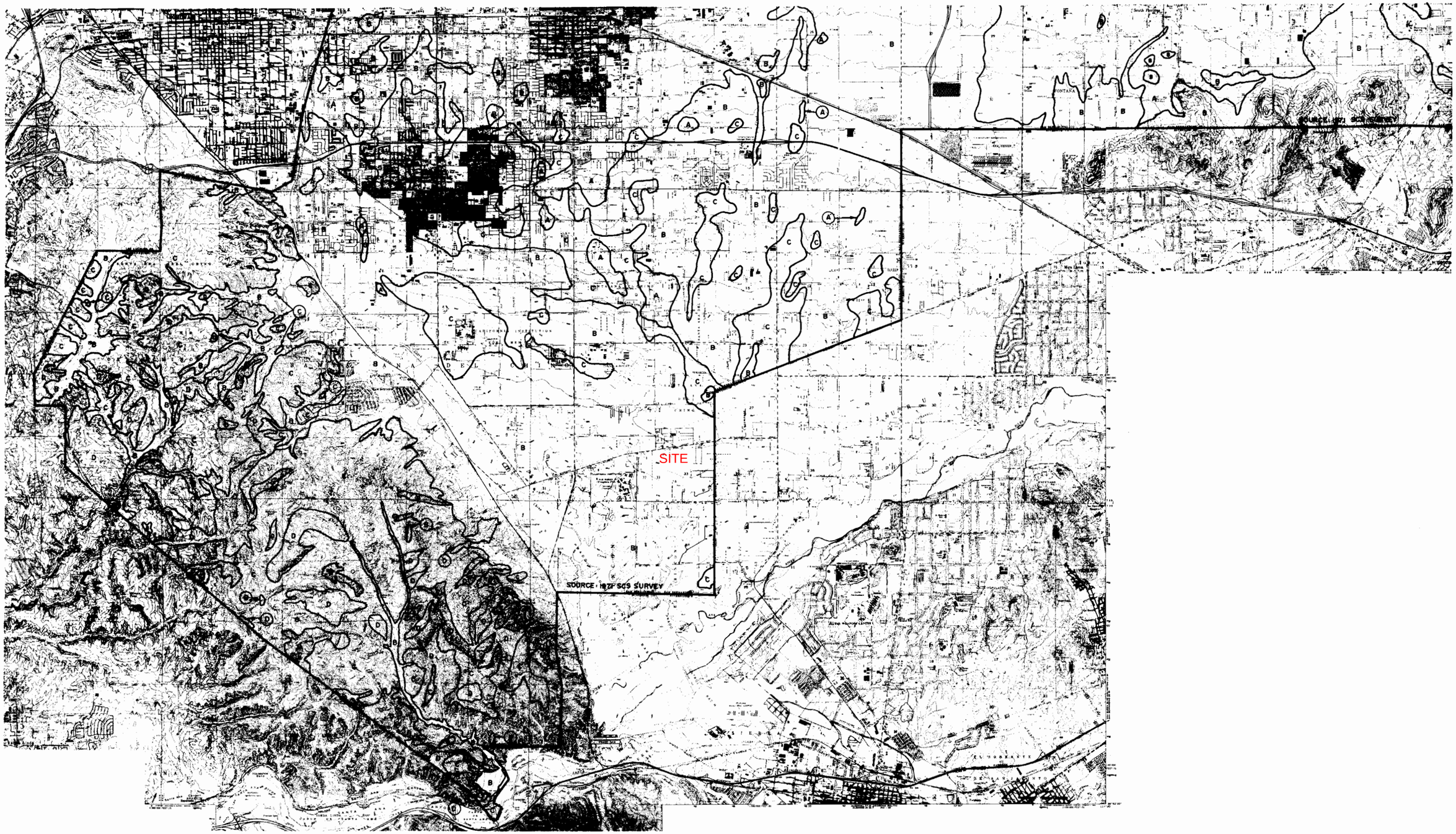



Back to Top

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer




**SAN BERNARDINO COUNTY**
HYDROLOGY MANUAL

**SCALE REDUCED BY 1/2**

HYDROLOGIC SOILS GROUP MAP
FOR
SOUTHWEST-C AREA



FIGURE C-15

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for San Bernardino County Southwestern Part, California




October 1, 2020

# Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# Contents

**Preface**.....2
**How Soil Surveys Are Made**.....5
**Soil Map**.....8
Soil Map.....9
Legend.....10
Map Unit Legend.....12
Map Unit Descriptions.....12
San Bernardino County Southwestern Part, California.....14
Cb—Chino silt loam.....14
CkA—Chualar clay loam, 0 to 2 percent slopes.....15

# How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

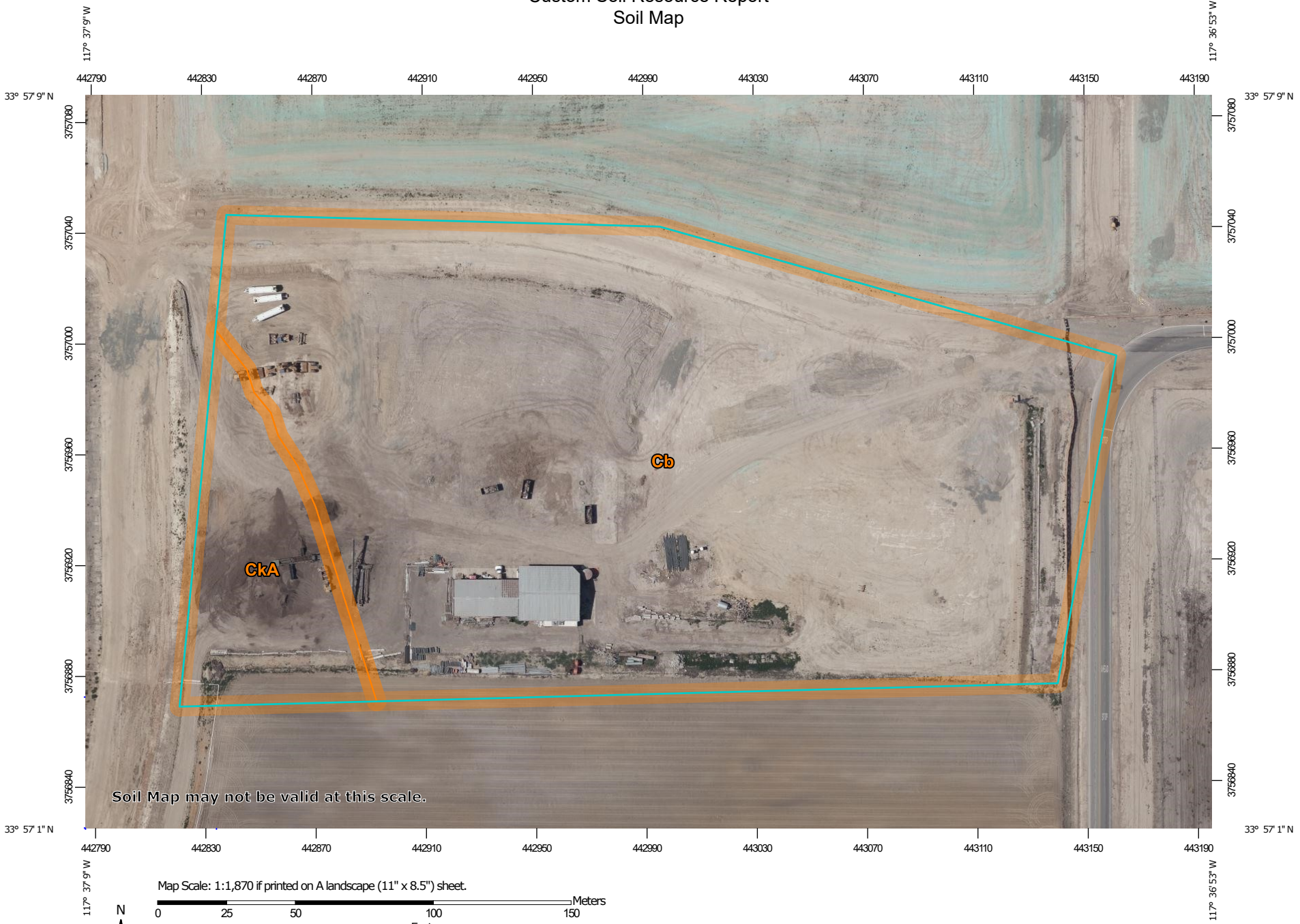
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report
## Soil Map




Map Scale: 1:1,870 if printed on A landscape (11" x 8.5") sheet.

N

0 25 50 100 150 Meters

0 50 100 200 300 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**
- Area of Interest (AOI)

**Soils**
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

**Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

**Water Features**
- Streams and Canals

**Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**
- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Bernardino County Southwestern Part, California
Survey Area Data: Version 12, May 27, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 10, 2018—Jun 5, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

## MAP LEGEND

## MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| Cb | Chino silt loam | 11.3 | 89.2% |
| CkA | Chualar clay loam, 0 to 2 percent slopes | 1.4 | 10.8% |
| **Totals for Area of Interest** | | **12.7** | **100.0%** |

# Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

# San Bernardino County Southwestern Part, California

## Cb—Chino silt loam

### Map Unit Setting

*National map unit symbol:* hcjg
*Elevation:* 20 to 3,100 feet
*Mean annual precipitation:* 8 to 20 inches
*Mean annual air temperature:* 61 to 64 degrees F
*Frost-free period:* 230 to 340 days
*Farmland classification:* Prime farmland if irrigated

### Map Unit Composition

*Chino and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Chino

#### Setting

*Landform:* Basin floors, flood plains
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from mixed

#### Typical profile

*H1 - 0 to 16 inches:* silt loam
*H2 - 16 to 60 inches:* silty clay loam

#### Properties and qualities

*Slope:* 0 to 2 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Somewhat poorly drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* Rare
*Frequency of ponding:* Rare
*Calcium carbonate, maximum content:* 10 percent
*Maximum salinity:* Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
*Sodium adsorption ratio, maximum:* 5.0
*Available water capacity:* High (about 11.2 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 1
*Land capability classification (nonirrigated):* 3e
*Hydrologic Soil Group:* C
*Hydric soil rating:* No

### Minor Components

#### Merrill, silt loam

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

**Unnamed**

*Percent of map unit:* 5 percent
*Landform:* Fan remnants
*Hydric soil rating:* Yes

**Hanford**

*Percent of map unit:* 5 percent
*Hydric soil rating:* No

## CkA—Chualar clay loam, 0 to 2 percent slopes

**Map Unit Setting**

*National map unit symbol:* hcjh
*Elevation:* 600 to 1,100 feet
*Mean annual precipitation:* 12 to 16 inches
*Mean annual air temperature:* 63 degrees F
*Frost-free period:* 230 to 300 days
*Farmland classification:* Prime farmland if irrigated

**Map Unit Composition**

*Chualar and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Chualar**

**Setting**

*Landform:* Alluvial fans
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from mixed

**Typical profile**

*H1 - 0 to 11 inches:* clay loam
*H2 - 11 to 36 inches:* clay loam
*H3 - 36 to 67 inches:* loam

**Properties and qualities**

*Slope:* 0 to 2 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Well drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 10 percent
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Available water capacity:* High (about 10.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 1
*Land capability classification (nonirrigated):* 3c
*Hydrologic Soil Group:* C
*Hydric soil rating:* No

**Minor Components**

**Chino, silt loam**

*Percent of map unit:* 5 percent
*Hydric soil rating:* No

**Hanford**

*Percent of map unit:* 5 percent
*Hydric soil rating:* No

**Sorrento, clay loam**

*Percent of map unit:* 3 percent
*Hydric soil rating:* No

**Unnamed**

*Percent of map unit:* 2 percent
*Landform:* Fan remnants
*Hydric soil rating:* Yes

# Appendix B

## Alternative Compliance Materials

Revised: 04/28/10

E:\400-499\481\0481-031\DIF Exhibits\StormDIF_011117.dwg, Plotted: Jan 10, 2017 - 9:20am

JN 48131 Lewis Operating Corp

L.D. KING, INC.
2151 CONVENTION CENTER WAY
SUITE 100B
ONTARIO, CA 91764
(909) 937-0200

Water Quality & Detention Basin
Water Quality & Detention Basin
4'x42' RCB
54" Line D 54" 54"
78" 60"
24" 24" 24" 24" 24" 36" 78" 54"
30" 48" 60" 36" 24" 84"
36" 72" 72" 36" 48" 96"
78" 6' x 16' RCB
Line I
20'x5' RCB
Line J
9'x46' Trapzoidal Earth Channel
36" 72" 78" 72" Line E 24"
42" 48"
Water Quality Basin
Detention Basin
10'x60' TEC
36" 54" 36" 36" 48"
Line H 96" 48" 36" 72" 84" 84" Line C 60" 36"
Detention Basin
Detention Basin
Line B 96"
Detention Basin
4' x 36' RCB
54" 48" 30" 24" 60"
20'x5' RCB 102" 54" 10'x60' TEC
SITE
42" 66" 36"
48" 54" 48" 96"
Receiving Waters
Receiving Waters
48" 48" 60" 54" 48" Line F 78"
Line G 54" 54" 60" 54" 60" 24"
Diversion Structure
Diversion Structure
60" Water Quality Basin 66" 90" 66" 90" 42" MCW Forebay
Diversion Structure
30" 48" 96" Mill Creek
36" 5'x35' TEC
MCW Water Quality Basin
Water Quality Basin
Diversion Structure
Mill Creek Wetlands

LEGEND

EXISTING
FUTURE

PRADO BASIN

# "The Preserve"
# STORM DRAIN DIF

November 14, 2016

Al C. Boling
City Manager
City of Ontario
303 East "B" Street
Ontario, CA 91764-4105

**APPROVAL TO ADD THE CUCAMONGA CREEK WATERSHED REGIONAL WATER QUALITY PROJECT (MILL CREEK WETLANDS) AS A REGIONAL BEST MANAGEMENT PRACTICE (BMP) TO THE SAN BERNARDINO COUNTY WATERSHED ACTION PLAN FOR DESIGN CAPTURE VOLUME**

Dear Mr. Boling:

On August 12, 2014, I issued a letter approving the Mill Creek Wetlands (MCW) as a regional BMP to address hydraulic conditions of concern (HCOC) potentially caused by certain new developments proposed in the cities of Ontario and Chino. The August 12, 2014 letter did not approve the MCW as satisfying requirements for low-impact development (LID) structural treatment controls for those new developments according to Provision XI.E.4 of the *Waste Discharge Requirements for the San Bernardino County Flood Control District, the County of San Bernardino, and the Incorporated Cities of San Bernardino County within the Santa Ana Region, Area-Wide Urban Storm Water Runoff Management Program*, Order No. R8-2010-0036, NPDES Permit No. CAS618036 (MS4 Permit). These requests for approvals were submitted by the City of Ontario in a letter dated October 2, 2013 in accordance with Provision XI.B.3.b.vi. of the MS4 Permit.

On June 20, 2016, the City of Ontario submitted another request that the Regional Board approve Mill Creek Wetlands as a regional LID structural treatment control for certain new developments in the cities of Ontario and Chino. This second request included new treatment control performance information collected, in part, to satisfy Performance and Bioassessment Monitoring and Reporting requirements under the State Water Resources Control Board (State Board) and Department of Water Resources (DWR) grants. The new information is contained in the technical report, *Water Quality Performance of Mill Creek Wetlands, Technical Documentation Validating Alternative Compliance for Treatment Control*, prepared by Geosyntec Consultants and dated May 2016 (Technical Documentation).

After careful consideration of the City's request, the Technical Documentation, and subsequent discussions between new development project proponent representatives and Regional Board staff, I am hereby approving the use of MCW for use as a regional LID structural treatment control best management practice (BMP) for certain new developments in the cities of Ontario and Chino. This approval is issued pursuant to the

authority contained in Provisions XI.B, XI.E.4, XI.E.9, XI.E.10, XI.G, XI.LXX.F and other applicable portions of the MS4 Permit and in Resolution No. R8-2010-0037. Consequently, those projects within the subject 3,000 acres of the 4,000 acre New Model Colony (NMC) and Chino Preserve (CP) developments who are authorized by the cities to use its Design Capture Volume do not have to disprove the feasibility of on-site LID structural treatment controls in order to discharge into the Mill Creek Wetlands.

The background, scope, and limitations of this approval are as follows:

I. Background

The Mill Creek Wetlands (MCW) are located near the southeast corner of Chino-Corona Road and East County Road in the City of Chino in San Bernardino County. The MCW are located along Mill Creek/Cucamonga Creek, upstream of Prado Dam in the Santa Ana River Basin. Cucamonga Creek, along with the upstream County Line Channel, convey urban runoff and treated wastewater from an approximate 77 square mile watershed that includes the cities of Ontario, Chino, Rancho Cucamonga and Upland in San Bernardino County and the city of Eastvale in Riverside County.

Cucamonga Creek and the upstream County Line Channel are engineered, hardened, and regularly-maintained channels. South of the Hellman Avenue Bridge and north of Chino Corona Road, Cucamonga Creek transitions to a rip-rap lined channel. The name of the creek changes to Mill Creek at this location. Mill Creek continues in a southwesterly direction as a vegetated unlined channel, until it's confluence with the Santa Ana River within Prado Basin.

The following reaches are tributary to the Mill Creek Wetlands and are on the Clean Water Act Section 303(d) list of impaired waters[1] for the specified pollutants of concern (POCs):

- Cucamonga Creek Reach 1 (Valley Ranch) is listed as impaired for metals (cadmium, copper, lead and zinc) and *Coliform Bacteria*.
- Mill Creek (Prado Area) is listed as impaired for nutrients, pathogens, and Total Suspended Solids (TSS).
- Middle Santa Ana River, Reach 3, is listed as impaired for metals (copper and lead) and Pathogens.

A small portion of flow from the entire 77 square mile watershed in Cucamonga Creek is allowed to flow past the diversion structure to maintain downstream wildlife habitat and other in-stream beneficial uses. The remaining flow is diverted to the Mill Creek Wetlands where it is routed through a series of cascading basins that combine

[1] 2010 California 303(d) list of Water Quality Limited Segments (category 5), US EPA Final Approval: October 11,2011 http://www.waterboards.ca.gov/water_issues/programs/tmdl/2010state_ir_reports/category5_report.shtml

constructed wetlands and wet extended detention basin treatment features prior to returning treated flows back to Mill Creek at a location 0.67 mile downstream of the diversion.[2]

Geosyntec's Technical Documentation indicates that:

- During wet weather, some pollutants in the Design Capture Volume (DCV) (2-year, 24-hour storm runoff) are removed in structural treatment controls located in the 4,000 acres of new development area as depicted in Figure 1. The DCV and other runoff are then discharged to Cucamonga Creek and the upstream County Line Channel where they comingle with runoff from the remainder of the watershed. The amount of runoff diverted from Cucamonga Creek to the MCW is the equivalent volume of the DCV from 3,000 acres of new residential development. Consequently, MCW does not treat the entire DCV from the 4,000 acres of new development. The comingled flow entering the MCW does not likely have the same characteristics as the original DCV leaving the new development sites.

- During dry-weather conditions, Cucamonga Channel typically has flow for diversion into the MCW which is composed of nuisance flow from urban areas in the watershed and waste water treatment plant discharges. Therefore, the MCW will continuously be treating flows. Because the MCW treats greater dry-weather volumes, it is expected to provide greater long-term capture of urban runoff volume and greater pollutant load reductions than on-site treatment systems.

- Due to modern landscaping practices and other source and the site design controls, new development projects are expected to generate little to no dry-weather runoff. The installation of nutrient separating baffle boxes and Contech CDS hydrodynamic separator units as required by the NMC WQMP satisfies the onsite source control and pre-treatment requirements of the applicable MS4 Permit. Also, in accordance with the NMC Water Quality Management Plan, on-site LID structural treatment control BMPs will be placed to treat any flow from commercial and industrial projects within the NMC and CP developments prior to reaching waters of the U.S., as depicted in Figure 1.

- The MCW has also been constructed ahead of the completion of the new development projects for which it has been sized. Therefore, additional reductions in pollutant loads from existing development have been achieved by the MCW with year-round capacity.

The Phase I MS4 permit (R8-2010-0036) for San Bernardino County has the following requirements that have been considered as part of this approval:

1. Section XI.B.3.b.vi lists information required for approval of regional treatment control BMPs. This list includes the demonstration of the BMPs effectiveness in reducing the target Pollutants of Concern (POCs).

[2] Geosyntec, Cucamonga Creek Watershed Regional Water Quality Project (Mill Creek Wetlands) Water Quality Design Report, Revision 2: August 13, 2012, Section 2.1

2. Section XI.D.7 states that "pollutant removal should be accomplished prior to discharge to Waters of the U.S. Regional treatment control BMPs shall be completed and operational prior to occupation of any of the priority project sites tributary to the regional treatment BMP."

3. Sections XI.E.4, XI.E.9 and XI.E.10 address the WQMP, alternatives to onsite compliance and the Executive Officer's approval authority.
4. Section XI.G.3. of the MS4 Permit reflects the Regional Board's intent to provide an alternative integrated approach to project-level analysis for new development projects and the Executive Officer's authority to approve such approaches.

5. Section XI.L of the MS4 Permit notes the Regional Board's recognition that full implementation of all permit requirements may not be feasible for certain projects which have received tentative tract or parcel map or other approvals prior to the approval of the updated WQMP."

6. Section XX.F provided that upon "approval by the Executive Officer or the Regional Board, all plans, reports and subsequent amendments required by this Order shall be implemented and shall become an enforceable part of this Order."

In addition, the Phase I MS4 Permit (R8-2002-0012) for San Bernardino County, that was effective at the time of the development of MCW, has the following relevant requirements:

1. Section XII.B.2 of the MS4 Permit provides that "[t]he permittees are encouraged to include in the WQMP the development and implementation of regional and/or watershed management programs that address runoff from new development and significant re-development."

2. Section XII.B.2 of the MS4 Permit further provides that "[t]he goal of the WQMP is to develop and implement programs and policies to minimize the effects of urbanization on site hydrology, urban runoff flow rates or velocities and pollutant loads. This goal may be achieved through watershed-based structural treatment controls, in combination with site-specific BMPs."

II. Scope

The MCW is hereby approved as a regional structural LID treatment control for 3,000 acres within the 4,000 acre New Model Colony (NMC) and Chino Preserve (CP) developments. This acreage includes part of the New Model Colony - East within the City of Ontario, as well as a portion of Planning Area B and all of Planning Areas F & G of the Chino Preserve within the City of Chino. An additional 1,000 acres of the NMC and CP developments may be approved subsequent to expansion of the Mill Creek Wetlands. This expansion is not within the scope of this approval letter.

This letter also confirms that the portion of this 3,000 acre area covered by the approved NMC Water Quality Management Plan satisfies the requirements of Provision XI.L of the MS4 Permit, subject to the conditions of this letter.

Based on a July 11, 2016 telephone conversation with Scott Crawford with Lewis Management, it is Regional Board staff's understanding that only a certain percentage of each Specific Plan area (i.e., all of the colored areas shown in Figure 1), and not the entire New Model Colony-East, will be captured and treated by the Mill Creek Wetlands. The exact acreage depends on the allocation described in a construction agreement between each developer and the New Model Colony Builders, LLC. Roughly, the allocation will be 2,000 acres for New Model Colony-East, 500 acres for streets and parkways, and 500 acres for portions of the Chino Preserve. The City of Ontario will be responsible for keeping track of the number of the acres allotted to each developer to ensure no more than 3,000 acres of new development claims the use of the MCW's Design Capture Volume to meet the projects' obligations for treating urban runoff using LID structural treatment controls.

III. Limitations

Based on the above, the Cities of Ontario and Chino are authorized to consider the Mill Creek Wetlands as an off-site Regional Treatment Facility for 3,000 of the 4,000 acre new development project discussed above. The MCW is approved for use as a regional LID structural treatment control to remove pollutants from the Design Capture Volume produced by those projects in addition to addressing Hydrologic Conditions of Concern, not to exceed the MCW's design capacity. Please be aware of the following requirements specified in the permit or grant documents[3]:

1) Unless projects are confirmed in accordance with this letter as being within the 3,000 acres, the cities of Ontario and Chino must continue to ensure that projects within the footprint of the New Development meet onsite source control pre-treatment prior to discharging into Waters of the U.S. for the 24 hour, 85th percentile storm event design capture volume and other applicable requirements of the MS4 Permit (Section XI.D.6). The cities of Ontario and Chino must continue to ensure that projects outside the 3,000 acres within the New Development satisfy or have satisfied these requirements through properly approved Water Quality Management Plans under the MS4 Permit.

2) If the monitoring data and performance assessment submitted as part of the reporting requirements in the monitoring program do not continue to demonstrate regional water quality benefits the City must re-evaluate the Mill Creek Wetland's designation as a Regional Treatment BMP in the WAP (Section XI.D.7).

3) The City is obligated to monitor water quality in Cucamonga Creek and influent and effluent flows to and from Mill Creek Wetlands to validate the Wetland's wet and dry-weather performance. The City must report this as part of BMP performance assessment. The City shall also track and provide a summary of the number of acres, name of the developers, as well as an updated tract map showing the new

[3] This is not a comprehensive list and the actual permit and grant documents should be reviewed for additional requirements.

development areas that have received approval to discharge into the Mill Creek Wetlands. The above information shall be provided in the City's annual report required under the MS4 Permit at a minimum until after the first reporting period following completion of construction and storm drain connections for the 3,000 acre development (Section XI.G.3).

4) Monitoring will be conducted according to the Mill Creek Wetlands Regional Monitoring Program (RMP) consistent with the grant agreements and regulatory permits issued by various agencies for this project. The Bioassessment Monitoring specified in the RMP does not include monitoring for benthic macroinvertebrates. Therefore, in addition to the Bioassessment Monitoring in the RMP, please implement bioassessment monitoring and reporting consistent with the Methods for Conducting Bioassessments in Freshwater Streams and Rivers as described in the State Water Resources Control Board (SWRCB) website[4]. This methodology is consistent with the regional bioassessment monitoring procedures being conducted pursuant to the MS4 permit (Section II.T.5).

5) Section XI.B.3.b.vi of the MS4 Permit requires that BMP effectiveness monitoring and other design and operation maintenance information be included for all regional treatment control BMPs that are submitted for Regional Board approval. Approved regional BMPs must demonstrate effectiveness in reducing the target Pollutants of Concern. If the monitoring data and performance assessment submitted as part of the reporting requirements in the RMP and as specified in this letter do not continue to demonstrate regional water quality benefits the City must re-evaluate the Mill Creek Wetland's designation as a Regional Treatment BMP in the WAP.

6) Please submit the monitoring results and performance assessment as part of the City of Ontario's Annual Report according to the MS4 Permit (Section VII.E.7). Within 30 days of completion of all the required Performance and Bioassessment Monitoring and Reporting required under the State Water Resources Control Board (SWRCB) and Department of Water Resources (DWR) grants, the City must propose a revised monitoring and reporting plan and describe the basis for the revision. At a minimum, post-grant monitoring shall provide information on long term BMP effectiveness, demonstrate regional benefits and/or determine need for operational adjustment

[4] Collecting Benthic Macroinvertebrate Samples & Associated Physical and Chemical Data for Ambient Bioassessments in California - Standard Operating Procedures Manual - February 2007; http://www. waterboards.ca.gov/water issues/programs/swamp/docs/swamp sop bio.pdf.

If you have any questions, please contact Adam Fischer at afischer@waterboards.ca.gov, 951-320-6363 or Keith Elliott at kelliott@waterboards.ca.gov 951-782-4925.

Sincerely,

Kurt V. Berchtold
Executive Officer
Santa Ana Regional Water Quality Control Board

Enclosure: Figure 1, New Model Colony (East) Diagram
Figure 2, Water Quality Overall Drainage Areas - Chino

cc: Mathew Ballantyne, Chino City Manager, mballantyne@cityofchino.org
Louis Abi-younes, Ontario City Engieer; labi-younes@ontarioca.gov
Shawn Haggerty, Best Best & Krieger; Shawn.Hagerty@bbklaw.com
Scott Crawford; Lewis Management Corp. scott.crawford@lewismc.com

# Section 6.2

## Electronic Data Submittal

# Section 6.3

## Post Construction

AND WHEN RECORDED MAIL TO

City Clerk
City of Chino
P.O. Box 667
Chino, CA 91708

SPACE ABOVE THIS LINE FOR RECORDER'S USE

# WATER QUALITY MANAGEMENT PLAN AND STORMWATER BMP TRANSFER, ACCESS AND MAINTENANCE AGREEMENT

## CITY OF CHINO, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA

This Agreement is made and entered into this _____ day of _____, 20___, by and between the CITY OF CHINO, a municipal corporation, hereinafter referred to as CITY, and _____ hereinafter referred to as OWNER.

WHEREAS, the Owner is the legal property owner of the real property situated in the State of California, County of San Bernardino, located at _____ in the City of Chino, more commonly referred to as San Bernardino County Tax Assessor Parcel No._____ described in Exhibit A and depicted in Exhibit B attached hereto and incorporated herein by this reference; and

WHEREAS, at the time of initial approval of the development project known as _____ within the Property described herein, the City required the project to employ Best Management Practices, hereinafter referred to as "BMPs, " to minimize pollutants in urban runoff; and

WHEREAS, the Owner has chosen to install and/or implement BMPs as described in the Water Quality Management Plan, on file with the City, hereinafter referred to as "WQMP," to minimize pollutants in urban runoff and to minimize other adverse impacts of urban runoff; and

WHEREAS, said WQMP has been certified by the Owner and reviewed and approved by the City; and

WHEREAS, said BMPs, with installation and/or implementation on private property and draining only private property, are part of a private facility with all maintenance or replacement therefore, the sole responsibility of the Owner in accordance with the terms of this Agreement;

WHEREAS, the Owner is aware that periodic and continuous maintenance, including, but not necessarily limited to, filter material replacement and sediment removal, is required to assure peak performance of all BMPs in the WQMP and that, furthermore, such maintenance activity will require compliance with all Local, State, or Federal laws and regulations, including those pertaining to confined space and waste disposal methods, in effect at the time such maintenance occurs;

NOW THEREFORE, it is mutually stipulated and agreed as follows:

1. The Owner hereby provides the City or the City's designee complete access, of any duration, to the BMPs and their immediate vicinity at any time, upon reasonable notice, or in the event of emergency, as determined by City's Director of Public Works with no advance notice, for the purpose of inspection, sampling, testing of the BMPs, and in case of emergency, to undertake all necessary repairs or other preventative measures at the owner's expense as provided in paragraph 3 below. The City shall make every effort at all times to minimize or avoid interference with the Owner's use of the Property.

2. The Owner shall use its best efforts diligently to maintain all BMPs in a manner assuring peak performance at all times. All reasonable precautions shall be exercised by the Owner and the Owner's representative or contractor in the removal and extraction of any material(s) from the BMPs and the ultimate disposal of the material(s) in a manner consistent with all relevant laws and regulations in effect at the time. As may be requested from time to time by the City, the Owner shall provide the City with documentation identifying the material(s) removed, the quantity, and disposal destination.

3. In the event the Owner, or its successors or assigns, fails to accomplish the necessary maintenance contemplated by this Agreement, within five (5) days of being given written notice by the City, the City is hereby authorized to cause any maintenance necessary to be done and charge the entire cost and expense to the Owner or the Owner's successors or assigns, including administrative costs, attorneys fees and interest thereon at the maximum rate authorized by the Civil Code from the date of the notice of expense until paid in full.

4. The City may require the Owner to post security in form and for a time period satisfactory to the City to guarantee the performance of the obligations stated herein. Should the Owner fail to perform the obligations under this Agreement, the City may, in the case of a cash bond, act for the Owner using the proceeds from it, or in the case of a surety bond, require the sureties to perform the obligations of this Agreement. As an additional remedy, the Director may withdraw any previous stormwater-related approval with respect to the property on which BMPs have been installed and/or implemented until such time as the Owner repays to the City its reasonable costs incurred in accordance with paragraph 3 above.

5. This Agreement shall be recorded in the Office of the Recorder of San Bernardino County, California, at the expense of the Owner and shall constitute notice to all successors and assigns of the title to said Property of the obligation herein set forth, and also a lien in such amount as will fully reimburse the City, including interest as herein above set forth, subject to foreclosure in event of default in payment.

6. In event of legal action occasioned by any default or action of the Owner, or its successors or assigns, then the Owner and its successors or assigns agree(s) to pay all costs incurred by the City in enforcing the terms of this Agreement, including reasonable attorney's fees and costs, and that the same shall become a part of the lien against said Property.

7. It is the intent of the parties hereto that burdens and benefits herein undertaken shall constitute covenants that run with said Property and constitute a lien against the Property.

8. The obligations herein undertaken shall be binding upon the heirs, successors, executors, administrators and assigns of the parties hereto. The term "Owner" shall include not only the present Owner, but also its heirs, successors, executors, administrators, and assigns. The Owner shall notify any successor to title of all or part of the Property about the existence of this Agreement. The Owner shall provide such notice prior to such successor obtaining an interest in all or part of the Property. The Owner shall provide a copy of such notice to the City at the same time such notice is provided to the successor.

9. Time is of the essence in the performance of this Agreement.

10. Any notice to a party required or called for in this Agreement shall be served in person, or by deposit in the U.S. Mail, first class postage prepaid, to the address set forth below. Notice(s) shall be deemed effective upon receipt, or seventy-two (72) hours after deposit in the U.S. Mail, whichever is earlier. A party may change a notice address only by providing written notice thereof to the other party.

| IF TO CITY: | IF TO OWNER: |
|---|---|
| Amer Jakher | |
| Director of Public Works | |
| 13220 Central Avenue | |
| Chino, CA 91710 | |

IN WITNESS THEREOF, the parties hereto have affixed their signatures as of the date first written above.

APPROVED AS TO FORM:

By: (Signature Not Required)
City Attorney

City of Chino

By: _____
Matthew C. Ballantyne
City Manager

ATTEST:

_____
Angela Robles, City Clerk

APPROVED AS TO CONTENT:

By: _____
Amer Jakher
Director of Public Works
City of Chino

Owner: _____
*(Company)*

By: _____
*(Signature and Date)*

Name: _____
*(Please Print or Type Name)*

Title: _____
*(Please Print or Type Title)*

**NOTE: OWNER'S SIGNATURE MUST BE NOTARIZED FOR RECORDATION**

# Section 6.4

## Other Supporting Material

# Appendix C

## Education Materials, BMP Fact Sheets

- ✓ Facility map of the locations of industrial materials;
- ✓ Notification and evacuation procedures;
- ✓ Cleanup instructions;
- ✓ Identification of responsible departments; and
- ✓ Identify key spill response personnel.

- ☐ Recycle, reclaim, or reuse materials whenever possible. This will reduce the amount of process materials that are brought into the facility.



### *Spill and Leak Prevention and Response*

*Spill Prevention*

- ☐ Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- ☐ If illegal dumping is observed at the facility:

  - ✓ Post "No Dumping" signs with a phone number for reporting illegal dumping and disposal. Signs should also indicate fines and penalties applicable for illegal dumping.
  - ✓ Landscaping and beautification efforts may also discourage illegal dumping.
  - ✓ Bright lighting and/or entrance barriers may also be needed to discourage illegal dumping.

- ☐ Store and contain liquid materials in such a manner that if the container is ruptured, the contents will not discharge, flow, or be washed into the storm drainage system, surface waters, or groundwater.

- ☐ If the liquid is oil, gas, or other material that separates from and floats on water, install a spill control device (such as a tee section) in the catch basins that collects runoff from the storage tank area.



### *Preventative Maintenance*

- ☐ Place drip pans or absorbent materials beneath all mounted taps, and at all potential drip and spill locations during filling and unloading of tanks. Any collected liquids or soiled absorbent materials must be reused/recycled or properly disposed.

- ☐ Store and maintain appropriate spill cleanup materials in a location known to all near the tank storage area; and ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.

- ☐ Sweep and clean the storage area monthly if it is paved, *do not hose down the area to a storm drain.*

- ☐ Check tanks (and any containment sumps) daily for leaks and spills. Replace tanks that are leaking, corroded, or otherwise deteriorating with tanks in good condition. Collect all spilled liquids and properly dispose of them.

- ☐ Label all containers according to their contents (e.g., solvent, gasoline).

- ☐ Label hazardous substances regarding the potential hazard (corrosive, radioactive, flammable, explosive, poisonous).

- ☐ Prominently display required labels on transported hazardous and toxic materials (per US DOT regulations).

- ☐ Identify key spill response personnel.

*Spill Response*

- ☐ Clean up leaks and spills immediately.

- ☐ Place a stockpile of spill cleanup materials where it will be readily accessible (e.g., near storage and maintenance areas).

- ☐ On paved surfaces, clean up spills with as little water as possible.

  - ✓ Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills.

  - ✓ If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.

  - ✓ If possible use physical methods for the cleanup of dry chemicals (e.g., brooms, shovels, sweepers, or vacuums).

- ☐ Never hose down or bury dry material spills. Sweep up the material and dispose of properly.

- ☐ Chemical cleanups of material can be achieved with the use of adsorbents, gels, and foams. Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.

- ☐ For larger spills, a private spill cleanup company or Hazmat team may be necessary.

*Reporting*

- Report spills that pose an immediate threat to human health or the environment to the Regional Water Quality Control Board or local authority as location regulations dictate.
- Federal regulations require that any oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hour).
- Report spills to 911 for dispatch and clean-up assistance when needed. Do not contact fire agencies directly.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - ✓ Types and quantities (in some cases) of wastes;
  - ✓ Patterns in time of occurrence (time of day/night, month, or year);
  - ✓ Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills);
  - ✓ Clean-up procedures; and
  - ✓ Responsible parties.



***Employee Training Program***

- Educate employees about spill prevention and cleanup.
- Well-trained employees can reduce human errors that lead to accidental releases or spills:
  - ✓ The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur; and
  - ✓ Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.
- Employees should be educated about aboveground storage tank requirements. Employees responsible for aboveground storage tanks and liquid transfers should be thoroughly familiar with the Spill Prevention Control and Countermeasure Plan and the plan should be readily available.
- Train employees to recognize and report illegal dumping incidents.

### *Other Considerations (Limitations and Regulations)*

- State regulations exist for facilities with a storage capacity of 10,000 gallons or more of petroleum to prepare a Spill Prevention Control and Countermeasure (SPCC) Plan (Health & Safety Code Chapter 6.67).
- State regulations also exist for storage of hazardous materials (Health & Safety Code Chapter 6.95), including the preparation of area and business plans for emergency response to the releases or threatened releases.
- Consider requiring smaller secondary containment areas (less than 200 sq. ft.) to be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.

## Requirements

### *Costs (including capital and operation & maintenance)*

- Will vary depending on the size of the facility and the necessary controls.
- Prevention of leaks and spills is inexpensive. Treatment and/or disposal of contaminated soil or water can be quite expensive.

### *Maintenance (including administrative and staffing)*

- Develop spill prevention and control plan, provide and document training, conduct inspections of material storage areas, and supply spill kits.
- Extra time is needed to properly handle and dispose of spills, which results in increased labor costs.

## Supplemental Information

### *Further Detail of the BMP*

*Reporting*

Record keeping and internal reporting represent good operating practices because they can increase the efficiency of the facility and the effectiveness of BMPs. A good record keeping system helps the facility minimize incident recurrence, correctly respond with appropriate cleanup activities, and comply with legal requirements. A record keeping and reporting system should be set up for documenting spills, leaks, and other discharges, including discharges of hazardous substances in reportable quantities. Incident records describe the quality and quantity of non-stormwater discharges to the storm sewer. These records should contain the following information:

- Date and time of the incident;
- Weather conditions;
- Duration of the spill/leak/discharge;

- Cause of the spill/leak/discharge;
- Response procedures implemented;
- Persons notified; and
- Environmental problems associated with the spill/leak/discharge.

Separate record keeping systems should be established to document housekeeping and preventive maintenance inspections, and training activities. All housekeeping and preventive maintenance inspections should be documented. Inspection documentation should contain the following information:

- Date and time the inspection was performed;
- Name of the inspector;
- Items inspected;
- Problems noted;
- Corrective action required; and
- Date corrective action was taken.

Other means to document and record inspection results are field notes, timed and dated photographs, videotapes, and drawings and maps.

*Aboveground Tank Leak and Spill Control*

Accidental releases of materials from aboveground liquid storage tanks present the potential for contaminating stormwater with many different pollutants. Materials spilled, leaked, or lost from tanks may accumulate in soils or on impervious surfaces and be carried away by stormwater runoff.

The most common causes of unintentional releases are:

- Installation problems;
- Failure of piping systems (pipes, pumps, flanges, couplings, hoses, and valves);
- External corrosion and structural failure;
- Spills and overfills due to operator error; and
- Leaks during pumping of liquids or gases from truck or rail car to a storage tank or vice versa.

Storage of reactive, ignitable, or flammable liquids should comply with the Uniform Fire Code and the National Electric Code. Practices listed below should be employed to enhance the code requirements:

- Tanks should be placed in a designated area.
- Tanks located in areas where firearms are discharged should be encapsulated in concrete or the equivalent.
- Designated areas should be impervious and paved with Portland cement concrete, free of cracks and gaps, in order to contain leaks and spills.
- Liquid materials should be stored in UL approved double walled tanks or surrounded by a curb or dike to provide the volume to contain 10 percent of the volume of all of the containers or 110 percent of the volume of the largest container, whichever is greater. The area inside the curb should slope to a drain.
- For used oil or dangerous waste, a dead-end sump should be installed in the drain.
- All other liquids should be drained to the sanitary sewer if available. The drain must have a positive control such as a lock, valve, or plug to prevent release of contaminated liquids.
- Accumulated stormwater in petroleum storage areas should be passed through an oil/water separator.

Maintenance is critical to preventing leaks and spills. Conduct routine inspections and:

- Check for external corrosion and structural failure.
- Check for spills and overfills due to operator error.
- Check for failure of piping system (pipes, pumps, flanges, coupling, hoses, and valves).
- Check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa.
- Visually inspect new tank or container installation for loose fittings, poor welding, and improper or poorly fitted gaskets.
- Inspect tank foundations, connections, coatings, and tank walls and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
- Frequently relocate accumulated stormwater during the wet season.

- Periodically conduct integrity testing by a qualified professional.

*Vehicle Leak and Spill Control*

Major spills on roadways and other public areas are generally handled by highly trained Hazmat teams from local fire departments or environmental health departments. The measures listed below pertain to leaks and smaller spills at vehicle maintenance shops.

In addition to implementing the spill prevention, control, and clean up practices above, use the following measures related to specific activities:

*Vehicle and Equipment Maintenance*

- Perform all vehicle fluid removal or changing inside or under cover to prevent the run-on of stormwater and the runoff of spills.
- Regularly inspect vehicles and equipment for leaks, and repair immediately.
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Immediately drain all fluids from wrecked vehicles.
- Store wrecked vehicles or damaged equipment under cover.
- Place drip pans or absorbent materials under heavy equipment when not in use.
- Use absorbent materials on small spills rather than hosing down the spill.
- Remove the adsorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- Oil filters disposed of in trashcans or dumpsters can leak oil and contaminate stormwater. Place the oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters.
- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

*Vehicle and Equipment Fueling*

- Design the fueling area to prevent the run-on of stormwater and the runoff of spills:

  Cover fueling area if possible.

  Use a perimeter drain or slope pavement inward with drainage to a sump.

  Pave fueling area with concrete rather than asphalt.

- If dead-end sump is not used to collect spills, install an oil/water separator.
- Install vapor recovery nozzles to help control drips as well as air pollution.
- Discourage "topping-off" of fuel tanks.
- Use secondary containment when transferring fuel from the tank truck to the fuel tank.
- Use absorbent materials on small spills and general cleaning rather than hosing down the area. Remove the absorbent materials promptly.
- Carry out all Federal and State requirements regarding underground storage tanks, or install above ground tanks.
- Do not use mobile fueling of mobile industrial equipment around the facility; rather, transport the equipment to designated fueling areas.
- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Train employees in proper fueling and cleanup procedures.

### *Industrial Spill Prevention Response*

For the purposes of developing a spill prevention and response program to meet the stormwater regulations, facility managers should use information provided in this fact sheet and the spill prevention/response portions of the fact sheets in this handbook, for specific activities.

The program should:

- Integrate with existing emergency response/hazardous materials programs (e.g., Fire Department).
- Develop procedures to prevent/mitigate spills to storm drain systems.
- Identify responsible departments.

- Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.
- Address spills at municipal facilities, as well as public areas.
- Provide training concerning spill prevention, response and cleanup to all appropriate personnel.

## References and Resources

California's Nonpoint Source Program Plan. http://www.swrcb.ca.gov/nps/index.html.

Clark County Storm Water Pollution Control Manual. Available online at: http://www.co.clark.wa.us/pubworks/bmpman.pdf.

King County Storm Water Pollution Control Manual. Available online at: http://dnr.metrokc.gov/wlr/dss/spcm.htm.

Orange County Stormwater Program, Best Management Practices for Industrial/Commercial Business Activities. Available online at: http://ocwatersheds.com/documents/bmp/industrialcommercialbusinessesactivities

Santa Clara Valley Urban Runoff Pollution Prevention Program. http://www.scvurppp.org.

The Stormwater Managers Resource Center. http://www.stormwatercenter.net/.

# Parking Area Maintenance SC-43

## Description

Parking lots can contribute a number of substances, such as trash, suspended solids, hydrocarbons, oil and grease, and heavy metals that can enter receiving waters through stormwater runoff or non-stormwater discharges. The protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants from parking areas and include using good housekeeping practices, following appropriate cleaning BMPs, and training employees.

BMPs for other outdoor areas on site (loading/unloading, material storage, and equipment operations) are described in SC-30 through SC-33.

## Approach

The goal of this program is to ensure stormwater pollution prevention practices are considered when conducting activities on or around parking areas to reduce potential for pollutant discharge to receiving waters. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

### *General Pollution Prevention Protocols*

- Encourage advanced designs and maintenance strategies for impervious parking lots. Refer to the treatment control BMP fact sheets in this manual for additional information.
- Keep accurate maintenance logs to evaluate BMP implementation.

### *Good Housekeeping*

- Keep all parking areas clean and orderly. Remove debris, litter, and sediments in a timely fashion.
- Post "No Littering" signs and enforce anti-litter laws.

| Objectives |
|---|
| *Cover* |
| *Contain* |
| *Educate* |
| *Reduce/Minimize* |
| *Product Substitution* |

| Targeted Constituents | |
|---|---|
| *Sediment* | ✓ |
| *Nutrients* | |
| *Trash* | ✓ |
| *Metals* | ✓ |
| *Bacteria* | |
| *Oil and Grease* | ✓ |
| *Organics* | ✓ |

| Minimum BMPs Covered | |
|---|---|
| *Good Housekeeping* | ✓ |
| *Preventative Maintenance* | ✓ |
| *Spill and Leak Prevention and Response* | ✓ |
| *Material Handling & Waste Management* | |
| *Erosion and Sediment Controls* | |
| *Employee Training Program* | ✓ |
| *Quality Assurance Record Keeping* | ✓ |

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- ☐ Provide an adequate number of litter receptacles.
- ☐ Clean out and cover litter receptacles frequently to prevent spillage.

### *Preventative Maintenance*

*Inspection*

Have designated personnel conduct inspections of parking facilities and stormwater conveyance systems associated with parking facilities on a regular basis.

- ☐ Inspect cleaning equipment/sweepers for leaks on a regular basis.

*Surface Cleaning*

- ☐ Use dry cleaning methods (e.g., sweeping, vacuuming) to prevent the discharge of pollutants into the stormwater conveyance system if possible.
- ☐ Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.
- ☐ Sweep all parking lots at least once before the onset of the wet season.
- ☐ Dispose of parking lot sweeping debris and dirt at a landfill.
- ☐ Follow the procedures below if water is used to clean surfaces:
  - ✓ Block the storm drain or contain runoff.
  - ✓ Collect and pump wash water to the sanitary sewer or discharge to a pervious surface. Do not allow wash water to enter storm drains.
- ☐ Follow the procedures below when cleaning heavy oily deposits:
  - ✓ Clean oily spots with absorbent materials.
  - ✓ Use a screen or filter fabric over inlet, then wash surfaces.
  - ✓ Do not allow discharges to the storm drain.
  - ✓ Vacuum/pump discharges to a tank or discharge to sanitary sewer.
  - ✓ Dispose of spilled materials and absorbents appropriately.

*Surface Repair*

- ☐ Check local ordinance for SUSMP/LID ordinance.
- ☐ Preheat, transfer or load hot bituminous material away from storm drain inlets.
- ☐ Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff.
- ☐ Cover and seal nearby storm drain inlets where applicable (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in

place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal.

- Use only as much water as necessary for dust control during sweeping to avoid runoff.
- Catch drips from paving equipment that is not in use with pans or absorbent material placed under the machines. Dispose of collected material and absorbents properly.



### *Spill Response and Prevention Procedures*

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible or at a central location.
- Clean up fluid spills immediately with absorbent rags or material.
- Dispose of spilled material and absorbents properly.



### *Employee Training Program*

- Provide regular training to field employees and/or contractors regarding cleaning of paved areas and proper operation of equipment.
- Train employees and contractors in proper techniques for spill containment and cleanup.
- Use a training log or similar method to document training.




### *Quality Assurance and Record Keeping*

- Keep accurate maintenance logs that document minimum BMP activities performed for parking area maintenance, types and quantities of waste disposed of, and any improvement actions.
- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- Establish procedures to complete logs and file them in the central office.

## Potential Capital Facility Costs and Operation & Maintenance Requirements

### *Facilities*

- Capital investments may be required at some sites to purchase sweeping equipment, train sweeper operators, install oil/water/sand separators, or implement advanced BMPs. These costs can vary significantly depending upon site conditions and the amount of BMPs required.

***Maintenance***

- Sweep and clean parking lots regularly to minimize pollutant transport into storm drains from stormwater runoff.
- Clean out oil/water/sand separators regularly, especially after heavy storms.
- Maintain advanced BMPs such as vegetated swales, infiltration trenches, or detention basins as appropriate. Refer to the treatment control fact sheets for more information.

## Supplemental Information

***Advanced BMPs***

Some parking areas may require advanced BMPs to further reduce pollutants in stormwater runoff, and a few examples are listed below. Refer to the Treatment Control Fact Sheets and the New Development and Redevelopment Manual for more information.

- When possible, direct sheet runoff to flow into biofilters (vegetated strip and swale) and/or infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low quantities.
- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.

## References and Resources

City of Seattle, Seattle Public Utilities Department of Planning and Development, 2009. *Stormwater Manual Vol. 1 Source Control Technical Requirements Manual.*

California Stormwater Quality Association, 2003. *New Development and Redevelopment Stormwater Best Management Practice Handbook*. Available online at: https://www.casqa.org/resources/bmp-handbooks/new-development-redevelopment-bmp-handbook.

Kennedy/Jenks Consultants, 2007. *The Truckee Meadows Industrial and Commercial Storm Water Best Management Practices Handbook*. Available online at: http://www.cityofsparks.us/sites/default/files/assets/documents/env-control/construction/TM-I-C_BMP_Handbook_2-07-final.pdf.

Orange County Stormwater Program, Best Management Practices for Industrial/Commercial Business Activities. Available online at: http://ocwatersheds.com/documents/bmp/industrialcommercialbusinessesactivities.

Pollution from Surface Cleaning Folder, 1996, 2003. Bay Area Stormwater Management Agencies Association. Available online at: http://basmaa.org/Portals/0/documents/pdf/Pollution%20from%20Surface%20Cleaning.pdf.

Sacramento Stormwater Management Program. *Best Management Practices for Industrial Storm Water Pollution Control*. Available online at: http://www.msa.saccounty.net/sactostormwater/documents/guides/industrial-BMP-manual.pdf.

The Storm Water Managers Resource Center, http://www.stormwatercenter.net.

US EPA. *Post-Construction Stormwater Management in New Development and Redevelopment*. BMP Fact Sheets. Available online at: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=5.

# Housekeeping Practices SC-60

## Description

Promote efficient and safe housekeeping practices (storage, use, and cleanup) when handling potentially harmful materials such as fertilizers, pesticides, cleaning solutions, paint products, automotive products, and swimming pool chemicals. Related information is provided in BMP fact sheets SC-11 Spill Prevention, Control & Cleanup and SC-34 Waste Handling & Disposal.

## Approach

### *Pollution Prevention*

- Purchase only the amount of material that will be needed for foreseeable use. In most cases this will result in cost savings in both purchasing and disposal. See SC-61 Safer Alternative Products for additional information.
- Be aware of new products that may do the same job with less environmental risk and for less or the equivalent cost. Total cost must be used here; this includes purchase price, transportation costs, storage costs, use related costs, clean up costs and disposal costs.

### *Suggested Protocols*

*General*

- Keep work sites clean and orderly. Remove debris in a timely fashion. Sweep the area.
- Dispose of wash water, sweepings, and sediments, properly.
- Recycle or dispose of fluids properly.
- Establish a daily checklist of office, yard and plant areas to confirm cleanliness and adherence to proper storage and security. Specific employees should be assigned specific inspection responsibilities and given the authority to remedy any problems found.
- Post waste disposal charts in appropriate locations detailing for each waste its hazardous nature (poison, corrosive, flammable), prohibitions on its disposal (dumpster, drain, sewer) and the recommended disposal method (recycle, sewer, burn, storage, landfill).
- Summarize the chosen BMPs applicable to your operation and post them in appropriate conspicuous places.

### Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

### Targeted Constituents

| | |
|---|---|
| Sediment | ☑ |
| Nutrients | ☑ |
| Trash | ☑ |
| Metals | ☑ |
| Bacteria | ☑ |
| Oil and Grease | ☑ |
| Organics | ☑ |
| Oxygen Demanding | ☑ |

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- Require a signed checklist from every user of any hazardous material detailing amount taken, amount used, amount returned and disposal of spent material.
- Do a before audit of your site to establish baseline conditions and regular subsequent audits to note any changes and whether conditions are improving or deteriorating.
- Keep records of water, air and solid waste quantities and quality tests and their disposition.
- Maintain a mass balance of incoming, outgoing and on hand materials so you know when there are unknown losses that need to be tracked down and accounted for.
- Use and reward employee suggestions related to BMPs, hazards, pollution reduction, work place safety, cost reduction, alternative materials and procedures, recycling and disposal.
- Have, and review regularly, a contingency plan for spills, leaks, weather extremes etc. Make sure all employees know about it and what their role is so that it comes into force automatically.

***Training***

- Train all employees, management, office, yard, manufacturing, field and clerical in BMPs and pollution prevention and make them accountable.
- Train municipal employees who handle potentially harmful materials in good housekeeping practices.
- Train personnel who use pesticides in the proper use of the pesticides. The California Department of Pesticide Regulation license pesticide dealers, certify pesticide applicators and conduct onsite inspections.
- Train employees and contractors in proper techniques for spill containment and cleanup. The employee should have the tools and knowledge to immediately begin cleaning up a spill if one should occur.

***Spill Response and Prevention***

- Refer to SC-11, Spill Prevention, Control & Cleanup.
- Keep your Spill Prevention Control and Countermeasure (SPCC) plant up-to-date, and implement accordingly.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

***Other Considerations***

- There are no major limitations to this best management practice.
- There are no regulatory requirements to this BMP. Existing regulations already require municipalities to properly store, use, and dispose of hazardous materials

## Requirements

### *Costs*

- Minimal cost associated with this BMP. Implementation of good housekeeping practices may result in cost savings as these procedures may reduce the need for more costly BMPs.

### *Maintenance*

- Ongoing maintenance required to keep a clean site. Level of effort is a function of site size and type of activities.

## Supplemental Information

### *Further Detail of the BMP*

- The California Integrated Waste Management Board's Recycling Hotline, 1-800-553-2962, provides information on household hazardous waste collection programs and facilities.

### *Examples*

There are a number of communities with effective programs. The most pro-active include Santa Clara County and the City of Palo Alto, the City and County of San Francisco, and the Municipality of Metropolitan Seattle (Metro).

## References and Resources

British Columbia Lake Stewardship Society. Best Management Practices to Protect Water Quality from Non-Point Source Pollution. March 2000.
http://www.nalms.org/bclss/bmphome.html#bmp

King County Stormwater Pollution Control Manual - http://dnr.metrokc.gov/wlr/dss/spcm.htm

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 by California Coastal Commission, February 2002.

Orange County Stormwater Program
http://www.ocwatersheds.com/stormwater/swp_introduction.asp

San Mateo STOPPP - (http://stoppp.tripod.com/bmp.html)

# Road and Street Maintenance SC-70



## Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

## Targeted Constituents

| | |
|---|---|
| Sediment | ☑ |
| Nutrients | |
| Trash | ☑ |
| Metals | ☑ |
| Bacteria | |
| Oil and Grease | ☑ |
| Organics | ☑ |
| Oxygen Demanding | ☑ |

## Description

Streets, roads, and highways are significant sources of pollutants in stormwater discharges, and operation and maintenance (O&M) practices, if not conducted properly, can contribute to the problem. Stormwater pollution from roadway and bridge maintenance should be addressed on a site-specific basis. Use of the procedures outlined below, that address street sweeping and repair, bridge and structure maintenance, and unpaved roads will reduce pollutants in stormwater.

## Approach

### *Pollution Prevention*

- Use the least toxic materials available (e.g. water based paints, gels or sprays for graffiti removal)
- Recycle paint and other materials whenever possible.
- Enlist the help of citizens to keep yard waste, used oil, and other wastes out of the gutter.

### *Suggested Protocols*

*Street Sweeping and Cleaning*

- Maintain a consistent sweeping schedule. Provide minimum monthly sweeping of curbed streets.
- Perform street cleaning during dry weather if possible.

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- Avoid wet cleaning or flushing of street, and utilize dry methods where possible.
- Consider increasing sweeping frequency based on factors such as traffic volume, land use, field observations of sediment and trash accumulation, proximity to water courses, etc. For example:
  - Increase the sweeping frequency for streets with high pollutant loadings, especially in high traffic and industrial areas.
  - Increase the sweeping frequency just before the wet season to remove sediments accumulated during the summer.
  - Increase the sweeping frequency for streets in special problem areas such as special events, high litter or erosion zones.
- Maintain cleaning equipment in good working condition and purchase replacement equipment as needed. Old sweepers should be replaced with new technologically advanced sweepers (preferably regenerative air sweepers) that maximize pollutant removal.
- Operate sweepers at manufacturer requested optimal speed levels to increase effectiveness.
- To increase sweeping effectiveness consider the following:
  - Institute a parking policy to restrict parking in problematic areas during periods of street sweeping.
  - Post permanent street sweeping signs in problematic areas; use temporary signs if installation of permanent signs is not possible.
  - Develop and distribute flyers notifying residents of street sweeping schedules.
- Regularly inspect vehicles and equipment for leaks, and repair immediately.
- If available use vacuum or regenerative air sweepers in the high sediment and trash areas (typically industrial/commercial).
- Keep accurate logs of the number of curb-miles swept and the amount of waste collected.
- Dispose of street sweeping debris and dirt at a landfill.
- Do not store swept material along the side of the street or near a storm drain inlet.
- Keep debris storage to a minimum during the wet season or make sure debris piles are contained (e.g. by berming the area) or covered (e.g. with tarps or permanent covers).

*Street Repair and Maintenance*

*Pavement marking*

- Schedule pavement marking activities for dry weather.

- Develop paint handling procedures for proper use, storage, and disposal of paints.
- Transfer and load paint and hot thermoplastic away from storm drain inlets.
- Provide drop cloths and drip pans in paint mixing areas.
- Properly maintain application equipment.
- Street sweep thermoplastic grindings. Yellow thermoplastic grindings may require special handling as they may contain lead.
- Paints containing lead or tributyltin are considered a hazardous waste and must be disposed of properly.
- Use water based paints whenever possible. If using water based paints, clean the application equipment in a sink that is connected to the sanitary sewer.
- Properly store leftover paints if they are to be kept for the next job, or dispose of properly.

*Concrete installation and repair*

- Schedule asphalt and concrete activities for dry weather.
- Take measures to protect any nearby storm drain inlets and adjacent watercourses, prior to breaking up asphalt or concrete (e.g. place san bags around inlets or work areas).
- Limit the amount of fresh concrete or cement mortar mixed, mix only what is needed for the job.
- Store concrete materials under cover, away from drainage areas. Secure bags of cement after they are open. Be sure to keep wind-blown cement powder away from streets, gutters, storm drains, rainfall, and runoff.
- Return leftover materials to the transit mixer. Dispose of small amounts of hardened excess concrete, grout, and mortar in the trash.
- Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile, or dispose in the trash.
- When making saw cuts in pavement, use as little water as possible and perform during dry weather. Cover each storm drain inlet completely with filter fabric or plastic during the sawing operation and contain the slurry by placing straw bales, sandbags, or gravel dams around the inlets. After the liquid drains or evaporates, shovel or vacuum the slurry residue from the pavement or gutter and remove from site. Alternatively, a small onsite vacuum may be used to pick up the slurry as this will prohibit slurry from reaching storm drain inlets.
- Wash concrete trucks off site or in designated areas on site designed to preclude discharge of wash water to drainage system.

*Patching, resurfacing, and surface sealing*

- Schedule patching, resurfacing and surface sealing for dry weather.
- Stockpile materials away from streets, gutter areas, storm drain inlets or watercourses. During wet weather, cover stockpiles with plastic tarps or berm around them if necessary to prevent transport of materials in runoff.
- Pre-heat, transfer or load hot bituminous material away from drainage systems or watercourses.
- Where applicable, cover and seal nearby storm drain inlets (with waterproof material or mesh) and maintenance holes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and until all water from emulsified oil sealants has drained or evaporated. Clean any debris from covered maintenance holes and storm drain inlets when the job is complete.
- Prevent excess material from exposed aggregate concrete or similar treatments from entering streets or storm drain inlets. Designate an area for clean up and proper disposal of excess materials.
- Use only as much water as necessary for dust control, to avoid runoff.
- Sweep, never hose down streets to clean up tracked dirt. Use a street sweeper or vacuum truck. Do not dump vacuumed liquid in storm drains.
- Catch drips from paving equipment that is not in use with pans or absorbent material placed under the machines. Dispose of collected material and absorbents properly.

*Equipment cleaning maintenance and storage*

- Inspect equipment daily and repair any leaks. Place drip pans or absorbent materials under heavy equipment when not in use.
- Perform major equipment repairs at the corporation yard, when practical.
- If refueling or repairing vehicles and equipment must be done onsite, use a location away from storm drain inlets and watercourses.
- Clean equipment including sprayers, sprayer paint supply lines, patch and paving equipment, and mud jacking equipment at the end of each day. Clean in a sink or other area (e.g. vehicle wash area) that is connected to the sanitary sewer.

*Bridge and Structure Maintenance*

*Paint and Paint Removal*

- Transport paint and materials to and from job sites in containers with secure lids and tied down to the transport vehicle.
- Do not transfer or load paint near storm drain inlets or watercourses.

- Test and inspect spray equipment prior to starting to paint. Tighten all hoses and connections and do not overfill paint container.
- Plug nearby storm drain inlets prior to starting painting where there is significant risk of a spill reaching storm drains. Remove plugs when job is completed.
- If sand blasting is used to remove paint, cover nearby storm drain inlets prior to starting work.
- Perform work on a maintenance traveler or platform, or use suspended netting or tarps to capture paint, rust, paint removing agents, or other materials, to prevent discharge of materials to surface waters if the bridge crosses a watercourse. If sanding, use a sander with a vacuum filter bag.
- Capture all clean-up water, and dispose of properly.
- Recycle paint when possible (e.g. paint may be used for graffiti removal activities). Dispose of unused paint at an appropriate household hazardous waste facility.

*Graffiti Removal*

- Schedule graffiti removal activities for dry weather.
- Protect nearby storm drain inlets prior to removing graffiti from walls, signs, sidewalks, or other structures needing graffiti abatement. Clean up afterwards by sweeping or vacuuming thoroughly, and/or by using absorbent and properly disposing of the absorbent.
- When graffiti is removed by painting over, implement the procedures under Painting and Paint Removal above.
- Direct runoff from sand blasting and high pressure washing (with no cleaning agents) into a landscaped or dirt area. If such an area is not available, filter runoff through an appropriate filtering device (e.g. filter fabric) to keep sand, particles, and debris out of storm drains.
- If a graffiti abatement method generates wash water containing a cleaning compound (such as high pressure washing with a cleaning compound), plug nearby storm drains and vacuum/pump wash water to the sanitary sewer.
- Consider using a waterless and non-toxic chemical cleaning method for graffiti removal (e.g. gels or spray compounds).

*Repair Work*

- Prevent concrete, steel, wood, metal parts, tools, or other work materials from entering storm drains or watercourses.
- Thoroughly clean up the job site when the repair work is completed.
- When cleaning guardrails or fences follow the appropriate surface cleaning methods (depending on the type of surface) outlined in SC-71 Plaza & Sidewalk Cleaning fact sheet.

- If painting is conducted, follow the painting and paint removal procedures above.
- If graffiti removal is conducted, follow the graffiti removal procedures above.
- If construction takes place, see the Construction Activity BMP Handbook.
- Recycle materials whenever possible.

*Unpaved Roads and Trails*

- Stabilize exposed soil areas to prevent soil from eroding during rain events. This is particularly important on steep slopes.
- For roadside areas with exposed soils, the most cost-effective choice is to vegetate the area, preferably with a mulch or binder that will hold the soils in place while the vegetation is establishing. Native vegetation should be used if possible.
- If vegetation cannot be established immediately, apply temporary erosion control mats/blankets; a comma straw, or gravel as appropriate.
- If sediment is already eroded and mobilized in roadside areas, temporary controls should be installed. These may include: sediment control fences, fabric-covered triangular dikes, gravel-filled burlap bags, biobags, or hay bales staked in place.

*Non-Stormwater Discharges*

Field crews should be aware of non-stormwater discharges as part of their ongoing street maintenance efforts.

- Refer to SC-10 Non-Stormwater Discharges
- Identify location, time and estimated quantity of discharges.
- Notify appropriate personnel.

***Training***

- Train employees regarding proper street sweeping operation and street repair and maintenance.
- Instruct employees and subcontractors to ensure that measures to reduce the stormwater impacts of roadway/bridge maintenance are being followed.
- Require engineering staff and/or consulting A/E firms to address stormwater quality in new bridge designs or existing bridge retrofits.
- Use a training log or similar method to document training.
- Train employees on proper spill containment and clean up, and in identifying non-stormwater discharges.

***Spill Response and Prevention***

- Refer to SC-11, Spill Prevention, Control & Cleanup.
- Keep your Spill Prevention Control and countermeasure (SPCC) plan up-to-date, and implement accordingly.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

***Other Considerations***

- Densely populated areas or heavily used streets may require parking regulations to clear streets for cleaning.
- No currently available conventional sweeper is effective at removing oil and grease. Mechanical sweepers are not effective at removing finer sediments.
- Limitations may arise in the location of new bridges. The availability and cost of land and other economic and political factors may dictate where the placement of a new bridge will occur. Better design of the bridge to control runoff is required if it is being placed near sensitive waters.

## Requirements

***Costs***

- The maintenance of local roads and bridges is already a consideration of most community public works or transportation departments. Therefore, the cost of pollutant reducing management practices will involve the training and equipment required to implement these new practices.
- The largest expenditures for street sweeping programs are in staffing and equipment. The capital cost for a conventional street sweeper is between $60,000 and $120,000. Newer technologies might have prices approaching $180,000. The average useful life of a conventional sweeper is about four years, and programs must budget for equipment replacement. Sweeping frequencies will determine equipment life, so programs that sweep more often should expect to have a higher cost of replacement.
- A street sweeping program may require the following.
  - Sweeper operators, maintenance, supervisory, and administrative personnel are required.
  - Traffic control officers may be required to enforce parking restrictions.
  - Skillful design of cleaning routes is required for program to be productive.
  - Arrangements must be made for disposal of collected wastes.

- If investing in newer technologies, training for operators must be included in operation and maintenance budgets. Costs for public education are small, and mostly deal with the need to obey parking restrictions and litter control. Parking tickets are an effective reminder to obey parking rules, as well as being a source of revenue.

***Maintenance***

- Not applicable

## Supplemental Information

***Further Detail of the BMP***

*Street sweeping*

There are advantages and disadvantages to the two common types of sweepers. The best choice depends on your specific conditions. Many communities find it useful to have a compliment of both types in their fleet.

Mechanical Broom Sweepers - More effective at picking up large debris and cleaning wet streets. Less costly to purchase and operate. Create more airborne dust.

Vacuum Sweepers - More effective at removing fine particles and associated heavy metals. Ineffective at cleaning wet streets. Noisier than mechanical broom sweepers which may restrict areas or times of operation. May require an advance vehicle to remove large debris.

Street Flushers - Not affected by biggest interference to cleaning, parked cars. May remove finer sediments, moving them toward the gutter and stormwater inlets. For this reason, flushing fell out of favor and is now used primarily after sweeping. Flushing may be effective for combined sewer systems. Presently street flushing is not allowed under most NPDES permits.

*Cross-Media Transfer of Pollutants*

The California Air Resources Board (ARB) has established state ambient air quality standards including a standard for respirable particulate matter (less than or equal to 10 microns in diameter, symbolized as PM10). In the effort to sweep up finer sediments to remove attached heavy metals, municipalities should be aware that fine dust, that cannot be captured by the sweeping equipment and becomes airborne, could lead to issues of worker and public safety.

*Bridges*

Bridges that carry vehicular traffic generate some of the more direct discharges of runoff to surface waters. Bridge scupper drains cause a direct discharge of stormwater into receiving waters and have been shown to carry relatively high concentrations of pollutants. Bridge maintenance also generates wastes that may be either directly deposited to the water below or carried to the receiving water by stormwater. The following steps will help reduce the stormwater impacts of bridge maintenance:

- Site new bridges so that significant adverse impacts to wetlands, sensitive areas, critical habitat, and riparian vegetation are minimized.

- Design new bridges to avoid the use of scupper drains and route runoff to land for treatment control. Existing scupper drains should be cleaned on a regular basis to avoid sediment/debris accumulation.

- Reduce the discharge of pollutants to surface waters during maintenance by using suspended traps, vacuums, or booms in the water to capture paint, rust, and paint removing agents. Many of these wastes may be hazardous. Properly dispose of this waste by referring to CA21 (Hazardous Waste Management) in the Construction Handbook.

- Train employees and subcontractors to reduce the discharge of wastes during bridge maintenance.

*De-icing*

- Do not over-apply deicing salt and sand, and routinely calibrate spreaders.

- Near reservoirs, restrict the application of deicing salt and redirect any runoff away from reservoirs.

- Consider using alternative deicing agents (less toxic, biodegradable, etc.).

## References and Resources

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.

Orange County Stormwater Program
http://www.ocwatersheds.com/stormwater/swp_introduction.asp

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Santa Clara Valley Urban Runoff Pollution Prevention Program. 1997 Urban Runoff Management Plan. September 1997, updated October 2000.

Santa Clara Valley Urban Runoff Pollution Prevention Program. 2001. Fresh Concrete and Mortar Application Best Management Practices for the Construction Industry. June.

Santa Clara Valley Urban Runoff Pollution Prevention Program. 2001. Roadwork and Paving Best Management Practices for the Construction Industry. June.

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Roadway and Bridge Maintenance. On-line http://www.epa.gov/npdes/menuofbmps/poll_13.htm

# Efficient Irrigation SD-12



**Design Objectives**

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

## Description

Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

## Approach

Project plan designs for development and redevelopment should include application methods of irrigation water that minimize runoff of excess irrigation water into the stormwater conveyance system.

## Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

## Design Considerations

### *Designing New Installations*

The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible by the Permittee:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- Design irrigation systems to each landscape area's specific water requirements.
- Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
- Implement landscape plans consistent with County or City water conservation resolutions, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.

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- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:
  - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff
  - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect
  - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible
  - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth
- Employ other comparable, equally effective methods to reduce irrigation water runoff.

***Redeveloping Existing Installations***

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

## Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

# Storm Drain Signage SD-13




**Design Objectives**

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ☑ Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

## Description

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

## Approach

The stencil or affixed sign contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

## Suitable Applications

Stencils and signs alert the public to the destination of pollutants discharged to the storm drain. Signs are appropriate in residential, commercial, and industrial areas, as well as any other area where contributions or dumping to storm drains is likely.

## Design Considerations

Storm drain message markers or placards are recommended at all storm drain inlets within the boundary of a development project. The marker should be placed in clear sight facing toward anyone approaching the inlet from either side. All storm drain inlet locations should be identified on the development site map.

### *Designing New Installations*

The following methods should be considered for inclusion in the project design and show on project plans:

- Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language. Examples include “NO DUMPING

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– DRAINS TO OCEAN" and/or other graphical icons to discourage illegal dumping.

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

Note - Some local agencies have approved specific signage and/or storm drain message placards for use. Consult local agency stormwater staff to determine specific requirements for placard types and methods of application.

***Redeveloping Existing Installations***

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. If the project meets the definition of "redevelopment", then the requirements stated under " designing new installations" above should be included in all project design plans.

## Additional Information

***Maintenance Considerations***

- Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner's association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

***Placement***

- Signage on top of curbs tends to weather and fade.

- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

## Supplemental Information

***Examples***

- Most MS4 programs have storm drain signage programs. Some MS4 programs will provide stencils, or arrange for volunteers to stencil storm drains as part of their outreach program.

## Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

# Trash Storage Areas SD-32

## Description

Trash storage areas are areas where a trash receptacle (s) are located for use as a repository for solid wastes. Stormwater runoff from areas where trash is stored or disposed of can be polluted. In addition, loose trash and debris can be easily transported by water or wind into nearby storm drain inlets, channels, and/or creeks. Waste handling operations that may be sources of stormwater pollution include dumpsters, litter control, and waste piles.

**Design Objectives**

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

## Approach

This fact sheet contains details on the specific measures required to prevent or reduce pollutants in stormwater runoff associated with trash storage and handling. Preventative measures including enclosures, containment structures, and impervious pavements to mitigate spills, should be used to reduce the likelihood of contamination.

## Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

## Design Considerations

Design requirements for waste handling areas are governed by Building and Fire Codes, and by current local agency ordinances and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code and ordinance requirements. Hazardous waste should be handled in accordance with legal requirements established in Title 22, California Code of Regulation.

Wastes from commercial and industrial sites are typically hauled by either public or commercial carriers that may have design or access requirements for waste storage areas. The design criteria in this fact sheet are recommendations and are not intended to be in conflict with requirements established by the waste hauler. The waste hauler should be contacted prior to the design of your site trash collection areas. Conflicts or issues should be discussed with the local agency.

### *Designing New Installations*

Trash storage areas should be designed to consider the following structural or treatment control BMPs:

- Design trash container areas so that drainage from adjoining roofs and pavement is diverted around the area(s) to avoid run-on. This might include berming or grading the waste handling area to prevent run-on of stormwater.
- Make sure trash container areas are screened or walled to prevent off-site transport of trash.

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- Use lined bins or dumpsters to reduce leaking of liquid waste.
- Provide roofs, awnings, or attached lids on all trash containers to minimize direct precipitation and prevent rainfall from entering containers.
- Pave trash storage areas with an impervious surface to mitigate spills.
- Do not locate storm drains in immediate vicinity of the trash storage area.
- Post signs on all dumpsters informing users that hazardous materials are not to be disposed of therein.

### *Redeveloping Existing Installations*

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

## Additional Information

### *Maintenance Considerations*

The integrity of structural elements that are subject to damage (i.e., screens, covers, and signs) must be maintained by the owner/operator. Maintenance agreements between the local agency and the owner/operator may be required. Some agencies will require maintenance deed restrictions to be recorded of the property title. If required by the local agency, maintenance agreements or deed restrictions must be executed by the owner/operator before improvement plans are approved.

## Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

# Stormwater Pollution Prevention

## *Best Management Practices for Homeowner's Associations, Property Managers and Property Owners*

*Your Guide To Maintaining Water Friendly Standards In Your Community*

**sbcountystormwater.org**

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# Table of Contents


| | |
|---|---|
| Commercial Trash Enclosures | 1 |
| Hazardous Waste | 2 |
| Working Outdoors & Handling Spills | 4 |
| Commercial Landscape | 5 |
| Sidewalk, Plaza, Entry Monument & Fountain Maintenance | 6 |
| Equipment Maintenance & Repair | 10 |
| Pool Maintenance | 14 |
| Paint | 16 |
| Vehicle Maintenance | 17 |
| Pet Waste Disposal | 18 |
| Get In Touch With Us Online | 19 |

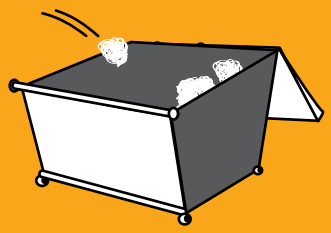
# COMMERCIAL TRASH ENCLOSURES

## FOLLOW THESE **REQUIREMENTS** TO **KEEP OUR WATERWAYS CLEAN**

Trash enclosures, such as those found in commercial and apartment complexes, typically contain materials that are intended to find their way to a landfill or a recycling facility. **These materials are NOT meant to go into our local lakes and rivers.**

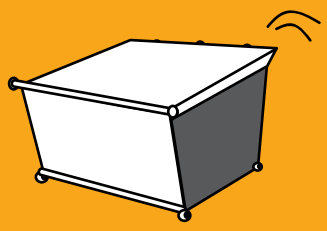
### PROTECT WATER QUALITY BY FOLLOWING THESE SIMPLE STEPS

#### PUT TRASH INSIDE



Place trash inside the bin (preferably in sealed bags)

#### CLOSE THE LID



Prevent rain from entering the bin in order to avoid leakage of polluted water runoff

#### KEEP TOXICS OUT



- Paint
- Grease, fats and used oils
- Batteries, electronics and fluorescent lights

### SOME ADDITIONAL GUIDELINES, INCLUDE

**✓ SWEEP FREQUENTLY**
Sweep trash enclosure areas frequently, instead of hosing them down, to prevent polluted water from flowing into the streets and storm drains.

**✓ FIX LEAKS**
Address trash bin leaks immediately by using dry clean up methods and report to your waste hauler to receive a replacement.

**✓ CONSTRUCT ROOF**
Construct a solid cover roof over the existing trash enclosure structure to prevent rainwater from coming into contact with trash and garbage. Check with your local City/County for Building Codes.

In San Bernardino County, stormwater pollution is caused by food waste, landscape waste, chemicals and other debris that are washed into storm drains and end up in our waterways - untreated! You can be part of the solution by maintaining a water-friendly trash enclosure.

**THANK YOU FOR HELPING TO KEEP SAN BERNARDINO COUNTY CLEAN AND HEALTHY!**

San Bernardino County STORMWATER PROGRAM

In the event of a spill or discharge to a storm drain or waterway, contact San Bernardino County Stormwater immediately: (877) WASTE18 | sbcountystormwater.org/report

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# CESQG PROGRAM

**Conditionally Exempt Small Quantity Generator**

## WHAT IS A CESQG?

Businesses that generate 27 gallons or 220 lbs. of hazardous waste, or 2.2 lbs. of extremely hazardous waste per month are called "Conditionally Exempt Small Quantity Generators," or CESQGs. San Bernardino County Household Hazardous Program provides waste management services to CESQG businesses. The most common CESQGs in San Bernardino County are painters, print shops, auto shops, builders, agricultural operators and property managers, but there are many others. When you call, be ready to describe the types and amounts of waste your business generates in a typical month. If you generate hazardous waste on a regular basis, you must:

- Register with San Bernardino County Fire Department (909) 386-8400 as a hazardous waste generator.
- To obtain an EPA ID# and application form from the State visit www.dtsc.ca.gov.
- Manage hazardous waste in accordance with all applicable local, state and federal laws and regulations.

## HOW DO I GET SERVICE?

To arrange an appointment for the CESQG Program, call 1-800-OILY CAT or 909-382-5401. Be ready to describe the type and amount of hazardous waste your business is ready to dispose of, and the types and size(s) of containers that the waste is in.

## Waste Type and Cost

There is a small handling fee involved in the collection of hazardous waste from your business. Disposal costs depend on the type of waste.

| | |
|---|---|
| Aerosols | $1.29/lb. |
| Automobile motor oil | $.73/gal. |
| Anti-freeze | $1.57/gal. |
| Contaminated oil | $4.48/gal. |
| Car batteries | $.62/ea. |
| Corrosive liquids, solids | $2.80/lb. |
| Flammable solids, liquids | $1.57/lb. |
| Latex Paint | $.73/lb. |
| Mercury | $10.08/lb. |
| NiCad/Alkaline Batteries | $2.13/lb. |
| Oil Base Paints | $1.00/lb. |
| Oil Filters | $.56/ea. |
| Oxidizers | $9.63/lb. |
| PCB Ballasts | $5.94/lb. |
| Pesticides (most) | $2.91/lb. |
| Photofixer, developer | $4.31/gal. |
| Television & Monitors | $11.20/ea. |
| Additional Handling | $138.00/hr. |

*Rates subject to change without notice*

## WE CANNOT ACCEPT

- Radioactives
- Water reactives
- Explosives
- Compressed gas cylinders
- Medical or biohazardous waste
- Asbestos
- Remediation wastes

# HAZARDOUS WASTE

## WHY IS THE FIRE DEPARTMENT COLLECTING HAZARDOUS WASTE?

Small Quantity Generators often have difficulty disposing of small quantities of hazardous waste. Hazardous waste companies usually have a minimum amount of waste that they will pick up, or charge a minimum fee for service. Typically, the minimum fee exceeds the cost of disposal for the hazardous waste. This leaves the small quantity generator in a difficult situation. Some respond by storing hazardous waste until it becomes economical for the hazardous waste transporter to pick it up, putting the business out of compliance by exceeding regulatory accumulation time limits. Other businesses simply store their hazardous wastes indefinitely, creating an unsafe work environment and exceeding accumulation time limits. Yet other businesses attempt to illegally dispose of their waste at household hazardous waste collection facilities. These facilities are not legally permitted to accept commercial wastes, nor are prepared to provide legal documentation for commercial hazardous waste disposal. In answer to the problems identified above, the San Bernardino County Fire Department Household Hazardous Program instituted the Conditionally Exempt Small Quantity Generator Program.

## PAYMENT FOR SERVICES

The CESQG Program will prepare an invoice for your business at the time of service. You can pay at the time of service with cash or a check, or you can mail your payment to the Fire Department within 30 days. Please note that we do not accept credit card payments. The preferred method of payment is to handle payment at time of service. Additional charges may apply for accounts not paid within 30 days.

## ARE THERE ANY OTHER WAYS THAT I CAN SAVE MONEY ON HAZARDOUS WASTE DISPOSAL?

Yes! First, start by reducing the amount of waste that you produce by changing processes or process chemicals, at your business. Next, examine if there is a way that you can recycle your waste back into your processes. Network with similar businesses or trade associations for waste minimization and pollution prevention solutions.

## WHAT IF YOUR BUSINESS DOES NOT QUALIFY?

Call the San Bernardino County Fire Department Field Services Division for assistance with hazardous waste management at 909-386-8400.

If you reduce the amount of waste you generate each month to 27 gallons or less, you may qualify in the future.

## WHAT HAPPENS TO YOUR HAZARDOUS WASTE?

Hazardous waste collected by the CESQG Program is transported to a state permitted processing facility in San Bernardino. The waste is further processed at this point and packaged for off-site recycling (oil filters, oil, latex paint, antifreeze, and batteries) or destructive incineration (pesticides, corrosives, flammables, oil based paint).

San Bernardino County Fire Department
CESQG Program
2824 East "W" Street
San Bernardino, CA 92415-0799
Phone: 909-382-5401
Fax: 909-382-5413
www.sbcfire.org/ofm/hhw/HouseholdHazardousWaste.aspx
Email: mvangese@sbcfire.org

# WHEN WORKING OUTDOORS USE THE 3Cs

## CUANDO TRABAJE AL AIRE LIBRE UTILICE LAS 3Cs

### CONTROL | CONTROL



Locate the nearest storm drain and ensure nothing can enter or be discharged into it.
*Ubique el desagüe de aguas pluviales más cercano y asegúrese de que nada pueda ingresar a éste ni descargarse en él.*

### CONTAIN | CONTENER



Isolate your area to prevent material from potentially flowing or being blown away.
*Aísle su área para evitar que el material pueda discurrirse o ser llevado por el viento.*

### CAPTURE | CAPTURAR



Sweep up debris and place it in the trash. Clean up spills with an absorbent material (e.g. kitty litter) or vacuum with a Wet-Vac and dispose of properly.
*Recoja los restos y colóquelos en la basura. Limpie los derrames con un material absorbente (como la arena para gatos) o aspírelos con una Wet-Vac (aspiradora de humedad) y deséchelos correctamente.*

# COMMERCIAL LANDSCAPE

DISCHARGE TO THE STORM DRAIN, **ACCIDENTAL OR NOT**, COULD LEAD TO ENFORCEMENT ACTIONS, WHICH COULD INCLUDE FINES.

Follow the best practices below to **prevent water pollution from landscaping activities.**

## RECYCLE YARD WASTE



- Recycle leaves, grass clippings and other yard waste.
- Do not blow, sweep, rake or hose yard waste into the street or catch basin.
- **Try grasscycling:** the natural recycling of grass by leaving clippings on the lawn when mowing.

  For more information, please visit: **www.calrecycle.ca.gov/organics/grasscycling**

## USE FERTILIZERS, HERBICIDES AND PESTICIDES SAFELY



- Fertilizers, herbicides and pesticides are often carried into the storm drain system by sprinkler runoff. Use natural and non-toxic alternatives as often as possible.
- If you must use chemical fertilizers, herbicides or pesticides:
  - Spot apply, rather than blanketing entire areas.
  - Avoid applying near curbs and driveways, and **never** before a rain.
  - Apply fertilizers as needed: when plants could best use it and when the potential runoff would be low.
  - Follow the manufacturer's instructions carefully—this will not only give the best results, but will save money.

## USE WATER WISELY



- Control the amount of water and direction of sprinklers. Sprinklers should only be on long enough to allow water to soak into the ground, but not so long as to cause runoff.
- Periodically inspect, fix leaks and realign sprinkler heads.
- Plant native vegetation to reduce the need of water, fertilizers, herbicides and pesticides.

## HOMEOWNERS

KEEP THESE TIPS IN MIND WHEN HIRING PROFESSIONAL LANDSCAPERS AND REMIND AS NECESSARY.



Leftover pesticides, fertilizers, and herbicides contaminate landfills and should be disposed of through a Hazardous Waste Facility.

For more information on proper disposal call,

**(909) 382-5401 or 1-800-OILY CAT.**

In the event of a spill or discharge to a storm drain or waterway, contact San Bernardino County Stormwater immediately: (877) WASTE18 | sbcountystormwater.org/report

**sbcountystormwater.org**

Big Bear • Chino • Chino Hills • Colton • Fontana • Grand Terrace • Highland • Loma Linda • Montclair • Ontario • Rancho Cucamonga
Redlands • Rialto • San Bernardino • San Bernardino County • San Bernardino County Flood Control District • Upland • Yucaipa

# SIDEWALK, PLAZA, ENTRY MONUMENT & FOUNTAIN MAINTENANCE

**Pollutants on sidewalks and other pedestrian traffic areas and plazas are typically due to littering and vehicle use. Fountain water containing chlorine and copperbased algaecides is toxic to aquatic life. Proper inspection, cleaning, and repair of pedestrian areas and HOA owned surfaces and structures can reduce pollutant runoff from these areas. Maintaining these areas may involve one or more of the following activities:**

1. **Surface Cleaning**
2. **Graffiti Cleaning**
3. **Sidewalk Repair**
4. **Controlling Litter**
5. **Fountain Maintenance**

## POLLUTION PREVENTION:

Pollution prevention measures have been considered and incorporated in the model procedures. Implementation of these measures may be more effective and reduce or eliminate the need to implement other more complicated or costly procedures. Possible pollution prevention measures for sidewalk, plaza, and fountain maintenance and cleaning include:

- Use dry cleaning methods whenever practical for surface cleaning activities.
- Use the least toxic materials available (e.g. water based paints, gels or sprays for graffiti removal).
- Once per year, educate HOA staff and tenants on pollution prevention measures.

## MODEL PROCEDURES:

### 1. Surface Cleaning

**Discharges of wash water to the storm water drainage system from cleaning or hosing of impervious surfaces is prohibited.**

**Sidewalks, Plazas**

✓ Use dry methods (e.g. sweeping, backpack blowers, vacuuming) whenever practical to clean sidewalks and plazas rather than hosing, pressure washing, or steam cleaning. DO NOT sweep or blow material into curb; use devices that contain the materials.

✓ If water must be used, block storm drain inlets and contain runoff. Discharge wash water to landscaping or contain and dispose of properly.

# SIDEWALK, PLAZA, ENTRY MONUMENT & FOUNTAIN MAINTENANCE

**Parking Areas, Driveways, Drive-thru**

✓ Parking facilities should be swept/vacuumed on a regular basis. Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.

✓ If water must be used, block storm drain inlets and contain runoff. Discharge wash water to landscaping or contain and dispose of properly.

✓ Sweep all parking lots at least once before the onset of the wet season.

✓ Use absorbents to pick up oil; then dry sweep.

✓ Appropriately dispose of spilled materials and absorbents.

OPTIONAL:

- Consider increasing sweeping frequency based on factors such as traffic volume, land use, field observations of sediment and trash accumulation, proximity to water courses, etc.

**Building Surfaces, Decks, etc., without loose paint**

✓ Use high-pressure water, no soap.

✓ If water must be used, block storm drain inlets and contain runoff. Discharge wash water to landscaping or contain and dispose of properly.

**Unpainted Building Surfaces, Wood Decks, etc.**

✓ If water must be used, block storm drain inlets and contain runoff. Discharge wash water to landscaping or contain and dispose of properly.

✓ If using a biodegradable or other cleaning agent to remove deposits contain and dispose of properly.

## 2. Graffiti Cleaning

**Graffiti Removal**

✓ Avoid graffiti abatement activities during rain events.

✓ When graffiti is removed by painting over, implement the procedures under Painting and Paint Removal in the Roads, Streets, and Highway Operation and Maintenance procedure sheet.

✓ Protect nearby storm drain inlets prior to removing graffiti from walls, signs, sidewalks, or other structures needing graffiti abatement. Clean up afterwards by sweeping or vacuuming thoroughly, and/or by using absorbent and properly disposing of the absorbent.

# SIDEWALK, PLAZA, ENTRY MONUMENT & FOUNTAIN MAINTENANCE

✓ Note that care should be taken when disposing of waste since it may need to be disposed of as hazardous waste.

OPTIONAL:

• Consider using a waterless and non-toxic chemical cleaning method for graffiti removal (e.g. gels or spray compounds).

## 3. Sidewalk Repair

**Surface Removal and Repair**

✓ Schedule surface removal activities for dry weather if possible.

✓ Avoid creating excess dust when breaking asphalt or concrete.

✓ Take measures to protect nearby storm drain inlets prior to breaking up asphalt or concrete (e.g. place hay bales or sand bags around inlets). Clean afterwards by sweeping up material.

✓ Designate an area for clean up and proper disposal of excess materials.

✓ Remove and recycle as much of the broken pavement as possible.

✓ When making saw cuts in pavement, use as little water as possible. Cover each storm drain inlet with filter fabric during the sawing operation and contain the slurry by placing straw bales, sandbags, or gravel dams around the inlets. After the liquid drains shovel or vacuum the slurry, remove from site and dispose of properly.

✓ Always dry sweep first to clean up tracked dirt. Use a street sweeper or vacuum truck. Do not dump vacuumed liquid in storm drains. Once dry sweeping is complete, the area may be hosed down if needed. Discharge wash water to landscaping, pump to the sanitary sewer if permitted to do so or contain and dispose of properly.

**Concrete Installation and Repair**

✓ Avoid mixing excess amounts of fresh concrete or cement mortar on-site. Only mix what is needed for the job.

✓ Wash concrete trucks off-site or in designated areas on-site, such that there is no discharge of concrete wash water into storm drain inlets, open ditches, streets, or other storm water conveyance structures. (See Concrete Waste Management BMP WM – 8)

# SIDEWALK, PLAZA, ENTRY MONUMENT & FOUNTAIN MAINTENANCE

✓ Store dry and wet concrete materials under cover, protected from rainfall and runoff and away from drainage areas. After job is complete remove temporary stockpiles (asphalt materials, sand, etc.) and other materials as soon as possible.

✓ Return leftover materials to the transit mixer. Dispose of small amounts of excess concrete, grout, and mortar in the trash.

✓ When washing concrete to remove fine particles and expose the aggregate, contain the wash water for proper disposal.

✓ Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stock pile, or dispose in the trash.

✓ Protect applications of fresh concrete from rainfall and runoff until the material has hardened.

## 4. Litter Control

✓ Enforce anti-litter laws.

✓ Provide litter receptacles in busy, high pedestrian traffic areas of the community, at recreational facilities, and at community events.

✓ Cover litter receptacles and clean out frequently to prevent leaking/spillage or overflow.

OPTIONAL:

• Post "No Littering" signs.

## 5. Fountain Maintenance

✓ Do not use copper-based algaecides. Control algae with chlorine or other alternatives, such as sodium bromide.

✓ Allow chlorine to dissipate for a few days and then recycle/reuse water by draining it gradually onto a landscaped area. Water must be tested prior to discharge to ensure that chlorine is not present (concentration must be less than 0.1 ppm).

✓ Contact local agency for approval to drain into sewer or storm drain.

✓ Avoid mixing excess amounts of fresh concrete or cement mortar on-site. Only mix what is needed for the job.

# EQUIPMENT MAINTENANCE & REPAIR

**Vehicle or equipment maintenance has the potential to be a significant source of stormwater pollution. Engine repair and service (parts cleaning, spilled fuel, oil, etc.), replacement of fluids, and outdoor equipment storage and parking (dripping engines) can all contaminate stormwater. Conducting the following activities in a controlled manner will reduce the potential for stormwater contamination:**

1. **General Maintenance and Repair**
2. **Vehicle and Machine Repair**
3. **Waste Handling/Disposal**

**Related vehicle maintenance activities are covered under the following program headings in this manual: "Vehicle and Equipment Cleaning", "Vehicle and Equipment Storage", and "Vehicle Fueling".**

## POLLUTION PREVENTION:

Pollution prevention measures have been considered and incorporated in the model procedures. Implementation of these measures may be more effective and reduce or eliminate the need to implement other more complicated or costly procedures. Possible pollution prevention measures for equipment maintenance and repair include:

- Review maintenance activities to verify that they minimize the amount of pollutants discharged to receiving waters. Keep accurate maintenance logs to evaluate materials removed and improvements made.
- Switch to non-toxic chemicals for maintenance when possible.
- Choose cleaning agents that can be recycled.
- Minimize use of solvents. Clean parts without using solvents whenever possible. Recycle used motor oil, diesel oil, and other vehicle fluids and parts whenever possible.
- Once per year, educate HOA staff and tenants on pollution prevention measures.

# EQUIPMENT MAINTENANCE & REPAIR

## MODEL PROCEDURES:

### 1. General Maintenance and Repair

**General Guidelines**

➔ *Note: Permission must be obtained for any discharge of wash water to the sanitary sewer from the local sewering agency.*

- ✓ Review maintenance activities to verify that they minimize the amount of pollutants discharged to receiving waters. Keep accurate maintenance logs to evaluate materials removed and improvements made.
- ✓ Regularly inspect vehicles and equipment for leaks.
- ✓ Move activity indoors or cover repair area with a permanent roof if feasible.
- ✓ Minimize contact of stormwater with outside operations through berming the local sewering and drainage routing.
- ✓ Place curbs around the immediate boundaries of the process equipment.
- ✓ Clean yard storm drain inlets regularly and stencil them.

**Good Housekeeping**

- ✓ Avoid hosing down work areas. If work areas are washed and if discharge to the sanitary sewer is allowed, treat water with an appropriate treatment device (e.g. clarifier) before discharging. If discharge to the sanitary sewer is not permitted, pump water to a tank and dispose of properly.
- ✓ Collect leaking or dripping fluids in drip pans or container. Fluids are easier to recycle or dispose of properly if kept separate.
- ✓ Keep a drip pan under the vehicle while you unclip hoses, unscrew filters, any discharge of or remove other parts. Place a drip pan under any vehicle that might leak while you work on it to keep splatters or drips off the shop floor.
- ✓ Educate employees on proper handling and disposal of engine fluids.
- ✓ Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- ✓ Do not pour liquid waste to floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections.
- ✓ Post signs at sinks and stencil outdoor storm drain inlets.

### 2. Vehicle Repair

**General Guidelines**

- ✓ Perform vehicle fluid removal or changing inside of a building or in a contained covered area, where feasible, to prevent the run-on of stormwater and the runoff of spills.
- ✓ Regularly inspect vehicles and equipment for leaks, and repair as needed.

# EQUIPMENT MAINTENANCE & REPAIR

- ✓ Use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- ✓ Immediately drain all fluids from wrecked vehicles. Ensure that the drain pan or drip pan is large enough to contain drained fluids (e.g. larger pans are needed to contain antifreeze, which may gush from some vehicles).
- ✓ Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- ✓ Recycle used motor oil, diesel oil, and other vehicle fluids and parts whenever possible.
- ✓ Oil filters disposed of in trash cans or dumpsters can leak oil. Place the oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters.
- ✓ Store cracked batteries in a non-leaking secondary container and dispose of properly at recycling facilities or at County hazardous waste disposal site.

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**Vehicle Leak and Spill Control**

- ✓ Use absorbent materials on small spills. Remove the absorbent materials promptly and dispose of properly.
- ✓ Place a stockpile of spill cleanup materials where it will be readily accessible.
- ✓ Sweep floor using dry absorbent material.

## 3. Machine Repair

- ✓ Keep equipment clean; don't allow excessive build-up of oil or grease.
- ✓ Minimize use of solvents.
- ✓ Use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- ✓ Perform major equipment repairs at the corporation yard, when practical.
- ✓ Following good housekeeping measures in Vehicle Repair section.

## 4. Waste Handling/Disposal

**Waste Reduction**

- ✓ Prevent spills and drips of solvents and cleansers to the shop floor.
- ✓ Do liquid cleaning at a centralized station so the solvents and residues stay in one area. Recycle liquid cleaners when feasible.

✓ Locate drip pans, drain boards, and drying racks to direct drips back into a solvent sink or fluid holding tank for reuse.

OPTIONAL:

- If possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous material:

  -Use non-caustic detergents instead of caustic cleaning for parts cleaning.

  -Use a water-based cleaning service and have tank cleaned. Use detergent-based or water-based cleaning systems in place of organic solvent degreasers.

  -Replace chlorinated organic solvents with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check list of active ingredients to see whether it contains chlorinated solvents.

  -Choose cleaning agents that can be recycled.

**Recycling**

OPTIONAL:

- Separate wastes for easier recycling. Keep hazardous and non-hazardous wastes separate, do not mix used oil and solvents, and keep chlorinated solvents separate from non-chlorinated solvents.

- Label and track the recycling of waste material (e.g. used oil, spent solvents, batteries).

- Purchase recycled products to support the market for recycled materials.

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## LIMITATIONS:

Space and time limitations may preclude all work being conducted indoors. It may not be possible to contain and clean up spills from vehicles/equipment brought on-site after working hours. Dry floor cleaning methods may not be sufficient for some spills – see spill prevention and control procedures sheet. Identification of engine leaks may require some use of solvents.

# POOL MAINTENANCE

***Pool chemicals and filter solids, when discharged to the City streets, gutters or storm drans, DO NOT GET TREATED before reaching the Santa Ana River. Chlorine, acid cleaning chemicals and metal-based algaecides used in pools can kill beneficial organisms in the food chain and pollute our drinking water.***

**When emptying your swimming pool, spa or fountain, please use one of the following best management practices to prevent water pollution:**

- Reuse the water as landscape irrigation
- Empty the water into the sewer between midnight and 6:00 am
- Remove solids and floating debris and dispose of in the trash, de-chlorinate the water to a chlorine residual = 0, wait 24 hours, then discharge the water to the street or storm drain
- Try not to use metal-based algaecides (i.e. copper sulfate) in your pool or spa. If you have, empty your pool or spa into the sewer. *Prior to discharging pool water into the sanitary sewer system, contact your local agency.*
- If the pool contains algae and mosquito larvae, discharge the water to the sewer

**When acid cleaning or other chemical cleaning:**

- Neutralize the pool water to pH of 6.5 to 8.5, then discharge to the sewer

**For swimming pool and spa filter backwash:**

- Dispose of solids into trash bag, then wash filter into a landscape area
- Settle, dispose of solids in trash and discharge water to the sewer, never to the storm drain

# » For Residents

*The following is a preview of the information we have available to residents. For more fact sheets, visit* ***sbcountystormwater.org***

## Household Hazardous Waste Center Locations

### DO YOU HAVE THE FOLLOWING ITEMS IN YOUR HOME?



Automotive Fluids
Batteries
Cooking Oil
Fertilizers & Pesticides
Fluorescent Bulbs
Household Cleaners
Medicine
Motor Oil & Filters
Paint Products
Pool Chemicals

**PROTECT YOUR COMMUNITY!**
**Take your toxic products to a local waste collection center:**

Big Bear Lake
Chino
Fontana
Ontario
Rancho Cucamonga
Redlands
Rialto
San Bernardino
Upland

**No business waste accepted. Must be a San Bernardino County resident.*

Find locations and a full list of items, visit
**tootoxictotrash.com**

SAN BERNARDINO COUNTY STORMWATER PROGRAM
WHERE WATER MEETS COMMUNITY



# WE DID IT OURSELVES AND WE DID IT RIGHT

When painting your home, protect your family and community.

- **PAINTS** that are water-based are less toxic and should be used whenever possible.
- **BRUSHES** with water-based paint should be washed in the sink. Those with oil-based paint should be cleaned with paint thinner.
- **SAFELY** dispose of unwanted paint and paint thinner.

The County of San Bernardino offers 9 HHW Centers that accept paint and other household hazardous waste from residents FREE of charge. For a list of acceptable materials, location information, and hours of operation visit TooToxicToTrash.com.

# VEHICLE MAINTENANCE

Oil, grease, anti-freeze and other toxic automotive fluids often make their way into the San Bernardino County storm drain system, and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution and protect public health.

**Cleaning Auto Parts**
Scrape parts with a wire brush or use a bake oven rather than liquid cleaners. Arrange drip pans, drying racks and drain boards so that fluids are directed back into the parts washer or the fluid holding tank. Do not wash parts or equipment in a sink, parking lot, driveway or street.

**Storing Hazardous Waste**
Keep your liquid waste segregated. Many fluids can be recycled via hazardous waste disposal companies if they are not mixed. Store all materials under cover with spill containment or inside to prevent contamination of rainwater runoff.

**Preventing Leaks and Spills**
Conduct all vehicle maintenance inside of a garage. Place drip pans underneath vehicle to capture fluids. Use absorbent materials instead of water to clean work areas.

**Cleaning Spills**
Use dry methods for spill cleanup (sweeping, absorbent materials). To report accidental spills into the street or storm drain call (877) WASTE18 or 911.

**Proper Disposal of Hazardous Waste**
Dispose of household hazardous waste by taking it to your nearest household hazardous waste center. For more information, call 1-800-OILY CAT or check out TooToxicToTrash.com.

# PET WASTE DISPOSAL






# » Get In Touch With Us Online!

**» Website**
*sbcountystormwater.org*

**» eUpdates**
*sbcountystormwater.org/newsletter*

**» Facebook**
*facebook.com/sbcountystormwater*

**» YouTube**
*youtube.com/sbcountystormwater*



**» Report Pollution Violations**
*sbcountystormwater.org/report*

**» Email**
*info@sbcountystormwater.org*