SEWER STUDY
FOR
NORTH DOUGLAS II

City of Rancho Cordova, California

May 2006

Prepared For:

Lennar Communities, Inc.

Prepared By:

WOOD RODGERS
ENGINEERING • PLANNING • MAPPING • SURVEYING
3301 C Street, Bldg. 100-B Tel: 916.341.7760
Sacramento, CA 95816 Fax: 916.341.7767

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Executive Summary

This report has been prepared to present onsite and offsite sewer conveyance facilities to gravity serve the study area as well as identifying off-site contributing areas and downstream impacted areas. It addresses the viability of sewering the project, as well as consistency with the existing interceptor and trunk sewer master plans.

North Douglas II (NDII) is a proposed single family development (See **Exhibit D**). NDII is located in the eastern part of Sacramento County, approximately 4,500 feet north of the intersection of Douglas Road and Americanos Boulevard. (See **Exhibit A**)

NDII encompasses a total of 41.5± acres, of which 19.8 acres are designated to be wet land preserve per the North Douglas Community Master Plan. Based on land use, with a minimum of 6 ESD's per acre, the 21.7 developable acre project includes 177.0 ESD's and has a Peak Wet Weather Flow (PWWF) of 0.133 MGD. This flow leaves the site at Node WP (See **Exhibit B**).

There are no upstream areas that will contribute flow to the NDII sewer shed.

NDII is part of the AJ Douglas White Rock Trunk Shed area and per the SFEMP, would receive ultimate service from the Aerojet Interceptor Section 2S.

This project will not have project phasing. There are no required pump stations or force mains. This project proposes a permanent shed shift to shift 21.7 acres of NDII to the AJ Sunrise Douglas Trunk Shed. The wetland preserve is not shifted (See **Attachment A**). The offsite facilities that will be required will be constructed with the North Douglas development and will be existing at the time of construction for NDII. Approximately 1120 feet of 8" pipe in the North Douglas development will be required to be upsized to 10" pipe to accept the increased flows from NDII. (See **Sheet 3 of Exhibit B**). The existing park on page 3 of Exhibit B does not show a schematic line, but the proposed elevations allow the park to have sewer service. See the approved North Douglas 1 & 2 Sewer Study.

This project proposes a permanent shed-shift from the AJ Douglas White Rock Trunk Shed to the AJ Sunrise Douglas Trunk Shed.

Participation in the financing and / or construction of interim regional sewer facilities to serve the Sunrise / Douglas area is required to the satisfaction of Sacramento Regional County Sanitation District (SRCSD) and CSD-1. Facilities could include, but not be limited to, lift stations, lift station pumps, and interceptor force and gravity mains. Required financing mechanisms shall be implemented prior to recordation of the final map.

Section 1: Introduction

This study has been prepared at a Subdivision Plan level. At this level, it serves as a design guide for the creation of the subsequent improvement plans.

NDII covers 41.5+/- acres. The ground ranges in elevation from 210 feet at the north west corner to 240 feet above sea level at the south east corner. 19.8 acres of the total 41.5 acres are designated as wetland preserve. As a wetland preserve, the area is not included in the flow calculations. Because of the topography of the wetland preserve, if it were to be developed, flow would be directed into the AJ Douglas White Rock Trunk Shed. To include this area in the AJ Sunrise Douglas Trunk Shed, a pump station and force main would be required.

There are no offsite upstream areas that will contribute to the flows produced by NDII. The flow created from NDII flow through the North Douglas subdivision, scheduled to be constructed in 2006. (See the approved Sewer Master Plan for North Douglas, prepared by Wood Rodgers, Inc. dated March 2004)

NDII will ultimately receive service from the Aerojet Interceptor.

Section 2: Design

This study has been prepared in accordance with the current master plans.

Assumptions

Future upstream areas will not be served through NDII without the use of a lift station and force main. It is anticipated that undeveloped areas within the AJ Douglas White Rock Trunk Shed will be served according to the SFEMP, and will not be served to the south, through NDII or North Douglas.

Per the approved North Douglas Sewer Study, there are 1390 acres and 8522 ESD's at Node DR-4 in Douglas Road, producing 5.442 MGD. This study proposes to increase Node DR-4 to 1412 acres and 8699 ESD's producing 5.543 MGD. From Node DR-4, flows travel west in a 24" sewer pipe at a slope of 0.0021. A 24" sewer pipe at s=0.0021 has a capacity of 6.697 MGD. Prior to the Aerojet / Laguna Creek Interceptors being online, interim facilities will be required. Participation in the financing and / or construction of interim regional sewer facilities to serve the Sunrise / Douglas area is required to the satisfaction of SRCSD and CSD-1. Required financing mechanisms shall be implemented prior to recordation of the final map.

High ground water tables typically don't exist in this area of Sacramento County.

Approach: Master Plan Design Procedures

The following general procedures are used in the development of this Sewer Master Plan:

- Major sewer sheds defined.
- A detailed collection system established.
- Major sheds divided into sub-sheds in order to define the areas, which contribute flows to certain points (nodes) on the collection system.
- To estimate sewage flows, land use boundaries overlaid on the sub-sheds creating sub-areas of single land use within each sub-shed. The acreages of these sub-areas are determined and multiplied by the average number of Equivalent Single-Family Dwellings (ESDs) per acre for their particular land use in order to determine the total number of ESDs entering each pipe system. Pipes are sized and inverts calculated using an iterative process.

The methodology for estimating sewage flows in collectors and trunk lines in the Plan area sewer system is defined in the County of Sacramento Improvement Standards dated June 1999. The primary design criteria used in our analysis are listed in Table 1 below.

Table 1

Category	Conditions	Modifiers
Development Density	Planned Development Density	Minimum Plan Density shall be RD-6
Flow Generation	310 gpd/ESD	I/I-new 1200 gpd/ac (local sewer) 1000 gpd/ac (trunk sewer)
Peaking Factor	PF=3.5 - $1.8Q_a^{0.05}$ (local sewers) PF=3.3 - $1.8Q_a^{0.04}$ (trunk sewers) Where: Q_a= ADWF	
Velocity Criteria	Min. 2 fps at Peak Wet Weather Flow	
Hydraulic Grade Line	Maximum HGL at crown of pipe Peak Wet Weather Flow	
Friction Factor	n=0.013	
Minimum Depth	6.3' at periphery of plan. 6.3' min depth @ last line manhole	8" sewer from periphery to collection point
Minimum Slope	Slope = 0.007 Minimum	Main to last line manhole

Peak Dry Weather Flows are computed based on 310 gallons per day (gpd) per Equivalent Single Family Dwelling Unit (ESD) entering each trunk pipe system. ESD values used in Sewer Master Plans assumed a minimum plan density of 6 ESD's per acre.

SRCSD and CSD-1

Sanitary sewer service in the project area is provided by the Sacramento Regional County Sanitation District (SRCSD) and the County Sanitation District No.1 (CSD-1).

SRCSD is responsible for the interceptor collection (sanitary sewers which are designed to carry flows in excess of 10 million gallons per day) and treatment of wastewater. SRCSD's policies regarding the extension of interceptors is that they will not be constructed until it can be demonstrated that they will maintain a 2 feet per second velocity at Average Daily Flow. Therefore, interim facilities will be necessary prior to the interceptors being on line.

CSD-1 is responsible for the local collection facilities (up to 1 MGD) and trunk sewers with capacity of 1 million to 10 million gallons per day.

SRCSD and CSD-1 own, operate and are responsible for the public collection, trunk and interceptor sewer systems throughout Sacramento County as well as the Regional Wastewater Treatment Plant located south of Freeport.

Section 3: Sewer Flow Information

Currently there are no existing sewer facilities within NDII. When the 21.7 acres develops, it will produce 177.0 ESD's and have a Peak Wet Weather Flow (PWWF) of 0.133 mgd. These flows leave the site at node WP and enter the North Douglas site. See the approved Sewer Master Study for North Douglas 1 & 2, dated March 2004, prepared by Wood Rodgers, Inc.

Per this study (See **Exhibit B**), approximately 1120 feet of 8" sewer pipe in North Douglas will be required to be constructed as 10" sewer pipe and not 8" sewer as proposed in the Approved Sewer Master Plan for North Douglas. All remaining downstream facilities, upstream of the Anatolia pump station have adequate capacity to accept the additional flows produced by NDII.

Section 4: Sewer Alignments and Facilities

The most feasible way to serve this project is by gravity through the North Douglas property. This is a permanent shed shift. At this time, there are no other alternatives proposed to sewer NDII.

Section 5: Conclusion

This study was prepared with the intent of providing support documentation for use in the development of NDII improvement plans. As configured, all of the project flows will sewer south through North Douglas, and eventually into the Aerojet Interceptor. No offsite upstream sewer flows through NDII, thus our study has only accounted for flows originated onsite. This project's 21.7 developable acres account for approximately 177.0 ESD's, producing a Peak Wet Weather Flow of 0.133 MGD's. NDII does not adversely affect the downstream system.

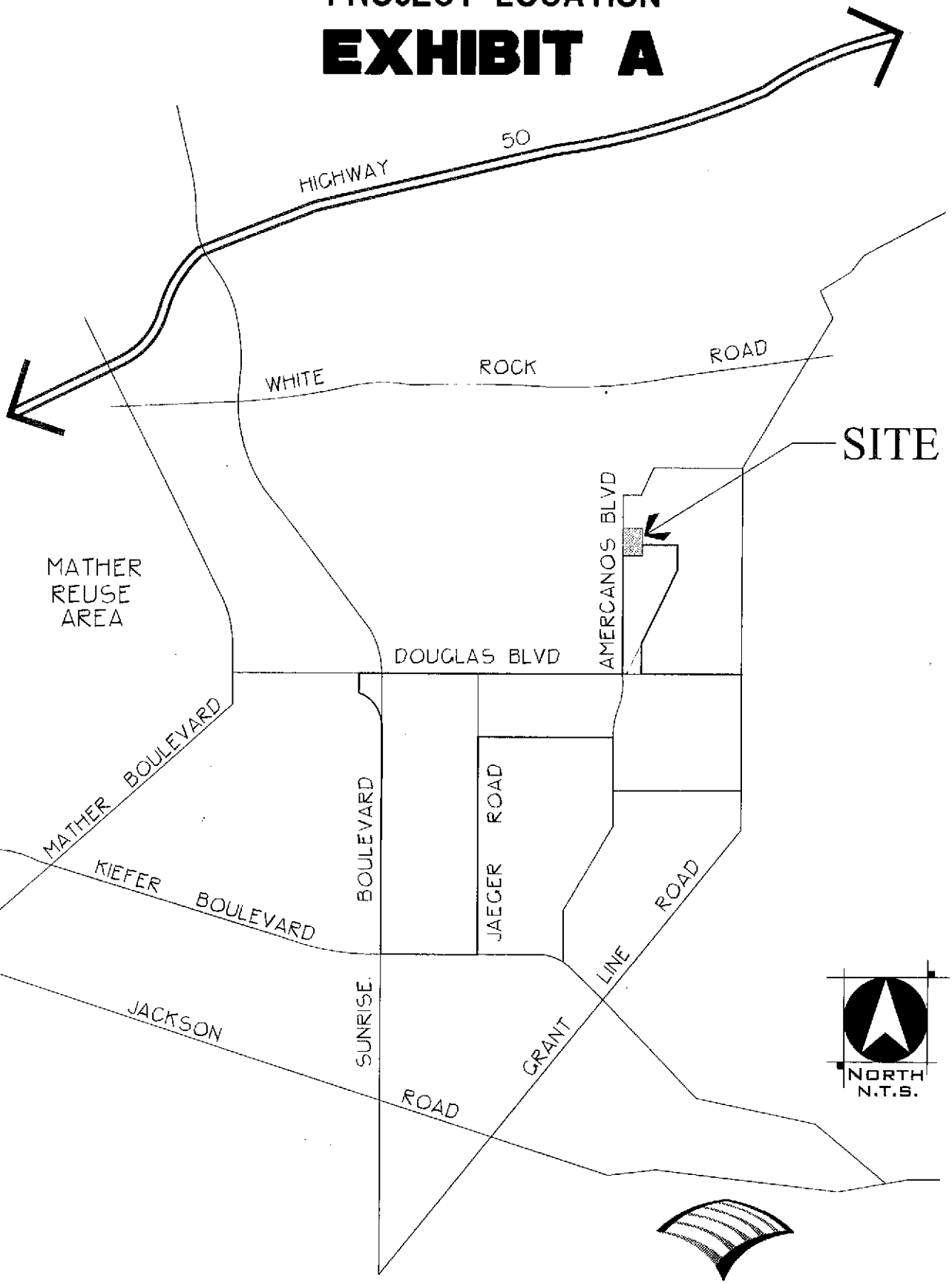
Participation in the financing and / or construction of interim regional sewer facilities to serve the Sunrise / Douglas area is required to the satisfaction of Sacramento Regional County Sanitation District (SRCSD) and CSD-1. Facilities could include, but not be limited to, lift stations, lift station pumps, and interceptor force and gravity mains. Required financing mechanisms shall be implemented prior to recordation of the final map.

Exhibits

Exhibit A: **Project Location Map**
Exhibit B: **Sewer Study (11 x 17 & Insert)**
Exhibit C: **Sewer Flow Calculations**
Exhibit D: **Land Use Plan**
Exhibit E: **Grading Plan**

PROJECT LOCATION

EXHIBIT A



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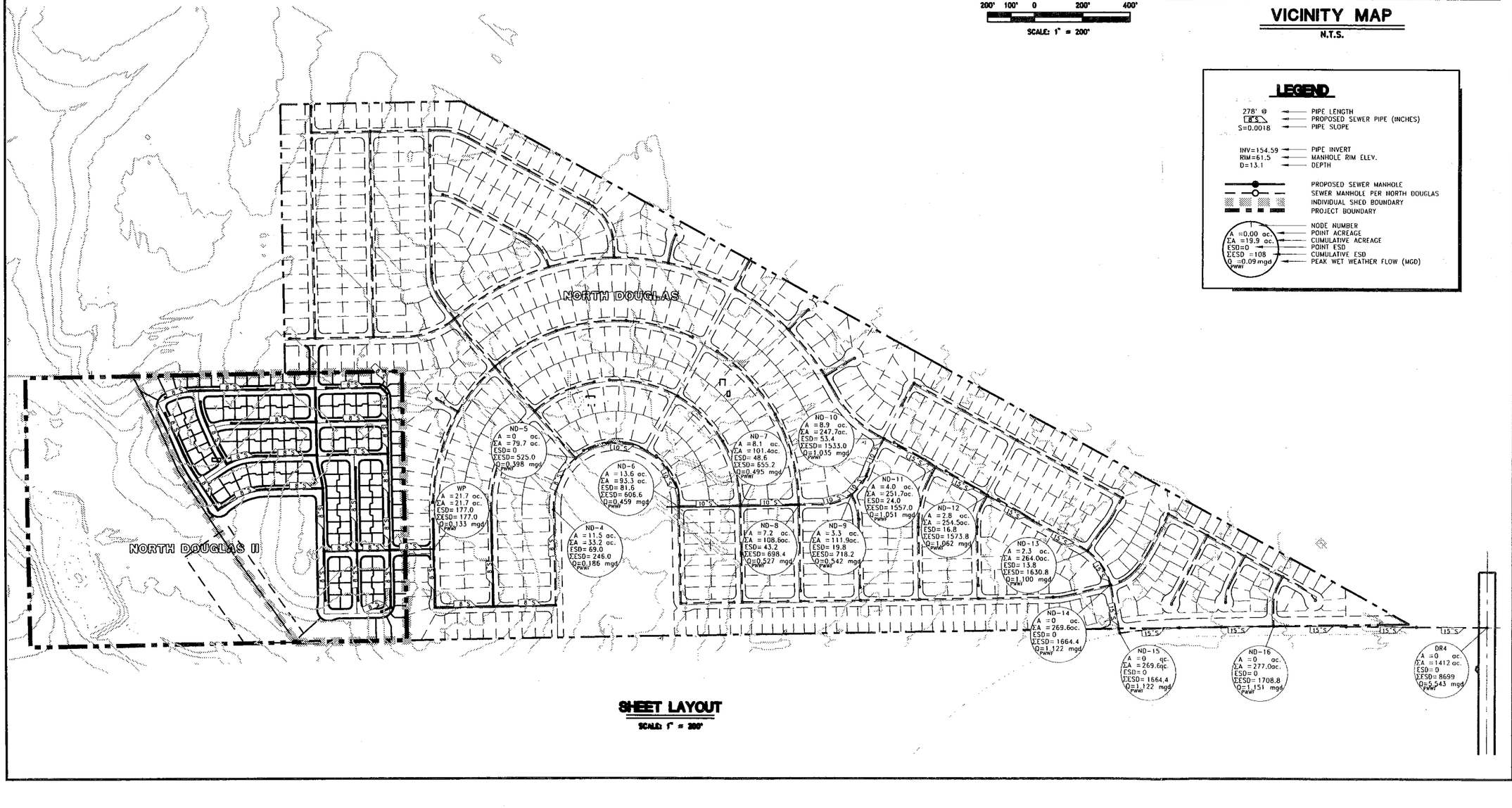
SEWER STUDY FOR

NORTH DOUGLAS II

LENNAR COMMUNITIES

CITY OF RANCHO CORDOVA

MAY 2005

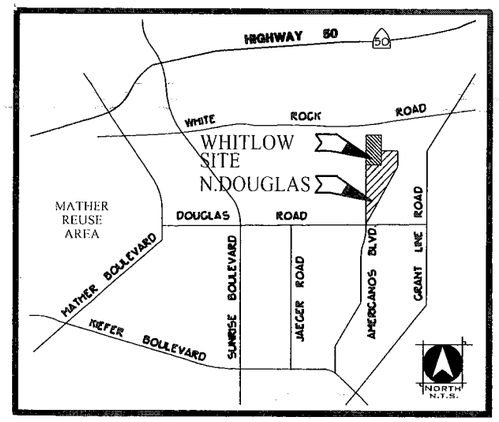


200' 100' 0 200' 400'

SCALE: 1" = 200'

SHEET LAYOUT

SCALE: 1" = 200'



VICINITY MAP

N.T.S.

LEGEND

- 278' @ 8" S. S=0.0018 — PIPE LENGTH; PROPOSED SEWER PIPE (INCHES); PIPE SLOPE
- INV=154.59, RIM=61.5, D=13.1 — PIPE INVERT; MANHOLE RIM ELEV.; DEPTH
- PROPOSED SEWER MANHOLE
- SEWER MANHOLE PER NORTH DOUGLAS
- INDIVIDUAL SHED BOUNDARY
- PROJECT BOUNDARY
- A =0.00 ac., ΣA =19.9 ac., ESD=0, ΣESD =108, Q =0.09 mgd PWWF — NODE NUMBER; POINT ACREAGE; CUMULATIVE ACREAGE; POINT ESD; CUMULATIVE ESD; PEAK WET WEATHER FLOW (MGD)

NO.	DESCRIPTION	DWGR INIT	BY	DATE
			COUNTY APPROVED	

DATE: ____ DATE

SCALE: H: 1"=100' V:N/A DRAWN BY: M.WRIGHT

DESIGNED BY: M.WRIGHT

CHECKED BY: T.CRUSH

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SEWER STUDY FOR

NORTH DOUGLAS II

CALIFORNIA

SACRAMENTO COUNTY

PROJECT NO. 1232.03

EXHIBIT B

SHEET 1 OF 1

EXHIBIT C

NORTH DOUGLAS 2 - NORTH DOUGLAS

(Note: Node (MH) Data Applies to Pipes Downstream of Subject Node)

Up Stream Node #	Down Stream Node#	LDR [ac]	ESD's	MDR [ac]	ESD's	HDR [ac]	ESD's	Elem. School [ac]	ESD's	Mid. School [ac]	ESD's	High School [ac]	ESD's	Comm. [ac]	ESD's	PARK [ac]	ESD's	Total Area (ac.)	Total ESD's	Cumulative Area (ac.)	Cumulative ESD's	Qavg [MGD]	Q I/I [MGD]	Peaking Factor	Q Peak DWF [MGD]	Q Peak PWWF [MGD]	Q Peak [cfs]	Proposed Pipe Dia [in]	Slope [ft/ft]	C=COLL. T=TRUNK	Capacity @ S [cfs]	@ S [MGD]	Depth to Pipe Invert [ft]	Velocity @ Qpeak &S fps
WP	ND-4	17.7	153.0		0.0		0.0							0.0	0.0	4.0	24.0	21.7	177.0	21.7	177.0	0.055	0.026	1.943	0.107	0.133	0.205	8	0.0035	C	0.60	0.39	12.7	1.78
ND-1	ND-2	34.4	206.4		0.0		0.0							0.0	0.0	0.0	0.0	34.4	206.4	34.4	206.4	0.064	0.041	1.931	0.124	0.165	0.255	8	0.0035	C	0.60	0.39	8.1	1.86
ND-2	ND-3	10.3	61.8		0.0		0.0							0.0	0.0	0.0	0.0	10.3	61.8	44.7	268.2	0.083	0.054	1.910	0.159	0.212	0.329	8	0.0035	C	0.60	0.39	10.5	2.01
ND-3	ND-5	1.8	10.8		0.0		0.0							0.0	0.0	0.0	0.0	1.8	10.8	46.5	279.0	0.086	0.056	1.907	0.165	0.221	0.342	8	0.0035	C	0.60	0.39	10.5	2.04
ND-4	ND-5	11.5	69.0		0.0		0.0							0.0	0.0	0.0	0.0	11.5	69.0	33.2	246.0	0.076	0.040	1.917	0.146	0.186	0.288	8	0.0035	C	0.60	0.39	12.1	1.95
ND-5	ND-6	0.0	0.0		0.0		0.0							0.0	0.0	0.0	0.0	0.0	0.0	79.7	525.0	0.163	0.096	1.856	0.302	0.398	0.616	10	0.0034	C	1.07	0.69	15.8	2.32
ND-6	ND-7	4.6	27.6		0.0		0.0							0.0	0.0	9.0	54.0	13.6	81.6	93.3	606.6	0.188	0.112	1.844	0.347	0.459	0.710	10	0.0036	C	1.10	0.71	15.3	2.45
ND-7	ND-8	8.1	48.6		0.0		0.0							0.0	0.0	0.0	0.0	8.1	48.6	101.4	655.2	0.203	0.122	1.838	0.373	0.495	0.766	10	0.0036	C	1.10	0.71	17.4	2.49
ND-8	ND-9	7.2	43.2		0.0		0.0							0.0	0.0	0.0	0.0	7.2	43.2	108.6	698.4	0.217	0.130	1.833	0.397	0.527	0.816	10	0.0025	C	0.92	0.59	20.8	2.19
ND-9	ND-10	3.3	19.8		0.0		0.0							0.0	0.0	0.0	0.0	3.3	19.8	111.9	718.2	0.223	0.134	1.830	0.407	0.542	0.839	10	0.0031	C	1.02	0.66	21.8	2.41
ND-10A	ND-10	126.9	761.4		0.0		0.0							0.0	0.0	0.0	0.0	126.9	761.4	126.9	761.4	0.236	0.152	1.825	0.431	0.583	0.903	12	0.0097	C	2.94	1.90	8.2	3.76
ND-10	ND-11	8.9	53.4		0.0		0.0							0.0	0.0	0.0	0.0	8.9	53.4	247.7	1533.0	0.475	0.297	1.553	0.738	1.035	1.602	15	0.0015	T	2.50	1.62	22.3	2.17
ND-11	ND-12	4.0	24.0		0.0		0.0							0.0	0.0	0.0	0.0	4.0	24.0	251.7	1557.0	0.483	0.302	1.552	0.749	1.051	1.627	15	0.0015	T	2.50	1.62	19.5	2.18
ND-12	ND-13	2.8	16.8		0.0		0.0							0.0	0.0	0.0	0.0	2.8	16.8	254.5	1573.8	0.488	0.305	1.551	0.757	1.062	1.644	15	0.0036	T	3.88	2.50	16.7	3.03
ND-13A	ND-13	7.2	43.2		0.0		0.0							0.0	0.0	0.0	0.0	7.2	43.2	7.2	43.2	0.013	0.009	2.049	0.027	0.036	0.056	8	0.0035	C	0.60	0.39	8.1	1.21
ND-13	ND-14	2.3	13.8		0.0		0.0							0.0	0.0	0.0	0.0	2.3	13.8	264.0	1630.8	0.506	0.317	1.548	0.783	1.100	1.702	15	0.0015	T	2.50	1.62	14.7	2.19
ND-14A	ND-14	5.6	33.6		0.0		0.0							0.0	0.0	0.0	0.0	5.6	33.6	5.6	33.6	0.010	0.007	2.067	0.022	0.028	0.044	8	0.0096	C	0.99	0.64	9.2	1.64
ND-14	ND-15	0.0	0.0		0.0		0.0							0.0	0.0	0.0	0.0	0.0	0.0	269.6	1664.4	0.516	0.324	1.547	0.798	1.122	1.736	15	0.0015	T	2.50	1.62	14.3	2.19
ND-15	ND-16	0.0	0.0		0.0		0.0							0.0	0.0	0.0	0.0	0.0	0.0	269.6	1664.4	0.516	0.324	1.547	0.798	1.122	1.736	15	0.0137	T	7.56	4.88	16.1	5.02
ND-16A	ND-16	7.4	44.4		0.0		0.0							0.0	0.0	0.0	0.0	7.4	44.4	7.4	44.4	0.014	0.009	2.047	0.028	0.037	0.057	8	0.0035	C	0.60	0.39	10.5	1.24
ND-16	DR4	0.0	0.0		0.0		0.0							0.0	0.0	0.0	0.0	0.0	0.0	277.0	1708.8	0.530	0.332	1.545	0.819	1.151	1.782	15	0.0144	T	7.75	5.01	16.0	5.15
DR4	OUT	1134.7	6990.2		0.0		0.0							0.0	0.0	0.0	0.0	1,134.7	6,990.2	1411.7	8699.0	2.697	1.694	1.427	3.849	5.543	8.580	24	0.0021	T	10.37	6.70	26.2	3.68

7	8	264.0		0.0		0.0		0.0		0.0		0.0		0.0		13.0		277.0	
ΣESD			1630.8		0.0		0.0		0.0		0.0		0.0		0.0		78.0		1708.8

Attachments

Attachment A: Approved Sewer Shed Shift Request

CSD-1
COUNTY SANITATION DISTRICT 1
Wastewater Collection For a Growing Sacramento

December 7, 2005
E225.000

Michael Wright
Wood Rodgers
3301 C Street, Building 100-B
Sacramento, CA 95816

Subject: Shed Shift Request for the North Douglas II/Whitlow Property (NDII/WP): Approval

Dear Mr. Wright:

County Sanitation District 1 (CSD-1) staff reviewed the last submittal of the Shed Shift Request for the North Douglas II/Whitlow Property and finds it will not significantly affect the proposed CSD-1 and Sacramento Regional County Sanitation District (SRCSD) infrastructure, and may be considered approved. Any significant change in the proposed and/or assumed land use presented in this document, which impacts the sewer design, may require additional shed shift requests.

There is a possible collector-sized lift station involved with the North Douglas I & II properties. If the addition of this project makes the lift station trunk sized, CSD-1 will not reimburse the developers for the lift station.

The outfall for this project does not currently exist. The outfall system will be constructed by the first development to need sewer service. If this project becomes the first to develop, then this developer will be required to construct the outfall system.

A sewer study associated with this project may be submitted for review and approval. If you have any questions regarding these comments, please call Stephen Moore at (916) 876-6296 or myself at (916) 876-6094.

Sincerely,

Wendy Haggard, P.E.
Department of Water Quality
Development Services

WH/SM: cc

cc: Melenie Spahn
Amber Schalansky

Letter of Transmittal

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

Date: 9-27-05

Job No.: 1420.002

To: CSD-1

Attn: Nanette Bailey

Address: 10545 Armstrong Avenue, STE 101

City: Mather **State:** Ca. **ZIP:** 95655

Phone: 876-6397

From: Michael Wright

Re: North Douglas II / Whitlow Property

We are sending you:

Courier/Hand Deliver

We are sending you:

- ☐ Exhibits ☐ Plans
- ☐ Reports ☐ Maps
- ☐ Copies
- ☐ Specifications
- ☐ Contract/Change Order
- ☒ Other: Shed Shift

These are transmitted as checked below:

☒ For Approval ☐ For your use ☐ As requested ☐ For review/comment

Copies	Description
5	Shed Shift Request

Comments:

Nan,

Please call me at 326-4479 if you have any questions, or if more information is required.

Thanks,

Mike

3301 C Street, Bldg. 100-B • Sacramento, California 95816 • Tel: 916.341.7760 • Fax: 916.341.7767
www.woodrodgers.com

WOOD RODGERS

September 27, 2005

Nanette Bailey
Development Services
County Sanitation District 1 (CSD-1)
10545 Armstrong Avenue, STE 101
Mather, CA 95655

Subject: Shed Shift Request for the North Douglas II / Whitlow Property (NDII/WP)

Nanette,

Please find 5 copies of the completed Permanent Shed Shift Request form for the above project.

This shed shift is necessary to provide sewer service to the NDII/WP. Per the SFEMP, the AJ Sunrise Douglas Trunk Shed area wont develop for an estimated 20+/- years. The NDII/WP is scheduled to develop in 2006/2007. It is proposed to sewer NDII/WP through the North Douglas development located directly south of NDII/WP. The additional 0.139 mgd that will flow through North Douglas into the AJ Sunrise Douglas Trunk Shed does not impact and trunk sewers, as shown in the revised model results table.

1. A clean copy of the Shed Maps and a revised copy of the Shed Maps are included.
2. There will be no facility changes due to the small area / flow.
3. A clean copy of the Master Plan Model Results Tables and a Revised copy of the Master Plan Model Results Tables are included.
4. Plan and profile of the trunk sewers did not change, therefore copies of plan and profile are not included in this request.
5. Cost estimates will not change due to this request because no trunk sewers are affected by this shift.
6. Cost summary does not change. Change in PWWF, acreage and ESD's are displayed in the Master Plan Model Results Tables.

This Shed Shift proposes to shift 21.7 acres, 188.0 ESD's which gives a flow of 0.139 mgd.

If you have any questions or comments regarding the enclosed information, please call me at 326-4479.

Sincerely,

Michael Wright
WOOD RODGERS, INC.

Corporate Office: 3301 C Street, Bldg. 100-B • Sacramento, CA 95816 • Tel: 916.341.7760 • Fax: 916.341.7767
Sacramento, CA • San Francisco, CA • Reno, NV • Salinas, CA • Modesto, CA • Oakland, CA • Las Vegas, NV
www.woodrodgers.com

PERMANENT Project name: Whitlow Property / North Douglas II

CSD-1 Master Plan Permanent Shed Shift Request Form

☒ **Expansion Area** ☐ **Relief Area** Note: (CSD-1 Master Plan does not have cost estimates or plan & profiles)

*Originator: Michael Wright – Wood Rodgers, Inc.	Date: 9-27-05

Requested change:
Shift 21.7 acres from the AJ Douglas White Rock Trunk Shed to the AJ Sunrise Douglas Trunk Shed via North Douglas.
Describe related facilities: (Pump station, force main, trunks, etc.)
There will be no added pump stations, force mains or trunk sewers.

Reason for change:
This change is required to supply sewer service to the North Douglas II / Whitlow Property. Per the SFEMP, this area would sewer through the Rio Del Oro / Aerojet land to the west. Facilities will not be constructed for 20+/- years on the Aerojet land. Service will be required in 2006/2007 for North Douglas II / Whitlow.
List of Trunk Sheds Impacted:
1. AJ Douglas White Rock Trunk Shed
2. AJ Sunrise Douglas Trunk Shed
Summary of Total Cost Impact to District, Total change in PWWF, Acreage, ESDs:
There are no cost impacts associated with this shed shift. Because only 0.139 mgd are being shifted, no trunks will be affected. It is proposed to shift 21.7 acres and 188.0 ESD's.

* *Originator completes this side of the form.*

PERMANENT Project name: Whitlow Property / North Douglas II

This side of the form is for DEPARTMENTAL USE ONLY:

Note: Attach modeling results before forwarding to sections 2,3,and 4.

		Initials	*Recommend* Approval (√)	*Recommend* Denial (√)
1	**Collection Systems Capacity Management & Master Planning**			
2	**CSD-1 District Design & Rehabilitation Engineering**			
3	**Major Conveyance Engineering**			
4	**Development Services**			

Reason for recommending denial:
Other comments:

This box to be completed by Section 4: (Development Services)

Change ☐ approved ☐ denied BY:	Date:

CLEAN COPY

Trunk Shed AJ Sunrise Douglas
Buildout 10-Year Design Storm

US Manhole	DS Manhole	Dia. (in.)	Length (ft.)	US Rim Elev.	DS Rim Elev.	US Invert Elev.	DS Invert Elev.	Slope	Full Cap. (mgd)	Peak Flow (mgd)	% Full Cap.	DS d/D
SDB910	AJ4110	8	98	158	154	140.40	139.80	0.0061	0.6	0.39	63	0.56
SDC910	AJ4080	8	98	152	152	119.12	118.52	0.0061	0.6	0.00	0	0.13
SDC010	AJ4050	8	1220	152	147	124.31	117.00	0.0060	0.6	0.00	0	0.12
SDC020	SDC010	8	1020	150	152	130.40	124.31	0.0060	0.6	0.00	0	0.12
SDC030	SDC020	8	928	160	150	136.00	130.40	0.0060	0.6	0.00	0	0.12
SDA9030	AJ1060	36	1660	185	172	153.99	152.00	0.0012	14.9	11.32	76	0.45
SDA9040	SDA9030	36	1152	188	185	155.38	153.99	0.0012	14.9	10.45	70	0.65
SDA9050	SDA9040	36	928	180	188	156.49	155.38	0.0012	14.9	10.45	70	0.63
SDA9060	SDA9050	36	581	185	180	157.18	156.49	0.0012	14.9	10.47	70	0.63
SDA9070	SDA9060	33	1220	190	185	166.79	165.45	0.0011	11.3	9.90	87	0.47
SDA9080	SDA9070	33	1362	198	190	168.29	166.79	0.0011	11.3	9.93	88	0.71
SDA9090	SDA9080	33	1309	198	198	169.73	168.29	0.0011	11.3	9.93	88	0.72
SDA9100	SDA9090	33	289	198	198	170.05	169.73	0.0011	11.3	9.93	88	0.72
SDA010	SDA9100	27	801	195	198	171.43	170.55	0.0011	6.6	6.14	92	0.66
SDA020	SDA010	21	669	190	195	172.73	171.93	0.0012	3.5	2.62	74	0.67
SDA030	SDA020	21	1480	185	190	174.51	172.73	0.0012	3.6	2.62	74	0.64
SDA040	SDA030	21	1749	190	185	176.78	174.51	0.0013	3.7	2.49	68	0.64
SDA050	SDA040	15	1670	220	190	208.00	177.28	0.0184	5.7	2.51	44	0.48
SDA060	SDA050	15	2011	230	220	214.00	208.00	0.0030	2.3	1.67	73	0.52
SDA070	SDA060	15	1821	247	230	219.05	214.00	0.0028	2.2	1.67	76	0.64
SDA080	SDA070	12	1880	240	247	223.81	219.30	0.0024	1.1	0.69	60	0.56
SDA110	SDA010	18	1152	201	195	188.75	182.98	0.0050	4.8	3.54	73	0.60
SDA120	SDA110	15	1709	230	201	213.50	189.00	0.0143	5.0	3.15	63	0.58
SDA130	SDA120	15	2041	240	230	221.00	213.50	0.0037	2.5	1.89	75	0.59
SDA140	SDA130	15	1781	245	240	227.30	221.00	0.0035	2.5	1.32	53	0.65
SDA150	SDA140	12	1020	248	245	230.00	227.55	0.0024	1.1	1.32	116	0.61
SDA160	SDA150	12	1529	260	248	233.67	230.00	0.0024	1.1	0.71	62	1.00
SDA960	SDA9100	12	98	198	198	174.24	174.00	0.0024	1.1	0.71	62	0.45
SDA210	SDA9100	21	1660	205	198	184.50	182.34	0.0013	3.7	3.13	85	0.46
SDA220	SDA210	15	1240	210	205	198.00	185.00	0.0105	4.3	2.58	60	0.60
SDA230	SDA220	15	1371	220	210	207.75	198.00	0.0071	3.5	2.58	73	0.64
SDA240	SDA230	12	2241	248	220	229.50	208.00	0.0096	2.3	1.44	64	0.58
SDA250	SDA240	12	1250	250	248	238.00	229.50	0.0068	1.9	1.05	55	0.58
SDA260	SDA250	12	2001	260	250	246.00	238.00	0.0040	1.5	1.05	72	0.54
SDA950	SDA9060	12	98	185	185	167.24	167.00	0.0024	1.1	0.59	52	0.41
SDA940	SDA9030	8	98	185	185	159.60	159.00	0.0061	0.6	0.27	44	0.47
SDA930	SDA9030	12	98	185	185	158.07	157.83	0.0024	1.1	0.69	60	0.44
SDA920	AJ1050	12	98	170	170	160.25	160.00	0.0025	1.2	0.69	59	0.44
SDA910	AJ1050	10	98	170	170	154.96	154.60	0.0037	0.9	0.37	42	0.40
SDB010	AJ1030	21	1670	162	165	143.48	141.31	0.0013	3.7	3.10	84	0.46
SDB020	SDB010	21	1650	162	162	145.63	143.48	0.0013	3.7	3.13	85	0.71
SDB030	SDB020	21	1939	158	162	148.15	145.63	0.0013	3.7	3.13	85	0.71
SDB040	SDB030	21	2090	168	158	150.87	148.15	0.0013	3.7	2.49	67	0.71
SDB050	SDB040	18	879	170	168	152.52	151.12	0.0016	2.7	1.73	64	0.54
SDB060	SDB050	18	410	170	170	153.18	152.52	0.0016	2.7	1.73	64	0.58
SDB070	SDB060	18	1558	180	170	161.34	153.18	0.0052	4.9	1.73	35	0.58
SDB080	SDB070	18	1136	180	180	163.16	161.34	0.0016	2.7	1.73	64	0.42

Note: Pipes with peak flow less than 1 mgd are considered local collectors and are labeled "LC" on the trunk shed maps.

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TRUNK SHED AJ SUNRISE DOUGLAS
BUILDOUT 10-YEAR DESIGN STORM

US MANHOLE	DS MANHOLE	DIA. (IN.)	LENGTH (FT.)	US RIM ELEV.	DS RIM ELEV.	US INVERT ELEV.	DS INVERT ELEV.	SLOPE	FULL CAP. (MGD)	PEAK FLOW (MGD)	% FULL CAP.	DS d/D
SDA9030	AJ1060	36	1660	185	172	153.99	152.00	0.0012	14.9	11.38	76	0.66
SDA9040	SDA9030	36	1152	188	185	155.38	153.99	0.0012	14.9	10.53	71	0.62
SDA9050	SDA9040	36	928	180	188	156.49	155.38	0.0012	14.9	10.53	71	0.62
SDA9060	SDA9050	36	581	185	180	157.18	156.49	0.0012	14.9	10.53	71	0.62
SDA9070	SDA9060	33	1220	190	185	166.79	165.45	0.0011	11.3	9.99	88	0.73
SDA9080	SDA9070	33	1362	198	190	168.29	166.79	0.0011	11.3	9.99	88	0.73
SDA9090	SDA9080	33	1309	198	198	169.73	168.29	0.0011	11.3	9.99	88	0.73
SDA9100	SDA9090	33	289	198	198	170.05	169.73	0.0011	11.3	9.99	88	0.73
SDA210	SDA9100	21	1660	205	198	184.50	182.34	0.0013	3.7	3.20	86	0.72

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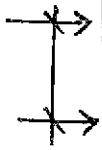
Trunk Shed AJ Douglas-White Rock
Buildout 10-Year Design Storm



US Manhole	DS Manhole	Dia. (in.)	Length (ft.)	US Rim Elev.	DS Rim Elev.	US Invert Elev.	DS Invert Elev.	Slope	Full Cap. (mgd)	Peak Flow (mgd)	% Full Cap.	DS d/D
DWB970	AJ2S80	12	98	185	185	128.44	128.20	0.0025	1.1	0.78	68	0.47
DWB960	AJ2S80	12	98	185	185	128.44	128.20	0.0025	1.1	0.62	54	0.41
DWB050	AJ2S80	30	1309	192	185	167.74	165.00	0.0021	12.1	8.72	72	0.50
DWB060	DWB050	30	1759	200	192	171.44	167.74	0.0021	12.2	8.72	72	0.64
DWB080	DWB060	30	1070	195	200	172.73	171.44	0.0012	9.2	6.71	73	0.64
DWB090	DWB080	30	1138	195	195	174.10	172.73	0.0012	9.2	6.71	73	0.64
DWB100	DWB090	24	1900	208	195	187.91	174.60	0.0070	12.3	5.66	46	0.55
DWB110	DWB100	24	1339	220	208	197.30	187.91	0.0070	12.3	5.66	46	0.48
DWB120	DWB110	24	1161	228	220	205.39	197.30	0.0070	12.2	4.75	39	0.48
DWB130	DWB120	24	2530	254	228	230.68	205.39	0.0100	14.7	4.75	32	0.43
DWB140	DWB130	24	909	250	254	231.77	230.68	0.0012	5.1	3.88	76	0.43
DWB160	DWB140	15	2388	271	250	254.03	232.52	0.0090	4.0	1.94	49	0.50
DWB170	DWB160	15	1161	278	271	260.99	254.03	0.0060	3.2	1.94	60	0.56
DWB180	DWB170	10	1270	282	278	266.47	261.40	0.0040	0.9	0.66	74	0.55
DWB150	DWB140	12	3071	270	250	252.72	232.77	0.0065	1.9	1.26	67	0.60
DWB070	DWB060	12	1280	200	200	182.01	178.94	0.0024	1.1	0.96	84	0.51
DWB940	AJ2S50	12	98	150	150	126.65	126.41	0.0024	1.1	0.57	50	0.40
DWB950	AJ2S50	12	98	150	150	126.65	126.41	0.0024	1.1	0.75	66	0.46
DWA930	AJ2110	8	98	155	155	131.06	130.46	0.0061	0.6	0.30	48	0.48
DWA920	AJ2110	8	98	155	155	131.06	130.46	0.0061	0.6	0.21	33	0.40
DWA060	AJ2110	24	2589	167	155	143.65	132.00	0.0045	9.8	7.53	77	0.61
DWA070	DWA060	24	1690	173	167	150.40	143.65	0.0040	9.3	7.53	81	0.66
DWA080	DWA070	24	2110	180	173	156.73	150.40	0.0030	8.0	5.93	74	0.70
DWA090	DWA080	21	1709	185	180	161.24	156.98	0.0025	5.1	4.61	90	0.59
DWA100	DWA090	21	1581	188	185	165.20	161.24	0.0025	5.1	4.61	90	0.75
DWA110	DWA100	21	1791	190	188	169.67	165.20	0.0025	5.1	3.33	65	0.75
DWA120	DWA110	21	2300	210	190	172.67	169.67	0.0013	3.7	2.97	80	0.59
DWA130	DWA120	18	1020	190	210	174.23	172.92	0.0013	2.4	2.26	93	0.63
DWA140	DWA130	12	2021	220	190	198.67	174.73	0.0118	2.5	2.26	90	0.77
DWA150	DWA140	12	1391	230	220	212.79	198.67	0.0101	2.3	1.55	67	0.78
DWA160	DWA150	10	1079	245	230	225.88	212.96	0.0120	1.6	1.14	74	0.65
DWA170	DWA160	8	751	255	245	241.11	226.05	0.0201	1.1	0.64	58	0.57
DWA910	AJ2070	12	98	144	144	128.73	128.49	0.0024	1.1	0.64	56	0.42
DWB930	AJ2050	12	98	142	142	127.44	127.20	0.0024	1.1	0.71	62	0.44
DWB920	AJ2020	10	98	141	141	125.73	125.38	0.0036	0.8	0.46	54	0.45
DWB910	AJ2020	8	98	141	141	125.98	125.38	0.0061	0.6	0.32	52	0.50

Note: Pipes with peak flow less than 1 mgd are considered local collectors and are labeled "LC" on the trunk shed maps.

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TRUNK SHED AJ DOUGLAS-WHITE ROCK
BUILDOUT 10-YEAR DESIGN STORM

US MANHOLE	DS MANHOLE	DIA. (IN.)	LENGTH (FT.)	US RIM ELEV.	DS RIM ELEV.	US INVERT ELEV.	DS INVERT ELEV.	SLOPE	FULL CAP. (MGD)	PEAK FLOW (MGD)	% FULL CAP.	DS d/D
DWB050	AJ2S80	30	1309	192	185	167.74	165	0.0021	12.1	8.7	72	0.63
DWB060	DWB050	30	1759	200	192	171.44	167.74	0.0021	12.2	8.7	71	0.63
DWB080	DWB060	30	1070	195	200	172.73	171.44	0.0012	9.2	6.6	72	0.63
DWB090	DWB080	30	1138	195	195	174.1	172.73	0.0012	9.2	6.6	72	0.63
DWB100	DWB090	24	1900	208	195	187.91	174.6	0.007	12.3	5.6	46	0.48

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AJ DW

Trunk Shed Buildout Projections

	ESDs				Area (acres)			
Sewershed	2005	2010	2020	Buildout	2005	2010	2020	Buildout
DWA-01	0	0	351	896	0	0	59	149
DWA-02	0	0	114	290	0	0	19	48
DWA-03	0	0	159	405	0	0	26	67
DWA-04	0	0	304	775	0	0	51	129
DWA-05	1	1	707	1,802	0	0	66	169
DWA-06	0	0	363	925	0	0	60	153
DWA-07	0	0	392	999	0	0	65	167
DWA-08	0	0	528	1,345	0	0	57	145
DWA-09	0	0	266	678	0	0	44	113
DWA-10	0	0	220	561	0	0	35	90
DWA-11	0	0	399	1,017	0	0	67	169
DWA-12	0	0	401	1,021	0	0	67	170
DWA-13	0	0	220	560	0	0	37	93
DWA-14	0	0	278	709	0	0	46	118
DWA-16	0	0	348	888	0	0	58	148
DWB-01	99	212	212	436	16	35	35	73
DWB-02	0	0	260	663	0	0	38	97
DWB-03	0	0	385	982	0	0	63	160
DWB-04	0	0	311	792	0	0	52	132
DWB-05	0	0	416	1,060	0	0	68	173
DWB-06	0	0	339	865	0	0	57	144
DWB-07	0	0	500	1,273	0	0	49	126
DWB-08	0	0	278	709	0	0	45	116
DWB-09	0	0	361	920	0	0	47	119
DWB-10	0	0	527	1,343	0	0	62	158
DWB-11	0	0	124	316	0	0	21	53
DWB-12	0	0	522	1,330	0	0	87	222
→ DWB-14	0	0	506	1,290	0	0	84	215
DWB-15	0	0	484	1,233	0	0	81	205
DWB-16	1	1	1	598	0	0	0	100
DWB-17	1	1	1	984	0	0	0	164
DWB-18	1	1	1	882	0	0	0	147
DWB-19	1	1	1	915	0	0	0	153
DWB-20	2	2	2	1,149	0	0	0	192
DWB-21	1	1	1	933	0	0	0	155
Total	114	228	10,283	31,541	19	38	1,547	4,831

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AJ DW

Trunk Shed Buildout Projections

	ESDs				Area (acres)			
Sewershed	2005	2010	2020	Buildout	2005	2010	2020	Buildout
DWA-01	0	0	351	896	0	0	59	149
DWA-02	0	0	114	290	0	0	19	48
DWA-03	0	0	159	405	0	0	26	67
DWA-04	0	0	304	775	0	0	51	129
DWA-05	1	1	707	1,802	0	0	66	169
DWA-06	0	0	363	925	0	0	60	153
DWA-07	0	0	392	999	0	0	65	167
DWA-08	0	0	528	1,345	0	0	57	145
DWA-09	0	0	266	678	0	0	44	113
DWA-10	0	0	220	561	0	0	35	90
DWA-11	0	0	399	1,017	0	0	67	169
DWA-12	0	0	401	1,021	0	0	67	170
DWA-13	0	0	220	560	0	0	37	93
DWA-14	0	0	278	709	0	0	46	118
DWA-16	0	0	348	888	0	0	58	148
DWB-01	99	212	212	436	16	35	35	73
DWB-02	0	0	260	663	0	0	38	97
DWB-03	0	0	385	982	0	0	63	160
DWB-04	0	0	311	792	0	0	52	132
DWB-05	0	0	416	1,060	0	0	68	173
DWB-06	0	0	339	865	0	0	57	144
DWB-07	0	0	500	1,273	0	0	49	126
DWB-08	0	0	278	709	0	0	45	116
DWB-09	0	0	361	920	0	0	47	119
DWB-10	0	0	527	1,343	0	0	62	158
DWB-11	0	0	124	316	0	0	21	53
DWB-12	0	0	522	1,330	0	0	87	222
DWB-14	0	0	318 ~~996~~	102 ~~1,396~~	0	0	62 ~~84~~	193 ~~245~~
DWB-15	0	0	484	1,233	0	0	81	205
DWB-16	1	1	1	598	0	0	0	100
DWB-17	1	1	1	984	0	0	0	164
DWB-18	1	1	1	882	0	0	0	147
DWB-19	1	1	1	915	0	0	0	153
DWB-20	2	2	2	1,149	0	0	0	192
DWB-21	1	1	1	933	0	0	0	155
Total	114	228	~~10,869~~ 10,095	~~31,441~~ 31,353	19	38	~~1,547~~ 1,525	~~4,881~~ 4,809

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AJ SDA

Trunk Shed Buildout Projections

	ESDs				Area (acres)			
Sewershed	2005	2010	2020	Buildout	2005	2010	2020	Buildout
SDA-01	1	123	314	510	0	21	52	85
SDA-02	2	244	621	1,009	0	35	89	145
SDA-03	2	239	609	989	0	36	91	148
SDA-04	1	95	242	393	0	15	37	60
SDA-05	0	121	365	842	0	20	61	140
SDA-06	0	144	433	998	0	24	72	166
SDA-07	0	0	305	778	0	0	49	126
SDA-08	0	0	218	555	0	0	36	93
SDA-09	2	2	3	673	0	0	0	112
SDA-10	2	3	3	784	0	0	0	131
SDA-11	0	0	136	348	0	0	23	58
SDA-12	0	0	507	1,293	0	0	85	215
SDA-13	3	3	4	990	0	1	1	165
SDA-14	3	3	3	907	0	0	1	151
SDA-15	0	86	259	596	0	13	39	90
SDA-16	0	93	280	645	0	15	45	104
SDA-17	2	3	3	822	0	0	1	137
SDA-18	0	164	493	1,136	0	27	80	185
SDA-19	0	170	512	1,181	0	28	85	195
SDA-20	3	4	4	1,150	1	1	1	192
SDA-21	3	3	4	968	0	1	1	161
SDA-22	1	1	1	230	0	0	0	38
SDA-23	0	27	80	185	0	4	13	31
SDB-01	1	1	196	556	0	0	32	91
SDB-02	0	0	129	367	0	0	22	61
SDB-03	0	115	435	756	0	19	73	126
SDB-04	2	248	631	1,025	0	29	73	119
SDB-05	2	177	451	733	0	28	72	117
SDB-06	0	129	390	898	0	22	65	150
SDB-07	0	112	338	779	0	19	56	130
SDC-01	0	0	5	15	0	0	1	3
SDC-02	0	0	3	8	0	0	0	1
Total	33	2,309	7,976	23,118	5	357	1,256	3,726

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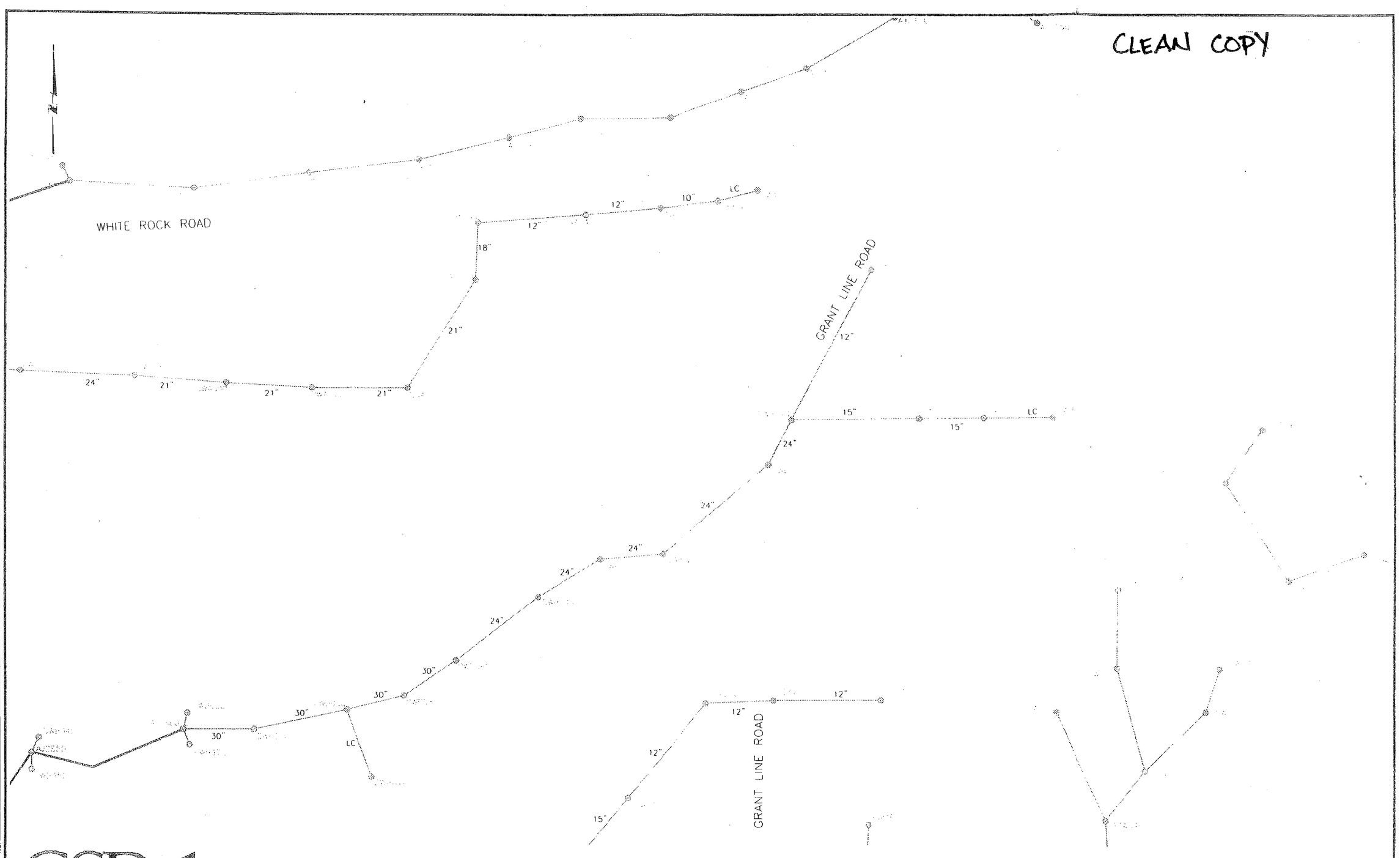
AJ SDA

Trunk Shed Buildout Projections

Sewershed	ESDs 2005	ESDs 2010	ESDs 2020	ESDs Buildout	Area (acres) 2005	Area (acres) 2010	Area (acres) 2020	Area (acres) Buildout
SDA-01	1	123	314	510	0	21	52	85
SDA-02	2	244	621	1,009	0	35	89	145
SDA-03	2	239	609	989	0	36	91	148
SDA-04	1	95	242	393	0	15	37	60
SDA-05	0	121	365	842	0	20	61	140
SDA-06	0	144	433	998	0	24	72	166
SDA-07	0	180	305	966	0	22	49	148
SDA-08	0	0	218	555	0	0	36	93
SDA-09	2	2	3	673	0	0	0	112
SDA-10	2	3	3	784	0	0	0	131
SDA-11	0	0	136	348	0	0	23	58
SDA-12	0	0	507	1,293	0	0	85	215
SDA-13	3	3	4	990	0	1	1	165
SDA-14	3	3	3	907	0	0	1	151
SDA-15	0	86	259	596	0	13	39	90
SDA-16	0	93	280	645	0	15	45	104
SDA-17	2	3	3	822	0	0	1	137
SDA-18	0	164	493	1,136	0	27	80	185
SDA-19	0	170	512	1,181	0	28	85	195
SDA-20	3	4	4	1,150	1	1	1	192
SDA-21	3	3	4	968	0	1	1	161
SDA-22	1	1	1	230	0	0	0	38
SDA-23	0	27	80	185	0	4	13	31
SDB-01	1	1	196	556	0	0	32	91
SDB-02	0	0	129	367	0	0	22	61
SDB-03	0	115	435	756	0	19	73	126
SDB-04	2	248	631	1,025	0	29	73	119
SDB-05	2	177	451	733	0	28	72	117
SDB-06	0	129	390	898	0	22	65	150
SDB-07	0	112	338	779	0	19	56	130
SDC-01	0	0	5	15	0	0	1	3
SDC-02	0	0	3	8	0	0	0	1
Total	33	2,497	7,976	23,306	5	379	1,256	3,748

CLEAN COPY



CSD-1

COUNTY SANITATION DISTRICT 1

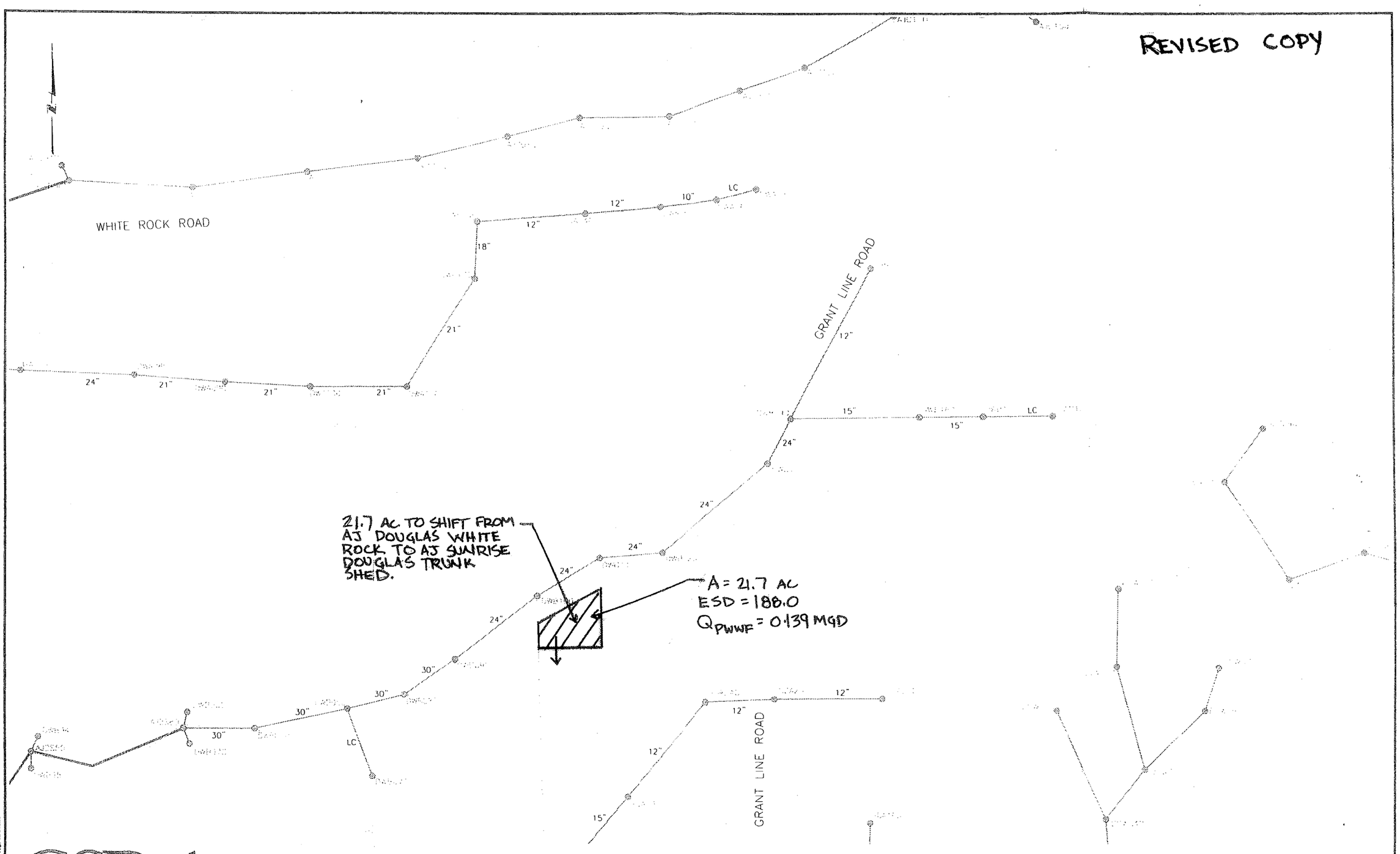
Wastewater Conveyance For a Growing Sacramento

JOB No

FILE No.

AJ DOUGLAS-WHITE ROCK TRUNK SHED 2 OF 2

REVISED COPY



CSD-1

COUNTY SANITATION DISTRICT 1

Wastewater Conveyance For a Growing Sacramento

0 800 1600 2400 3200

SCALE 1"=1600'

AJ DOUGLAS-WHITE ROCK TRUNK SHED 2 OF 2

FILE No

JOB No

CLEAN COPY

DOUGLAS ROAD

MATHER INTERCEPTOR

AEROJET INTERCEPTOR

FOLSOM SOUTH CANAL

SUNRISE BLVD

GRANT LINE ROAD

12" 12" 12" 15" 15" 12" 15" LC 21" 33" 33" 27" 18" 15" 15" 21" 21" 21" 15" 15" 15" LC 36" 36" 36" 36" 33" 33" 21" 21" 21" 18" 18" 18" 21" 21"

CSD-1
COUNTY SANITATION DISTRICT 1
Wastewater Conveyance For a Growing Sacramento

JOB No FILE No

0 800 1600 2400 3200
SCALE 1"=1600'

AJ SUNRISE DOUGLAS TRUNK SHED 1 OF 2

REVISED COPY

21.7 AC. TO SHIFT FROM AJ DOUGLAS WHITE ROCK TO AJ SUNRISE DOUGLAS TRUNK SHED

A = 21.7 AC.
ESD = 188.0
Q_{PWWF} = 0.139 MGD

DOUGLAS ROAD

MATHER INTERCEPTOR

AEROJET INTERCEPTOR

FOLSOM SOUTH CANAL

SUNRISE BLVD

GRANT LINE ROAD

12" 12" 12" 15" 15" 21" 33" 27" 18" 15" 15" 21" 21" 21" 21" 15" 15" 15" LC 33" 36" 36" 36" 36" 33" 33" 21" 21" 21" 18" 18" 18" 18" 21" 21"

CSD-1
COUNTY SANITATION DISTRICT 1
Wastewater Conveyance For a Growing Sacramento

0 800 1600 2400 3200
SCALE: 1"=1600'

AJ SUNRISE DOUGLAS TRUNK SHED 1 OF 2

FILE No.

JOB No.