

**ADDENDUM #1 TO THE
TECHNICAL DRAINAGE STUDY
FOR RANCHO MULTI FAMILY PHASE 2**

Prepared for:

**Edward Homes
8475 S. Eastern Avenue, Suite 105
Las Vegas, NV 89123
Phone: (702)-665-6989
Fax: (702)-675-6319**

AUGUST 2022

PROJECT 4555.008

**RCI Engineering
500 South Rancho Drive, Suite 17 * Las Vegas, NV 89106
Tel: 702.453.0800 * Fax: 702.453.0801
www.rcicnevada.com**



RCI
ENGINEERING

August 9, 2022

City of Las Vegas
Flood Control
495 S. Main St.
Las Vegas, NV 89101

**RE: Certification Letter for Paper and Digital Plans for the
Addendum #1 to the Technical Drainage Study for Rancho Multi-Family Phase 2**

Mr. Sung,

This letter has been provided as certification that the paper version of the plans match the digital PDF plans on the CD submitted with the drainage study.

Sincerely,

RCI Engineering



Andrew Whittaker, P.E.

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL
DRAINAGE STUDY INFORMATION FORM

Name of Development: Rancho Multi-Family Phase 2 Date: JUNE 2022

Location of Development: a) Descriptive (Cross Streets) North/South: Rancho Drive
East/West: Smoke Ranch Road

b) Section: 18 Township: 20 S Range: 61 E

c) APN : 139-18-410-017

Name of Owner: Nola Sol Holdings, LLC

Telephone No.: 480-577-3989 Fax No.: 480-718-8283 E-Mail Address: steve@littlegiantholdings.com

Address: 919 N. Market Street Suite 725 Wilmington, Delaware 19801

Contact Person-Name: Andrew Whittaker, P.E. Telephone No.: 702-453-0800

* E-Mail Address: awhittaker@rcinevada.com Fax No.: 702-453-0801

Firm: RCI Engineering

Address: 500 South Rancho Drive, Suite 17 Las Vegas, Nevada 89106

Type of Land Development/Land Disturbance Process:

☐	Rezoning	☐	Subdivision Map	☐	Clearing and Grading Only
☐	Parcel Map	☐	Planned Unit Development	☐	Other (Please specify below)
☐	Large Parcel Map	☒	Building Permit		

1. Total Owned Land Area: At Site: 11.77 Acres +/- Being Developed/Disturbed: 11.77 Acres +/-

2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☐ Yes** ☒ No

3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☒ Yes** ☐ No

4. Proposed type of development (Residential, Commercial, Etc.): Residential Apartments

5. Approximate upstream land area which drains to the subject site: 230 Acres +/-

6. Has the site drainage been evaluated in the past? ☐ YES ☒ NO If yes, please identify documentation: _____

7. If known, please briefly identify the proposed discharge point(s) of runoff from the site:
Through storm drain into a 12-foot by 8-foot RCB in Rancho Drive (CCRFCD LVRA 0012)

8. Briefly describe your proposed schedule for the subject project: ASAP



Engineer's Seal

Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

*New Required Field

**Review and concurrence of the Clark County Regional Flood Control District is required.

	Revision	Date
	ADD1	August 2022

Local Entity File No. _____

REFERENCE:

STANDARD FORM 1



RCI
ENGINEERING

August 9, 2022

City of Las Vegas Flood Control
495 S. Main St.
Las Vegas, NV 89101

**RE: Rancho Multi Family Phase 2
DS5583**

Mr. Albert Sung,

The purpose of this letter is to address the comment letter dated July 13, 2022 regarding the above-referenced project. The comments are individually addressed. Each comment has been re-typed with the response to each comment.

CLV Review Comments:

Comment 1: Sites with a grade difference of 2 feet above or below existing are required to have approval from the *City Planning and Development Department*. The engineer must submit copies of the grading plans and detail sheet with a letter justifying the grade difference to the *City Planning Department* (229- 6301). The engineer must provide Planning approval with the next submittal.

Response: A copy of the approved justification letter is provided in Appendix B.

Comment 2: The site is adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District* (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

Please note that effective March 15, 2019, the CCRFCD adopted new requirements for drainage study concurrence submittal. Follow the link below for specific guidance.

<http://gustfront.ccrfcd.org/LandDev/LandDev.aspx>

Response: A copy of the drainage study and addendum will be submitted to CCRFCD for concurrence upon receipt of the conditional letter of approval from CLV.

Comment 3: The project is adjacent to the jurisdiction of *City of North Las Vegas* to the east of *Rancho Drive*. Obtain concurrence of the subject drainage study from the *Public Works Department of City of North Las Vegas* prior to the final approval of the study.

Response: A copy of the drainage study will be submitted to the Public Works Department of City of North Las Vegas for concurrence upon receipt of the conditional letter of approval from CLV.

Comment 4: The project proposes to construct facilities and/or increase flows within *Nevada Department of Transportation* (NDOT) right-of-way. The engineer must contact NDOT for encroachment permit for the proposed project.

Response: Currently coordinating with NDOT for encroachment permit.

Comment 5: Figure 8 (Interim Conditions Map) and Figure 9 (Ultimate Conditions Map): Label the existing contours with elevations.

Response: Existing contours with elevations for Figure 8 (Interim Conditions Map) and Figure 9 (Ultimate Conditions Map) are updated and enclosed in Appendix A.

Comment 6: The 100-year flow in *Smoke Ranch Road* is above and beyond the back of sidewalk and erosive. Provide erosion protection measures in the landscaping area behind the sidewalk. *Revise Section Detail 29/C5.1* and all pertinent grading plans accordingly.

Response: The improvement plans were revised to show riprap within the landscape area adjacent to Smoke Ranch Road.

Comment 7: Sheet C2.6: Provide a storm drain manhole at the 30"-RCP behind the property line to distinguish public/private maintenance responsibility post development.

Response: The improvement plans were revised to provide an oil / grit separator behind the property line to distinguish public / private maintenance responsibility. The oil / grit separator and onsite storm drain will be privately maintained. The offsite storm drain, downstream of the oil / grit separator, will be publicly maintained.

Comment 8: Sheet C2.6: Provide a storm drain manhole at the connection point of the 30"-RCP and the extended new regional box. Revise all pertinent plans and details accordingly.

Response: The improvement plans were revised to show a manhole at the connection point of the 30" RCP and the extended new regional box.

Comment 9: Provide structural detail for the connection of the proposed regional box to the existing regional box and the connection of the 30"-RCP to the new RCP box.

Response: RCI is coordinating with the structural engineer to provide structural details per CLV request. The structural details will be submitted to CLV as a separate submittal prior to submitting full improvement plans.

Comment 10: Sheet C2.6 & Sheet C5.1: At the southeast corner, per *Section Details 26/C5.1, 27/C5.1 & 28/C5.1*, a 3'-wide strip with a concrete valley gutter is proposed. However, this strip of land will create a no-man zone and may cause public nuisance or maintenance difficulty in the future. Eliminate this no-man zone in the next submittal.

Response: A redundant wall cannot be constructed at 8" or less from the existing Tire Store wall as it is about 1.2 feet into the tire store property. Therefore, since that is not a possible solution to eliminate the no-man zone at this time, we are proposing to make the area between the apartment perimeter fence and the existing Tire Store wall less desirable as a place where people can hide by making the gap larger and more exposed from the street and the apartment site. Most of the retaining wall has been eliminated. Only about 40 feet of retaining wall with a maximum height of 2 feet remain in the vicinity of the angle point at the corner of the Tire Store. View fence will be located on this wall. The remainder of that frontage will have only view fence that has been pulled back from the Tire Store wall with a max slope of 3:1 down to match existing grade at the Tire Store wall. A pedestrian gate is provided to the Smoke Ranch frontage that will serve as an accessible route to the bus stop and also serve as access for apartment staff to maintain the area between the perimeter fence and the Tire store west boundary. There is also a pedestrian gate provided, for maintenance purposes only, to the area between the perimeter fence and the north side of the tire store.

Comment 11: Sheet C5.0: Section Detail 19: The minimum size for a wall opening is 48"x16". Review and revise accordingly.

Response: The improvement plans were revised to show wall opening at 48" x 16".

Comment 12: Label all existing storm drains in the perimeter streets (*Rancho Drive, Smoke Ranch Road and King Air Place*) with *City of Las Vegas* recorded drawing numbers on the pertinent grading plans. Identify all associated drop inlets, laterals and storm drain manholes with type and size information.

Response: The improvements plans were revised to include labels that show the size and type of storm drain and inlets as requested.

Comment 13: The overall parking lot improvement area is larger than 1 acre. Per **Section 1500** of the *Clark County Regional Flood Control District's Hydrologic Criteria and Drainage Design Manual*, the subject improvements must provide for Low Impact Development (LID) measures. Review and address the issue in the next submittal.

Response: The total area of the parking lot is about 4.9 acres of which 3.63 acres drains to a proposed BMP OIL / Grit Separator near the southeast corner of the site. Figure 10, provided in Appendix A, is a BMP Exhibit that shows the areas of parking lot that drain to the BMP. Calculations to determine the size of Oil / Grit Separator is provided in Appendix B. The Oil / Grit Separator detail is provided in the detail sheet of the improvement plans.

Comment 14: For parking lot LID and storm water quality, the engineer must provide calculations (per *Section 1500 of the CCRFCD Hydrologic Criteria and Drainage Design Manual*) to justify that the length, width and depth of the landscape swales are meeting the design guidelines in an effective disconnected impervious areas layout.

Response: An Oil / Grit Separator is used in lieu of BMP swales to treat storm water runoff from minor storm events.

Comment 15: Provide a note on all grading plans (Standard Note No. 6): Post-Construction BMPs (PCBMPs) / Control Measures noted on the Grading Plans are mandatory permanent regulatory stormwater pollution controls. These PCBMPs must be installed per the approved plans and must be permanently maintained.

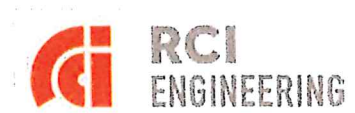
Response: The improvement plans were revised to show PCBMPs to be permanently maintained.

Comment 16: Provide a note on the grading plan: All Onsite Storm Drains and the associated facilities are Privately Owned and to be Privately Maintained by the Property Owner".

Response: The improvement plans were revised to provide a note as requested above.

Comment 17: Add a note in all pertinent sheets for the construction of all storm drain drop inlets per a newly adopted USDCCA Drawing No. 421 (*Stormwater Quality Management Stamp and Sign Detail*).

Response: The improvement plans were revised to provide a note as requested above.



If you have any questions or wish to further discuss these responses, please contact me at (702) 998-2101.

RCI Engineering

A handwritten signature in blue ink, appearing to read 'Andrew E. Whittaker'.

Andrew E. Whittaker, P.E.

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM		DATE: July 13, 2022
TO: Land Development Services Department of Building & Safety		FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: Rancho Multi Family Phase 2	
Cross Streets:	NWC of Rancho Drive & Smoke Ranch Rd.	COPIES TO: RCI Engineering
File Number:	F:\Depot\DSMemos\DS5583A.doc	Nola Sol Holdings, LLC
Parcel Number:	139-18-410-017	Bart Anderson, P.E., DevCo
Zoning Action:	EOT-78774 on SDR-73295	CCRFCD
FEMA Flood Zone	YES	CNLV
Proposed Storm Drain	YES	NDOT
	NO	X
	NO	X

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Payment Trn #
1 st Submittal	6/22/2022	7/13/2022	See Comments Below	\$400.00	4838802: \$400
			TOTAL FEES (LDDRS):	\$400.00	----

REMARKS:

The Drainage Study for the subject project has been reviewed and:

	is approved subject to conformance to all City standards and the following conditions:
X	must be resubmitted or supplemented including the following:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
	is conditionally approved subject to Clark County Public Works Department concurrence.

1. Sites with a grade difference of 2 feet above or below existing are required to have approval from the *City Planning and Development Department*. The engineer must submit copies of the grading plans and detail sheet with a letter justifying the grade difference to the *City Planning Department* (229-6301). The engineer must provide Planning approval with the next submittal.
2. The site is adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District* (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

Please note that effective March 15, 2019, the CCRFCD adopted new requirements for drainage study concurrence submittal. Follow the link below for specific guidance.

<http://gustfront.ccrfcd.org/LandDev/LandDev.aspx>

3. The project is adjacent to the jurisdiction of *City of North Las Vegas* to the east of *Rancho Drive*. Obtain concurrence of the subject drainage study from the *Public Works Department* of *City of North Las Vegas* prior to the final approval of the study.
4. The project proposes to construct facilities and/or increase flows within *Nevada Department of Transportation* (NDOT) right-of-way. The engineer must contact NDOT for encroachment permit for the proposed project.

5. **Figure 8 (Interim Conditions Map)** and **Figure 9 (Ultimate Conditions Map)**: Label the existing contours with elevations.
6. The 100-year flow in *Smoke Ranch Road* is above and beyond the back of sidewalk and erosive. Provide erosion protection measures in the landscaping area behind the sidewalk. Revise *Section Detail 29/C5.1* and all pertinent grading plans accordingly.
7. **Sheet C2.6**: Provide a storm drain manhole at the 30"-RCP behind the property line to distinguish public/private maintenance responsibility post development.
8. **Sheet C2.6**: Provide a storm drain manhole at the connection point of the 30"-RCP and the extended new regional box. Revise all pertinent plans and details accordingly.
9. Provide structural detail for the connection of the proposed regional box to the existing regional box and the connection of the 30"-RCP to the new RCP box.
10. **Sheet C2.6 & Sheet C5.1**: At the southeast corner, per *Section Details 26/C5.1, 27/C5.1 & 28/C5.1*, a 3'-wide strip with a concrete valley gutter is proposed. However, this strip of land will create a no-man zone and may cause public nuisance or maintenance difficulty in the future. Eliminate this no-man zone in the next submittal.
11. **Sheet C5.0**: *Section Detail 19*: The minimum size for a wall opening is 48"x16". Review and revise accordingly.
12. Label all existing storm drains in the perimeter streets (*Rancho Drive, Smoke Ranch Road and King Air Place*) with *City of Las Vegas* recorded drawing numbers on the pertinent grading plans. Identify all associated drop inlets, laterals and storm drain manholes with type and size information.
13. The overall parking lot improvement area is larger than 1 acre. Per **Section 1500** of the *Clark County Regional Flood Control District's Hydrologic Criteria and Drainage Design Manual*, the subject improvements must provide for Low Impact Development (LID) measures. Review and address the issue in the next submittal.
14. For parking lot LID and storm water quality, the engineer must provide calculations (per *Section 1500 of the CCRFCD Hydrologic Criteria and Drainage Design Manual*) to justify that the length, width and depth of the landscape swales are meeting the design guidelines in an effective disconnected impervious areas layout.
15. Provide a note on all grading plans (Standard Note No. 6): Post-Construction BMPs (PCBMPs) / Control Measures noted on the Grading Plans are mandatory permanent regulatory stormwater pollution controls. These PCBMPs must be installed per the approved plans and must be permanently maintained.
16. Provide a note on the grading plan: All Onsite Storm Drains and the associated facilities are Privately Owned and to be Privately Maintained by the Property Owner".
17. Add a note in all pertinent sheets for the construction of all storm drain drop inlets per a newly adopted USDCCA Drawing No. 421 (*Stormwater Quality Management Stamp and Sign Detail*).

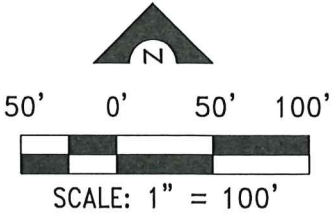
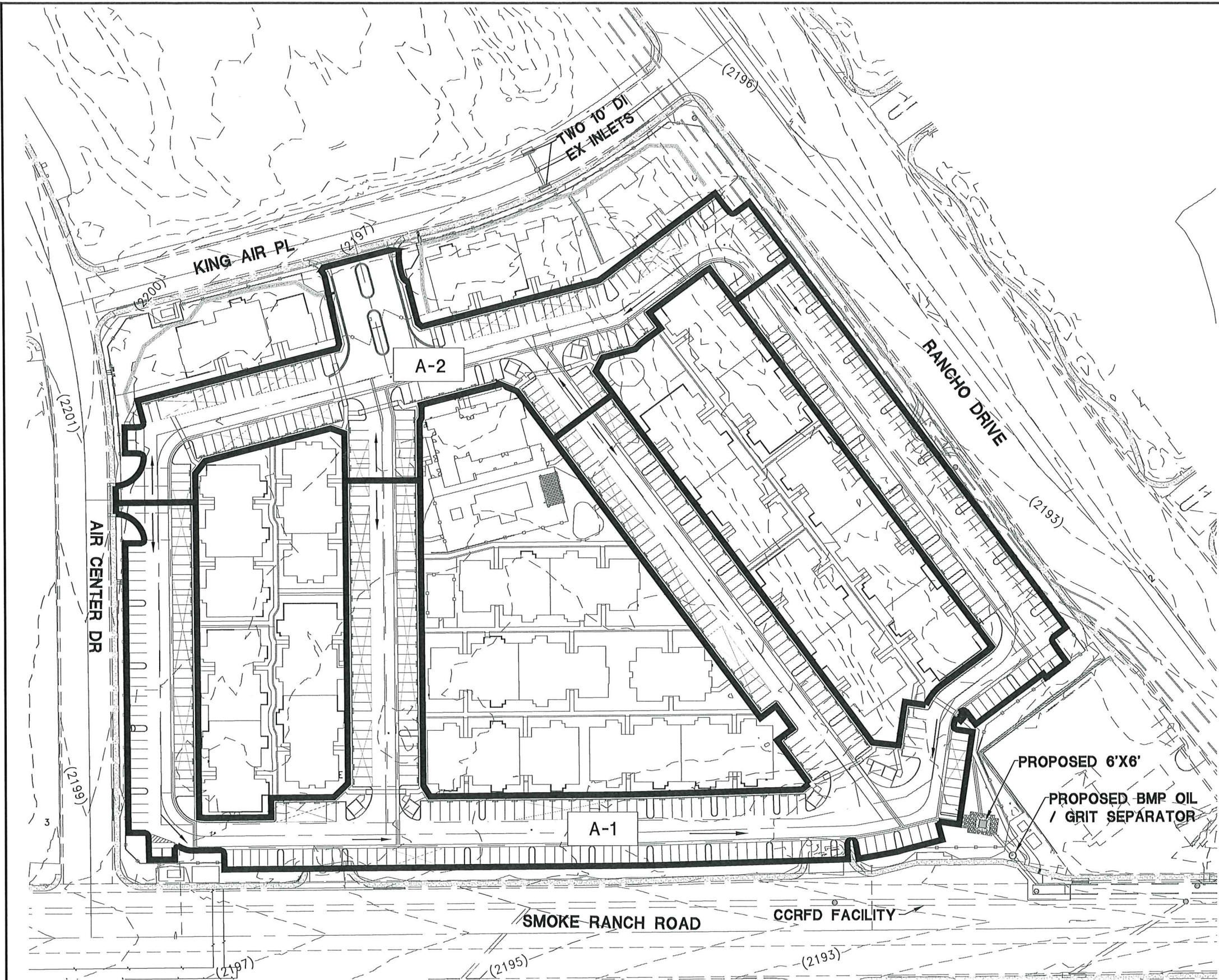
NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the *Nevada Division of Environmental Protection* a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see <http://ndep.nv.gov/bwpc/storm01.htm> or call (775) 687-9429.

END OF REMARKS
AYS

T/R/S: T20S/R61E/18
AREA M-18

APPENDIX A – FIGURES

Figure 8	Interim Conditions Basin Map
Figure 9	Ultimate Conditions Basin Map
Figure 10	BMP MAP



LEGEND

- PROPOSED FLOW DIRECTION
- PROPOSED SUBBASIN BOUNDARY
- A-1 PARKING AREA

BMP AREA		
BASIN	BMP	NO BMP
A-1	3.63	—
A-2	—	1.30
TOTAL	3.63	1.30

PERCENTAGE (%) AREA DRAINING TO BMP FACILITY = 74%

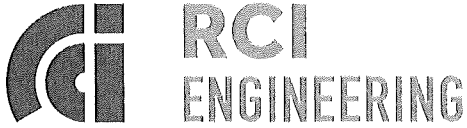
RANCHO MULTI-FAMILY PH 2
EDWARD HOMES
FIGURE 10
BMP EXHIBIT

RCI *Engineering*

500 SOUTH RANCHO DRIVE LAS VEGAS, NV 89106
PH#702.453.0800 FAX#702.453.0801

APPENDIX B – CORRESPONDENCE

Justification Letter



August 02, 2022

City of Las Vegas
Planning Department
333 N. Rancho Drive
Las Vegas, NV 89106

**RE: Justification Letter for Rancho Apartments Phase 2
APN 139-18-410-017**

On behalf of our client, Edward Homes, we have prepared the following justification letter in support of a vertical grade difference of two (2) feet or greater adjacent to existing grade for the subject parcel located in the Rancho Air Center, aka Smoke Ranch Commercial Development, APN 139-18-410-017.

Per City of Las Vegas Title 19 Section 19.06.030.B.1 when the natural grade of a lot is proposed to be raised more than two feet at any point from existing grade a review of the proposed grading plan is required by the Department of Public Works to determine if the proposed grading plan will not be incompatible or out of harmony with the surrounding area.

This letter and attached grading plans for the subject development are intended to provide clarification of the areas of grade difference in excess of two feet as well as identify that there will be no negative impact to adjacent developments in relation to Title 19 requirements. The proposed development has direct frontage on Smoke Ranch Road right of way and Rancho Drive (NDOT Business Route 95) right of way. To the north is King Air Place, a private street that is part of Rancho Air Center. To the west is Air Center Drive, a private street that is part of Rancho Air Center.

There are several existing conditions and constraints that required the site to be in a mostly fill condition. First, there is an existing CCRFCD 8'x12' box culvert that is located inside the parcel along Rancho. This facility is well within the developable area of the site and was installed with just 3-feet of cover. As we intend to construct private drive isles and parking over the box, adequate cover must be maintained. Second, the site is relatively flat at approximately 1.2% draining from the northwest to the southeast.

The site was graded so that a small portion of the site can drain to the north in King Air Place to reduce the amount of fill on the site. This design follows the site plan for previously approved Rancho Air Center. As all onsite runoff to the south must be captured in the proposed onsite storm drain and all onsite runoff to the south must drain as surface flow to King Air Place. The



use of retaining walls is necessary along the perimeter of the site to bring it into the onsite drive isle and swale system that takes it to the said catch basins.

Worst case along the west boundary (adjacent to Air Center Drive - Private) is about 3.2 feet of fill. Worst case along the east boundary (Rancho Drive) is 5 feet of fill. Worst case along the south boundary (Smoke Ranch Road) is 3 feet of fill. Worst case along the north boundary (King Air Place - Private) is 5 feet of fill. Note, all retaining walls will extend 0.5 to 1 foot above the highest adjacent finished grade (fill). There will be a 6 foot high perimeter view fence on top the retaining walls along all sides of the site. There will be only about 40 lineal feet of 2 foot high retaining wall along the common property line with the existing Tire Store with view fence on top. Most of the rest of that common frontage is at existing grade and the view fence is pulled back up to 15 feet from the property line. The existing CMU wall along the Tire Store will remain and a 1.5' concrete valley gutter will be constructed adjacent to the existing Tire Store wall to direct drainage to the on-site drop inlet.

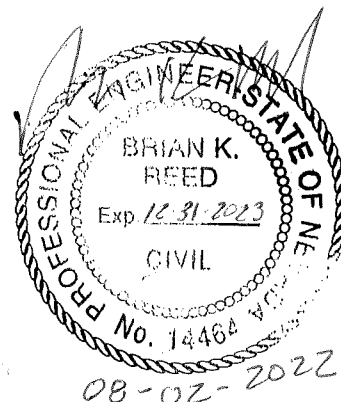
This development is in compliance with all other City of Las Vegas zoning and development requirements and the requirements set forth as part of the approved entitlements. Should you have any questions or wish to further discuss this application please contact me at (702) 453-0800.

Sincerely,

RCI Engineering

A handwritten signature in black ink, appearing to read 'Brian K. Reed'.

Brian K Reed, P.E.



APPROVED
DEPARTMENT OF PLANNING
CITY OF LAS VEGAS, NEVADA
2-Foot Grade Difference Only
rgumarang
Aug 09 2022

APPENDIX C – HYDRAULIC CALCS

BMP Design Discharge

BMP - OIL / GRIT SEPARATOR FLOW RATE CALCULATIONS									
HYDRAULIC CRITERIA AND DRAINAGE DESIGN MANUAL FOR 2-YEAR, 6-HOUR STORM									
Location	A (acres)	D ₂ (in.)	D _{M85}	D ₈₅ (in.)	Q _p /A (cfs/ac)	% Impervious	Q _p /A (ratio)	Q _{AP} /A (cfs/ac)	Q _p (cfs)
Smoke Ranch Road, West of Rancho Drive	3.63	0.72	0.32	0.23	0.34	98	1.05	0.36	1.3

Where:

A is the upstream parking lot area given in acres

D₂ is the adjusted 2-year rainfall depth for site per CCRFCD methods on page 1509 of Drainage Design Manual

D_{M85} is 85th percentile rainfall for McCarran Area given in page 1509 of the Drainage Design Manual

D₈₅ is the BMP Design Precipitation (85th Percentile Rainfall Depth) computed by D₂ x D_{M85} on page 1509 of the Drainage Design Manual

Q_p/A (cfs/ac) is the unit discharge for the 90 percent average percent impervious area calculated by the regression equation Y1

% Impervious is percentage calculated for Asphalt on Table 602 page 1 of 4

Q_p/A (ratio) is adjustment ratio for Q_p/A obtained from regression equation Y₂

Q_{AP}/A (cfs/ac) is the adjusted Q_p/A relative to 90% average percent impervious obtained from the multiplication of Q_p/A (ratio) and Q_p/A (cfs/ac)

Q_p (cfs) is peak design discharge where the adjusted Q_{AP}/A is multiplied by the site area (A)

Regression Equations used:

$$Y1 = 1.5042(x) - 0.0066$$

$$Y2 = 0.0059(x) + 0.4688$$

Figure 1501, Conceptual Layout 1, represents a parking lot that can be designed so that the runoff can be directed towards the perimeter landscape buffer areas that incorporate a landscaped swale. These swales are designed as rock or xeriscaped swales to convey runoff to a low point, which discharges either directly to the MS4 or to a main drainage pipe and then into the MS4.

Figure 1502, Conceptual Layout 2, represents a parking lot that is not designed to direct all runoff towards swales installed in the perimeter landscape buffer areas. One example could be that the adjacent right-of-way at this area is higher in elevation than the onsite grade. In order to still use the landscape swale BMP, the Developer could use swales in depressed medians within the site, combined with perimeter swales where feasible.

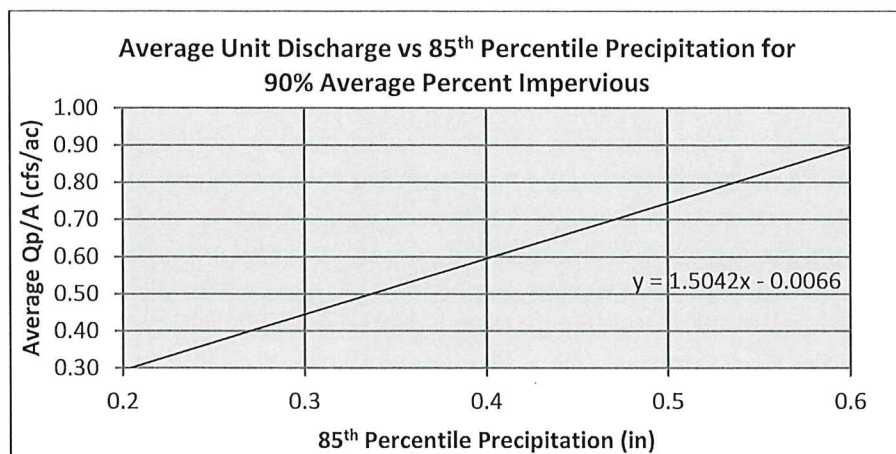
Treatment control devices rather than BMP swales may be used, however, the amount of parking lot area required to be treated would need to be calculated.

Figure 1503, Conceptual Layout 3, shows a conceptual level layout for this scenario, which relies on a combination of modular pavers, sand/oil separators, and underground detention to provide treatment for at least 75 percent of the parking lot area. To size the treatment control BMPs, the approaches described in section 1502.3 should be used. Note that for treatment devices, hydraulic sizing may need to account for the contribution of runoff from building areas draining through the parking lot.

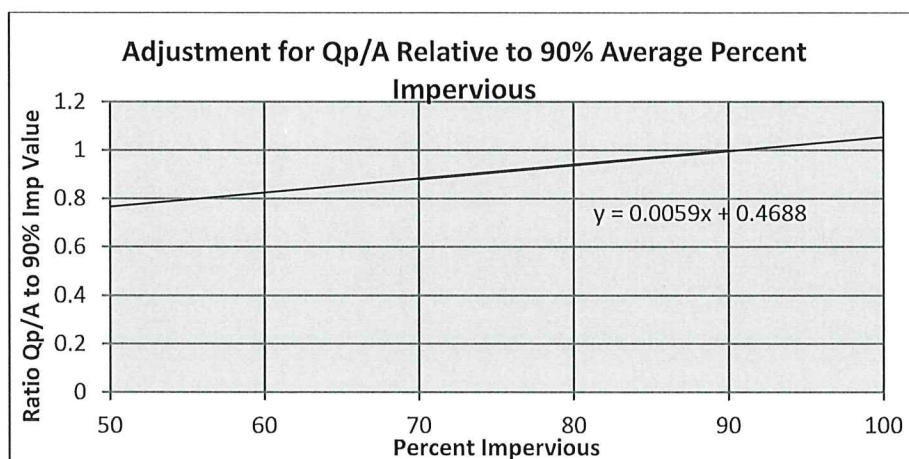
1502.3 Water Quality Design Storm

This section describes the steps to be followed to determine the design hydrology for sizing parking lot BMPs in the Las Vegas Valley.

1. Determine BMP Design Precipitation - 85th Percentile Rainfall Depth
 - a. Locate site on CCRFCD Design Rainfall Map for 2-year, 6-hour storm
 - b. Determine the adjusted 2-year rainfall depth (D_2) for site, per CCRFCD methods
 - c. Compute ratio of D_2 site to D_2 for the McCarran Airport Area
 - d. Compute 85th percentile rainfall depth (D_{85}) as $0.32 \times D_2$ ratio (0.32 is D_{85} for McCarran Area)
2. Calculate BMP Design Peak Discharge
 - a. Use the following chart or regression equation to calculate the unit discharge (Q_p/A) for the 90 percent average percent impervious area condition based on the D_{85} value.



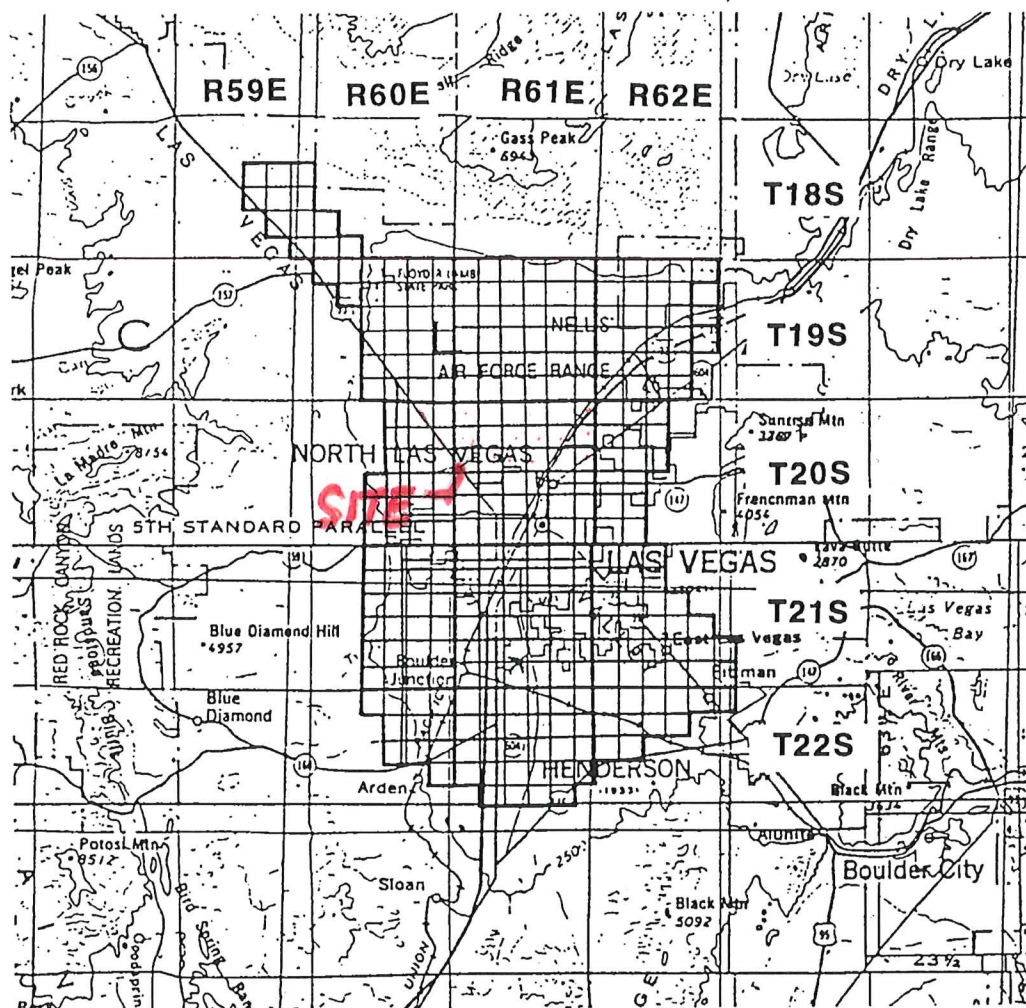
- b. Use the following chart or regression equation to calculate the unit discharge for the site based on the actual percent impervious area of the parking lot and associated landscaped areas.



- c. Calculate the peak design discharge in cfs as $Q_P = Q_P/A \times A$ where Q_P/A is from step (2b) and A is in acres.
3. Calculate BMP Design Runoff Volume
- a. Use the following chart or regression equation to calculate the unit runoff volume (Vol/A) for the 90 percent impervious condition based on the D_{85} value.

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

McCARRAN AIRPORT RAINFALL AREA



TOWNSHIP	RANGE	SECTIONS	TOWNSHIP	RANGE	SECTIONS
18 South	59 East	13-15,22-26,36	20 South	62 East	4-9,16-20,29-32
18 South	60 East	30-32	21 South	60 East	1-4,9-16,21-28,33-36
19 South	60 East	1-6,8-16,21-28,33-36	21 South	61 East	ALL SECTIONS
19 South	61 East	ALL SECTIONS	21 South	62 East	4-9,15-23, 25-36
19 South	62 East	2-11,14-23,27-34	22 South	60 East	1-4,10-15,24
20 South	60 East	1-3,10-15,21-28,33-36	22 South	61 East	1-24,26-29
20 South	61 East	ALL SECTIONS	22 South	62 East	1-10,17-18

Notes:

1. Refer to Table 505 and Figure 516 Depth-Duration- Frequency values in the McCarran Airport Rainfall Area.
2. Refer to Table 506 and Figure 517 for Time-Intensity-Frequency values on the McCarran Airport Rainfall Area.

Revision	Date

WRC
ENGINEERING

REFERENCE:

USACE, Los Angeles District, 1988

FIGURE 513

HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

DEPTH-DURATION-FREQUENCY VALUES FOR McCARRAN AIRPORT RAINFALL AREA (IN INCHES)

TIME	RECURRENCE INTERVAL					
	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
5 min.	0.15	0.27	0.35	0.46	0.54	0.63
10 min.	0.25	0.44	0.57	0.74	0.89	1.02
15 min.	0.33	0.57	0.74	0.97	1.15	1.32
30 min.	0.44	0.78	1.01	1.31	1.55	1.79
1 hour	0.52	0.89	1.15	1.50	1.78	2.06
2 hour	0.59	1.01	1.30	1.70	2.01	2.30
3 hour	0.64	1.08	1.39	1.82	2.15	2.48
6 hour	0.72	1.22	1.58	2.05	2.41	2.77
24 hour (TR-55)	1.20	1.60	1.80	2.40	2.70	2.96

- NOTE: 1. Refer to Figure 513 for a description and drawing of the area included in the McCarran Airport Rainfall Area.
2. The 24 hour values presented above are for use with TR-55 only.
3. Table 501 adjustments not required.

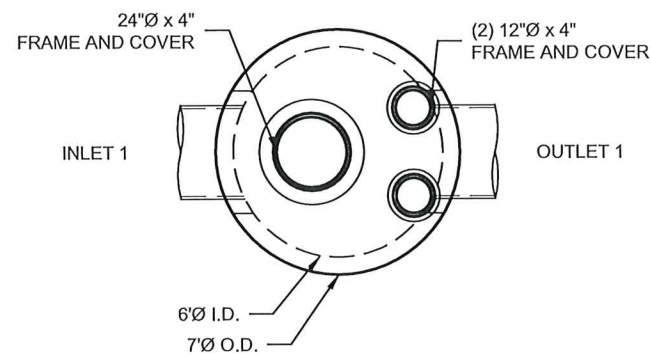
Revision	Date

**WRC
ENGINEERING**

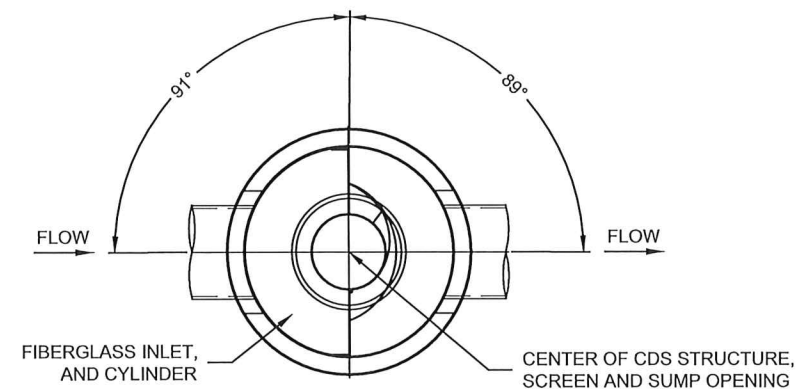
REFERENCE:

USACE, Los Angeles District, 1988

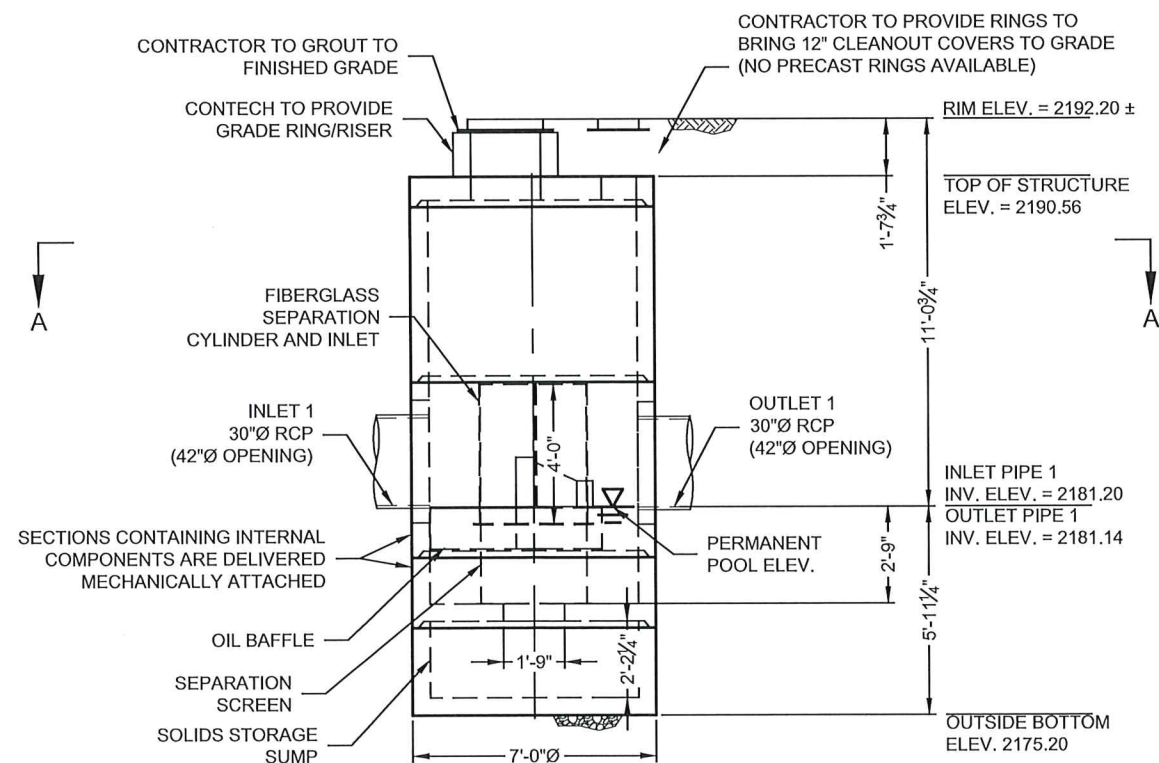
TABLE 505



PLAN VIEW



SECTION A-A



ELEVATION VIEW

MATERIAL LIST (PROVIDED BY CONTECH)

COUNT	DESCRIPTION	INSTALLED BY
1	FIBERGLASS INLET AND CYLINDER	CONTECH
1	4700 micron, 3' O.D. x 2.25' SEP. SCREEN	CONTECH
1	HARDWARE KIT	CONTECH
1	SEALANT FOR JOINTS	CONTRACTOR
1 PLC	GRADE RINGS/RISERS	CONTRACTOR
1	24"Ø x 4" FRAME AND COVER, NON-VENTED EJ#416003009A01, OR EQUIV.	CONTRACTOR
2	12"Ø x 4" FRAME AND COVER, NON-VENTED EJ#41610201, OR EQUIV.	CONTRACTOR

SITE DESIGN DATA

WATER QUALITY FLOW RATE	2 CFS
PEAK FLOW RATE	20 CFS
RETURN PERIOD OF PEAK FLOW	100 YRS

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS-20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
6. CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES

- A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
- B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE.
- C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
- D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
- E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

STRUCTURE WEIGHT

APPROXIMATE HEAVIEST PICK = 12000 LBS.
STRUCTURE IS DELIVERED IN 4 PIECES

MAX FOOTPRINT = Ø7'

CONTECH
PROPOSAL
DRAWING

OLSAZ
5944 / 570484
LAYOUT 1A
3020-6-FGIS

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DATE: 07/26/22	SCALE: 3/16" = 1'-0"
DESIGNED: GHH	DRAWN: GHH
CHECKED:	APPROVED:
PROJECT No.: 718747	SEQUENCE No.: 10
SHEET: 1 OF 1	