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ROOSEVELT WATER CONSERVATION DISTRICT TAILWATER DITCH CAPACITY EVALUATION

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Prepared for:

Flood Control District of Maricopa County

Prepared by:

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

Registered Professional Engineer (Civil)
CERTIFICATE NO.
21684
BRIAN J.
FRY
Date Signed 10.23.01
ARIZONA, U.S.A.

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I. INTRODUCTION

The purpose of this assignment is to estimate the current conveyance capacity of the **RWCD Tailwater Ditch** adjacent to the SRP Eastern Canal to define the level of flood protection provided under existing and built-out development conditions. This assignment identifies cost-effective improvements that may be made to system bottlenecks that could increase the overall system capacity at minimal cost. The study limits are from the Superstition Freeway to Riggs Road and includes the Town of Gilbert Crossroads Park Retention Basin and the planned ADOT Santan Freeway drainage system. Consideration of potential system outfalls is also included in the analysis.

II. ASSUMPTIONS

It is assumed that the channels, culverts and basins associated with the Santan Freeway drainage system will be built per the *Santan Freeway (202L) Arizona Avenue to Gilbert Road Initial Drainage Report (30% design)*. However, the Higley and ADOT systems will operate independently from one another. Therefore, the latest ADOT revisions to the HEC-1 models have not been incorporated except for Basin "O" and its associated outfall, which will be discussed in detail later. Other key assumptions from the ADOT *Initial Drainage Report* are as follows:

- The Santan Freeway drainage system will collect and convey the 100-year peak discharge reaching the freeway at the Eastern and Consolidated canals, under existing watershed conditions (307 cfs at the Eastern Canal).
- 100-year runoff tributary to the north-south portion of the freeway from ½-mile south of Pecos Road north to ½-mile north of Ray Road will be collected and conveyed in the ADOT Santan Freeway system.
- The ADOT Santan Freeway system will accept future conditions flows along the Eastern Canal with the Higley ADMP improvements in place up to 307 cfs.

III. METHODOLOGY

1. Data Collection:

Survey was conducted as part of the Higley ADMP for many of the existing cross-road culverts along the RWCD Tailwater Ditch and field reconnaissance was conducted to confirm the survey data and existing conditions. Photos taken during the field reconnaissance are presented in **Appendix E**. The two-foot contour mapping prepared for the Higley ADMP is used to establish typical cross-sections and slope for the Tailwater Ditch and to determine storage volumes in existing RWCD ponds.

2. Hydrology Update:

Hydrology is developed using the U.S. Army Corps of Engineers, *HEC-1 Flood Hydrograph Package* (HEC-1) computer program. Guidance is given in the *Drainage Design Manual for Maricopa County, Arizona, Volume I, Hydrology* (Hydrology Manual) for application of the HEC-1 program within Maricopa County. The hydrology from the Higley ADMP is used as the basis for this study and is updated to reflect watershed runoff conditions at build-out. The build-out model includes changes to the ultimate planned land use including runoff diversions to account for on-site retention. Point precipitation values are calculated for each of the 2, 5, 10, 25, 50 and 100-year return periods for a range of durations from 5-minutes to 24-hours. These point precipitation values are then reduced based on the watershed area as described in the *Hydrology Manual*. **Table 1** presents the calculated point precipitation values as well as the reduced rainfall depths used in HEC-1 for each of

Table 1 - Rainfall Data

Primary Zone Number:	**7**	Latitude:	**0.00**	Elevation:	**0**	
Short Duration Zone Number:	**8**	Longitude:	**0.00**			

		Point Values (in)					
Duration		**2-Yr**	**5-Yr**	**10-Yr**	**25-Yr**	**50-Yr**	**100-Yr**
	5 MIN	0.29	0.40	0.47	0.56	0.64	0.71
	10 MIN	0.44	0.60	0.71	0.86	0.98	1.10
	15 MIN	0.54	0.75	0.90	1.10	1.25	1.41
	30 MIN	0.71	1.01	1.21	1.48	1.69	1.91
	1 HOUR	0.87	1.25	1.50	1.85	2.12	2.38
	2 HOUR	0.95	1.36	1.63	2.01	2.30	2.59
	3 HOUR	1.00	1.43	1.72	2.12	2.43	2.73
	6 HOUR	1.10	1.58	1.89	2.33	2.67	3.00
	12 HOUR	1.20	1.73	2.08	2.56	2.93	3.30
	24 HOUR	**1.30**	**1.88**	**2.26**	**2.79**	**3.20**	**3.60**
Model	**Depth-Area Reduction Factor**	**Precipitation Values**					
M	**0.88**	1.14	1.65	1.99	2.46	2.82	3.17
S1	**0.89**	1.16	1.67	2.01	2.48	2.85	3.20
S2	**0.946**	1.23	1.78	2.14	2.64	3.03	3.41

the modeled events. Runoff is evaluated under both existing and built-out conditions for each return period with a 24-hour duration using the SCS Type II time distribution of rainfall. Rainfall losses are estimated using the Green-Ampt method. The drainage subarea and HEC-1 model boundaries are shown on **Figure 1**. Using the results from each of the HEC-1 models, Discharge-Frequency curves are developed which are used to determine the level of protection that is offered by the existing tailwater ditch.

3. Hydraulic Analysis:

The maximum capacity of each reach of the RWCD Tailwater Ditch is estimated using Manning's equation with cross-section and slope information taken from the Higley ADMP mapping. The maximum capacity is based on the channel flowing full with no freeboard. Culvert capacity is estimated using standard culvert analysis equations from FHWA HDS-5 *Hydraulic Design of Highway Culverts*, September 1985. The approximate capacity of the existing tailwater ditch and system bottlenecks is determined from this analysis.

4. Preliminary Cost Estimate:

Preliminary cost estimates are developed using the same assumptions as in the ADMP and consider major cost items. Examples of such cost items are; excavation, concrete, utility relocations, maintenance roads, land acquisition, and landscape. Other cost assumptions are:

- Utility relocation costs are included as a lump sum, as a dollar amount per utility crossing.
- Land acquisition costs are included only for new facilities and are based on required right-of-way widths.
- Culvert costs are based on the length, number of barrels and size for each crossing and includes inlet and outlet headwalls.
- Detention basin costs include basin excavation, outlet headwall and drain pipe with manholes, inflow spillway, land acquisition, and landscape.

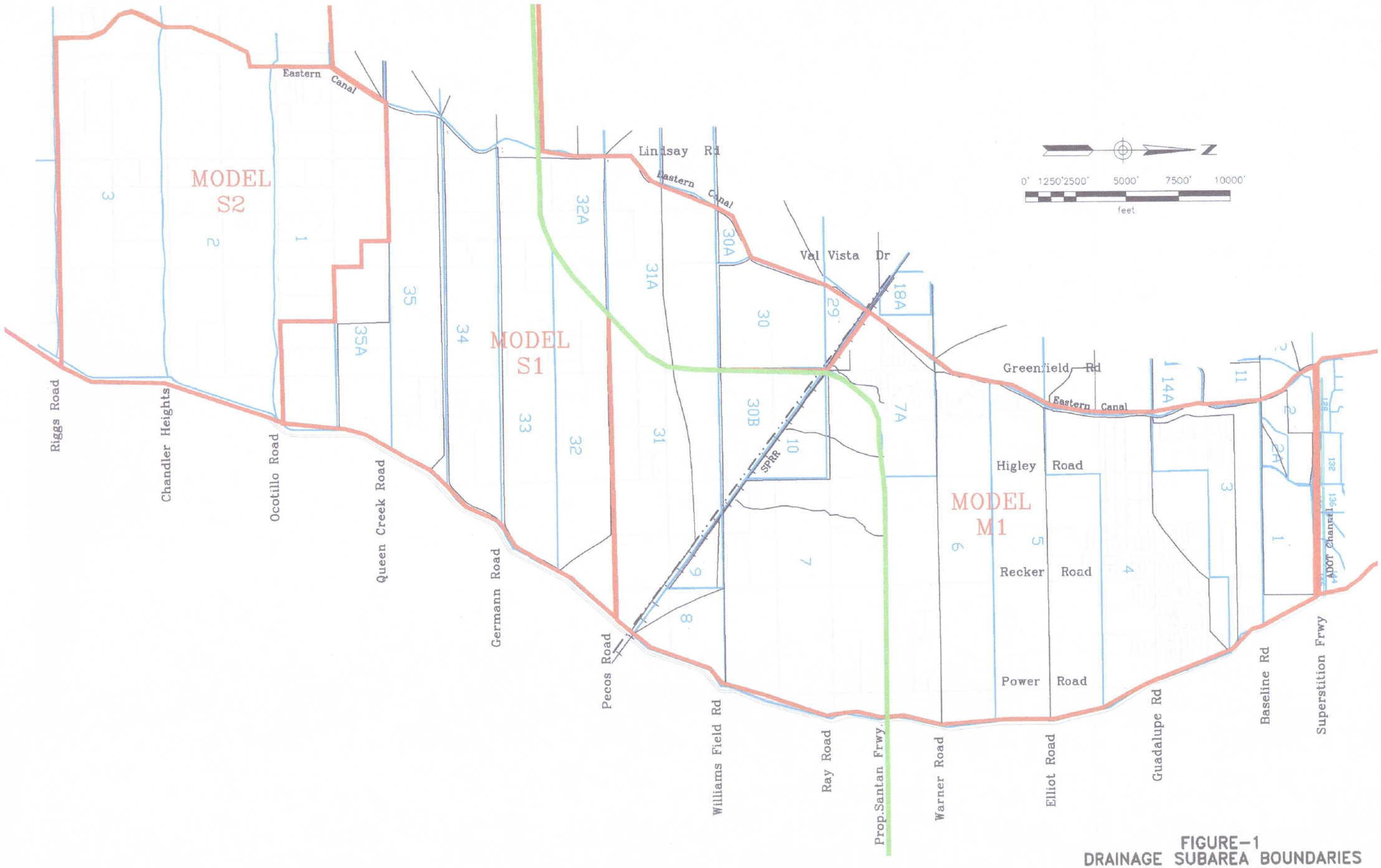


FIGURE-1
DRAINAGE SUBAREA BOUNDARIES

IV. RESULTS & RECOMMENDATIONS

1. Data Collection:

Field reconnaissance has verified the survey data gathered during the Higley ADMP is complete for the area north of Pecos Road. However, there is no survey data for the area south of Pecos Road and high water levels in the canal has prevented accurate field-measurement of the canals and culverts. For these reaches, estimates are made as to the channel and culvert slope as well as the culvert size and are denoted as such in the capacity calculations.

2. Hydrology Update:

Hydrology is updated to reflect the built-out conditions for both the existing conditions and with the ADMP improvements in place. The existing conditions watershed is defined as having the Santan Freeway in place but without any ADMP elements. Whereas, the ADMP watershed is defined as having both the Santan and ADMP features in place. The existing conditions watershed is evaluated for the 2, 5, 10, 25, 50 and 100-year events and the ADMP watershed is evaluated for the 100-year event only. Both the existing and the ADMP watersheds are evaluated under existing and built-out development conditions. The predominant land use has shifted from primarily agricultural in the existing condition to primarily urbanized in the built-out condition. The results of this HEC-1 analysis are presented in **Appendix A**. From the hydrology, discharge-frequency curves are developed and are presented in **Appendix B**.

3. Hydraulic Analysis:

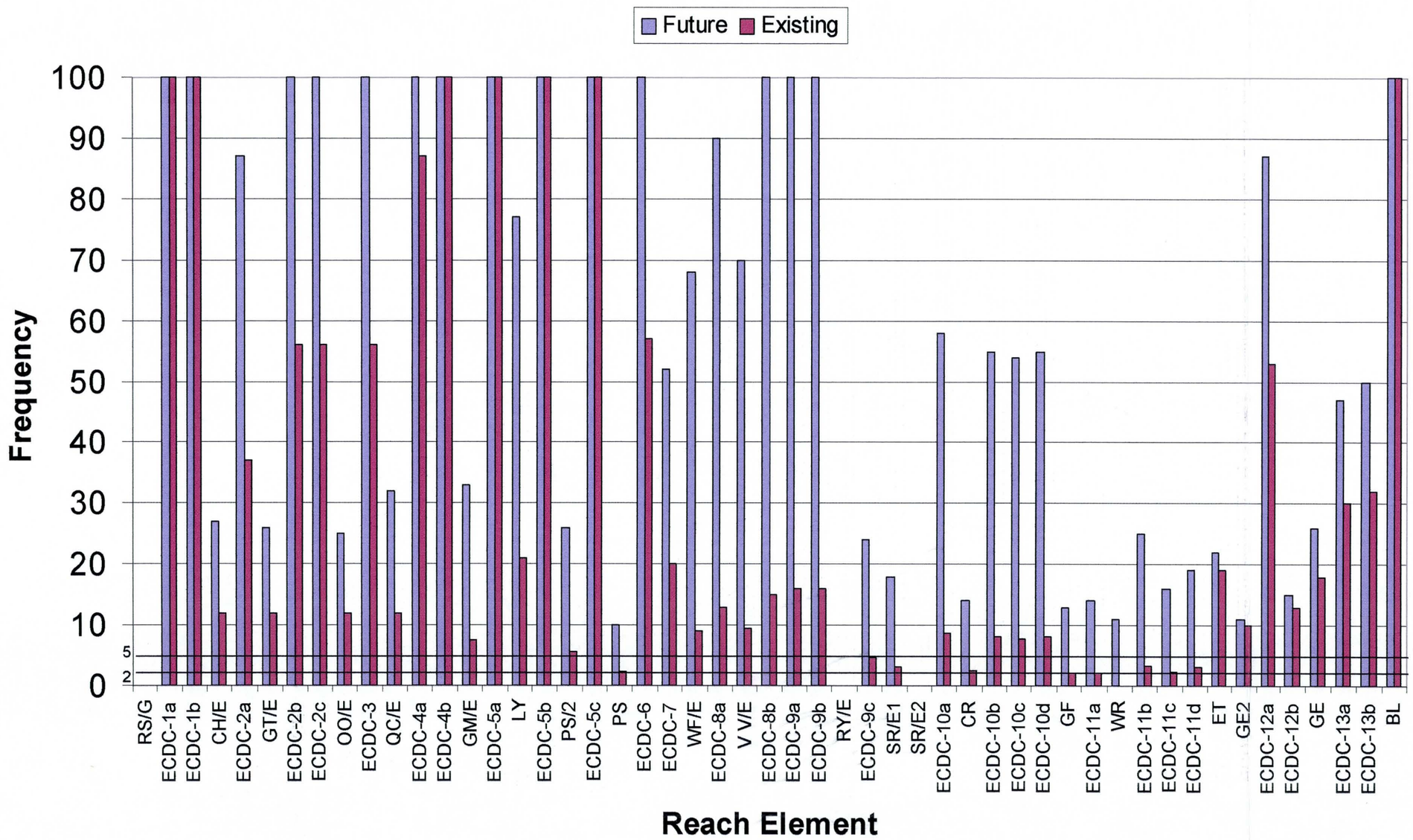
The existing tailwater ditch and culverts are evaluated to determine the current capacity for each reach of the system. The results of the evaluation are presented in **Appendix C**. This capacity is plotted on the discharge-frequency curves to estimate the level of flood protection provided by the existing ditch, under existing and build-out watershed conditions, and is illustrated on **Figure 2**. From this graph, it is determined that the overall system currently offers a 2-year level of protection and the system bottlenecks are typically at culverts. **Table 2** lists the number of culverts and channels that are deficient for a given level of protection. These deficiencies are shown graphically on **Figure 3** where it is understood that if a reach is deficient for a more frequent event, it will also be deficient for the less frequent event.

The area with the greatest concentration of bottlenecks is the 2-mile stretch from Elliot Road to Ray Road. The conveyance of this reach is limited by both the channels and culverts. Improvements within this reach would have a great benefit to the system functionality.

Table 2 - Number of Deficient Structures

	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Culverts	0	6	10	18	18	18
Channels	0	5	9	15	17	24

Figure 2
Current Level of Protection



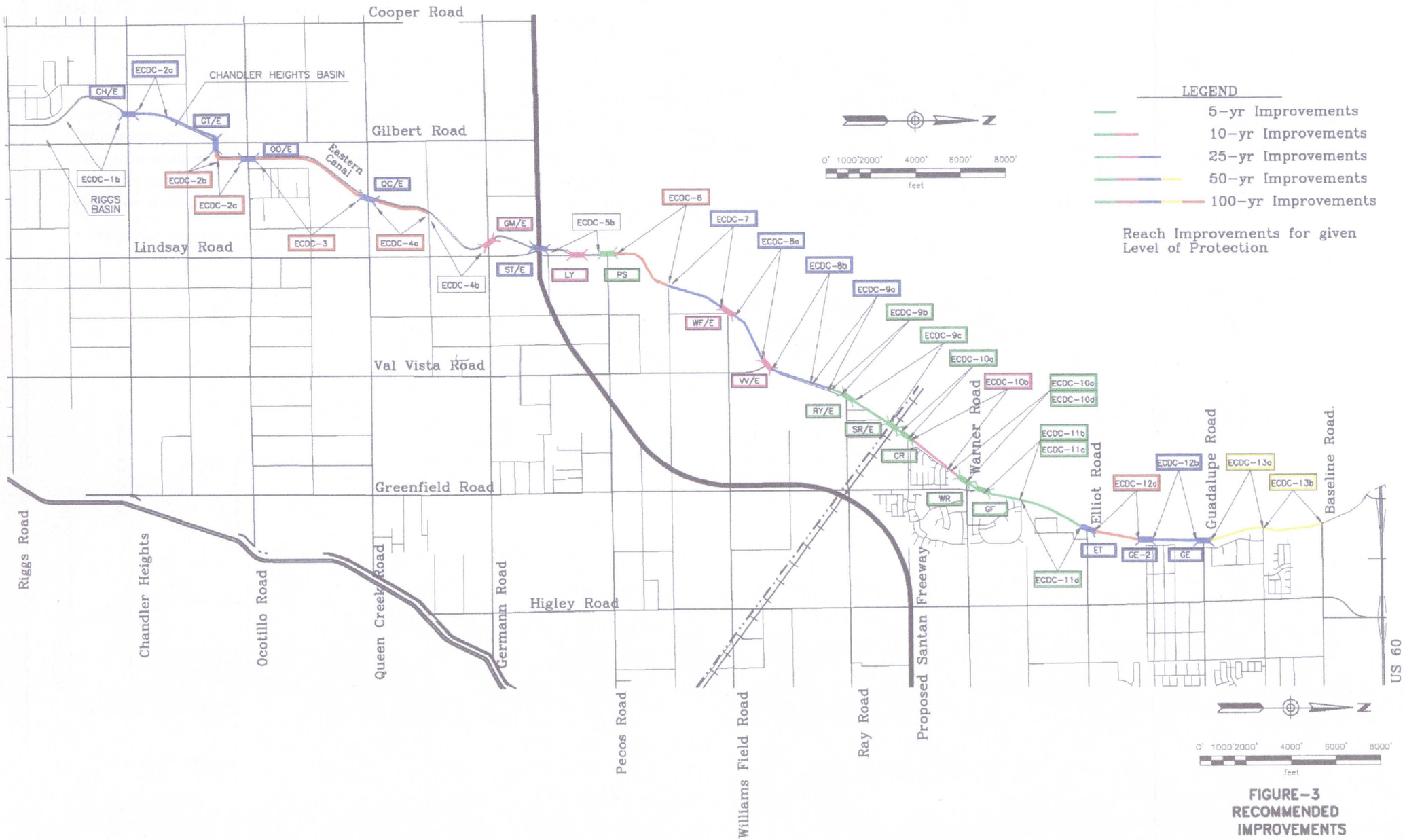


FIGURE-3
RECOMMENDED IMPROVEMENTS

4. Proposed Improvements:

Two levels of protection are deemed feasible which could be constructed in a timely manner and without excessive capital cost. These levels of protection are for the 5- and 10-year events. The 5-year protection will require that 6 culverts and 5 channel reaches be upgraded – mostly in the reach from Ray Road to Elliot Road and the culvert at Pecos Road. 10-year protection will require upgrading 10 culverts and 9 channel reaches. Calculations for these upgraded channels are found in **Appendix D**. Generally, the upgrades are as follows;

- **Channels -** Where possible, it is first proposed that the existing earthen tailwater ditches be lined with concrete (**Figure 4A**). If this does not provide adequate conveyance, then the channel will be widened with no lining to the extent that right-of-way permits (**Figure 4B**). If this too fails to meet the conveyance requirement then the channel will be widened and concrete lined (**Figure 4C**). If the existing channel is concrete lined, then the channel will be widened and lined with concrete (**Figure 4D**). **Table 3** summarizes the channel improvements for both the 5- and 10-year level of protection.

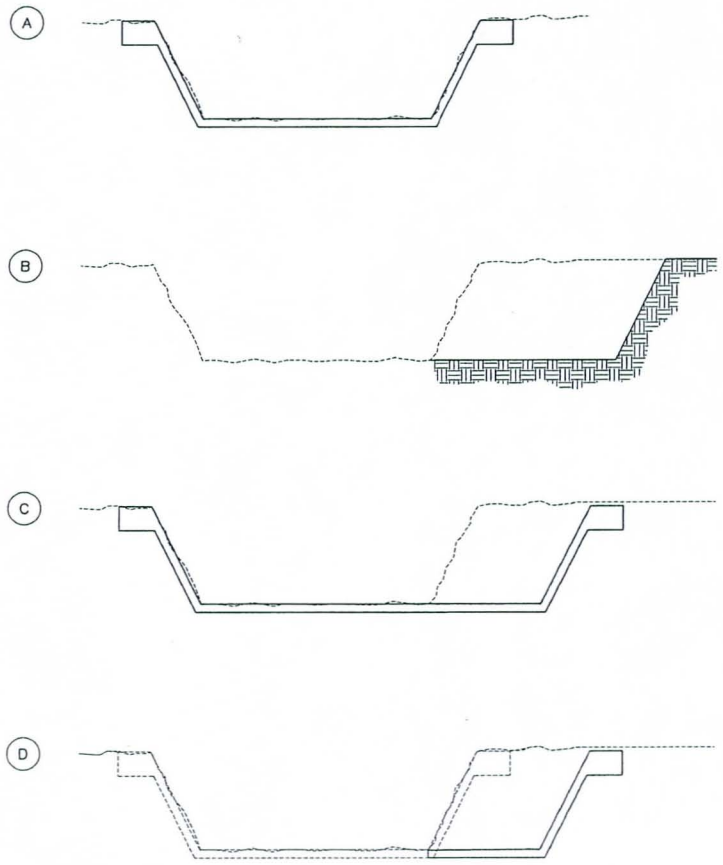


Figure 4 – Channel Improvement Options

Table 3 -Tailwater Ditch Summary
(existing watershed and development conditions)

Reach ID	Current Capacity	Current Top Width	Current Depth	Current Lining Material	5-yr Design Discharge	5-yr Top Width	5-yr Depth	Improvement Type *	10-yr Design Discharge	10-yr Top Width	10-yr Depth	Improvement Type *
ECDC-13b	161	20.0	6.0	E	4				20			
ECDC-13a	146	19.0	6.0	E	4				20			
TW-ECDC-12b	71	19.0	6.0	E	3				14			
TW-ECDC-12a	509	20.0	6.0	C	3				14			
TW-ECDC-11d	193	8.0	6.0	C	306	11.3	6.0	D	472	15.7	6.0	D
TW-ECDC-11c	209	20.0	6.0	E	672	26.6	6.0	C	996	34.3	6.0	C
TW-ECDC-11b	410	20.0	6.0	C	672	26.9	6.0	D	996	34.8	6.0	D
TW-ECDC-11a	145	22.0	6.0	E	672	38.2	6.0	C	996	51.0	6.0	C
TW-ECDC-10d	434	20.0	6.0	C	110				582	23.6	6.0	D
TW-ECDC-10c	405	20.0	6.0	C	110				582	24.6	6.0	D
TW-ECDC-10b	416	20.0	6.0	C	110				582	24.2	6.0	D
TW-ECDC-10a	494	20.0	6.0	C	110				582	21.9	6.0	D
TW-ECDC-9c	129	20.0	6.0	E	134	20.0	6.0	A	145	20.0	6.0	A
TW-ECDC-9b	278	20.0	6.0	C	1				184			
TW-ECDC-9a	272	20.0	6.0	C	1				184			
TW-ECDC-8b	259	20.0	6.0	C	1				184			
TW-ECDC-8a	225	20.0	6.0	C	1				184			
TW-ECDC-7	233	28.0	6.0	E	52				70			
TW-ECDC-6	435	28.0	6.0	C	52				70			
TW-ECDC-5c	462	28.0	6.0	C	0				62			
TW-ECDC-5b	465	28.0	6.0	C	0				62			
TW-ECDC-5a	464	28.0	6.0	C	0				62			
TW-ECDC-4b	465	28.0	6.0	C	0				68			
TW-ECDC-4a	467	28.0	6.0	C	0				37			
TW-ECDC-3	465	28.0	6.0	C	0				0			
TW-ECDC-2b	466	28.0	6.0	C	0				0			
TW-ECDC-2a	465	28.0	6.0	C	0				0			
TW-ECDC-1a	458	28.0	6.0	C	0				0			

* For Improvement Type, refer to **Figure 4**

- **Culverts –** Generally, the existing culverts north of Val Vista Road are inadequate to convey either the 5- or the 10-year discharges and will need to be replaced. Depending on the level of protection desired, this could either be accomplished with the addition of another barrel or with a whole new concrete box culvert. From Val Vista Road to the south, the current system has a 5-yr level of protection with the exception of the culvert at Pecos Road. Generally, this area can be easily upgraded to a 10-year level of protection by adding another barrel(s). **Table 4** summarizes the culvert requirements for both the 5- and 10-year events. Where no culverts are indicated for the 5-year event, the existing culvert is determined to have adequate capacity.

Table 4 Tailwater Ditch Culvert Summary

Culvert ID	Current Capacity	Current Culvert Size	5-yr Design Capacity	5-yr Culvert Size	10-yr Design Capacity	10-yr Culvert Size
GF	115	2-48"	680	3-10x5 CBC	1000	5-10x5 CBC
WR	65	2-48"	680	5-10x5 CBC	1000	7-12x5 CBC
CR	19	1-54"	110	2-8x5 CBC	580	7-12x5 CBC
SR/E1	39	1-48"	120	3-48"	580	3-12x5 CBC
RY/E	65	2-48"	135	4-48"	147	5-48"
VV/E	165	1-12x5.5 CBC	-	-	180	2-12x5.5 CBC
WF/E	160	1-72"	-	-	180	2-72"
PS	10	1-48"	55	3-48"	70	4-48"
PS2	10	1-48"	-	-	65	4-48"
GM/E	40	1-72"	-	-	65	2-72"

- **Outfalls -** The area north of the proposed Santan Freeway will outfall into the Santan Freeway Drainage System with a discharge of up to 307 cfs. This will cover all return periods for the existing watershed conditions for both the existing and built-out conditions but will not cover the Higley ADMP watershed conditions for the 100-year event without modifications to the ADOT system (refer to the Higley ADMP Addendum). The area south of the proposed Santan Freeway does not currently have an outfall. Therefore, it is proposed that storm water be directed into the existing Riggs and Chandler Heights basins as identified in the ADMP. These basins will offer protection for events up to and including the 10-year storm. For rainfall events larger than the 10-year, these facilities will require improvements either in the basin size or by designing them as off-line facilities.

5. **Preliminary Cost Update:**

As in the ADMP, the estimated costs include land acquisition cost, construction cost, construction contingency at 15 percent of construction cost, landscape cost, design and construction management cost at 15 percent of construction cost. The cost for of these improvements are presented in **Table 5**.

Table 5 - Cost Summary

	Channels	Culverts	Total
5-year	$3,324,986	$785,575	$4,110,561
10-year	$5,678,346	$1,960,964	$7,639,310

Appendix A
Hydrology Summary

Existing Watershed (with Santan)													
	Existing Development Conditions							Built-Out Development Conditions					
	2	5	10	25	50	100		2	5	10	25	50	100
SUB1	2	4	26	80	126	171	SUB1	54	91	118	154	182	221
							OR1	54	91	118	154	182	221
							D1	0	0	0	20	81	159
R1-2A	2	3	19	67	111	155	R1-2A	0	0	0	16	50	117
SUB2A	1	16	34	59	79	96	SUB2A	26	42	52	67	78	94
							OR2A	26	42	52	67	78	94
							D2A	0	0	0	0	2	13
HC2A	2	17	35	67	111	155	HC2A	0	0	0	16	50	122
RR2A	0	0	0	0	0	3	RR2A	0	0	0	0	0	7
R2A-2	0	0	0	0	0	3	R2A-2	0	0	0	0	0	7
SUB2	2	6	26	61	90	117	SUB2	29	48	64	87	104	128
							OR2	29	48	64	87	104	128
							D2	0	0	0	3	15	71
HC2	2	6	26	61	90	117	HC2	0	0	0	3	15	71
RR2	1	6	25	59	86	91	RR2	0	0	0	2	13	58
D2-EC	0	0	0	0	0	0	D2-EC	0	0	0	0	0	0
DIV2	1	6	25	59	86	91	DIV2	0	0	0	2	13	58
R2-3	1	4	20	52	79	90	R2-3	0	0	0	2	11	45
SUB3	34	102	166	253	316	375	SUB3	64	125	168	225	268	331
OR3	34	102	166	253	316	375	OR3	64	125	168	225	268	331
D3	0	0	0	110	225	311	D3	0	0	0	67	157	262
HC3	1	4	20	116	249	362	HC3	0	0	0	67	157	303
RR3	1	4	16	61	83	108	RR3	0	0	0	46	74	110
D3-EC	0	0	0	0	0	0	D3-EC	0	0	0	0	0	0
DIV3	1	4	16	61	83	108	DIV3	0	0	0	46	74	110
R3-4	1	3	14	60	82	107	R3-4	0	0	0	42	73	109
SUB4	127	312	435	596	726	851	SUB4	129	248	324	427	511	632
OR4	127	312	435	596	726	851	OR4	129	248	324	427	511	632
D4	0	0	0	157	431	646	D4	0	0	0	175	317	524
HC4	1	3	14	203	491	713	HC4	0	0	0	177	333	555
RR4	1	3	14	64	157	365	RR4	0	0	0	64	169	402
D4TWD	1	3	14	64	70	70	D4TWD	0	0	0	64	70	70
OVRELL	0	0	0	0	87	295	OVRELL	0	0	0	0	99	332
R4-5O	0	0	0	0	67	261	R4-5O	0	0	0	0	78	302
RD4	1	3	14	64	70	70	RD4	0	0	0	64	70	70
R4-5	1	3	14	63	70	70	R4-5	0	0	0	64	70	70
SUB5	86	306	472	686	842	1000	SUB5	190	306	385	498	587	719
OR5	47	83	89	82	73	75	OR5	190	306	385	498	587	719
D5	86	306	472	686	842	1000	D5	0	0	0	203	371	594
HC5	86	306	472	686	843	1000	HC5	0	0	0	258	426	681
R5-6	84	305	430	621	772	937	R5-6	0	0	0	247	410	634
SUB6	126	404	602	850	1036	1213	SUB6	236	368	460	589	689	833
OR6	126	299	343	393	416	451	OR6	236	368	460	589	689	833
D6	4	404	602	850	1036	1213	D6	0	0	28	307	485	721
HC6	84	672	996	1263	1476	1778	HC6	0	0	28	419	788	1050
RR6	0	246	724	1141	1434	1745	RR6	0	0	0	200	484	981
D6TWD	0	130	130	130	130	130	D6TWD	0	0	0	130	130	130
OVRWNR	0	116	594	1011	1304	1615	OVRWNR	0	0	0	70	354	851
R6-7O	0	110	582	999	1288	1591	R6-7O	0	0	0	67	351	843
SUB8	0	3	38	108	165	220	SUB8	35	68	97	136	165	207
							OR8	35	68	97	136	165	207
							D8	0	0	0	26	94	168
R8-9	0	1	18	53	79	134	R8-9	0	0	0	12	33	65
SUB9	3	6	21	49	71	92	SUB9	15	30	42	58	70	87
							OR9	15	30	42	58	70	87
							D9	0	0	1	27	51	84
HC9	3	6	21	54	79	138	HC9	0	0	1	27	51	84
RR9	0	0	0	49	78	129	RR9	0	0	0	6	33	70
R9-7	0	0	0	34	64	82	R9-7	0	0	0	5	27	62
SUB10	28	95	142	201	243	283	SUB10	54	86	108	139	162	196
							OR10	54	86	108	139	162	182
							D10	0	4	53	111	154	196
RR10	0	0	0	0	0	0	RR10	0	0	0	0	0	0
SUB7	55	296	483	744	928	1105	SUB7	216	346	435	561	661	808
OR7	31	71	65	62	75	83	OR7	216	346	435	561	661	808
D7	55	296	483	744	928	1105	D7	0	0	38	288	464	702
SUB31	12	26	107	268	399	523	SUB31	91	171	251	361	443	559
OR31	12	26	107	188	216	251	OR31	91	171	251	361	443	559
D31	0	0	53	268	399	523	D31	0	0	0	110	274	461
31BASQ	0	0	19	171	298	414	31BASQ	0	0	0	66	175	320
SUB30B	16	103	173	272	343	414	SUB30B	77	139	178	233	276	337
OR30B	16	41	47	37	28	19	OR30B	77	139	178	233	276	332
D30B	8	103	173	272	343	414	D30B	0	0	33	152	230	333
HC7	57	302	491	899	1242	1534	HC7	0	0	39	339	565	901
BASQ	3	22	32	32	32	32	BASQ	0	0	5	32	32	32
DQ-O	3	22	32	32	32	32	DQ-O	0	0	5	32	32	32

Existing Watershed (with Santan)													
	Existing Development Conditions							Built-Out Development Conditions					
	2	5	10	25	50	100		2	5	10	25	50	100
DIVSD	0	0	0	0	0	0	DIVSD	0	0	0	0	0	0
RDDUMB	3	22	32	32	32	32	RDDUMB	0	0	5	32	32	32
DUMMY	3	22	32	32	32	32	DUMMY	0	0	5	32	32	32
DIVALL	0	0	0	0	0	0	DIVALL	0	0	0	0	0	0
HCMTY	0	0	0	0	0	0	HCMTY	0	0	0	0	0	0
BASQ7A	0	0	0	0	0	0	BASQ7A	0	0	0	0	0	0
SUB7A	179	309	393	505	590	671	SUB7A	128	207	261	335	392	473
OR7A	179	309	393	505	590	671	OR7A	128	207	261	335	392	473
D7A	0	0	0	166	392	538	D7A	0	0	0	21	143	335
HCI7A	0	110	582	1039	1340	1655	HCI7A	0	0	0	74	362	865
RRXRDB	0	0	0	0	0	0	RRXRDB	0	0	0	0	0	0
RD6	0	130	130	130	130	130	RD6	0	0	0	130	130	130
R6-7D	0	164	169	167	165	167	R6-7D	0	0	0	130	130	130
HC7	0	164	169	167	165	167	HC7	0	0	0	130	130	130
D7-TD	0	130	130	130	130	130	D7-TD	0	0	0	130	130	130
DIV7D	0	34	39	37	35	37	DIV7D	0	0	0	0	0	0
D7-EC	0	34	39	37	35	37	D7-EC	0	0	0	0	0	0
DIVALL	0	0	0	0	0	0	DIVALL	0	0	0	0	0	0
DUMMY7	0	130	130	130	130	130	DUMMY7	0	0	0	130	130	130
DUMMY	0	130	130	130	130	130	DUMMY	0	0	0	130	130	130
DIVALL	0	0	0	0	0	0	DIVALL	0	0	0	0	0	0
RDECIN	0	0	0	0	0	0	RDECIN	0	0	0	0	0	0
REC-GF	0	0	0	0	0	0	REC-GF	0	0	0	0	0	0
DECS12	0	0	0	0	0	0	DECS12	0	0	0	0	0	0
DIVGF	0	0	0	0	0	0	DIVGF	0	0	0	0	0	0
REC-2	0	0	0	0	0	0	REC-2	0	0	0	0	0	0
RD2	0	0	0	0	0	0	RD2	0	0	0	0	0	0
EC2	0	0	0	0	0	0	EC2	0	0	0	0	0	0
DECS11	0	0	0	0	0	0	DECS11	0	0	0	0	0	0
DIVBL	0	0	0	0	0	0	DIVBL	0	0	0	0	0	0
REC-3	0	0	0	0	0	0	REC-3	0	0	0	0	0	0
RD3	0	0	0	0	0	0	RD3	0	0	0	0	0	0
EC3	0	0	0	0	0	0	EC3	0	0	0	0	0	0
DECS14	0	0	0	0	0	0	DECS14	0	0	0	0	0	0
DIVGL	0	0	0	0	0	0	DIVGL	0	0	0	0	0	0
REC-4	0	0	0	0	0	0	REC-4	0	0	0	0	0	0
DECS15	0	0	0	0	0	0	DECS15	0	0	0	0	0	0
DIVEL	0	0	0	0	0	0	DIVEL	0	0	0	0	0	0
REC-6	0	0	0	0	0	0	REC-6	0	0	0	0	0	0
DXTRA	0	0	0	0	0	0	DXTRA	0	0	0	0	0	0
CHNGBF	0	0	0	0	0	0	CHNGBF	0	0	0	0	0	0
REC-7	0	0	0	0	0	0	REC-7	0	0	0	0	0	0
DXTRA	0	0	0	0	0	0	DXTRA	0	0	0	0	0	0
CHNGBF	0	0	0	0	0	0	CHNGBF	0	0	0	0	0	0
RD7	0	34	39	37	35	37	RD7	0	0	0	0	0	0
EC7	0	34	39	37	35	37	EC7	0	0	0	0	0	0
DECS18	0	0	0	0	0	0	DECS18	0	0	0	0	0	0
DIVRR	0	34	39	37	35	37	DIVRR	0	0	0	0	0	0
EC-OUT	0	34	39	37	35	37	EC-OUT	0	0	0	0	0	0
DIVEC	0	0	0	0	0	0	DIVEC	0	0	0	0	0	0
RDGF	0	0	0	0	0	0	RDGF	0	0	0	0	0	0
RGF-12	0	0	0	0	0	0	RGF-12	0	0	0	0	0	0
RDBL	0	0	0	0	0	0	RDBL	0	0	0	0	0	0
RBL-11	0	0	0	0	0	0	RBL-11	0	0	0	0	0	0
SUB11	15	52	77	112	137	161	SUB11	31	55	70	92	109	133
OR11	9	13	15	9	8	6	OR11	31	55	70	92	109	133
D11	15	52	77	112	137	161	D11	0	0	11	57	86	129
HC11	15	52	77	112	137	161	HC11	0	0	11	57	86	129
R11-12	12	50	75	109	134	158	R11-12	0	0	8	50	78	119
SUB12	20	77	112	159	195	228	SUB12	30	51	65	83	98	119
							OR12	30	51	65	83	98	119
							D12	0	0	0	5	31	85
HC12	20	77	113	167	208	245	HC12	0	0	8	50	94	149
R12-13	8	43	72	118	155	188	R12-13	0	0	5	35	77	125
SUB13	43	107	149	207	249	292	SUB13	58	97	124	160	188	231
OR13	43	107	149	204	222	213	OR13	58	97	124	160	188	231
D13	0	26	110	202	249	292	D13	0	0	0	40	106	185
HC13	8	50	176	298	366	433	HC13	0	0	5	65	168	301
RR13	0	0	0	9	36	141	RR13	0	0	0	0	5	23
D13-CC	0	0	0	0	3	18	D13-CC	0	0	0	0	0	1
DIV13	0	0	0	9	33	122	DIV13	0	0	0	0	5	22
R1314B	0	0	0	9	27	105	R1314B	0	0	0	0	5	21
SUB14B	13	23	29	38	46	53	SUB14B	12	22	28	37	44	54
OR14B	13	23	29	38	44	47	OR14B	12	22	28	37	44	51
D14B	0	2	19	35	46	53	D14B	0	0	11	28	41	54
HC14B	0	2	19	35	46	109	HC14B	0	0	11	28	41	54

Existing Watershed (with Santan)													
	Existing Development Conditions							Built-Out Development Conditions					
	2	5	10	25	50	100		2	5	10	25	50	100
RR14B	0	0	0	3	12	24	RR14B	0	0	0	0	1	15
D14BCC	0	0	0	0	0	0	D14BCC	0	0	0	0	0	0
DIV14B	0	0	0	3	12	24	DIV14B	0	0	0	0	1	15
14B14A	0	0	0	3	12	24	14B14A	0	0	0	0	1	15
RDGL	0	0	0	0	0	0	RDGL	0	0	0	0	0	0
RGL14A	0	0	0	0	0	0	RGL14A	0	0	0	0	0	0
SUB14A	37	107	156	219	269	318	SUB14A	54	101	132	173	206	254
OR14A	37	107	156	219	269	317	OR14A	54	101	132	173	206	254
D14A	0	0	9	138	231	309	D14A	0	0	0	0	9	101
HC14A	0	0	9	138	231	309	HC14A	0	0	0	0	9	101
RR14A	0	0	0	0	6	21	RR14A	0	0	0	0	0	9
D14ACC	0	0	0	0	6	21	D14ACC	0	0	0	0	0	9
DIV14A	0	0	0	0	0	0	DIV14A	0	0	0	0	0	0
SUB15	122	314	438	613	741	871	SUB15	152	293	383	513	610	762
OR15	122	314	438	477	486	534	OR15	152	293	383	513	610	762
D15	0	220	422	613	741	871	D15	0	0	0	129	348	616
RDEL	0	0	0	0	0	0	RDEL	0	0	0	0	0	0
REL-15	0	0	0	0	0	0	REL-15	0	0	0	0	0	0
HC15	0	220	422	613	741	871	HC15	0	0	0	129	348	616
D15FB	0	220	422	613	741	871	D15FB	0	0	0	129	348	616
DIV15	0	0	0	0	0	0	DIV15	0	0	0	0	0	0
R15-17	0	0	0	0	0	0	R15-17	0	0	0	0	0	0
SUB17	84	228	328	458	557	657	SUB17	133	222	282	368	436	537
OR17	84	124	154	175	195	176	OR17	133	222	282	368	436	521
D17	63	228	328	458	557	657	D17	0	5	121	275	390	537
HC17	63	228	328	458	557	657	HC17	0	5	121	275	390	537
RR17	0	82	178	299	387	474	RR17	0	0	8	106	196	314
D17-CC	0	82	178	299	387	474	D17-CC	0	0	8	106	196	314
DIV17	0	0	0	0	0	0	DIV17	0	0	0	0	0	0
SUB18	35	86	120	164	200	235	SUB18	49	83	106	139	165	203
OR18	35	60	67	75	87	89	OR18	49	83	106	139	165	199
D18	20	86	120	164	200	235	D18	0	0	43	102	145	202
RDRR	0	0	0	0	0	0	RDRR	0	0	0	0	0	0
RRR18A	0	0	0	0	0	0	RRR18A	0	0	0	0	0	0
R18A-B	0	0	0	0	0	0	R18A-B	0	0	0	0	0	0
R18B-C	0	0	0	0	0	0	R18B-C	0	0	0	0	0	0
HC18	20	86	120	164	200	235	HC18	0	0	43	102	145	202
RR18	5	85	119	164	199	234	RR18	0	0	24	95	140	200
D18-CC	5	85	119	164	199	234	D18-CC	0	0	24	95	140	200
DIV18	0	0	0	0	0	0	DIV18	0	0	0	0	0	0
SUB19	25	85	126	180	223	264	SUB19	50	94	122	161	191	234
OR19	25	85	126	180	223	255	OR19	50	94	122	161	191	234
D19	0	0	16	125	202	264	D19	0	0	0	0	6	95
RR19	0	0	0	30	90	145	RR19	0	0	0	0	0	24
D19-CC	0	0	0	0	0	0	D19-CC	0	0	0	0	0	0
DIV19	0	0	0	30	90	145	DIV19	0	0	0	0	0	24
SUB20	51	155	225	321	391	463	SUB20	107	177	225	292	346	425
OR20	51	155	225	248	250	273	OR20	107	177	225	292	346	425
D20	0	94	217	321	391	463	D20	0	0	0	25	153	293
HC20	0	94	217	351	457	550	HC20	0	0	0	25	153	316
D20-TG	0	94	197	137	73	85	D20-TG	0	0	0	25	153	24
DIVTGM	0	83	206	351	457	550	DIVTGM	0	0	0	23	142	316
SUB21	0	24	47	78	101	124	SUB21	31	50	63	79	92	111
OR21	0	6	6	8	9	8	OR21	31	50	63	79	92	111
D21	0	24	47	78	101	124	D21	0	0	0	0	0	4
HC21	0	83	206	351	457	550	HC21	0	0	0	23	142	320
RR21	0	3	105	283	432	549	RR21	0	0	0	0	54	237
D21-CC	0	3	105	283	432	549	D21-CC	0	0	0	0	54	237
DIV21	0	0	0	0	0	0	DIV21	0	0	0	0	0	0
SUB22	2	10	57	143	216	285	SUB22	43	86	123	172	209	261
OR22	2	10	36	57	58	65	OR22	43	86	123	172	209	261
D22	0	0	57	143	216	285	D22	0	0	0	0	0	36
RR22	0	0	0	82	186	266	RR22	0	0	0	0	0	8
D22-CC	0	0	0	82	186	266	D22-CC	0	0	0	0	0	8
DIV22	0	0	0	0	0	0	DIV22	0	0	0	0	0	0
RDCCIN	0	0	0	0	0	0	RDCCIN	0	0	0	0	0	0
RCC-13	0	0	0	0	0	0	RCC-13	0	0	0	0	0	0
RD13	0	0	0	0	3	18	RD13	0	0	0	0	0	1
CC13	0	0	0	0	3	18	CC13	0	0	0	0	0	1
DCC231	0	0	0	0	0	0	DCC231	0	0	0	0	0	0
DIVBL	0	0	0	0	3	18	DIVBL	0	0	0	0	0	1
RCC14B	0	0	0	0	1	13	RCC14B	0	0	0	0	0	0
DXTRA	0	0	0	0	1	13	DXTRA	0	0	0	0	0	0
CHNGBF	0	0	0	0	0	0	CHNGBF	0	0	0	0	0	0
RD14B	0	0	0	0	0	0	RD14B	0	0	0	0	0	0
CC14B	0	0	0	0	0	0	CC14B	0	0	0	0	0	0

Existing Watershed (with Santan)													
	Existing Development Conditions							Built-Out Development Conditions					
	2	5	10	25	50	100		2	5	10	25	50	100
DCC232	0	0	0	0	0	0	DCC232	0	0	0	0	0	0
DIVHOU	0	0	0	0	0	0	DIVHOU	0	0	0	0	0	0
RCC-14	0	0	0	0	0	0	RCC-14	0	0	0	0	0	0
RD14A	0	0	0	0	6	21	RD14A	0	0	0	0	0	9
CC14A	0	0	0	0	6	21	CC14A	0	0	0	0	0	9
DCC233	0	0	0	0	0	0	DCC233	0	0	0	0	0	0
DIVGL	0	0	0	0	6	21	DIVGL	0	0	0	0	0	9
DCCWC	0	0	0	0	6	21	DCCWC	0	0	0	0	0	9
DIVWC	0	0	0	0	0	0	DIVWC	0	0	0	0	0	0
RCC-18	0	0	0	0	0	0	RCC-18	0	0	0	0	0	0
DXTRA	0	0	0	0	0	0	DXTRA	0	0	0	0	0	0
CHNGBF	0	0	0	0	0	0	CHNGBF	0	0	0	0	0	0
RD17	0	82	178	299	387	474	RD17	0	0	8	106	196	314
RD18	5	85	119	164	199	234	RD18	0	0	24	95	140	200
CC18	5	125	261	431	557	680	CC18	0	0	24	149	273	437
DCC-24	0	0	0	0	0	0	DCC-24	0	0	0	0	0	0
DIVRR	5	125	261	431	557	680	DIVRR	0	0	24	149	273	437
RCC-19	4	121	257	426	552	674	RCC-19	0	0	14	140	266	430
RD19	0	0	0	0	0	0	RD19	0	0	0	0	0	0
CC19	4	121	257	426	552	674	CC19	0	0	14	140	266	430
DCC-26	0	0	0	0	0	0	DCC-26	0	0	0	0	0	0
DIVWR	4	121	257	426	552	674	DIVWR	0	0	14	140	266	430
RCC-21	4	119	255	424	548	670	RCC-21	0	0	11	134	258	422
DXTRA	4	75	75	75	75	75	DXTRA	0	0	11	75	75	75
CHNGBF	0	44	180	349	473	595	CHNGBF	0	0	0	59	183	347
RD21	0	3	105	283	432	549	RD21	0	0	0	0	54	237
CC21	0	44	255	631	887	1108	CC21	0	0	0	59	183	519
DCC-25	0	0	0	170	426	647	DCC-25	0	0	0	0	0	58
DIVKNX	0	44	255	461	461	461	DIVKNX	0	0	0	59	183	461
RCC-22	0	40	251	461	461	461	RCC-22	0	0	0	57	181	461
RD22	0	0	0	82	186	266	RD22	0	0	0	0	0	8
CC22	0	40	251	465	472	484	CC22	0	0	0	57	181	461
DCC25A	0	0	0	5	12	24	DCC25A	0	0	0	0	0	1
DIVRAY	0	40	251	460	460	460	DIVRAY	0	0	0	57	181	460
DCCOUT	0	40	251	460	460	460	DCCOUT	0	0	0	57	181	460
DIVCC	0	0	0	0	0	0	DIVCC	0	0	0	0	0	0
RDBL	0	0	0	0	0	0	RDBL	0	0	0	0	0	0
RBL-LY	0	0	0	0	0	0	RBL-LY	0	0	0	0	0	0
RDHOU	0	0	0	0	0	0	RDHOU	0	0	0	0	0	0
RHOUBL	0	0	0	0	0	0	RHOUBL	0	0	0	0	0	0
RDGL	0	0	0	0	0	0	RDGL	0	0	0	0	0	0
RGL-BL	0	0	0	0	0	0	RGL-BL	0	0	0	0	0	0
HCBL	0	0	0	0	0	0	HCBL	0	0	0	0	0	0
RBL-CS	0	0	0	0	0	0	RBL-CS	0	0	0	0	0	0
RDRR	0	0	0	0	0	0	RDRR	0	0	0	0	0	0
RRR-GB	0	0	0	0	0	0	RRR-GB	0	0	0	0	0	0
SUB26A	20	35	45	58	69	79	SUB26A	20	34	44	57	66	81
OR26A	20	35	45	58	69	79	OR26A	20	34	44	57	66	81
D26A	0	0	1	22	45	67	D26A	0	0	0	2	22	55
D26A26	0	0	0	0	0	17	D26A26	0	0	0	0	0	5
DIV26A	0	0	1	22	45	50	DIV26A	0	0	0	2	22	50
R26A24	0	0	1	17	37	48	R26A24	0	0	0	2	17	44
SUB24	37	61	77	100	118	136	SUB24	36	59	75	97	114	139
OR24	37	59	62	61	65	68	OR24	36	59	75	97	102	98
D24	19	61	77	100	118	136	D24	0	31	57	95	114	139
HC24	19	61	77	117	143	164	HC24	0	31	57	95	130	169
RR24	0	0	0	3	26	73	RR24	0	0	0	0	4	50
RDWC1	0	0	0	0	6	21	RDWC1	0	0	0	0	0	9
RWC-GB	0	0	0	0	6	21	RWC-GB	0	0	0	0	0	9
HCWCGB	0	0	0	3	26	73	HCWCGB	0	0	0	0	4	50
DCU-WC	0	0	0	3	26	73	DCU-WC	0	0	0	0	4	50
DIVWC	0	0	0	0	0	0	DIVWC	0	0	0	0	0	0
RWC-WT	0	0	0	0	0	0	RWC-WT	0	0	0	0	0	0
DWT-28	0	0	0	0	0	0	DWT-28	0	0	0	0	0	0
DIVWT	0	0	0	0	0	0	DIVWT	0	0	0	0	0	0
RWTCSB	0	0	0	0	0	0	RWTCSB	0	0	0	0	0	0
SUB23	210	437	580	787	945	1097	SUB23	270	449	565	733	860	1053
OR23	210	437	580	787	945	1097	OR23	270	449	565	733	860	1053
D23	0	0	0	345	611	846	D23	0	0	0	0	140	540
HC23	0	0	0	345	611	846	HC23	0	0	0	0	140	540
FWYCSB	0	0	0	0	0	0	FWYCSB	0	0	0	0	0	0
HCCSB	0	0	0	345	611	846	HCCSB	0	0	0	0	140	540
RRCSB	0	0	0	0	0	0	RRCSB	0	0	0	0	0	0
DCSOUT	0	0	0	0	0	0	DCSOUT	0	0	0	0	0	0
DIVCSB	0	0	0	0	0	0	DIVCSB	0	0	0	0	0	0
RDRAY	0	0	0	5	12	24	RDRAY	0	0	0	0	0	1

Existing Watershed (with Santan)													
	Existing Development Conditions							Built-Out Development Conditions					
	2	5	10	25	50	100		2	5	10	25	50	100
RRY-CP	0	0	0	1	4	6	RRY-CP	0	0	0	0	0	0
SUB25A	2	3	19	56	87	117	SUB25A	20	35	53	78	96	122
OR25A	2	3	19	38	37	37	OR25A	20	35	53	78	96	122
D25A	0	0	11	56	87	117	D25A	0	0	0	0	0	11
HC25A	0	0	11	56	87	117	HC25A	0	0	0	0	0	11
RR25A	0	0	0	0	0	0	RR25A	0	0	0	0	0	0
R25AWR	0	0	0	0	0	0	R25AWR	0	0	0	0	0	0
SUB25	9	18	37	69	92	114	SUB25	19	36	53	78	96	122
OR25	9	18	37	66	70	73	OR25	19	36	53	78	96	122
D25	0	0	19	69	92	114	D25	0	0	0	3	27	78
RDKNX	0	0	0	170	426	647	RDKNX	0	0	0	0	0	58
RKX-WR	0	0	0	125	400	630	RKX-WR	0	0	0	0	0	17
HC25	0	0	19	132	415	652	HC25	0	0	0	3	27	78
R25-EL	0	0	7	102	380	626	R25-EL	0	0	0	2	17	62
SUB26	73	156	209	285	342	397	SUB26	91	154	195	253	297	366
OR26	73	156	209	285	342	397	OR26	91	154	195	253	297	366
D26	0	0	0	8	130	235	D26	0	0	0	11	76	225
RD26A	0	0	0	0	0	17	RD26A	0	0	0	0	0	5
R26A26	0	0	0	0	0	2	R26A26	0	0	0	0	0	0
RDWR	0	0	0	0	0	0	RDWR	0	0	0	0	0	0
RCC-CO	0	0	0	0	0	0	RCC-CO	0	0	0	0	0	0
HC26	0	0	7	102	428	858	HC26	0	0	0	13	87	257
R26-RR	0	0	3	44	237	544	R26-RR	0	0	0	5	39	119
SUB27	43	139	206	300	368	434	SUB27	93	149	187	240	282	344
OR27	43	139	173	184	196	217	OR27	93	149	187	240	282	344
D27	0	112	206	300	368	434	D27	0	0	0	0	64	199
HC27	0	112	206	300	368	561	HC27	0	0	0	5	64	199
RDWC	0	0	0	3	26	73	RDWC	0	0	0	0	4	50
RWC-27	0	0	0	2	23	63	RWC-27	0	0	0	0	4	40
WC27	0	112	206	300	368	587	WC27	0	0	0	5	64	230
DRR-WC	0	112	188	188	188	188	DRR-WC	0	0	0	5	64	188
DIVRR	0	0	18	112	180	399	DIVRR	0	0	0	0	0	42
RR27	0	0	0	0	18	341	RR27	0	0	0	0	0	0
RWC-28	0	0	0	0	6	233	RWC-28	0	0	0	0	0	0
SUB28	68	197	290	411	501	592	SUB28	113	182	229	294	346	423
OR28	68	197	284	304	310	339	OR28	113	182	229	294	346	423
D28	0	140	286	411	501	592	D28	0	0	0	0	0	0
RDWT	0	0	0	0	0	0	RDWT	0	0	0	0	0	0
RWT-28	0	0	0	0	0	0	RWT-28	0	0	0	0	0	0
HC28	0	140	286	411	501	592	HC28	0	0	0	0	0	0
RR28	0	2	4	8	10	18	RR28	0	0	0	0	0	0
DRROUT	0	2	4	8	10	18	DRROUT	0	0	0	0	0	0
DIVRR	0	0	0	0	0	0	DIVRR	0	0	0	0	0	0
RD7A	0	130	130	130	130	130	RD7A	0	0	0	130	130	130
RRR-29	0	130	130	130	130	130	RRR-29	0	0	0	130	130	130
SUB29	19	33	42	56	66	76	SUB29	19	33	42	56	66	81
HC29	19	134	145	159	171	183	HC29	19	33	42	130	131	131
RR29	10	89	110	123	129	131	RR29	10	17	23	121	129	130
D29TWD	10	89	110	123	129	131	D29TWD	10	17	23	121	129	130
OVRRAY	0	0	0	0	0	0	OVRRAY	0	0	0	0	0	0
R2930O	0	0	0	0	0	0	R2930O	0	0	0	0	0	0
SUB30	55	184	274	396	490	575	SUB30	108	175	222	285	337	412
OR30	55	184	274	394	437	451	OR30	108	175	222	285	337	412
D30	0	1	184	382	490	575	D30	0	0	0	8	78	253
HC30	0	1	184	382	490	575	HC30	0	0	0	8	78	253
RR30	0	0	0	46	109	172	RR30	0	0	0	0	7	52
3030AO	0	0	0	36	92	147	3030AO	0	0	0	0	7	43
RDTWD	10	89	110	123	129	131	RDTWD	10	17	23	121	129	130
R29-30	10	88	110	123	129	131	R29-30	10	17	22	121	128	130
R3030A	9	81	105	121	129	130	R3030A	9	16	20	119	128	130
SUB30A	0	15	32	56	75	91	SUB30A	17	31	40	52	62	77
							OR30A	17	31	40	52	62	77
							D30A	0	0	0	2	14	46
HC30A	9	81	105	135	165	216	HC30A	9	16	20	119	135	143
RR30A	5	52	71	107	129	138	RR30A	5	9	12	100	121	136
D30ATD	5	52	71	107	129	138	D30ATD	5	9	12	100	121	136
OVERWF	0	0	0	0	0	0	OVERWF	0	0	0	0	0	0
30A31O	0	0	0	0	0	0	30A31O	0	0	0	0	0	0
SUB31A	0	27	119	278	412	532	SUB31A	92	160	217	293	352	435
DRE31A	0	27	119	245	269	293	OR31A	92	160	217	293	352	435
DIV31A	0	0	22	278	412	532	D31A	0	0	0	95	211	353
RDTWD	5	52	71	107	129	138	RDTWD	5	9	12	100	121	136
30A31A	5	52	70	107	129	138	30A31A	5	9	12	99	121	136
HC31A	5	52	70	279	412	533	HC31A	5	9	12	109	224	367
RR31A	3	30	42	83	125	137	RR31A	3	5	6	75	119	139
D31ARW	3	30	42	78	78	78	D31ARW	3	5	6	75	78	78

Existing Watershed (with Santan)													
	Existing Development Conditions							Built-Out Development Conditions					
	2	5	10	25	50	100		2	5	10	25	50	100
OVRPEC	0	0	0	5	47	59	OVRPEC	0	0	0	0	41	61
SUB32A	8	44	93	167	223	273	SUB32A	48	96	133	183	221	275
OR32A	8	44	93	147	157	161	OR32A	48	96	133	183	221	275
D32A	0	0	62	167	223	273	D32A	0	0	0	9	79	187
HC32A	0	0	62	167	223	273	HC32A	0	0	0	9	79	187
DED32A	0	0	62	143	136	194	DED32A	0	0	0	9	79	177
D32A	0	0	35	167	223	273	D32A	0	0	0	6	55	177
32A39A	0	0	0	3	11	19	32A39A	0	0	0	0	0	4
DIV32A	0	0	35	165	211	254	DIV32A	0	0	0	6	55	173
R32A33	0	0	7	85	147	201	R32A33	0	0	0	5	41	104
SUB32	4	71	169	319	432	533	SUB32	73	153	207	279	334	418
OR32	4	71	104	137	170	174	OR32	73	153	207	279	334	418
D32	0	51	169	319	432	533	D32	0	0	2	127	226	358
32BASO	0	41	160	307	420	521	32BASO	0	0	2	111	200	327
SUB33	7	27	89	199	292	375	SUB33	72	135	187	256	309	384
OR33	7	27	89	114	135	160	OR33	72	135	187	256	309	384
D33	0	0	79	199	292	375	D33	0	0	2	130	214	336
RDQGD	3	22	32	32	32	32	RDQGD	0	0	5	32	32	32
RQTOO	3	21	32	32	32	32	RQTOO	0	0	5	32	32	32
HC33	3	41	160	412	619	815	HC33	0	0	7	176	327	593
BASO	2	16	37	64	64	64	BASO	0	0	4	54	64	99
DO-L	2	16	37	64	64	64	DO-L	0	0	4	54	64	64
DIVGD	0	0	0	0	0	0	DIVGD	0	0	0	0	0	35
DO-LCH	0	0	0	0	0	0	DO-LCH	0	0	0	0	0	35
DIVCH	0	0	0	0	0	0	DIVCH	0	0	0	0	0	0
RR33	0	0	0	0	0	0	RR33	0	0	0	0	0	0
D33-EC	0	0	0	0	0	0	D33-EC	0	0	0	0	0	0
DIV33	0	0	0	0	0	0	DIV33	0	0	0	0	0	0
R33-34	0	0	0	0	0	0	R33-34	0	0	0	0	0	0
SUB34	2	11	68	179	275	362	SUB34	36	71	114	176	223	288
OR34	2	11	39	65	86	77	OR34	36	71	114	176	223	288
D34	0	0	68	179	275	362	D34	0	0	0	12	102	208
HC34	0	0	68	179	275	362	HC34	0	0	0	12	102	208
RR34	0	0	64	175	271	357	RR34	0	0	0	11	91	189
D34-EC	0	0	0	0	0	0	D34-EC	0	0	0	0	0	0
DIV34	0	0	64	175	271	357	DIV34	0	0	0	11	91	189
R34-35	0	0	37	147	242	326	R34-35	0	0	0	6	65	163
SUB35	12	24	80	192	288	375	SUB35	35	64	104	162	207	269
OR35	12	24	80	192	231	256	OR35	35	64	104	162	207	269
D35	0	0	0	155	288	375	D35	0	0	0	11	95	194
HC35	0	0	37	230	395	542	HC35	0	0	0	11	104	282
RR35	0	0	0	126	309	503	RR35	0	0	0	0	69	216
D35-EC	0	0	0	0	31	135	D35-EC	0	0	0	0	0	10
DIV35	0	0	0	126	279	368	DIV35	0	0	0	0	69	207
SUB35A	4	7	21	56	87	116	SUB35A	13	20	34	60	80	109
OR35A	4	7	21	56	64	70	OR35A	13	20	34	60	80	109
D35A	0	0	0	49	87	116	D35A	0	0	0	0	35	79
HC35A	0	0	0	160	352	484	HC35A	0	0	0	0	81	250
D35A42	0	0	0	160	352	484	D35A42	0	0	0	0	81	250
DIV35A	0	0	0	0	0	0	DIV35A	0	0	0	0	0	0
RDEC	0	34	39	37	35	37	RDEC	0	0	0	0	0	0
HCMT	0	34	39	37	35	37	HCMT	0	0	0	0	0	0
REC-29	0	3	4	4	4	4	REC-29	0	0	0	0	0	0
REC30A	0	2	2	2	3	2	REC30A	0	0	0	0	0	0
Dec-36	0	0	0	0	0	0	13485	0	0	0	0	0	0
DIVWF	0	2	2	2	3	2	DIVWF	0	0	0	0	0	0
RECPEC	0	1	2	2	2	2	RECPEC	0	0	0	0	0	0
Dec-38	0	0	0	0	0	0	14215	0	0	0	0	0	0
DIVPEC	0	1	2	2	2	2	DIVPEC	0	0	0	0	0	0
RPECBI	0	1	2	2	2	2	RPECBI	0	0	0	0	0	0
DEC39A	0	0	0	0	0	0	DEC39A	0	0	0	0	0	0
DIVBIF	0	1	2	2	2	2	DIVBIF	0	0	0	0	0	0
RDRWCD	3	30	42	78	78	78	RDRWCD	3	5	6	75	78	78
ECBIF	3	30	42	78	79	80	ECBIF	3	5	6	75	78	78
REC-33	3	30	42	78	79	80	REC-33	3	5	6	75	78	78
DXTRA	3	30	42	78	79	80	DXTRA	3	5	6	75	78	78
CHNGBF	0	0	0	0	0	0	CHNGBF	0	0	0	0	0	0
RD33	0	0	0	0	0	0	RD33	0	0	0	0	0	0
ECGRM	0	0	0	0	0	0	ECGRM	0	0	0	0	0	0
DEC392	0	0	0	0	0	0	DEC392	0	0	0	0	0	0
DIVGRM	0	0	0	0	0	0	DIVGRM	0	0	0	0	0	0
REC-34	0	0	0	0	0	0	REC-34	0	0	0	0	0	0
RD34	0	0	0	0	0	0	RD34	0	0	0	0	0	0
EC34	0	0	0	0	0	0	EC34	0	0	0	0	0	0
DEC393	0	0	0	0	0	0	DEC393	0	0	0	0	0	0
DIVRYA	0	0	0	0	0	0	DIVRYA	0	0	0	0	0	0

Existing Watershed (with Santan)													
	Existing Development Conditions							Built-Out Development Conditions					
	2	5	10	25	50	100		2	5	10	25	50	100
REC-35	0	0	0	0	0	0	REC-35	0	0	0	0	0	0
RD35	0	0	0	0	31	135	RD35	0	0	0	0	0	10
EC35	0	0	0	0	31	135	EC35	0	0	0	0	0	10
Dec-40	0	0	0	0	0	0	14946	0	0	0	0	0	0
DIVQC	0	0	0	0	31	135	DIVQC	0	0	0	0	0	10
DEC-OU	0	0	0	0	31	135	DEC-OU	0	0	0	0	0	10
DIVOUT	0	0	0	0	0	0	DIVOUT	0	0	0	0	0	0
SUB36	30	166	278	425	535	645	SUB36	80	189	260	354	432	546
OR36	30	90	118	145	157	154	OR36	80	189	260	354	432	546
D36	2	166	278	425	535	645	D36	0	0	25	207	329	534
RDWF	0	0	0	0	0	0	RDWF	0	0	0	0	0	0
RWF-36	0	0	0	0	0	0	RWF-36	0	0	0	0	0	0
HC36	2	166	278	425	535	645	HC36	0	0	25	207	329	534
RR36	0	0	61	210	315	472	RR36	0	0	0	0	77	231
R36-37	0	0	60	208	312	464	R36-37	0	0	0	0	77	230
SUB37	25	64	110	176	225	270	SUB37	51	96	130	175	210	260
OR37	25	37	45	48	42	32	OR37	51	96	130	175	210	260
D37	21	64	110	176	225	270	D37	0	0	15	102	161	241
HC37	21	64	110	265	411	606	HC37	0	0	15	102	161	292
RR37	0	0	0	213	372	580	RR37	0	0	0	0	52	278
SUB37A	1	2	4	7	9	11	SUB37A	1	2	4	7	9	12
HC37A	1	2	4	213	372	580	HC37A	1	2	4	7	52	278
DRR37A	1	2	4	211	329	423	DRR37A	1	2	4	7	52	242
RR37A	0	0	0	213	372	580	RR37A	0	0	0	0	48	278
37A49A	0	0	0	21	21	21	37A49A	0	0	0	0	21	21
DIV37A	0	0	0	192	351	559	DIV37A	0	0	0	0	27	257
R37A38	0	0	0	120	302	468	R37A38	0	0	0	0	14	210
SUB38	5	16	64	155	229	297	SUB38	67	117	154	206	245	301
OR38	5	16	64	82	103	115	OR38	67	117	154	206	245	301
D38	0	0	60	155	229	297	D38	0	0	0	23	105	203
HC38	0	0	60	155	303	478	HC38	0	0	0	23	105	243
RR38	0	0	0	115	287	445	RR38	0	0	0	0	39	235
D38-CC	0	0	0	115	287	445	D38-CC	0	0	0	0	39	235
DIV38	0	0	0	0	0	0	DIV38	0	0	0	0	0	0
RD32A	0	0	0	3	11	19	RD32A	0	0	0	0	0	4
RDBIF	0	0	0	0	0	0	RDBIF	0	0	0	0	0	0
HCBIF	0	0	0	3	11	19	HCBIF	0	0	0	0	0	4
BIF39A	0	0	0	0	0	1	BIF39A	0	0	0	0	0	0
SUB39A	3	4	37	131	218	300	SUB39A	80	133	180	245	295	365
OR39A	3	4	36	56	76	75	OR39A	80	133	180	245	295	365
D39A	0	0	37	131	218	300	D39A	0	0	0	27	123	250
RDGD	2	16	37	64	64	64	RDGD	0	0	4	54	64	64
RO-L	2	16	37	64	64	64	RO-L	0	0	4	54	64	64
RDCH	0	0	0	0	0	0	RDCH	0	0	0	0	0	35
RO-LCH	0	0	0	0	0	0	RO-LCH	0	0	0	0	0	34
HCCMB	2	16	37	138	236	331							
HC39A	2	16	37	138	236	331	HC39A	0	0	4	71	153	289
BASL	2	16	37	52	64	77	BASL	0	0	4	52	64	115
DL-K	2	16	37	52	52	52	DL-K	0	0	4	52	52	52
DIVGD	0	0	0	0	12	25	DIVGD	0	0	0	0	12	63
DL-KCH	0	0	0	0	12	25	DL-KCH	0	0	0	0	12	63
DIVCH	0	0	0	0	0	0	DIVCH	0	0	0	0	0	0
RDGRM	0	0	0	0	0	0	RDGRM	0	0	0	0	0	0
RGRM39	0	0	0	0	0	0	RGRM39	0	0	0	0	0	0
RDRN	0	0	0	0	0	0	RDRN	0	0	0	0	0	0
RRN39A	0	0	0	0	0	0	RRN39A	0	0	0	0	0	0
RRN39B	0	0	0	0	0	0	RRN39B	0	0	0	0	0	0
SUB39	0	31	116	260	377	483	SUB39	99	178	234	309	367	451
OR39	0	31	52	74	81	95	OR39	99	178	234	309	367	451
D39	0	24	116	260	377	483	D39	0	0	0	29	128	297
HC39	0	24	116	260	377	483	HC39	0	0	0	29	128	297
RR39	0	0	74	229	350	453	RR39	0	0	0	15	78	223
D39-CC	0	0	74	229	350	453	D39-CC	0	0	0	15	78	223
DIV39	0	0	0	0	0	0	DIV39	0	0	0	0	0	0
RDQC	0	0	0	0	0	0	RDQC	0	0	0	0	0	0
RQC40A	0	0	0	0	0	0	RQC40A	0	0	0	0	0	0
R40A-B	0	0	0	0	0	0	R40A-B	0	0	0	0	0	0
R40B-C	0	0	0	0	0	0	R40B-C	0	0	0	0	0	0
SUB40	9	19	64	148	220	286	SUB40	73	124	163	217	258	316
OR40	9	19	64	92	108	130	OR40	73	124	163	217	258	316
D40	0	0	48	148	220	286	D40	0	0	0	0	47	170
HC40	0	0	48	148	220	286	HC40	0	0	0	0	47	170
R40-41	0	0	42	142	210	274	R40-41	0	0	0	0	45	156
SUB41	35	86	144	229	292	350	SUB41	87	140	179	232	273	331
OR41N	35	86	144	178	186	203	OR41N	87	140	179	225	223	220
DIV41N	0	20	123	229	292	350	DIV41N	0	76	142	232	273	331

Existing Watershed (with Santan)													
	Existing Development Conditions							Built-Out Development Conditions					
	2	5	10	25	50	100		2	5	10	25	50	100
HC41	0	20	123	337	463	575	HC41	0	76	142	232	273	331
RR41	0	0	0	0	0	0	RR41	0	0	0	0	0	0
RD35A	0	0	0	160	352	484	RD35A	0	0	0	0	81	250
R35A42	0	0	0	103	244	358	R35A42	0	0	0	0	57	185
SUB42	7	36	128	286	411	524	SUB42	76	132	189	268	329	414
OR42	7	36	78	118	133	139	OR42	76	132	189	268	329	414
D42	0	12	128	286	411	524	D42	0	0	0	10	93	264
HC42	0	12	128	286	411	524	HC42	0	0	0	10	93	264
RR42	0	0	0	92	218	319	RR42	0	0	0	0	42	198
D42-CC	0	0	0	92	218	319	D42-CC	0	0	0	0	42	198
DIV42	0	0	0	0	0	0	DIV42	0	0	0	0	0	0
RDCC	0	40	251	460	460	460	RDCC	0	0	0	57	181	460
RCC-36	0	27	242	469	471	469	RCC-36	0	0	0	48	174	458
DCC-49	0	0	0	142	144	142	DCC-49	0	0	0	0	0	131
DIVCHL	0	27	242	327	327	327	DIVCHL	0	0	0	48	174	327
RCC-38	0	20	238	327	327	327	RCC-38	0	0	0	43	169	327
DXTRA	0	20	75	75	75	75	DXTRA	0	0	0	43	75	75
CHNGBF	0	0	163	252	252	252	CHNGBF	0	0	0	0	94	252
RD38	0	0	0	115	287	445	RD38	0	0	0	0	39	235
CC38	0	0	163	259	535	697	CC38	0	0	0	0	104	374
DCC48A	0	0	0	0	142	304	DCC48A	0	0	0	0	0	0
DIVPEC	0	0	163	259	393	393	DIVPEC	0	0	0	0	104	374
RCC-39	0	0	142	258	393	393	RCC-39	0	0	0	0	96	364
DXTRA	0	0	62	62	62	62	DXTRA	0	0	0	0	62	62
CHNGBF	0	0	80	196	331	331	CHNGBF	0	0	0	0	34	302
RD39	0	0	74	229	350	453	RD39	0	0	0	15	78	223
CC39	0	0	83	229	350	453	CC39	0	0	0	15	78	344
DCC-47	0	0	0	0	83	186	DCC-47	0	0	0	0	0	77
DIVGRM	0	0	83	229	267	267	DIVGRM	0	0	0	15	78	267
RCC-41	0	0	68	217	267	267	RCC-41	0	0	0	15	69	267
DCC-46	0	0	0	0	0	0	DCC-46	0	0	0	0	0	0
DIVQC	0	0	68	217	267	267	DIVQC	0	0	0	15	69	267
RCC-42	0	0	66	216	267	267	RCC-42	0	0	0	15	69	267
RD42CC	0	0	0	92	218	319	RD42CC	0	0	0	0	42	198
CC42	0	0	66	216	484	586	CC42	0	0	0	15	69	355
DCC-45	0	0	0	0	0	0	DCC-45	0	0	0	0	0	0
DIVMCQ	0	0	66	216	484	586	DIVMCQ	0	0	0	15	69	355
RCC-OC	0	0	48	193	472	577	RCC-OC	0	0	0	14	62	349
DCC-44	0	0	0	14	293	398	DCC-44	0	0	0	0	0	170
DIVOC	0	0	48	179	179	179	DIVOC	0	0	0	14	62	179
DCC-OU	0	0	48	179	179	179	DCC-OU	0	0	0	14	62	179
DIVOUT	0	0	0	0	0	0	DIVOUT	0	0	0	0	0	0
RDOC	0	0	0	14	293	398	RDOC	0	0	0	0	0	170
ROC-44	0	0	0	2	269	386	ROC-44	0	0	0	0	0	159
SUB44	18	36	66	111	145	177	SUB44	38	63	81	106	125	152
OR44	18	36	66	111	145	177	OR44	38	63	81	106	125	152
D44	0	0	0	1	47	112	D44	0	0	0	0	9	60
HC44	0	0	0	3	270	387	HC44	0	0	0	0	9	161
RR44	0	0	0	0	182	362	RR44	0	0	0	0	0	151
D44-OU	0	0	0	0	8	8	D44-OU	0	0	0	0	0	8
DIVAPP	0	0	0	0	174	355	DIVAPP	0	0	0	0	0	143
DUMMY	0	0	0	0	8	8	DUMMY	0	0	0	0	0	8
DUMMY	0	0	0	0	8	8	DUMMY	0	0	0	0	0	8
DUMMY	0	0	0	0	0	0	DUMMY	0	0	0	0	0	0
HCDMMY	0	0	0	0	174	355	HCDMMY	0	0	0	0	0	143
R44-45	0	0	0	0	172	353	R44-45	0	0	0	0	0	143
RDMCQ	0	0	0	0	0	0	RDMCQ	0	0	0	0	0	0
RMCQ45	0	0	0	0	0	0	RMCQ45	0	0	0	0	0	0
SUB45	20	39	68	112	146	177	SUB45	38	63	81	105	123	150
OR45	20	39	68	112	146	177	OR45	38	63	81	105	123	150
D45	0	0	0	19	91	151	D45	0	0	0	0	15	71
HC45	0	0	0	19	174	355	HC45	0	0	0	0	15	146
RR45	0	0	0	0	0	235	RR45	0	0	0	0	0	9
DTR76A	0	0	0	0	0	8	DTR76A	0	0	0	0	0	8
DIVQC	0	0	0	0	0	227	DIVQC	0	0	0	0	0	1
DUMMY	0	0	0	0	0	8	DUMMY	0	0	0	0	0	8
DUMMY	0	0	0	0	0	8	DUMMY	0	0	0	0	0	8
DUMMY	0	0	0	0	0	0	DUMMY	0	0	0	0	0	0
HCDMMY	0	0	0	0	0	227	HCDMMY	0	0	0	0	0	1
R45-46	0	0	0	0	0	223	R45-46	0	0	0	0	0	1
RDQC	0	0	0	0	0	0	RDQC	0	0	0	0	0	0
RQC-46	0	0	0	0	0	0	RQC-46	0	0	0	0	0	0
SUB46	3	72	161	291	388	477	SUB46	96	173	224	292	346	425
OR46	3	49	72	82	89	90	OR46	96	173	224	292	346	425
D46	0	72	161	291	388	477	D46	0	0	0	53	174	321
HCI46	0	72	161	291	388	477	HCI46	0	0	0	53	174	321

Existing Watershed (with Santan)													
	Existing Development Conditions							Built-Out Development Conditions					
	2	5	10	25	50	100		2	5	10	25	50	100
RDPEC	0	0	0	0	142	304	RDPEC	0	0	0	0	0	0
R3848A	0	0	0	0	83	237	R3848A	0	0	0	0	0	0
SUB48A	11	20	41	77	106	132	SUB48A	27	42	58	81	98	123
OR48A	11	20	41	77	103	102	OR48A	27	42	58	81	98	123
D48A	0	0	1	62	106	132	D48A	0	0	0	8	40	86
HC48A	0	0	1	62	106	240	HC48A	0	0	0	8	40	86
D48A62	0	0	1	30	30	30	D48A62	0	0	0	8	30	30
DIVSD	0	0	0	32	76	210	DIVSD	0	0	0	0	10	56
DUMMY	0	0	1	30	30	30	DUMMY	0	0	0	8	30	30
DUMMY	0	0	1	30	30	30	DUMMY	0	0	0	8	30	30
DUMMY	0	0	0	0	0	0	DUMMY	0	0	0	0	0	0
HCDMMY	0	0	0	32	76	210	HCDMMY	0	0	0	0	10	56
D48A66	0	0	0	21	21	21	D48A66	0	0	0	0	10	21
DIV48A	0	0	0	11	55	189	DIV48A	0	0	0	0	0	35
DUMMY	0	0	0	21	21	21	DUMMY	0	0	0	0	10	21
DUMMY	0	0	0	21	21	21	DUMMY	0	0	0	0	10	21
DUMMY	0	0	0	0	0	0	DUMMY	0	0	0	0	0	0
HCDMMY	0	0	0	11	55	189	HCDMMY	0	0	0	0	0	35
SUB48	11	16	36	91	140	185	SUB48	37	58	87	132	166	214
OR48	11	16	36	91	140	184	OR48	37	58	87	132	166	214
D48	0	0	0	13	109	180	D48	0	0	0	0	29	125
RDGD	2	16	37	52	52	52	RDGD	0	0	4	52	52	52
RL-K	2	16	37	52	52	52	RL-K	0	0	4	52	52	52
RDCH	0	0	0	0	12	25	RDCH	0	0	0	0	12	63
RL-KCH	0	0	0	0	13	21	RL-KCH	0	0	0	0	12	55
HC48	2	16	37	65	209	306	HC48	0	0	4	52	65	125
BASK	2	16	35	45	64	66	BASK	0	0	4	45	52	94
DK-J	2	16	35	45	45	45	DK-J	0	0	4	45	45	45
DIVGD	0	0	0	0	19	21	DIVGD	0	0	0	0	7	49
DK-JCH	0	0	0	0	19	21	DK-JCH	0	0	0	0	7	49
DIVCH	0	0	0	0	0	0	DIVCH	0	0	0	0	0	0
RDDUMB	2	16	35	45	45	45	RDDUMB	0	0	4	45	45	45
DUMMY	2	16	35	45	45	45	DUMMY	0	0	4	45	45	45
DIVALL	0	0	0	0	0	0	DIVALL	0	0	0	0	0	0
HCMTY	0	0	0	0	0	0	HCMTY	0	0	0	0	0	0
RDDUMB	0	0	0	0	19	21	RDDUMB	0	0	0	0	7	49
DUMMY	0	0	0	0	19	21	DUMMY	0	0	0	0	7	49
DIVALL	0	0	0	0	0	0	DIVALL	0	0	0	0	0	0
HCMTY	0	0	0	0	0	0	HCMTY	0	0	0	0	0	0
RR48	0	0	0	0	0	0	RR48	0	0	0	0	0	0
D4874D	0	0	0	0	0	0	D4874D	0	0	0	0	0	0
DIV48	0	0	0	0	0	0	DIV48	0	0	0	0	0	0
DUMMY	0	0	0	0	0	0	DUMMY	0	0	0	0	0	0
DUMMY	0	0	0	0	0	0	DUMMY	0	0	0	0	0	0
DUMMY	0	0	0	0	0	0	DUMMY	0	0	0	0	0	0
HCDMMY	0	0	0	0	0	0	HCDMMY	0	0	0	0	0	0
RDGRM	0	0	0	0	83	186	RDGRM	0	0	0	0	0	77
R39-47	0	0	0	0	23	52	R39-47	0	0	0	0	0	30
SUB47	4	26	75	156	220	278	SUB47	46	87	119	161	194	240
							OR47	46	87	119	161	194	240
							D47	0	0	4	67	132	210
HC47	4	26	75	156	220	278	HC47	0	0	4	67	132	210
RR47	0	0	0	0	15	42	RR47	0	0	0	0	0	26
HC46	0	72	161	291	388	477	HC46	0	0	0	0	0	35
RR46	0	41	64	81	94	108	RR46	0	0	0	0	0	25
D4675A	0	41	64	81	94	108	D4675A	0	0	0	0	0	25
DIV46	0	0	0	0	0	0	DIV46	0	0	0	0	0	0
RD37A	0	0	0	21	21	21	RD37A	0	0	0	0	21	21
HCMT	0	0	0	21	21	21	HCMT	0	0	0	0	21	21
37A49A	0	0	0	21	21	21	37A49A	0	0	0	0	21	21
SUB49A	56	116	179	264	329	390	SUB49A	76	138	188	256	308	382
OR49A	56	116	179	264	329	362	OR49A	76	138	188	256	308	382
D49A	0	0	30	192	301	390	D49A	0	0	0	78	192	313
HCI49A	0	0	30	192	301	390	HCI49A	0	0	0	78	192	313
RDCHL	0	0	0	142	144	142	RDCHL	0	0	0	0	0	131
R36-49	0	0	0	130	133	133	R36-49	0	0	0	0	0	126
SUB49	61	207	324	476	590	703	SUB49	129	244	318	418	498	616
OR49	61	202	218	249	287	293	OR49	129	244	318	418	498	608
D49	0	204	324	476	590	703	D49	0	0	76	280	411	609
HC49	0	204	324	476	590	703	HC49	0	0	76	280	411	609
RR49	0	19	26	71	127	238	RR49	0	0	12	26	26	139
DDT-62	0	19	26	26	26	26	DDT-62	0	0	12	26	26	26
DIVDTR	0	0	0	45	101	212	DIVDTR	0	0	0	0	0	113
DUMMY	0	19	26	26	26	26	DUMMY	0	0	12	26	26	26
DUMMY	0	19	26	26	26	26	DUMMY	0	0	12	26	26	26
DUMMY	0	0	0	0	0	0	DUMMY	0	0	0	0	0	0

Existing Watershed (with Santan)													
	Existing Development Conditions							Built-Out Development Conditions					
	2	5	10	25	50	100		2	5	10	25	50	100
HCDMMY	0	0	0	45	101	212	HCDMMY	0	0	0	0	0	113
HC49A	0	0	30	192	301	402	HC49A	0	0	0	78	192	313
RR49A	0	0	0	19	117	217	RR49A	0	0	0	6	16	134
DCMW62	0	0	0	19	117	217	DCMW62	0	0	0	6	16	134
DIV49A	0	0	0	0	0	0	DIV49A	0	0	0	0	0	0
SUB50	45	114	185	284	358	426	SUB50	75	139	188	254	305	377
OR50	45	114	185	284	358	400	OR50	75	139	188	254	305	377
D50	0	0	26	216	336	426	D50	0	0	0	25	130	265
HC50	0	0	26	216	336	426	HC50	0	0	0	25	130	265
RR50	0	0	0	0	0	0	RR50	0	0	0	0	0	0
SUB52	0	47	92	156	204	248	SUB52	48	78	98	124	146	177
							OR52	48	78	98	124	146	177
							D52	0	0	0	0	0	33
RR52	0	9	11	14	15	15	RR52	0	0	0	0	0	9
SUB1	43	71	157	317	468	610	SUB1	79	126	207	353	474	588
2RET	43	71	157	317	400	417	2RET1	79	126	207	353	474	588
1CONT	0	0	3	247	468	610	1CONT	0	0	0	49	275	458
RTOCO	0	0	0	194	430	602	RTOCO	0	0	0	24	229	410
CANQC	0	0	0	0	0	0	CANQC	0	0	0	0	0	0
QCTOOc	0	0	0	0	0	0	QCTOOc	0	0	0	0	0	0
Oc2	0	0	0	194	430	602	Oc2	0	0	0	24	229	410
DIVOC	0	0	0	0	0	160	DIVOC	0	0	0	0	0	0
Oc3	0	0	0	194	430	442	Oc3	0	0	0	24	229	410
OcTOCH	0	0	0	143	318	420	OcTOCH	0	0	0	19	172	321
SUB2	0	6	88	248	407	558	SUB2	105	173	268	436	571	699
							2RET2	105	173	268	436	571	699
							CONT2	0	0	0	84	339	545
RTCH	0	0	0	144	357	533	RTCH	0	0	0	0	93	327
CH2	0	0	0	268	637	862	CH2	0	0	0	19	172	543
DIVCH	0	0	0	102	470	695	DIVCH	0	0	0	0	6	376
CH3	0	0	0	167	167	167	CH3	0	0	0	19	167	167
CHTORI	0	0	0	157	166	166	CHTORI	0	0	0	16	138	166
RICANO	0	0	0	157	166	166	RICANO	0	0	0	16	138	166
CANRI	0	0	0	0	0	0	CANRI	0	0	0	0	0	0
SUB3	0	18	97	247	383	508	SUB3	102	181	268	415	526	632
							2RET3	102	181	268	415	526	632
							CONT3	0	0	0	109	325	494
RTRG	0	0	0	16	151	305	RTRG	0	0	0	0	19	113
2CANB	0	0	0	0	0	0	2CANB	0	0	0	0	0	0
CANAL2	0	0	0	16	151	305	CANAL2	0	0	0	0	19	113
2SUB8	0	0	0	16	151	305	2SUB8	0	0	0	0	19	113
BASINO	0	0	0	0	0	0	BASINO	0	0	0	0	0	0
CANRII	0	0	0	157	166	166	CANRII	0	0	0	16	138	166
FLOW	0	0	0	0	0	0	FLOW	0	0	0	0	0	0
Ri0	0	0	0	157	166	166	Ri0	0	0	0	16	138	166
DIVRi	0	0	0	0	0	0	DIVRi	0	0	0	0	0	0
Ri1	0	0	0	157	166	166	Ri1	0	0	0	16	138	166
CANAL	0	0	0	157	166	166	CANAL	0	0	0	16	138	166
END	0	0	0	0	0	0	END	0	0	0	0	0	0
DUM2	0	0	0	0	0	0	DUM2	0	0	0	0	0	0
SUB5	0	2	28	80	130	178	SUB5	78	131	174	235	281	325
							2RET8	78	131	174	235	281	325
							CONT5	0	0	5	63	175	262
1EXCES	0	0	0	0	0	160	1EXCES	0	0	0	0	0	0
1TO5	0	0	0	0	0	123	1TO5	0	0	0	0	0	0
CP5	0	2	28	80	130	178	CP5	0	0	5	63	175	262
5TO6A	0	0	13	55	104	151	5TO6A	0	0	2	30	95	173
RET	0	0	0	102	470	695	RET	0	0	0	0	6	376
2TO6A	0	0	0	99	467	695	2TO6A	0	0	0	0	1	371
CP6A	0	0	13	115	504	747	CP6A	0	0	2	30	95	396
6ATO6	0	0	13	105	501	747	6ATO6	0	0	2	27	82	395
SUB6	18	33	113	259	398	529	SUB6	98	157	230	354	453	547
2RET4	18	33	113	259	281	306	2RET9	98	157	230	354	453	547
6CONT	0	0	2	252	398	529	6CONT	0	0	0	0	141	325
CP6	0	0	13	291	744	1135	CP6	0	0	2	27	167	619
RTCCH	0	0	0	225	744	1132	RTCCH	0	0	0	13	137	615
6TO7A	0	0	0	189	718	1123	6TO7A	0	0	0	11	124	581
SUB7	74	120	198	337	458	572	SUB7	149	233	319	460	570	674
2RET3	74	120	198	337	458	504	2RET10	149	233	319	460	570	674
7CONT	0	0	6	217	433	572	7CONT	0	0	0	48	268	474
CP7A	0	0	6	345	946	1501	CP7A	0	0	0	48	268	663
RTCC	0	0	0	331	937	1498	RTCC	0	0	0	34	194	655
CONCAN	0	0	0	0	0	0	CONCAN	0	0	0	0	0	0
OCTOCH	0	0	0	0	0	0	OCTOCH	0	0	0	0	0	0
CHTOSP	0	0	0	0	0	0	CHTOSP	0	0	0	0	0	0
SP1	0	0	0	331	937	1498	SP1	0	0	0	34	194	655

Existing Watershed (with Santan)													
	Existing Development Conditions							Built-Out Development Conditions					
	2	5	10	25	50	100		2	5	10	25	50	100
211A	0	0	0	185	791	1352	211A	0	0	0	0	48	509
SP3	0	0	0	146	146	146	SP3	0	0	0	34	146	146
SPTORI	0	0	0	146	146	146	SPTORI	0	0	0	34	146	146
FRM3	0	0	0	0	0	0	FRM3	0	0	0	0	0	0
3WTO7	0	0	0	0	0	0	3WTO7	0	0	0	0	0	0
RI2	0	0	0	146	146	146	RI2	0	0	0	34	146	146
211B	0	0	0	0	0	0	211B	0	0	0	0	0	0
RI3	0	0	0	146	146	146	RI3	0	0	0	34	146	146
RITORR	0	0	0	143	146	146	RITORR	0	0	0	33	142	146
CCRR	0	0	0	143	146	146	CCRR	0	0	0	33	142	146
CANRR	0	0	0	0	0	0	CANRR	0	0	0	0	0	0
DUM4	0	0	0	0	0	0	DUM4	0	0	0	0	0	0
RGOVR	0	0	0	16	151	305	RGOVR	0	0	0	0	19	113
3STO8	0	0	0	15	149	266	3STO8	0	0	0	0	19	112
SUB4	10	17	56	131	205	275	SUB4	89	157	226	334	416	494
2RET2	10	17	56	131	176	201	2RET4	89	157	226	334	416	494
4CONT	0	0	21	131	205	275	CONT4	0	0	0	0	0	5
4TO8	0	0	13	116	203	272	4TO8	0	0	0	0	0	2
SUB8	3	5	48	143	242	339	SUB8	113	189	267	394	491	583
							2RET5	113	189	267	394	491	583
							CONT8	0	0	0	0	69	267
CP8	3	5	48	215	418	588	CP8	0	0	0	0	69	267
8TO9	3	5	46	208	405	585	8TO9	0	0	0	0	48	218
SUB9	67	118	198	338	451	558	SUB9	102	174	252	381	480	574
2RET1	67	118	198	338	451	558	2RET6	102	174	252	381	480	574
9CONT	0	0	0	0	0	9	9CONT	0	0	0	0	85	298
CP9	3	5	46	208	405	585	CP9	0	0	0	0	85	298
RTRR1	2	4	35	157	238	347	RTRR1	0	0	0	0	57	169
9TO17	2	4	35	157	238	347	9TO17	0	0	0	0	57	169
SUB17	0	0	7	22	38	53	SUB17	0	0	7	22	38	53
CP17	2	4	35	157	238	347	CP17	0	0	7	22	57	169
SUB13	0	1	13	36	59	80	SUB13	59	88	108	136	158	180
							RET11	59	88	108	136	158	180
							CONT13	0	0	0	13	59	111
13TO14	0	0	10	28	48	68	13TO14	0	0	0	10	30	61
SUB11A	1	2	9	23	37	51	SUB11A	0	1	8	22	34	45
FRM7A	0	0	0	185	791	1352	FRM7A	0	0	0	0	48	509
7A211A	0	0	0	132	761	1324	7A211A	0	0	0	0	11	486
CP11A	1	2	9	133	762	1326	CP11A	0	1	8	22	34	486
SPUR	0	0	0	0	604	1197	SPUR	0	0	0	0	0	58
							CULV	0	0	0	0	0	24
							PONDQ	0	0	0	0	0	33
OVRSPR	0	0	0	0	388	822	OVRSPR	0	0	0	0	0	13
OVRCH	0	0	0	0	216	374	OVRCH	0	0	0	0	0	21
SUB10	0	0	4	28	52	79	SUB10	64	96	120	155	182	208
							2RET12	64	96	120	155	182	208
							CONT10	0	0	0	11	52	117
CP10	0	0	4	28	217	375	CP10	0	0	0	11	52	117
RTRR	0	0	3	16	113	181	RTRR	0	0	0	8	22	44
10TO14	0	0	2	16	113	181	10TO14	0	0	0	8	22	44
SUB14	0	0	10	33	56	79	SUB14	59	89	111	142	166	189
							2RET13	59	89	111	142	166	189
							CONT14	0	0	0	17	66	118
CP14	0	0	15	54	116	185	CP14	0	0	0	26	73	143
142WST	0	0	14	53	115	185	142WST	0	0	0	26	73	142
FRMSPR	0	0	0	0	388	822	FRMSPR	0	0	0	0	0	13
11A2B	0	0	0	0	355	796	11A2B	0	0	0	0	0	12
SUB11B	1	1	12	34	56	77	SUB11B	0	3	14	36	54	71
FRM7	0	0	0	0	0	0	FRMCUL	0	0	0	0	0	24
							FRM7	0	0	0	0	0	0
7TO11B	0	0	0	0	0	0	7TO11B	0	0	0	0	0	0
CP11B	1	1	12	34	356	798	CP11B	0	3	14	36	54	71
ATRG	0	0	0	4	55	103	ATRG	0	0	0	0	0	0
RR215	0	0	0	2	34	65	RR215	0	0	0	0	0	0
OVRRG	0	0	0	1	20	39	OVRRG	0	0	0	0	0	0
11B212	0	0	0	1	20	39	11B212	0	0	0	0	0	0
SUB12	0	0	2	9	17	25	SUB12	17	26	32	42	49	56
							2RET13	17	26	32	42	49	56
							CONT12	0	0	0	3	15	34
CP12	0	0	2	9	20	39	CP12	0	0	0	3	15	34
PT12	0	0	0	0	6	16	PT12	0	0	0	0	0	0
12TO16	0	0	0	0	6	16	12TO16	0	0	0	0	0	0
SUB15	5	14	29	56	77	97	SUB15	15	32	51	82	105	127
2RET4	5	14	29	52	57	59	RET14	15	32	51	81	93	102
15CONT	0	0	22	56	77	97	15CONT	0	0	11	77	105	127
FRM11B	0	0	0	2	34	65	FRM11B	0	0	0	0	0	0

Existing Watershed (with Santan)													
	Existing Development Conditions							Built-Out Development Conditions					
	2	5	10	25	50	100			2	5	10	25	50	100
11B215	0	0	0	2	34	65		**11B215**	0	0	0	0	0	0
CP15	0	0	22	56	77	97		**CP15**	0	0	11	77	105	127
15TO16	0	0	11	36	57	77		**15TO16**	0	0	5	35	61	85
SUB16	8	12	18	28	37	46		**SUB16**	15	22	31	47	61	74
RET	8	12	18	28	37	46		**RET15**	15	22	31	47	61	74
16CONT	0	0	1	14	31	44		**CONT16**	0	0	0	16	43	69
CP16	0	0	11	36	83	121		**CP16**	0	0	5	50	94	133
SUB18	32	64	105	174	227	278		**SUB18**	77	132	179	244	293	341
2RET	32	64	105	174	227	278		**2RET16**	77	132	179	244	293	341
18CONT	0	0	0	0	0	5		**18CONT**	0	0	0	0	11	66
18TO19	0	0	0	0	0	4		**18TO19**	0	0	0	0	8	30
SUB19	30	47	89	178	266	351		**SUB19**	92	140	202	307	392	473
2RET	30	47	76	81	79	62		**RET17**	92	140	202	307	392	473
19CONT	8	42	89	178	266	351		**CONT19**	0	0	0	44	231	357
CP19	8	42	89	178	266	351		**CP19**	0	0	0	44	231	357
SUB20	12	28	48	82	109	134		**SUB20**	69	107	133	168	196	223
2RET	12	28	48	82	97	112		**2RET18**	69	107	133	168	196	223
20CONT	0	1	32	82	109	134		**CONT20**	0	0	0	20	77	148
20TO21	0	1	11	48	78	107		**20TO21**	0	0	0	11	37	76
SUB21	102	163	234	353	453	548		**SUB21**	180	276	355	473	564	652
2RET6	102	163	234	353	453	548		**2RET19**	180	276	355	473	564	652
21CONT	0	0	0	23	216	384		**21CONT**	0	0	0	22	126	333
CP21	0	1	11	48	257	461		**CP21**	0	0	0	29	154	398

Higley ADMP

Existing Conditions	100-yr	Future Conditions	100-yr
SUB1	194	SUB1	221
		OR1	221
		D1	159
R1-2A	172	R1-2A	117
SUB2A	105	SUB2A	94
		OR2A	94
		D2A	13
HC2A	172	HC2A	122
RR2A	9	RR2A	7
R2A-2	9	R2A-2	7
SUB2	130	SUB2	128
		OR2	128
		D2	71
HC2	130	HC2	71
R2-3a	111	R2-3a	37
SUB3	405	SUB3	331
OR3	405	OR3	331
D3	383	D3	262
HC3	450	HC3	296
R3-4a	358	R3-4a	260
R3-4b	323	R3-4b	238
SUB4	912	SUB4	632
OR4	912	OR4	632
D4	758	D4	524
HC4	940	HC4	673
R4-5A	918	R4-5A	660
SUB5	1078	SUB5	719
OR5	68	OR5	719
D5	1078	D5	594
HC5	1454	HC5	1183
R4-5B	1446	R4-5B	1182
R5-6C	1431	R5-6C	1176
SUB6	1301	SUB6	833
OR6	492	OR6	833
D6	1301	D6	721
HC6	2263	HC6	1738
R6-7a	2241	R6-7a	1725
R6-7b	2242	R6-7b	1726
SUB7A	711	SUB7A	473
OR7A	711	OR7A	473
D7A	626	D7A	443
HC7A	2400	HC7A	1763
CRPB	130	CRPB	130
DICRPB	2270	DICRPB	1633
BASCRP	704	BASCRP	3
DRCRPB	130	DRCRPB	130
LFCHAN	130	LFCHAN	130
CBSNCR	834	CBSNCR	133
SUB8	246	SUB8	207
		OR8	207

Higley ADMP

Existing Conditions	100-yr	Future Conditions	100-yr
		D8	168
R8-9	127	R8-9	65
SUB9	102	SUB9	87
		OR9	87
		D9	84
HC9	131	HC9	84
RR9	127	RR9	70
R9-7	88	R9-7	62
SUB10	303	SUB10	196
		OR10	182
		D10	196
RR10	3	RR10	0
SUB7	1196	SUB7	808
OR7	79	OR7	20
D7	1196	D7	808
SUB30B	448	SUB30B	337
OR30B	20	OR30B	332
D30B	448	D30B	333
HC7	1217	HC7	827
BASQ	2	BASQ	461
SUB31	584	SUB31	559
OR31	280	OR31	559
D31	584	D31	461
RT30P	560	RT30P	391
BASP	0	BASP	0
RD7A	834	RD7A	133
RRR-29	822	RRR-29	132
SUB29	81	SUB29	81
HC29	828	HC29	173
R2930a	825	R2930a	170
R2930b	817	R2930b	166
SUB30	619	SUB30	412
OR30	485	OR30	412
D30	619	D30	253
HC30	821	HC30	381
3030A	808	3030A	362
SUB30A	100	SUB30A	77
		OR30A	77
		D30A	46
HC30A	808	HC30A	365
30A31A	781	30A31A	322
		OR31A	322
		D31A	147
SUB31A	592	SUB31A	435
DRE31A	299	DRE31A	32
DIV31A	592	DIV31A	435
HC31A	781	HC31A	435
31A32A	765	31A32A	425
SUB32A	298	SUB32A	275
OR32A	171	OR32A	275

Higley ADMP

Existing Conditions	100-yr	Future Conditions	100-yr
D32A	298	D32A	187
HC32A	767	HC32A	486
DIOL	0	DIOL	0
DIBASO	767	DIBASO	486
SUB32	584	SUB32	418
OR32	186	OR32	418
D32	584	D32	358
32BSNO	565	32BSNO	319
SUB33	417	SUB33	384
OR33	168	OR33	384
D33	417	D33	336
HC33A	1552	HC33A	865
BASO	159	BASO	516
DO-LCH	159	DO-LCH	516
DIVCH	0	DIVCH	0
SUB34	406	SUB34	288
OR34	87	OR34	288
D34	406	D34	208
HC34	406	HC34	208
34-35A	392	34-35A	180
34-35B	379	34-35B	166
SUB35	419	SUB35	269
OR35	250	OR35A	156
D35	419	D35A	269
HC35	637	HC35	291
SUB35A	130	SUB35A	109
OR35A	73	OR35A	49
D35A	130	D35A	109
HC35A	748	HC35A	374
SUB36	701	SUB36	546
OR36	167	OR36	546
D36	701	D36	534
RR36	554	RR36	231
R36-37	550	R36-37	230
SUB37	293	SUB37	260
OR37	34	OR37	260
D37	293	D37	241
HC37	719	HC37	292
RR37	692	RR37	278
SUB37A	12	SUB37A	12
HC37A	692	HC37A	278
DRR37A	396	DRR37A	242
RR37A	692	RR37A	278
37A49A	21	37A49A	21
DIV37A	671	DIV37A	257
R37A38	553	R37A38	210
SUB38	331	SUB38	301
OR38	128	OR38	301
D38	331	D38	203
HC38	564	HC38	243

Higley ADMP

Existing Conditions	100-yr	Future Conditions	100-yr
RR38	527	RR38	235
D38-CC	527	D38-CC	235
DIV38	0	DIV38	0
SUB39A	340	SUB39A	365
OR39A	86	OR39A	365
D39A	340	D39A	250
RDCH	0	RDCH	0
RO-La	0	RO-La	0
RO-Lb	0	RO-Lb	0
RO-Lc	0	RO-Lc	0
HC39A	340	HC39A	250
BASL	1	BASL	1
SUB39	535	SUB39	451
OR39	81	OR39	451
D39	535	D39	297
HC39	536	HC39	297
R3941a	517	R3941a	260
R3941b	499	R3941b	240
R3941c	497	R3941c	237
SUB40	319	SUB40	316
OR40	133	OR40	316
D40	319	D40	170
R40-41	310	R40-41	156
SUB41	379	SUB41	331
OR41N	205	OR41N	220
DIV41N	379	DIV41N	331
HC41	1086	HC41	444
DIV42	48	DIV42	48
DBSNQC	1038	DBSNQC	396
SUB42	581	SUB42	414
OR42	134	OR42	414
D42	581	D42	264
HCBSN	1563	HCBSN	608
BASQC	79	BASQC	34
RBSNQC	48	RBSNQC	48
RTQCMQ	48	RTQCMQ	48
CP42	127	CP42	82
RDCC	0	RDCC	0
RCC-36	0	RCC-36	0
DCC-49	0	DCC-49	0
DIVCHL	0	DIVCHL	0
RCC-38	0	RCC-38	0
DXTRA	0	DXTRA	0
CHNGBF	0	CHNGBF	0
RD38	527	RD38	235
CC38	527	CC38	235
DCC48A	134	DCC48A	0
DIVPEC	393	DIVPEC	235
SUB44	194	SUB44	152
OR44	194	OR44	152

Higley ADMP

Existing Conditions	100-yr	Future Conditions	100-yr
D44	151	D44	60
HC44	514	HC44	322
RR44	485	RR44	305
D44-OU	8	D44-OU	8
DIVAPP	478	DIVAPP	297
DUMMY	8	DUMMY	8
DUMMY	8	DUMMY	8
DUMMY	0	DUMMY	0
HCDMMY	478	HCDMMY	297
R44-45	477	R44-45	296
SUB45	193	SUB45	150
OR45	193	OR45	150
D45	182	D45	71
HC45	481	HC45	303
RR45	458	RR45	269
DTR76A	8	DTR76A	8
DIVQC	451	DIVQC	261
DUMMY	8	DUMMY	8
DUMMY	8	DUMMY	8
DUMMY	0	DUMMY	0
HCDMMY	451	HCDMMY	261
R45-46	449	R45-46	260
RQC-46	358	RQC-46	207
SUB46	522	SUB46	425
OR46	83	OR46	425
D46	522	D46	321
HCI46	522	HCI46	321
CLEAR	766	CLEAR	466
SUB48A	146	SUB48A	123
OR48A	102	OR48A	123
D48A	146	D48A	86
SUB48	208	SUB48	214
OR48	196	OR48	214
D48	208	D48	125
RL-KCH	167	RL-KCH	98
HC48	291	HC48	173
K-PASS	37	K-PASS	37
DIBASK	254	DIBASK	136
BASK	2	BASK	1
DRBASK	37	DRBASK	37
CBASK	39	CBASK	38
R3941b	39	R3941b	38
DUMMY	39	DUMMY	38
OUT	0	OUT	0
DUMMY	0	DUMMY	0
DIVALL	0	DIVALL	0
HCMTY	766	HCMTY	466
D4874D	21	D4874D	21
DIV48	745	DIV48	445
DUMMY	21	DUMMY	21

Higley ADMP

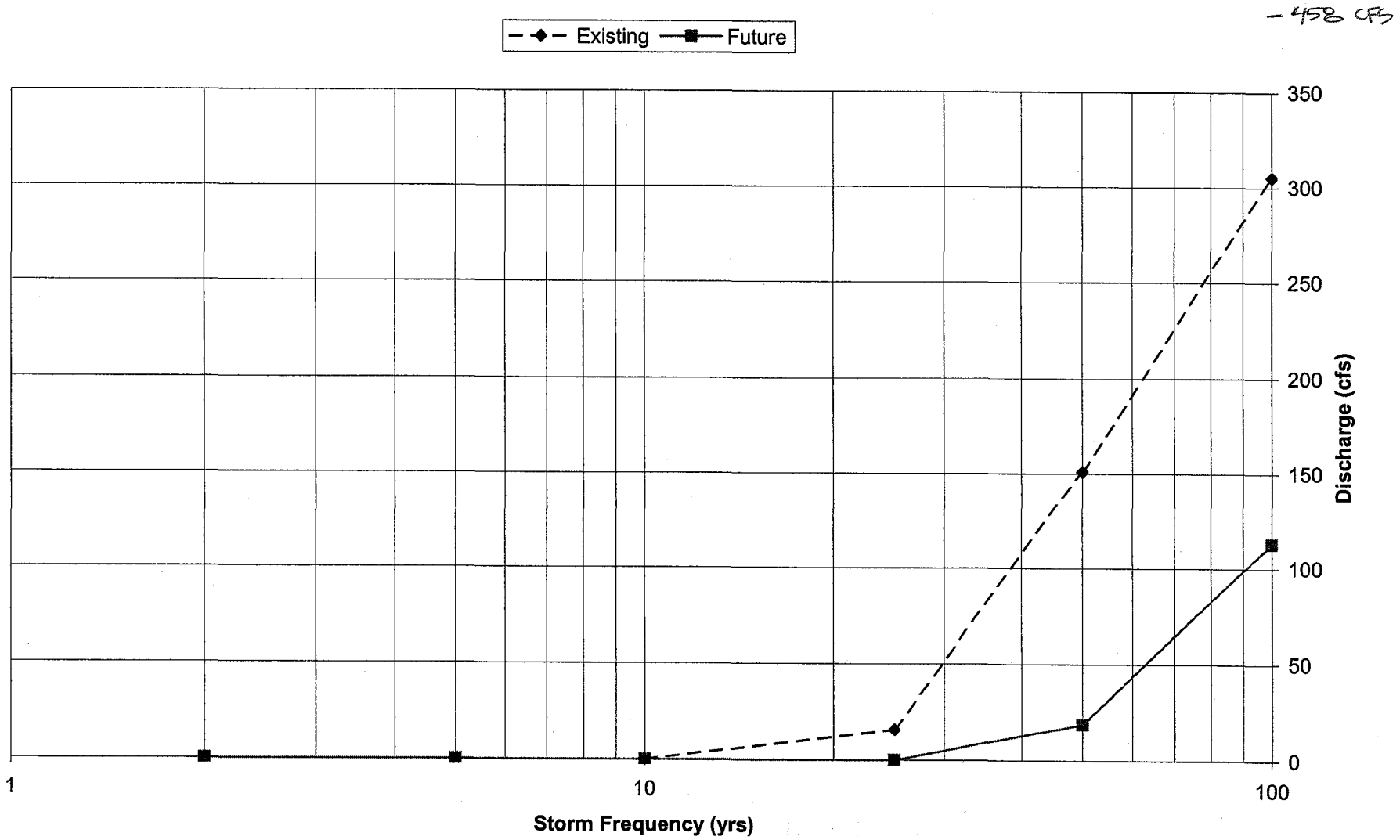
Existing Conditions	100-yr	Future Conditions	100-yr
DUMMY	21	DUMMY	21
DUMMY	0	DUMMY	0
HCDMMY	745	HCDMMY	445
SUB47	307	SUB47	240
HC47	795	HC47	551
RR47	749	RR47	509
RR46	188	RR46	182
D4675A	188	D4675A	182
DIV46	0	DIV46	0
RD37A	21	RD37A	21
HCMT	21	HCMT	21
37A49A	21	37A49A	21
SUB49A	420	SUB49A	382
OR49A	361	OR49A	382
D49A	420	D49A	313
HCI49A	420	HCI49A	313
RDCHL	0	RDCHL	0
R36-49	0	R36-49	0
SUB49	762	SUB49	616
OR49	316	OR49	608
D49	762	D49	609
HC49	762	HC49	609
RR49	293	RR49	139
DDT-62	26	DDT-62	26
DIVDTR	267	DIVDTR	113
DUMMY	26	DUMMY	26
DUMMY	26	DUMMY	26
DUMMY	0	DUMMY	0
HCDMMY	267	HCDMMY	113
HC49A	486	HC49A	313
RR49A	303	RR49A	134
DCMW62	303	DCMW62	134
DIV49A	0	DIV49A	0
SUB50	461	SUB50	377
OR50	410	OR50	377
D50	461	D50	265
HC50	461	HC50	265
RR50	0	RR50	0
SUB52	272	SUB52	177
RR52	16	RR52	18
SUB1	610	SUB1	588
2RET	417	2RET1	588
1CONT	610	1CONT	458
CANQC	748	CANQC	374
QCTOOC	731	QCTOOC	356
OC2	1025	OC2	459
OCCHa	1014	OCCHa	454
BASCH	591	BASCH	329
OCCHb	590	OCCHb	329
SUB2	558	SUB2	699

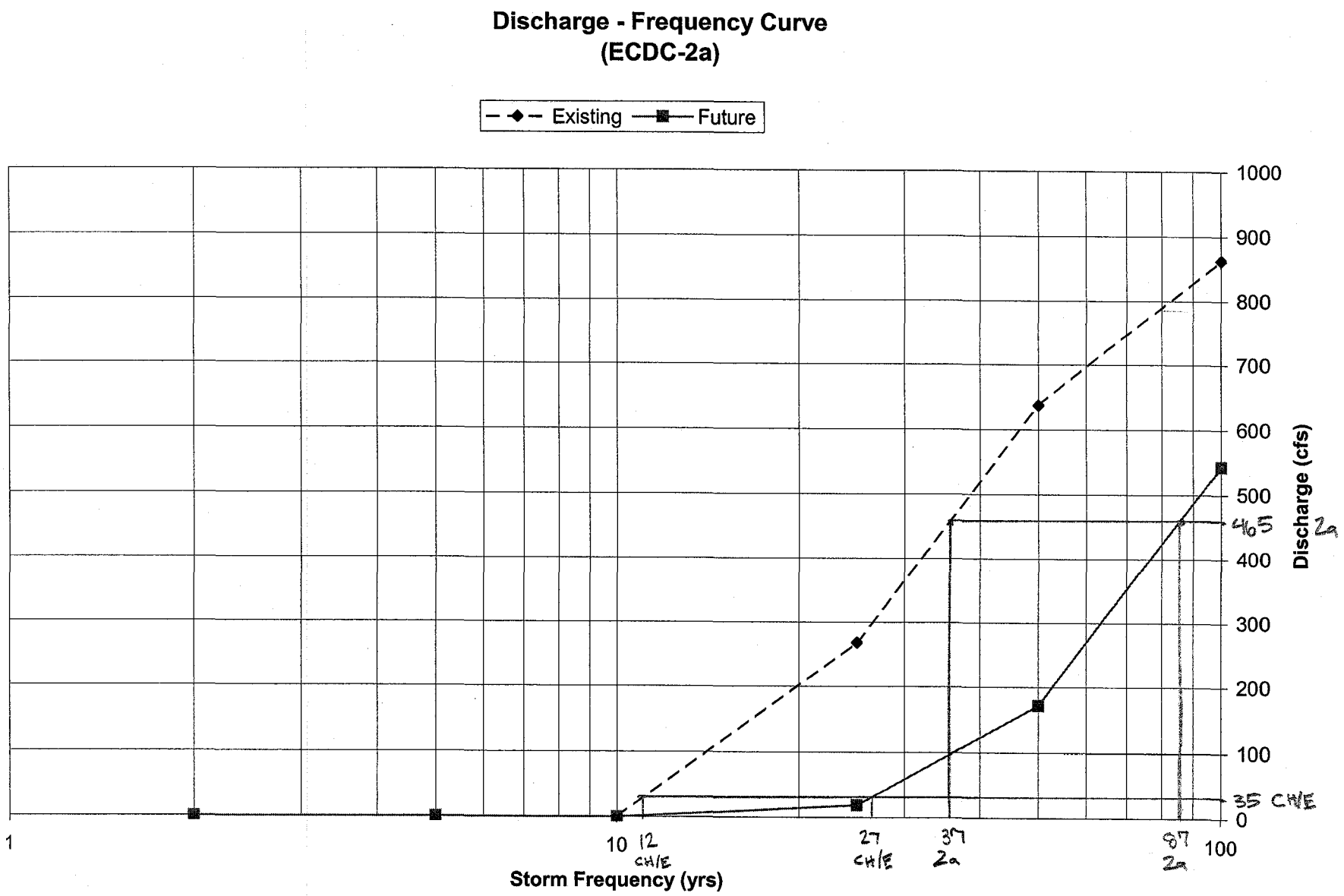
Higley ADMP

Existing Conditions	100-yr	Future Conditions	100-yr
		2RET2	699
		CONT2	545
CH2	659	CH2	545
CHSRPB	656	CHSRPB	471
SRPLF	100	SRPLF	100
DISRPB	556	DISRPB	371
BASSRP	2	BASSRP	1
DRDRPB	100	DRDRPB	100
CPSRPB	102	CPSRPB	101
SRPBRI	102	SRPBRI	101
SUB3	508	SUB3	632
		2RET3	632
		CONT3	494
DUM2	608	DUM2	515

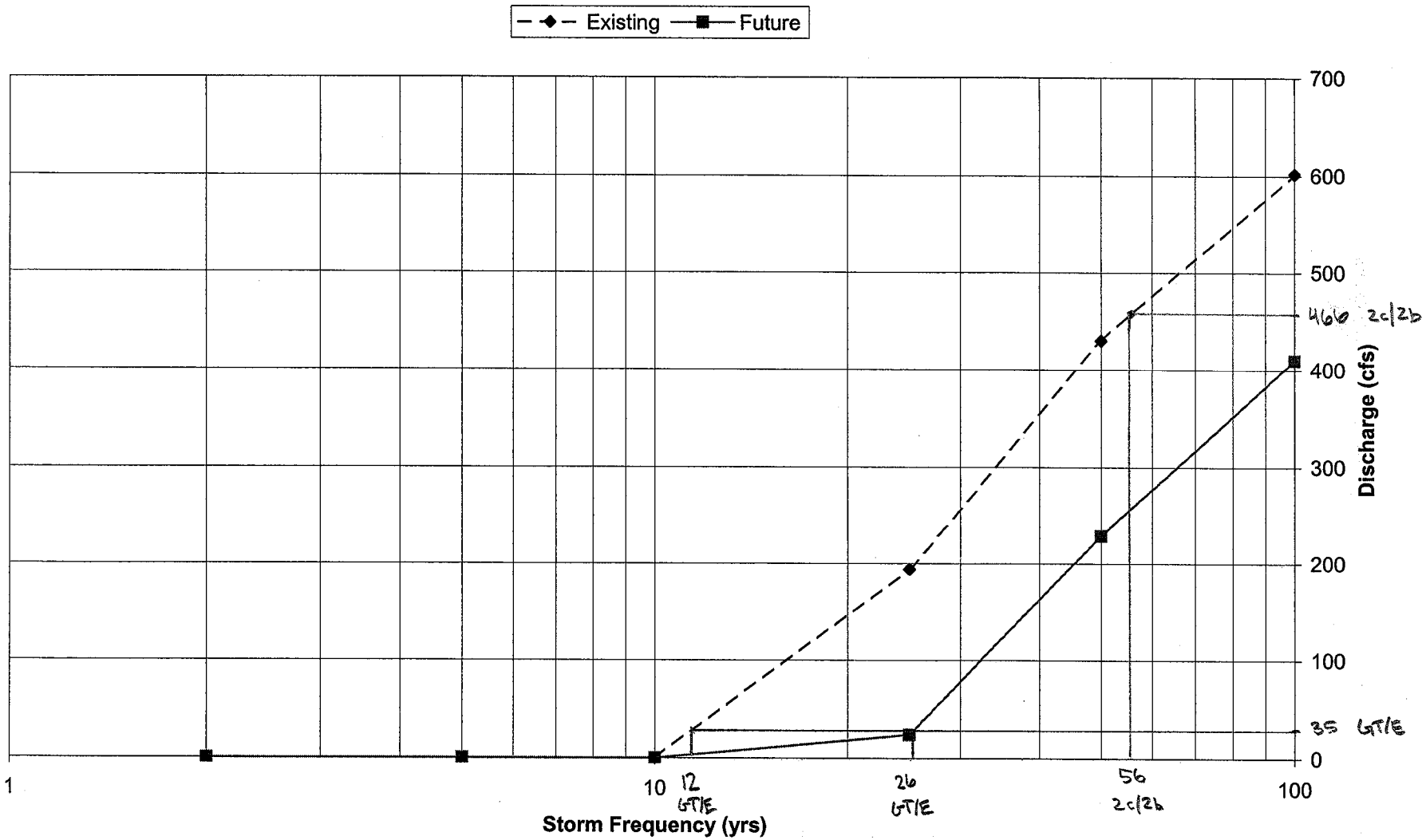
Appendix B
Discharge-Frequency Curves

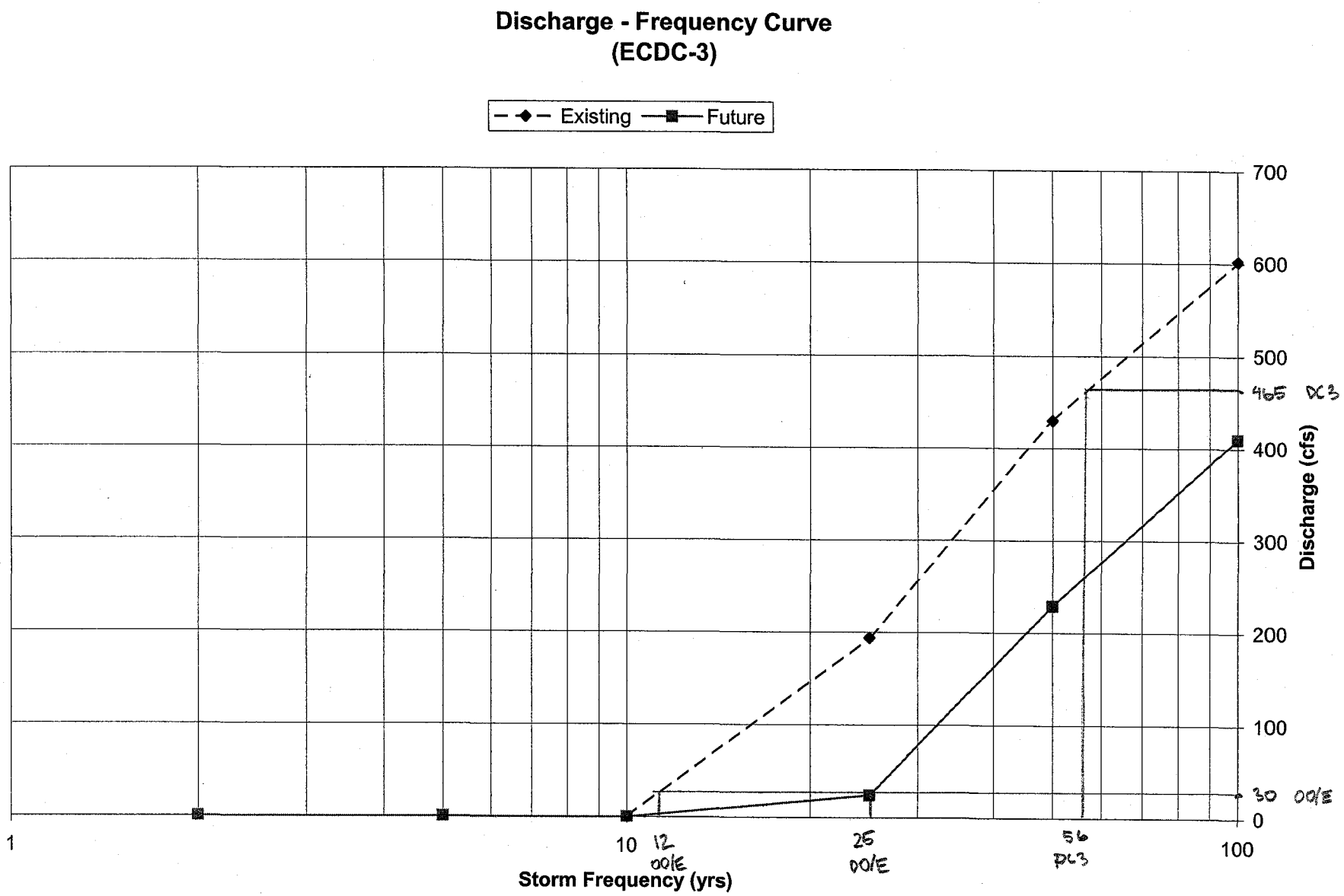
Discharge - Frequency Curve
(ECDC-1)



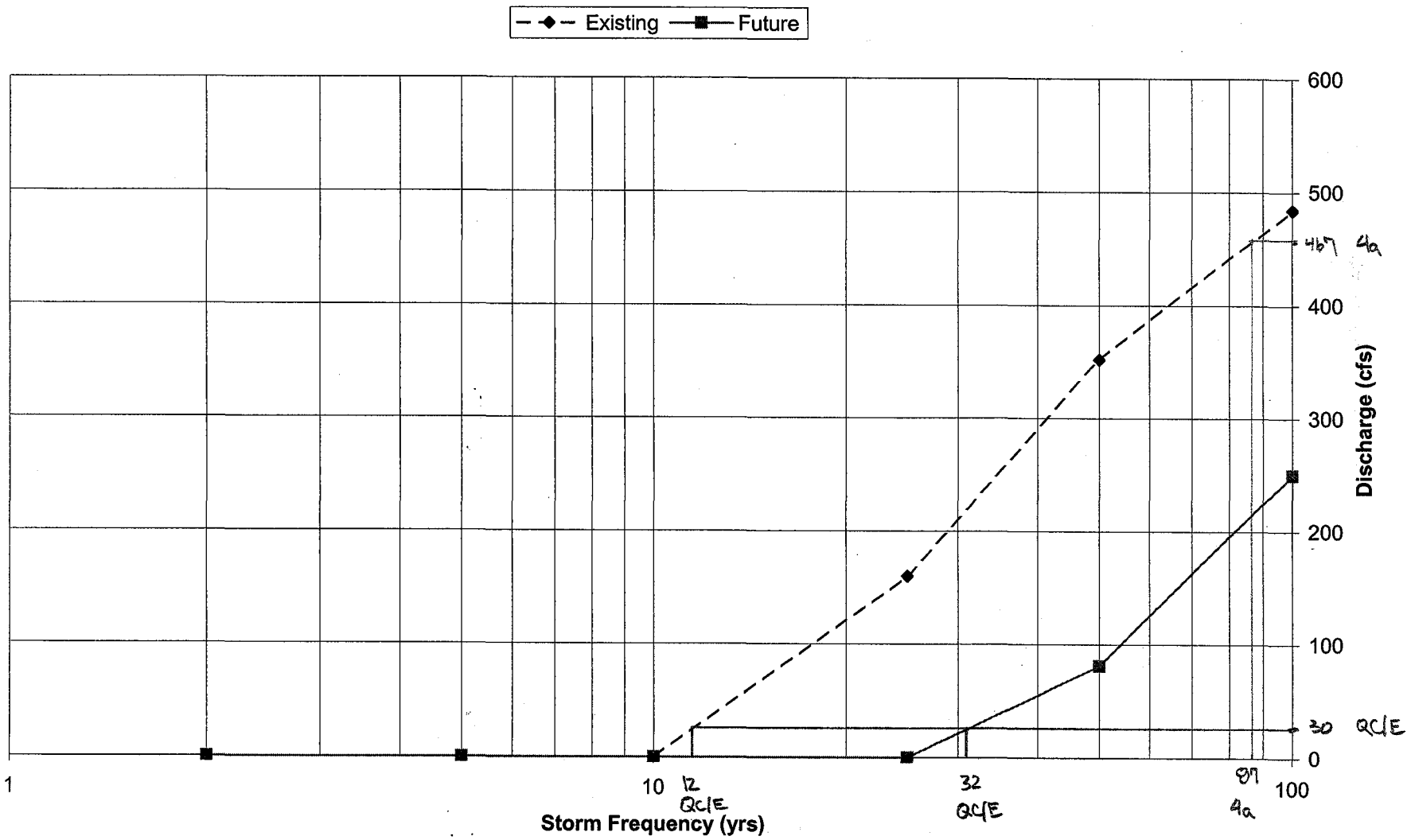

Discharge - Frequency Curve
(ECDC-2a)
Existing
Future
1000
900
800
700
600
500
465 2a
400
300
200
100
35 CH/E
0
Discharge (cfs)
1
10
12 CH/E
27 CH/E
37 2a
87 2a
100
Storm Frequency (yrs)

Discharge - Frequency Curve
(ECDC-2c & 2b)

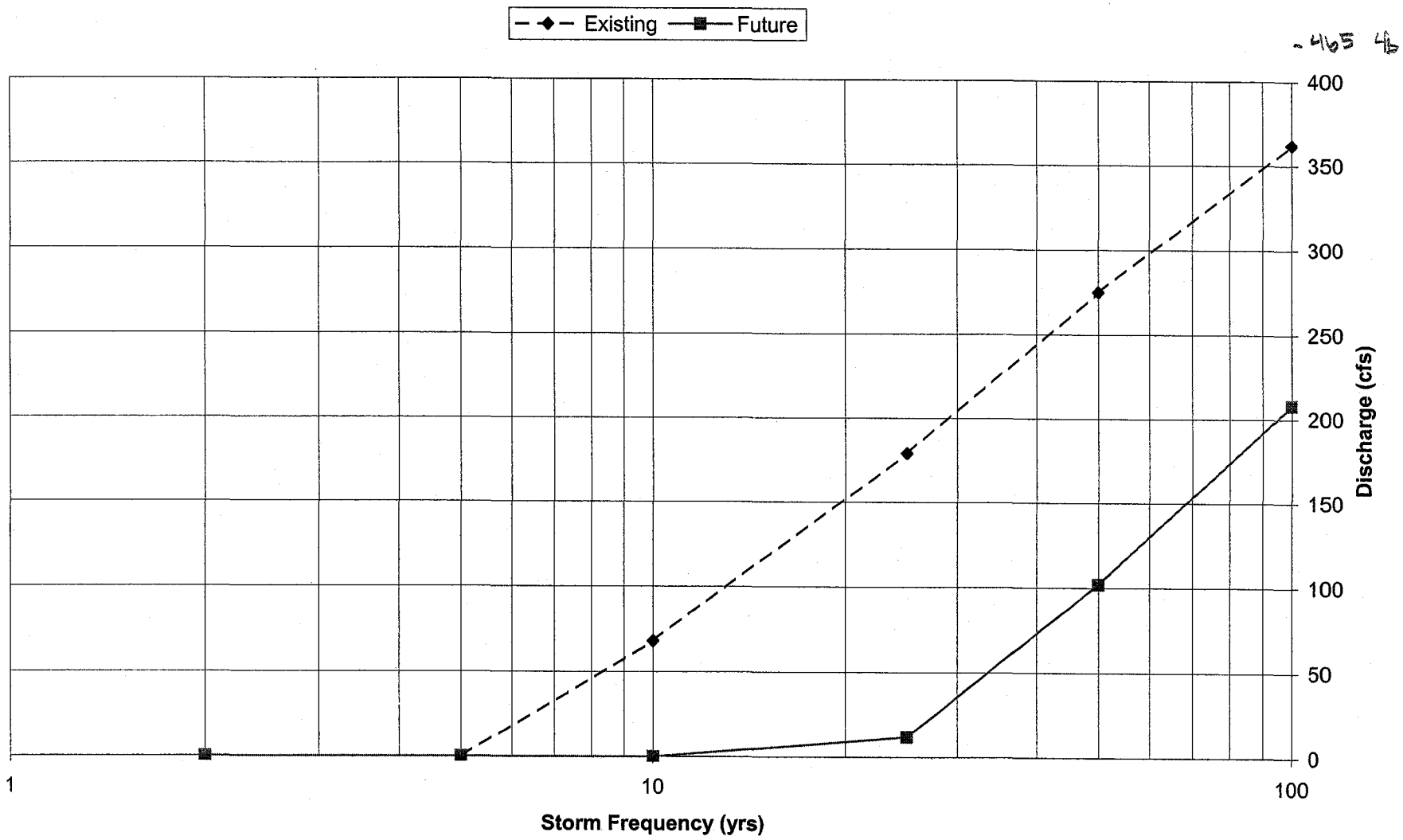



Discharge - Frequency Curve
(ECDC-3)
Existing
Future
700
600
500
465 DC3
400
300
200
100
30 OO/E
0
Discharge (cfs)
1
10
12
OO/E
25
OO/E
56
DC3
100
Storm Frequency (yrs)

Discharge - Frequency Curve
(ECDC-4a)

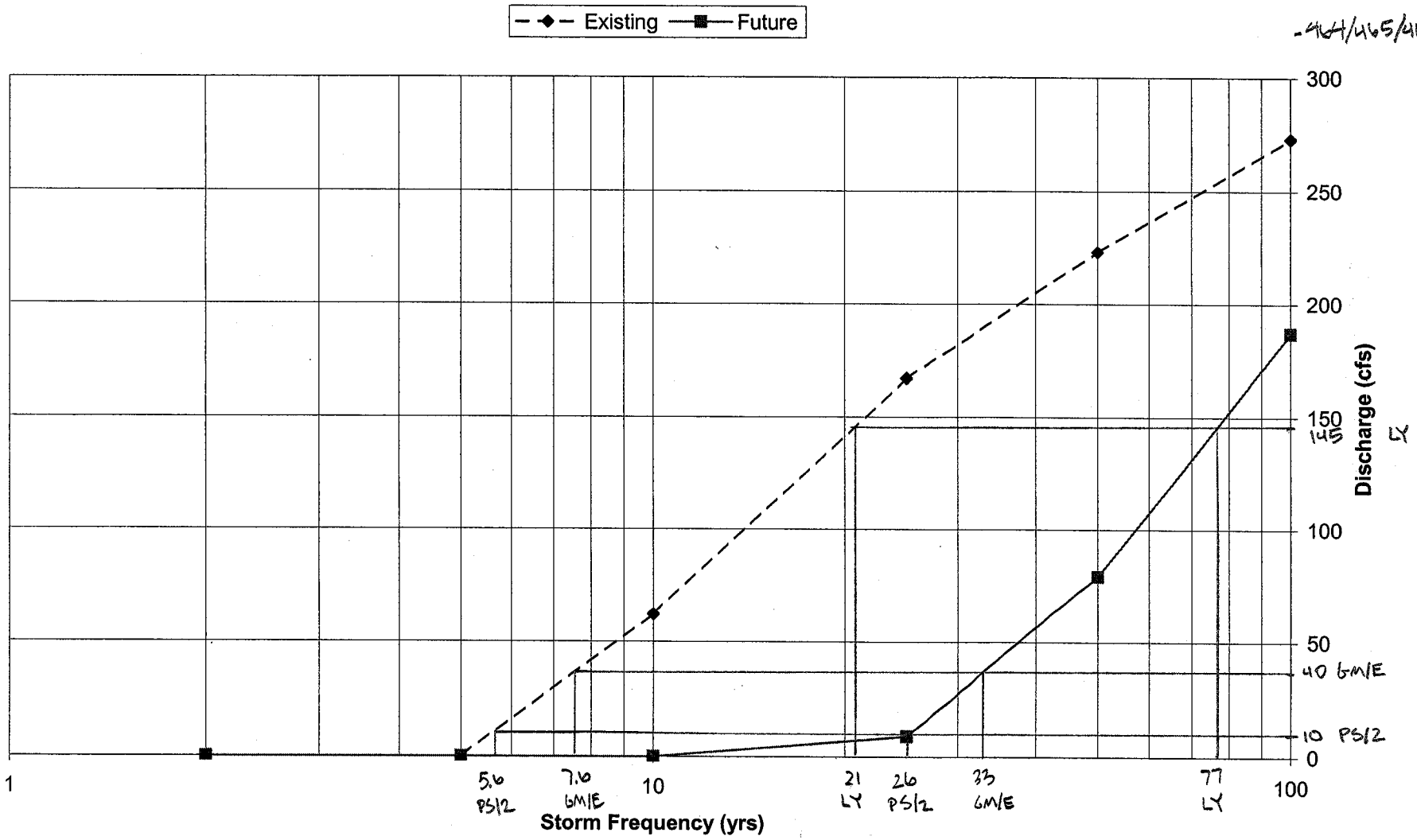


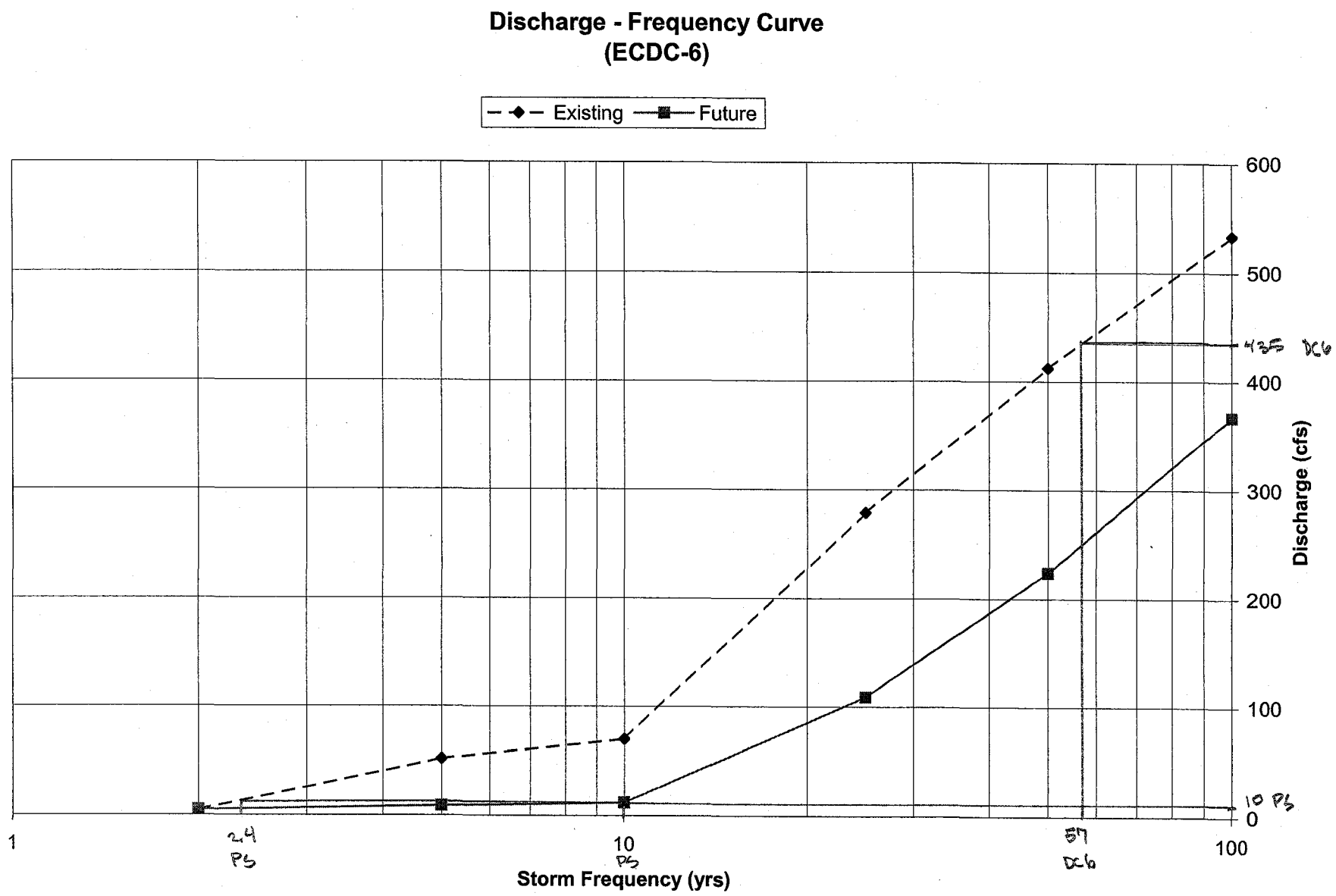
Discharge - Frequency Curve
(ECDC-4b)

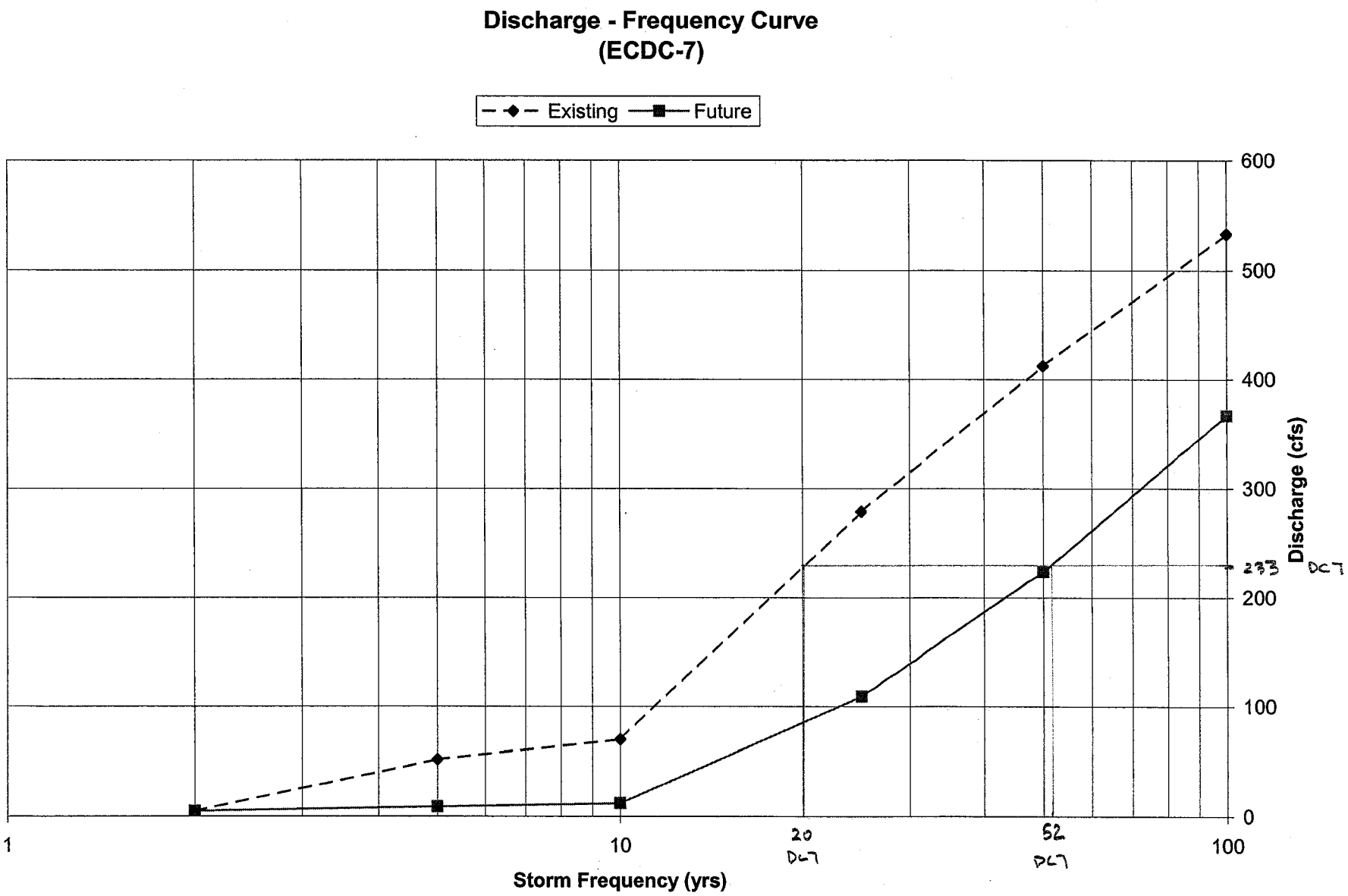


-465 4b

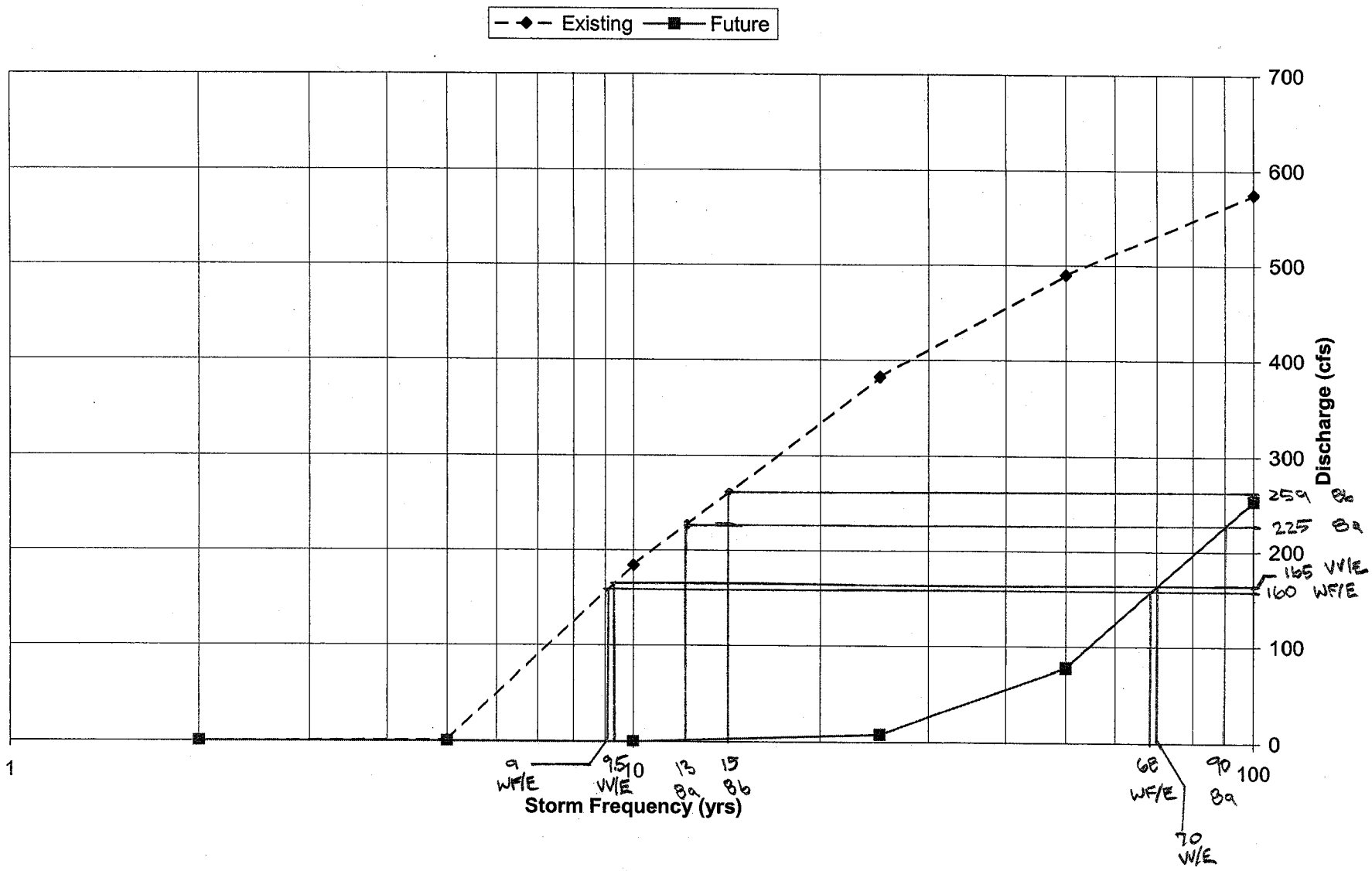
Discharge - Frequency Curve
(ECDC-5)

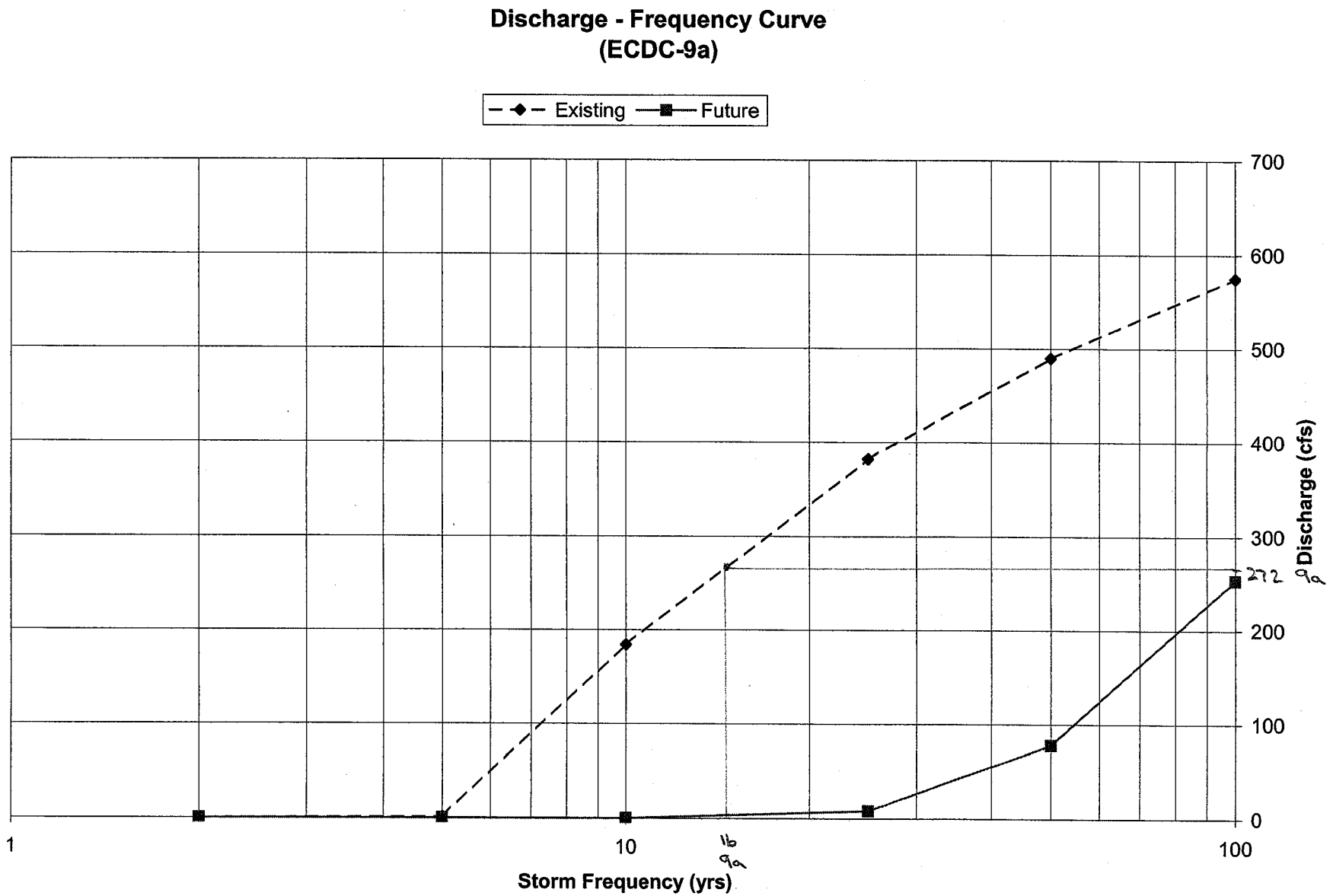


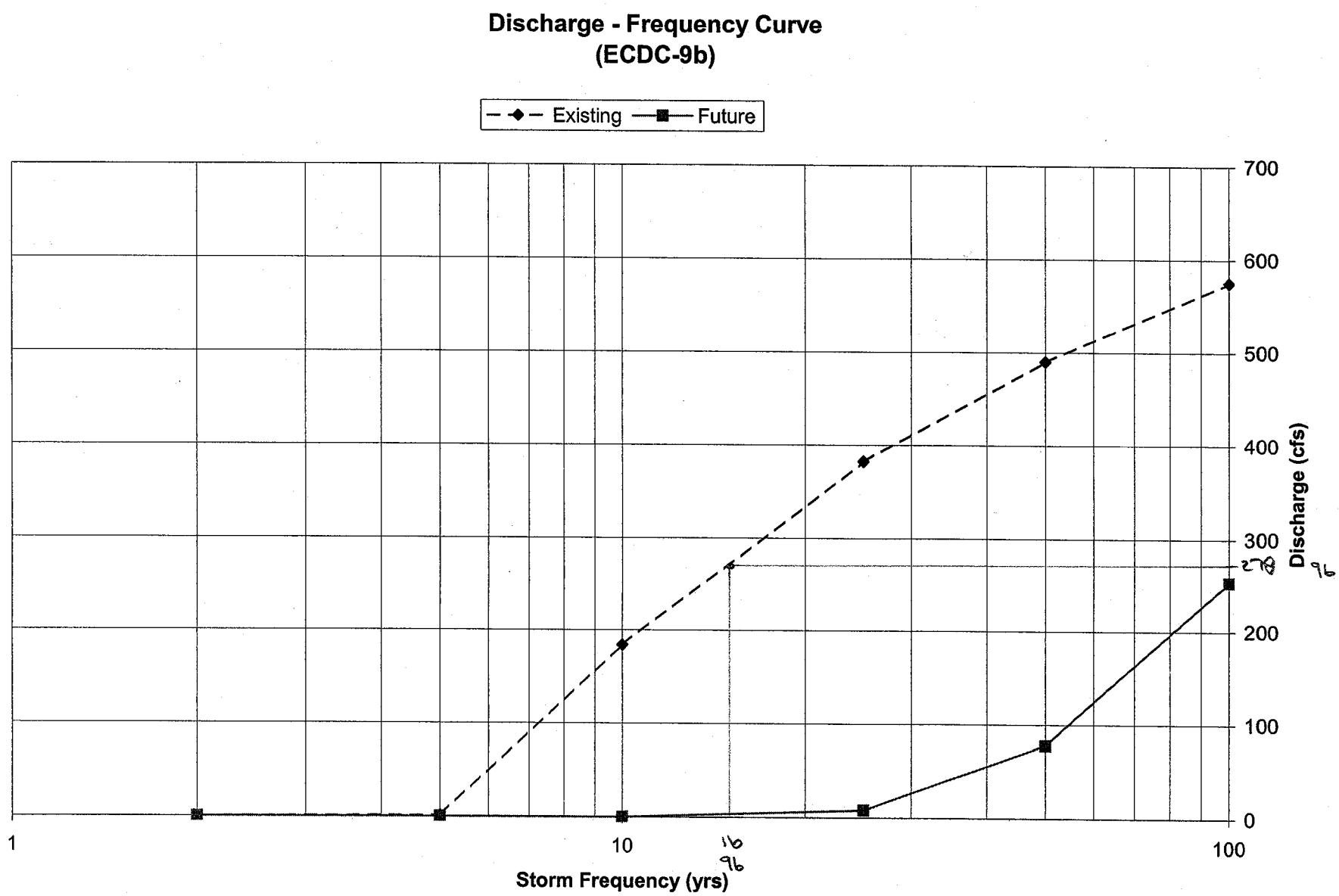

Discharge - Frequency Curve
(ECDC-6)
Existing
Future
600
500
435 DC6
400
300
200
100
10 PS
0
Discharge (cfs)
1
2.4 PS
10 PS
57 DC6
100
Storm Frequency (yrs)


Discharge - Frequency Curve
(ECDC-7)
Existing
Future
600
500
400
300
233
DC7
200
100
0
Discharge (cfs)
1
10
20
DC7
52
DC7
100
Storm Frequency (yrs)

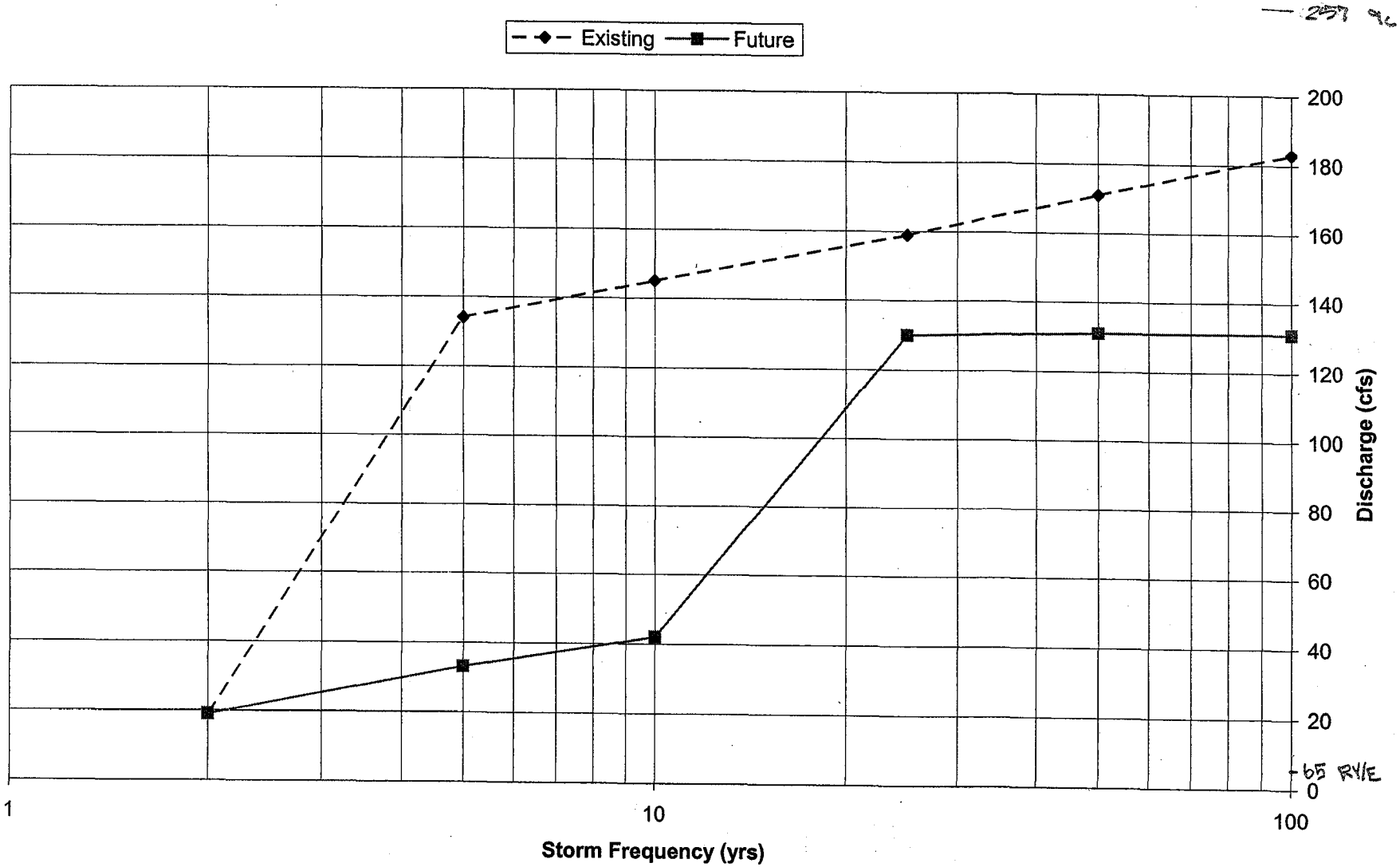
Discharge - Frequency Curve
(ECDC-8a, ECDC-8b)

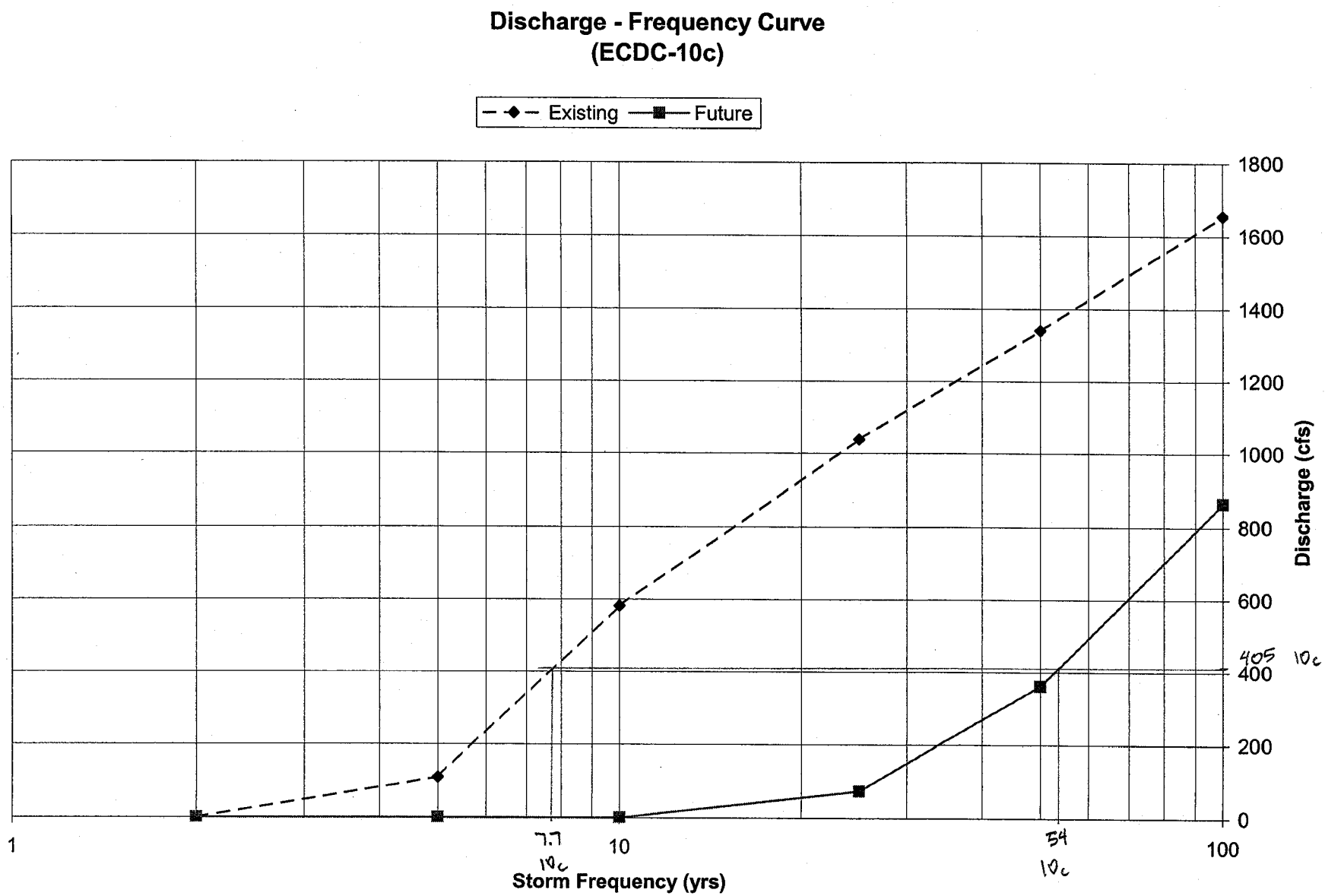


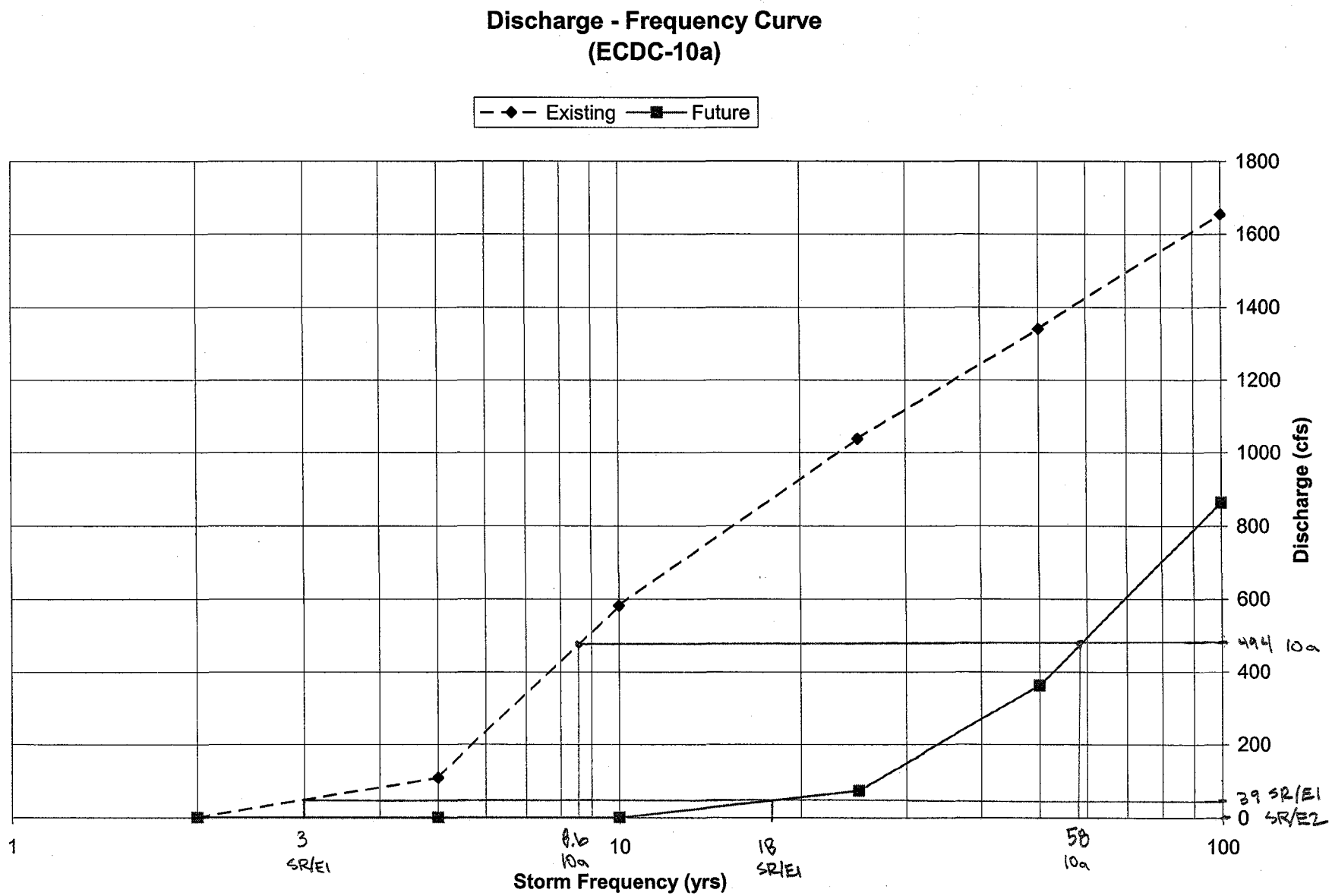

Discharge - Frequency Curve
(ECDC-9a)
Existing
Future
700
600
500
400
300
272
200
100
0
Discharge (cfs)
1
10
16
9a
100
Storm Frequency (yrs)

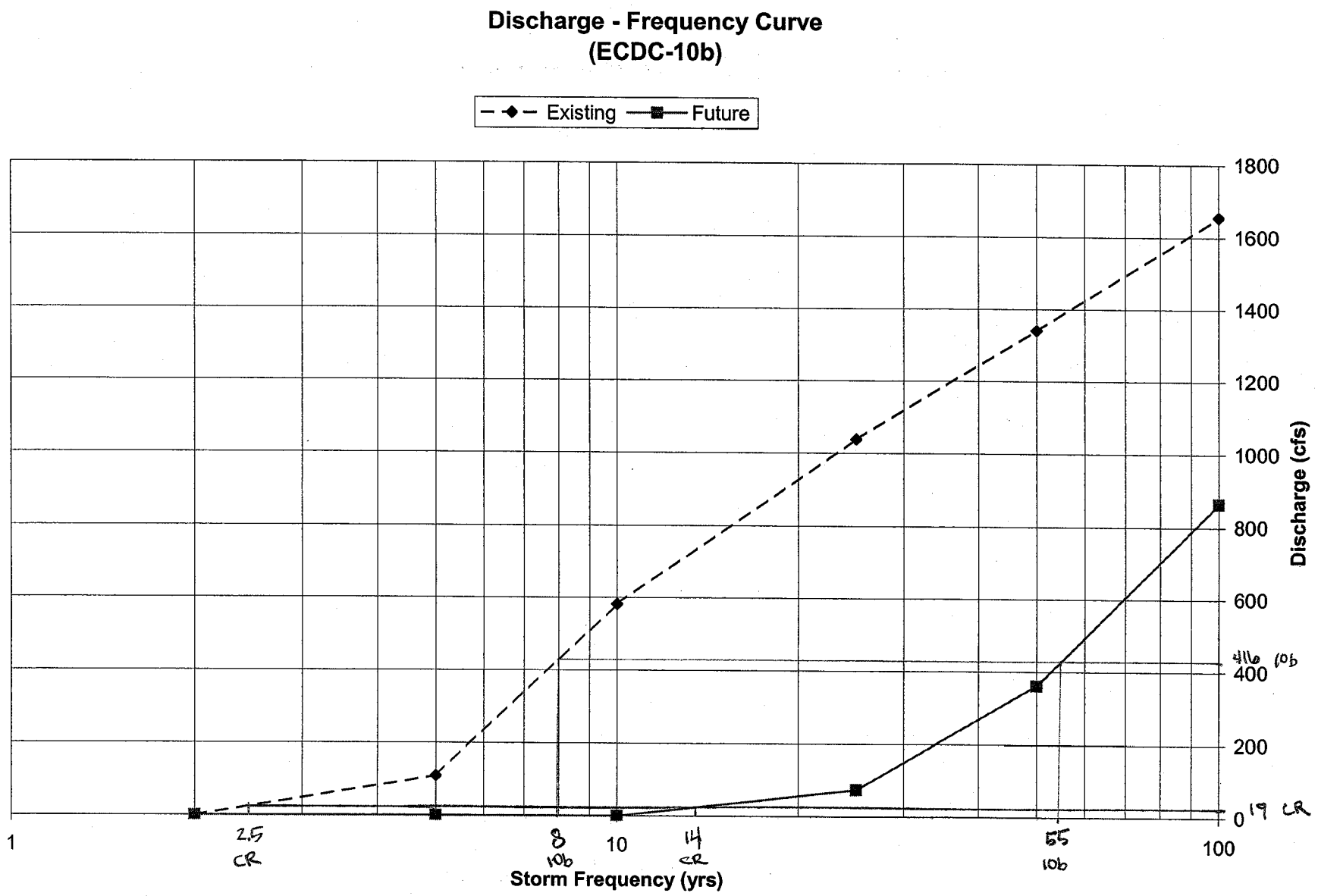

Discharge - Frequency Curve
(ECDC-9b)
Existing
Future
700
600
500
400
300
278
96
200
100
0
Discharge (cfs)
1
10
16
96
100
Storm Frequency (yrs)

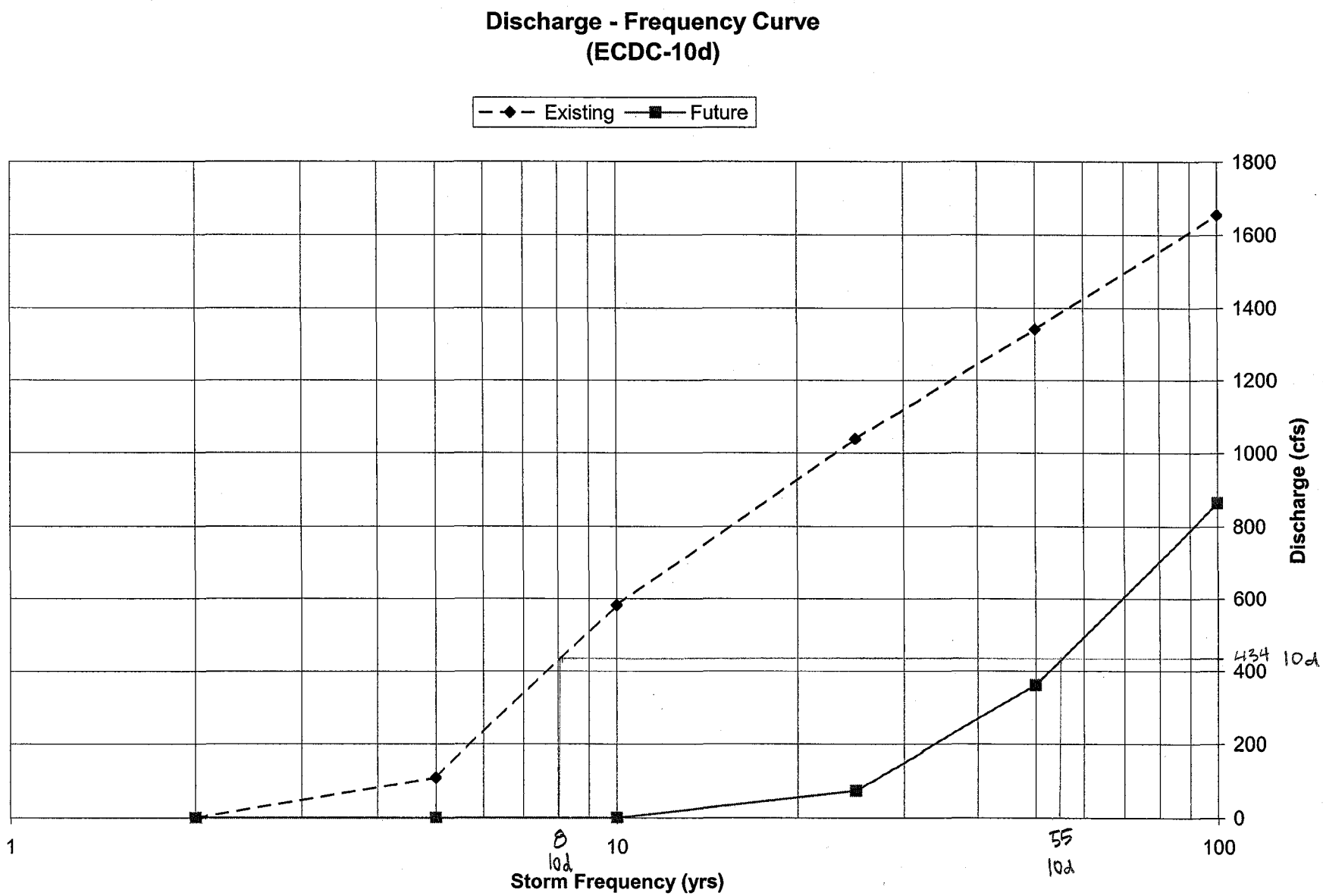
Discharge - Frequency Curve
(ECDC-9c)



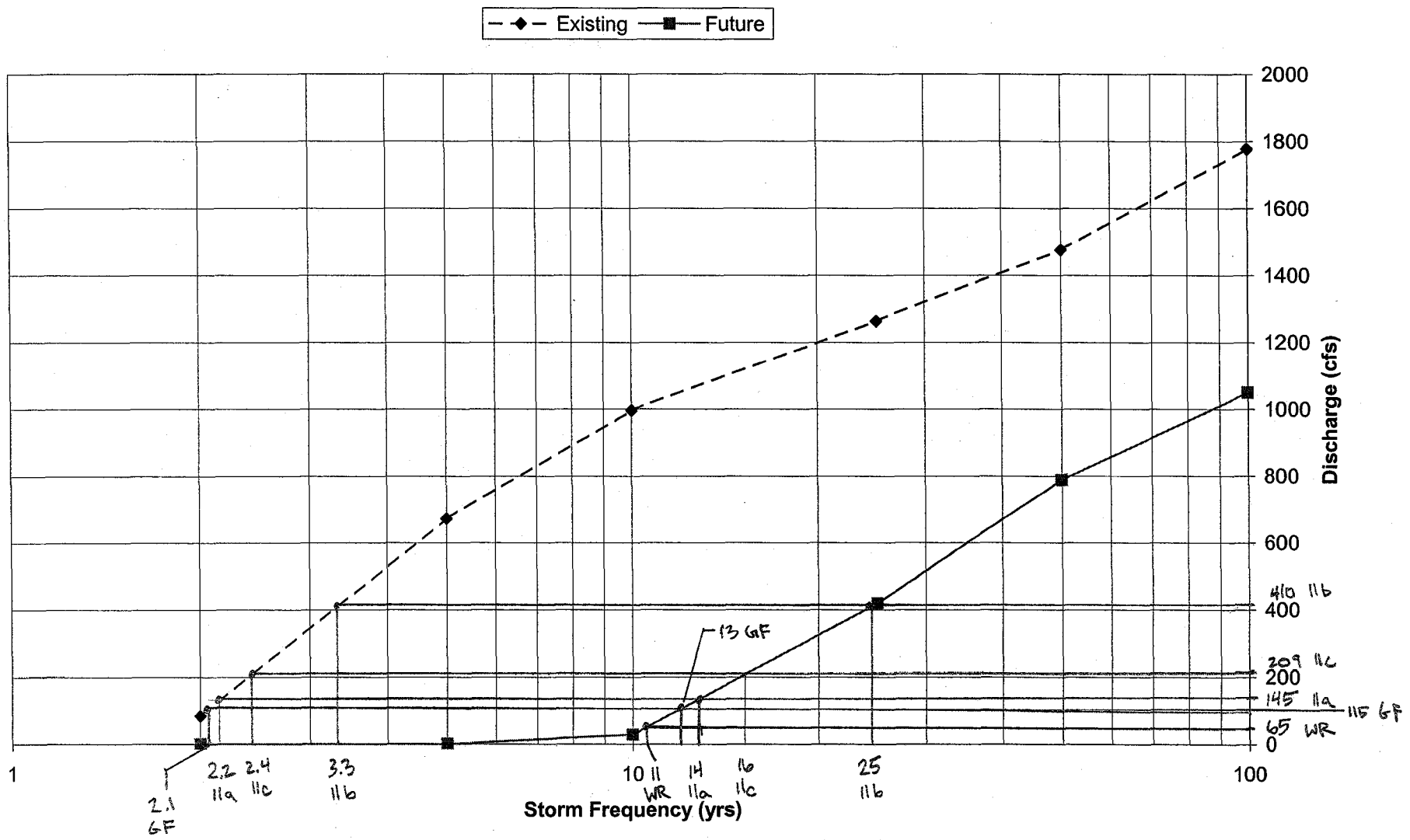

Discharge - Frequency Curve
(ECDC-10c)
Existing
Future
1800
1600
1400
1200
1000
800
600
405 10c
400
200
0
Discharge (cfs)
1
7.7
10c
10
54
10c
100
Storm Frequency (yrs)

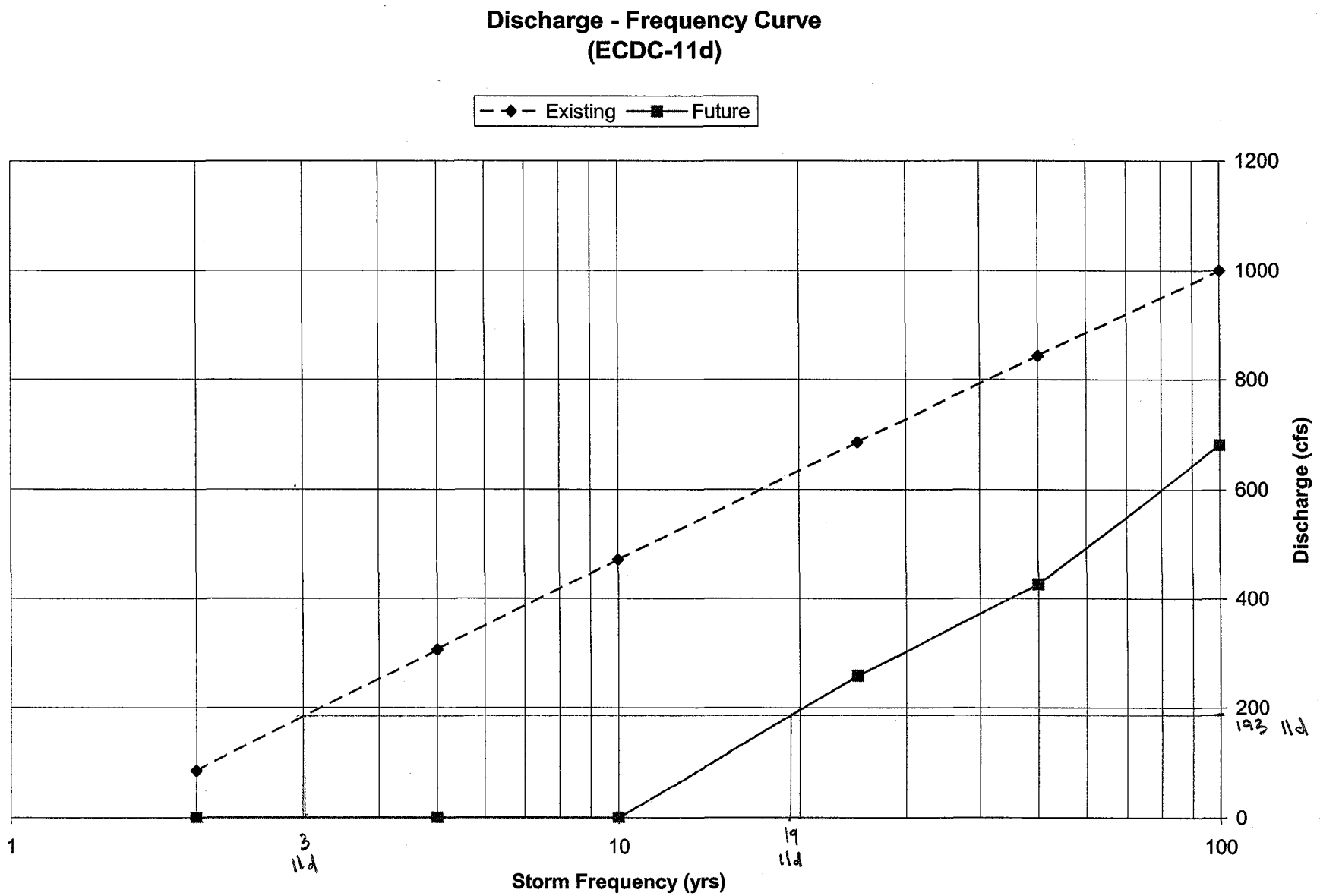

Discharge - Frequency Curve
(ECDC-10a)
Existing
Future
1800
1600
1400
1200
1000
800
600
494 10a
400
200
39 SR/E1
0 SR/E2
Discharge (cfs)
1
3
SR/E1
8.6
10a
10
18
SR/E1
58
10a
100
Storm Frequency (yrs)


Discharge - Frequency Curve
(ECDC-10b)
Existing
Future
1800
1600
1400
1200
1000
800
600
400
200
0
Discharge (cfs)
416 10b
19 CR
1
2.5
CR
8
10b
10
14
CR
55
10b
100
Storm Frequency (yrs)

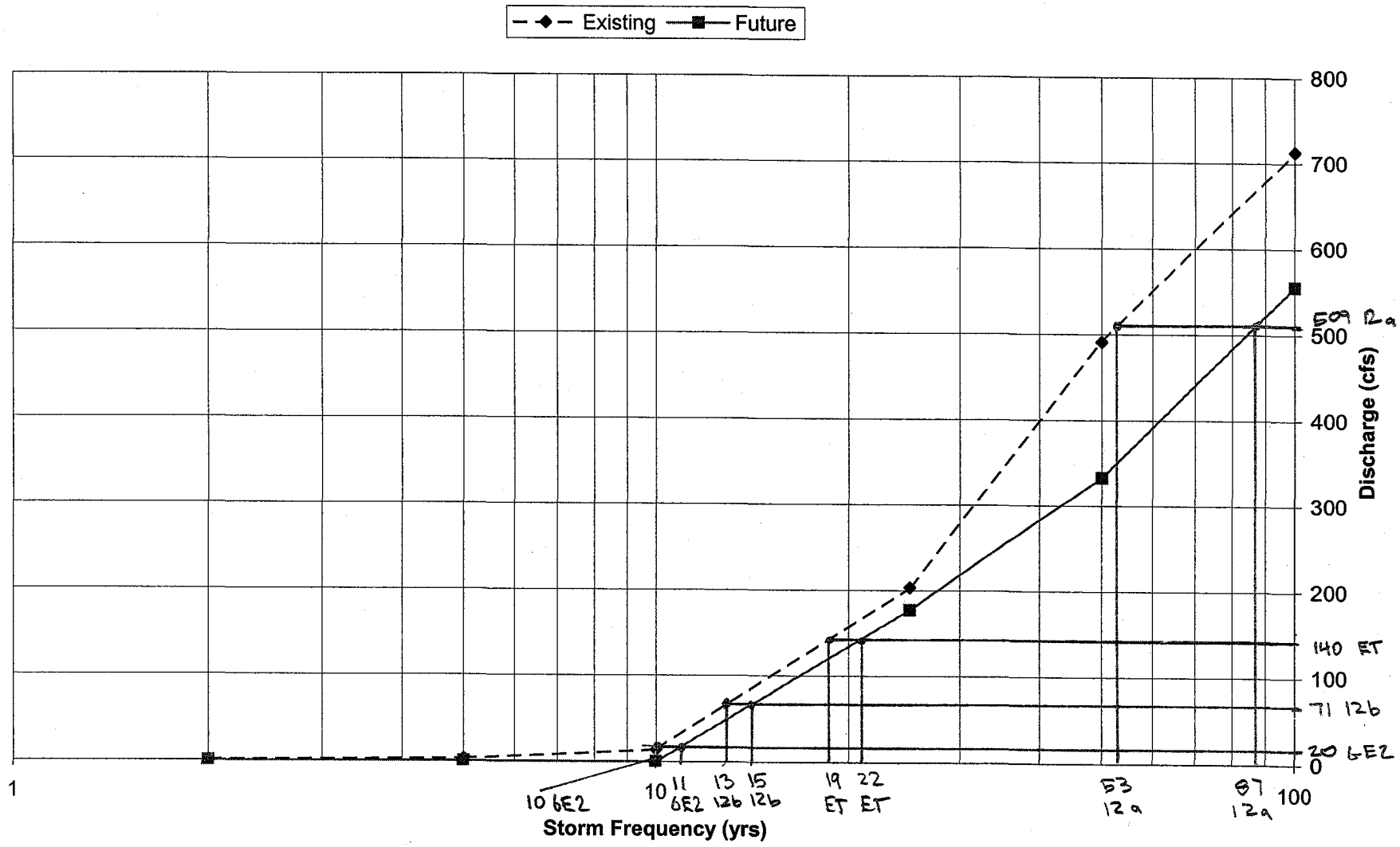

Discharge - Frequency Curve
(ECDC-10d)
Existing
Future
1800
1600
1400
1200
1000
800
600
434 10d
400
200
0
Discharge (cfs)
1
8
10d
10
55
10d
100
Storm Frequency (yrs)

Discharge - Frequency Curve
(ECDC-11a, 11b, 11c)

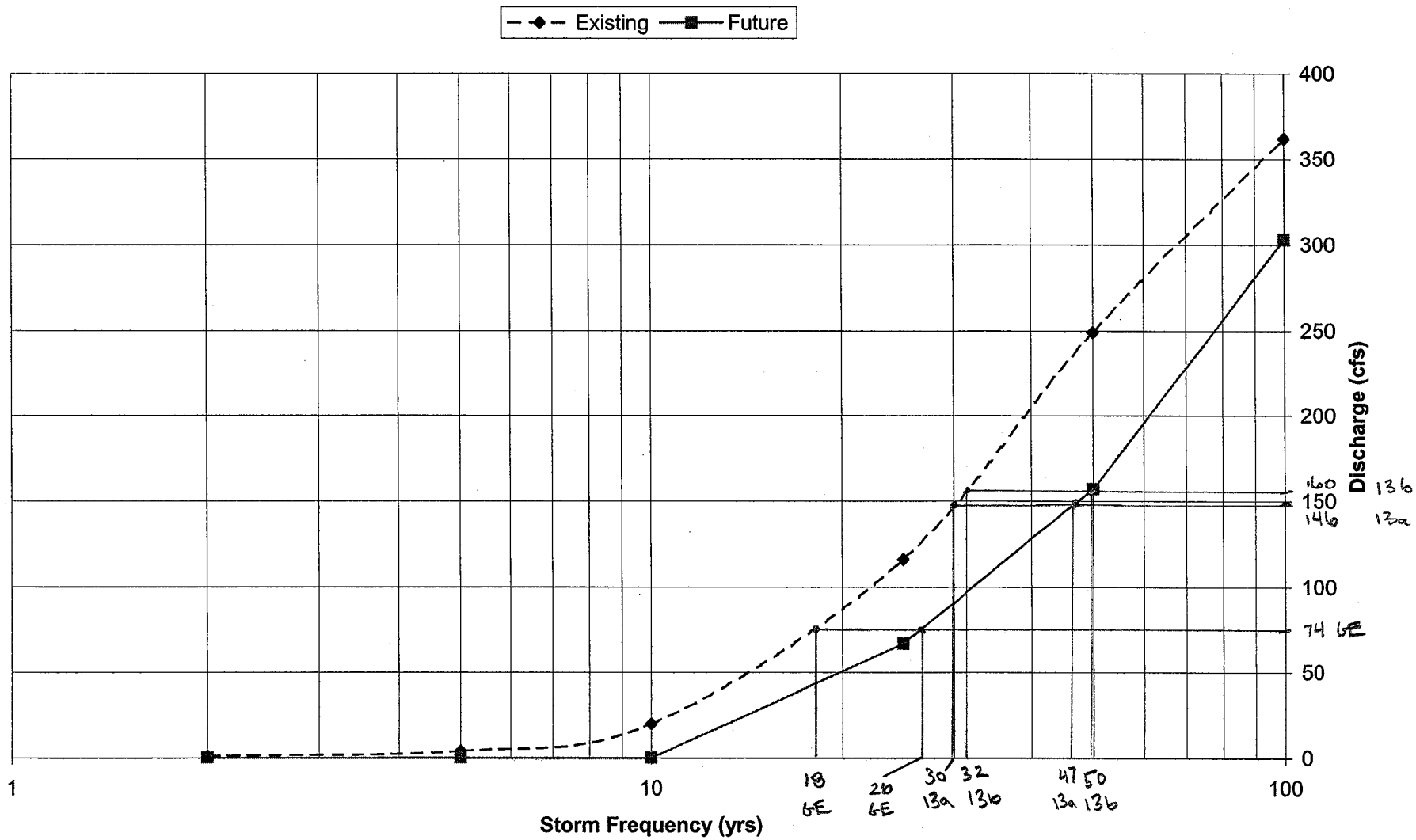


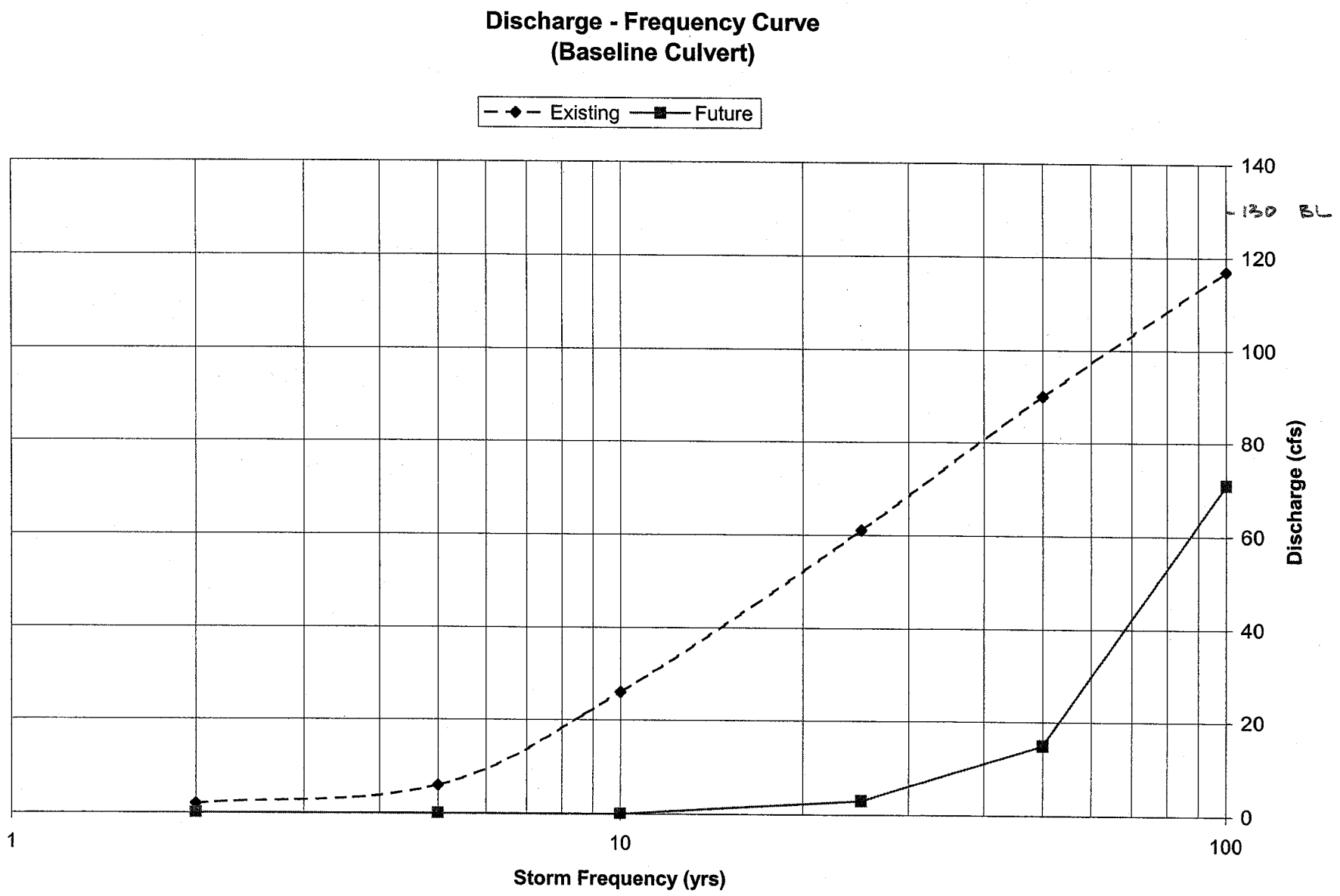

Discharge - Frequency Curve
(ECDC-11d)
Existing
Future
1200
1000
800
600
400
200
193 11d
0
Discharge (cfs)
1
3
11d
10
19
11d
100
Storm Frequency (yrs)

Discharge - Frequency Curve
(ECDC-12a & ECDC-12b)



Discharge - Frequency Curve
(ECDC-13a & ECDC13b)




Discharge - Frequency Curve
(Baseline Culvert)
Existing
Future
140
130 BL
120
100
80
60
40
20
0
Discharge (cfs)
1
10
100
Storm Frequency (yrs)

Appendix C
Channel & Culvert
Capacity Calculations

Current Tailwater Ditch Capacity Calculations

Channel ID	Maximum Tailwater Ditch Capacity (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Downstream Top of Chennel Elevation (ft)	Upstream Top of Channel Elevation (ft)	Length (ft.)	Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (HL)	Sideslope (H:1) Right (HR)	Area (sf.)	Perimeter (ft.)	Flow Top Width (ft)	Hydraulic Depth (ft)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Channel Topwidth (ft)
TW-ECDC-13b	161	1273.6	1274.0	1279.6	1280.0	1246	0.0003	E	0.0300	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.16	Sub	1.9	0.0	20.0
TW-ECDC-13a	146	1272.4	1273.6	1278.4	1279.6	4042	0.0003	E	0.0300	7.0	6.0	1	1	78.0	24.0	19.0	4.1	0.16	Sub	1.9	0.0	19.0
TW-ECDC-12b	71	1271.9	1272.1	1277.9	1278.1	2600	0.0001	E	0.0300	7.0	6.0	1	1	78.0	24.0	19.0	4.1	0.08	Sub	0.9	0.0	19.0
TW-ECDC-12a	509	1269.8	1271.7	1275.8	1277.7	2677	0.0007	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.52	Sub	6.1	0.0	20.0
TW-ECDC-11d	193	1267.5	1268.9	1273.5	1274.9	2883	0.0005	C	0.0150	8.0	6.0	0	0	48.0	20.0	8.0	6.0	0.29	Sub	4.0	0.0	8.0
TW-ECDC-11c	209	1267.0	1267.5	1273.0	1273.5	1040	0.0005	E	0.0300	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.21	Sub	2.5	0.0	20.0
TW-ECDC-11b	410	1266.4	1267.0	1272.4	1273.0	1181	0.0005	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.42	Sub	4.9	0.0	20.0
TW-ECDC-11a	145	1265.7	1265.8	1271.7	1271.8	525	0.0002	E	0.0300	10.0	6.0	1	1	96.0	27.0	22.0	4.4	0.13	Sub	1.5	0.0	22.0
TW-ECDC-10d	434	1265.1	1265.5	1271.1	1271.5	779	0.0005	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.44	Sub	5.2	0.0	20.0
TW-ECDC-10c	405	1264.9	1265.1	1270.9	1271.1	447	0.0005	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.41	Sub	4.8	0.0	20.0
TW-ECDC-10b	416	1263.9	1264.9	1269.9	1270.9	2055	0.0005	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.43	Sub	5.0	0.0	20.0
TW-ECDC-10a	494	1263.3	1263.8	1269.3	1269.8	772	0.0007	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.51	Sub	5.9	0.0	20.0
TW-ECDC-9c	129	1262.0	1262.5	1268.0	1268.5	2372	0.0002	E	0.0300	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.13	Sub	1.5	0.0	20.0
TW-ECDC-9b	278	1261.6	1261.8	1267.6	1267.8	950	0.0002	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.28	Sub	3.3	0.0	20.0
TW-ECDC-9a	272	1261.4	1261.6	1267.4	1267.6	1134	0.0002	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.28	Sub	3.2	0.0	20.0
TW-ECDC-8b	259	1261.0	1261.4	1267.0	1267.4	1764	0.0002	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.27	Sub	3.1	0.0	20.0
TW-ECDC-8a	225	1260.5	1260.9	1266.5	1266.9	2823	0.0001	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.23	Sub	2.7	0.0	20.0
TW-ECDC-7	233	1259.1	1259.6	1265.1	1265.6	2754	0.0002	E	0.0300	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.14	Sub	1.8	0.0	28.0
TW-ECDC-6	435	1258.5	1259.1	1264.5	1265.1	3396	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.27	Sub	3.3	0.0	28.0
TW-ECDC-5c	462	1258.2	1258.5	1264.2	1264.5	1273	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.28	Sub	3.5	0.0	28.0
TW-ECDC-5b	465	1257.9	1258.2	1263.9	1264.2	1410	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-5a	464	1257.3	1257.8	1263.3	1263.8	2325	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-4b	465	1256.6	1257.2	1262.6	1263.2	3164	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-4a	467	1256.2	1256.6	1262.2	1262.6	2197	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-3	465	1255.0	1256.1	1261.0	1262.1	5824	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-2b	466	1254.6	1255.0	1260.6	1261.0	1803	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-2a	465	1253.7	1254.6	1259.7	1260.6	4267	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-1a	458	1252.5	1253.7	1258.5	1259.7	5849	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.28	Sub	3.5	0.0	28.0

Current Tailwater Culvert Capacity Calculations

Location	ID	HEC-1 Flow I.D.	Comp. Capacity (cfs)	Length (ft.)		Inlet Inv. (ft.)		Outlet Inv. (ft.)	Slope (ft./ft.)	Material/ Barrel Type	Manning's "n" Value	Number of Barrels	Culvert Dia./ Height	Unit	Width ft)	Barrel/ Material	Entrance (Wingwall, Headwall or Project)	Tailwater (channel) Depth (ft.)	Allowable HW depth (ft)	Allowable HW (elev.)	Computed Headwater	Computed HW/D	Control
Baseline	BL	HC2	130	157		1275.4	#	1274.0	0.0088	C	0.0120	2	48	in.		RCP	headwall	6.0	6.0	1281.4	5.39	1.35	TW
Guadalupe	GE	HC3	74	64	#	1272.4	#	1272.1	0.0055	C	0.0120	2	42	in.		RCP	headwall	6.0	6.0	1278.4	6.00	1.71	TW
1/2 Mi S/Guadalupe	GE2	HC4	20	18		1271.9		1271.7	0.0072	C	0.0120	1	42	in.		RCP	headwall	6.0	6.0	1277.9	5.96	1.70	TW
Elliot	ET	HC4	140	103		1269.8		1268.9	0.0079	C	0.0120	1	66	in.		RCP	headwall	6.0	6.0	1275.8	5.99	1.09	TW
Greenfield	GF	HC6	115	162	#	1266.4	#	1265.8	0.0040	C	0.0120	2	48	in.		RCP	headwall	6.0	6.0	1272.4	5.96	1.49	TW
Warner	WR	HC6	65	57	#	1265.7	#	1265.5	0.0028	C	0.0120	2	48	in.		RCP	headwall	6.0	6.0	1271.7	5.99	1.50	TW
Crossroads Park	CR	HC7A	19	21		1263.9		1263.8	0.0019	C	0.0120	1	54	in.		RCP	headwall	6.0	6.0	1269.9	5.99	1.33	TW
UPRR 48"	SR/E1	HC7A	39	61		1262.7		1262.5	0.0036	C	0.0120	1	48	in.		RCP	headwall	6.0	6.6	1269.3	6.00	1.50	TW
UPRR 36"	SR/E2	HC7A	0	24		1264.4		1264.2	0.0075	C	0.0120	1	36	in.		RCP	headwall	6.0	4.9	1269.3	5.82	1.94	TW
Ray Road	RY/E	HC29	65	106	#	1262.0	#	1261.8	0.0018	C	0.0120	2	48	in.		RCP	headwall	6.0	6.0	1268.0	5.98	1.50	TW
Val Vista	VV/E	HC30	165	133		1261.1		1260.9	0.0014	C	0.0120	1	5.5	ft.	12	RCBC	Wingwall	6.0	6.0	1267.0	5.98	1.09	TW
Williams Field	WF/E	HC30	160	135		1260.5		1259.6	0.0064	C	0.0120	1	72	in.		RCP	headwall	6.0	6.0	1266.5	5.89	0.98	TW
Pecos	PS	HC31A	10	84		1258.5		1258.5	0.0005	C	0.0120	1	48	in.		RCP	headwall	6.0	6.0	1264.5	5.98	1.49	TW
1/4 Mi S/Pecos	PS2	HC31A	10	58		1258.2		1258.2	0.0005	C	0.0120	1	48	in.		RCP	headwall	6.0	6.0	1264.2	5.98	1.50	TW
Lindsay	LY	HC31A	145	293		1257.9		1257.8	0.0005	C	0.0120	1	5.5	ft.	12	RCBC	Wingwall	6.0	6.0	1263.9	5.99	1.09	TW
Germann Road	GM/E	HC34	40	96		1257.3		1257.2	0.0005	C	0.0120	1	72	in.		RCP	headwall	6.0	6.0	1263.3	5.99	1.00	TW
Queen Creek	QC/E	HC35A	30	56		1256.2		1256.1	0.0005	C	0.0120	1	72	in.		RCP	headwall	6.0	6.0	1262.2	5.99	1.00	TW
Ocotillo	OO/E	OC2	30	56		1255.0		1255.0	0.0005	C	0.0120	1	72	in.		RCP	headwall	6.0	6.0	1261.0	5.99	1.00	TW
Gilbert	GT/E	OC2	35	73		1254.6		1254.6	0.0005	C	0.0120	1	72	in.		RCP	headwall	6.0	6.0	1260.6	5.99	1.00	TW
Chandler Heights	CH/E	OC2	35	72		1253.7		1253.7	0.0006	C	0.0120	1	72	in.		RCP	headwall	6.0	6.0	1259.7	5.99	1.00	TW

# Indicates that Invert elevation value is an average of two or more pipe inverts.

Appendix D
Improved Channel & Culvert Capacity Calculations

RWCD Tailwater Ditch - Improved - 5 yr

Channel ID	Maximum Tailwater Ditch Capacity (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Downstream Top of Chennel Elevation (ft)	Upstream Top of Channel Elevation (ft)	Length (ft.)	Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (HL)	Sideslope (H:1) Right (HR)	Area (sf.)	Perimeter (ft.)	Flow Top Width (ft)	Hydraulic Depth (ft)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Channel Topwidth (ft)
TW-ECDC-13b	161	1273.6	1274.0	1279.6	1280.0	1246	0.0003	E	0.0300	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.16	Sub	1.9	0.0	20.0
TW-ECDC-13a	146	1272.4	1273.6	1278.4	1279.6	4042	0.0003	E	0.0300	7.0	6.0	1	1	78.0	24.0	19.0	4.1	0.16	Sub	1.9	0.0	19.0
TW-ECDC-12b	71	1271.9	1272.1	1277.9	1278.1	2600	0.0001	E	0.0300	7.0	6.0	1	1	78.0	24.0	19.0	4.1	0.08	Sub	0.9	0.0	19.0
TW-ECDC-12a	509	1269.8	1271.7	1275.8	1277.7	2677	0.0007	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.52	Sub	6.1	0.0	20.0
TW-ECDC-11d	310	1267.5	1268.9	1273.5	1274.9	2883	0.0005	C	0.0150	11.3	6.0	0	0	67.8	23.3	11.3	6.0	0.33	Sub	4.6	0.0	11.3
TW-ECDC-11c	680	1267.0	1267.5	1273.0	1273.5	1040	0.0005	C	0.0150	14.6	6.0	1	1	123.6	31.6	26.6	4.6	0.45	Sub	5.5	0.0	26.6
TW-ECDC-11b	680	1266.4	1267.0	1272.4	1273.0	1181	0.0005	C	0.0150	14.9	6.0	1	1	125.4	31.9	26.9	4.7	0.44	Sub	5.4	0.0	26.9
TW-ECDC-11a	680	1265.7	1265.8	1271.7	1271.8	525	0.0002	C	0.0150	26.2	6.0	1	1	193.0	43.1	38.2	5.1	0.28	Sub	3.5	0.0	38.2
TW-ECDC-10d	434	1265.1	1265.5	1271.1	1271.5	779	0.0005	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.44	Sub	5.2	0.0	20.0
TW-ECDC-10c	405	1264.9	1265.1	1270.9	1271.1	447	0.0005	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.41	Sub	4.8	0.0	20.0
TW-ECDC-10b	416	1263.9	1264.9	1269.9	1270.9	2055	0.0005	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.43	Sub	5.0	0.0	20.0
TW-ECDC-10a	494	1263.3	1263.8	1269.3	1269.8	772	0.0007	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.51	Sub	5.9	0.0	20.0
TW-ECDC-9c	257	1262.0	1262.5	1268.0	1268.5	2372	0.0002	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.26	Sub	3.1	0.0	20.0
TW-ECDC-9b	278	1261.6	1261.8	1267.6	1267.8	950	0.0002	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.28	Sub	3.3	0.0	20.0
TW-ECDC-9a	272	1261.4	1261.6	1267.4	1267.6	1134	0.0002	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.28	Sub	3.2	0.0	20.0
TW-ECDC-8b	259	1261.0	1261.4	1267.0	1267.4	1764	0.0002	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.27	Sub	3.1	0.0	20.0
TW-ECDC-8a	225	1260.5	1260.9	1266.5	1266.9	2823	0.0001	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.23	Sub	2.7	0.0	20.0
TW-ECDC-7	233	1259.1	1259.6	1265.1	1265.6	2754	0.0002	E	0.0300	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.14	Sub	1.8	0.0	28.0
TW-ECDC-6	435	1258.5	1259.1	1264.5	1265.1	3396	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.27	Sub	3.3	0.0	28.0
TW-ECDC-5c	462	1258.2	1258.5	1264.2	1264.5	1273	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.28	Sub	3.5	0.0	28.0
TW-ECDC-5b	465	1257.9	1258.2	1263.9	1264.2	1410	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-5a	464	1257.3	1257.8	1263.3	1263.8	2325	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-4b	465	1256.6	1257.2	1262.6	1263.2	3164	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-4a	467	1256.2	1256.6	1262.2	1262.6	2197	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-3	465	1255.0	1256.1	1261.0	1262.1	5824	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-2b	466	1254.6	1255.0	1260.6	1261.0	1803	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-2a	465	1253.7	1254.6	1259.7	1260.6	4267	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-1a	458	1252.5	1253.7	1258.5	1259.7	5849	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.28	Sub	3.5	0.0	28.0

Indicates channels for which survey data is not available

Indicates channels that have been improved to satisfy 5 yr condition

RWCD Tailwater Ditch - Improved - 10 yr

Channel ID	Maximum Tailwater Ditch Capacity (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Downstream Top of Chennel Elevation (ft)	Upstream Top of Channel Elevation (ft)	Length (ft.)	Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (HL)	Sideslope (H:1) Right (HR)	Area (sf.)	Perimeter (ft.)	Flow Top Width (ft)	Hydraulic Depth (ft)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Channel Topwidth (ft)
TW-ECDC-13b	161	1273.6	1274.0	1279.6	1280.0	1246	0.0003	E	0.0300	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.16	Sub	1.9	0.0	20.0
TW-ECDC-13a	146	1272.4	1273.6	1278.4	1279.6	4042	0.0003	E	0.0300	7.0	6.0	1	1	78.0	24.0	19.0	4.1	0.16	Sub	1.9	0.0	19.0
TW-ECDC-12b	71	1271.9	1272.1	1277.9	1278.1	2600	0.0001	E	0.0300	7.0	6.0	1	1	78.0	24.0	19.0	4.1	0.08	Sub	0.9	0.0	19.0
TW-ECDC-12a	509	1269.8	1271.7	1275.8	1277.7	2677	0.0007	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.52	Sub	6.1	0.0	20.0
TW-ECDC-11d	480	1267.5	1268.9	1273.5	1274.9	2883	0.0005	C	0.0150	15.7	6.0	0	0	94.5	27.7	15.7	6.0	0.37	Sub	5.1	0.0	15.7
TW-ECDC-11c	1000	1267.0	1267.5	1273.0	1273.5	1040	0.0005	C	0.0150	22.3	6.0	1	1	170.0	39.3	34.3	5.0	0.47	Sub	5.9	0.0	34.3
TW-ECDC-11b	1000	1266.4	1267.0	1272.4	1273.0	1181	0.0005	C	0.0150	22.8	6.0	1	1	172.6	39.7	34.8	5.0	0.46	Sub	5.8	0.0	34.8
TW-ECDC-11a	1000	1265.7	1265.8	1271.7	1271.8	525	0.0002	C	0.0150	39.0	6.0	1	1	270.0	56.0	51.0	5.3	0.28	Sub	3.7	0.0	51.0
TW-ECDC-10d	580	1265.1	1265.5	1271.1	1271.5	779	0.0005	C	0.0150	11.6	6.0	1	1	105.5	28.6	23.6	4.5	0.46	Sub	5.5	0.0	23.6
TW-ECDC-10c	580	1264.9	1265.1	1270.9	1271.1	447	0.0005	C	0.0150	12.6	6.0	1	1	111.5	29.5	24.6	4.5	0.43	Sub	5.2	0.0	24.6
TW-ECDC-10b	580	1263.9	1264.9	1269.9	1270.9	2055	0.0005	C	0.0150	12.2	6.0	1	1	109.0	29.1	24.2	4.5	0.44	Sub	5.3	0.0	24.2
TW-ECDC-10a	580	1263.3	1263.8	1269.3	1269.8	772	0.0007	C	0.0150	9.9	6.0	1	1	95.2	26.8	21.9	4.4	0.51	Sub	6.1	0.0	21.9
TW-ECDC-9c	257	1262.0	1262.5	1268.0	1268.5	2372	0.0002	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.26	Sub	3.1	0.0	20.0
TW-ECDC-9b	278	1261.6	1261.8	1267.6	1267.8	950	0.0002	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.28	Sub	3.3	0.0	20.0
TW-ECDC-9a	272	1261.4	1261.6	1267.4	1267.6	1134	0.0002	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.28	Sub	3.2	0.0	20.0
TW-ECDC-8b	259	1261.0	1261.4	1267.0	1267.4	1764	0.0002	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.27	Sub	3.1	0.0	20.0
TW-ECDC-8a	225	1260.5	1260.9	1266.5	1266.9	2823	0.0001	C	0.0150	8.0	6.0	1	1	84.0	25.0	20.0	4.2	0.23	Sub	2.7	0.0	20.0
TW-ECDC-7	233	1259.1	1259.6	1265.1	1265.6	2754	0.0002	E	0.0300	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.14	Sub	1.8	0.0	28.0
TW-ECDC-6	435	1258.5	1259.1	1264.5	1265.1	3396	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.27	Sub	3.3	0.0	28.0
TW-ECDC-5c	462	1258.2	1258.5	1264.2	1264.5	1273	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.28	Sub	3.5	0.0	28.0
TW-ECDC-5b	465	1257.9	1258.2	1263.9	1264.2	1410	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-5a	464	1257.3	1257.8	1263.3	1263.8	2325	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-4b	465	1256.6	1257.2	1262.6	1263.2	3164	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-4a	467	1256.2	1256.6	1262.2	1262.6	2197	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-3	465	1255.0	1256.1	1261.0	1262.1	5824	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-2b	466	1254.6	1255.0	1260.6	1261.0	1803	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-2a	465	1253.7	1254.6	1259.7	1260.6	4267	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.29	Sub	3.5	0.0	28.0
TW-ECDC-1a	458	1252.5	1253.7	1258.5	1259.7	5849	0.0002	C	0.0150	16.0	6.0	1	1	132.0	33.0	28.0	4.7	0.28	Sub	3.5	0.0	28.0

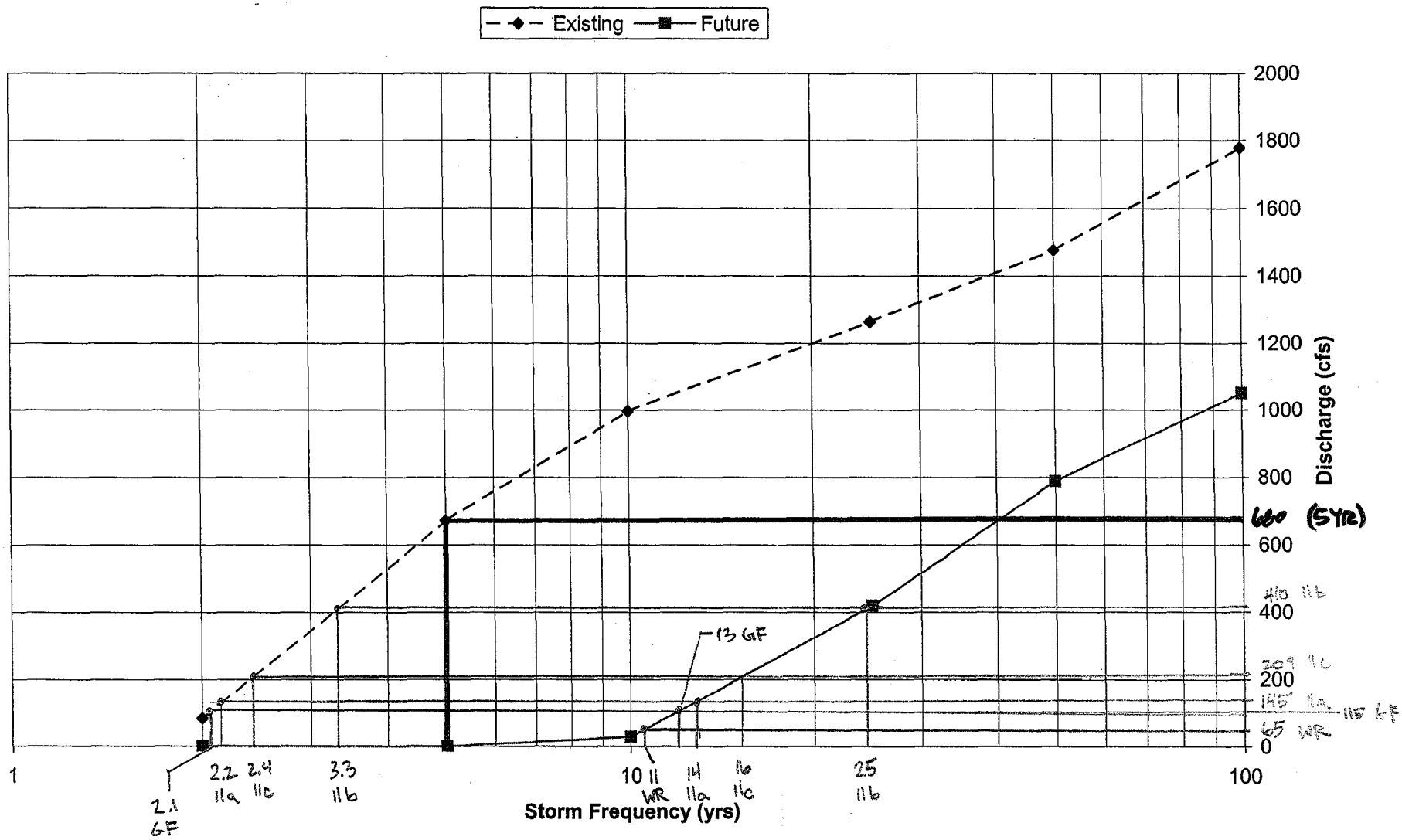
Indicates channels for which survey data is not available

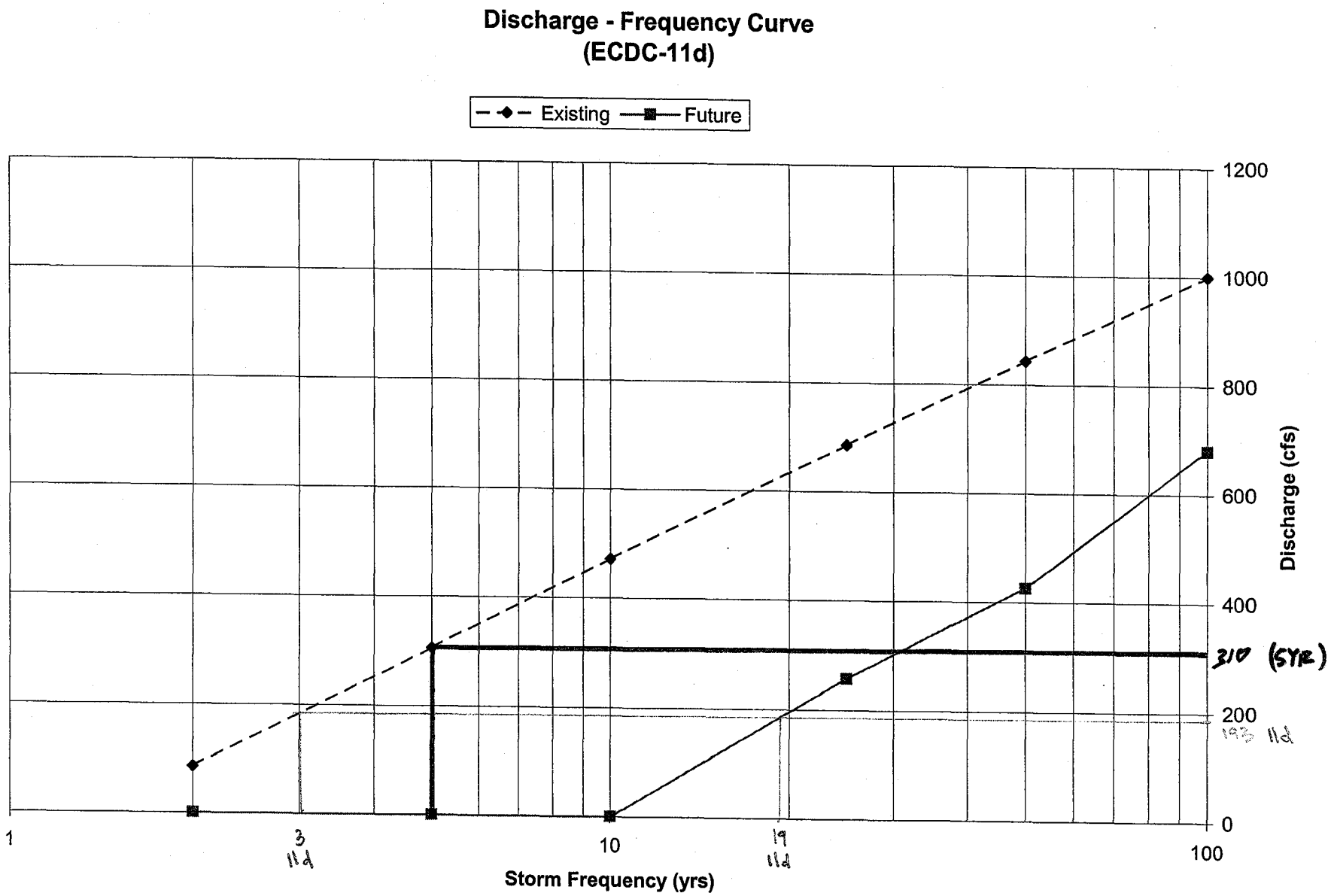
Indicates channels that have been improved to satisfy 10 yr condition

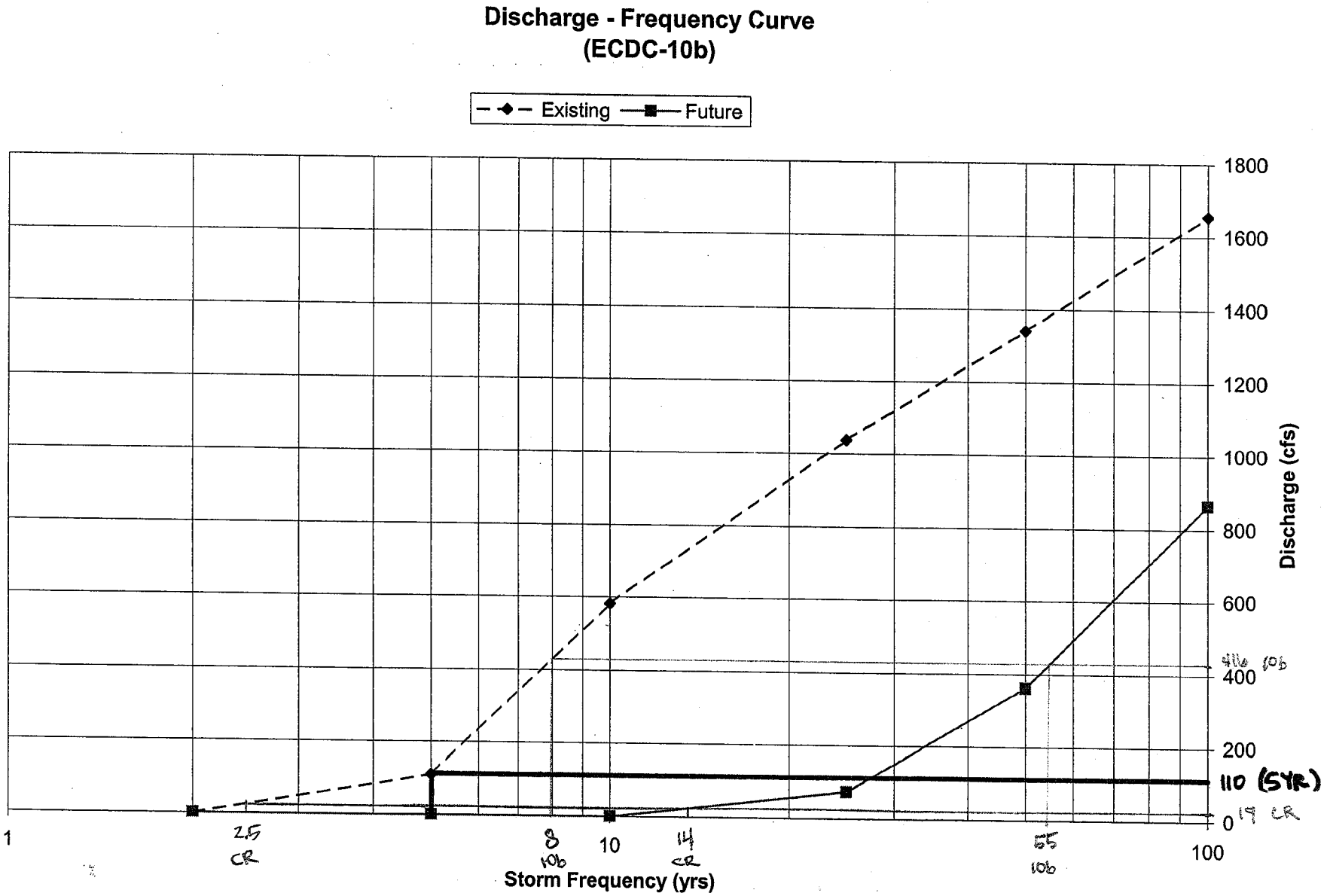
Location	ID	HEC-1 Flow I.D.	Comp. Capacity (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Material/ Barrel Type	Manning's "n" Value	Number of Barrels	Culvert Dia./ Height	Unit	Width ft)	Barrel/ Material	Entrance (Wingwall, Headwall or Project)	Tailwater (channel) Depth (ft.)	Allowable HW depth (ft)	Allowable HW (elev.)	Computed Headwater	Computed HW/D	Control	Length of Pipe/ Box Culvert (ft.)
RWCD Tailwater Ditch - Improved - 5 yr																						
Greenfield	GF	HC6	680	162	# 1266.4	# 1265.8	0.0040	C	0.0120	3	5	ft.	10	RCBC	Wingwall	6.0	6.0	1272.4	5.91	1.18	TW	162
Warner	WR	HC6	680	57	# 1265.7	# 1265.5	0.0028	C	0.0120	5	5	ft.	10	RCBC	Wingwall	6.0	6.0	1271.7	6.01	1.20	TW	57
Crossroads Park	CR	HC7A	110	21	1263.9	1263.8	0.0019	C	0.0120	2	5	ft.	8	RCBC	Wingwall	6.0	6.0	1269.9	6.00	1.20	TW	21
UPRR 48"	SR/E1	HC7A	120	61	1262.7	1262.5	0.0036	C	0.0120	3	48	in.		RCP	headwall	6.0	6.6	1269.3	6.01	1.50	TW	61
Ray Road	RY/E	HC29	135	106	# 1262.0	# 1261.8	0.0018	C	0.0120	4	48	in.		RCP	headwall	6.0	6.0	1268.0	5.99	1.50	TW	106
Pecos	PS	HC31A	55	84	1258.5	1258.5	0.0005	C	0.0120	3	48	in.		RCP	headwall	6.0	6.0	1264.5	6.01	1.50	TW	84
RWCD Tailwater Ditch - Improved - 10 yr																						
Greenfield	GF	HC6	1000	162	# 1266.4	# 1265.8	0.0040	C	0.0120	5	5	ft.	10	RCBC	Wingwall	6.0	6.0	1272.4	5.78	1.16	TW	162
Warner	WR	HC6	1000	57	# 1265.7	# 1265.5	0.0028	C	0.0120	7	5	ft.	12	RCBC	Wingwall	6.0	6.0	1271.7	5.97	1.19	TW	57
Crossroads Park	CR	HC7A	580	21	1263.9	1263.8	0.0019	C	0.0120	7	5	ft.	12	RCBC	Wingwall	6.0	6.0	1269.9	6.00	1.20	TW	21
UPRR 48"	SR/E1	HC7A	580	61	1262.7	1262.5	0.0036	C	0.0120	3	5	ft.	12	RCBC	Wingwall	6.0	6.6	1269.3	6.02	1.20	TW	61
Ray Road	RY/E	HC29	147	106	# 1262.0	# 1261.8	0.0018	C	0.0120	5	48	in.		RCP	headwall	6.0	6.0	1268.0	5.95	1.49	TW	106
Val Vista	VV/E	HC30	180	133	1261.1	1260.9	0.0014	C	0.0120	2	5.5	ft.	12	RCBC	Wingwall	6.0	6.0	1267.0	5.87	1.07	TW	133
Williams Field	WF/E	HC30	180	135	1260.5	1259.6	0.0064	C	0.0120	2	72	in.		RCP	headwall	6.0	6.0	1266.5	5.37	0.90	TW	135
Pecos	PS	HC31A	70	84	1258.5	1258.5	0.0005	C	0.0120	4	48	in.		RCP	headwall	6.0	6.0	1264.5	6.01	1.50	TW	84
1/4 Mi S/Pecos	PS2	HC31A	65	58	1258.2	1258.2	0.0005	C	0.0120	4	48	in.		RCP	headwall	6.0	6.0	1264.2	6.01	1.50	TW	58
Germann Road	GM/E	HC34	65	96	1257.3	1257.2	0.0005	C	0.0120	2	72	in.		RCP	headwall	6.0	6.0	1263.3	5.98	1.00	TW	96

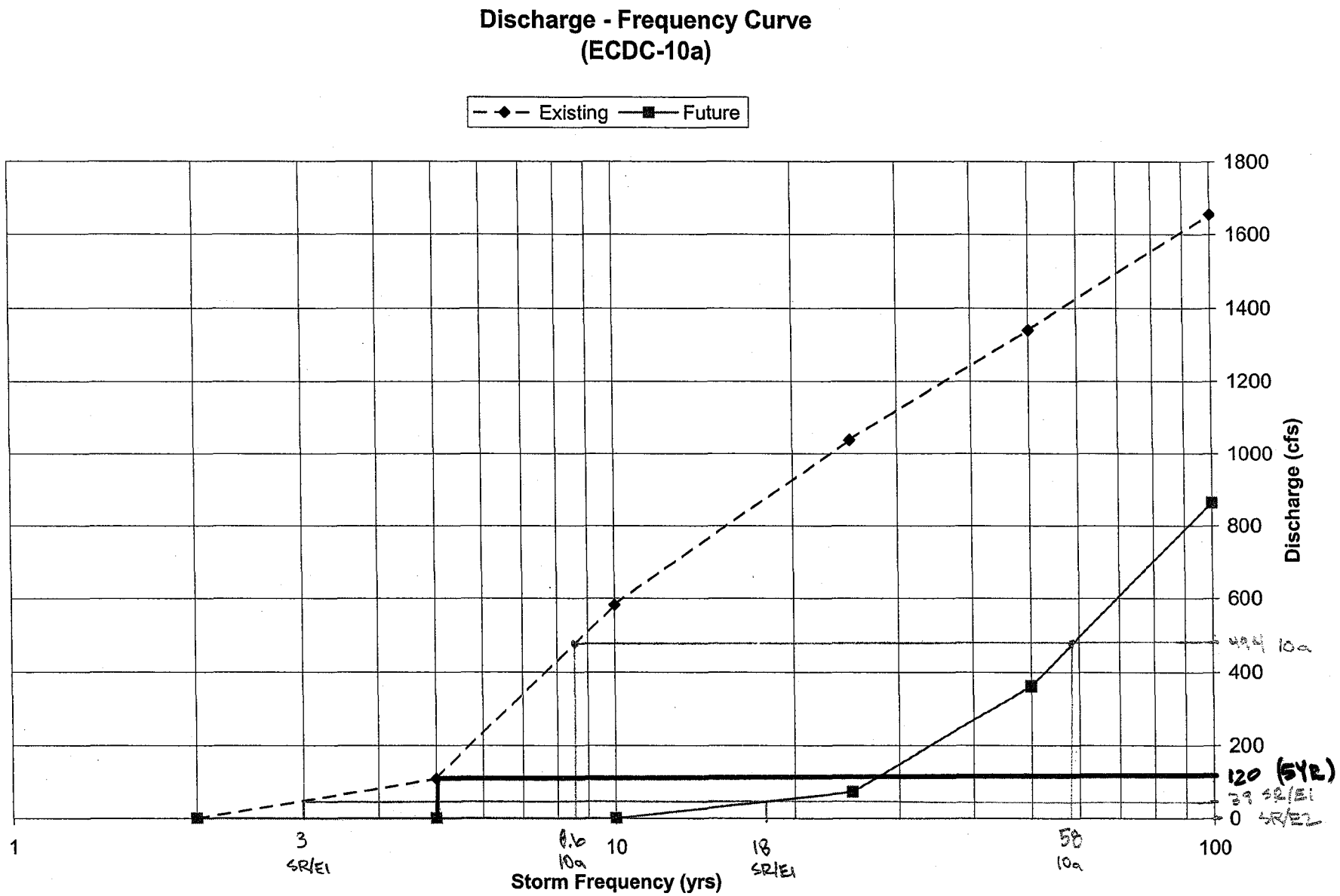
# Indicates that Invert elevation value is an average of two or more pipe inverts.

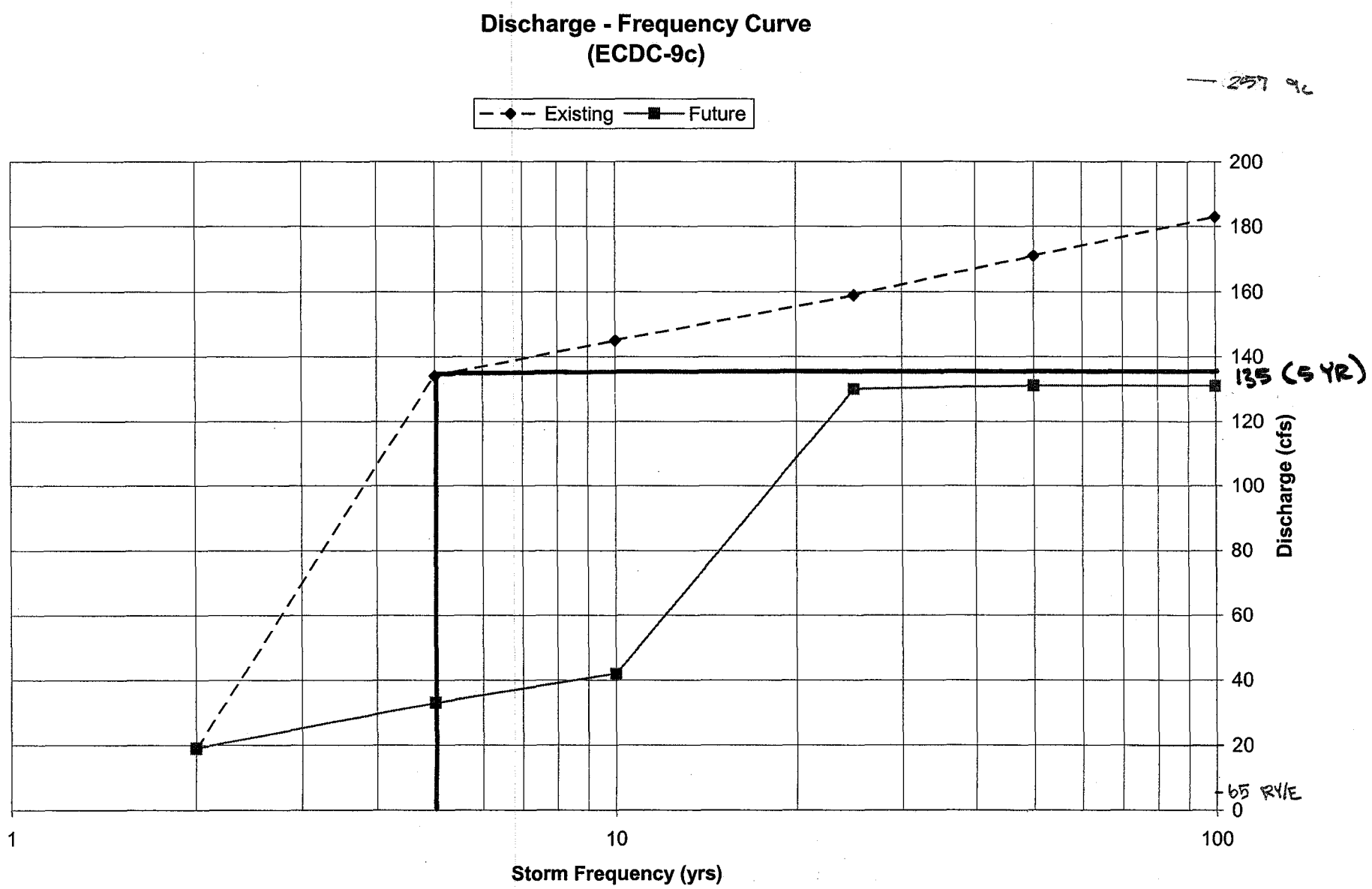
Discharge - Frequency Curve
(ECDC-11a, 11b, 11c)

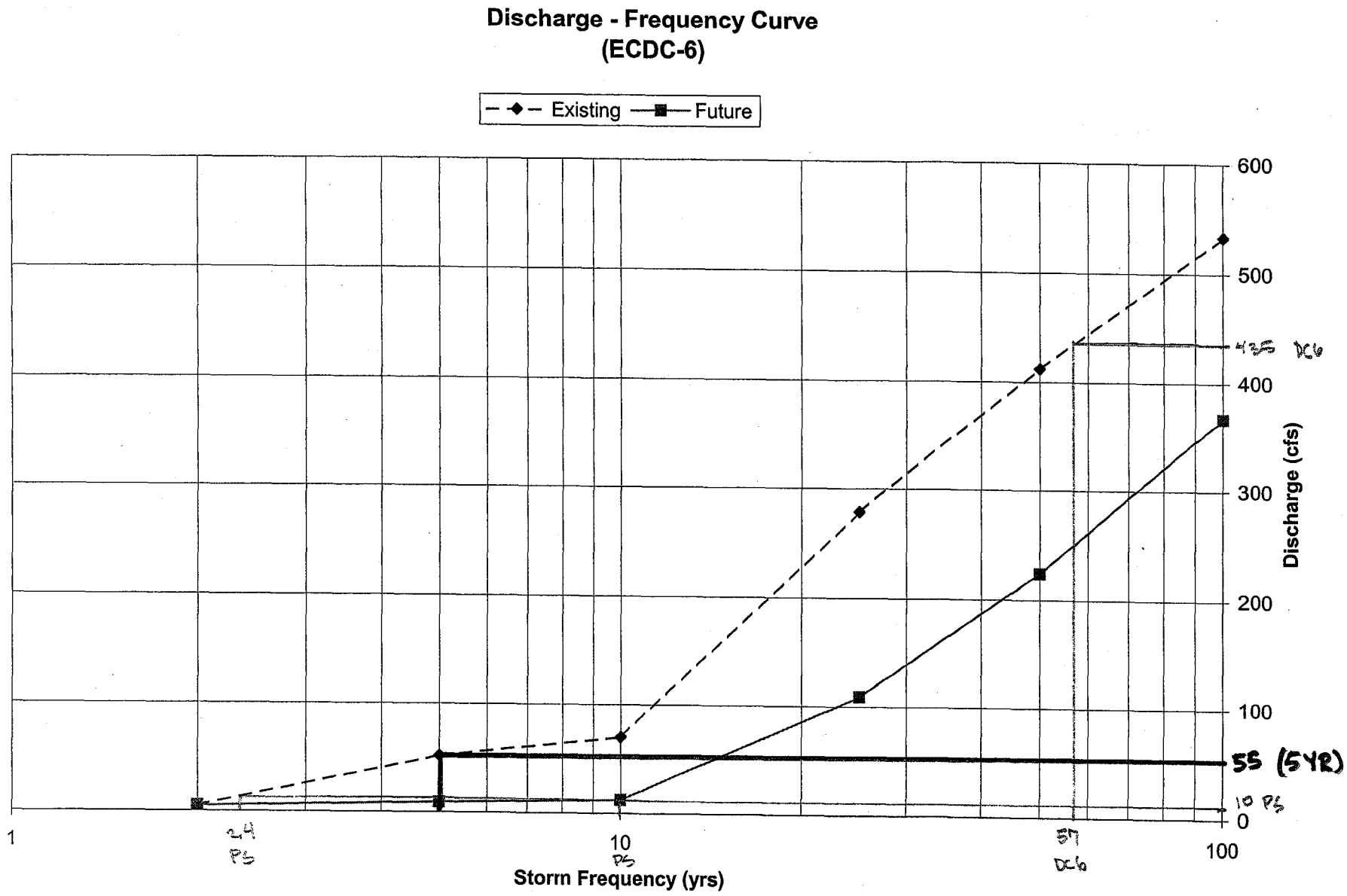



Discharge - Frequency Curve
(ECDC-11d)
Existing
Future
1200
1000
800
600
400
310 (5YR)
200
193 11d
0
Discharge (cfs)
1
3
11d
10
19
11d
100
Storm Frequency (yrs)

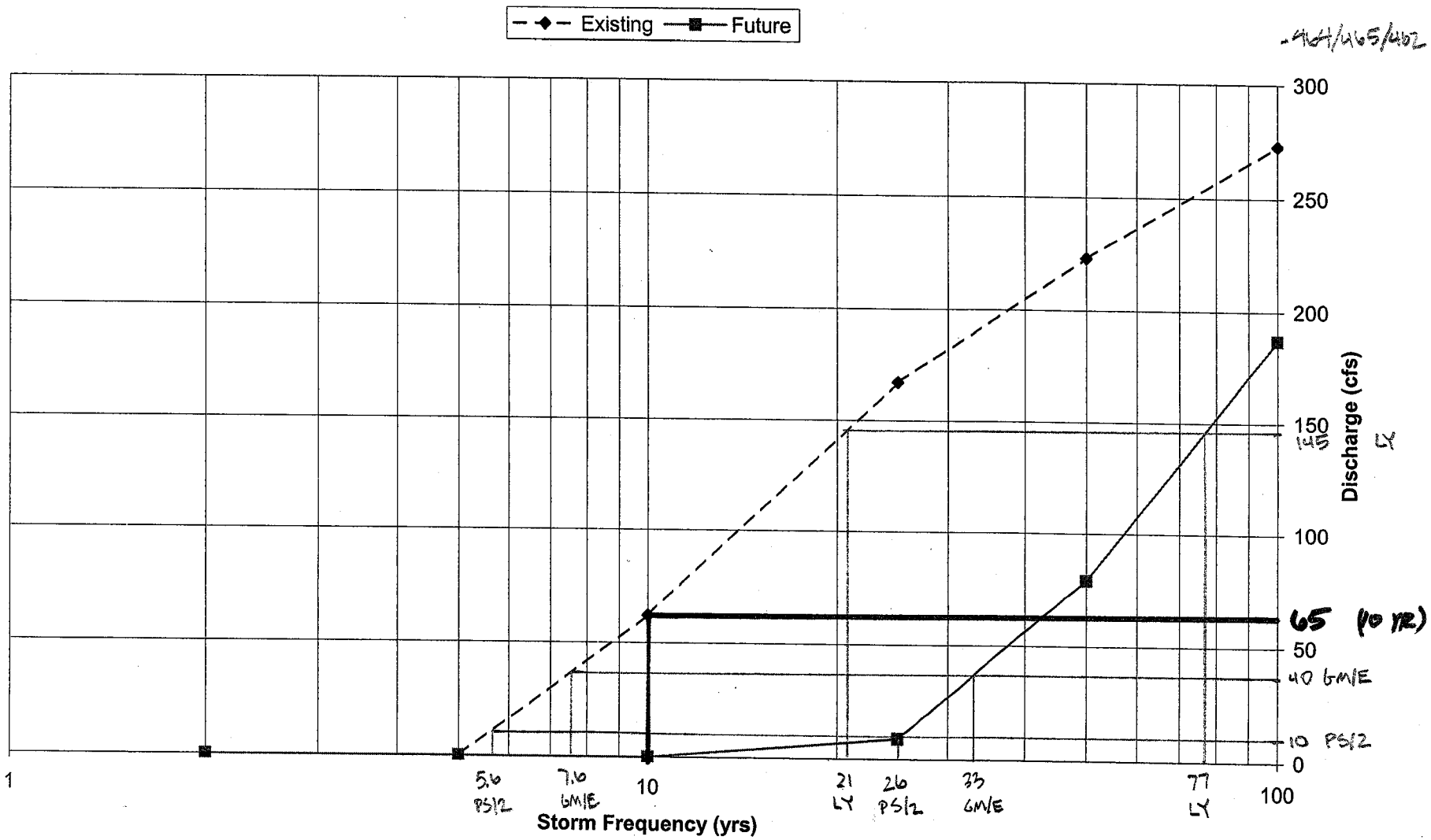

Discharge - Frequency Curve
(ECDC-10b)
Existing
Future
1800
1600
1400
1200
1000
800
600
400
200
0
Discharge (cfs)
1
10
100
Storm Frequency (yrs)
2.5 CR
8 10b
14 CR
55 10b
416 10b
110 (5YR)
19 CR

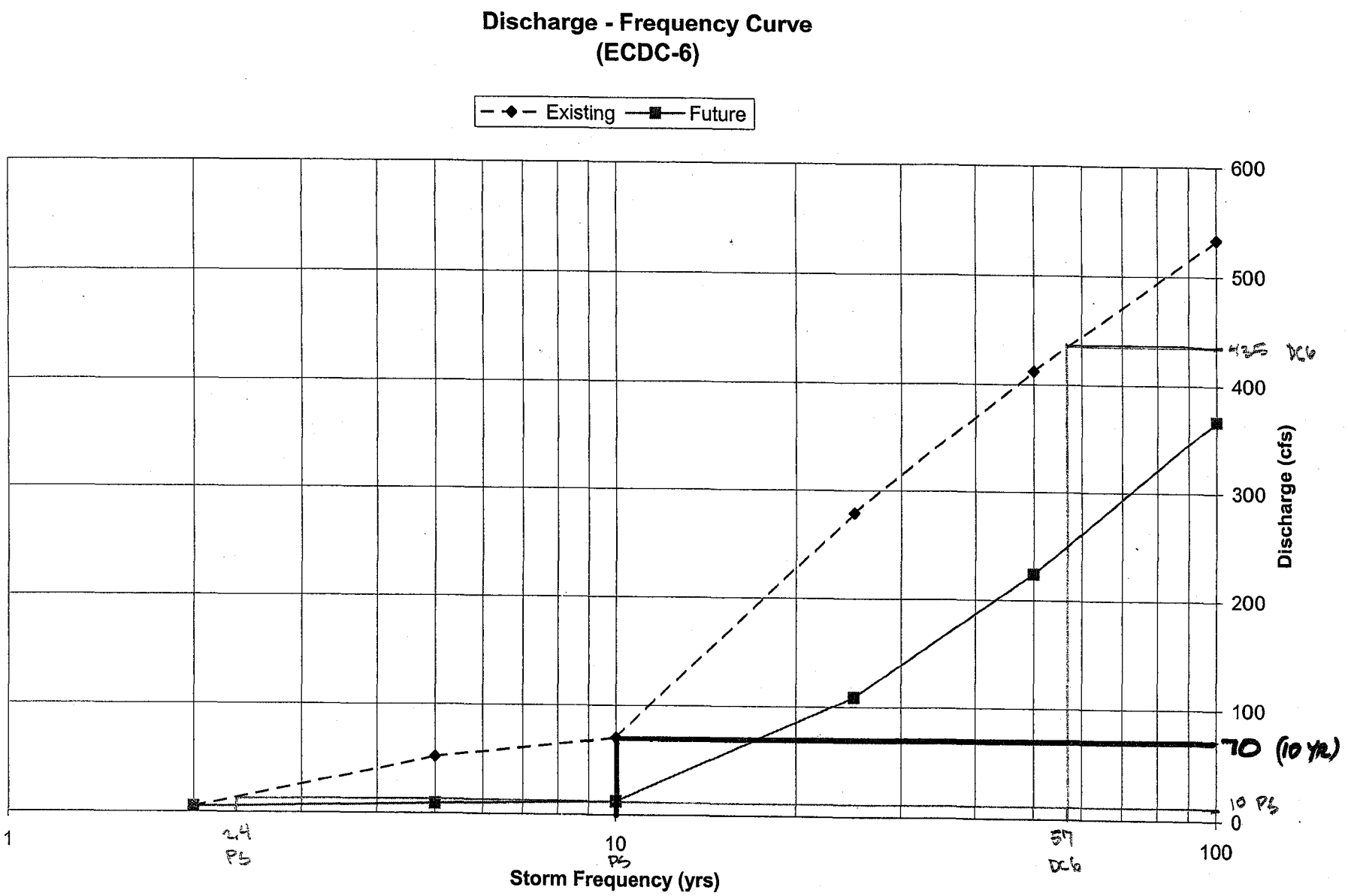

Discharge - Frequency Curve
(ECDC-10a)
Existing
Future
1800
1600
1400
1200
1000
800
600
400
200
0
Discharge (cfs)
120 (5YR)
1
3
SR/E1
6.6
10a
10
18
SR/E1
58
10a
100
Storm Frequency (yrs)


Discharge - Frequency Curve
(ECDC-9c)
257 9c
Existing
Future
200
180
160
140
135 (5 YR)
120
100
80
60
40
20
65 RY/E
0
Discharge (cfs)
1
10
100
Storm Frequency (yrs)

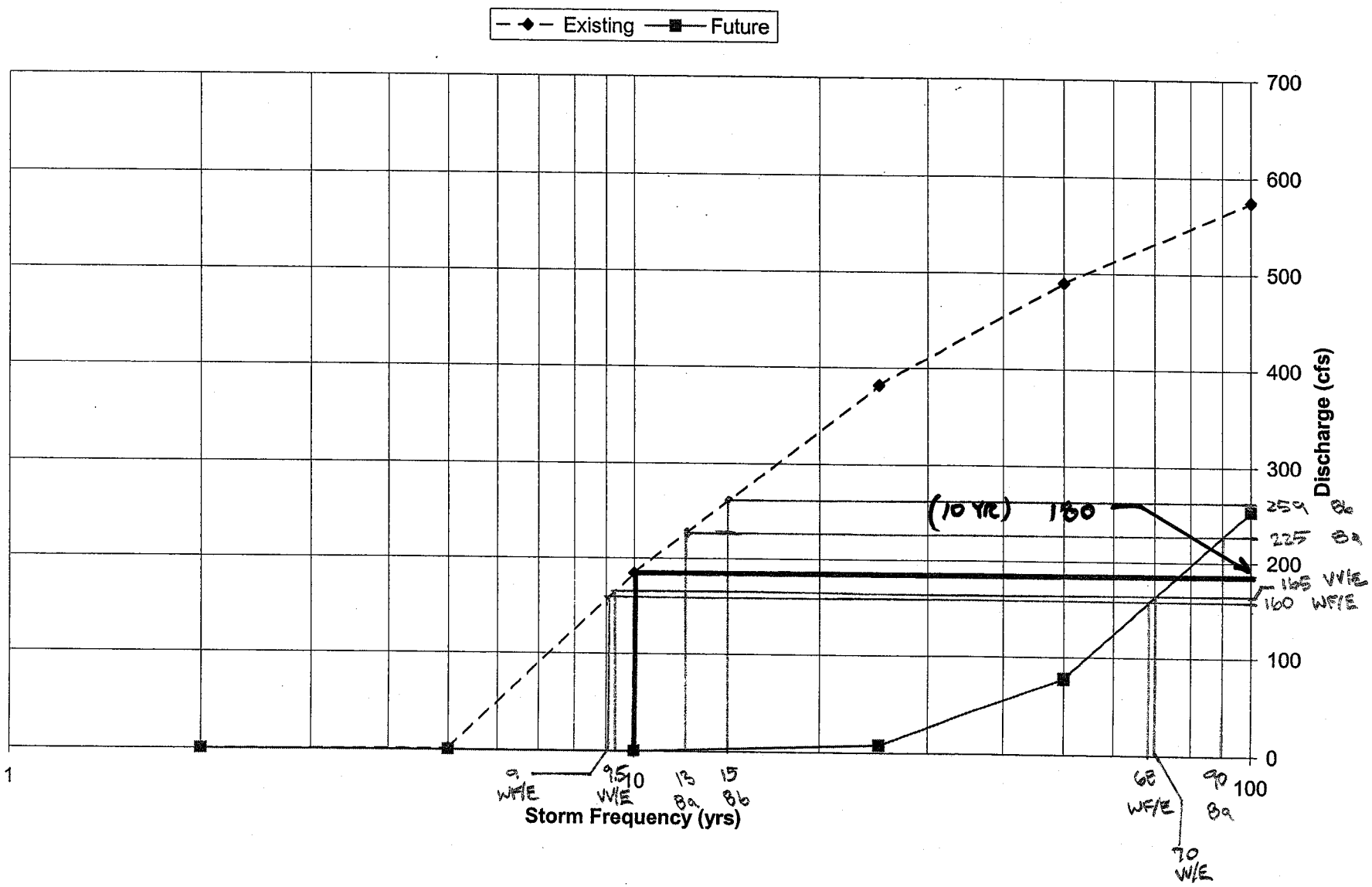

Discharge - Frequency Curve
(ECDC-6)
Existing
Future
600
500
435 DC6
400
300
200
100
55 (5YR)
10 PS
0
Discharge (cfs)
1
2.4 PS
10 PS
57 DC6
100
Storm Frequency (yrs)

Discharge - Frequency Curve
(ECDC-5)

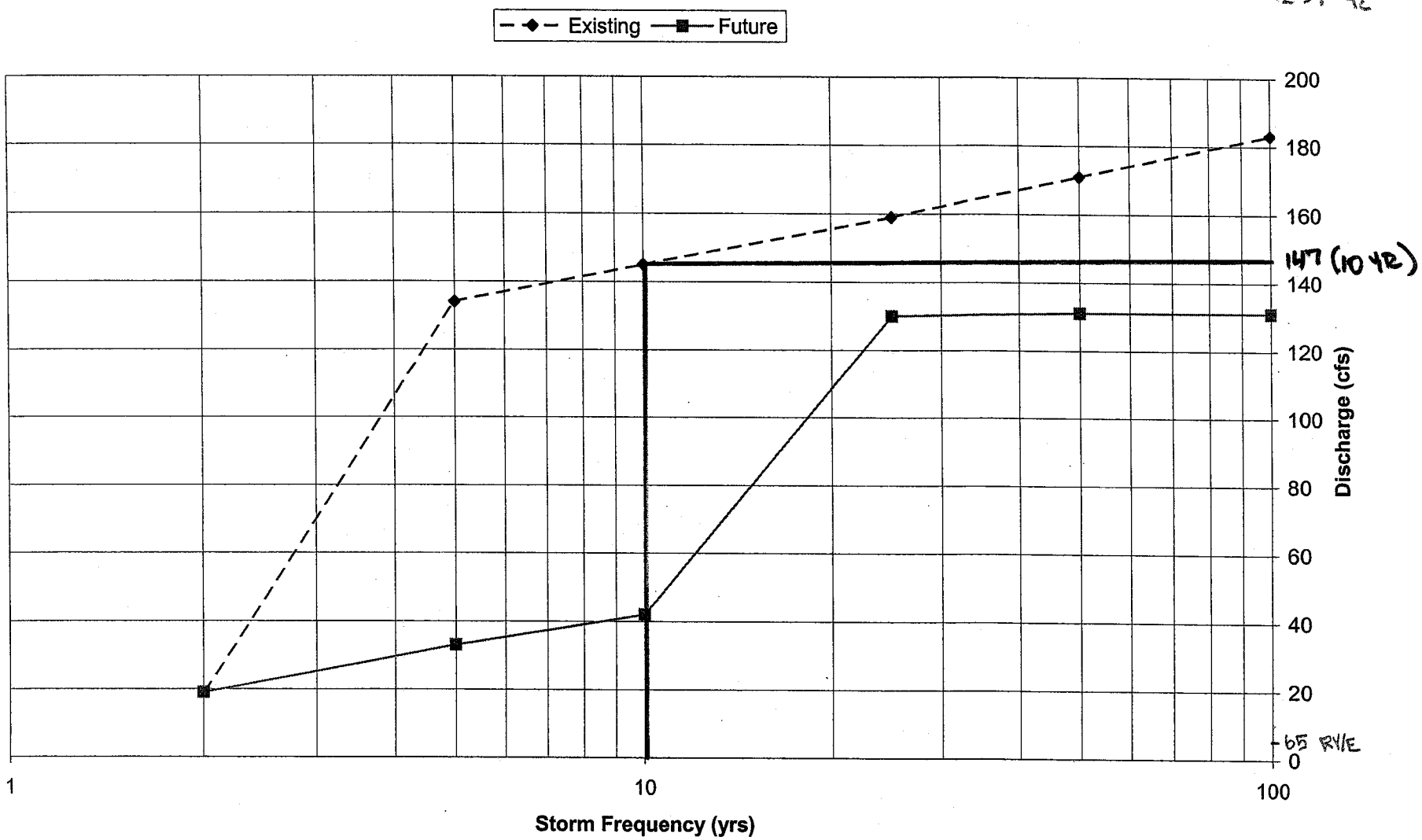



Discharge - Frequency Curve
(ECDC-6)
Existing
Future
600
500
435 DC6
400
300
200
100
70 (10 YR)
10 PS
0
Discharge (cfs)
1
2.4 PS
10 PS
57 DC6
100
Storm Frequency (yrs)

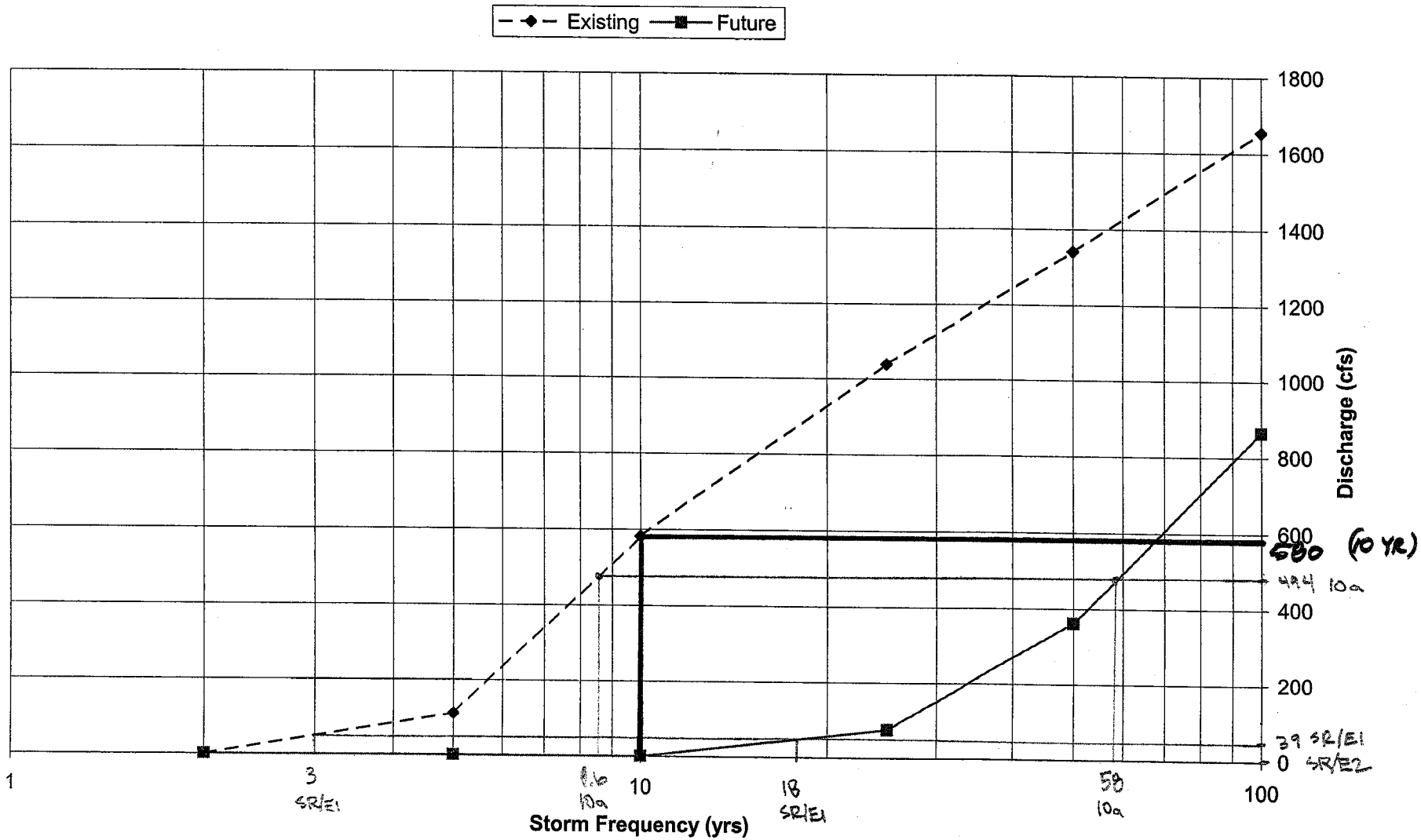
Discharge - Frequency Curve
(ECDC-8a, ECDC-8b)

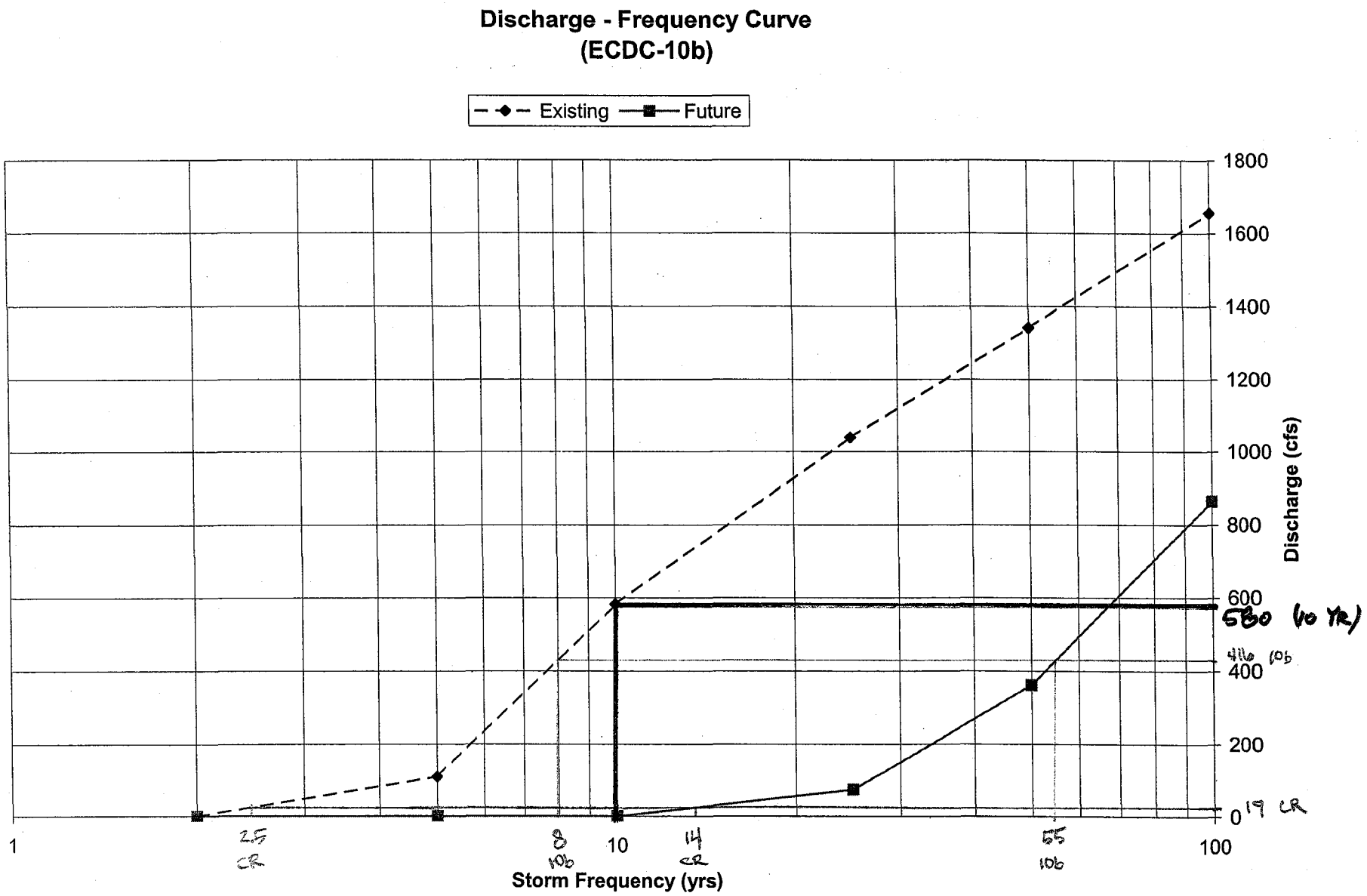


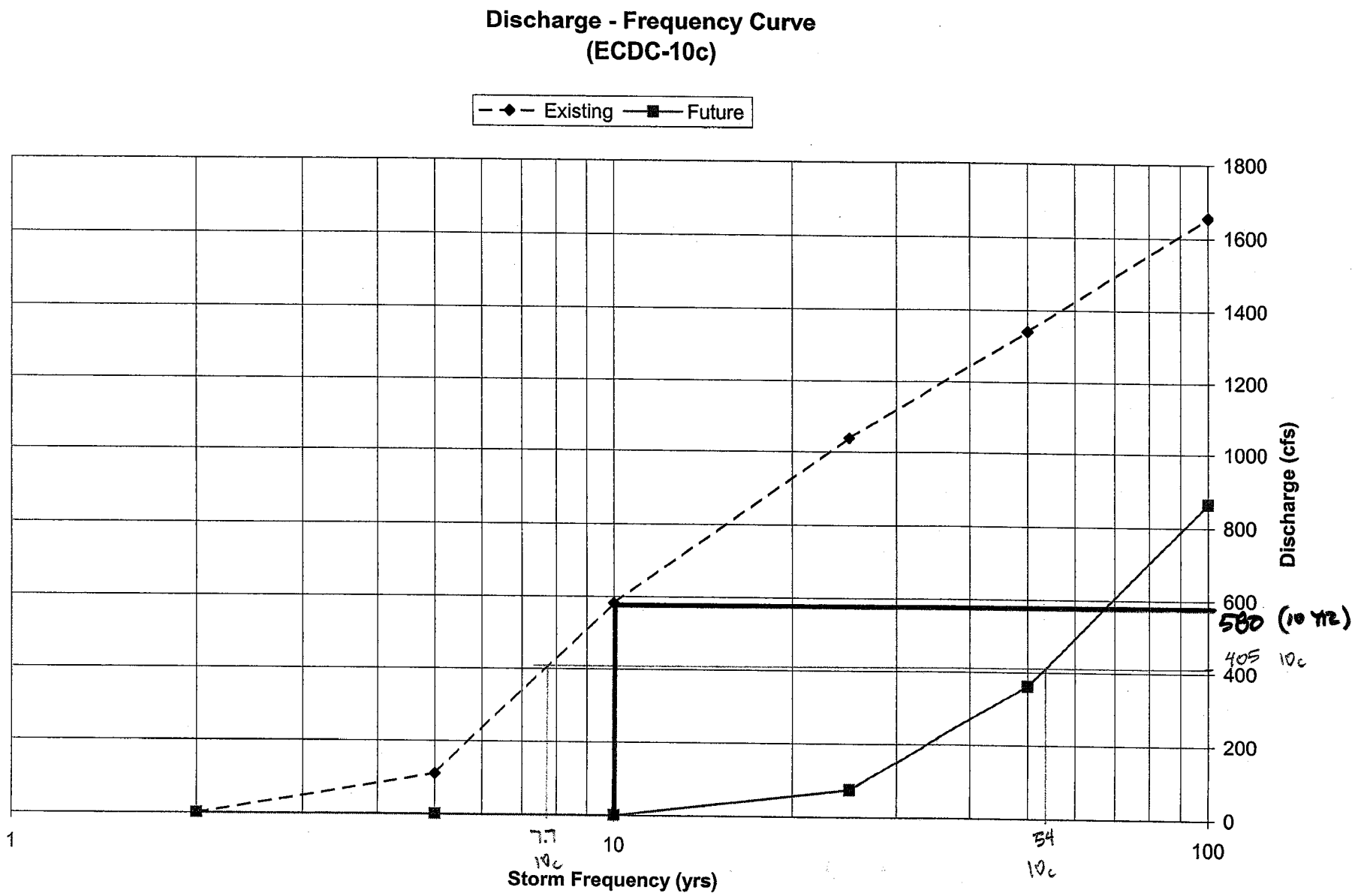
Discharge - Frequency Curve
(ECDC-9c)

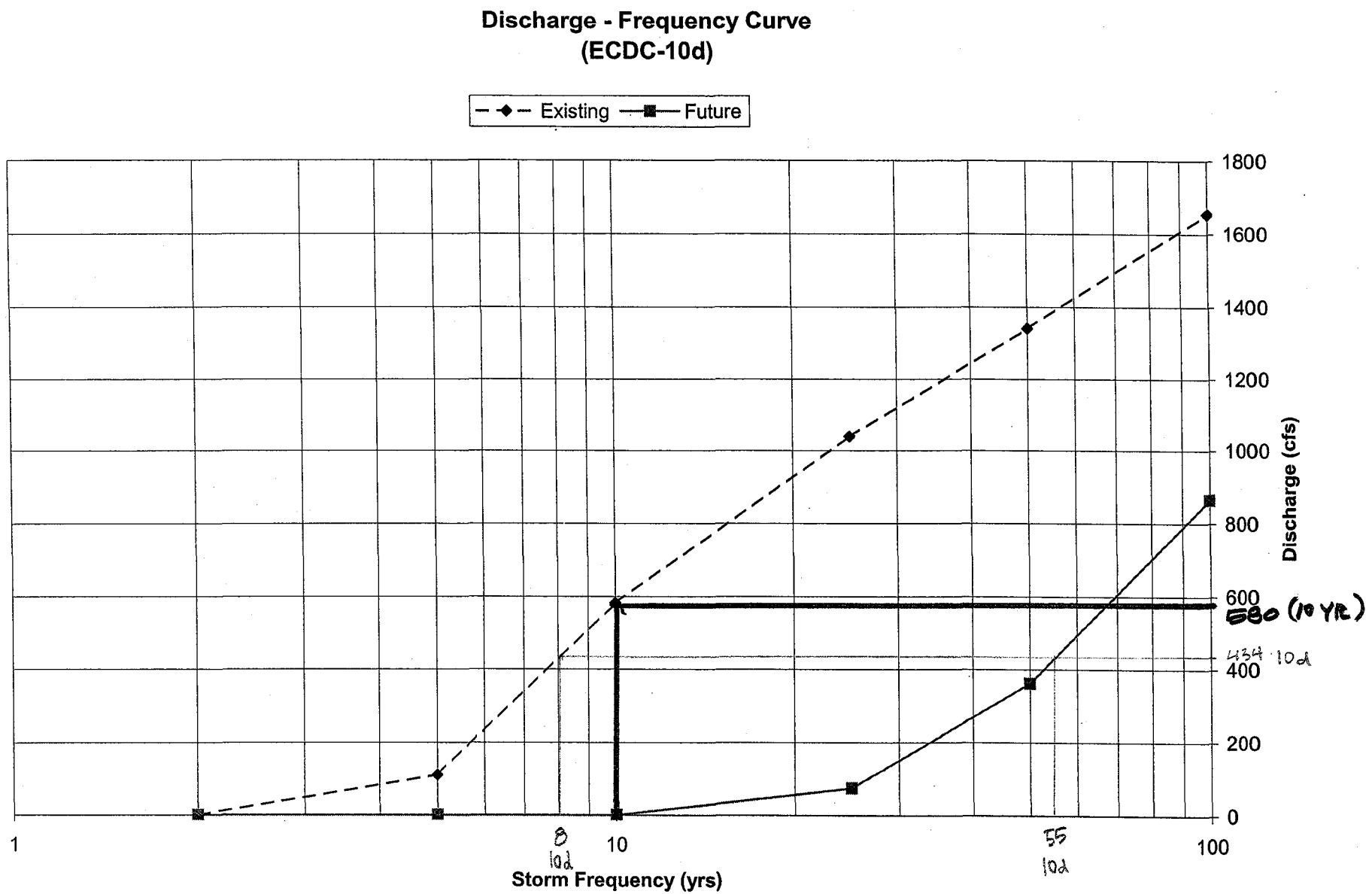


Discharge - Frequency Curve
(ECDC-10a)

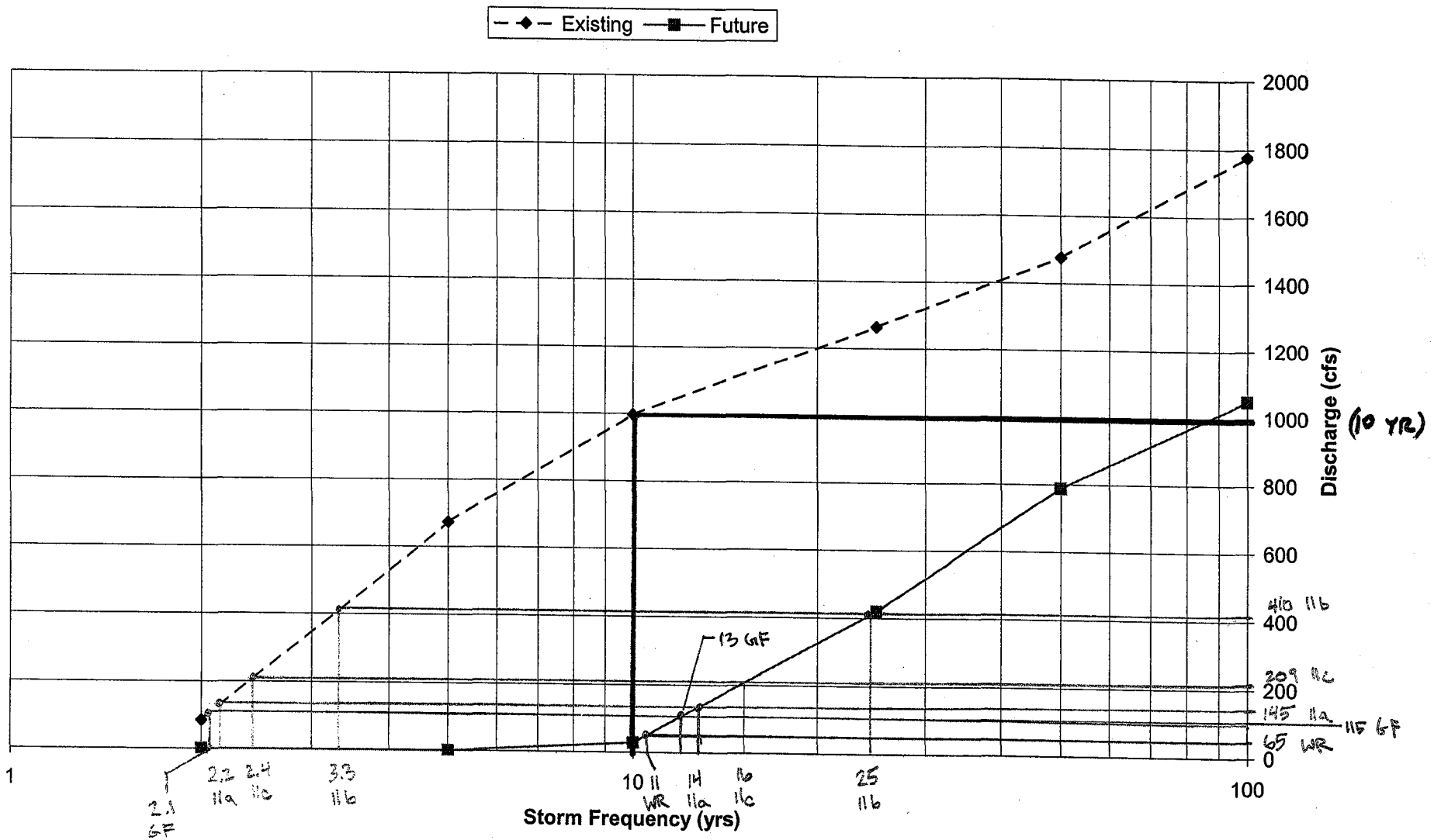


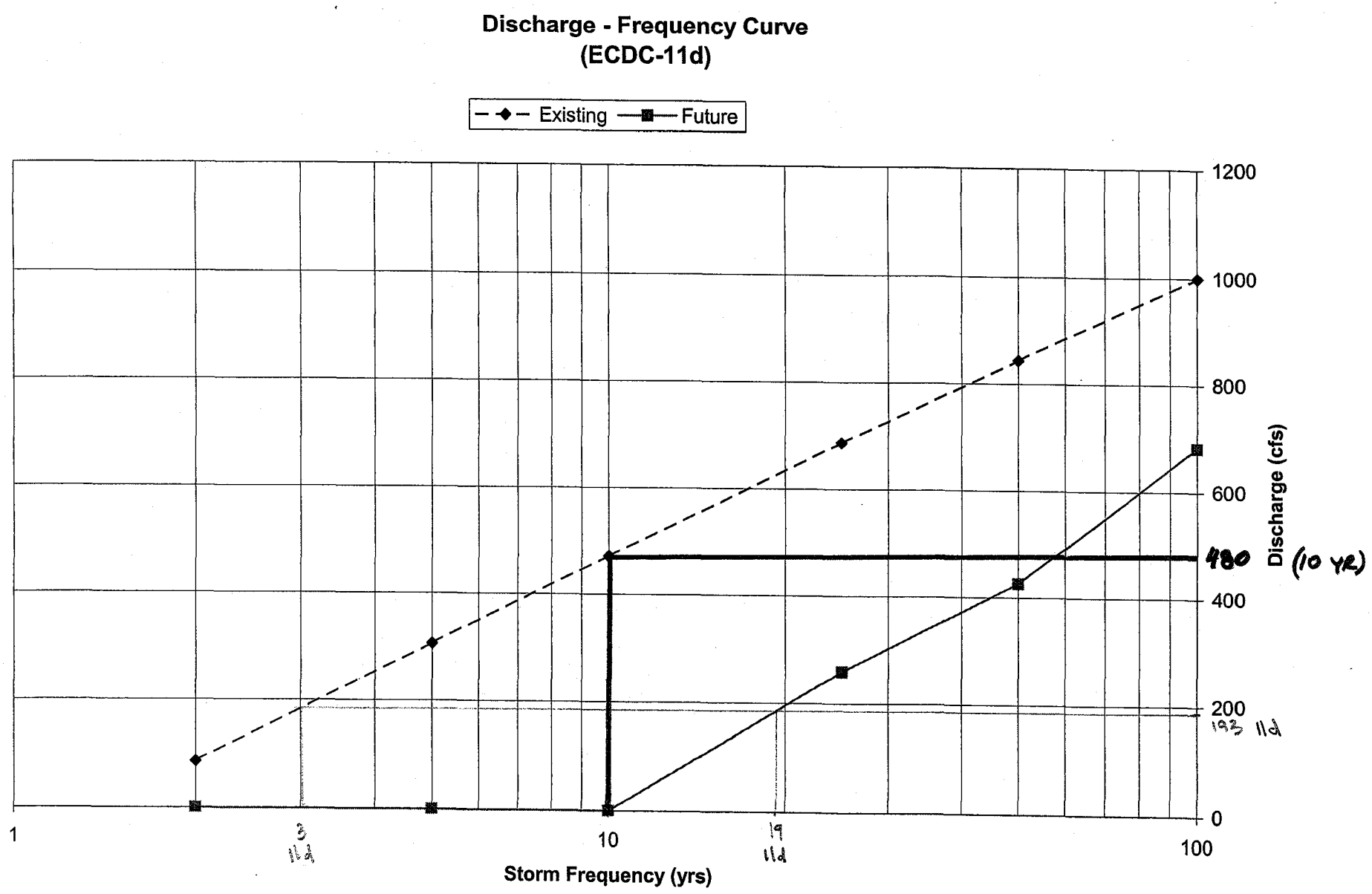

Discharge - Frequency Curve
(ECDC-10b)
Existing
Future
1800
1600
1400
1200
1000
800
600
400
200
0
Discharge (cfs)
580 (10 YR)
416 10b
19 CR
1
2.5 CR
8 10b
10
14 CR
55 10b
100
Storm Frequency (yrs)


Discharge - Frequency Curve
(ECDC-10c)
Existing
Future
1800
1600
1400
1200
1000
800
600
580 (10 YR)
405 10c
400
200
0
Discharge (cfs)
1
7.7 10c
10
54 10c
100
Storm Frequency (yrs)

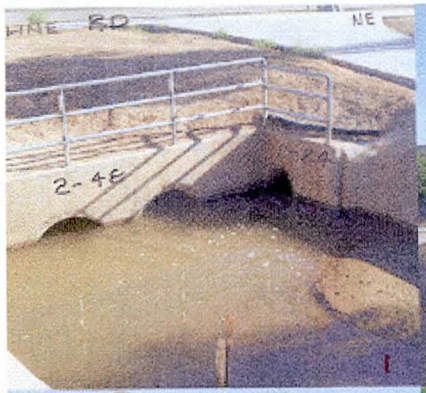

Discharge - Frequency Curve
(ECDC-10d)
Existing
Future
1800
1600
1400
1200
1000
800
600
580 (10 YR)
434 10d
400
200
0
Discharge (cfs)
1
8
10d
10
55
10d
100
Storm Frequency (yrs)

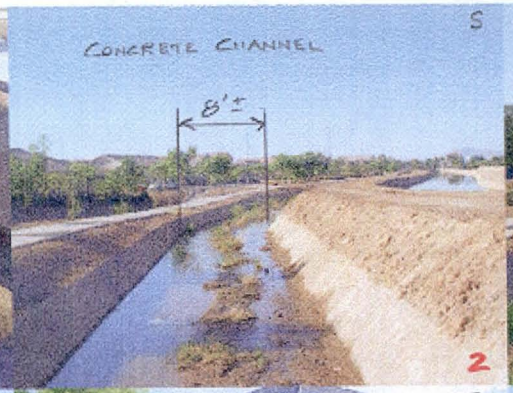
Discharge - Frequency Curve
(ECDC-11a, 11b, 11c)

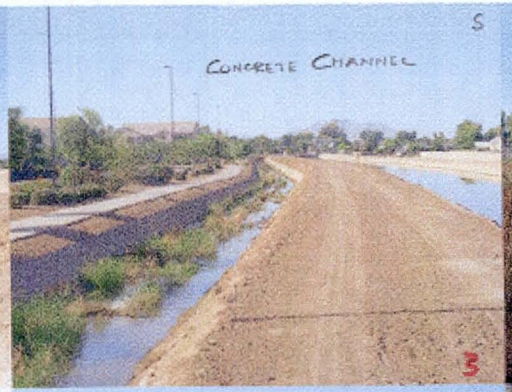



Discharge - Frequency Curve
(ECDC-11d)
Existing
Future
1200
1000
800
600
480
(10 YR)
400
200
193 11d
0
Discharge (cfs)
1
3
11d
10
19
11d
100
Storm Frequency (yrs)

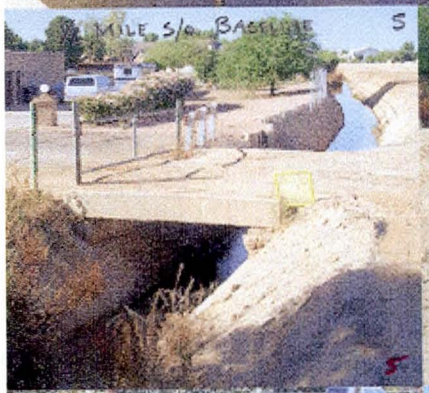
Appendix E
Field Reconnaissance Photos

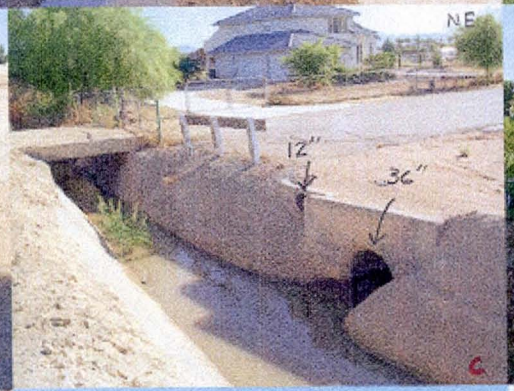

NE
2-48
1

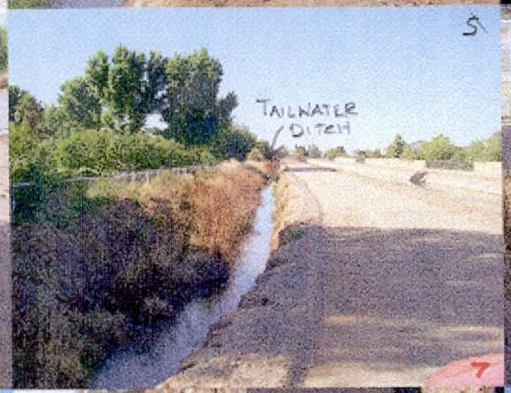

S
CONCRETE CHANNEL
8'±
2

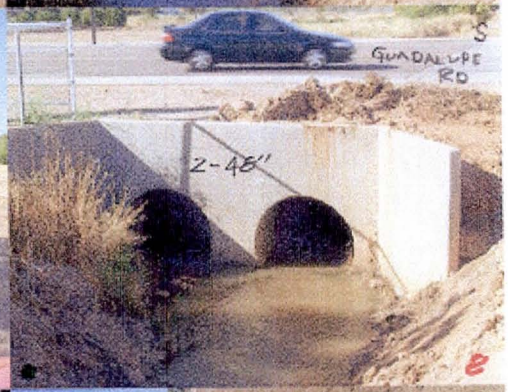

S
CONCRETE CHANNEL
3

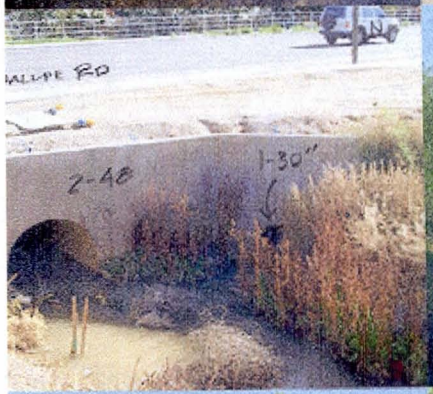
S
7'±
4

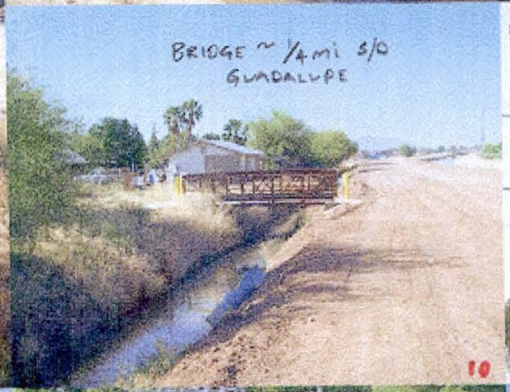

S
5


NE
12"
36"
6

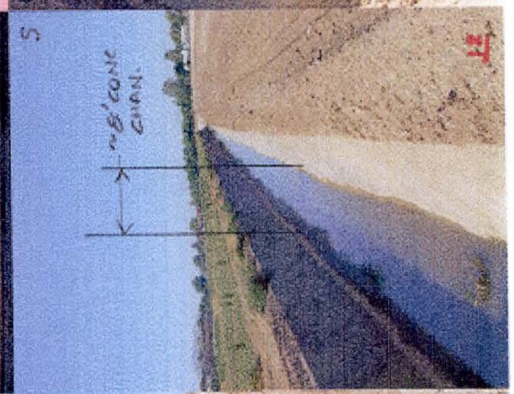

S
TAILWATER
DITCH
7

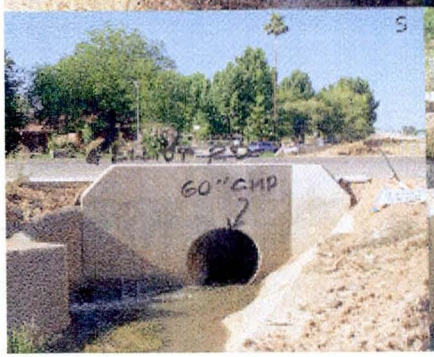

S
GUADALUPE
RD
2-48"
8

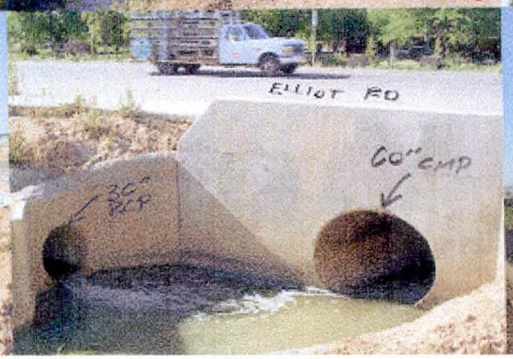

2-48
1-30"


BRIDGE ~ 1/4 mi S/O
GUADALUPE
10

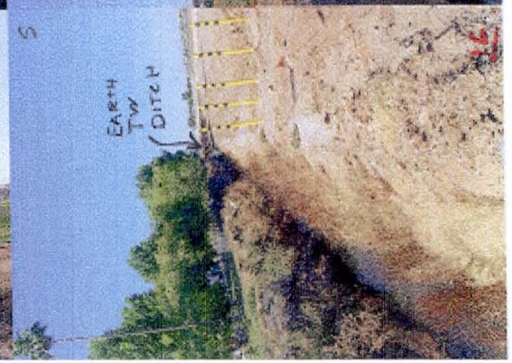
E
IRR
DITCH
11

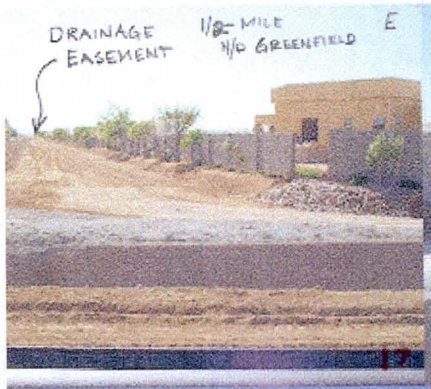

S
~8' CONC
CHAN.
12

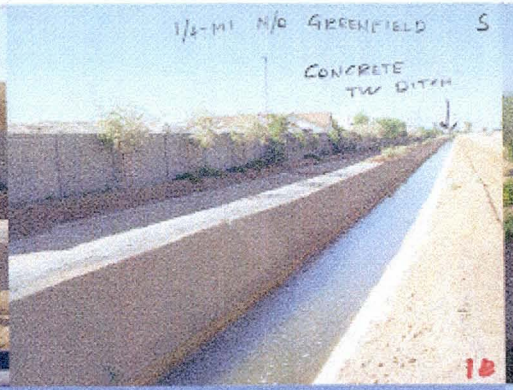

S
60" CMP

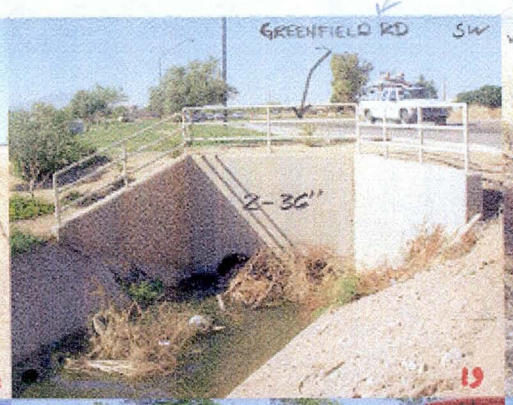

ELLIOT RD
36"
RCP
60" CMP

NE
BASIN

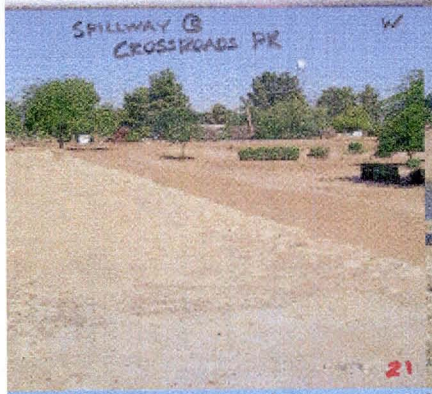

S
EARTH
TW
DITCH
13

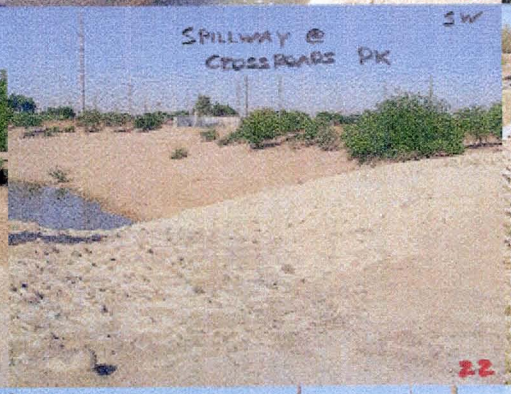

DRAINAGE EASEMENT
1/2 MILE N/O GREENFIELD
E
17

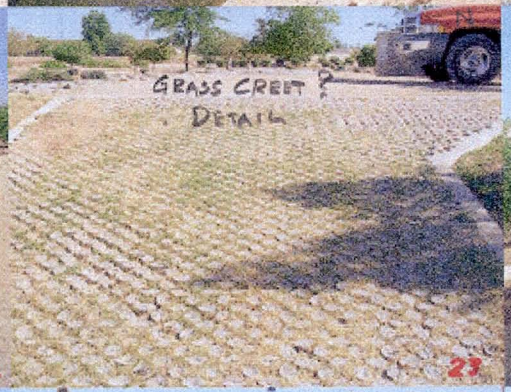

1/4-MI N/O GREENFIELD
S
CONCRETE TW DITCH
18

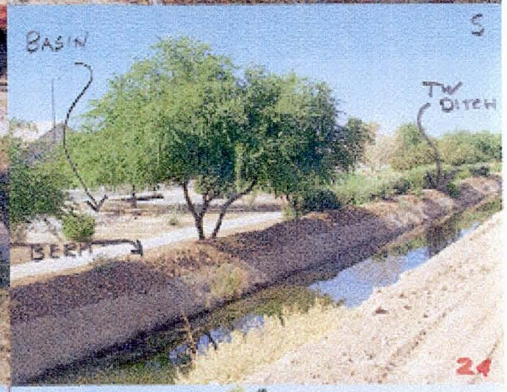

GREENFIELD RD
SW
2-36"
19

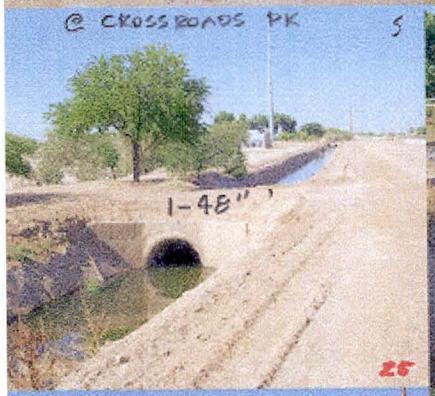
WARNER RD
NE
2-36"
20

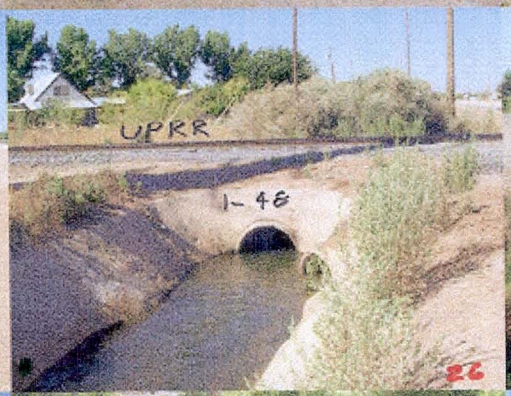

SPILLWAY @ CROSSROADS PK
W
21

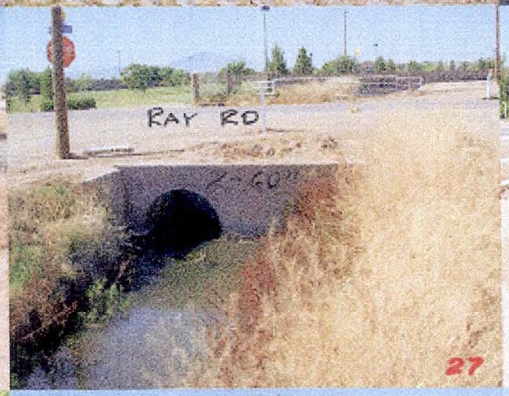

SPILLWAY @ CROSSROADS PK
SW
22

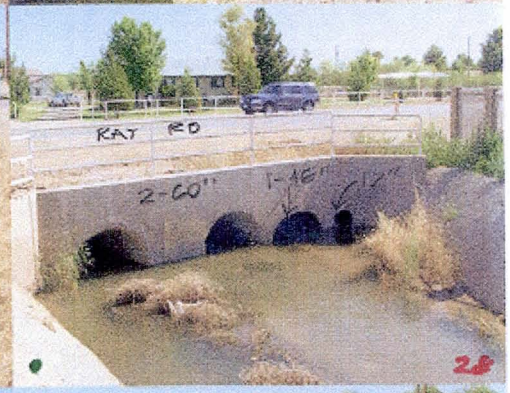

GRASS CREET DETAIL
23

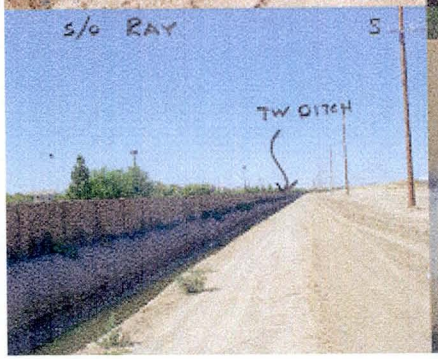

BASIN
BERM
TW DITCH
S
24

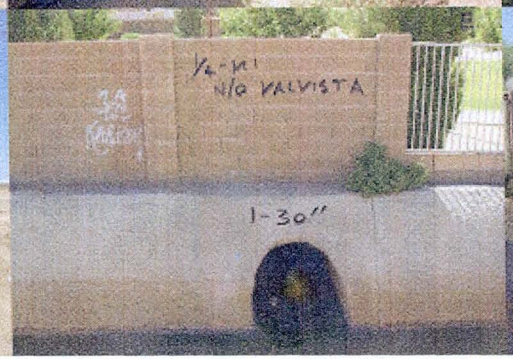

@ CROSSROADS PK
S
1-48"
25

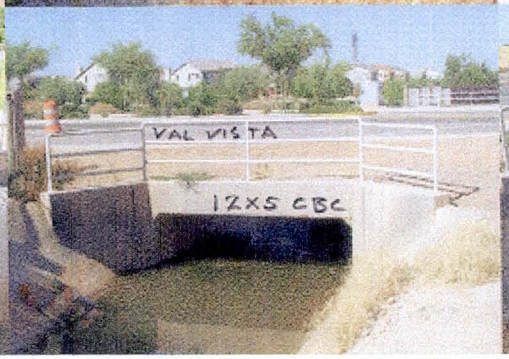

UPRR
1-48
26

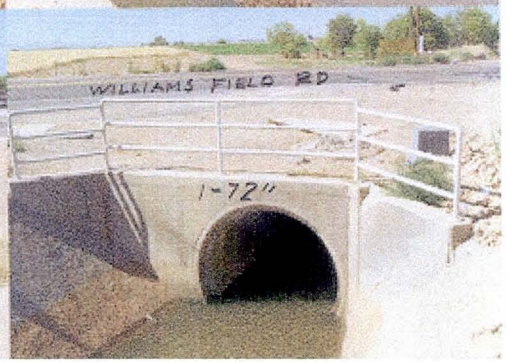

RAY RD
2-60"
27


RAY RD
2-60"
1-48"
28

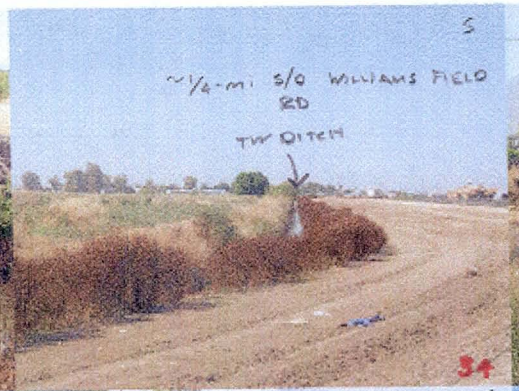

S/O RAY
S
TW DITCH

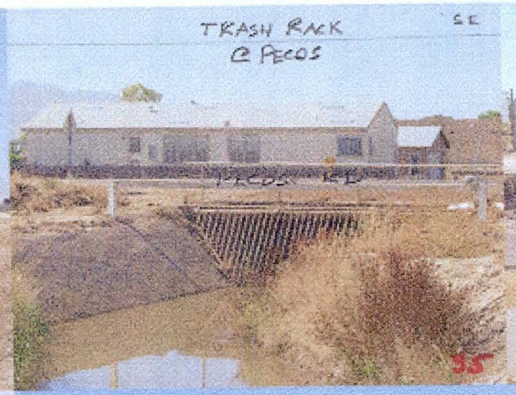

1/4-MI N/O VALVISTA
1-30"

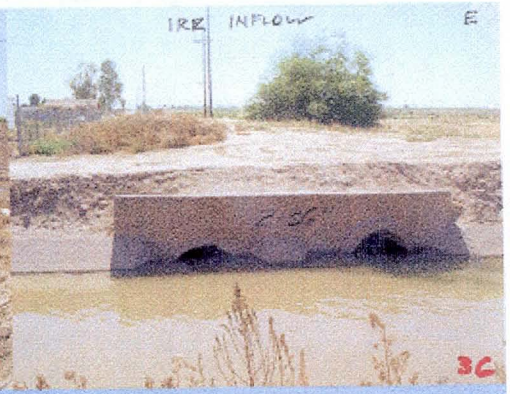

VAL VISTA
12X5 CBC

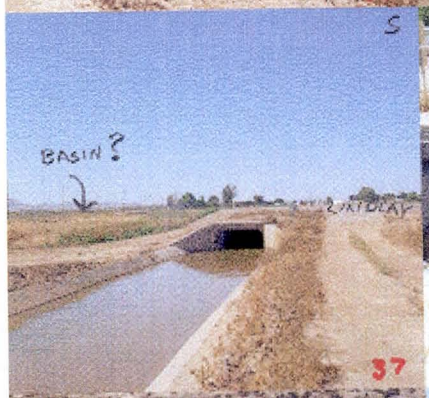

WILLIAMS FIELD RD
1-72"

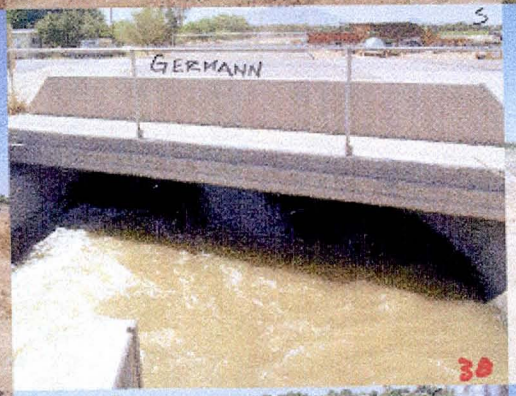
NE
FIELD RD
1-72"
33

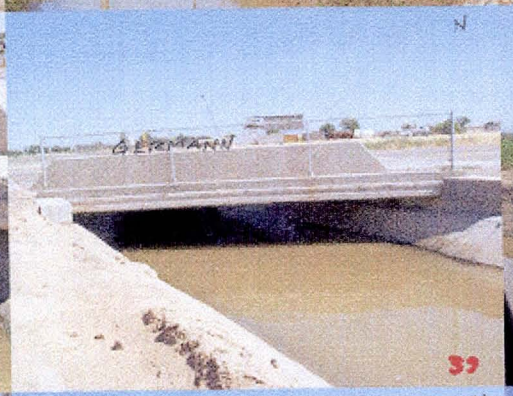

S
~1/4-mi S/O WILLIAMS FIELD RD
TW DITCH
34

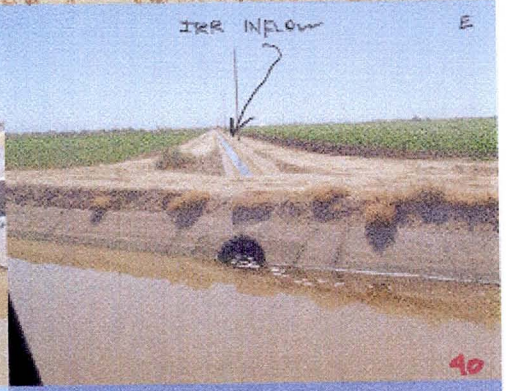

TRASH RACK @ PECOS
SE
PECOS RD
35


IRR INFLOW
E
36


S
BASIN?
37

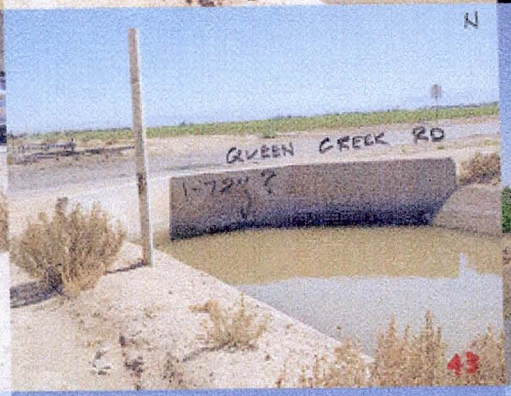

S
GERMANN
38

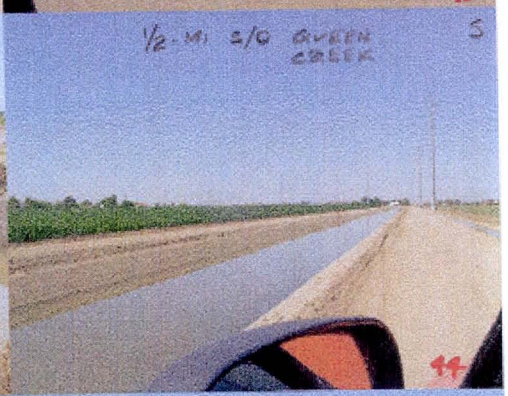

N
GERMANN
39


IRR INFLOW
E
40

DUCKS
41

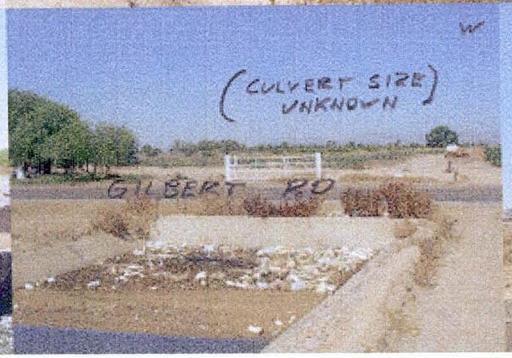
S
QUEEN CREEK RD
1-72" ?
42


N
QUEEN CREEK RD
1-72" ?
43

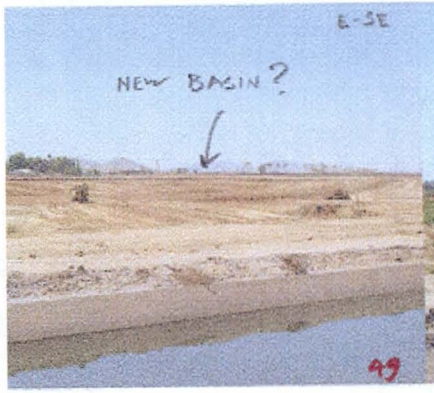

1/2-mi S/O QUEEN CREEK
S
44

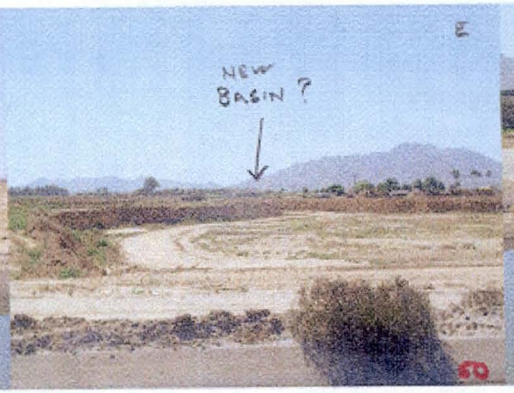
S
RCP (SIZE UNKNOWN)
OCOTILLO RD

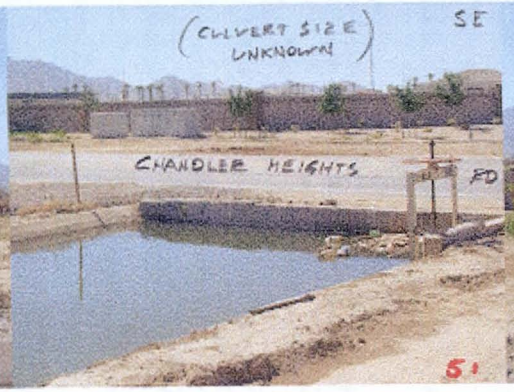
E
IRR DITCH
OCOTILLO RD

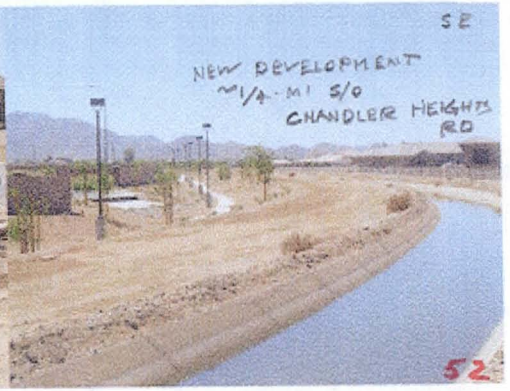

W
(CULVERT SIZE UNKNOWN)
GILBERT RD

SE
NEW BASIN?
CHANDLER HEIGHTS RD


E-SE
NEW BASIN?
49


E
NEW BASIN?
50


(CULVERT SIZE UNKNOWN)
SE
CHANDLER HEIGHTS RD
51


SE
NEW DEVELOPMENT ~1/4 MI S/O CHANDLER HEIGHTS RD
52