September 21, 2016

Joseph Cetrulo, P.E.
GCW, Inc.
1555 South Rainbow Blvd
Las Vegas, NV 89146

RE: Two Fifty – Wastewater Master Plan

Dear Mr. Cetrulo:

The updated Two Fifty Wastewater Master Plan dated July 6, 2016, was received and reviewed. The City re-evaluated the downstream system and determined that no off-property sanitary sewer capacity shortfalls are anticipated or need to be addressed as a result of this Plan.

There is a typographical error on Page 7 which refers to 62 existing "multifamily" residential units for Alta Outfall #2, when these should be identified as "single family". Throughout the rest of the report, these are correctly identified as "single family" and the correct values of 284 gallons per day per unit were used for these units in the calculations and exhibits.

Other than that one typographical error, the Two Fifty Wastewater Master Plan is approved by the Sanitary Sewer Planning Section of the Department of Public Works. If you have any questions, feel free to email me or call me at (702) 229-2178.

Sincerely,

Tim Parks, P.E.
Engineering Project Manager
Sanitary Sewer Planning
Department of Public Works

cc: Kristina Swallow, P.E., CLV Public Works
Keith Letus, P.E., CLV Public Works

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840-050

SEVENTY ACRES LLC, 180 LAND CO LLC AND FORE STARS LTD

TWO FIFTY

Wastewater Master Plan

July 6, 2016

Prepared By:
Jaffer Almosawy, E.I.

Approved By:
Joseph Cetrulo, P.E.

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7/6/16

Prepared For:
Seventy Acres LLC,
180 Land Co LLC
Fore Stars LTD

GCW
ENGINEERS \ SURVEYORS

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Two Fifty
Wastewater Master Plan

Introduction

This Wasterwater Master Plan has been prepared to present the plan for the planning, design and construction of the wastewater collection system necessary for the ultimate development of the Two Fifty, land on which the Badlands Golf Course is currently operated, being developed by Seventy Acres LLC, 180 Land Co LLC and Fore Stars LTD. This report will provide future sewer planning of the subdivision. See Figure 1, Vicinity Map, for project location and Figure 2, Master Land Use Plan for planning development. The 253-acre site is located south of Alta Drive, north of Charleston Road, east of Hualapai Way and west of Rampart Boulevard in Las Vegas, Nevada. The project improvements include 3,020 luxury multi-family units and 60 1 acre estate lots on the 253 acres of APN's 138-32-301-005 (17.49 acres), 138-32-301-007 (47.59 acres), 138-31-801-003 (5.44 acres), 138-32-210-008 (2.37 acres), 138-32-202-001 (2.13 acres), 138-31-702-002 (166.99 acres) and 138-31-801-002 (11.28 acres).

The agency responsible for wastewater collection and treatment for this project is the City of Las Vegas (CLV).

The information presented in this report is at a planning level only and should not be considered design of the proposed sewer system. "As-built" details of the existing infrastructure and topography must be obtained and design of the proposed infrastructure facilities will require refinement as the detailed subdivision and roadway plans are developed.

This edition of the report address comments from the June 1, 2016 letter from Tim Parks with the City of Las Vegas Department of Public Works Sanitary Sewer Planning Department and the responses to the comments are addressed below:

1. Removed all notations referring to the improvements to the sewer system that are outside the project limits as 'off-site' and replaced with 'off-property'.
2. Changed townhome classification from multiple-family dwellings to single family dwellings (1 ERU). Updated sewer calcs and changed labels in all figures and exhibits.
3. Acquisition of public sewer easements from third parties to cross Palace Court may be required. However, if such easements cannot be acquired, service to the seven single

family dwellings shall be limited to Individual Sewage Disposal Systems if allowed by the Southern Nevada Health District.

A copy of the review comments can be found in the Appendix.

The objectives established for this study are:

- Present the design criteria and assumptions utilized.
- Analyze site constraints that may affect the gravity sewer system.
- Quantify the wastewater flows generated for on-site flows.
- Determine the conceptual infrastructure requirements necessary for the various flow contributions, including alignment, pipe depth, slope and sizing.
- Identify the future off-property flows (if necessary) to provide sewer service to the development.

A. Design Criteria

1. The following criteria and assumptions were utilized to calculate the anticipated wastewater flows and size the sewer pipes:
   a. Single Family Residential* development types = Standard Residential Wastewater Contribution Rate = 284 gallons per day (gpd) per Equivalent Residential Unit (ERU). This is based on the wastewater contribution rates from the CLV WWMPU August 2008 (refer to the Appendix for chart).
   b. Multi-Family Residential* (up to 25.5 units per acre) development types = 0.86 ERUs Wastewater Contribution Rate = 244 gpd per unit. This is based on the wastewater contribution rates from the CLV WWMPU August 2008.
   c. High Rise Condominium* (greater than 26 units per acre) development types = 0.63 ERUs Wastewater Contribution Rate = 179 gpd per unit. This is based on the wastewater contribution rates from the CLV WWMPU August 2008.
   d. Commercial Development with a contribution rate = 907.2 gpd per acre. This is based on the wastewater contribution rates from the CLV WWMPU August 2008.
   e. Other Non-residential Wastewater Contribution Rate will be based on the wastewater contribution rates from the CLV WWMPU August 2008.
   f. Wastewater Flow Peaking Factor is per the ASCE General Curve from the Manual of Engineering Practice No. 37, 1969, as provided by the CLV. Equivalent equations are as follows:
      1) Peaking Factor = [(Average Flow in MGD) $^{-0.0956}$] 2.6186.
      2) Peak Flow = [(Average Flow in MGD) $^{0.9044}$] 2.6186.
      3) Peak Flow to Average Flow = (Peak Flow in MGD/2.6186) $^{1.1057}$
   g. Pipe capacity for the <u>proposed and removed/replaced</u> sewer pipelines is based on a d/D ratio of 0.50 (d=depth of flow, D = pipe diameter) for pipes 12" and smaller and a max d/D ratio of 0.60 for pipes larger than 12".
   h. Pipe capacity for the <u>existing</u> sewer pipelines is based on a d/D ratio of 0.75 (d=depth of flow, D = pipe diameter) for all pipe diameters.
   i. A Manning's n-value of 0.013 will be used for all capacity calculations.

   * Development names are based on the CLV's sanitary sewer contribution criteria shown on Table 5-5 in the Appendix.

2. *The Design and Construction Standards for Wastewater Collection Systems*, Southern Nevada, 2009, 3rd Edition (Standards) will be used as a design guideline. The following items will assist the development of the model:
   a. Standard minimum depth of cover shall be 5 feet to top of pipe except special cases where extreme situations dictate otherwise, such as wash crossings, existing storm drain infrastructure crossings and existing sewer connection point.
   b. Pipe material for pipes 15 inches in diameter and less shall be solid wall polyvinyl chloride (PVC) in accordance with ASTM D-3034, SDR 35. Materials for pipelines greater than 15 inches in diameter will be selected on a case-by-case basis and approved by the City of Las Vegas. Also, pipe material deflection calculations may be required for plan approval.
   c. Pipelines were designed to have a velocity from 2 feet per second (fps) to 10 fps, velocities greater than 10 fps in critical sections of pipelines may be considered by the City of Las Vegas for use on this project when pipeline diameters cannot be downsized due to the criteria presented in Item No. 3 below. In public sewers where there is insufficient tributary flow to achieve a velocity of 2 fps all slopes will be a minimum of 1%.

B. Basin Delineation

The topography in the Two Fifty ranges from approximately 2910 feet to 2670 feet in elevation, as shown in Figure 3. In order to calculate and route the sewer flows generated the project has been split into three different basins based on flow contribution location, existing topography and outfall point. All three basins final outfall points are the connections of the new and existing sewer system to the 21-inch sewer in Alta Drive. This decision was made based on the email from Tim Parks on December 21, 2015 that there is enough capacity in the system once all flows get to the existing 21-inch sewer in Alta Drive. Refer to Appendix for the email correspondence. Along with the proposed improvements the entire site also includes the following existing/approved conditions:

- 672 existing single family residential units
- 219 existing high rise condominiums
- 166 approved high rise condominiums
- 9.51 acres of existing commercial development

This study includes the routing or rerouting of these flows to their respective final outfalls into Alta Drive.

Rampart Outfall (OK-938)

The Rampart Outfall is the area along the southern part of the project and includes the following:

- 10 new single family residential units
- 206 existing single family residential units
- 9.51 acres of existing commercial development
- 180 new high rise condominiums

The basin consists of the existing 8-inch sewer between manholes OK-2755 to OK-870 and the 12-inch sewer between manholes OK-870 to OK-938. The final outfall point to the 21-inch sewer in Alta Drive is existing manhole OK-938.

Refer to Figure 4, Sewer Contribution Basin Plan for delineation and Figure 5 for the existing sewer system.

Alta Outfall #1 (OK-937)

The Alta Outfall #1 is the area along the middle portion of the project and includes the following:

- 13 new single family residential units
- 404 existing single residential units
- 2440 new high rise condominiums

The basin consists of the rerouting of the existing sewer line for 404 existing single family residential units and the proposed new improvements via a new 8/10/12/18-inch sewer until it enters the 21-inch sewer in Alta Drive at existing manhole OK-937. Rerouting will begin at existing manholes OK-235 and OK-728.

In the long reaches of sewer collecting the flows from the few new single family residential areas where there is insufficient tributary flow to achieve a velocity of 2 fps all slopes will be a minimum of 1%.

Refer to Figure 4, Sewer Contribution Basin Plan for delineation and Figure 5 for the existing sewer system.

Alta Outfall #2 (OK-936)

The Alta Outfall #2 is the area along the top portion of the project and includes the following:

- 37 new single family residential units
- 62 existing multifamily residential units
- 400 new high rise condominiums
- 219 existing high rise condominiums
- 166 approved high rise condominiums

The basin consists of the rerouting of the existing sewer line for 62 existing single family residential units and the proposed new improvements via a new 8-inch sewer until it enters existing manhole OK-228. These flows will continue in the existing 8-inch sewer until it enters the 21-inch sewer in Alta Drive at existing manhole OK-936. Rerouting will begin at existing manhole OK-3404.

Refer to Figure 4, Sewer Contribution Basin Plan for delineation and Figure 5 for the existing sewer system.

C. Onsite Sewer System

The Land Use Plan for the project site is shown on Figure 2. Project sewer contributions from onsite developments are provided in Table 1.

Models of the proposed sewer lines were constructed using Bentley's *SewerCAD, Version 8*. *SewerCAD* integrates the slopes, pipe sizes, flows, Manning's coefficient, lengths and peaking factors in order to produce accurate sewer calculation results. Preliminary sewer routing for the proposed development has been provided in Figure 6. Refer to Figure 7 for the Peak Flows on each pipe segment. Refer to Figure 8 for the d/D during peak flow on each pipe segment.

The proposed pipe diameters shown are provided as a planning guide and are based on estimated pipeline slopes based on current site topography. Design of the final pipe diameters will be based on actual slopes as necessary to maintain standards and to allow for conveyance of required flows. *SewerCAD* data sheets are included in the Appendix.

In the long reaches of sewer collecting the flows from the few new single family residential areas where there is insufficient tributary flow to achieve a velocity of 2 fps all slopes will be a minimum of 1%.

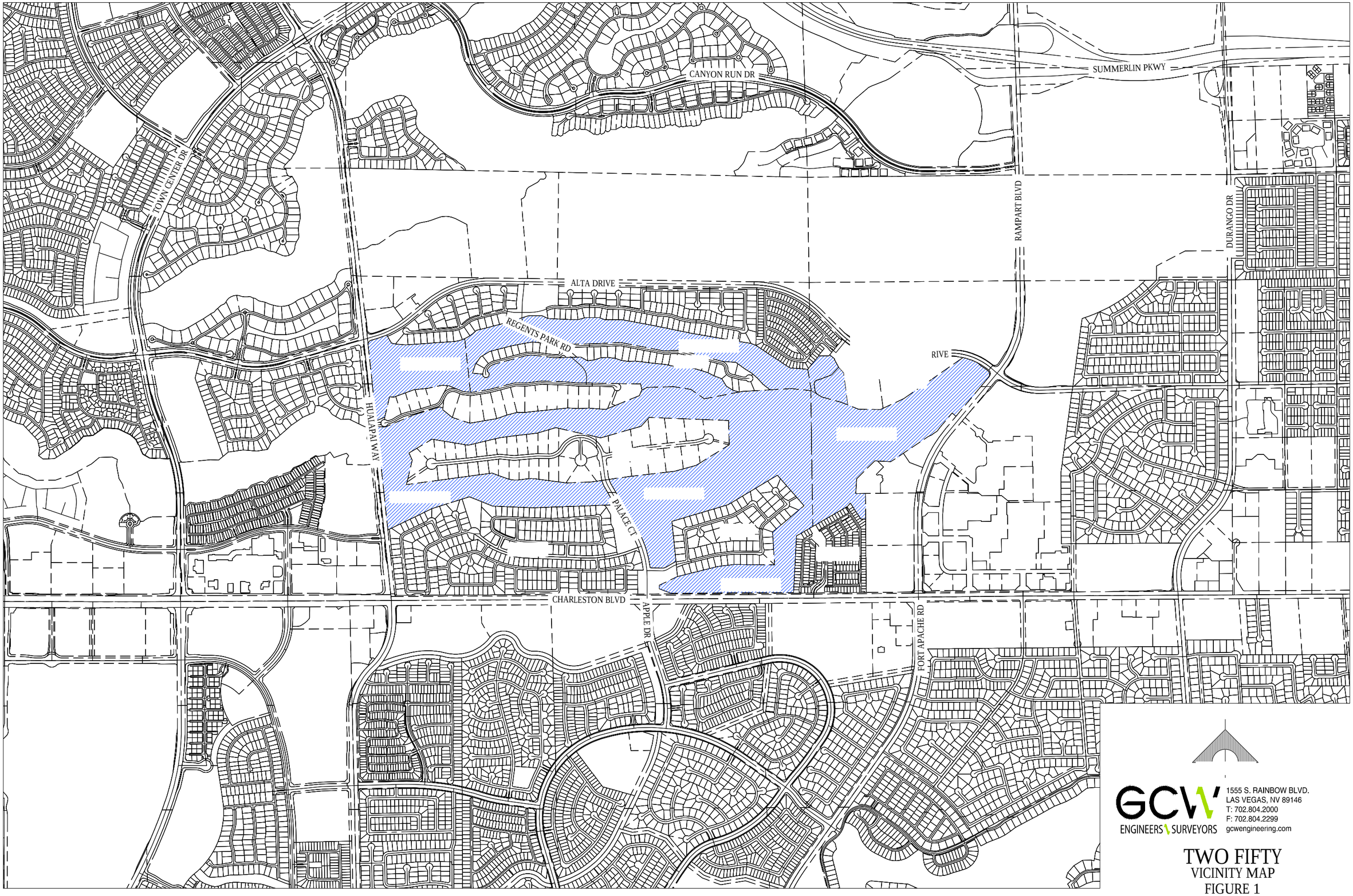
D. Summary

The wastewater infrastructure for the Two Fifty has been planned sufficiently in the facilities proposed for construction with the master planned community. The design and construction of the proposed sewer infrastructure shall conform to the recommendations of this Wastewater Master Plan. In order to meet the d/D of 0.5 for new sewer installations between manholes MH-17 and MH-19 the pipe diameter was upsized to 12-inch. The downstream pipes were downsized to 10-inch to prevent achieving a velocity of greater than 10 fps. In the long reaches of sewer collecting the flows from the few new single family residential areas where there is insufficient tributary flow to achieve a velocity of 2 fps all slopes will be a minimum of 1%.

If any further changes to the land plan should occur, including changes in densities or sewer routing, the Wastewater Master Plan shall be re-evaluated to verify whether revisions to the Wastewater Master Plan or infrastructure will need to be made.

GCW understands that the CLV maintains the right to require a Wastewater master plan update based on revised land use densities or sewer routing.

FIGURES



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TWO FIFTY
VICINITY MAP
FIGURE 1

ALTA DRIVE

REGENTS PARK RD

HUALAPAI WAY

PALACE CT

CHARLESTON BLVD

APPLE DR

RAMPART BLVD

LEGEND

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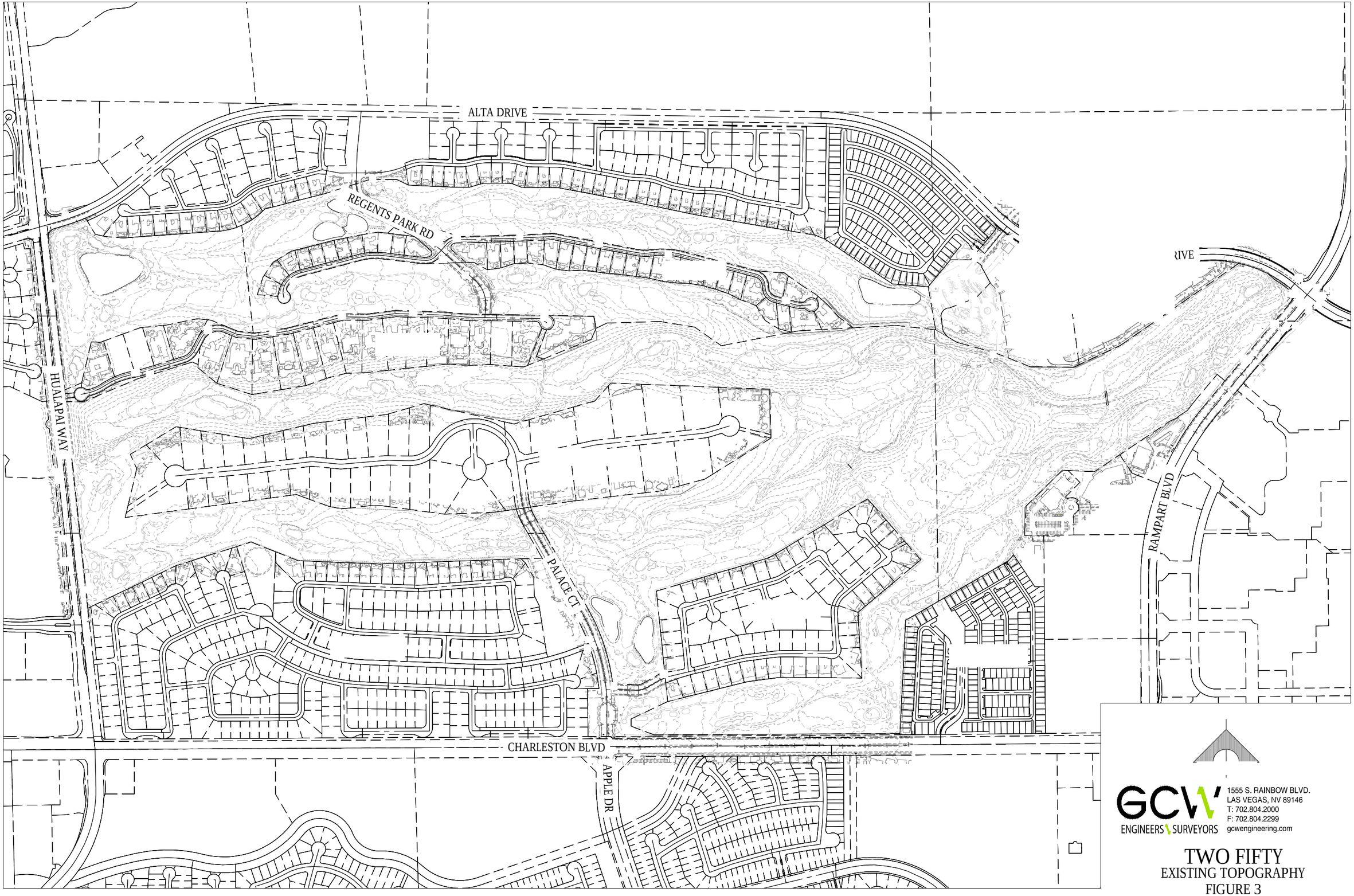
TWO FIFTY

MASTER LAND USE PLAN

FIGURE 2



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TWO FIFTY
EXISTING TOPOGRAPHY
FIGURE 3

ALTA DRIVE

REGENTS PARK RD

HUALAPAI WAY

PALACE CT

CHARLESTON BLVD

APPLE DR

RAMPART BLVD

LEGEND

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TWO FIFTY

SEWER CONTRIBUTION BASIN PLAN

FIGURE 4

Alta

Hualapai

Rampart

Fort Apache

OK-936

OK-937

OK-938

OK-3404

OK-228

OK-870

OK-235

OK-728

OK-2755

Legend

CLV Sewer Manholes

CLV Sewer Mains

Diameter

- 4
- 6
- 8
- 10
- 12
- 15
- 18
- 21
- 24
- 27

N

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TWO FIFTY
EXISTING SEWER SYSTEM
FIGURE 5

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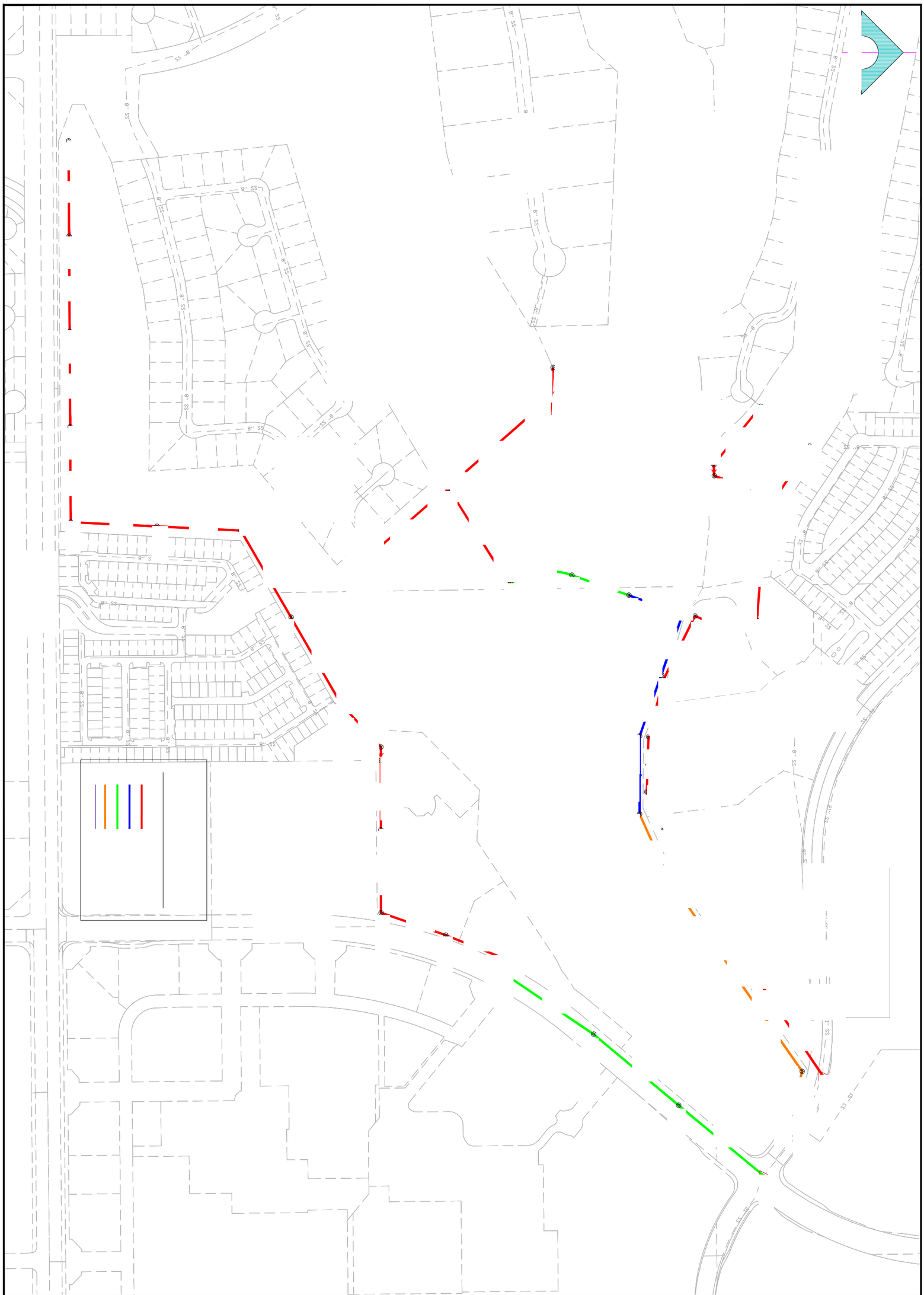

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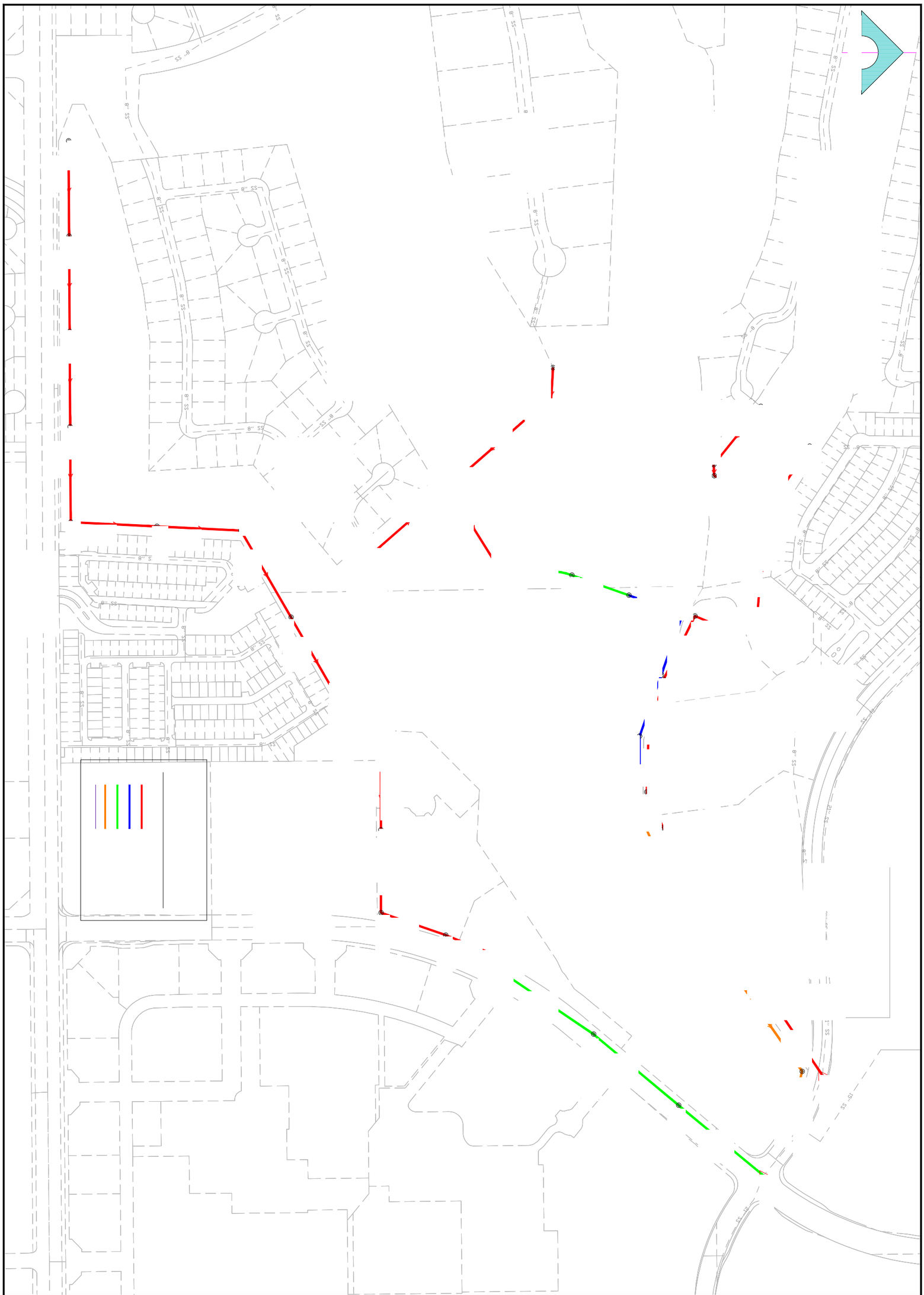

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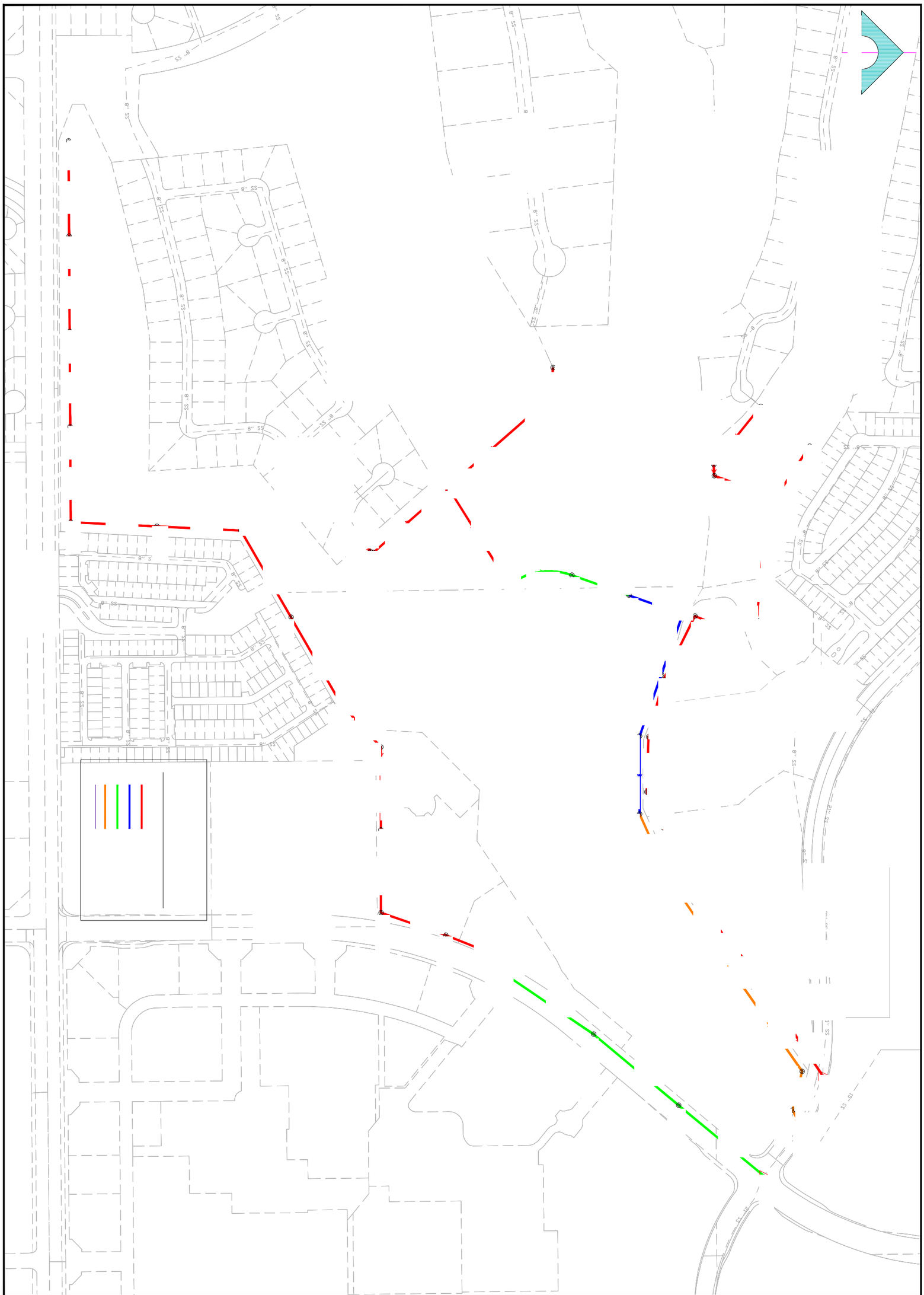

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APPENDIX

WASTEWATER CONTRIBUTION RATES FROM CLV

Table 5-5 shows the ERUs for the residential land use categories and the sanitary sewer contribution rates for non-residential land use categories that were used for the MPU based on the flow data analysis. The unit flow rates (gpm/acre) for non-residential land use types and the average contribution rates (gpm/unit) for residential land uses were applied as input data during model calibration to generate sewer flows from various land use categories and sewersheds. It should be noted that the contribution rates shown in this table were subject to revision and modification during the calibration of the City's existing sewer system, which will be discussed later in this section.

The calibrated average contribution rates for residential land uses (which are a function of gpcd and number of persons per dwelling unit) were modified using a conservative base flow rate of 105 gpcd to generate future flows for master planning purposes.

Table 5-5 Sanitary Sewer Contribution Criteria

Land Use Classification	ERU[1]/ Unit	Unit Density, units/ acre	Average Daily Contribution (gpd/ERU)	Average Contribution (gpm/unit)	Flow Rate (gpm/acre)
Single Family-Low (SF-L)	1.00[2]	2.5	284	0.20	0.5
Single Family-Medium (SF-M)	1.00	6	284	0.20	1.2
Single Family-High (SF-H)	0.86[3]	9	284	0.17	1.53
Multi-Family-Low (MF-L)	0.86	13	284	0.17	2.21
Multi-Family-Medium (MF-M)	0.86	22	284	0.17	3.74
Multi-Family-High (MF-H)	0.86	25.5	284	0.17	4.34
High-Rise Condominiums	0.63[4]	>26	284	0.13	—
Hotel/Casino	—	—	—	—	3.88[5]
Hospital	—	—	—	—	4.17
Commercial/Retail	—	—	—	—	0.63
Industrial	—	—	—	—	1.40
School	—	—	—	—	0.14
Mixed Use	—	—	—	—	4.34[6]
Future Hybrid Use	—	—	—	—	1.45[7]

Notes:
(1) ERU = Equivalent Residential Unit
(2) Based on a flow rate of 105 gpcd and 2.7 persons per unit.
(3) Based on a flow rate of 90 gpcd and 2.7 persons per unit.
(4) Based on a flow rate of 90 gpcd and 2 persons per unit.
(5) The occupancy rate was 83% based on the data provided from the hotel/casino.
(6) This flow rate is based on a combination of commercial (on the ground floor) and MF-M (on the floor directly above) with both classifications assigned the same area.
(7) This flow rate is computed based on the percentage of area composition of 10 land use classifications defined in **Section 3.1** - Land Use Planning Criteria.

CONFIRMATION OF CAPACITY

Joseph Cetrulo

From: Tim Parks [tparks@LasVegasNevada.GOV]
Sent: Tuesday, December 22, 2015 1:32 PM
To: Joseph Cetrulo
Cc: Keith Letus; Joe Pena
Subject: RE: Orchestra Master Sewer Study

Hi Joseph,
I have some comments on the sewer calcs sheet. Based on our WWMPU, please use the following:

Single Family Residential (1 ERU) – 284 gpd/unit
Multi Family Residential up to 25.5 units per acre (0.86 ERU) – 244 gpd/unit
or
High Rise Condominium greater than 26 units per acre (0.63 ERU) – 179 gpd/unit

For the master plan, new or relocated onsite sewers 8" to 12" should be designed for d/D=50%, and sewers >12" for d/D=60%. This ratio is for peak dry weather flow, and utilizes the ASCE peaking factor. The offsite tie-in point was previously identified as the 21-inch sewer in Alta Dr, just west of Rampart Blvd. Is that still the current location? The existing 12-inch sewer in Rampart Blvd south of Alta Dr is only capable of handling slightly less than 3 mgd, therefore would not have capacity for the entire development given existing and future contribution area. The City reviewed the downstream system in Alta Dr using the provided flows and found no capacity shortfalls that require further evaluation at this time. Once the master sewer study is submitted, we'll run the model again with updated flows. Please let me know should you have any questions or require further information.

Regards,

Tim Parks P.E., Engineering Project Manager
City of Las Vegas | Dept. of Public Works
City Engineer Division | Sanitary Sewer Planning
Development Services Center (DSC) 7th Floor
333 North Rancho Drive | Las Vegas, Nevada 89106
Work: 702-229-2178 | Fax: 702-382-8551 Link: www.lasvegasnevada.gov
"Building Community to Make Life Better"
Your opinion is important! Click here to take a short survey.

From: Joseph Cetrulo [mailto:JCetrulo@gcwengineering.com]
Sent: Tuesday, December 15, 2015 10:39 AM
To: Tim Parks
Subject: Orchestra Master Sewer Study

Good Morning Tim,

I'm about to begin working on the master sewer study for the Orchestra development. This is the development over the existing Badlands Golf Course. I have attached two different items as it relates to the proposed project.

1) Project Site.pdf – This shows the project area.
2) Sewer Calcs.pdf – This is the sewer generated flows for the project.

I just wanted to check in with you to determine what you would like us to analysis to confirm downstream capacity? Also would like to confirm the offsite tie-in point.

Thanks for your help,

GCW ENGINEERS \ SURVEYORS

Joseph Cetrulo, P.E.
Project Manager

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EXCEL CALCS

TWO FIFTY
SEWER GENERATED FLOWS
TABLE 1

Sewer Flow Factors		
1 ERU=	284	gpd/unit - Single Family Residential*
0.86 ERU=	244	gpd/unit - Multi-Family Residential* (Up to 25.5 units per AC)
0.63 ERU=	179	gpd/unit - High Rise Condominium* (Greater than 26 units per AC)
Per the CLV WWMPU	907.2	gpd/acre - Commercial*

PROPOSED SEWER CONTRIBUTIONS										
Area	**Land Use***	**Density**	**Gross Acres**	**Units**	**Manhole**	**ERU/UNIT**	**Avg. Flow (GPD)**	**Avg. Flow (MGD)**	**Peaking Factor**	**Peak Flow (MGD)**
RAMPART OUTFALL (OK-938)										
New Single Family Residential	Single Family Residential	-	-	10	1	1	2,840.0	0.003	4.587	0.013
Existing Single Family Residential	Single Family Residential	-	-	206	OK-2755	1	58,504.0	0.059	3.435	0.201
New High Rise Condominium	High Rise Condominium	-	-	180	OK-932	0.63	32,220.0	0.032	3.637	0.117
Existing Commercial	Commercial	-	9.51	-	OK-872	1	8,627.5	0.009	4.125	0.036
Rampart Outfall	**SUBTOTALS**		**9.51**	**396**		**-**	**102,191.5**	**0.102**	**3.257**	**0.333**
ALTA OUTFALL #1 (OK-937)										
New Single Family Residential	Single Family Residential	-	-	13	OK-235	1	3,692.0	0.004	4.473	0.017
Existing Single Family Residential	Single Family Residential	-	-	360	OK-728	1	102,240.0	0.102	3.256	0.333
Existing Single Family Residential	Single Family Residential	-	-	44	OK-235	1	12,496.0	0.012	3.981	0.050
New High Rise Condominium	High Rise Condominium	-	-	1100	17	0.63	196,900.0	0.197	3.059	0.602
New High Rise Condominium	High Rise Condominium	-	-	800	23	0.63	143,200.0	0.143	3.153	0.452
New High Rise Condominium	High Rise Condominium	-	-	180	24	0.63	32,220.0	0.032	3.637	0.117
New High Rise Condominium	High Rise Condominium	-	-	360	26	0.63	64,440.0	0.064	3.403	0.219
Alta Outfall #1	**SUBTOTALS**		**0.0**	**2,857**		**-**	**555,188.0**	**0.555**	**2.770**	**1.538**
ALTA OUTFALL #2 (OK-936)										
New Single Family Residential	Single Family Residential	-	-	18	29	1	5,112.0	0.005	4.336	0.022
New Single Family Residential	Single Family Residential	-	-	19	OK-3404	1	5,396.0	0.005	4.314	0.023
Existing Single Family Residential	Single Family Residential	-	-	62	OK-2833	1	17,608.0	0.018	3.853	0.068
New High Rise Condominium	High Rise Condominium	-	-	400	37	0.63	71,600.0	0.072	3.369	0.241
Existing High Rise Condominium	High Rise Condominium	-	-	219	OK-3949	0.63	39,201.0	0.039	3.569	0.140
Approved High Rise Condominium	High Rise Condominium	-	-	166	OK-229	0.63	29,714.0	0.030	3.665	0.109
Alta Outfall #2	**SUBTOTALS**		**0.0**	**884**		**-**	**168,631.0**	**0.169**	**3.104**	**0.523**

*Landuse names are based on the CLV's sanitary sewer contribution criteria shown on Table 5-5 in the Appendix.

SEWERCAD DATA SHEETS

FlexTable: Manhole Table

Active Scenario: Average Flow

Label	Base Load (Local Sanitary) (MGD)	Sanitary Loads <Count>	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Depth (Structure) (ft)	Flow (Total In) (MGD)	Flow (Total Out) (MGD)
MH-1	0.00	1	2,789.10	2,782.62	6.48	0.000	0.003
MH-2	0.00	0	2,785.30	2,778.62	6.68	0.003	0.003
MH-3	0.00	0	2,781.30	2,774.62	6.68	0.003	0.003
MH-4	0.00	0	2,777.40	2,770.63	6.77	0.003	0.003
MH-5	0.00	0	2,773.40	2,766.63	6.77	0.003	0.003
MH-6	0.00	0	2,769.70	2,762.99	6.71	0.003	0.003
MH-7	0.00	0	2,766.20	2,759.44	6.76	0.003	0.003
MH-8	0.00	0	2,766.90	2,755.25	11.65	0.003	0.003
MH-9	0.00	0	2,766.00	2,759.20	6.80	0.102	0.102
MH-10	0.00	0	2,765.40	2,758.65	6.75	0.102	0.102
MH-11	0.00	0	2,770.30	2,754.88	15.42	0.102	0.102
MH-12	0.00	0	2,773.90	2,764.34	9.56	0.016	0.016
MH-13	0.00	0	2,767.00	2,759.06	7.94	0.016	0.016
MH-14	0.00	0	2,762.40	2,754.89	7.51	0.016	0.016
MH-15	0.00	0	2,773.00	2,754.30	18.70	0.118	0.118
MH-16	0.00	0	2,750.80	2,744.42	6.38	0.118	0.118
MH-17	0.20	1	2,751.90	2,743.17	8.73	0.118	0.315
MH-18	0.00	0	2,749.90	2,741.29	8.61	0.315	0.315
MH-19	0.00	0	2,749.10	2,739.53	9.57	0.315	0.315
MH-20	0.00	0	2,751.30	2,731.70	19.60	0.315	0.315
MH-21	0.00	0	2,744.50	2,720.01	24.49	0.315	0.315
MH-22	0.00	0	2,729.80	2,707.84	21.96	0.315	0.315
MH-23	0.14	1	2,722.80	2,692.91	29.89	0.315	0.459
MH-24	0.03	1	2,711.90	2,689.65	22.25	0.459	0.491
MH-25	0.00	0	2,711.00	2,687.20	23.80	0.491	0.491
MH-26	0.06	1	2,710.60	2,686.75	23.85	0.491	0.555
MH-27	0.00	0	2,702.50	2,684.31	18.19	0.555	0.555
MH-28	0.00	0	2,696.80	2,683.32	13.48	0.555	0.555
MH-29	0.01	1	2,765.00	2,751.12	13.88	0.000	0.005
MH-30	0.00	0	2,760.30	2,748.41	11.89	0.028	0.028
MH-31	0.00	0	2,758.40	2,751.41	6.99	0.023	0.023
MH-32	0.00	0	2,761.50	2,748.84	12.66	0.023	0.023
MH-33	0.00	0	2,758.40	2,747.80	10.60	0.028	0.028
MH-34	0.00	0	2,757.90	2,747.37	10.53	0.028	0.028
MH-35	0.00	0	2,753.90	2,744.84	9.06	0.028	0.028
MH-36	0.00	0	2,753.40	2,742.56	10.84	0.028	0.028
MH-37	0.07	1	2,739.00	2,732.39	6.61	0.028	0.100
MH-38	0.00	0	2,759.30	2,751.06	8.24	0.003	0.003
MH-OK-228	0.00	0	2,737.26	2,728.78	8.48	0.100	0.100
MH-OK-229	0.03	1	2,731.40	2,724.93	6.47	0.100	0.129
MH-OK-230	0.00	0	2,731.87	2,723.75	8.12	0.129	0.129
MH-OK-231	0.00	0	2,718.84	2,713.54	5.30	0.129	0.129
MH-OK-233	0.00	0	2,706.83	2,701.40	5.43	0.169	0.169
MH-OK-235	0.02	2	2,777.80	2,763.07	14.73	0.000	0.016
MH-OK-728	0.10	1	2,767.00	2,760.00	7.00	0.000	0.102
MH-OK-741	0.00	0	2,751.30	2,745.20	6.10	0.070	0.070

FlexTable: Manhole Table

Active Scenario: Average Flow

Label	Base Load (Local Sanitary) (MGD)	Sanitary Loads <Count>	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Depth (Structure) (ft)	Flow (Total In) (MGD)	Flow (Total Out) (MGD)
MH-OK-869	0.00	0	2,730.90	2,724.00	6.90	0.070	0.070
MH-OK-870	0.00	0	2,726.80	2,712.97	13.83	0.070	0.070
MH-OK-872	0.01	1	2,753.50	2,746.50	7.00	0.061	0.070
MH-OK-873	0.00	0	2,744.80	2,738.46	6.34	0.070	0.070
MH-OK-874	0.00	0	2,736.50	2,731.00	5.50	0.070	0.070
MH-OK-930	0.00	0	2,725.30	2,710.00	15.30	0.070	0.070
MH-OK-931	0.00	0	2,713.20	2,699.36	13.84	0.070	0.070
MH-OK-932	0.03	1	2,698.50	2,688.70	9.80	0.070	0.102
MH-OK-2755	0.06	1	2,757.40	2,750.51	6.89	0.003	0.061
MH-OK-2833	0.02	1	2,775.00	2,768.04	6.96	0.000	0.018
MH-OK-3404	0.01	1	2,759.00	2,752.05	6.95	0.018	0.023
MH-OK-3940	0.00	0	2,721.49	2,702.54	18.95	0.169	0.169
MH-OK-3946	0.00	0	2,722.31	2,713.18	9.13	0.129	0.129
MH-OK-3947	0.00	0	2,721.59	2,708.68	12.91	0.169	0.169
MH-OK-3948	0.00	0	2,721.74	2,709.41	12.33	0.169	0.169
MH-OK-3949	0.04	1	2,722.25	2,711.74	10.51	0.129	0.169
MH-OK-3950	0.00	0	2,723.28	2,714.42	8.86	0.129	0.129
MH-OK-3951	0.00	0	2,723.95	2,719.33	4.62	0.129	0.129
MH-OK-3952	0.00	0	2,721.92	2,708.30	13.62	0.169	0.169

FlexTable: Conduit Table

Active Scenario: Average Flow

Label	Start Node	Invert (Start) (ft)	Stop Node	Invert (Stop) (ft)	Length (Scaled) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Flow (MGD)	Capacity (Design) (MGD)	Capacity (Excess Design) (MGD)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Depth (Normal) / Rise (%)	Design Percent Full (%)
P-1	MH-1	2,782.62	MH-2	2,778.82	379.5	0.010	8.0	0.003	0.390	0.388	0.81	0.82	4.4	50.0
P-2	MH-2	2,778.62	MH-3	2,774.82	379.5	0.010	8.0	0.003	0.390	0.388	0.81	0.82	4.4	50.0
P-3	MH-3	2,774.62	MH-4	2,770.83	379.5	0.010	8.0	0.003	0.390	0.388	0.81	0.82	4.4	50.0
P-4	MH-4	2,770.63	MH-5	2,766.83	379.5	0.010	8.0	0.003	0.390	0.388	0.81	0.82	4.4	50.0
P-5	MH-5	2,766.63	MH-6	2,763.19	344.0	0.010	8.0	0.003	0.390	0.388	0.81	0.82	4.4	50.0
P-6	MH-6	2,762.99	MH-7	2,759.64	334.8	0.010	8.0	0.003	0.390	0.388	0.81	0.82	4.4	50.0
P-7	MH-7	2,759.44	MH-8	2,755.45	398.8	0.010	8.0	0.003	0.390	0.388	0.81	0.82	4.4	50.0
P-8	MH-8	2,755.25	MH-38	2,751.26	398.8	0.010	8.0	0.003	0.390	0.388	0.81	0.82	4.4	50.0
P-9	MH-38	2,751.06	MH-OK-2755	2,750.71	34.8	0.010	8.0	0.003	0.390	0.388	0.81	0.82	4.4	50.0
P-10	MH-OK-2755	2,750.51	MH-OK-872	2,746.70	198.6	0.019	8.0	0.061	0.985	0.924	1.78	2.59	16.2	75.0
P-11	MH-OK-872	2,746.50	MH-OK-741	2,745.22	53.8	0.024	8.0	0.070	1.096	1.026	1.84	2.90	16.4	75.0
P-12	MH-OK-741	2,745.22	MH-OK-873	2,738.66	275.8	0.024	8.0	0.070	1.098	1.028	1.84	2.91	16.4	75.0
P-13	MH-OK-873	2,738.46	MH-OK-874	2,731.20	330.1	0.022	8.0	0.070	1.056	0.986	1.84	2.83	16.7	75.0
P-14	MH-OK-874	2,731.00	MH-OK-869	2,724.20	272.4	0.025	8.0	0.070	1.126	1.056	1.84	2.96	16.2	75.0
P-15	MH-OK-869	2,724.00	MH-OK-870	2,713.17	272.6	0.040	8.0	0.070	1.418	1.348	1.84	3.47	14.5	75.0
P-16	MH-OK-870	2,712.97	MH-OK-930	2,710.10	54.8	0.052	12.0	0.070	4.796	4.726	1.73	3.61	8.1	75.0
P-17	MH-OK-930	2,710.00	MH-OK-931	2,699.46	435.3	0.024	12.0	0.070	3.268	3.198	1.73	2.77	9.7	75.0
P-18	MH-OK-931	2,699.36	MH-OK-932	2,688.80	441.5	0.024	12.0	0.070	3.249	3.179	1.73	2.76	9.7	75.0
P-19	MH-OK-932	2,688.70	O-OK-938	2,679.95	439.0	0.020	12.0	0.102	2.964	2.862	1.90	2.91	12.1	75.0
P-20	MH-OK-728	2,760.00	MH-9	2,759.43	25.6	0.022	8.0	0.102	0.578	0.476	2.05	3.16	20.1	50.0
P-21	MH-9	2,759.23	MH-10	2,758.85	12.5	0.029	8.0	0.102	0.668	0.565	2.05	3.51	18.7	50.0
P-22	MH-10	2,758.65	MH-11	2,755.08	357.1	0.010	8.0	0.102	0.390	0.288	2.05	2.39	24.4	50.0
P-23	MH-11	2,754.88	MH-15	2,754.50	37.4	0.010	8.0	0.102	0.396	0.293	2.05	2.41	24.3	50.0
P-24	MH-OK-235	2,772.97	MH-12	2,764.54	195.5	0.043	8.0	0.016	1.481	1.465	1.25	2.29	7.1	75.0
P-25	MH-12	2,764.34	MH-13	2,759.26	80.1	0.063	8.0	0.016	0.984	0.968	1.25	2.62	6.5	50.0
P-26	MH-13	2,759.06	MH-14	2,755.09	396.5	0.010	8.0	0.016	0.390	0.374	1.25	1.38	10.0	50.0
P-27	MH-14	2,754.89	MH-15	2,754.50	39.2	0.010	8.0	0.016	0.390	0.374	1.25	1.38	10.0	50.0
P-28	MH-15	2,754.30	MH-16	2,744.62	360.4	0.027	8.0	0.118	0.640	0.522	2.13	3.55	20.5	50.0

FlexTable: Conduit Table

Active Scenario: Average Flow

Label	Start Node	Invert (Start) (ft)	Stop Node	Invert (Stop) (ft)	Length (Scaled) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Flow (MGD)	Capacity (Design) (MGD)	Capacity (Excess Design) (MGD)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Depth (Normal) / Rise (%)	Design Percent Full (%)
P-29	MH-16	2,744.42	MH-17	2,743.50	91.5	0.010	8.0	0.118	0.390	0.272	2.13	2.50	26.3	50.0
P-30	MH-17	2,743.17	MH-18	2,741.49	257.9	0.007	12.0	0.315	0.929	0.614	2.59	2.73	27.9	50.0
P-31	MH-18	2,741.29	MH-19	2,739.73	240.7	0.006	12.0	0.315	0.926	0.611	2.59	2.72	27.9	50.0
P-32	MH-19	2,739.53	MH-20	2,731.90	227.4	0.034	10.0	0.315	1.298	0.983	2.70	4.98	23.5	50.0
P-33	MH-20	2,731.70	MH-21	2,720.21	254.1	0.045	10.0	0.315	1.506	1.191	2.70	5.54	21.8	50.0
P-34	MH-21	2,720.01	MH-22	2,708.04	260.1	0.046	10.0	0.315	1.519	1.204	2.70	5.57	21.8	50.0
P-35	MH-22	2,707.84	MH-23	2,693.58	310.0	0.046	10.0	0.315	1.518	1.203	2.70	5.57	21.8	50.0
P-36	MH-23	2,692.91	MH-24	2,689.85	269.1	0.011	18.0	0.459	4.865	4.406	2.66	3.55	17.1	60.0
P-37	MH-24	2,689.65	MH-25	2,687.40	449.6	0.005	18.0	0.491	3.225	2.734	2.71	2.71	21.6	60.0
P-38	MH-25	2,687.20	MH-26	2,686.95	49.4	0.005	18.0	0.491	3.258	2.767	2.71	2.73	21.5	60.0
P-39	MH-26	2,686.75	MH-27	2,684.51	447.5	0.005	18.0	0.555	3.229	2.674	2.80	2.81	23.0	60.0
P-40	MH-27	2,684.31	MH-28	2,683.52	158.4	0.005	18.0	0.555	3.225	2.670	2.80	2.80	23.0	60.0
P-41	MH-28	2,683.32	O-OK-937	2,682.90	85.4	0.005	18.0	0.555	3.206	2.651	2.79	2.80	23.0	60.0
P-42	MH-OK-2833	2,768.04	MH-OK-3404	2,752.25	298.0	0.053	8.0	0.018	1.639	1.622	1.28	2.52	7.0	75.0
P-43	MH-OK-3404	2,752.05	MH-31	2,751.61	44.0	0.010	8.0	0.023	0.712	0.689	1.37	1.54	11.8	75.0
P-44	MH-31	2,751.41	MH-32	2,749.04	236.8	0.010	8.0	0.023	0.390	0.367	1.37	1.54	11.8	50.0
P-45	MH-32	2,748.84	MH-30	2,748.61	22.8	0.010	8.0	0.023	0.390	0.367	1.37	1.54	11.8	50.0
P-46	MH-29	2,751.12	MH-30	2,748.61	250.5	0.010	8.0	0.005	0.390	0.385	0.92	0.97	5.8	50.0
P-47	MH-30	2,748.41	MH-33	2,748.00	67.5	0.006	8.0	0.028	0.303	0.275	1.37	1.44	14.7	50.0
P-48	MH-33	2,747.80	MH-34	2,747.57	39.1	0.006	8.0	0.028	0.300	0.272	1.36	1.44	14.7	50.0
P-49	MH-34	2,747.37	MH-35	2,745.04	388.0	0.006	8.0	0.028	0.303	0.274	1.37	1.44	14.7	50.0
P-50	MH-35	2,744.84	MH-36	2,742.76	108.0	0.019	8.0	0.028	0.542	0.514	1.44	2.06	11.1	50.0
P-51	MH-36	2,742.56	MH-37	2,732.59	162.2	0.062	8.0	0.028	0.969	0.941	1.44	3.09	8.4	50.0
P-52	MH-37	2,732.39	MH-OK-228	2,728.98	281.5	0.012	8.0	0.100	0.430	0.330	2.04	2.54	23.0	50.0
P-53	MH-OK-228	2,728.78	MH-OK-229	2,725.10	236.7	0.016	8.0	0.100	0.887	0.788	2.04	2.78	21.6	75.0
P-54	MH-OK-229	2,724.93	MH-OK-230	2,723.82	220.0	0.005	8.0	0.129	0.506	0.376	2.01	2.18	32.8	75.0
P-55	MH-OK-230	2,723.75	MH-OK-3951	2,719.38	156.5	0.028	8.0	0.129	1.192	1.063	2.18	3.69	21.2	75.0
P-56	MH-OK-3951	2,719.33	MH-OK-3950	2,714.48	177.7	0.027	8.0	0.129	1.176	1.046	2.18	3.66	21.4	75.0

FlexTable: Conduit Table

Active Scenario: Average Flow

Label	Start Node	Invert (Start) (ft)	Stop Node	Invert (Stop) (ft)	Length (Scaled) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Flow (MGD)	Capacity (Design) (MGD)	Capacity (Excess Design) (MGD)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Depth (Normal) / Rise (%)	Design Percent Full (%)
P-57	MH-OK-3950	2,714.42	MH-OK-231	2,713.64	28.1	0.028	8.0	0.129	1.189	1.059	2.18	3.69	21.3	75.0
P-58	MH-OK-231	2,713.54	MH-OK-3946	2,713.38	13.4	0.012	8.0	0.129	0.790	0.661	2.18	2.76	26.1	75.0
P-59	MH-OK-3946	2,713.18	MH-OK-3949	2,711.94	110.2	0.011	8.0	0.129	0.756	0.627	2.18	2.67	26.7	75.0
P-60	MH-OK-3949	2,711.74	MH-OK-3948	2,709.61	188.1	0.011	8.0	0.169	0.758	0.589	2.36	2.89	30.6	75.0
P-61	MH-OK-3948	2,709.41	MH-OK-3947	2,708.88	46.9	0.011	8.0	0.169	0.756	0.588	2.36	2.88	30.6	75.0
P-62	MH-OK-3947	2,708.68	MH-OK-3952	2,708.50	15.6	0.011	8.0	0.169	0.755	0.587	2.36	2.88	30.6	75.0
P-63	MH-OK-3952	2,708.30	MH-OK-3940	2,702.60	227.3	0.025	8.0	0.169	1.128	0.960	2.36	3.84	24.9	75.0
P-64	MH-OK-3940	2,702.54	MH-OK-233	2,701.60	34.4	0.028	8.0	0.169	1.184	1.015	2.36	3.97	24.4	75.0
P-65	MH-OK-233	2,701.40	O-OK-936	2,693.72	345.4	0.022	8.0	0.169	1.063	0.894	2.36	3.68	25.7	75.0

FlexTable: Outfall Table

Active Scenario: Average Flow

ID	Label	Elevation (Ground) (ft)	Elevation (Invert) (ft)	Boundary Condition Type	Flow (Total Out) (MGD)
791	O-OK-936	2,705.57	2,693.72	Free Outfall	0.169
739	O-OK-937	2,696.20	2,682.90	Free Outfall	0.555
692	O-OK-938	2,692.76	2,679.85	Free Outfall	0.102

FlexTable: Manhole Table

Active Scenario: Peak Flow (No Wet Weather)

Label	Base Load (Local Sanitary) (MGD)	Sanitary Loads <Count>	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Depth (Structure) (ft)	Flow (Total In) (MGD)	Flow (Total Out) (MGD)
MH-1	0.01	1	2,789.10	2,782.62	6.48	0.000	0.013
MH-2	0.00	0	2,785.30	2,778.62	6.68	0.013	0.013
MH-3	0.00	0	2,781.30	2,774.62	6.68	0.013	0.013
MH-4	0.00	0	2,777.40	2,770.63	6.77	0.013	0.013
MH-5	0.00	0	2,773.40	2,766.63	6.77	0.013	0.013
MH-6	0.00	0	2,769.70	2,762.99	6.71	0.013	0.013
MH-7	0.00	0	2,766.20	2,759.44	6.76	0.013	0.013
MH-8	0.00	0	2,766.90	2,755.25	11.65	0.013	0.013
MH-9	0.00	0	2,766.00	2,759.20	6.80	0.333	0.333
MH-10	0.00	0	2,765.40	2,758.65	6.75	0.333	0.333
MH-11	0.00	0	2,770.30	2,754.88	15.42	0.333	0.333
MH-12	0.00	0	2,773.90	2,764.34	9.56	0.063	0.063
MH-13	0.00	0	2,767.00	2,759.06	7.94	0.063	0.063
MH-14	0.00	0	2,762.40	2,754.89	7.51	0.063	0.063
MH-15	0.00	0	2,773.00	2,754.30	18.70	0.380	0.380
MH-16	0.00	0	2,750.80	2,744.42	6.38	0.380	0.380
MH-17	0.58	1	2,751.90	2,743.17	8.73	0.346	0.922
MH-18	0.00	0	2,749.90	2,741.29	8.61	0.922	0.922
MH-19	0.00	0	2,749.10	2,739.53	9.57	0.922	0.922
MH-20	0.00	0	2,751.30	2,731.70	19.60	0.922	0.922
MH-21	0.00	0	2,744.50	2,720.01	24.49	0.922	0.922
MH-22	0.00	0	2,729.80	2,707.84	21.96	0.922	0.922
MH-23	0.40	1	2,722.80	2,692.91	29.89	0.890	1.294
MH-24	0.09	1	2,711.90	2,689.65	22.25	1.285	1.376
MH-25	0.00	0	2,711.00	2,687.20	23.80	1.376	1.376
MH-26	0.18	1	2,710.60	2,686.75	23.85	1.359	1.538
MH-27	0.00	0	2,702.50	2,684.31	18.19	1.538	1.538
MH-28	0.00	0	2,696.80	2,683.32	13.48	1.538	1.538
MH-29	0.02	1	2,765.00	2,751.12	13.88	0.000	0.022
MH-30	0.00	0	2,760.30	2,748.41	11.89	0.104	0.104
MH-31	0.00	0	2,758.40	2,751.41	6.99	0.086	0.086
MH-32	0.00	0	2,761.50	2,748.84	12.66	0.086	0.086
MH-33	0.00	0	2,758.40	2,747.80	10.60	0.104	0.104
MH-34	0.00	0	2,757.90	2,747.37	10.53	0.104	0.104
MH-35	0.00	0	2,753.90	2,744.84	9.06	0.104	0.104
MH-36	0.00	0	2,753.40	2,742.56	10.84	0.104	0.104
MH-37	0.23	1	2,739.00	2,732.39	6.61	0.092	0.326
MH-38	0.00	0	2,759.30	2,751.06	8.24	0.013	0.013
MH-OK-228	0.00	0	2,737.26	2,728.78	8.48	0.326	0.326
MH-OK-229	0.09	1	2,731.40	2,724.93	6.47	0.318	0.412
MH-OK-230	0.00	0	2,731.87	2,723.75	8.12	0.412	0.412
MH-OK-231	0.00	0	2,718.84	2,713.54	5.30	0.412	0.412
MH-OK-233	0.00	0	2,706.83	2,701.40	5.43	0.524	0.524
MH-OK-235	0.06	2	2,777.80	2,763.07	14.73	0.000	0.063
MH-OK-728	0.33	1	2,767.00	2,760.00	7.00	0.000	0.333
MH-OK-741	0.00	0	2,751.30	2,745.20	6.10	0.236	0.236

FlexTable: Manhole Table

Active Scenario: Peak Flow (No Wet Weather)

Label	Base Load (Local Sanitary) (MGD)	Sanitary Loads <Count>	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Depth (Structure) (ft)	Flow (Total In) (MGD)	Flow (Total Out) (MGD)
MH-OK-869	0.00	0	2,730.90	2,724.00	6.90	0.236	0.236
MH-OK-870	0.00	0	2,726.80	2,712.97	13.83	0.236	0.236
MH-OK-872	0.03	1	2,753.50	2,746.50	7.00	0.207	0.236
MH-OK-873	0.00	0	2,744.80	2,738.46	6.34	0.236	0.236
MH-OK-874	0.00	0	2,736.50	2,731.00	5.50	0.236	0.236
MH-OK-930	0.00	0	2,725.30	2,710.00	15.30	0.236	0.236
MH-OK-931	0.00	0	2,713.20	2,699.36	13.84	0.236	0.236
MH-OK-932	0.10	1	2,698.50	2,688.70	9.80	0.228	0.333
MH-OK-2755	0.20	1	2,757.40	2,750.51	6.89	0.010	0.210
MH-OK-2833	0.07	1	2,775.00	2,768.04	6.96	0.000	0.068
MH-OK-3404	0.02	1	2,759.00	2,752.05	6.95	0.066	0.086
MH-OK-3940	0.00	0	2,721.49	2,702.54	18.95	0.524	0.524
MH-OK-3946	0.00	0	2,722.31	2,713.18	9.13	0.412	0.412
MH-OK-3947	0.00	0	2,721.59	2,708.68	12.91	0.524	0.524
MH-OK-3948	0.00	0	2,721.74	2,709.41	12.33	0.524	0.524
MH-OK-3949	0.12	1	2,722.25	2,711.74	10.51	0.402	0.524
MH-OK-3950	0.00	0	2,723.28	2,714.42	8.86	0.412	0.412
MH-OK-3951	0.00	0	2,723.95	2,719.33	4.62	0.412	0.412
MH-OK-3952	0.00	0	2,721.92	2,708.30	13.62	0.524	0.524

FlexTable: Conduit Table

Active Scenario: Peak Flow (No Wet Weather)

Label	Start Node	Invert (Start) (ft)	Stop Node	Invert (Stop) (ft)	Length (Scaled) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Flow (MGD)	Capacity (Design) (MGD)	Capacity (Excess Design) (MGD)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Depth (Normal) / Rise (%)	Design Percent Full (%)
P-1	MH-1	2,782.62	MH-2	2,778.82	379.5	0.010	8.0	0.013	0.390	0.377	1.19	1.30	9.0	50.0
P-2	MH-2	2,778.62	MH-3	2,774.82	379.5	0.010	8.0	0.013	0.390	0.377	1.19	1.30	9.0	50.0
P-3	MH-3	2,774.62	MH-4	2,770.83	379.5	0.010	8.0	0.013	0.390	0.377	1.19	1.30	9.0	50.0
P-4	MH-4	2,770.63	MH-5	2,766.83	379.5	0.010	8.0	0.013	0.390	0.377	1.19	1.30	9.0	50.0
P-5	MH-5	2,766.63	MH-6	2,763.19	344.0	0.010	8.0	0.013	0.390	0.377	1.19	1.30	9.0	50.0
P-6	MH-6	2,762.99	MH-7	2,759.64	334.8	0.010	8.0	0.013	0.390	0.377	1.19	1.30	9.0	50.0
P-7	MH-7	2,759.44	MH-8	2,755.45	398.8	0.010	8.0	0.013	0.390	0.377	1.19	1.30	9.0	50.0
P-8	MH-8	2,755.25	MH-38	2,751.26	398.8	0.010	8.0	0.013	0.390	0.377	1.19	1.30	9.0	50.0
P-9	MH-38	2,751.06	MH-OK-2755	2,750.71	34.8	0.010	8.0	0.013	0.390	0.377	1.19	1.17	9.0	50.0
P-10	MH-OK-2755	2,750.51	MH-OK-872	2,746.70	198.6	0.019	8.0	0.210	0.985	0.775	2.52	3.71	29.9	75.0
P-11	MH-OK-872	2,746.50	MH-OK-741	2,745.22	53.8	0.024	8.0	0.236	1.096	0.860	2.62	4.14	30.1	75.0
P-12	MH-OK-741	2,745.22	MH-OK-873	2,738.66	275.8	0.024	8.0	0.236	1.098	0.861	2.62	4.14	30.1	75.0
P-13	MH-OK-873	2,738.46	MH-OK-874	2,731.20	330.1	0.022	8.0	0.236	1.056	0.820	2.62	4.03	30.7	75.0
P-14	MH-OK-874	2,731.00	MH-OK-869	2,724.20	272.4	0.025	8.0	0.236	1.126	0.890	2.62	4.22	29.7	75.0
P-15	MH-OK-869	2,724.00	MH-OK-870	2,713.17	272.6	0.040	8.0	0.236	1.418	1.182	2.62	4.98	26.3	75.0
P-16	MH-OK-870	2,712.97	MH-OK-930	2,710.10	54.8	0.052	12.0	0.236	4.796	4.560	2.39	5.23	14.4	75.0
P-17	MH-OK-930	2,710.00	MH-OK-931	2,699.46	435.3	0.024	12.0	0.236	3.268	3.032	2.39	4.00	17.4	75.0
P-18	MH-OK-931	2,699.36	MH-OK-932	2,688.80	441.5	0.024	12.0	0.236	3.249	3.013	2.39	3.98	17.4	75.0
P-19	MH-OK-932	2,688.70	O-OK-938	2,679.95	439.0	0.020	12.0	0.333	2.964	2.631	2.63	4.12	21.6	75.0
P-20	MH-OK-728	2,760.00	MH-9	2,759.43	25.6	0.022	8.0	0.333	0.578	0.245	2.92	4.44	36.7	50.0
P-21	MH-9	2,759.23	MH-10	2,758.85	12.5	0.029	8.0	0.333	0.668	0.334	2.92	4.75	34.1	50.0
P-22	MH-10	2,758.65	MH-11	2,755.08	357.1	0.010	8.0	0.333	0.390	0.057	2.92	3.33	45.6	50.0
P-23	MH-11	2,754.88	MH-15	2,754.50	37.4	0.010	8.0	0.333	0.396	0.063	2.92	3.36	45.2	50.0
P-24	MH-OK-235	2,772.97	MH-12	2,764.54	195.5	0.043	8.0	0.063	1.481	1.418	1.79	3.48	13.4	75.0
P-25	MH-12	2,764.34	MH-13	2,759.26	80.1	0.063	8.0	0.063	0.984	0.921	1.79	3.98	12.2	50.0
P-26	MH-13	2,759.06	MH-14	2,755.09	396.5	0.010	8.0	0.063	0.390	0.328	1.79	2.07	19.2	50.0
P-27	MH-14	2,754.89	MH-15	2,754.50	39.2	0.010	8.0	0.063	0.390	0.328	1.79	1.50	19.2	50.0
P-28	MH-15	2,754.30	MH-16	2,744.62	360.4	0.027	8.0	0.380	0.640	0.260	3.05	4.95	37.4	50.0

FlexTable: Conduit Table

Active Scenario: Peak Flow (No Wet Weather)

Label	Start Node	Invert (Start) (ft)	Stop Node	Invert (Stop) (ft)	Length (Scaled) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Flow (MGD)	Capacity (Design) (MGD)	Capacity (Excess Design) (MGD)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Depth (Normal) / Rise (%)	Design Percent Full (%)
P-29	MH-16	2,744.42	MH-17	2,743.50	91.5	0.010	8.0	0.380	0.390	0.010	3.05	3.44	49.2	50.0
P-30	MH-17	2,743.17	MH-18	2,741.49	257.9	0.007	12.0	0.922	0.929	0.007	3.58	3.65	49.8	50.0
P-31	MH-18	2,741.29	MH-19	2,739.73	240.7	0.006	12.0	0.922	0.926	0.004	3.58	3.65	49.9	50.0
P-32	MH-19	2,739.53	MH-20	2,731.90	227.4	0.034	10.0	0.922	1.298	0.376	3.86	6.74	41.1	50.0
P-33	MH-20	2,731.70	MH-21	2,720.21	254.1	0.045	10.0	0.922	1.506	0.584	3.86	7.51	38.0	50.0
P-34	MH-21	2,720.01	MH-22	2,708.04	260.1	0.046	10.0	0.922	1.519	0.597	3.86	7.56	37.8	50.0
P-35	MH-22	2,707.84	MH-23	2,693.58	310.0	0.046	10.0	0.922	1.518	0.596	3.86	7.56	37.8	50.0
P-36	MH-23	2,692.91	MH-24	2,689.85	269.1	0.011	18.0	1.294	4.865	3.571	3.55	4.79	28.6	60.0
P-37	MH-24	2,689.65	MH-25	2,687.40	449.6	0.005	18.0	1.376	3.225	1.850	3.62	3.63	36.6	60.0
P-38	MH-25	2,687.20	MH-26	2,686.95	49.4	0.005	18.0	1.376	3.258	1.882	3.62	3.65	36.4	60.0
P-39	MH-26	2,686.75	MH-27	2,684.51	447.5	0.005	18.0	1.538	3.229	1.691	3.74	3.74	38.9	60.0
P-40	MH-27	2,684.31	MH-28	2,683.52	158.4	0.005	18.0	1.538	3.225	1.687	3.74	3.74	38.9	60.0
P-41	MH-28	2,683.32	O-OK-937	2,682.90	85.4	0.005	18.0	1.538	3.206	1.668	3.72	3.74	39.0	60.0
P-42	MH-OK-2833	2,768.04	MH-OK-3404	2,752.25	298.0	0.053	8.0	0.068	1.639	1.571	1.83	3.82	13.3	75.0
P-43	MH-OK-3404	2,752.05	MH-31	2,751.61	44.0	0.010	8.0	0.086	0.712	0.626	1.95	2.28	22.5	75.0
P-44	MH-31	2,751.41	MH-32	2,749.04	236.8	0.010	8.0	0.086	0.390	0.304	1.95	2.28	22.5	50.0
P-45	MH-32	2,748.84	MH-30	2,748.61	22.8	0.010	8.0	0.086	0.390	0.304	1.95	2.28	22.5	50.0
P-46	MH-29	2,751.12	MH-30	2,748.61	250.5	0.010	8.0	0.022	0.390	0.368	1.36	1.52	11.6	50.0
P-47	MH-30	2,748.41	MH-33	2,748.00	67.5	0.006	8.0	0.104	0.303	0.200	2.01	2.06	28.0	50.0
P-48	MH-33	2,747.80	MH-34	2,747.57	39.1	0.006	8.0	0.104	0.300	0.196	1.99	2.06	28.1	50.0
P-49	MH-34	2,747.37	MH-35	2,745.04	388.0	0.006	8.0	0.104	0.303	0.199	2.01	2.06	28.0	50.0
P-50	MH-35	2,744.84	MH-36	2,742.76	108.0	0.019	8.0	0.104	0.542	0.438	2.06	3.03	20.9	50.0
P-51	MH-36	2,742.56	MH-37	2,732.59	162.2	0.062	8.0	0.104	0.969	0.865	2.06	4.57	15.7	50.0
P-52	MH-37	2,732.39	MH-OK-228	2,728.98	281.5	0.012	8.0	0.326	0.430	0.104	2.89	3.55	42.6	50.0
P-53	MH-OK-228	2,728.78	MH-OK-229	2,725.10	236.7	0.016	8.0	0.326	0.887	0.562	2.89	3.88	39.9	75.0
P-54	MH-OK-229	2,724.93	MH-OK-230	2,723.82	220.0	0.005	8.0	0.412	0.506	0.094	2.69	3.14	64.2	75.0
P-55	MH-OK-230	2,723.75	MH-OK-3951	2,719.38	156.5	0.028	8.0	0.412	1.192	0.780	3.14	5.14	38.6	75.0
P-56	MH-OK-3951	2,719.33	MH-OK-3950	2,714.48	177.7	0.027	8.0	0.412	1.176	0.763	3.14	5.09	38.8	75.0

FlexTable: Conduit Table

Active Scenario: Peak Flow (No Wet Weather)

Label	Start Node	Invert (Start) (ft)	Stop Node	Invert (Stop) (ft)	Length (Scaled) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Flow (MGD)	Capacity (Design) (MGD)	Capacity (Excess Design) (MGD)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Depth (Normal) / Rise (%)	Design Percent Full (%)
P-57	MH-OK-3950	2,714.42	MH-OK-231	2,713.64	28.1	0.028	8.0	0.412	1.189	0.776	3.14	5.13	38.6	75.0
P-58	MH-OK-231	2,713.54	MH-OK-3946	2,713.38	13.4	0.012	8.0	0.412	0.790	0.378	3.14	3.77	48.6	75.0
P-59	MH-OK-3946	2,713.18	MH-OK-3949	2,711.94	110.2	0.011	8.0	0.412	0.756	0.344	3.14	3.67	49.8	75.0
P-60	MH-OK-3949	2,711.74	MH-OK-3948	2,709.61	188.1	0.011	8.0	0.524	0.758	0.234	3.44	3.89	57.6	75.0
P-61	MH-OK-3948	2,709.41	MH-OK-3947	2,708.88	46.9	0.011	8.0	0.524	0.756	0.233	3.44	3.89	57.7	75.0
P-62	MH-OK-3947	2,708.68	MH-OK-3952	2,708.50	15.6	0.011	8.0	0.524	0.755	0.232	3.44	3.88	57.7	75.0
P-63	MH-OK-3952	2,708.30	MH-OK-3940	2,702.60	227.3	0.025	8.0	0.524	1.128	0.605	3.44	5.26	45.4	75.0
P-64	MH-OK-3940	2,702.54	MH-OK-233	2,701.60	34.4	0.028	8.0	0.524	1.184	0.660	3.44	5.45	44.2	75.0
P-65	MH-OK-233	2,701.40	O-OK-936	2,693.72	345.4	0.022	8.0	0.524	1.063	0.539	3.44	5.03	47.0	75.0

FlexTable: Outfall Table

Active Scenario: Peak Flow (No Wet Weather)

ID	Label	Elevation (Ground) (ft)	Elevation (Invert) (ft)	Boundary Condition Type	Flow (Total Out) (MGD)
791	O-OK-936	2,705.57	2,693.72	Free Outfall	0.524
739	O-OK-937	2,696.20	2,682.90	Free Outfall	1.538
692	O-OK-938	2,692.76	2,679.85	Free Outfall	0.333

REVIEW COMMENTS FROM CLV

CITY OF LAS VEGAS
PUBLIC WORKS
333 NORTH RANCHO DRIVE
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June 1, 2016

Joseph Centrulo, P.E.
GCW, Inc.
1555 South Rainbow Blvd
Las Vegas, NV 89146

RE: Two Fifty – Wastewater Master Plan

Dear Mr. Centrulo:

The Two Fifty Wastewater Master Plan was received on March 29th, 2016 and the submittal review is now complete. Please accept the following comments:

1. Page 1; refer to improvements to the sewer system that are outside of the project limits as 'off-property' instead of 'off-site' in all instances for consistency with the development agreement.

2. Basin Delineation; the existing multiple-family dwellings, otherwise known as townhomes, at the southeast corner of the master plan area are classified by flow contribution as single family dwellings (1 ERU) in the City. The submittal locations impacted include this section, Figure 3, Figure 4, and most importantly the modeling calculations to establish the flow rates for the Rampart Outfall and all its associated Figures.

3. Figure 4; describe proposed access to serve seven single family dwellings shown west of Palace Ct. Initial review of layout indicates a potential land-lock situation that could necessitate an easement acquisition.

The City re-evaluated the downstream system and determined that no off-property sanitary sewer capacity shortfalls are anticipated or need to be addressed as a result of this plan. Please resubmit a revised Two Fifty Wastewater Master Plan addressing the three comments to receive City approval.

If you have any questions, feel free to email me or call me at (702) 229-2178.

Sincerely,

Tim Parks, P.E.
Engineering Project Manager
Sanitary Sewer Planning
Department of Public Works

cc: Kristina Swallow, P.E., CLV Public Works
Keith Letus, P.E., CLV Public Works

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