

09 HYDROLOGY AND DRAINAGE

INTRODUCTION

This section describes the environmental and regulatory setting for hydrology and water quality. It also describes impacts on hydrology and water quality that would result from implementation of the project and mitigation for significant impacts where feasible and appropriate. The setting information and analysis found in this chapter are based on the *Preliminary Drainage Report, Barrett Ranch East* prepared by MacKay & Soms in September 2015 (See Appendix F). Water supply and wastewater treatment are addressed in the Utilities chapter of this EIR.

ENVIRONMENTAL SETTING

The project site is situated on ruderal grasslands surrounded by commercial and residential development at elevations ranging from approximately 120 to 155 feet above sea level, outside of any 100-year floodplain or local floodplain. The project site drains to the west and north, and consists of gently hilly to undulating terrain. Slopes primarily range from 2% to 5% in steepness with isolated areas exceeding 5% in slope.

Historically, the site was used for grazing livestock, and portions of the property have been disked in recent years, although the topography has not been substantially altered. Don Julio Boulevard bisects the project site from north to south. As described and evaluated in the Biological Resources section of this document, there are ten vernal pools, a wetland swale, a drainage ditch and a channel on the property. Offsite, Sierra Creek is located approximately 1,000 feet west of the project site.

The existing site topography and hydrographic patterns are complex, as the project is at or near the drainage divides of three watersheds, labeled Southeast, North and West (each watershed was further divided into sub-basins for analysis). Each of the watersheds are described in more detail below. The site contains two local knolls, two ridgelines, two well-defined drainage ways, and five or six other sheet-flow or less-defined drainage corridors. As a result, stormwater discharges from the undeveloped site to the north, the east, the southeast, and to two different locations to the west. Storm water also drains onto the southwest portion of the site from the developed area near the southwest corner of the property. **Plate HD-1** below illustrates the overall drainage patterns of the site and the project vicinity. Each of the watersheds is described in more detail below.

West Project Drainage: This watershed consists of 28 on- and off-site sub-basins. **Plate HD-2** shows the existing on-site and off-site site drainage patterns and infrastructure for this area. Under existing conditions, runoff from the west drainage area flows along the west project boundary at Olberoning Way. There, runoff is collected and conveyed through an existing 36-inch diameter storm drain stubbed just past the

easterly improved end of Olbering Way within the neighboring Barrett Ranch West subdivision. When storm water exceeds the drain's conveyance capacity, water ponds at this node and then continues to the west as street surface flow in Olbering Way to Titan Drive. This large storm drain was stubbed out to this location as part of the Barrett Ranch West improvements in anticipation of future development of the project site.

An existing sump in Elverta Road lies slightly east of its intersection with Titan Drive. This sump is comprised of two pairs of two large catch basins, placed roughly 213 feet apart. These basins collect surface flows and drain into a pair of 60-inch diameter pipes that run northwest beneath Elverta Road. Further downstream, triple 60-inch pipes convey flows westward, also beneath Elverta Road. These pipes eventually discharge into Sierra Creek approximately 1,000 feet west of the Elverta Road and Titan Drive intersection.

Southeast Project Drainage: This watershed in the southeastern portion of the project site consists of one on-site sub-basin and several off-site sub-basins. **Plate HD-3** below shows these drainages. Flood water occasionally collects in an existing roadway sump in Antelope Road, just east of Don Julio Boulevard. In addition, there is a shallow surface depression in the southeasterly corner of the project site that acts as informal storage for the Antelope Road drainage system.

North Project Drainage: This watershed consists of four on-site sub-basins and 14 off-site sub-basins, illustrated on **Plate HD-4** below. This area drains to four different drainage systems, each with limited capacity to accept additional runoff. Three of the four drainage systems are nearly incapable of discharging overland release flows. The fourth's ability to release overland flows is limited.

Plate HD-1: Existing Drainage Subbasins

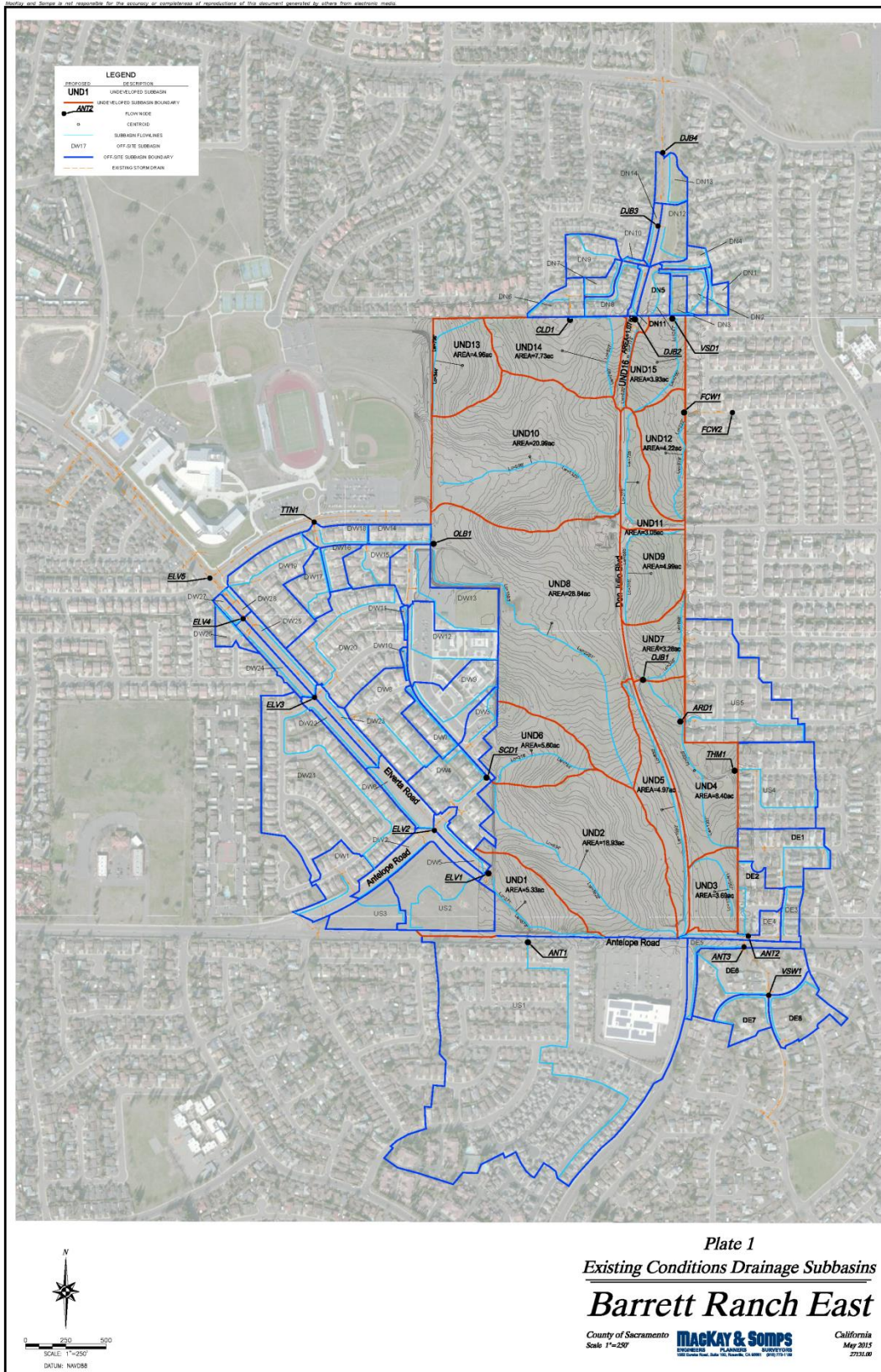


Plate HD-2: West Boundary Drainage

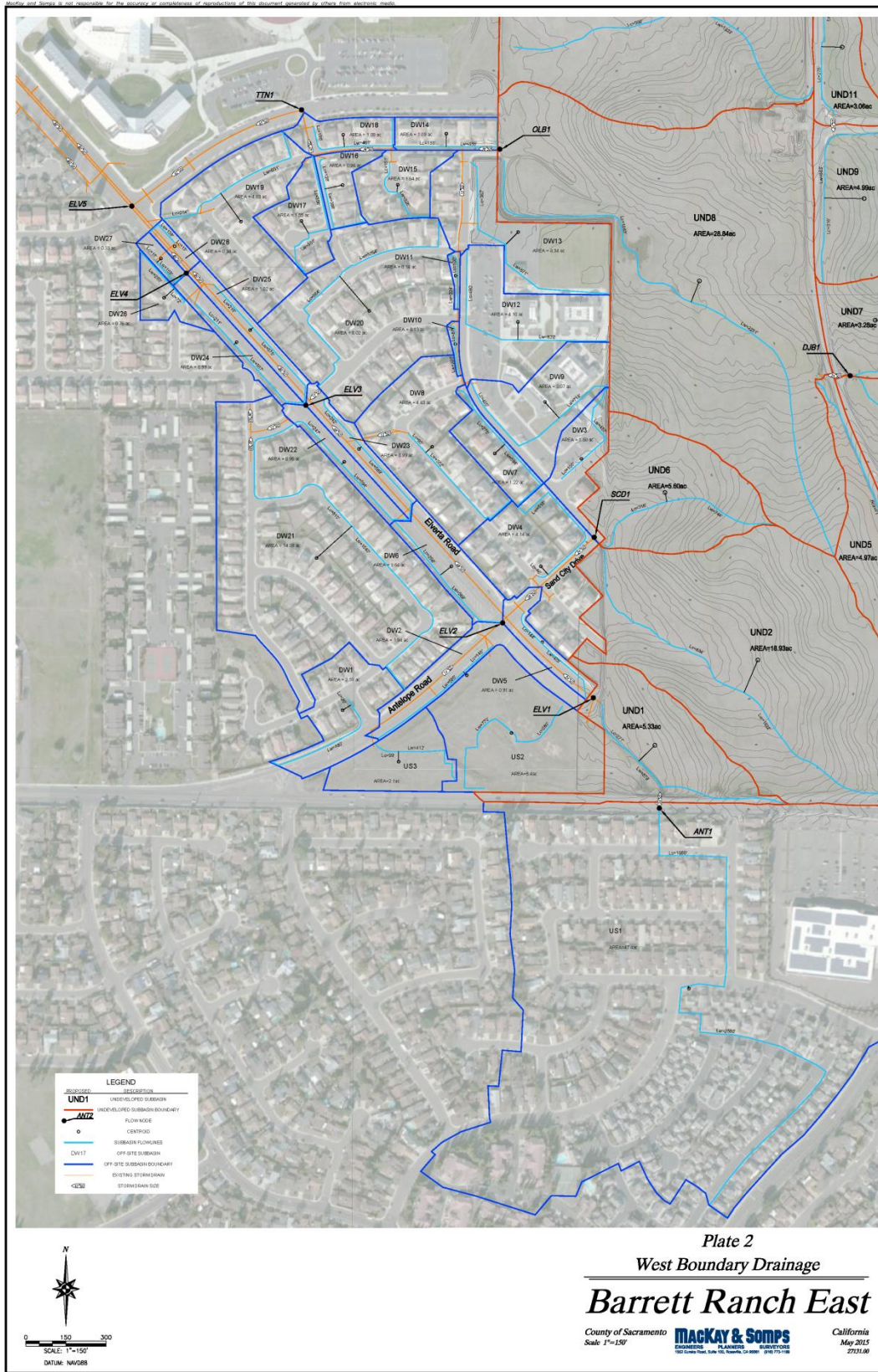


Plate HD-3: Southeast Corner Drainage

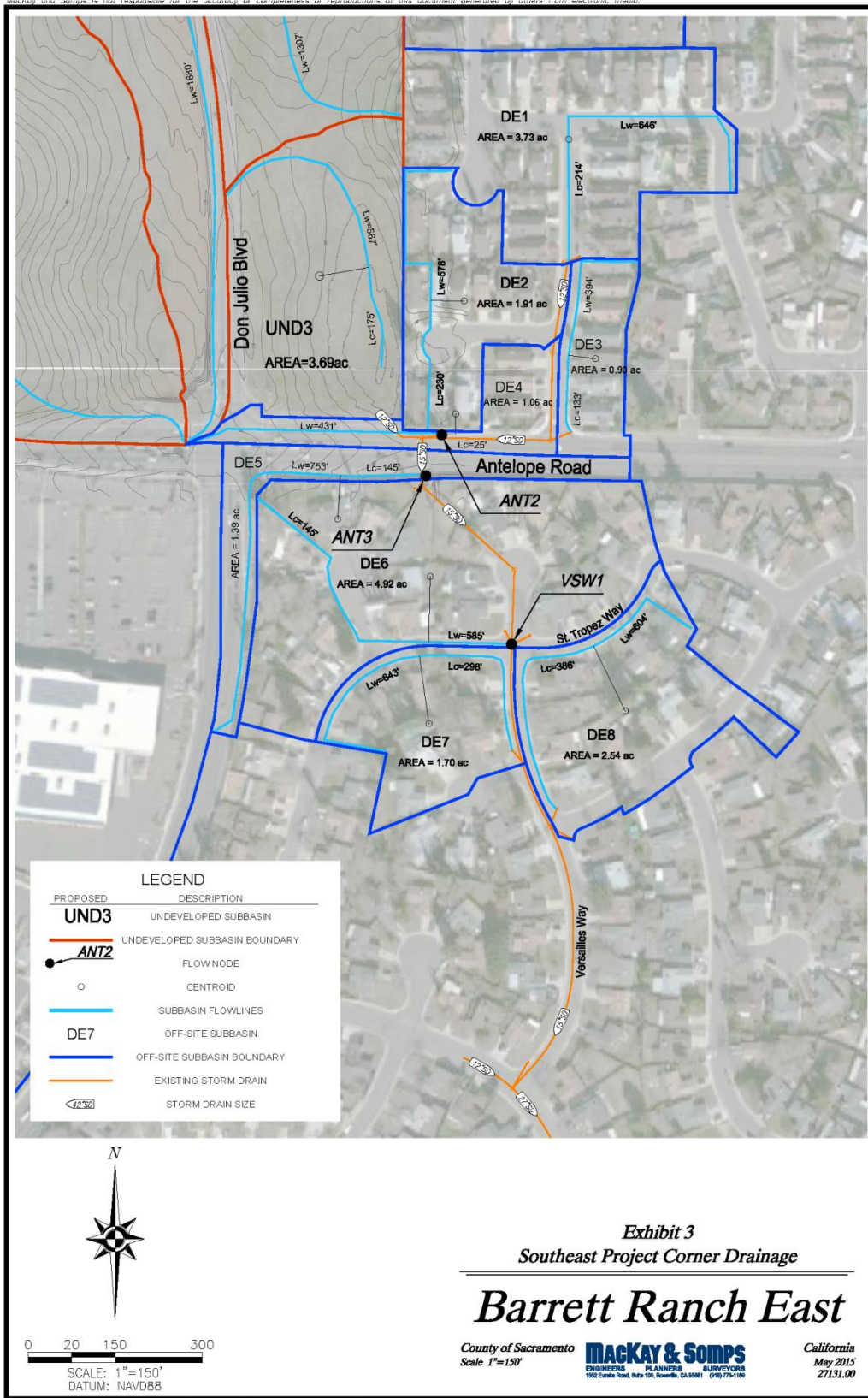
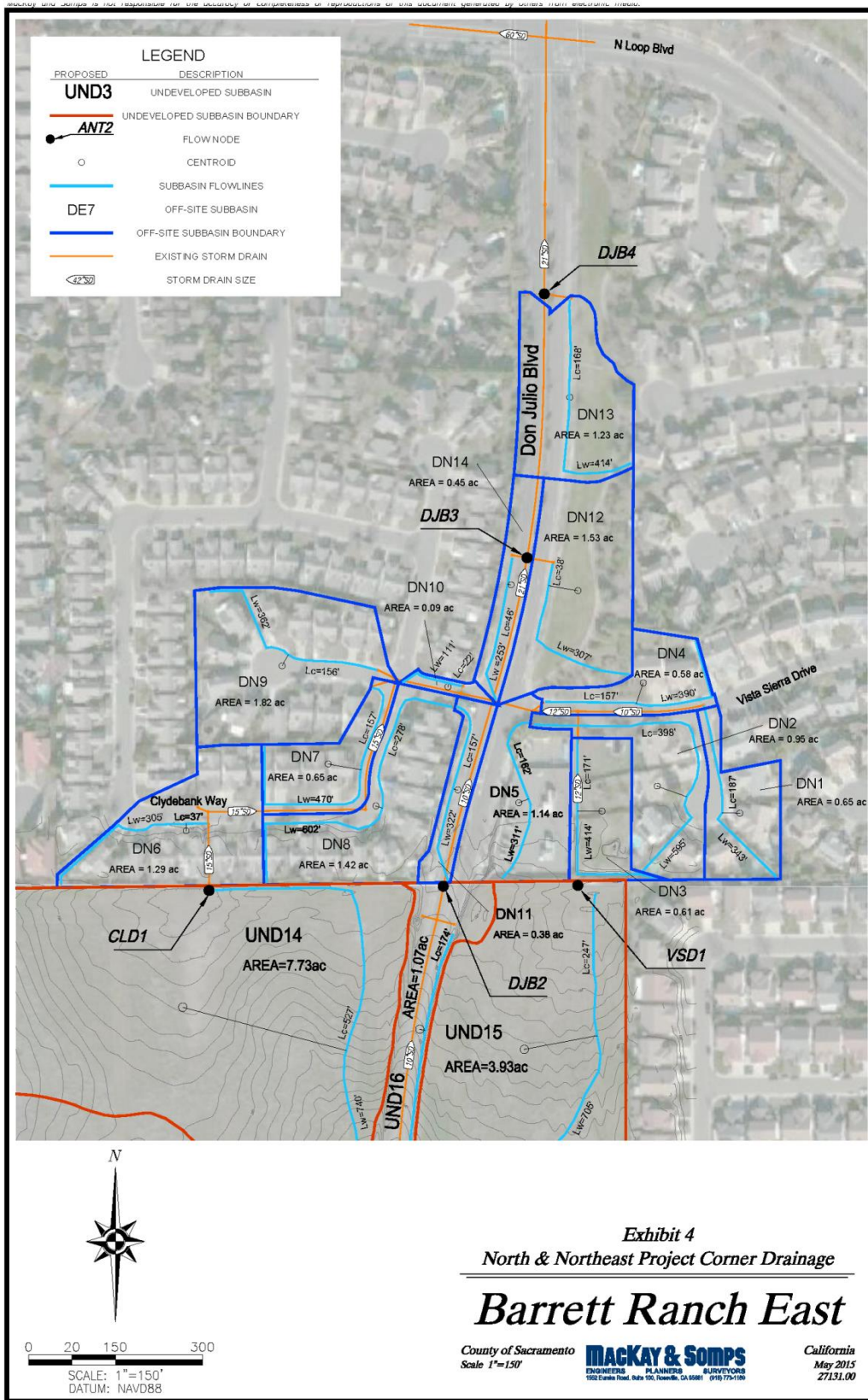


Exhibit 3
 Southeast Project Corner Drainage
Barrett Ranch East

County of Sacramento **Mackay & Somps** California
 Scale 1"=150' ENGINEERS PLANNERS SURVEYORS
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Plate HD-4: North and Northeast Corner Drainage



REGULATORY SETTING

WATER QUALITY LEGISLATION

Government agencies regulate potential impacts to water quality in order to comply with legislative acts such as: the Clean Water Act (CWA), the Porter-Cologne Water Quality Act (Porter-Cologne), the Rivers and Harbors Act, and the California Environmental Quality Act (CEQA). The Clean Water Act contributes to the dramatic improvement of surface water bodies in the United States. The Rivers and Harbors Act prevents obstructions to navigation, including dumping of trash and sewage. CEQA prevents avoidable damage to water quality by requiring changes in projects through the use of alternatives or mitigation measures [15002(a)(3)]. Coordinated efforts by the following agencies protect water supplies from degradation:

- County of Sacramento
- Sacramento Area Flood Control Agency (SAFCA)
- California Department of Fish and Game (Fish and Game)
- State Water Resources Control Board (State Water Board)
- Regional Water Quality Control Board (Regional Water Board)
- State Lands Commission
- U.S. Coast Guard (Coast Guard)
- National Park Service (NPS)
- State Department of Water Resources Reclamation Board
- U.S. Army Corps of Engineers (Army Corps)

CLEAN WATER ACT

The Clean Water Act (CWA) is the Federal regulation covering surface water quality – it does not address either groundwater or water quantity. Surface waters protected by the CWA must either be navigable or hydrologically connected to a navigable water. The provisions of the CWA are administered and regulated primarily by the Environmental Protection Agency (EPA), the California EPA (Cal EPA), the Army Corps, and the State and Regional Water Boards. Under the “umbrella” of Cal EPA, the State and Regional Water Boards are responsible for administration of the National Pollutant Discharge Elimination System program, which deals with stormwater pollution from construction, industrial areas, and municipal areas. The Army Corps is responsible for issuance of the CWA Section 404 permit, which deals with the discharge of dredged or fill material in a surface water, and the State and Regional Water Boards are responsible for issuance of the CWA Section 401 permit, which covers the same activity. Section 303(d) of the Clean Water Act (CWA) also requires States to identify “impaired” waters that do not meet water quality standards, and to develop plans to address polluted water bodies on the 303(d) list (called Total Maximum Daily Load plans, or TMDLs).

STORMWATER POLLUTION AND EROSION CONTROL

Section 402 of the CWA established the National Pollutant Discharge Elimination System (NPDES) permit program to prohibit the unauthorized discharge of pollutants from a point source to U.S. waters. The County of Sacramento has obtained a Municipal Stormwater NPDES permit from the Central Valley Regional Water Quality Control Board under the requirements of the Clean Water Act, to reduce pollutants found in urban stormwater runoff to the maximum extent practicable. The County complies with this permit by developing and enforcing ordinances and requirements to reduce the discharge of sediments and other pollutants in runoff from areas within the County.

Sacramento County must verify compliance with permit requirements by monitoring effluent, maintaining records, and filing periodic reports. A provision of the NPDES permit is the requirement that Sacramento County develop a Construction Site Management Program. The Construction Site Management Program is intended to help protect the water quality of surface waters by minimizing the amount of sediment runoff from a construction site. This is accomplished by enforcement of the existing County Land Grading and Erosion Control Ordinance.

The County has established a Stormwater Ordinance (Sacramento County Code 15.12). The Stormwater Ordinance prohibits the discharge of unauthorized non-stormwater to the County's stormwater conveyance system and local creeks. It applies to all private and public projects in the County, regardless of size or land use type. In addition, Sacramento County Code 16.44 (Land Grading and Erosion Control) requires private construction sites disturbing one or more acres or moving 350 cubic yards or more of earthen material to obtain a grading permit. To obtain a grading permit, project proponents must prepare and submit for approval an Erosion and Sediment Control (ESC) Plan describing erosion and sediment control Best Management Practices (BMPs) that will be implemented during construction to prevent sediment from leaving the site and entering the County's storm drain system or local receiving waters. Construction projects not subject to SCC 16.44 are subject to the Stormwater Ordinance (SCC 15.12) described above.

In addition to complying with the County's ordinances and requirements, construction sites disturbing one or more acres are required to comply with the State's General Stormwater Permit for Construction Activities. The Construction General Permit is issued by the State Water Resources Control Board (<http://www.waterboards.ca.gov/stormwtr/construction.html>) and enforced by the Regional Board. Coverage is obtained by submitting a Notice of Intent (NOI) to the State Board prior to construction. The General Permit requires preparation and implementation of a site-specific Stormwater Pollution Prevention Plan (SWPPP) that must be kept on site at all times during construction for review.

Applicable projects applying for a County grading permit must show proof that a NOI has been filed and must submit a copy of the SWPPP. Although the County has no enforcement authority related to the Construction General Permit, the County is

required by its Municipal Stormwater Permit (Order Number R5-2008-0142) to verify that the SWPPP program includes six minimum components:

1. Public education and outreach on storm water impacts,
2. Public involvement participation,
3. Illicit discharge detection and elimination,
4. Construction site storm water runoff control,
5. Post-construction storm water management in new development and redevelopment, and
6. Pollution prevention/good housekeeping for municipal operations.

In addition to the above construction controls, new development is required to include treatment of urban runoff using the BMPs required by the current standard defined in the *Stormwater Quality Design Manual for the Sacramento and South Placer Regions, 2007*. The BMPs include a number of options for treatment including simple grassy swales and rain gardens, to more complex systems that use cisterns, pumps, and sand filters. Updates and background on the County's requirements for post-construction stormwater quality treatment controls, along with several downloadable publications, can be found at the following websites:

<http://www.waterresources.saccounty.net/stormwater/Pages/default.aspx>

<http://www.waterresources.saccounty.net/stormwater/Pages/newdevelopment.aspx>

PORTER-COLOGNE WATER QUALITY ACT

The Porter-Cologne Water Quality Act is part of the California Water Code, and is intended to protect the quality of waters within the State. Porter-Cologne covers many of the same issues as the Federal Clean Water Act (see below), but is specific to the needs and objectives of the State. Waters protected by the Clean Water Act must be navigable or hydrologically connected to navigable waters, whereas Porter-Cologne protects non-navigable, or "isolated", waters. The State Water Resources Control Board (Water Board) and the Regional Water Quality Control Boards (Regional Water Board) are responsible for the coordination and control of water quality protection efforts related to Porter-Cologne. Porter-Cologne requires each Regional Water Board to prepare and adopt a Basin Plan. According to Section 13050 of the California Water Code, Basin Plans consist of a designation or establishment for the waters within a specified area of beneficial uses to be protected, water quality objectives to protect those uses, and a program of implementation needed for achieving the objectives.

The Basin Plan for the Sacramento River and the San Joaquin River Basin (October 2011) identifies the following as the beneficial uses of waters within the basin (not all are applicable to every water body): municipal water supply, agricultural water supply,

industrial water supply, recreation, freshwater habitat, fish migration, fish spawning, wildlife habitat, and navigation. The “Implementation” section of the Basin Plan describes the various mechanisms used by the Regional Water Board to ensure that Basin Plan standards and policies are achieved. Mechanisms which are most germane to the discussion of this project’s impacts include: municipal and industrial National Pollutant Discharge Elimination System permits, construction National Pollutant Discharge Elimination System permits, and the 303(d) listing of impaired waters. All of these implementation mechanisms are described in sections that follow, and the project’s impacts related to these are analyzed.

SACRAMENTO COUNTY GENERAL PLAN

Several General Plan elements contain policies relevant to flooding and water quality: the Circulation Element, Conservation Element, and Safety Element. The policies of greatest relevance to the project are included below:

CI-65. Incorporate Low Impact Design (LID) techniques to the greatest extent feasible to improve water quality runoff and erosion control, infiltration, groundwater recharge, visual aesthetics, etc. LID techniques may include but are not limited to:

- Bioretention techniques, such as filtration strips, swales, and tree box filters
- Permeable Hardscape
- Green roofs
- Erosion and sediment controls
- Reduced street and lane widths where appropriate

CO-24. Comply with the Sacramento Areawide National Pollutant Discharge Elimination System Municipal Stormwater Permit (NPDES Municipal Permit) or subsequent permits, issued by the Central Valley Regional Water Quality Control Board (Regional Board) to the County, and the Cities of Sacramento, Elk Grove, Citrus Heights, Folsom, Rancho Cordova, and Galt (collectively known as the Sacramento Stormwater Quality Partnership [SSQP]).

CO-30. Require development projects to comply with the County’s stormwater development/design standards, including hydromodification management and low impact development standards, established pursuant to the NPDES Municipal Permit.

CO-31. Require property owners to maintain all required stormwater measures to ensure proper performance for the life of the project.

SA-14. The County shall require, when deemed to be physically or ecologically necessary, all new urban development and redevelopment projects to

incorporate runoff control measures to minimize peak flows of runoff and/or assist in financing or otherwise implementing Comprehensive Drainage Plans.

SIGNIFICANCE CRITERIA

This analysis uses the following criteria based on Appendix G of the CEQA Guidelines to determine whether an impact is significant:

1. A violation of any water quality standard or waste discharge requirement.
2. A substantial alteration of the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion, siltation, and/or environmental harm on- or off-site (hydromodification).
3. Creation or contribution of runoff water that would provide substantial additional sources of polluted runoff. Changes in water quality would be considered substantial if the project will not comply with the County NPDES Program, or there is a net increase in any other pollution source associated with an impaired waterway (under Section 303d of the Clean Water Act).
4. Substantial increase to the rate or amount of surface runoff in a manner that would result in flooding on- or off-site.
5. Creation or contribution of runoff water that would exceed the capacity of existing or planned stormwater drainage systems.
6. Placement of housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map, or other flood hazard delineation map.
7. Placement of structures within a 100-year flood hazard area that would impede or redirect flood flows.
8. Exposure of people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of a failure of a levee or dam.

Impacts not discussed include Criteria 6, 7 and 8. The project site is not in a floodplain or a 100-year flood hazard area, will not result in the placement of any structure within a 100-year flood hazard area, and is not located within a dam or levee failure inundation area. Therefore, these criteria are not further analyzed.

METHODOLOGY

The analysis below relies on the drainage report prepared for this project:

MacKay & Soms, Preliminary Drainage Report, Barrett Ranch East (revised September 2015)

This report evaluated the site's existing watershed characteristics and existing drainage, and is intended to serve as the master-planning framework for the project's storm water strategies. It includes designs for two storm water detention facilities and for storm water piping systems. The report was reviewed and revised in response to comments from the Sacramento County Department of Water Resources (DWR).

The drainage report proposes drainage solutions, which are described below, that have been designed to meet the County's drainage requirements for the project site. Based on their review, DWR has determined that the proposed solutions are appropriate at this time to allow for analysis and implementation of the project. A subsequent memorandum to the drainage report from MacKay & Soms stated that other, similar "solutions" could be designed later during the site-improvement plan phase of the project. As additional studies are prepared during later phases of project development, if the project is approved, then it is possible that the exact details of the drainage solutions presented could be modified.

IMPACTS AND ANALYSIS

IMPACT: CONTRIBUTION OF POLLUTED RUNOFF (CRITERIA 1, 2, 3)

LEVEL OF IMPACT: LESS THAN SIGNIFICANT

Pollutants entering waterways are generally categorized by regulatory agencies as either point or nonpoint discharge. A point source discharge is one that comes from a specific location, such as a wastewater treatment plant outfall. A nonpoint source discharge is one that comes from multiple locations over a wide land area, and is the type of pollution that occurs because of land development and human land uses. Rainwater or irrigation runoff flows over agricultural fields, streets, parking lots, backyards, and other areas, picking up sediment, pesticides, fertilizers, heavy metals, oils, and other pollutants before ultimately flowing into a waterway. Nonpoint source pollution may be generated both during construction and after a site is operational; construction and operations are discussed separately below.

CONSTRUCTION IMPACTS

The project would result in construction of streets, drainage infrastructure, buildings, and other paved areas. Water quality impacts could occur during construction from uncontrolled soil erosion and sedimentation from vegetation clearing, natural drainage alteration and grading. Construction also involves solvents, paints, concrete, and other materials that can be carried by storm water runoff into waterways.

During the wet season (October 1 – April 30), development on the project site would be required to include an effective combination of erosion, sediment, and other pollution-control BMPs in compliance with the Sacramento County Stormwater Ordinance, the

Land Grading and Erosion Control Ordinance, and the State's Construction General Permit. During the rest of the year, erosion controls typically are not required except in the case of predicted rain.

Examples of erosion controls include: stabilized construction entrances, tackified mulch, 3-step hydroseeding, spray-on soil stabilizers, and anchored blankets. Sediment controls help to filter sediment out of runoff before it reaches the storm drains and local waterways. Examples include rock bags to protect storm drain inlets, staked or weighted straw wattles/fiber rolls, and silt fences. Erosion control plans are a requirement of the County grading permit, and would be developed and submitted for approval prior to the commencement of grading. The plan for the proposed project would be tailored to address the constraints specific to the proposed grading area.

In addition to erosion and sediment controls, individual development projects that occur as a result of project approval must have BMPs in place to keep other construction-related wastes and pollutants out of the storm drains. Such BMPs include, but are not limited to:

- Filtering water from dewatering operations,
- Providing proper washout areas for concrete trucks and stucco/paint contractors,
- Containing wastes,
- Managing portable toilets properly, and
- Dry sweeping instead of washing down dirty pavement.

Compliance with adopted Ordinances and standards will ensure that future development projects implemented as a result of project approval will not cause violation of a water quality standard or waste discharge requirement, result in substantial erosion or siltation, and will not result in substantial increases to polluted runoff associated with construction; impacts are ***less than significant***.

OPERATIONAL IMPACTS (POST-CONSTRUCTION IMPACTS)

New development proposed by the project would result in the conversion of most of the currently undeveloped project site to a developed site with roads, sidewalks, homes, buildings, and parking lots, all of which would increase the amount of impervious surfaces within the project site. Too much impervious area can interfere with water soaking into soil and result in increases in runoff from a site.

In addition to the addition of impervious surfaces to a currently undeveloped site, development of the project would result in the use of substances that could pollute waterways if not regulated. For example, vehicles deposit heavy metals, oils, and other substances onto roadways, parking lots, and driveways; residents wash their cars in streets and driveways, and the water picks up soaps, waxes, dirt, oils, and heavy metals

from the cars; people maintaining landscaped areas often use pesticides and fertilizers. In areas with increased impervious surfaces and increases in surface flow, water carries these and other pollutants into storm drains, where the water flows without treatment directly into the streams that provide drinking water, recreation, and wildlife habitat. This runoff could increase pollutant loads to such an extent that the waterway becomes “impaired” i.e. where pollutant levels exceed clean water standards for the waterway. Nutrients in fertilizers can affect water quality, because they promote blooms of algae. Algal blooms use up oxygen in the water body, decreasing the amount available for aquatic organisms. Water temperatures can be increased as well, which decreases dissolved oxygen, affecting aquatic organisms’ viability. Increases in discharge amounts or velocity have the potential to greatly accelerate downstream erosion and impair stream habitat in natural drainage systems.

It is critical that stormwater runoff be treated, in particular for the first flush that carries the greatest pollutant concentration. Typically, the first flush is the first ½ inch of rain after an extended dry period, which is common in the regional climate. The first flush carries the accumulation of many weeks or months of pollutants that have been deposited onto the soils, pavement, and plants. It is impractical to treat *all* stormwater runoff during large storm events, but standard water quality treatment methods can treat the first inch of run-off, which is highly beneficial and can avoid significant impacts to water quality.

Sacramento County requires that projects include source and/or treatment control measures on most new development projects. Using the BMPs required by the current standard defined in the *Stormwater Quality Design Manual for the Sacramento and South Placer Regions, 2007* and subsequent editions in the years to come, Low Impact Development components and other measures will be required. These may include simple grassy swales and rain gardens, to more complex systems that use cisterns, pumps, and sand filters. Basic source controls applicable to all projects include “No Dumping – Drains to Creek/River” stencils/stamps on storm drain inlets to educate the public, and providing roofs over areas likely to contain pollutants, so that rainfall does not contact the pollutants.

Compliance with the County Stormwater Ordinance and implementation of Low Impact Development Standards would ensure that development of the site would not alter the course of local waterways in a manner that results in substantial erosion or siltation, would not cause violation of a water quality standard or waste discharge requirement, and would not result in substantial increases to polluted runoff. Accordingly, impacts are anticipated to be ***less than significant***.

MITIGATION MEASURES:

None required.

**IMPACT: INCREASES IN SURFACE RUNOFF, IMPACTS TO EXISTING OR
PLANNED DRAINAGE SYSTEMS (CRITERIA 4, 5)**

LEVEL OF IMPACT: LESS THAN SIGNIFICANT

A drainage study was prepared for the project to evaluate whether the project would detrimentally increase surface runoff, cause flooding or adversely affect existing infrastructure. Downstream infrastructure capacity was also examined. The study also relied on results from the 2004 drainage analysis performed for the Barrett Ranch West subdivision project located directly to the west of the project site (referred to as the BRW study). A combination of subsurface flood control storage facilities and above ground detention basins was assumed in the modeling to minimize the number of detention basins required on the project site. **Plate HD-5, Plate HD-6, and Plate HD-7** depict the proposed storm drainage system, drainage basins, and overland release flow system proposed for the project.

Drainage conditions and solutions vary greatly by area, so each of the three drainage areas were evaluated separately in the drainage study as described below.

Plate HD-5: Proposed Storm Drain System

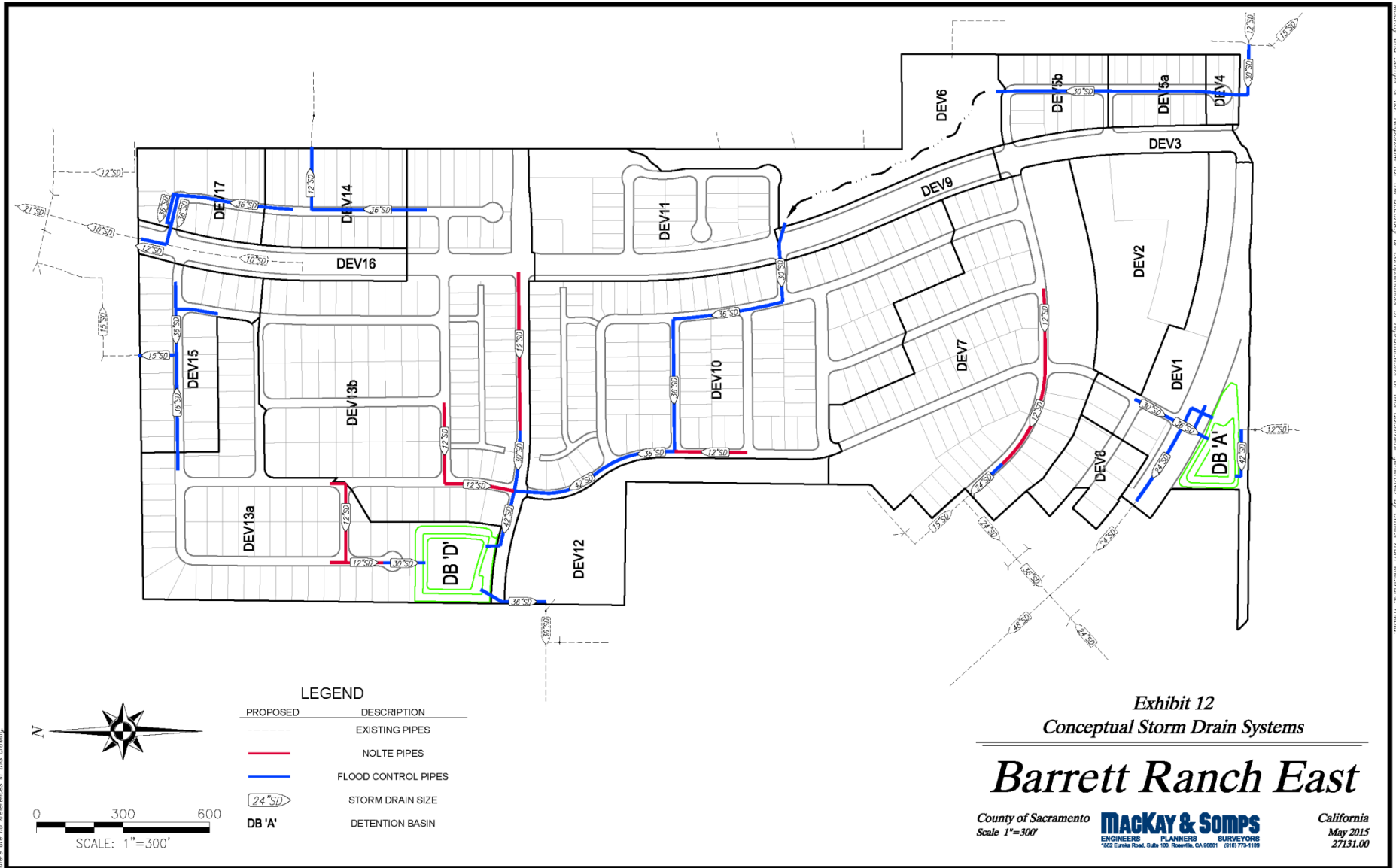


Plate HD-6: Proposed Overland Release Flow System

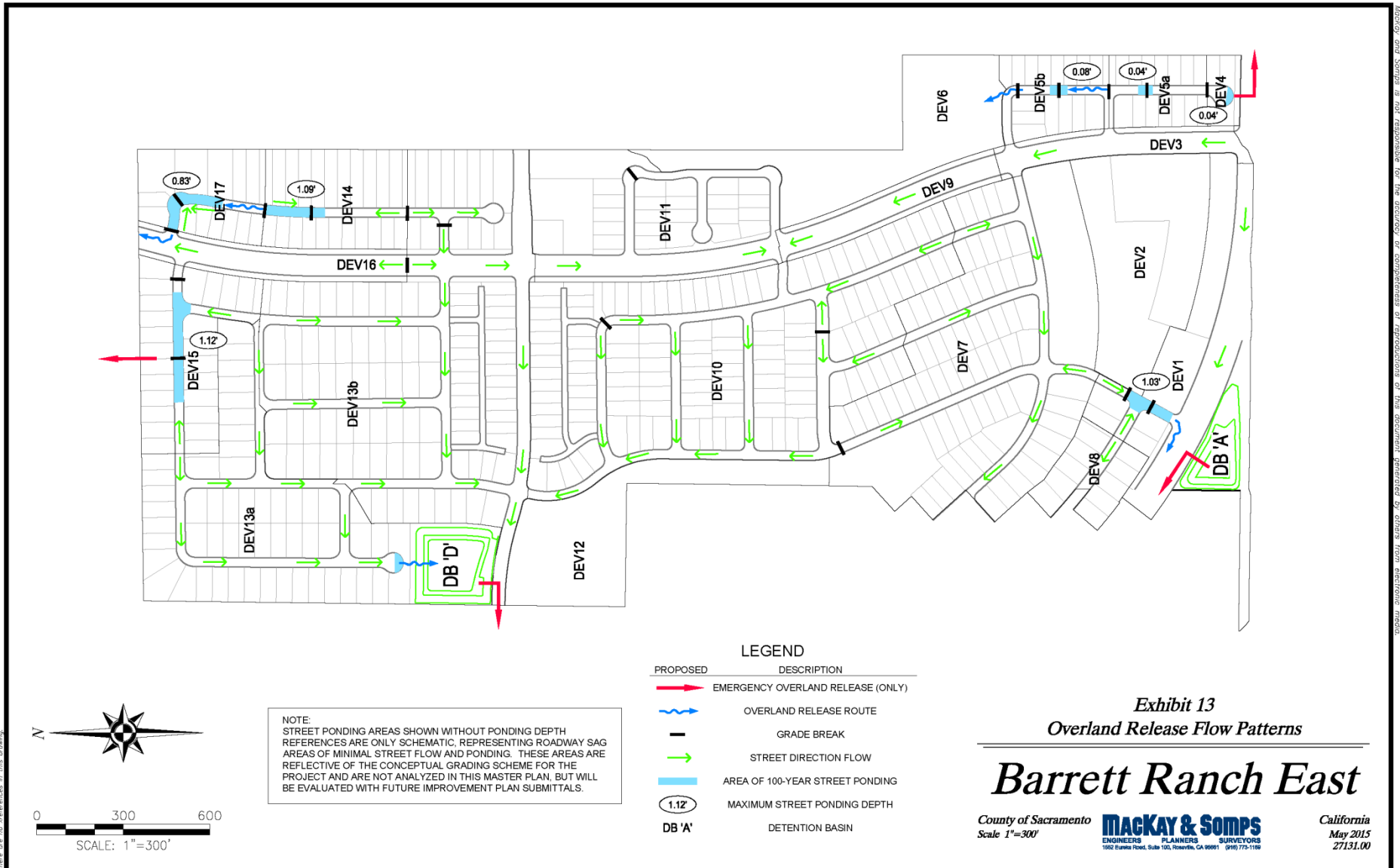


Plate HD-6: Proposed Overland Release Flow System

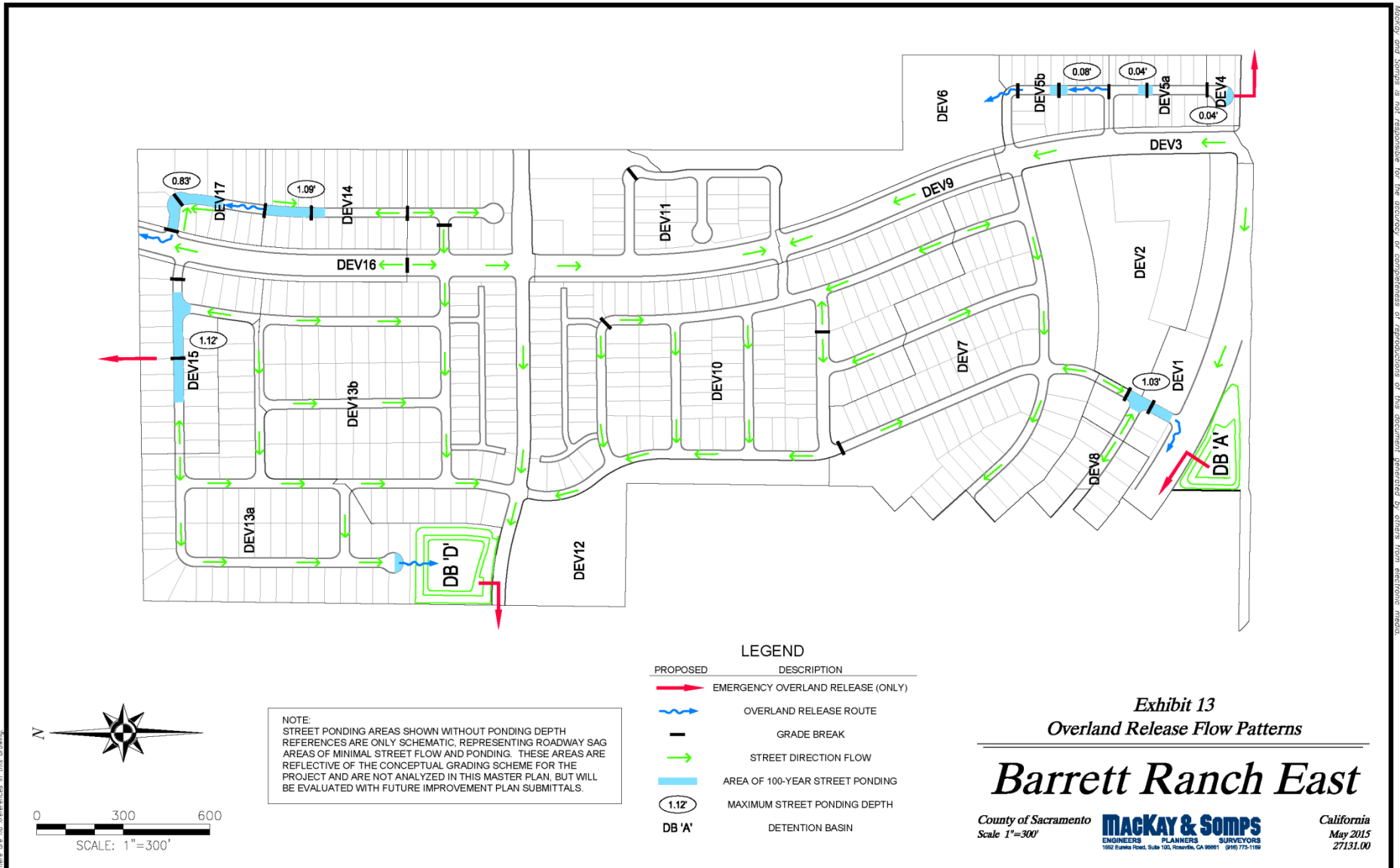


Exhibit 13
Overland Release Flow Patterns

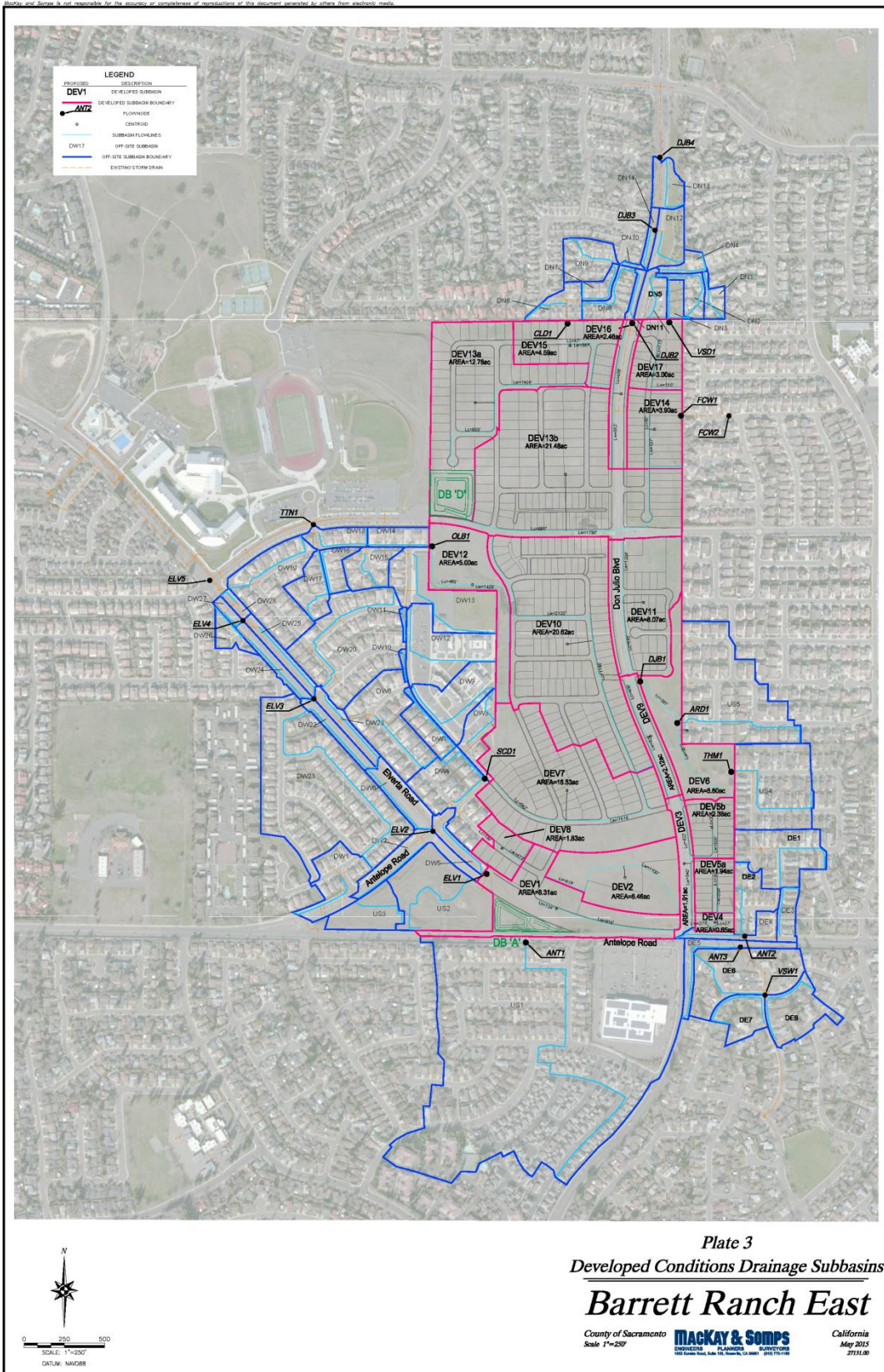
Barrett Ranch East

County of Sacramento
Scale 1"=300'

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Plate HD-7: Developed Condition Drainage



SOUTHEAST PROJECT DRAINAGE

Development of the southeast corner of the site (Subbasins UND3, DE1 – DE8) with the existing drainage conditions would exacerbate flooding on Antelope Road during storm events. Ponding occurs at this location due to existing capacity limitations of the existing infrastructure in Antelope Road and because the storm drain inlet at Antelope Road is at a higher elevation than the surrounding terrain. Connecting a new 30-inch pipe to the bottom (invert) of the Antelope Road storm drain manhole that drains northward will eliminate ponding at this location and provide adequate drainage.

NORTH PROJECT DRAINAGE

This area of the site drains to four different drainage systems. Each of these was found to have very limited capacity to accept runoff or to discharge overland storm water flows once developed (Subbasins UND12, UND14, UND15, UND16, DN1-DN14). This system can continue to function if peak-level runoff is detained within new underground storage on site, as proposed by the drainage report to meet DWR requirements.

Specifically, in the developed condition, runoff from (new) Subbasin DEV14 would be detained by an underground 400-foot long, 36-inch diameter stormwater storage facility. The maximum flow allowed downstream from this facility in a proposed 12-inch outlet pipe (to the east) would be approximately 5.6 cfs, as set by the existing condition's peak 100-year flow. With the proposed pipe and street surface storage volume, and with a minor overland release to the north, the proposed condition's peak flow to the east is less than 5 cfs, at least 0.6 cfs less than the provided capacity.

Although modeling for this facility was done with a single inlet, it is likely that supplementary drop inlets would be provided along the length of the 400-foot storage pipe as well as at a roadway sump at the system outlet location, so that during storm events runoff could drain quickly without excessive ponding.

Runoff from Subbasin DEV15 would be managed by a combination of underground detention storage and street surface storage volume. The proposed system would use an underground 36-inch diameter pipe storage facility, without any overland release capacity. The pipe storage system at this location would be 800-feet long to allow detention of 100 percent of the 100-year flows within the pipes and the street surfaces above. A 15-inch outlet pipe (to the north) would allow a maximum flow of 7.0 cfs, as set by the existing condition's peak 100-year flow. The hydraulic model predicted that the peak flow to the north at this location would be 7.0 cfs, equal to the discharge capacity of the proposed outlet pipe. Like the DEV14 facility, DEV15 was modeled with a single inlet, but would also use drop inlets along the length of the storage pipe, and at the roadway sump at the system outlet location.

Runoff from Subbasin DEV17 would be collected and detained much like that of DEV14. A 600-foot long, 36-inch diameter pipe would attenuate flows from both DEV17 and a portion of overland release flow from Subbasin DEV14. The drainage study proposes that a combination of parallel pipe segments be installed – one 400-foot pipe segment

and two 100-foot pipe segments in parallel, accomplishing a total detention capacity of a 600-foot pipe.

A roadway sump on Don Julio Boulevard would be provided for this subbasin to accommodate the volume and intensity of rainfall that exceeds a 100-year event. The sump would limit the maximum overland release into Don Julio Boulevard to approximately 1.5 cfs. When combined with street surface flows from Subbasin DEV16, this discharge would not increase 100-year ponding depths on Don Julio Boulevard downstream of this project.

WEST PROJECT DRAINAGE

This drainage area encompasses the remaining on-site subbasins and off-site Subbasins DW1 – DW28. The existing system that drains this area was installed with the Barrett Ranch West project and was designed to handle the proposed project's future runoff when developed. The system consists of drainage pipes for lower intensity storms, large diameter trunk drainage pipes to convey 100-year flows, and surface capacity in the streets.

The southernmost portion of this area and runoff from off-site Subbasin US1 would drain to proposed Detention Basin A, south of the future extension of Antelope Road. Part of the central portion of this area (Subbasin DEV7) would drain directly, without detention, to Sand City Drive. The remainder of Subbasin DEV7, and areas south of the North Project Drainage area would drain to the proposed Detention Basin D in Lot G, north of Titan Drive at the project's west boundary. Runoff from the existing sump in Antelope Road, as well as flow from Subbasins US4 and US5 would also drain into Detention Basin D. See Plate **Plate HD-7**¹ for the locations of the proposed detention basins.

STORMWATER QUALITY DETENTION FACILITIES

The proposed project would require a minimum stormwater quality storage volume of 5.03 acre-feet. As noted in the discussion above and depicted in Plate HYD-X, there are two detention basins proposed: Basin A, located in the southwest corner of the project site, would be designed to accommodate a volume of 2.14 acre-feet of stormwater flows. Basin D, proposed on the north side of Titan Road at the site's west boundary, would provide for a storage volume of 4.16 acre-feet of stormwater. Together, the basins could accommodate a total storage volume of 6.30 acre-feet, providing approximately 1.27 acre-feet of excess capacity.

¹ Plate **Plate HD-7** depicts a land use plan that varies slightly from the land plan as currently proposed. DWR staff have indicated that the conclusions of the drainage study, including the sizing of the proposed detention basin, still apply and are appropriate for the proposed project.

ANALYSIS

The proposed project would result in the development of a stormwater drainage system specifically designed to fully capture and detain all new stormwater flows generated by the proposed project. In the Southeast drainage area, a 30" pipeline located at the bottom of the Antelope Road storm drain is proposed that would alleviate ponding issues in that area and in the existing subdivision located south of Antelope Road. Stormwater flows are proposed to be managed in the Northern drainage area using a combination of underground storage facilities at various locations and a sump in Don Julio Boulevard that would limit overland water releases to avoid ponding and increases in flows downstream. The drainage report also indicates that additional refinements to the proposed drainage system may be made, if needed, during the improvement plans phase of the project. In the West drainage area of the project site, there are not substantial drainage challenges since the stormwater infrastructure build for the Barrett Ranch West subdivision was designed to accommodate future flows from the proposed project. The proposed drainage systems within the project site would complete this system.

The proposed project's storm water drainage infrastructure, combined with existing storm water drainage capacity, would accommodate runoff from the project. Accordingly, impacts are anticipated to be ***less than significant***.

MITIGATION MEASURES:

None required.

COMMERCIAL PROJECT ALTERNATIVE

IMPACT: CONTRIBUTION OF POLLUTED RUNOFF (CRITERIA 1, 2, 3)**LEVEL OF IMPACT: LESS THAN SIGNIFICANT*****CONSTRUCTION IMPACTS***

Construction of the Commercial Project Alternative is substantially the same as discussed in the impact section for the Preferred Project Scenario above. Construction of commercial uses in place of some of the proposed multi-family housing would not result in drastically different construction methods that would affect drainage of the project site or introduce drastically different materials. Compliance with the Sacramento County Stormwater Ordinance, the Land Grading and Erosion Control Ordinance, and the State's Construction General Permit will ensure that future development projects implemented as a result of approval of the Commercial Project Alternative will not cause violation of a water quality standard or waste discharge requirement, result in substantial erosion or siltation, and will not result in substantial increases to polluted runoff associated with construction; impacts are ***less than significant***.

OPERATIONAL IMPACTS (POST-CONSTRUCTION)

New development proposed as part of the Commercial Project Alternative would be substantially the same as discussed in the impact section for the Preferred Project Scenario above. Operation of commercial land uses in place of the multi-family housing would not substantially change the type of potential pollutants that could be released into the drainage system. In any event, compliance with the County Stormwater Ordinance and implementation of Low Impact Development Standards would ensure that development of the site would not alter the course of local waterways in a manner that results in substantial erosion or siltation, would not cause violation of a water quality standard or waste discharge requirement, and would not result in substantial increases to polluted runoff. Accordingly, impacts are anticipated to be ***less than significant***.

MITIGATION MEASURES:

None required.

IMPACT: INCREASES IN SURFACE RUNOFF, IMPACTS TO EXISTING OR PLANNED DRAINAGE SYSTEMS (CRITERIA 4, 5)**LEVEL OF IMPACT: LESS THAN SIGNIFICANT**

According to DWR staff, the increase in the amount of commercial land use proposed in the Commercial Project Alternative, if implemented, would increase the impervious area of the project site by 10 percent, but that the proposed drainage basins would have available capacity to handle this potential increase in stormwater volume (Rehman, email communication, September 23, 2016). The proposed storm water drainage infrastructure, combined with existing storm water drainage capacity, would accommodate runoff from the project; therefore, impacts are ***less than significant***.

MITIGATION MEASURES:

None required.