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MEMO

TO: Marvin E. Carter, Michael O'Haire, and John Amos

FROM: George A. Simons *AS*

THROUGH: Dean F. Luethje *DL*

RE: IRFWCD – Stormwater Discharge 2"/24 Hr. Limitation Clarifications

DATE: February 29, 2000

CAI requests that the supervisors formally accept the clarifications noted below. The clarifications will assist all stormwater design engineers working within the district as well as the city and county engineers reviewing plans as to the appropriate methodology for meeting the 2" rule.

1. The design storm event is a 25 yr-24 hour event. The storm event rainfall hydrograph shall be modeled using either the Santa Barbara Urban Hydrograph Method or the S.C.S. Unit Hydrograph Method. The Rational Hydrograph Method shall not be used.
2. The 2-inch limitation applies to any 24-hour period from hour 0 through hour 72. (Provide hourly accumulative discharge volume from hour 0 through hour 72.)
3. The peak stage elevation for the project's receiving water shall be determined using the results of CAI/Williams, Hatfield and Stoner study (IRFWCD Study) titled "Evaluation and Updating of the Plan of Reclamation Works of Improvement dated August 1988 (July 1990 revised) as follows:
 - A. Identify the IRFWCD System Junction number(s) which are the closest to the specific project site. (Refer to the District Maps, i.e. Figure 6.4.)
 - B. Identify the maximum computed stage (NGVD) for the Junction selected in part 3A from Appendix C, 25yr - design storm. (Refer to the Summary Statistics for Junctions as listed in Appendix C.)

C. The time (hour) of the maximum stage is estimated by relating the time of occurrence from the study (72 hr. event) peak stage to the 24-hour storm model as follows:

<u>District Study</u>	<u>Proposed Project</u>
Hr. 48	Hr. 0
Hr. 60	Hr. 12
Hr. 72	Hr. 24
Hr. 96	Hr. 48
Hr. 120	Hr. 72

D. The time/stage elevation relationship of receiving water can be estimated by correlating the project site location with the IRFWCD study results. Twenty (20) junction locations are listed in the IRFWCD Study Appendix C, under the "Time History of H.G.L.". The time/stage relationship of the junctions are noted from Hr. 36 through Hr. 96. The project's receiving water time/stage relationship can be estimated by interpolating/extrapolating between the adjacent junction nodes.

Note: CAI is currently developing a time stage relationship for each of the (20) nodes to be used in modeling the 25 yr.- 24 hr. storm event.

E. All District outfall canals have gate structures which control the water elevation upstream of them at elevation 15.5± (NGVD). These gates can be opened during a rainfall event which may temporarily result in a water elevation less than 15.5. However, we recommend that all project sites discharging upstream of a gate structure be modeled at a minimum elevation of 15.5.

4. Within the project site, all flood plain storage must be maintained from pre to post development. Predevelopment calculations shall be based on existing site conditions (NGVD) as determined by a Florida Registered Land Surveyor. Post development calculations shall be based on the design grades. The 100 yr. flood elevation shall be based on the results of the IRFWCD study calculated using the same methodology as noted in number 3 above.

I.R.F.W.C.D.
STORMWATER DISCHARGE 2"/24 HR LIMITATION
TIME VS STAGE ELEVATIONS FOR (20) NODES
April 25, 2000

<u>NODE</u>	<u>25 YR-24 HR</u> <u>STORM EVENT</u>	<u>STAGE ELEVATION</u> <u>@ NODE</u>
9133	(HR)	(NGVD)
	0	10.4
	10	11.0
	12	13.3
	14	15.5
	20	16.08
	26	16.0
	48	15.4
	60	14.9
	72	14.3

<u>NODE</u>	<u>25 YR-24 HR</u> <u>STORM EVENT</u>	<u>STAGE ELEVATION</u> <u>@ NODE</u>
9119	(HR)	(NGVD)
	0	15.5
	12	15.5
	14	17.9
	16	18.6
	24	19.1
	28	19.1
	48	18.5
	60	17.9
	72	17.1

<u>NODE</u>	<u>25 YR-24 HR</u> <u>STORM EVENT</u>	<u>STAGE ELEVATION</u> <u>@ NODE</u>
189	(HR)	(NGVD)
	0	5.3
	8	5.7
	16	13.8
	18	13.7
	24	12.7
	28	11.9
	30	11.3
	48	10.1
	60	9.5
72	8.8	

**20 NODES/TIME VS STAGE
IRFWCD STORMWATER DISCHARGE 2"/24 HR.**

<u>NODE</u>	<u>25 YR-24 HR STORM EVENT</u> (HR)	<u>STAGE ELEVATION</u> <u>@ NODE</u> (NGVD)
9159	0	15.5
	12	15.5
	14	17.7
	16	18.4
	20	18.2
	24	18.1
	36	17.6
	48	17.3
	60	16.9
	72	16.4

<u>NODE</u>	<u>25 YR-24 HR STORM EVENT</u> (HR)	<u>STAGE ELEVATION</u> <u>@ NODE</u> (NGVD)
9055	0	15.5
	12	15.5
	14	17.7
	16	18.2
	24	18.6
	26	18.63
	30	18.6
	40	18.2
	48	17.7
	60	17.0
	72	16.2

<u>NODE</u>	<u>25 YR-24 HR STORM EVENT</u> (HR)	<u>STAGE ELEVATION</u> <u>@ NODE</u> (NGVD)
8191	0	4.5
	10	6.4
	12	10.4
	14	13.0
	16	13.4
	24	13.2
	30	13.0
	42	12.0
	48	11.6
	60	11.0
	72	10.0

20 NODES/TIME VS STAGE
IRFWCD STORMWATER DISCHARGE 2"/24 HR.

<u>NODE</u>	<u>25 YR-24 HR</u> <u>STORM EVENT</u> (HR)	<u>STAGE ELEVATION</u> <u>@ NODE</u> (NGVD)
9134	0	2.8
	10	3.3
	12	5.2
	14	5.6
	16	5.64
	24	5.5
	38	5.4
	48	5.3
	60	5.1
	72	4.8

<u>NODE</u>	<u>25 YR-24 HR</u> <u>STORM EVENT</u> (HR)	<u>STAGE ELEVATION</u> <u>@ NODE</u> (NGVD)
9083	0	18.8
	12	18.9
	14	20.7
	16	21.8
	20	22.04
	24	22.0
	36	21.6
	48	20.9
	60	20.2
	72	19.5

<u>NODE</u>	<u>25 YR-24 HR</u> <u>STORM EVENT</u> (HR)	<u>STAGE ELEVATION</u> <u>@ NODE</u> (NGVD)
190	0	2
	12	2
	24	2
	48	2
	72	2

**20 NODES/TIME VS STAGE
IRFWCD STORMWATER DISCHARGE 2"/24 HR.**

<u>NODE</u>	<u>25 YR-24 HR STORM EVENT (HR)</u>	<u>STAGE ELEVATION @ NODE (NGVD)</u>
68	0	19.0
	10	19.5
	12	21.8
	14	23.8
	16	23.93
	24	23.8
	30	23.7
	36	23.5
	48	22.9
	60	22.2
	72	21.4

<u>NODE</u>	<u>25 YR-24 HR STORM EVENT (HR)</u>	<u>STAGE ELEVATION @ NODE (NGVD)</u>
#5	0	19.5
	6	20.5
	10	21.5
	12.5	23.6
	14	23.5
	24	23.3
	30	23.1
	36	23.0
	48	22.7
	60	22.0
	72	21.2

<u>NODE</u>	<u>25 YR-24 HR STORM EVENT (HR)</u>	<u>STAGE ELEVATION @ NODE (NGVD)</u>
25	0	11.6
	4	12.1
	10	13.0
	12	16.0
	14	17.2
	18	17.68
	24	17.6
	30	17.2
	36	15.9
	48	14.2
	60	13.4
	72	12.8

**20 NODES/TIME VS STAGE
IRFWCD STORMWATER DISCHARGE 2"/24 HR.**

<u>NODE</u>	<u>25 YR-24 HR STORM EVENT (HR)</u>	<u>STAGE ELEVATION @ NODE (NGVD)</u>
50	0	8.6
	10	9.6
	12	13.5
	14	15.7
	16	16.13
	18	16.1
	24	15.9
	30	15.5
	38	14.5
	48	13.5
	60	12.9
	72	12.2

<u>NODE</u>	<u>25 YR-24 HR STORM EVENT (HR)</u>	<u>STAGE ELEVATION @ NODE (NGVD)</u>
37	0	15.8
	10	16.2
	12	17.6
	14	19.5
	16	19.9
	24	20.2
	29	20.28
	36	20.2
	48	19.8
	60	19.3
	72	18.6

<u>NODE</u>	<u>25 YR-24 HR STORM EVENT (HR)</u>	<u>STAGE ELEVATION @ NODE (NGVD)</u>
86	0	15.7
	12	16.6
	14	18.8
	18	19.7
	24	20.2
	30	20.3
	36	20.2
	48	19.9
	60	19.3
	72	18.6

20 NODES/TIME VS STAGE
IRFWCD STORMWATER DISCHARGE 2"/24 HR.

<u>NODE</u>	<u>25 YR-24 HR STORM EVENT (HR)</u>	<u>STAGE ELEVATION @ NODE (NGVD)</u>
87	0	17.3
	8	18.4
	10	19.1
	12.5	22.3
	14	22.1
	16	21.6
	24	20.4
	36	19.8
	48	19.2
	60	18.6
	72	18.0

<u>NODE</u>	<u>25 YR-24 HR STORM EVENT (HR)</u>	<u>STAGE ELEVATION @ NODE (NGVD)</u>
127	0	16.2
	10	16.6
	12	17.2
	14	20.1
	16	20.5
	17.5	20.6
	24	20.5
	36	20.4
	48	20.2
	60	19.6
	72	18.9

<u>NODE</u>	<u>25 YR-24 HR STORM EVENT (HR)</u>	<u>STAGE ELEVATION @ NODE (NGVD)</u>
105	0	16.0
	10	16.6
	12	17.2
	14	19.8
	16	20.4
	20.5	20.5
	24	20.5
	36	20.3
	48	20.0
	60	19.4
	72	18.7

**20 NODES/TIME VS STAGE
IRFWCD STORMWATER DISCHARGE 2"/24 HR.**

<u>NODE</u>	<u>25 YR-24 HR STORM EVENT</u> (HR)	<u>STAGE ELEVATION</u> <u>@ NODE</u> (NGVD)
146	0	16.0
	10	16.6
	12	17.7
	14	19.9
	16	20.3
	18	20.3
	24	20.3
	26	20.34
	30	20.3
	38	20.2
	48	20.0
	60	19.5
	72	18.8

<u>NODE</u>	<u>25 YR-24 HR STORM EVENT</u> (HR)	<u>STAGE ELEVATION</u> <u>@ NODE</u> (NGVD)
174	0	16.0
	8	16.8
	10	17.7
	12	21.8
	14	22.03
	16	21.7
	24	20.8
	38	20.3
	48	20.0
	60	19.5
	72	18.8