RESPONSE TO COMMENTS FOR THE DRAFT DRAINAGE MEMORANDUM

FOR

Jones & Valley View Corridor Improvements
CLV Hansen No. 38800
Original Submittal dated January 27, 2011

Prepared for:

The City of Las Vegas
Nevada
333 N. Rancho Dr.
Las Vegas, NV 89107

Prepared by:

JACOBS
319 E. Warm Springs Rd., Ste. 200
Las Vegas, NV 89119
Office: (702) 938-5400
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June 6, 2011
Jacobs Project No. W4X52900

June 6, 2011

Peter Jackson, PE
Flood Control
City of Las Vegas
333 N. Rancho Drive
Las Vegas, NV 89107
(702) 229-5266

Re: Response to Draft Drainage Memorandum For
Jones & Valley View Corridor Improvements, March 2, 2011
Draft Drainage Memorandum Submittal Dated January 27, 2011
CLV Hansen No. 38800
Jacobs Job #W4X52900

Dear Mr. Jackson:

Enclosed please find the response to City of Las Vegas review comments regarding The Draft Drainage Memorandum for Jones & Valley View Corridor Improvements. All comments are addressed within the following summarization:

Comments on the Draft Drainage Memorandum for the Valley View improvements:

Comment 1 **Flood Control takes no exception to the overall Hydrology presented as it complies with the on-going Oakey Strom Drain – Cahlan to Barnard project.**

Response: Comment 1 is noted.

Comment 2 **The transition of the proposed storm drain system between the Valley View project and the Oakey Storm Drain – Cahlan to Barnard project needs to be revised to provide for a smooth transition between proposed facilities. Provide a transition from the 7'X5' RCB to a 5'X5' RCB and end this project with at least one section of 5'X5' RCB. Provide a concrete cap and plug at the terminus of the proposed storm drain at Station 21+51.86. Continue to coordinate the match point and design between the two systems with Parsons Brinckerhoff.**

Response: The downstream end of the storm drain has been revised accordingly. Jacobs continues design coordination with Parsons Brinkerhoff (PB) at the

tie-in point. PB raised the upstream end of their system in order to accommodate Jacobs' downstream end with a much smoother transition. Via coordination with Nick Appuglise at Parsons Brinkerhoff, Jacobs has worked out a logical match point with PB to be at Jacobs STA 21+00.72 = PB STA 1+55.45 at an invert elevation of 2141.95. During coordination, PB has provided Jacobs several iterations of their storm drain design and analysis. PB has not finished 100% approved plans as of the submittal of this document. Reference the Appendix of this report for the PB information used in preparing this report.

Comment 3 **The WSPG analysis must be revised to include the revised transition at the match point between this project and the Oakey Storm Drain – Cahlan to Barnard project. The WSPG needs to match the proposed system parameters. Update the Summary Table that provides both WSPG and Plan Stationing. Refine the WSPG input parameters based upon the minor profile adjustments. The revised WSPG analysis must be included with the design submittal. Provide an electronic copy of the WSPG analysis including both input and output files with the Final Drainage Report.**

Response: All comments are addressed accordingly. Please reference COMMENT 3 in the Appendix of this report for the appropriate updates. An electronic copy of the WSPG analysis will be provided with the final report. A revised standard form 6 has also been provided along with the WSPG analysis.

Comment 4 **The WSPG Plan & Profile needs to be printed at a larger scale to be legible.**

Response: The WSPG plan and profile has not been revised, instead, the HGL has been provided on the project drawing profiles.

Comment 5 **Revise Table 2 to label the Q100 bypass flow.**

Response: Table 2 has been updated and is included in the Appendix of this report under COMMENT 5.

Comment 6 **The drop inlet calculations need to be revised to reflect the curved vaned grates.**

Response: All drop inlet calculations in Flowmaster have been revised and are included in the Appendix under COMMENT 6 along with the Storm Drain Hydraulic Summary Exhibit. The intercepted and bypass flows are unchanged from the original submittal.

Comment 7 **Provide updated inlet calculations as needed based upon system design changes.**

Response: Revised inlet calculations have been provided in the appendix under COMMENT 6.

Comment 8 **Provide a PDF copy of the final Drainge Memorandum for the Valley View project.**

Response: Comment 8 noted, a PDF of the Final Drainage Memorandum will be provided with the final submittal. A PDF copy of the original Draft Drainage Memorandum along with this response to comments for the Draft Drainage Memorandum has been provided.

70% Plan comments for the Jones Boulevard and Valley View Boulevard Corridor Improvements:

Comment 9 **Provide Plan and Profiles of the entire storm drain facility including laterals with the next submittal.**

Response: Please reference all updated SD sheets for the plan and profiles for the proposed storm drain. Please note that all SP sheets and LAT sheets with storm drain information have been renamed as SD sheets.

Comment 10 **Provide updated storm drain design plans with the next submittal that include the design data and the complete construction notes. Include the Inlet type, lengths, depth, number of grates, etc.**

Response: Updated storm drain design plans have been included along with design data and complete construction notes. Please reference all profile sheets for the inlet type, length, depth and number of grates. Further inlet details can be found on sheet SD-22 in the Storm Drain Drop Inlet Design Matrix Table.

Comment 11 **Provide the new TC profiles with design elevations at critical locations for constructability.**

Response: Design of the new TC at critical locations have been provided on PP-01 through PP-21 in the plans.

Comment 12 **The existing and proposed utility crossings of the storm drain must be shown on the storm drain plan and profiles sheets and on the lateral profiles.**

Response: Please reference the storm drain plan and profile sheets and the lateral sheets for the proposed utility crossings.

Comment 13 The Engineer should acquire utility pothole information as soon as practical to determine additional constraints on the storm drain system design based upon the supplemental design information. Consideration on utility relocations and impacts must be identified.

Response: All pertinent pothole information has been acquired and included on the plans. As of May 12, 2011, Jacobs is waiting on supplemental survey information from Las Vegas Paving to complete all outstanding knowledge of existing information.

Comment 14 Provide detail sheets showing the drop inlets for the Neenah and CM inlets. The 412A drop inlet is also acceptable. Other inlet designs will be reviewed on a case by case basis. Verify the proper grate call outs on the details. Review and revise the corresponding Construction Notes accordingly.

Response: All comments have been addressed accordingly.

Comment 15 Provide detail sheets showing typical details needed for the construction, connection and any special transition structure details. Structural details, if required, must be submitted by the 90% submittal.

Response: All pertinent tie-in details have been included. There are no structural details required for this project as all transitions have been revised to pre-cast structures which will be manufactured by Las Vegas Paving's subcontractor.

Comment 16 Review the proposed storm drain modifications at Sirius Avenue and Valley View. Consider adding an inlet at the north side of the intersection. See Sheet SD-02 for marked up comments.

Response: The existing slope for the inlets on the north side of the valley gutter to the south side of the valley gutter is 0.3%. The intent of design at this location is to add the curb inlet on the south side of Sirius Avenue which has the same capacity as the two existing inlets in the valley gutter on the north and south side. The inlets on the north side are intended to be removed. The existing valley gutter is going to be replaced and the proposed slope in the valley gutter on the north side to the curb inlet will be positive. The concept was adopted in order to provide the same amount of capture capacity at the least amount of cost to the City, resulting in only one inlet. Running another storm line to the north would require more

utility crossings and more material including additional trenching, manholes and inlets.

Comment 17 **Review the proposed storm drain modifications at San Angelo Avenue and Valley View. Consider adding an inlet at the north side of the intersection. See Sheet SD-02 for marked up comments.**

Response: It was decided through both a field visit and an existing plans analysis that this is the best location for the replacement inlet. The inlet cannot be placed further south due to the existing driveways being in conflict with the inlet. In addition, moving this inlet elsewhere would require both crossing and parallel impacts to the existing gas, existing water, and existing sewer. All conflicts are eliminated when placing the inlet within the valley gutter.

Comment 18 **The Type 4 Manholes are not recommended with the RCB construction proposed for the Valley View Boulevard system near Oakey Boulevard. Consider extending the RCB's and capping the upstream ends and directly connecting the laterals to the RCB. Use an access manhole at the terminus. See comments on Sheets SD-05 and SD-06.**

Response: All comments have been addressed accordingly. All Type 4 manholes have been removed from the plans.

Comment 19 **Complete the detailed grading and storm drain plan for the north side intersection modifications at Elton Avenue and Jones Boulevard. There is a significant elevation change between the proposed roadway improvements and the existing parking lot to the west. See Sheet DG-11.**

Response: Please reference sheet DG-11 for the appropriate detailed grading. N/A

Comment 20 **The removal plans need to clearly indicate the storm drain removals.**

Response: Reference the removal plans R-01 through R-11 sheets; all storm drain removals are indicated.

Comment 21 **Clearly indicate those drainage facilities that are to be Protected in Place.**

Response: Reference the improvement plans SD01 through SD11 sheets, all drainage facilities to remain have been indicated with a note to protect in place.

Comment 22 **Add a note for all storm drain drop inlets that references the newly adopted USDCCA Drawing No. 421 (Stormwater Quality Management Stamp and Sign Detail).**

Response: Inlet note has been added to plans, reference sheet SD-15.

Comment 23 **Provide an updated cost estimate with the next submittal.**

Response: An updated cost estimate summarizing all changes has been added.

Comment 24 **Additional comments are shown on the attached 30% storm drain plans.**

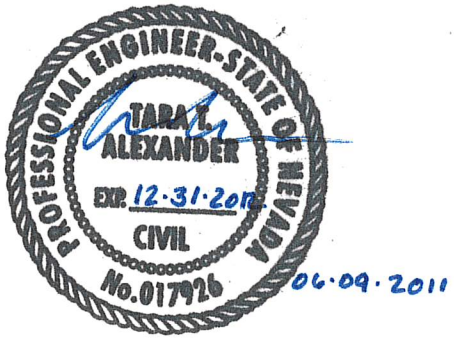
Response: Noted, additional comments on plans are addressed within the revised plans set.

If there are any questions concerning this study or additional information is needed, please contact me at (702) 938-5459.

Sincerely,

Tara Taylor Alexander, P.E.
Senior Hydrologist

JACOBS



Memorandum

City of Las Vegas
Department of Public Works
Engineering Planning

To: Rosa Cortez, P.E.
Engineering Project Manager

From: Peter Jackson, CFM
Flood Control Section

Date: March 2, 2011

Re: Jones & Valley View Corridor Improvements
70% Plan Submittal for Jones Boulevard
70% Plans for Valley View Boulevard with Draft Drainage Memorandum
Hansen # 38800, WU 8117

We have reviewed the 70% Jones & Valley View Corridor Improvements project submittal that includes the 70% plans for Jones Boulevard and the 70% Plans with the Draft Drainage Memorandum for Valley View Boulevard. This Construction Manager at Risk project includes improvements in Jones Boulevard between US-95 and Sahara Avenue along with improvements in Valley View Boulevard between US-95 and Desert Inn Road and Flood Control offers the following comments:

Comments on the Draft Drainage Memorandum for the Valley View improvements:

1. Flood Control takes no exception to the overall Hydrology presented as it complies with the on-going Oakey Storm Drain – Cahlan to Barnard project.
2. The transition of the proposed storm drain system between the Valley View project and the Oakey Storm Drain – Cahlan to Barnard project needs to be revised to provide for a smooth transition between proposed facilities. Provide a transition from the 7'x5' RCB to a 5'x5' RCB and end this project with at least one section of 5'x5' RCB. Provide a concrete cap & plug at the terminus of the proposed storm drain at Station 21+51.86. Continue to coordinate the match point and design between the two systems with Parsons Brinckerhoff.
3. The WSPG analysis must be revised to include the revised transition at the match point between this project and the Oakey Storm Drain – Cahlan to Barnard project. The WSPG needs to match the proposed system parameters. Update the Summary Table that provides both WSPG and Plan Stationing. Refine the WSPG input parameters based upon the minor profile adjustments. The revised WSPG analysis must be included with the design submittal. Provide an electronic copy of the WSPG analysis including both input and output files with the Final Design Report.
4. The provided WSPG Plan & Profile needs to be printed at a larger scale to be legible.
5. Revise Table 2 to label the Q100 bypass flow.
6. The drop inlet calculations need to be revised to reflect the curved vaned grates.

Valley View Blvd
Water Surface Profile

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT or "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
-1823.764	2093.201	7.744	2100.945	378.10	15.12	3.55	2104.50	.00	5.00	5.00	5.000	5.000	.00	0 .0
HYDRAULIC JUMP														
-1823.764	2093.201	3.123	2096.323	378.10	24.22	9.11	2105.43	.00	5.00	5.00	5.000	5.000	.00	0 .0
134.858	.0311					.0281	3.79	3.12	2.42	3.04	.013	.00	.00	BOX
-1688.906	2097.396	3.199	2100.595	378.10	23.64	8.68	2109.27	.00	5.00	5.00	5.000	5.000	.00	0 .0
115.856	.0311					.0256	2.97	3.20	2.33	3.04	.013	.00	.00	BOX
-1573.050	2101.000	3.355	2104.355	378.10	22.54	7.89	2112.24	.00	5.00	5.00	5.000	5.000	.00	0 .0
72.360	.0238					.0241	1.75	3.36	2.17	3.37	.013	.00	.00	BOX
-1500.690	2102.720	3.348	2106.068	378.10	22.59	7.92	2113.99	.00	5.00	5.00	5.000	5.000	.00	0 .0
80.898	.0260					.0238	1.92	3.35	2.18	3.26	.013	.00	.00	BOX
-1419.792	2104.823	3.397	2108.221	378.10	22.26	7.69	2115.91	.00	5.00	5.00	5.000	5.000	.00	0 .0
132.533	.0260					.0220	2.91	3.40	2.13	3.26	.013	.00	.00	BOX
-1287.259	2108.269	3.563	2111.833	378.10	21.22	6.99	2118.83	.00	5.00	5.00	5.000	5.000	.00	0 .0
70.616	.0260					.0195	1.37	3.56	1.98	3.26	.013	.00	.00	BOX
-1216.643	2110.105	3.737	2113.842	378.10	20.23	6.36	2120.20	.00	5.00	5.00	5.000	5.000	.00	0 .0
45.183	.0260					.0172	.78	3.74	1.84	3.26	.013	.00	.00	BOX
-1171.460	2111.280	3.920	2115.200	378.10	19.29	5.78	2120.98	.00	5.00	5.00	5.000	5.000	.00	0 .0
2.383	.0259					.0161	.04	3.92	1.72	3.26	.013	.00	.00	BOX

FILE: VVOVR1.WSW

W S P G W - CIVILDESIGN Version 14.06
Program Package Serial Number: 1267
WATER SURFACE PROFILE LISTING

Date: 5-19-2011 Time: 9:42:50

Valley View Blvd
Water Surface Profile

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT) / SF Ave	Water Elev / HF	Q (CFS) / SE Dpth	Vel (FPS) / Froude N	Vel Head / Norm Dp	Energy Grd.El. / "N"	Super Elev / X-Fall	Critical Depth / ZR	Flow Top Width / Type Ch	Height/Dia.-FT or I.D. / No Wth Prs/Pip	Base Wt / ZL
~1169.077	2111.342	3.931	2115.273	378.10	19.24	5.75	2121.02	.00	5.00	5.00	5.000	5.000 .00
30.797	.0259					.0152	.47	3.93	1.71	3.26	.013	.00 .00
												BOX
~1138.280	2112.140	4.123	2116.263	378.10	18.34	5.22	2121.49	.00	5.00	5.00	5.000	5.000 .00
33.534	.0181					.0139	.46	4.12	1.59	3.75	.013	.00 .00
												BOX
~1104.746	2112.748	4.222	2116.970	378.10	17.91	4.98	2121.95	.00	5.00	5.00	5.000	5.000 .00
45.400	.0181					.0127	.58	4.22	1.54	3.75	.013	.00 .00
												BOX
~1059.346	2113.572	4.428	2118.000	378.10	17.08	4.53	2122.53	.00	5.00	5.00	5.000	5.000 .00
28.541	.0181					.0113	.32	4.43	1.43	3.75	.013	.00 .00
												BOX
~1030.805	2114.090	4.644	2118.733	378.10	16.28	4.12	2122.85	.00	5.00	5.00	5.000	5.000 .00
18.215	.0181					.0100	.18	4.64	1.33	3.75	.013	.00 .00
		---------- WARNING - Flow depth near top of box conduit ----------										
~1012.590	2114.420	4.871	2119.291	378.10	15.53	3.74	2123.03	.00	5.00	5.00	5.000	5.000 .00
JUNCT STR	.0021					.0151	.07	4.87	1.24		.013	.00 .00
		---------- WARNING - Flow depth near top of box conduit ----------										
~1007.810	2114.430	3.233	2117.663	334.10	20.67	6.63	2124.29	.00	5.00	5.00	5.000	5.000 .00
4.410	.0340					.0205	.09	3.23	2.03	2.67	.013	.00 .00
												BOX

Valley View Blvd
Water Surface Profile

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
-1003.400	2114.580	3.253	2117.833	334.10	20.54	6.55	2124.39	.00	5.00	5.00	5.000	5.000	.00	0 .0
26.069	.0198					.0204	.53	3.25	2.01	3.29	.013	.00	.00	BOX
-977.331	2115.096	3.247	2118.344	334.10	20.58	6.57	2124.92	.00	5.00	5.00	5.000	5.000	.00	0 .0
254.705	.0198					.0218	5.55	3.25	2.01	3.29	.013	.00	.00	BOX
-722.626	2120.139	3.096	2123.236	334.10	21.58	7.23	2130.47	.00	5.00	5.00	5.000	5.000	.00	0 .0
119.226	.0198					.0247	2.94	3.10	2.16	3.29	.013	.00	.00	BOX
-603.400	2122.500	2.952	2125.452	334.10	22.63	7.96	2133.41	.00	5.00	5.00	5.000	5.000	.00	0 .0
348.900	.0263					.0251	8.74	2.95	2.32	2.95	.013	.00	.00	BOX
-254.500	2131.670	3.056	2134.726	334.10	21.87	7.43	2142.15	.00	5.00	5.00	5.000	5.000	.00	0 .0
JUNCT STR	.0406					.0235	3.53	3.06	2.20		.013	.00	.00	BOX
-104.040	2137.780	2.771	2140.551	288.10	20.80	6.72	2147.27	.00	4.69	5.00	5.000	5.000	.00	0 .0
1.287	.0401					.0229	.03	2.77	2.20	2.25	.013	.00	.00	BOX
-102.753	2137.832	2.776	2140.608	288.10	20.76	6.69	2147.30	.00	4.69	5.00	5.000	5.000	.00	0 .0
25.486	.0401					.0215	.55	2.78	2.20	2.25	.013	.00	.00	BOX
-77.267	2138.853	2.912	2141.765	288.10	19.79	6.08	2147.85	.00	4.69	5.00	5.000	5.000	.00	0 .0
19.495	.0401					.0190	.37	2.91	2.04	2.25	.013	.00	.00	BOX
-57.773	2139.635	3.054	2142.688	288.10	18.87	5.53	2148.22	.00	4.69	5.00	5.000	5.000	.00	0 .0
15.183	.0401					.0168	.25	3.05	1.90	2.25	.013	.00	.00	BOX

Valley View Blvd
Water Surface Profile

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
-42.589	2140.243	3.203	2143.446	288.10	17.99	5.03	2148.47	.00	4.69	5.00	5.000	5.000	.00	0 .0
11.913	.0401					.0148	.18	3.20	1.77	2.25	.013	.00	.00	BOX
-30.676	2140.721	3.359	2144.080	288.10	17.15	4.57	2148.65	.00	4.69	5.00	5.000	5.000	.00	0 .0
9.332	.0401					.0131	.12	3.36	1.65	2.25	.013	.00	.00	BOX
-21.344	2141.095	3.523	2144.618	288.10	16.36	4.15	2148.77	.00	4.69	5.00	5.000	5.000	.00	0 .0
7.230	.0401					.0116	.08	3.52	1.54	2.25	.013	.00	.00	BOX
-14.115	2141.385	3.695	2145.079	288.10	15.59	3.78	2148.86	.00	4.69	5.00	5.000	5.000	.00	0 .0
5.473	.0401					.0103	.06	3.69	1.43	2.25	.013	.00	.00	BOX
-8.642	2141.604	3.875	2145.479	288.10	14.87	3.43	2148.91	.00	4.69	5.00	5.000	5.000	.00	0 .0
3.973	.0401					.0091	.04	3.88	1.33	2.25	.013	.00	.00	BOX
-4.669	2141.763	4.064	2145.827	288.10	14.18	3.12	2148.95	.00	4.69	5.00	5.000	5.000	.00	0 .0
2.669	.0401					.0081	.02	4.06	1.24	2.25	.013	.00	.00	BOX
-1.999	2141.870	4.263	2146.133	288.10	13.52	2.84	2148.97	.00	4.69	5.00	5.000	5.000	.00	0 .0
1.517	.0401					.0072	.01	4.26	1.15	2.25	.013	.00	.00	BOX
-.483	2141.931	4.471	2146.401	288.10	12.89	2.58	2148.98	.00	4.69	5.00	5.000	5.000	.00	0 .0
.483	.0401					.0066	.00	4.47	1.07	2.25	.013	.00	.00	BOX
.000	2141.950	4.690	2146.640	288.10	12.29	2.34	2148.98	.00	4.69	5.00	5.000	5.000	.00	0 .0
TRANS STR	.0413					.0031	.03	4.69	1.00		.013	.00	.00	BOX

---------- WARNING - Flow depth near top of box conduit ----------

Valley View Blvd
Water Surface Profile

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT) / SF Ave	Water Elev / HF	Q (CFS) / SE Dpth	Vel (FPS) / Froude N	Vel Head / Norm Dp	Energy Grd.El. / "N"	Super Elev / X-Fall	Critical Depth / ZR	Flow Top Width	Height/Dia.-FT / or I.D.	Base Wt / ZL	No Wth Prs/Pip / Type Ch
619.680	2145.750	5.815	2151.565	131.10	6.56	.67	2152.23	.00	2.77	5.00	4.000	5.000	.00	0 .0
227.070	.0030					.0029	.65	5.82	.58	3.33	.013	.00	.00	BOX
846.750	2146.420	5.794	2152.214	131.10	6.56	.67	2152.88	.00	2.77	5.00	4.000	5.000	.00	0 .0
JUNCT STR	.0080					.0009	.00	5.79	.58		.013	.00	.00	BOX
849.250	2146.440	6.549	2152.989	72.10	3.61	.20	2153.19	.00	1.86	5.00	4.000	5.000	.00	0 .0
188.220	.0029					.0009	.16	6.55	.32	2.13	.013	.00	.00	BOX
1037.470	2146.990	6.161	2153.151	72.10	3.61	.20	2153.35	.00	1.86	5.00	4.000	5.000	.00	0 .0
JUNCT STR	.0080					.0000	.00	6.16	.32		.013	.00	.00	BOX

---------- WARNING - Junction Analysis - Large Lateral Flow(s) ----------

1039.970	2147.010	6.426	2153.436	.10	.00	.00	2153.44	.00	.02	5.00	4.000	5.000	.00	0 .0
JUNCT STR	.0080					.0044	.00	6.43	.00		.013	.00	.00	BOX
1055.260	2147.060	6.426	2153.486	.10	.00	.00	2153.49	.00	.02	5.00	4.000	5.000	.00	0 .0

Loc	te: 26-May-11								
Conduit Data				Energy and Hydraulic Data					
Station		Sl			Pipe			Comments
From	To	Width	F	Total	U/S EGL	U/S HGL	Press Flow?	
TIE-IN	BEND					2153.44		
				0.10	2154.37	2153.54	Yes	
BEND	DIVV01							
				0.39	2154.76	2153.92	Yes	TOG=2154.17
						2153.44		
TIE-IN	DIVV02							
				0.04	2154.32	2153.48	Yes	TOG=2154.38
						2152.99		
TIE-IN	BEND							
				0.06	2153.61	2153.05	Yes	
BEND	DIVV03							
				0.26	2153.87	2153.31	Yes	TOG=2154.17
						2152.99		
TIE-IN	DIVV04							
				0.04	2153.59	2153.03	Yes	TOG=2153.63
						2151.57		
TIE-IN	BEND							
				0.03	2151.78	2151.60	Yes	
BEND	DIVV05							
				0.16	2151.94	2151.76	Yes	TOG=2152.12
						2151.21		
TIE-IN	DI-VV06							
				0.02	2151.64	2151.23	Yes	TOG=2152.44
						2148.89		
T-INTERSECTION	TRANSITION	7.00						
				0.12	2149.16	2149.01	Yes	
TRANSITION	BEND	5.00						
				0.01	2149.49	2149.02	Yes	
BEND	TIE-IN	5.00						
				0.28	2149.78	2149.30	No	
TIE-IN	DIOAK01							
				1.19	2152.67	2150.19	Yes	TOG=2151.36
						2149.30		
TIE-IN	DIOAK02							
				0.18	2151.03	2149.48	Yes	TOG=2151.64
						2148.36		
DIOAK03	MHOAK03							
				0.26	2149.73	2148.62	Yes	TOG=2149.87

RESPONSE TO COMMENT 5

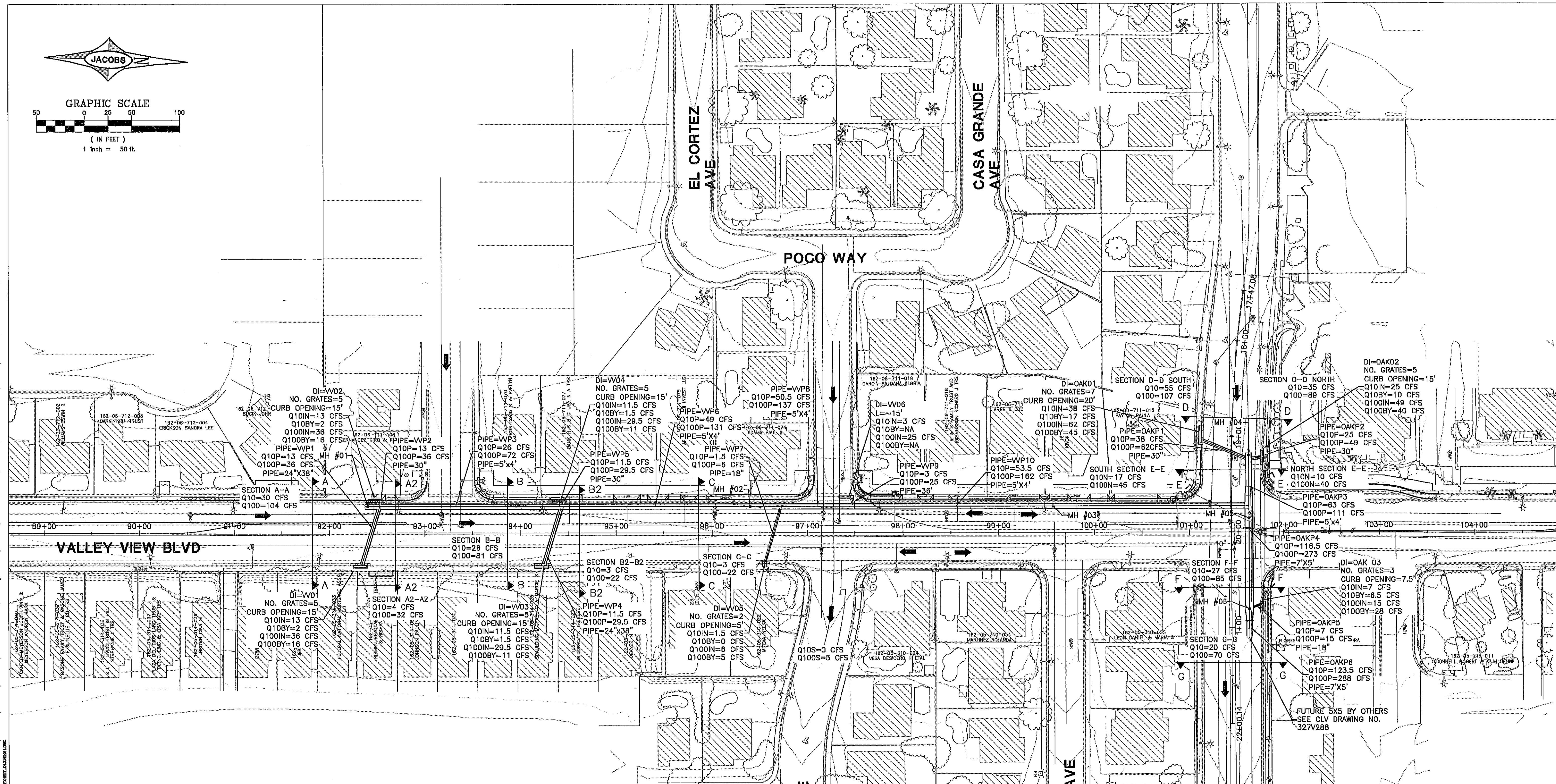
- Revised Table 2

TABLE 2

Inlet	Q_{10} (cfs)	Q_{100} (cfs)	Length (ft)	$Efficency_{10}$ (%)	$Efficency_{100}$ (%)	$Q_{10\ IN}$ (cfs)	$Q_{100\ IN}$ (cfs)	$Q_{10\ BYPASS}$ (cfs)	$Q_{100\ BYPASS}$ (cfs)
VV01	15	52	15	87.1	68.8	13	36	2	16
VV02	15	52	15	87.1	68.8	13	36	2	16
VV03	13	40.5	15	88.8	72.8	11.5	29.5	1.5	11
VV04	13	40.5	15	88.8	72.8	11.5	29.5	1.5	11
VV05	1.5	11	5	94.8	55.6	1.5	6	0	5
VV06	3	25	15	NA	NA	3	25	NA	NA
OAK01	55	107	20	68.3	57.7	38	62	17	45
OAK02	35	89	15	70	54.5	25	49	10	40
OAK03	13.5	42.5	10	53.7	34.6	7	15	6.5	28

RESPONSE TO COMMENT 6

- Storm Drain Hydraulic Summary Exhibit
- Revised Drop Inlet Calculations



STORM DRAIN
HYDRAULIC SUMMARY EXHIBIT

HYDRAULIC CALCULATION SUMMARY									
Hydraulic Section	Q10 (cfs)	D10 (ft)	V10 (fps)	D10 x V10 (<=6)	Q100 (cfs)	D100 (ft)	V100 (fps)	D100 x V100 (<=8)	Source Runoff*
A	30	0.67	2.4	1.6	104	0.97	3.4	3.3	PB CP2N
A2	4	0.38	1.6	0.6	32	0.68	2.5	1.7	PB CP2N - VV01 & VV02 IN
B	26	0.63	2.1	1.3	81	0.87	2.9	2.5	PB OFF4 + SECTION A2 +35% PB OFF5
B2	3	0.34	1.3	0.4	22	0.6	2	1.2	SECTION B - VV03 & VV04 IN
C	3	0.33	1.6	0.5	22	0.6	2.4	1.4	SECTION B - VV03 & VV04 IN
D	90	0.93	5.1	4.7	196	1.14	5.6	6.4	PB CPO
E	27	0.65	2.6	1.7	85	0.87	3.5	3.0	PB CPO - OAK01 & OAK02 IN
F	27	0.54	3.3	1.8	85	0.72	4.4	3.2	PB CPO - OAK01 & OAK02 IN
G	20	0.49	3.4	1.7	70	0.68	4.3	2.9	SECTION F - OAK03 IN

* PB SOURCE FLOWS ARE BASED ON THE PARSON BRINKERHOFF HYDROLOGY PERFORMED FOR THE OAKEY STORM DRAIN -CAHLAN TO BARNARD; DATED NOVEMBER 12, 2010

DI #VV01 & VV02_10-YR

Project Description

Solve For	Efficiency

Input Data

Discharge	15.00	ft³/s
Slope	0.40	%
Gutter Width	1.50	ft
Gutter Cross Slope	8.67	%
Road Cross Slope	2.75	%
Roughness Coefficient	0.015	
Local Depression	2.00	in
Local Depression Width	1.50	ft
Grate Width	1.50	ft
Grate Length	12.50	ft
Grate Type	Curved Vaned	
Clogging	50.00	%
Curb Opening Length	12.50	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	87.05	%
Intercepted Flow	13.06	ft³/s
Bypass Flow	1.94	ft³/s
Spread	18.70	ft
Depth	0.60	ft
Flow Area	4.87	ft²
Gutter Depression	0.09	ft
Total Depression	0.26	ft
Velocity	3.08	ft/s
Splash Over Velocity	16.48	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.62	
Grate Flow Ratio	0.22	
Equivalent Cross Slope	0.06569	ft/ft
Active Grate Length	6.25	ft
Length Factor	0.27	
Total Interception Length	22.73	ft

DI #VV01 & VV02_10-YR

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

DI #VV01 & VV02_100-YR

Project Description

Solve For	Efficiency

Input Data

Discharge		52.00	ft³/s
Slope		0.40	%
Gutter Width		1.50	ft
Gutter Cross Slope		8.67	%
Road Cross Slope		2.75	%
Roughness Coefficient		0.015	
Local Depression		2.00	in
Local Depression Width		1.50	ft
Grate Width		1.50	ft
Grate Length		12.50	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		12.50	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	68.82	%
Intercepted Flow	35.78	ft³/s
Bypass Flow	16.22	ft³/s
Spread	30.00	ft
Depth	0.91	ft
Flow Area	12.44	ft²
Gutter Depression	0.09	ft
Total Depression	0.26	ft
Velocity	4.18	ft/s
Splash Over Velocity	16.48	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.49	
Grate Flow Ratio	0.14	
Equivalent Cross Slope	0.05105	ft/ft
Active Grate Length	6.25	ft
Length Factor	0.14	
Total Interception Length	44.57	ft

DI #VV01 & VV02_100-YR

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

DI#VV 03 & VV04_10-YR

Project Description

Solve For	Efficiency

Input Data

Discharge		13.00	ft³/s
Slope		0.35	%
Gutter Width		1.50	ft
Gutter Cross Slope		8.67	%
Road Cross Slope		2.50	%
Roughness Coefficient		0.015	
Local Depression		2.00	in
Local Depression Width		1.50	ft
Grate Width		1.50	ft
Grate Length		12.50	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		12.50	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	88.79	%
Intercepted Flow	11.54	ft³/s
Bypass Flow	1.46	ft³/s
Spread	19.27	ft
Depth	0.57	ft
Flow Area	4.71	ft²
Gutter Depression	0.09	ft
Total Depression	0.26	ft
Velocity	2.76	ft/s
Splash Over Velocity	16.48	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.64	
Grate Flow Ratio	0.22	
Equivalent Cross Slope	0.06317	ft/ft
Active Grate Length	6.25	ft
Length Factor	0.30	
Total Interception Length	21.05	ft

DI#VV 03 & VV04_10-YR

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

DI#VV 03 & VV04_100-YR

Project Description

Solve For	Efficiency

Input Data

Discharge		40.50	ft³/s
Slope		0.35	%
Gutter Width		1.50	ft
Gutter Cross Slope		8.67	%
Road Cross Slope		2.50	%
Roughness Coefficient		0.015	
Local Depression		2.00	in
Local Depression Width		1.50	ft
Grate Width		1.50	ft
Grate Length		12.50	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		12.50	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	72.79	%
Intercepted Flow	29.48	ft³/s
Bypass Flow	11.02	ft³/s
Spread	29.71	ft
Depth	0.84	ft
Flow Area	11.10	ft²
Gutter Depression	0.09	ft
Total Depression	0.26	ft
Velocity	3.65	ft/s
Splash Over Velocity	16.48	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.52	
Grate Flow Ratio	0.14	
Equivalent Cross Slope	0.04941	ft/ft
Active Grate Length	6.25	ft
Length Factor	0.16	
Total Interception Length	39.32	ft

DI#VV 03 & VV04_100-YR

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

DI#VV05_10-YR

Project Description

Solve For	Efficiency

Input Data

Discharge		1.50	ft³/s
Slope		0.50	%
Gutter Width		1.50	ft
Gutter Cross Slope		8.67	%
Road Cross Slope		3.00	%
Roughness Coefficient		0.015	
Local Depression		2.00	in
Local Depression Width		1.50	ft
Grate Width		1.50	ft
Grate Length		5.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		5.00	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	94.83	%
Intercepted Flow	1.42	ft³/s
Bypass Flow	0.08	ft³/s
Spread	6.74	ft
Depth	0.29	ft
Flow Area	0.74	ft²
Gutter Depression	0.09	ft
Total Depression	0.25	ft
Velocity	2.01	ft/s
Splash Over Velocity	6.60	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.32	
Grate Flow Ratio	0.58	
Equivalent Cross Slope	0.12735	ft/ft
Active Grate Length	2.50	ft
Length Factor	0.40	
Total Interception Length	6.21	ft

DI#VV05_10-YR

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

DI#VV05_100-YR

Project Description

Solve For	Efficiency

Input Data

Discharge		11.00	ft³/s
Slope		0.50	%
Gutter Width		1.50	ft
Gutter Cross Slope		8.67	%
Road Cross Slope		3.00	%
Roughness Coefficient		0.015	
Local Depression		2.00	in
Local Depression Width		1.50	ft
Grate Width		1.50	ft
Grate Length		5.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		5.00	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	55.63	%
Intercepted Flow	6.12	ft³/s
Bypass Flow	4.88	ft³/s
Spread	15.06	ft
Depth	0.54	ft
Flow Area	3.47	ft²
Gutter Depression	0.09	ft
Total Depression	0.25	ft
Velocity	3.17	ft/s
Splash Over Velocity	6.60	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.17	
Grate Flow Ratio	0.27	
Equivalent Cross Slope	0.07612	ft/ft
Active Grate Length	2.50	ft
Length Factor	0.13	
Total Interception Length	19.53	ft

DI#VV05_100-YR

Messages

Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

DI#VV06_10-YR

Project Description

Solve For	Spread

Input Data

Discharge		3.00	ft³/s
Left Side Slope		64.00	ft/ft (H:V)
Right Side Slope		64.00	ft/ft (H:V)
Bottom Width		0.00	ft
Grate Width		2.00	ft
Grate Length		15.00	ft
Local Depression		2.00	in
Local Depression Width		2.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Results

Spread	2.00	ft
Depth	-0.07	ft
Wetted Perimeter	-8.64	ft
Top Width	-8.63	ft
Open Grate Area	5.25	ft²
Active Grate Weir Length	32.00	ft

DI#VV06_100-YR

Project Description

Solve For	Spread

Input Data

Discharge		25.00	ft³/s
Left Side Slope		64.00	ft/ft (H:V)
Right Side Slope		64.00	ft/ft (H:V)
Bottom Width		0.00	ft
Grate Width		2.00	ft
Grate Length		15.00	ft
Local Depression		2.00	in
Local Depression Width		2.00	ft
Grate Type	Curved Vaned		
Clogging		50.00	%

Results

Spread	79.15	ft
Depth	0.62	ft
Wetted Perimeter	79.16	ft
Top Width	79.15	ft
Open Grate Area	5.25	ft²
Active Grate Weir Length	32.00	ft

El Cortez Avenue - Low Point
Drop Inlet Orifice Calculation
DI #VV06
SOLVE FOR REQUIRED
OPENING AREA

$$Q=CA(2gh)^{0.5}$$

Inputs:

C = Discharge Coefficient=	**0.62**
Q = Discharge (cfs) =	**25**
g = Gravity Constant (ft^2/s)=	**32.2**
h = height of water=	**0.5**

Result:

A = Required Opening Area (ft^2)=	7.11
(area doubled for 50% clogging)	**14.21**

SOLVE FOR ACTUAL
GRATE OPENING AREA (GOA)

GOA = (NOG x OAG) + (COH x COL)

Inputs:

Number of Grates (NOG) =	**7**
Open Area/Grate (OAG) (ft^2)**=	**2.33**
Curb Opening Height (COH) (ft)=	**0**
Curb Opening Length (COL) (ft)=	**0**

**The effective Open Area/Grate is assumed to be 50% for overall inlet size (2.17x2.15)

Result:

Actual Grate Opening Area (ft^2)=	**16.31**

DI #OAK01_10-YR

Project Description

Solve For	Efficiency

Input Data

Discharge		55.00	ft³/s
Slope		1.00	%
Gutter Width		1.50	ft
Gutter Cross Slope		8.67	%
Road Cross Slope		2.10	%
Roughness Coefficient		0.015	
Local Depression		2.00	in
Local Depression Width		1.50	ft
Grate Width		1.50	ft
Grate Length		17.50	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		17.50	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	68.29	%
Intercepted Flow	37.56	ft³/s
Bypass Flow	17.44	ft³/s
Spread	30.49	ft
Depth	0.74	ft
Flow Area	9.84	ft²
Gutter Depression	0.10	ft
Total Depression	0.27	ft
Velocity	5.59	ft/s
Splash Over Velocity	44.17	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.48	
Grate Flow Ratio	0.14	
Equivalent Cross Slope	0.04587	ft/ft
Active Grate Length	8.75	ft
Length Factor	0.14	
Total Interception Length	64.05	ft

DI #OAK01_100-YR

Project Description

Solve For	Efficiency

Input Data

Discharge		107.00	ft³/s
Slope		1.00	%
Gutter Width		1.50	ft
Gutter Cross Slope		8.67	%
Road Cross Slope		2.10	%
Roughness Coefficient		0.015	
Local Depression		2.00	in
Local Depression Width		1.50	ft
Grate Width		1.50	ft
Grate Length		17.50	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		17.50	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	57.74	%
Intercepted Flow	61.78	ft³/s
Bypass Flow	45.22	ft³/s
Spread	39.22	ft
Depth	0.92	ft
Flow Area	16.23	ft²
Gutter Depression	0.10	ft
Total Depression	0.27	ft
Velocity	6.59	ft/s
Splash Over Velocity	44.17	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.41	
Grate Flow Ratio	0.11	
Equivalent Cross Slope	0.04010	ft/ft
Active Grate Length	8.75	ft
Length Factor	0.10	
Total Interception Length	91.83	ft

DI #OAK02_10-YR

Project Description

Solve For	Efficiency

Input Data

Discharge		35.00	ft³/s
Slope		1.00	%
Gutter Width		1.50	ft
Gutter Cross Slope		8.67	%
Road Cross Slope		3.80	%
Roughness Coefficient		0.015	
Local Depression		2.00	in
Local Depression Width		1.50	ft
Grate Width		1.50	ft
Grate Length		12.50	ft
Grate Type	Curved Vaned		
Clogging		50.00	%
Curb Opening Length		12.50	ft

Options

Calculation Option	Use Both
Grate Flow Option	Exclude None

Results

Efficiency	70.02	%
Intercepted Flow	24.51	ft³/s
Bypass Flow	10.49	ft³/s
Spread	17.74	ft
Depth	0.75	ft
Flow Area	6.04	ft²
Gutter Depression	0.07	ft
Total Depression	0.24	ft
Velocity	5.80	ft/s
Splash Over Velocity	16.48	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.42	
Grate Flow Ratio	0.23	
Equivalent Cross Slope	0.07407	ft/ft
Active Grate Length	6.25	ft
Length Factor	0.16	
Total Interception Length	39.74	ft

DI #OAK02_10-YR

Messages

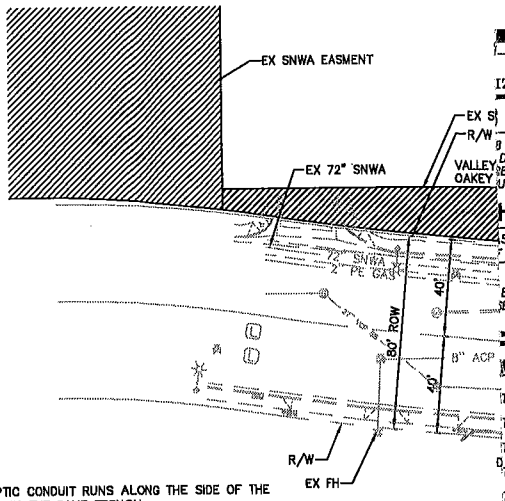
Messages	Grate Length should be within the defined range of HEC-22's Chart 5 (approx. 0.5-4.5 ft / 0.15-1.35 m).

GRAPHIC SCALE

0 20 40 80 160

(IN FEET)

IZ 1 inch = 40 ft. — VER 1 inch = 4 ft.



OF BEARINGS

W, BEING THE CENTERLINE OF OAKEY BOULEVARD, BETWEEN DRIVE AND VALLEY VIEW BOULEVARD, AS SHOWN ON A RECORD OF RECORDED IN FILE 142 OF SURVEYS, PAGE 72, OFFICIAL RECORDS, UNTY, NEVADA

HMARK

S VEGAS BM 1LV115 C4: RIVET & PLATE IN TOP OF CURB, AT SOUTHWEST OAKEY BOULEVARD AND CAMPBELL DRIVE. ELEVATION: 2106.93' (NAVD88)

CAUTION:

EXISTING UTILITIES ARE LOCATED ON THE PLANS FROM A SEARCH OF AVAILABLE RECORDS. CONTRACTOR TO VERIFY LOCATIONS AND DEPTHS PRIOR TO CONSTRUCTION.

UCTION ITEMS:

TRUCT PRECAST 5'X5' RCB

TRUCT PRECAST 5'X6' RCB

TRUCT 8" PVC C900 STORM DRAIN PIPE

TRUCT 18" RCP (CLASS III)

TRUCT 18" PVC C905 STORM DRAIN PIPE

TRUCT 24" RCP (CLASS III)

TRUCT 24" PVC C905 STORM DRAIN PIPE

TRUCT 30" RCP (CLASS III)

TRUCT 36" RCP (CLASS III)

TRUCT 48" RCP (CLASS III)

TRUCT 48" TYPE I STORM DRAIN MANHOLE
USDCCA STD. DWG. NO. 403

TRUCT 60" TYPE I STORM DRAIN MANHOLE
USDCCA STD. DWG. NO. 403

TRUCT TYPE II STORM DRAIN MANHOLE
USDCCA STD. DWG. NO. 405

TRUCT TYPE III STORM DRAIN MANHOLE
USDCCA STD. DWG. NO. 406

TRUCT PRECAST RCB ACCESS MANHOLE PER DETAIL ON SHEET D-3

TRUCT TYPE "DM" DROP INLET PER DETAIL ON SHEET D-1

LL 30" CONCRETE COLLAR PER DETAIL ON SHEET D-2 (NO DIRECT PAYMENT)

PLUG EXISTING SSMH ON EXISTING 8" SS LINE (NO DIRECT PAYMENT)

LSM PER DCSWCS SD-21

VE EXISTING PLUG AND TIE INTO 5'X5' RCB PER DETAIL ON SHEET D-3
IRECT PAYMENT)

TRUCT TYPE "F" SINGLE GRATE INLET OR APPROVED EQUAL PER DETAIL
HEET D-5

TRUCT PRECAST 5'X5' TO 5'X6' RCB TRANSITION STRUCTURE PER DETAIL
HEET D-2

TRUCT PRECAST 5'X6' TO 5'X5' RCB TRANSITION STRUCTURE PER DETAIL
HEET D-2

TRUCT D&L FOUNDRY, D-1620 SLOTTED LOCKING MANHOLE COVER PER DETAIL
HEET D-2

TATE SANITARY SEWER LATERAL PER SS SHEETS

ATE SANITARY SEWER LATERAL PER UT SHEETS. SEE UDACS SECTION 2.22
ANITARY SEWER/WATERLINE CROSSING REQUIREMENTS.

TRUCT 12"X12" ENVIRONMENTAL DROP INLET PER DETAIL ON SHEET D-3

TRUCT MODIFIED TYPE I SHALLOW STORM DRAIN MANHOLE PER DETAIL ON
D-2

SNWA NOTE:

EX SNWA FIBER OPTIC CONDUIT RUNS ALONG THE SIDE OF THE SNWA 84" PIPELINE IN THE SAME TRENCH.

SNWA CONSTRUCTION NOTES:

Contractor shall field locate and protect all SNWA/SNWS appurtenances including, but not lim access manways and cathodic protection systems. All above ground structures and at grade stru adjusted to new grade at contractor's expense. Cathodic protection test stations, rectifiers, and relocated to the sidewalk per SNWA standards and at the contractor's expense. Contractor to **Nevada Water Authority, Development Plan Review** , at (702) 862-3444 at least 48 hours construction activity.

Southern Nevada Water Authority DA

SNWA approval is valid for one (1) year from the signature date. If construction within the eas restricted pipe safety zone is not complete, plans must be resubmitted to SNWA for approval.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER

DATE_____ PROJECT No. 116388

2150

2145

2140

2135

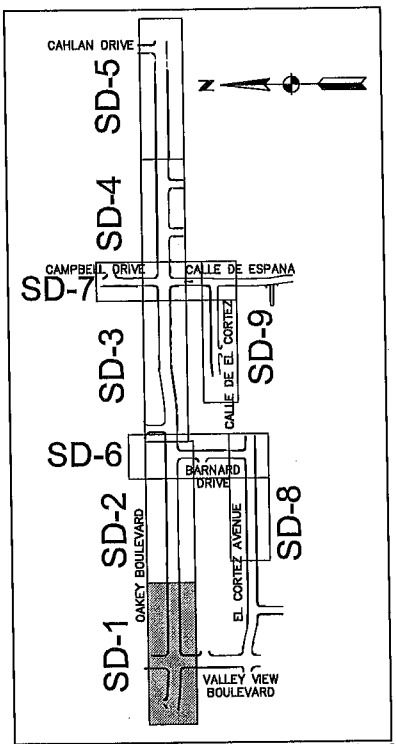
2130

2125

2120

2115

KEY MAP



100% SUBMITTAL

NO.	DATE:	DESCRIPTION	APP'D

REVISIONS

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

DESIGNED BY: NA
DRAWN BY: RM
CHECKED BY: EH

DATE: 3/28/11

PARSONS BRINCKERHOFF
3930 HOWARD HUGHES PARKWAY
SUITE 300
LAS VEGAS, NEVADA 89169

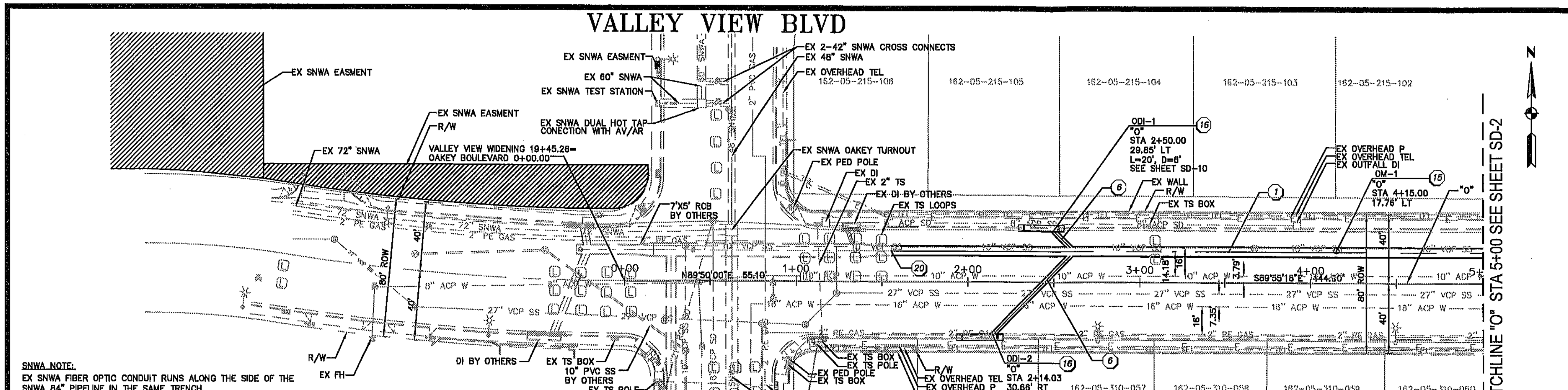
TITLE: OAKEY STORM DRAIN
CAHLAN TO BARNARD

SHEET: STORM DRAIN PLAN AND PROFILE
"O" STA: 0+00 TO 5+00

PROFESSIONAL ENGINEER - STATE OF NEVADA
No. 19840
NICHOLAS S. APPUGLISE
Exp 12/31/12
CIVIL

Sheet
SD-1
10 of 44

DRAWING NO.
327V288



SNWA NOTE:
EX SNWA FIBER OPTIC CONDUIT RUNS ALONG THE SIDE OF THE SNWA 84" PIPELINE IN THE SAME TRENCH.

SNWA CONSTRUCTION NOTES:

Contractor shall field locate and protect all SNWA/SNWS appurtenances including, but not limited to AV/AR, access manways and above ground structures and at grade structures must be adjusted to new grade at contractor's expense. Cathodic protection test stations, rectifiers, and AV/AR's must be relocated to the sidewalk per SNWA standards and at the contractor's expense. Contractor to **notify Southern Nevada Water Authority, Development Plan Review**, at (702) 862-3444 at least 48 hours **PRIOR** to construction activity.

Southern Nevada Water Authority ____________________ DATE

SNWA approval is valid for one (1) year from the signature date. If construction within the easement or restricted pipe safety zone is not complete, plans must be resubmitted to SNWA for approval.

APPROVED FOR CONSTRUCTION

LAS VEGAS VALLEY WATER DISTRICT ENGINEERING SERVICES MANAGER

DATE____________________ PROJECT No. 116388

Call before you Dig — Call Underground 1-702-453-5300 — Call before you Overhead 1-702-227-2929 — Call 811 1-800-227-2600 OR 1-702-455-7544

CONSTRUCTION NOTES:

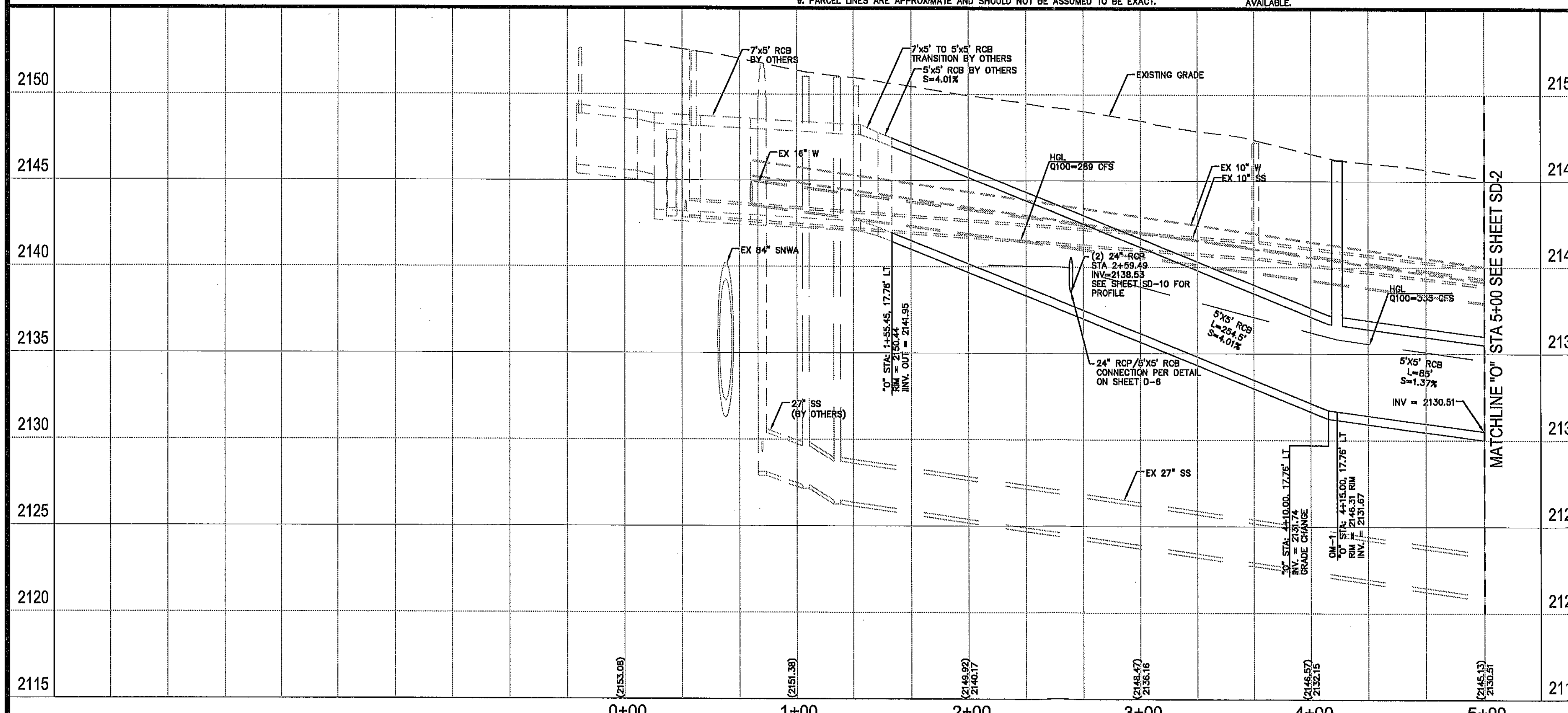
1. PROTECT ALL EXISTING DRY UTILITIES, WATER, AND SEWER FACILITIES IN PLACE AND ADJUST TO FINISHED GRADE EXCEPT WHERE OTHERWISE NOTED.
2. FOR STORM DRAIN TRENCH AND EXCAVATION LIMITS REFER TO DETAIL ON SHEET D-4.
3. ALL STORM DRAIN PIPE SHALL BE CLASS III PIPE UNLESS OTHERWISE NOTED.
4. ADJUST WATER VALVE BOXES TO FINISHED GRADE PER UDACS PLATE NO. 39. VALVES SHALL BE ACCESSIBLE AT ALL TIMES.
5. BACKFILL DRAIN INLETS WITH CLASS I CONTROLLED LOW STRENGTH MATERIAL (CLSM) WHERE WATER MAIN AND DRAIN INLET SEPARATION IS LESS THAN 6 FEET.
6. CONTRACTOR MUST SUBMIT SHOP DRAWINGS TO LVVWD BEFORE CONSTRUCTION TO SHOW HOW WATERLINES SPANNING A TRENCH WILL BE SUPPORTED DURING EXCAVATION AND BACKFILL. DRAWINGS WILL INCLUDE ALL LOCATIONS WHERE WATERLINES SPAN A TRENCH GREATER THAN FOUR (4) FEET WIDE.
7. PROTECT WATERLINES IN PLACE (EXCEPT WHERE OTHERWISE NOTED). WHEREVER A WATERLINE IS ABOVE A STORM DRAIN OR SEWER WHERE COMPACTION REQUIREMENTS UNDER A WATERLINE CANNOT BE MET, BACKFILL TRENCH WITH CLASS I / CLASS II CLSM TO THE SPRINGLINE OF THE WATERLINE. THIS REQUIREMENT IS FOR STRUCTURAL SUPPORT ONLY. ADDITIONAL HEALTH REGULATIONS MAY APPLY PER UDACS 2.22.
8. PROTECT-IN-PLACE EXISTING TRAFFIC SIGNAL CONDUIT UNLESS OTHERWISE NOTED.
9. PARCEL LINES ARE APPROXIMATE AND SHOULD NOT BE ASSUMED TO BE EXACT.

STORM DRAIN NOTES:

1. STORM DRAIN STATION AND OFFSETS ON OAKEY BOULEVARD ARE TAKEN FROM THE OAKEY BOULEVARD ALIGNMENT. STORM DRAIN STATION AND OFFSETS NOT ON OAKEY BOULEVARD ARE TAKEN FROM ALIGNMENTS ON THOSE STREETS, WHICH ARE MIDPOINT BETWEEN FACE OF CURB.
2. ALL LATERAL PIPE LENGTHS MEASURED ALONG PIPE CENTERLINE TO INSIDE EDGE OF MANHOLE, EDGE OF DI, RCB, OR STRUCTURE. ALL MAINLINE PIPE LENGTHS MEASURED ALONG PIPE CENTERLINE TO CENTER OF MANHOLE.

WATER LINE NOTES:

1. ALL SEWER/STORM DRAINS CROSSING WATER LINES MUST CONFORM TO SECTION 2.22 OF THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR POTABLE WATER SYSTEM (UDACS) FOR WATER AND STORM MAIN CROSSINGS AND CLEARANCES.
2. PROTECT WATER LINES IN PLACE (EXCEPT WHERE OTHERWISE NOTED). WHEREVER A WATER LINE IS WITHIN 18" ABOVE A STORM DRAIN LINE OR WHERE COMPACTION UNDER A WATER LINE CANNOT BE MET, BACKFILL TRENCH WITH CEMENT SLURRY OR FLOWABLE BACKFILL TO THE SPRINGLINE OF THE WATER LINE.
3. BACKFILL DRAIN INLETS WITH CLASS I CLSM WHERE WATER MAIN AND DRAIN INLET SEPARATION IS LESS THAN 6 FEET.
4. THE DISTRICT CANNOT GUARANTEE A WATERTIGHT SHUTDOWN WHERE CONNECTIONS OR REPAIRS TO EXISTING FACILITIES ARE REQUIRED. THE CONTRACTOR SHALL ENSURE ALL LABOR AND EQUIPMENT IS AVAILABLE TO REMOVE FUGITIVE WATER THAT MAY IMPEDE CONSTRUCTION AT ALL TIMES. COORDINATION WITH INSPECTION DIVISION MUST TAKE PLACE PRIOR TO ANY TRIAL SHUTDOWN. CONTRACTOR TO INSTALL TEMPORARY SERVICE TO ENSURE PROPER SHUTDOWN IN THE EVENT NO OTHER APPURTENANCES ARE AVAILABLE.



GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

HORIZ 1 inch = 40 ft. – VER 1 inch = 4 ft.

BASIS OF BEARINGS

N 89°55'18 W, BEING THE CENTERLINE OF OAKEY BOULEVARD, BETWEEN BARNARD DRIVE AND VALLEY VIEW BOULEVARD, AS SHOWN ON A RECORD OF SURVEY, RECORDED IN FILE 142 OF SURVEYS, PAGE 72, OFFICIAL RECORDS, CLARK COUNTY, NEVADA

BENCHMARK

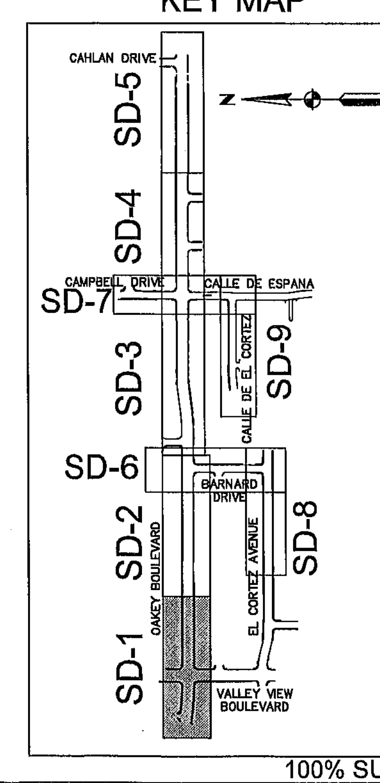
CITY OF LAS VEGAS BM 1LV115 C4: RIVET & PLATE IN TOP OF CURB, AT SOUTHWEST CORNER OF OAKEY BOULEVARD AND CAMPBELL DRIVE. ELEVATION: 2106.93' (NAVD88)

CAUTION:
EXISTING UTILITIES ARE LOCATED ON THE PLANS FROM A SEARCH OF AVAILABLE RECORDS. CONTRACTOR TO VERIFY LOCATIONS AND DEPTHS PRIOR TO CONSTRUCTION.

CONSTRUCTION ITEMS:

1. CONSTRUCT PRECAST 5'X5' RCB
2. CONSTRUCT PRECAST 5'X6' RCB
3. CONSTRUCT 8" PVC C900 STORM DRAIN PIPE
4. CONSTRUCT 18" RCP (CLASS III)
5. CONSTRUCT 18" PVC C905 STORM DRAIN PIPE
6. CONSTRUCT 24" RCP (CLASS III)
7. CONSTRUCT 24" PVC C905 STORM DRAIN PIPE
8. CONSTRUCT 30" RCP (CLASS III)
9. CONSTRUCT 36" RCP (CLASS III)
10. CONSTRUCT 48" RCP (CLASS III)
11. CONSTRUCT 48" TYPE I STORM DRAIN MANHOLE PER USDCCA STD. DWG. NO. 403
12. CONSTRUCT 60" TYPE I STORM DRAIN MANHOLE PER USDCCA STD. DWG. NO. 403
13. CONSTRUCT TYPE II STORM DRAIN MANHOLE PER USDCCA STD. DWG. NO. 405
14. CONSTRUCT TYPE III STORM DRAIN MANHOLE PER USDCCA STD. DWG. NO. 406
15. CONSTRUCT PRECAST RCB ACCESS MANHOLE PER DETAIL ON SHEET D-3
16. CONSTRUCT TYPE "DM" DROP INLET PER DETAIL ON SHEET D-1
17. INSTALL 30" CONCRETE COLLAR PER DETAIL ON SHEET D-2 (NO DIRECT PAYMENT)
18. CAP/PLUG EXISTING SSMH ON EXISTING 8" SS LINE (NO DIRECT PAYMENT)
19. USE CLSM PER DCSWCS SD-21
20. REMOVE EXISTING PLUG AND TIE INTO 5'X5' RCB PER DETAIL ON SHEET D-3 (NO DIRECT PAYMENT)
21. CONSTRUCT TYPE "F" SINGLE GRATE INLET OR APPROVED EQUAL PER DETAIL ON SHEET D-5
22. CONSTRUCT PRECAST 5'X5' TO 5'X6' RCB TRANSITION STRUCTURE PER DETAIL ON SHEET D-2
23. CONSTRUCT PRECAST 5'X6' TO 5'X5' RCB TRANSITION STRUCTURE PER DETAIL ON SHEET D-2
24. CONSTRUCT D&L FOUNDRY, D-1620 SLOTTED LOCKING MANHOLE COVER PER DETAIL ON SHEET D-2
25. REINSTATE SANITARY SEWER LATERAL PER SS SHEETS
26. RELOCATE SANITARY SEWER LATERAL PER UT SHEETS. SEE UDACS SECTION 2.22 FOR SANITARY SEWER/WATERLINE CROSSING REQUIREMENTS.
27. CONSTRUCT 12"X12" ENVIRONMENTAL DROP INLET PER DETAIL ON SHEET D-3
28. CONSTRUCT MODIFIED TYPE I SHALLOW STORM DRAIN MANHOLE PER DETAIL ON SHEET D-2

KEY MAP



100% SUBMITTAL

REVISIONS — NO. | DATE | DESCRIPTION | APP'D

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT

DATE: 3/28/11

DESIGNED BY: NA
DRAWN BY: RM
CHECKED BY: EH

PARSONS BRINCKERHOFF
3930 HOWARD HUGHES PARKWAY
SUITE 300
LAS VEGAS, NEVADA 89169

TITLE: OAKEY STORM DRAIN
CAHLAN TO BARNARD

SHEET: STORM DRAIN PLAN AND PROFILE
"O" STA: 0+00 TO 5+00

PROFESSIONAL ENGINEER STATE OF NEVADA — NICHOLAS G. APPUGLISE — Exp 12/31/12 — CIVIL — No. 19840

Sheet SD-1

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DRAWING NO. 327V288