

# **Appendix B**

## **Storm Drain Study**

# STORM DRAIN INSPECTION REPORT FOR:



## **VA Northern California Healthcare System Alameda Point, CA**

March 8, 2016

Prepared for:  
HDR Architecture  
560 Mission Street, Suite 900  
San Francisco, CA 94105

Prepared by:  
**SANDIS**  
636 9<sup>th</sup> Street  
Oakland, CA 94607

## **Table of Contents**

- A. PURPOSE OF STUDY
- B. METHODOLOGY
- C. COMMON ISSUES IMPACTING VIDEO SURVEY
- D. RESULTS OF VIDEO INSPECTION SURVEY
- E. OUTFALL CONDITIONS
- F. CONCLUSIONS AND RECOMMENDATIONS

## **Appendices**

- APPENDIX A: STORM DRAIN – VIDEO INSPECTION EXHIBIT
- APPENDIX B: 2016 VIDEO SURVEY BY SUBDYNAMIC
- APPENDIX C: EXISTING 2014 VIDEO SURVEY BY SUBTRONIC
- APPENDIX D: EXISTING SEWER MAPS USED FOR REFERENCE (BY NAVY AND OTHERS)
- APPENDIX E: PHASE 1 SITE PLAN – PROPOSED EASEMENT MAP (BY OTHERS)

## **A. Purpose of Study**

This study was performed for HDR Architecture to review the condition of the existing storm drain pipes at the former Alameda Point Naval Base in Alameda, CA. The following report includes a log of the pipe defects, damage, or other issues, recommendations for repair or replacement, and a professional opinion as to the suitability of the piping for reuse by the VA Alameda Point project.

Coinciding with this study was a field topographic survey to tie down the physical location of found storm drain pipes & structures.

## **B. Methodology**

The first order of work for this study was data collection. It is understood that in the fall of 2014 a similar video inspection effort was performed (by others). These videos were transmitted to SANDIS in December 2015 and were reviewed for completeness. There were a few videos that included complete segments of pipe, several videos where the pipe location was unidentifiable, and some videos that were abandoned due to debris or water in the existing pipes. For the pipes whose location was clear and fully video surveyed in 2014, additional video inspection was not attempted as part of this study. For pipes whose location was not identifiable or if there were other issues for completing the work in 2014, effort was made as part of this work (2016) to gather video of the pipes.

Step two was a review with the VA Alameda design team to identify the portions of pipe that were of use or interest to the design team. There were varying degrees of importance for the existing pipe network. The most important pipe networks were near to or connected to the VA's property and identified on the "Phase 1 Site Plan – Proposed Easement Map" (by others) as outfalls 2, 3, 5, 7, 10, & 12 (APPENDIX E). For these outfalls the study would attempt to video the pipe and provide a 30' strip survey along the existing pipe. Of secondary importance were outfalls 8, 9, & 11 because they were thought to be smaller diameter pipes or otherwise not connected to the VA Site. This study would include identifying the location and size of the pipe but not attempt video inspection. The outfalls shown as 1, 13, & 14 were of least importance because they were not near the VA project site and it was unlikely they would be used. For these outfalls, the location and pipe size was to be investigated if possible.

The next step was to coordinate site access with the Navy, the City, and the various survey crews and begin the work. Access to the site was limited to a period from February 1 – February 26 and could be accessed from 7:30 am – 6 PM. Since the storm drain pipes were connected to the bay and at a very low elevation, the video inspection work was timed with the Tides in order to access the storm drain pipes at low tide and reduce the likelihood of water in the pipes. It should be noted that videos cannot be taken if the pipe is submerged.

At the time of the survey work, there were several areas of the site that were planned to be accessed with the support of a Navy Radiological technician. When these areas were ready to be accessed, identified as IR 32 on the site maps, it was determined that additional access would be required since this site had not been mitigated. Due to timing constraints in getting access, the effort to collect data in the IR 32 area was abandoned.

## **C. Common Issues Impacting Video Survey**

In general, the condition of the structures, pipes, and outfalls found on site was poor due to an apparent lack of maintenance and deterioration with age. There were several common problems that directly impacted the completeness of the video survey. We would recommend that these obstructions be corrected prior to attempting another video surveying effort. The locations where these problems were encountered are shown on the "Storm Drain – Video Inspection Exhibit" in Appendix A. These included the following:

- 1.) Rims on Catch Basins were rusted shut. Due to age and deterioration, several rims were inoperable and rusted shut to the frame of the inlet. To mitigate this condition, the rims would have to be forcefully removed which would likely break them so if this was attempted the owner should be prepared to replace the rims and/or catch basins if intended for future use. A photo of this condition is shown below.



Structure: 7-21

- 2.) Inlets or Manholes were buried or otherwise covered. In locations where inlets were expected to be, debris piles, trench plates, dirt, or overgrowth were present so the storm drain pipe could not be inspected. In cases where debris or other material can be removed or relocated it is possible that the inlets could be located and inspected but it is unlikely they would be found if buried. Photos of this condition are shown below.



Structure 2-10 shown. Structure 2-06 not located.

- 3.) High Water Level encountered in pipes. As mentioned previously, the work was timed with the low tide to best mitigate this issue. However, in several locations high water level prevented the completion of a portion or entirety of a storm drain pipe. It is possible that the pipes are clogged downstream and water is not being released which is creating this condition. To fix this issue, we recommend the water be pumped out and the pipe be cleaned or repaired as needed. A photo of this condition is shown below.



Subdynamic Survey (2016) – Structure 7-20 to 7-21

- 4.) Silt, Sediment, or Debris clogging pipe. This was the most common problem and prevented completion of the video inspection in the majority of the pipe on this site. This issue can be mitigated by hydrojetting or vacuum cleaning the pipes in order to re-attempt the video inspection. In some cases portions of the pipe may need to be physically removed in order to complete the video inspection. Photos of this condition are shown below and seen in the videos that were performed.



Subdynamic Survey (2016) – Structure 8-26 to 8-27



Subdynamic Survey (2016) – Structure “Unknown” to 10-29A

## **D. Results of Video Inspection Survey**

The results of the video inspection survey are included in the tables on the following pages. Inspection videos and reports from the 2016 Subdynamic video survey are included in Appendix B. Video inspection reports performed by others in 2014 are included in Appendix C for reference.

Date: 8-Mar-16  
Project #: 615110  
Project: VA ALAMEDA - ALAMEDA POINT, CA

Pipe Network: OUTFALL 2

STRUCTURE #*		MATERIAL	DIAMETER (IN)	TOTAL PIPE LENGTH (FT)	PIPE LENGTH INSPECTED (FT)	COUNT (FT)		DEFECT	NOTES	VIDEO SURVEY			YEAR OF VIDEO SURVEY	VIDEO SURVEY DVD #
UPSTREAM	DOWNSTREAM					START	END			COMPLETE	STARTED AND ABANDONED	ATTEMPTED - BUT UNABLE TO START		
12	9	CMP	10	178	0				Structure 12 was unable to be video surveyed due to water			X	2016	N/A
8	9	N/A	10	133	0				Structure 8 was unable to be video surveyed due to water			X	2016	N/A
9	10	CMP	12	344	0				Structure 9 was full of water			X	2016	N/A
10	6	CMP	12	362	0				Structure 10 was unable to be opened due to rust and was full of water			X	2016	N/A
6	OUTFALL 2	CMP	12	369	0				Structure 6 could not be found			X	2016	N/A

\* = STRUCTURE # (AS REFERENCED ON "STORM DRAIN - VIDEO INSPECTION EXHIBIT" IN APPENDIX A)  
(#) = STRUCTURE LABEL AS REFERENCED ON THE VIDEO SURVEY DVD & INSPECTION REPORT (PER THE YEAR OF THE VIDEO SURVEY)  
**BOLD STRUCTURE #** = STARTING STRUCTURE OF VIDEO SURVEY  
CMP = CORRUGATED METAL PIPE  
CP=CONCRETE PIPE (NON-REINFORCED)  
RCP = REINFOCED CONCRETE PIPE  
DIP = Ductile Iron Pipe  
PE = POLYETHYLENE  
PVC = Polymerized Vinyl Chloride  
UNK = UNKNOWN

Date: 8-Mar-16  
Project #: 615110  
Project: VA ALAMEDA - ALAMEDA POINT, CA

Pipe Network: **OUTFALL 3**

STRUCTURE #*		MATERIAL	DIAMETER (IN)	TOTAL PIPE LENGTH (FT)	PIPE LENGTH INSPECTED (FT)	COUNT (FT)		DEFECT	NOTES	VIDEO SURVEY			YEAR OF VIDEO SURVEY	VIDEO SURVEY DVD #
UPSTREAM	DOWNSTREAM					START	END			COMPLETE	STARTED AND ABANDONED	ATTEMPTED - BUT UNABLE TO START		
15	14	PVC	21	348	157	0.0	157.0		Survey abandoned due to excessive amount of silt, camera could not pass. 25% full of silt.		X		2016	4
14 (16)	OUTFALL 3 (16OF)	CMP	30	681	403.2	108.6	219.4	Settled sediment and gravel	Some water in the pipe throughout the entire pipe		X		2014	3
						325.8	325.8		Tap from structure					
						361.3	403.2	Water level gets higher						
						401.5	401.5	Infiltration dripper						
						403.2	403.2	Survey abandoned	Survey abandoned due to debris					
16 (18)	14 (16)	PE	12	431.1	431.1	0.0	5.6	Water in pipe		X			2014	3
						3.0	6.0	Debris and settled gravel and deposits						
						416.7	423.2	Debris and settled gravel and deposits						
13 (14)	13A (14A)	CMP/RCP	12	78	78	0.0	11.6	Water	Tee connection to line between 16 and 16OF	X			2014	2
						0.0	11.6	Settled gravel and sediment						
						11.6	15.6	Surface corrosion on pipe						
						20.0	20.0	Surface corrosion on pipe						
						31.8	32.4	Surface corrosion on pipe						
						61.3	61.3	Pipe material change - CMP to RCP						
						78.0	78.0	Tee connection						

\* = STRUCTURE # (AS REFERENCED ON "STORM DRAIN - VIDEO INSPECTION EXHIBIT" IN APPENDIX A)  
(#) = STRUCTURE LABEL AS REFERENCED ON THE VIDEO SURVEY DVD & INSPECTION REPORT (PER THE YEAR OF THE VIDEO SURVEY)  
**BOLD STRUCTURE #** = STARTING STRUCTURE OF VIDEO SURVEY  
CMP = CORRUGATED METAL PIPE  
CP=CONCRETE PIPE (NON-REINFORCED)  
RCP = REINFOCED CONCRETE PIPE  
DIP = Ductile Iron Pipe  
PE = POLYETHYLENE  
PVC = Polymerized Vinyl Chloride  
UNK = UNKNOWN

Date: 8-Mar-16  
Project #: 615110  
Project: VA ALAMEDA - ALAMEDA POINT, CA

Pipe Network: **OUTFALL 5**

STRUCTURE #*		MATERIAL	DIAMETER (IN)	TOTAL PIPE LENGTH (FT)	PIPE LENGTH INSPECTED (FT)	COUNT (FT)		DEFECT	NOTES	VIDEO SURVEY			YEAR OF VIDEO SURVEY	VIDEO SURVEY DVD #
UPSTREAM	DOWNSTREAM					START	END			COMPLETE	STARTED AND ABANDONED	ATTEMPTED - BUT UNABLE TO START		
14A (14)	<b>17</b>	CMP	12	376	0	0	0		Excessive mud in pipe, unable to record			X	2016	1
<b>17</b>	OUTFALL 5	CMP	12	581	19.8	16.5	16.5	Infiltration dripper			X		2016	1
						19.8	19.8		Pipe has compacted debris throughout, cannot get passed. 25-50% full of water.					

\* = STRUCTURE # (AS REFERENCED ON "STORM DRAIN - VIDEO INSPECTION EXHIBIT" IN APPENDIX A)  
(#) = STRUCTURE LABEL AS REFERENCED ON THE VIDEO SURVEY DVD & INSPECTION REPORT (PER THE YEAR OF THE VIDEO SURVEY)  
**BOLD STRUCTURE #** = STARTING STRUCTURE OF VIDEO SURVEY  
CMP = CORRUGATED METAL PIPE  
CP=CONCRETE PIPE (NON-REINFORCED)  
RCP = REINFOCED CONCRETE PIPE  
DIP = Ductile Iron Pipe  
PE = POLYETHYLENE  
PVC = Polymerized Vinyl Chloride  
UNK = UNKNOWN

Date: 8-Mar-16  
Project #: 615110  
Project: VA ALAMEDA - ALAMEDA POINT, CA

Pipe Network: OUTFALL 7

STRUCTURE #*		MATERIAL	DIAMETER (IN)	TOTAL PIPE LENGTH (FT)	PIPE LENGTH INSPECTED (FT)	COUNT (FT)		DEFECT	NOTES	VIDEO SURVEY			YEAR OF VIDEO SURVEY	VIDEO SURVEY DVD #
UPSTREAM	DOWNSTREAM					START	END			COMPLETE	STARTED AND ABANDONED	ATTEMPTED - BUT UNABLE TO START		
19	<b>20</b>	CP	12	95.6	95.6	0	95.6		40% Water level 8.8 feet	X			2016	1
<b>20</b>	21	CP	12	207	0	0	0		Survey abandoned, excessive debris in line			X	2016	1
<b>23</b>	24	CP	8	59	19.4	0	19.4		Pipe filled with water and debris, camera under water entire time		X		2016	1
24	21	CP	12	218	0				Structure 24 was unable to be video surveyed due to water				2016	N/A
21	OUTFALL 7	CP	21	305	0				Could not open Structure 21				2016	N/A

\* = STRUCTURE # (AS REFERENCED ON "STORM DRAIN - VIDEO INSPECTION EXHIBIT" IN APPENDIX A)  
(#) = STRUCTURE LABEL AS REFERENCED ON THE VIDEO SURVEY DVD & INSPECTION REPORT (PER THE YEAR OF THE VIDEO SURVEY)  
**BOLD STRUCTURE #** = STARTING STRUCTURE OF VIDEO SURVEY  
CMP = CORRUGATED METAL PIPE  
CP=CONCRETE PIPE (NON-REINFORCED)  
RCP = REINFOCED CONCRETE PIPE  
DIP = Ductile Iron Pipe  
PE = POLYETHYLENE  
PVC = Polymerized Vinyl Chloride  
UNK = UNKNOWN

Date: 8-Mar-16  
Project #: 615110  
Project: VA ALAMEDA - ALAMEDA POINT, CA

Pipe Network: OUTFALL 8

STRUCTURE #*		MATERIAL	DIAMETER (IN)	TOTAL PIPE LENGTH (FT)	PIPE LENGTH INSPECTED (FT)	COUNT (FT)		DEFECT	NOTES	VIDEO SURVEY			YEAR OF VIDEO SURVEY	VIDEO SURVEY DVD #
UPSTREAM	DOWNSTREAM					START	END			COMPLETE	STARTED AND ABANDONED	ATTEMPTED - BUT UNABLE TO START		
26	27	CP	14	194	7.1	0	7.1		Survey abandoned due to excessive debris in line, dirt and debris fills approximately 50% of line		X		2016	2
27	OUTFALL 8	DIP	14	127	3.8	0	3.8		Survey abandoned due to excessive silt in line, silt fills 50% of line and camera cannot pass		X		2016	2

\* = STRUCTURE # (AS REFERENCED ON "STORM DRAIN - VIDEO INSPECTION EXHIBIT" IN APPENDIX A)  
(#) = STRUCTURE LABEL AS REFERENCED ON THE VIDEO SURVEY DVD & INSPECTION REPORT (PER THE YEAR OF THE VIDEO SURVEY)  
**BOLD STRUCTURE #** = STARTING STRUCTURE OF VIDEO SURVEY  
CMP = CORRUGATED METAL PIPE  
CP=CONCRETE PIPE (NON-REINFORCED)  
RCP = REINFOCED CONCRETE PIPE  
DIP = Ductile Iron Pipe  
PE = POLYETHYLENE  
PVC = Polymerized Vinyl Chloride  
UNK = UNKNOWN

Date: 8-Mar-16  
Project #: 615110  
Project: VA ALAMEDA - ALAMEDA POINT, CA

Pipe Network: **OUTFALL 10**

STRUCTURE #*		MATERIAL	DIAMETER (IN)	TOTAL PIPE LENGTH (FT)	PIPE LENGTH INSPECTED (FT)	COUNT (FT)		DEFECT	NOTES	VIDEO SURVEY			YEAR OF VIDEO SURVEY	VIDEO SURVEY DVD #
UPSTREAM	DOWNSTREAM					START	END			COMPLETE	STARTED AND ABANDONED	ATTEMPTED - BUT UNABLE TO START		
28 (9)	29 (10)	RCP	30	1072.6	1072.6	760.0	1072.6	Water level starts to rise	MH10 filled with water	X			2014	1
						932.9	1072.6	Sag in line						
						1072.6	1072.6	Intruding sealing grout						
29D (29A)	29E (OUTFALL 10)	CP	12	23.0	10.0	0.0	10.0		Survey abandoned due to excessive amount of debris on bottom of pipe, camera could not pass, 20% water level		X		2016	3
29 (10)	OUTFALL 10 (OUTFALL)	PVC	30	468	59.4	3.3	4.3	Water in pipe-possible sag			X		2014	1
						26.7	26.7	Infiltration dripper						
						51.3	51.3	Infiltration dripper						
						59.4	59.4	Infiltration dripper						
						59.4	59.4		Survey abandoned due to debris					
34 (20)	32 (19)	Steel Pipe	12	310	310.0	89.4	89.4	Sag in line		X			2014	3
						89.3	310.0		High water level at end of survey					
33	32	CMP	36	586	0.0				Water level to high to survey			X	2016	N/A
32 (19)	31 (12)	CMP	21	285	4.4	4.4	4.4		Survey abandoned due to high water level		X		2014	2
31 (12)	30 (11)	RCP	30	466	409.3	4.2	4.2	Intruding sealing grout	MH 12 has some water		X		2014	2
						55.5	55.5	Infiltration dripper	Water in entire pipe					
						208.3	409.3	Water level rises						
						301.3	301.3	Infiltration weeper						
						409.3	409.3		Survey abandoned due to high water level					
30 (11)	29 (10)	RCP	30	572	543.2	16.2	16.2	Infiltration dripper	MH 11 Has some water		X		2014	2
						276.6	276.6	Infiltration dripper						
						276.6		Sag in line						
						429.2	543.2	Water level rises						
						543.2	543.2		Survey abandoned due to high water level					

\* = STRUCTURE # (AS REFERENCED ON "STORM DRAIN - VIDEO INSPECTION EXHIBIT" IN APPENDIX A)  
(#) = STRUCTURE LABEL AS REFERENCED ON THE VIDEO SURVEY DVD & INSPECTION REPORT (PER THE YEAR OF THE VIDEO SURVEY)

**BOLD STRUCTURE #** = STARTING STRUCTURE OF VIDEO SURVEY

CMP = CORRUGATED METAL PIPE  
CP=CONCRETE PIPE (NON-REINFORCED)  
RCP = REINFOCED CONCRETE PIPE  
DIP = Ductile Iron Pipe  
PE = POLYETHYLENE  
PVC = Polymerized Vinyl Chloride  
UNK = UNKNOWN

Pipe Network: OUTFALL 12

STRUCTURE #*		MATERIAL	DIAMETER (IN)	TOTAL PIPE LENGTH (FT)	PIPE LENGTH INSPECTED (FT)	COUNT (FT)		DEFECT	NOTES	VIDEO SURVEY			YEAR OF VIDEO SURVEY	VIDEO SURVEY DVD #
UPSTREAM	DOWNSTREAM					START	END			COMPLETE	STARTED AND ABANDONED	ATTEMPTED - BUT UNABLE TO START		
43 (25)	42 (24)	CMP	8	106	88.6	3.8	3.8	Infiltration dripper		X			2014	4
						4.7	4.7	Water level sag						
						9.1	9.1	Camera underwater						
						29.3	29.3	Deposits attached encrustation						
						38.5	38.5	Camera underwater						
						88.6	88.6	Deposits attached encrustation						
						88.6	88.6	End of survey						
42 (24)	41 (21)	RCP	12	46	43.7	5.2	5.2	Deposits attached encrustation		X			2014	3
						8.8	8.8	infiltration stain						
						20.7	20.7	infiltration stain						
						23.3	23.3	infiltration stain						
						26.5	26.5	cracks						
						29.5	29.5	infiltration stain						
						43.1	43.1	joint offset large						
						43.7	43.7	infiltration stain						
						43.7	43.7	End of survey						
41 (21)	40 (22)	RCP	15	54	50.5	1.8	1.8	Infiltration stain, longitudinal fracture		X			2014	3
						2.0	2.0	Infiltration stain						
						5.0	5.0	Infiltration stain						
						14.5	14.5	Infiltration stain						
						24.0	24.0	Infiltration stain						
						26.9	26.9	Infiltration stain						
						48.9	48.9	Infiltration dripper						
						50.5	50.5	End of survey						
40 (22)	39 (23)	RCP	36	59	55.4	0.1	0.1	Infiltration stain		X			2014	3
						18.7	18.7	Infiltration dripper						
						35.9	35.9	Infiltration dripper						
39 (23)	38 (13)	RCP	36	67	63.1	63.1	63.1	Infiltration stain		X			2014	3
						63.1	63.1	End of survey						
49 (31)	48 (30)	RCP	12	49	47.0	5.5	5.5	Infiltration dripper, deposits attached encrustation		x			2014	4
						47.0	47.0	End of survey						

Date: 8-Mar-16  
Project #: 615110  
Project: VA ALAMEDA - ALAMEDA POINT, CA

Pipe Network: OUTFALL 12

STRUCTURE #*		MATERIAL	DIAMETER (IN)	TOTAL PIPE LENGTH (FT)	PIPE LENGTH INSPECTED (FT)	COUNT (FT)		DEFECT	NOTES	VIDEO SURVEY			YEAR OF VIDEO SURVEY	VIDEO SURVEY DVD #
UPSTREAM	DOWNSTREAM					START	END			COMPLETE	STARTED AND ABANDONED	ATTEMPTED - BUT UNABLE TO START		
48 (30)	47 (29)	RCP	12	51	48.1	0.2	0.2	Deposits of settled gravel		x			2014	4
						1.7	1.7	Infiltration dripper						
						36.0	36.0	Infiltration stain						
						41.9	41.9	Deposits attached encrustation						
						48.1	48.1	End of survey						
47 (29)	46 (28)	RCP	18	53	51.2	1.5	1.5	Deposits attached encrustation	MH29 has water in it	x			2014	4
						4.8	4.8	Alignment left						
						13.3	13.3	Water level decreases						
						26.7	26.7	Infiltration stain						
						29.8	29.8	Infiltration weeper						
						32.7	32.7	Infiltration stain						
						36.4	36.4	Infiltration stain						
						41.6	41.6	Infiltration dripper						
						51.2	51.2	Deposits attached encrustation						
						51.2	51.2	End of survey						
46 (28)	45 (27)	RCP	18	99	83.4	11.9	11.9	Infiltration stain			X		2014	4
						21.4	21.4	Infiltration dripper						
						36.4	36.4	Infiltration dripper						
						39.2	39.2	Infiltration dripper						
						45.2	45.2	Infiltration dripper						
						54.2	54.2	Infiltration runner						
						60.2	60.2	Deposits of settled gravel						
						66.4	66.4	Infiltration dripper						
						68.9	68.9	Infiltration dripper						
						72.1	72.1	Infiltration dripper						
						81.3	81.3	Infiltration runner						
						83.4	83.4	Infiltration stain, infiltration dripper						
						83.4	83.4		Survey abandoned due to debris					
45 (27)	44 (26)	RCP	24	198.3	198.3	1.0	1.0	Infiltration dripper		X			2014	4
						17.5	17.5	Infiltration stain						
						97.6	97.6	Joint offset medium, infiltration dripper						
						99.3	99.3	Broken void visible						
						128.5	128.5	Infiltration dripper						
						177.0	177.0	Infiltration dripper						
						192.2	192.2	Infiltration dripper						
						195.0	195.0	Infiltration dripper						
						198.3	198.3	Infiltration stain						
						198.3	198.3	End of survey						

## **E. Outfall Condition**

### **Outfall 2**

Size and Material: 12" Corrugated Metal Pipe  
Condition: Bottom half of pipe found eroded and rusted. Rocks blocking outfall pipe upstream.  
Suitability for Reuse: Outfall is not suitable for reuse.



OUTFALL 2

12" CMP



OUTFALL 2

12" CMP

### **Outfall 3**

Size and Material:  
Condition:

30" Corrugated Metal Pipe (metal has corroded away)  
Metal pipe has corroded away near outfall and only the concrete encasement remains.

Suitability for Reuse:

It is possible to connect to this outfall as it is still functional. The original pipe having eroded away would suggest reusing this structure would be a temporary condition, requiring rebuilding in the future.



OUTFALL 3

30" CMP



OUTFALL 3

30" CMP

## **Outfall 5**

Size and Material: 12" Corrugated Metal Pipe  
Condition: Metal has been corroded and rusted at outfall end. Pipe appears to be structurally intact.  
Suitability for Reuse: The outfall is missing a flap-gate, but may be a candidate for reuse in the short term. Recommend a long-term replacement option be investigated.



OUTFALL 5

12" CMP



OUTFALL 5

12" CMP

## **Outfall 7**

Size and Material:

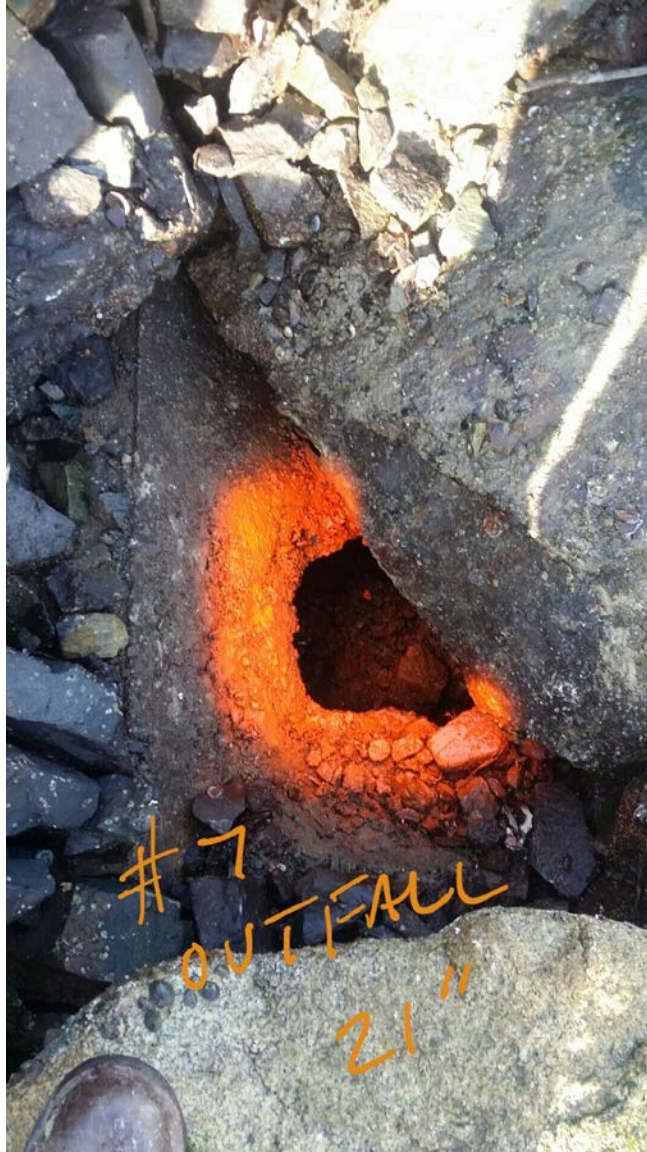
21" Non-reinforced Concrete Pipe

Condition:

The outfall contains debris and needs to be cleaned. There are several rocks that block the discharge point. There is no flap-gate present.

Suitability for Reuse:

The headwall looks intact, therefore if the pipe is cleaned and inspected it is a possible candidate for reuse. Recommend the outlet point be cleared of obstructing rocks.



OUTFALL 7

21" CP

## **Outfall 8**

Size and Material:

14" Ductile Iron Pipe

Condition:

Outside of pipe is corroded and rusted upstream from the outfall. Pipe looks to be replaced (less corroded) near the headwall. Pipe has a concrete headwall with metal grate at outfall end as seen in the photos below.

Suitability for Reuse:

Outfall appears to be in sufficient shape to reuse. Corrosion of upstream pipe may limit useful pipe life.



OUTFALL 8

14" DIP



OUTFALL 8

14" DIP



OUTFALL 8

14" DIP



OUTFALL 8

14" DIP

## **Outfall 9**

Size and Material: 12" Reinforced Concrete Pipe  
Condition: Pipe ends short of rip-rap. Some pipe segments have fallen apart at the outlet, but the pipe itself appears to be structurally sound.  
Suitability for Reuse: Recommend extending pipe to rip-rap to consider reuse.



OUTFALL 9

12" CP



OUTFALL 9

12" CP

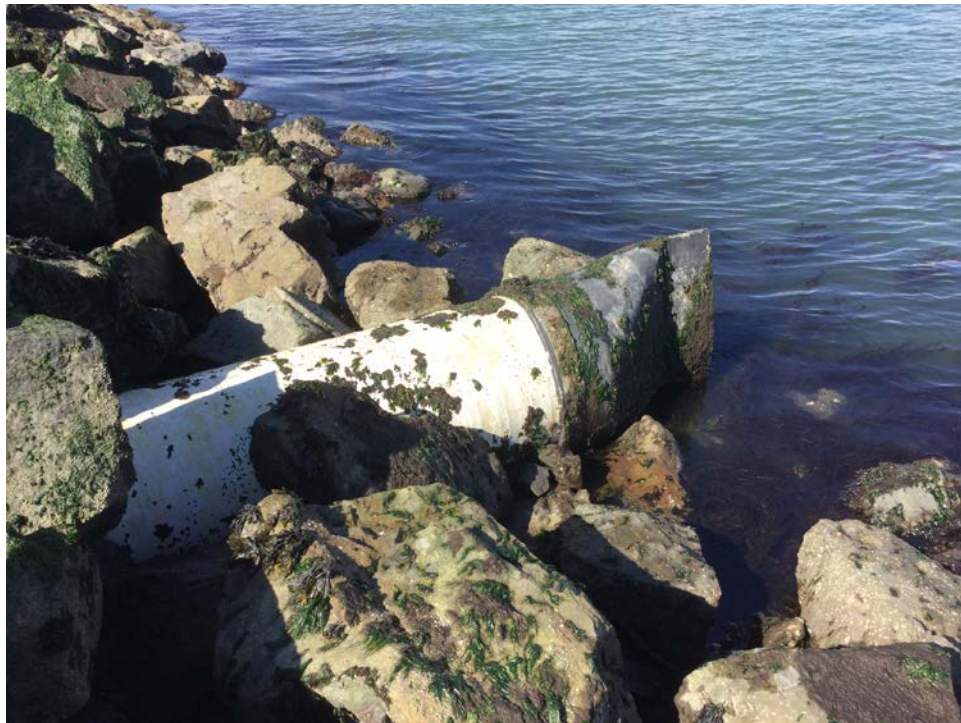
## **Outfall 10**

Size and Material: 30" PVC  
Condition: PVC outfall is in good shape with rubber tideflex valve at end. There is a large rock that is on valve that would limit the ability to open, but otherwise appears functional.  
Suitability for Reuse: Suitable.



OUTFALL 10

30" PVC



OUTFALL 10

30" PVC

## **Outfall 12**

Size and Material: 36" Reinforced Concrete Pipe  
Condition: Concrete headwall with no grate was found with rusted pipe end.  
Suitability for Reuse: Outfall appears to be structurally intact.  
Suitable.



OUTFALL 12

36" RCP



OUTFALL 12

36" RCP

## **F. Conclusions and Recommendations**

As indicated in the video inspection survey results and accompanying exhibit, it is clear that the majority of the existing storm drain pipe on site was unable to be adequately inspected due to the various issues accessing the existing storm drain pipes. Of the approximate 13,680 LF of total pipe on the site, only 4,400 LF or 32 % of the pipes were able to be reviewed.

Of the pipes that were able to be inspected, the pipes were generally in fair to poor condition. Some of the common issues found in the inspected pipes were as follows:

- 1) Sediment/Silt Buildup – This is a major defect for the functioning of the storm drain pipe system. If the pipes are to be reused, these pipes should be hydro-jetted or vacuum cleaned. As mentioned previously, due to environmental issues, hydrojetting may require collection of blown-out debris. Once pipe has been cleaned, the storm drain pipes should be re-inspected for any other potential structural issues.
- 2) Sag in Pipe – This defect reduces the flow capacity of the pipes and can promote future issues including sedimentation build-up and pipe clogging. Where sags are identified, the pipe section should be removed and replaced.
- 3) High Water Level in Pipe – Likely caused by downstream clogging. Water should be removed and the pipe re-inspected.
- 4) Surface Corrosion on Pipe – Corroded pipes are beyond their useful life and should be replaced. It is impossible to determine the remaining useful life that a corroded but otherwise structurally intact pipe will have. It is possible to prolong the use of the pipe using a pipe slip-lining technique in the short term.
- 5) Disjointed Pipe – This is considered a minor defect in the short term. Over time however, there is potential for erosion around the exterior of the pipe which affects its structural stability and could increase the potential for pipe collapse, root intrusion, and clogging. A typical fix for this type of defect would be to excavate, remove, and reset the disjointed pipe segments or the pipe could be slip-lined.
- 6) Infiltration – Dripping water (Infiltration dripper) and damp concrete pipe (Infiltration Stain) were both encountered. These defects are considered minor in the short term. A typical fix for this type of defect would be to grout the existing cracks or weak joints to reduce groundwater from infiltrating the existing pipe.

If portions of the existing storm drain pipe are intended to be reused, we recommend that any further investigation be performed after a work plan is developed to include the services of an underground pipe contractor and a hydrojetting and/or vacuum truck contractor to clean the existing pipes, open and replace the existing rusted grates, remove existing debris piles to expose all existing structures, and replace collapsed or broken pipe segments in order to verify the condition of the existing lines that may be reused. After the pipes have been maintained, then a follow up video inspection effort could be performed in order to determine the integrity and suitability for any potential pipe that may be reused.

Since there are several entities involved, a possible scenario would be to have the team onsite and ready to inspect/review the condition of the existing pipes as they are cleaned and to have the contractor replace pipes on an as-needed basis during this maintenance and inspection effort.

Alternatively, since most of the pipes in this system are in disrepair and at the end of their useful design life (60+ years), it may be prohibitively expensive to clean, re-inspect, and spot replace sections of pipe to gain a nominal extension in the existing pipe system's useful life. Therefore, it is our recommendation that the existing pipe network should be replaced to the maximum extent practical and that the existing system be abandoned in place.

It should also be noted that there are several unknowns for the existing storm drain system and this report relied on available Navy storm drain maps to supplement information determined in the field. There are several structures that are included in these maps that were not locatable in the field but are believed to exist or have existed. These uncertainties support our recommendation to install a new system with a known condition (new), useful design life, and location in order to serve the proposed project.

## OUTFALL REUSE SUMMARY:

OUTFALL SUMMARY						
OUTFALL #	PIPE DIAMETER (IN)	FLAP GATE PRESENT (Y/N)	2016 CONDITION			REUSE RECOMMENDATION <sup>1</sup>
			GOOD	FAIR	POOR	
2	12	N			X	No
3	30	N		X		Maybe
5	12	N		X		Maybe
7	21	N		X		Maybe
8	14	N		X		Maybe
9	12	N		X		No <sup>2</sup>
10	30	Y	X			Yes
12	36	N	X			Yes
<p>1. Outfall's reuse recommendation is based on the general condition of the outfall only. Further inspection/verification would be required to verify the condition of the existing pipe just upstream of the outfall after pipe has been cleaned.</p> <p>YES - Pipe outfall structure is in decent shape with limited apparent structural defects.</p> <p>No - Pipe outfall structure is unusable without substantial improvements below the top of bank at the estuary.</p> <p>Maybe - Pipe outfall structure is intact but may be in questionable condition. Design life may be of issue.</p> <p>2. Outfall ends short of the estuary and would need substantial improvements to be extended.</p>						

**APPENDIX A**

**STORM DRAIN – VIDEO INSPECTION EXHIBIT**



## **APPENDIX B**

### **2016 VIDEO SURVEY BY SUBDYNAMIC**

#### **File Format:**

##### **Video Survey DVD #**

- **Video Survey Data – Structure X to Y**
  - ♦ **Survey Report – Structure X to Y (.pdf)**
  - ♦ **Survey Video – Structure X to Y (.wmv)**
- **Archived Raw Video Survey Data from Subdynamic**

## **APPENDIX C**

### **EXISTING 2014 VIDEO SURVEY BY SUBTRONIC**

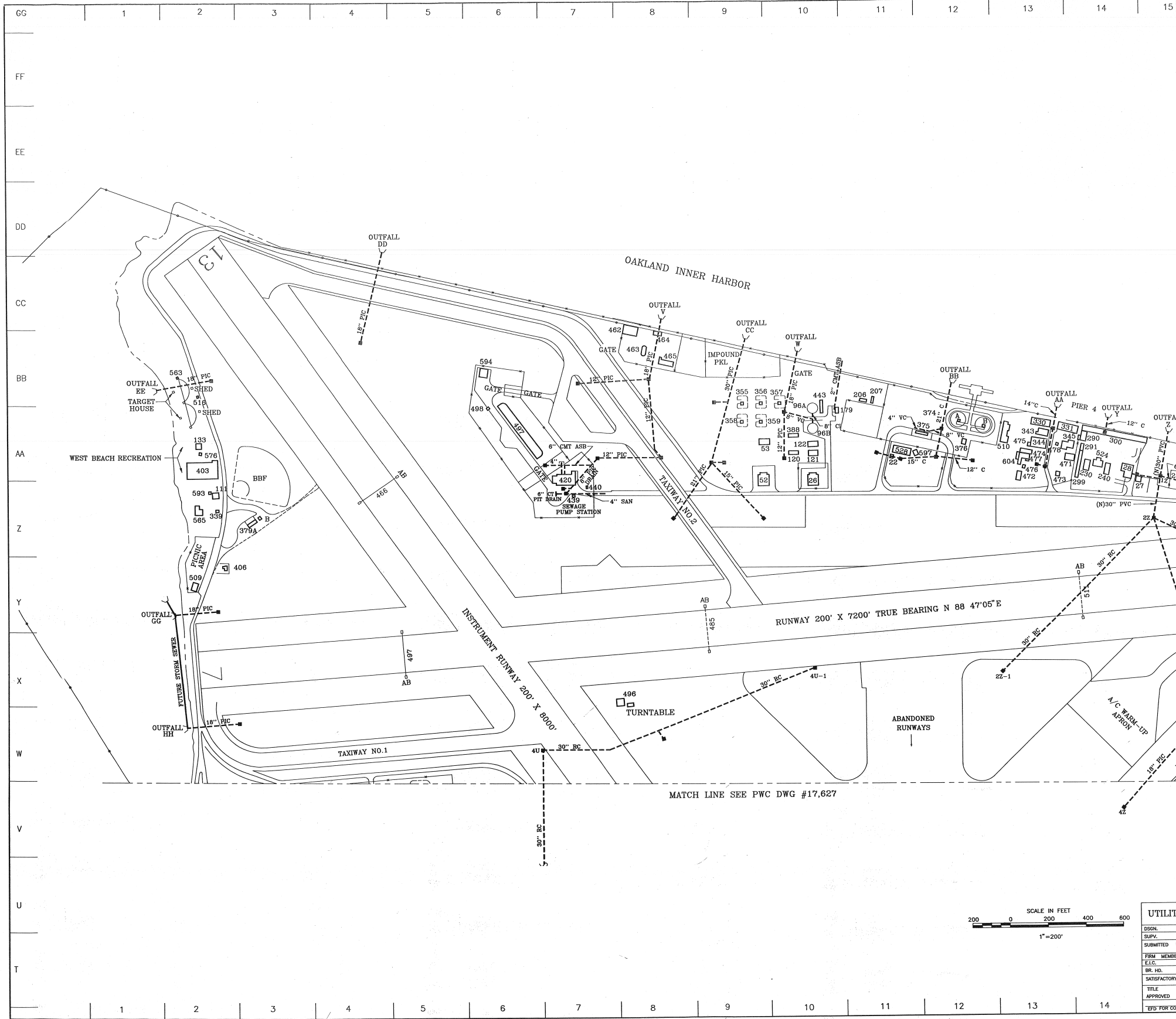
#### **File Format:**

##### **Video Survey DVD #**

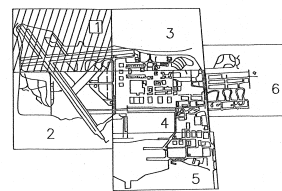
- **Survey Photos**
  - ◆ **Raw Photo Data (.jpg)**
- **Survey Videos**
  - ◆ **Raw Video Data (.MPG)**
- **Survey Reports**
  - ◆ **Raw Report Data (.pdf)**

**APPENDIX D**

**EXISTING SEWER MAPS USED FOR REFERENCE  
(BY NAVY AND OTHERS)**



REVISIONS				
SYM	DESCRIPTION	PREP'D BY	DATE	APPRO
A	REVISED TO SHOW CURRENT CONDITIONS.		11-3-93	
B	DRAWING CONVERTED TO DIGITAL FORMAT.	C.S.Abad	11-1-95	



KEY PLAN

LEGEND

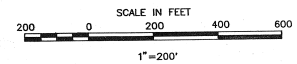
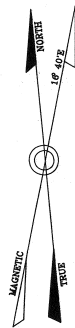
- EXISTING FACILITY
- ACTIVITY BOUNDARY
- FENCE
- ROCK SEAWALL
- SHORELINE
- RAILROAD
- LANDING PAD HELICOPTER

ABBREVIATIONS

- PKL - PARKING LOT
- AB - ARRESTING DEVICE
- PKL - PARKING LOT
- CI - CAST IRON PIPE
- RC - REINFORCED CONCRETE PIPE
- C - CONCRETE PIPE
- PIC - PAVED INVERT CORRUGATED IRON
- VC - VITRIFIED CLAY PIPE

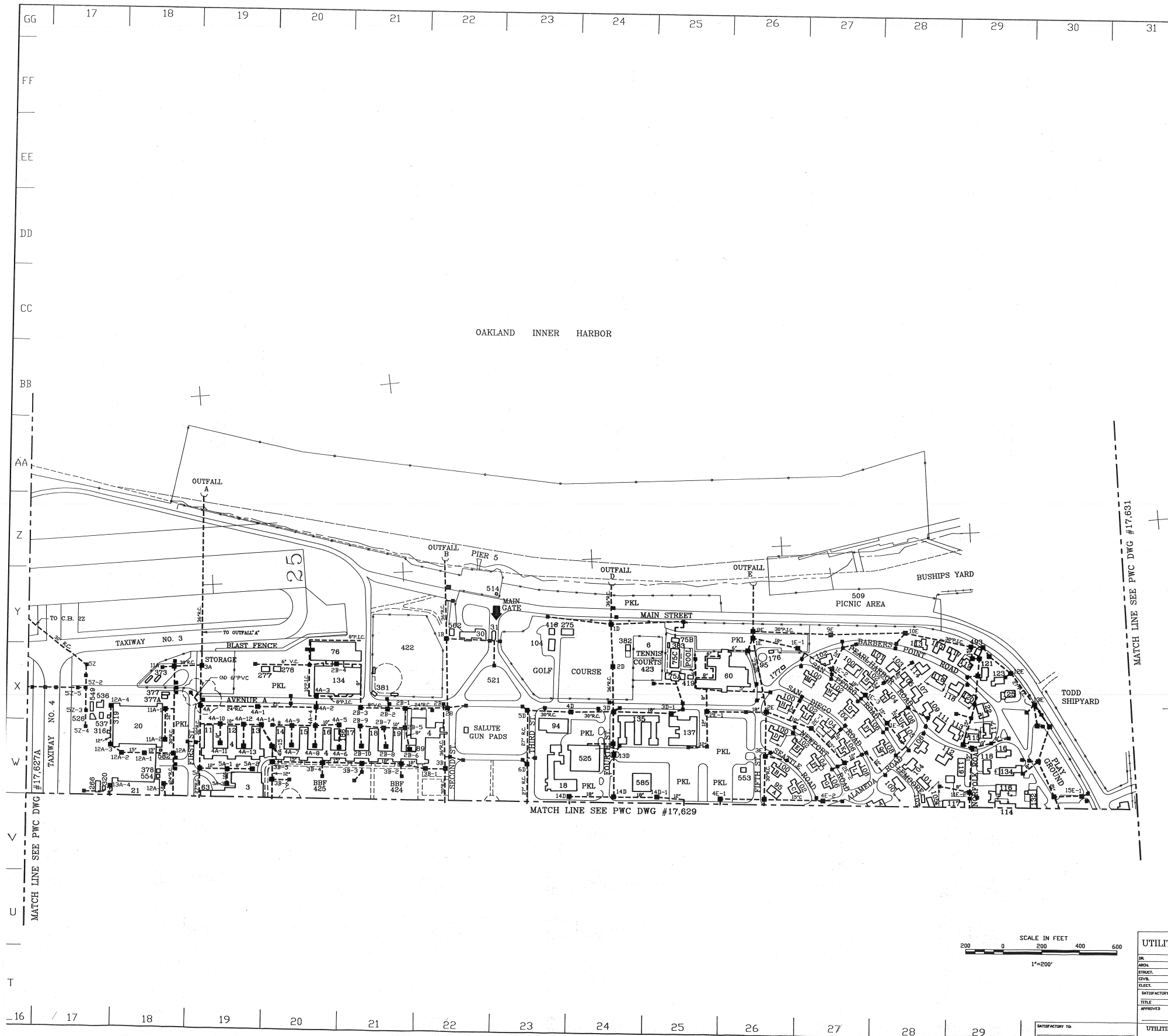
UTILITY LEGEND

- MANHOLE
- CATCH BASIN
- STORM SEWER LINE
- CONCRETE GUTTER (OPEN)

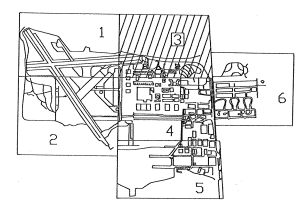


IF SHEET IS LESS THAN  
28" X 40"  
IT IS A REDUCED PRINT—  
SCALE REDUCED ACCORDINGLY

UTILITIES CODE 600			DEPARTMENT OF THE NAVY		NAVAL FACILITIES ENGINEERING	
NAVAL AIR STATION, ALAMEDA			NAVY PUBLIC WORKS CENTER		SAN FRANCISCO	
UTILITY DISTRIBUTION						
STORM DRAIN						
( AREA 1 )						
EXISTING			CONDIT			
SIZE			CODE IDENT. NO.			
F			80091			
TITLE			PWC# 17,627A			
APPROVED			CONST. CONTR. NO. N62474- 83 -C- 3			
SPEC.			SHEET 57A (			



REVISIONS				
SYM	DESCRIPTION	PREP'D BY	DATE	APPROVED
A	DRAWN and REVISED GRID SYSTEM	C.S.Abad	4-27-88	
B	REVISED HOUSE NUMBERS	C.S.Abad	4-2-91	
C	DRAWING CONVERTED TO DIGITAL FORMAT.	C.S.Abad	11-3-96	

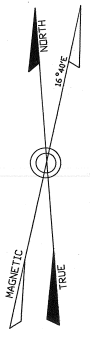


KEY PLAN

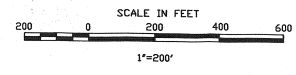
- LEGEND**
- EXISTING FACILITY
  - ACTIVITY BOUNDARY
  - FENCE
  - ROCK SEAWALL
  - SHORELINE
  - RAILROAD
  - LANDING PAD HELICOPTER

- ABBREVIATIONS**
- PKL - PARKING LOT
  - BBF - BASEBALL FIELD

- UTILITY LEGEND**
- MANHOLE
  - CATCH BASIN
  - STORM SEWER LINE
  - CONCRETE GUTTER (OPEN)



NOTES:  
THIS DRAWING SUPERSEDES INDEX SHEET NO. 7  
OF EARTHDATA DRAWINGS-PWC NO 52,501 AND  
NAVFAC NO. 6,085,669.



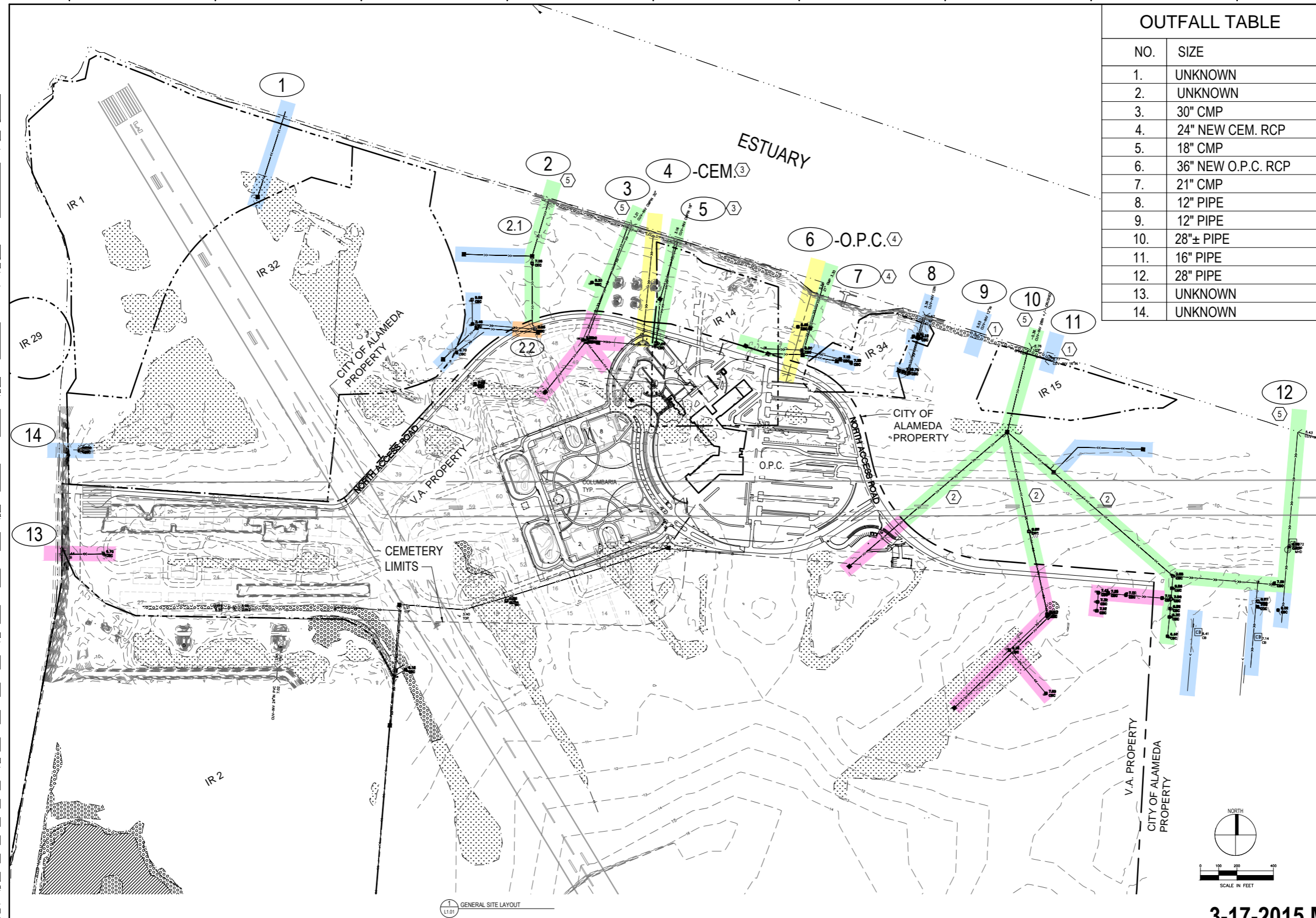
UTILITIES CODE 600		DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND	
NAVAL PUBLIC WORKS CENTER		SAN FRANCISCO BAY	
NAVAL AIR STATION, ALAMEDA			
UTILITY DISTRIBUTION			
STORM DRAIN			
( AREA 3 )			
TITLE	DATE	SIZE	CODE IDENT AND
APPROVED	DATE	F	80091
UTILITIES DRAWING RECORD		PVC DRAWING NO. 17,628	
169		NAV FAC DRAWING NO.	
SCALE AS NOTED		SPEC. HISTORY	



## **APPENDIX E**

### **PHASE 1 SITE PLAN – PROPOSED EASEMENT MAP (BY OTHERS)**

Y:\13000\13007 VA Alameda AE Design with HDR\Drawings\Civil\CD\1&2\Alameda Outfall plan - Overall Easements with IR SITES 3-17-2015.dwg PHASE1 SITE PLAN - CEMETERY Wetland-plot (2) 3/5/2015 4:27:00 PM DWG To PDF.pc3



## OUTFALL TABLE

NO.	SIZE
1.	UNKNOWN
2.	UNKNOWN
3.	30" CMP
4.	24" NEW CEM. RCP
5.	18" CMP
6.	36" NEW O.P.C. RCP
7.	21" CMP
8.	12" PIPE
9.	12" PIPE
10.	28"± PIPE
11.	16" PIPE
12.	28" PIPE
13.	UNKNOWN
14.	UNKNOWN

## LEGEND

- CITY SYSTEM, NO EASEMENT
- V.A. SYSTEM, NO EASEMENT
- EASEMENT (C.O.A. TO V.A.) EX. PIPE
- EASEMENT (C.O.A. TO V.A.) NEW PIPE
- EASEMENT (V.A. TO C.O.A.) EX. PIPE
- OUTFALL MAP NUMBER

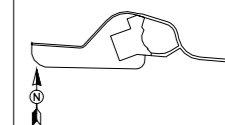
## GENERAL NOTES

- C.O.A. = CITY OF ALAMEDA
- V.A. = U.S. DEPARTMENT OF VETERANS AFFAIRS

## KEY NOTES

- VERIFY UPSTREAM ORIGIN
- VERIFY PIPE LOCATION (LINES FROM NAVY MAP ONLY)
- COMBINE LINES 4 & 5 (ONE OUTFALL)
- COMBINE LINES 6 & 7 (ONE OUTFALL)
- INSTALL NEW TIDE VALVE

## KEY PLAN



3-17-2015 MEETING

## CONSULTANTS:

Architecture, Interior Design, Mechanical/Plumbing, Electrical Engineering, Sanitary/HVAC, Energy Modeling, Wet. Ecops, Planning, Survey, Wetland, Security, Programming	Geotechnical Engineering	Master Plan, Landscape Architecture	Telecommunications Consultant, Interior Consultant	Imitation Consultant	Geotechnical Engineer
Anderson Engineering of MN, LLC 13055 1st Avenue, Suite 100 Minneapolis, MN 55441 Civil Engineering, Environmental Structural Engineer, Assessment	Degenkolb Engineers 235 Montgomery St, Suite 500 San Francisco, CA 94104	Smith & Smith Landscape Architects/TEECOM Design Group 1501 North Point Street San Francisco, CA 94123	Hessberg, Kessner & Associates/TEECOM Design Group 1333 Broadway Ave., Suite 500 Oakland, CA 94612	Hessberg, Kessner & Associates/TEECOM Design Group 1333 Broadway Ave., Suite 500 Oakland, CA 94612	Alvarado Group 4321 SW Corbett, Suite 200 Portland, OR 97239
HDR 550 Mission St, Suite 900 San Francisco, CA 94105	HDR Engineering, Inc. 2355 Ken Point Road, Suite 300 Folsom, CA 95630	Degenkolb Engineers 235 Montgomery St, Suite 500 San Francisco, CA 94104	Hessberg, Kessner & Associates/TEECOM Design Group 1333 Broadway Ave., Suite 500 Oakland, CA 94612	Hessberg, Kessner & Associates/TEECOM Design Group 1333 Broadway Ave., Suite 500 Oakland, CA 94612	Alvarado Group 4321 SW Corbett, Suite 200 Portland, OR 97239

## ARCHITECTS/ENGINEERS:

Architecture, Interior Design, Mechanical/Plumbing, Electrical Engineering, Sanitary/HVAC, Energy Modeling, Wet. Ecops, Planning, Survey, Wetland, Security, Programming	Geotechnical Engineering	Master Plan, Landscape Architecture	Telecommunications Consultant, Interior Consultant	Imitation Consultant	Geotechnical Engineer
Anderson Engineering of MN, LLC 13055 1st Avenue, Suite 100 Minneapolis, MN 55441 Civil Engineering, Environmental Structural Engineer, Assessment	Degenkolb Engineers 235 Montgomery St, Suite 500 San Francisco, CA 94104	Smith & Smith Landscape Architects/TEECOM Design Group 1501 North Point Street San Francisco, CA 94123	Hessberg, Kessner & Associates/TEECOM Design Group 1333 Broadway Ave., Suite 500 Oakland, CA 94612	Hessberg, Kessner & Associates/TEECOM Design Group 1333 Broadway Ave., Suite 500 Oakland, CA 94612	Alvarado Group 4321 SW Corbett, Suite 200 Portland, OR 97239
HDR 550 Mission St, Suite 900 San Francisco, CA 94105	HDR Engineering, Inc. 2355 Ken Point Road, Suite 300 Folsom, CA 95630	Degenkolb Engineers 235 Montgomery St, Suite 500 San Francisco, CA 94104	Hessberg, Kessner & Associates/TEECOM Design Group 1333 Broadway Ave., Suite 500 Oakland, CA 94612	Hessberg, Kessner & Associates/TEECOM Design Group 1333 Broadway Ave., Suite 500 Oakland, CA 94612	Alvarado Group 4321 SW Corbett, Suite 200 Portland, OR 97239

Drawing Title:

PHASE 1 SITE PLAN - PROPOSED EASEMENTS

Approved: Project Director

Project Title:

VA Northern California Healthcare System  
VA Multi-Specialty Outpatient Clinic, Columbarium and  
Conservation Management Office (CMO)

Location:

Alameda Point, California

Date:

MAR. 17, 2015

Checked by:

MBB

Drawn:

CJA

Project Number:

612-115

Building Number:

Drawing Number:

101

Office of  
Construction  
and Facilities  
Management

VA U.S. Department  
of Veterans Affairs