

# HYDROLOGIC CRITERIA AND DRAINAGE DESIGN MANUAL

## DRAINAGE SUBMITTAL CHECKLIST

Project Name: Sunrise Mountain Landfill

Map ID:

Firm Name: Republic Services, Inc.

Engineer: Todd Whittle, P.E.

Address: 770 East Sahara Avenue

City: Las Vegas

State: NV

Zip: 89104

Phone Number: 702-735-5151

Fax Number:

Property Owner: U.S Bureau of Land Management - Nevada

Address: 4701 North Torrey Pines Drive

City: Las Vegas

State: NV

Zip: 89130

Reviewed By:

Date Received:

Date Accepted for Review:

The following checklist is intended as a guide for the engineer preparing a Technical Drainage Study to submit to the local entity and Clark County Regional Flood Control District (if necessary). The listed items are the minimum information required prior to the entity performing a review. The engineer will remain responsible to ensure the Technical Drainage Study is prepared within the guidelines as set forth in the Clark County Regional Flood Control District (CCRFCD) Hydrologic Criteria and Drainage Design Manual (MANUAL).

This document is intended as an aid in preparing Technical Drainage Studies. Each study submitted is reviewed for compliance with local and regional criteria. This form is not intended to be all inclusive and does not limit the extent of the information, calculations or exhibits which may be necessary to properly evaluate the intended land use.

If items are not applicable for the subject site, provide N/A.

### I. GENERAL REQUIREMENT

Yes No

X \_\_\_\_\_ Design Manual **Standard Form 1** with the engineer's seal and signature.

X \_\_\_\_\_ Design Manual **Standard Form 4**. **NOTE: Form recreated in Appendix F**

X \_\_\_\_\_ 2 copies of the 24" x 36" Drainage Plan. **NOTE: 1-hard copy and 1-electronic copy**

\_\_\_\_\_ NA A notarized letter from the adjacent property owner(s) allowing off-site grading or discharge.  
**NOTE: Adjacent property owned by Bureau of Land Management**

**REFERENCE:**

**STANDARD FORM 2**

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### II. MAPS AND EXHIBITS

Yes      No

- X      \_\_\_\_\_ A copy of a current Flood Insurance Rate Map (FIRM) with the site delineated.
- X      \_\_\_\_\_ A copy of the current CCRFCD Master Plan Update Figure, (F-x), for Flood Control Facilities and Environmental areas with the site delineated.
- X      \_\_\_\_\_ Off-site drainage basin maps for existing, interim and future conditions showing the existing topography, basin boundaries, concentration points, and flows in cfs.
- X      \_\_\_\_\_ On-site drainage basin maps for existing and proposed conditions showing the existing topography, basin boundaries, concentration points, and on-site and off-site flows in cfs.  
**NOTE: Basin delineation map for proposed conditions only**
- X      \_\_\_\_\_ Vicinity Map with local and major cross streets identified and a north arrow.

### III. DRAINAGE PLAN

Yes      No

- X      \_\_\_\_\_ Sheet size: 24" x 36" sealed by a registered engineer in the State of Nevada.
- X      \_\_\_\_\_ Minimum scale: 1" = 60'.
- X      \_\_\_\_\_ Project name.
- X      \_\_\_\_\_ Vicinity Map with local and major cross streets.
- X      \_\_\_\_\_ Revision box.
- X      \_\_\_\_\_ North arrow and bar scale.
- X      \_\_\_\_\_ Engineer's/consultant's address and phone number.
- X      \_\_\_\_\_ Elevation datum and benchmark.
- X      \_\_\_\_\_ Legend for symbols and abbreviations.
- X      \_\_\_\_\_ Cut/fill scarps, where applicable.
- NA      \_\_\_\_\_ Street names, grades, widths.
- NA      \_\_\_\_\_ Proposed future and existing spot grades for top of curbs and street crowns at lot lines, grade breaks, and along curb returns on both sides of the street.

**REFERENCE:**

**STANDARD FORM 2**

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### III. DRAINAGE PLAN (Continued)

Yes No

- |                         |   |
|-------------------------|---|
| <u>X</u> <u>      </u>  | Existing contours encompassing the site and 100 feet beyond with spot elevations for important locations, where appropriate.  |
| <u>NA</u> <u>      </u> | Minimum finish floor elevations with top-of-curb elevations at upstream end of lot.   |
| <u>NA</u> <u>      </u> | Proposed typical street sections.   |
| <u>NA</u> <u>      </u> | Streets with off-set crowns.  |
| <u>X</u> <u>      </u>  | Proposed contours or spot elevations in sufficient detail to exhibit intended drainage patterns and slopes.   |
| <u>X</u> <u>      </u>  | Property lines.   |
| <u>NA</u> <u>      </u> | Right-of-way lines and widths, existing and proposed.   |
| <u>X</u> <u>      </u>  | Existing improvements and their elevations.   |
| <u>X</u> <u>      </u>  | Delineation of proposed on-site drainage basins indicating area and 10-year and 100-year storm peak flows at basin concentration points. <b>NOTE: Utilized 200-yr design storm only.</b>  |
| <u>NA</u> <u>      </u> | Concentration points and drainage flow direction with $Q_{100}$ and $V_{100}$ and $D_{100}$ in streets.   |
| <u>X</u> <u>      </u>  | Cumulative flows, velocity, and direction of flow at upstream and downstream ends of site for the 10-year and 100-year flows. <b>NOTE: Utilized 200-yr design storm only.</b>   |
| <u>NA</u> <u>      </u> | Location and cross-section of street capacity calculations.   |
| <u>X</u> <u>      </u>  | Cross-sectional detail for channels, including cutoff wall locations.   |
| <u>X</u> <u>      </u>  | Existing and proposed drainage facilities, appurtenances, and connections (i.e., sidewalk, ditches, swales, storm drain systems, unimproved and improved channels, and culverts, etc.) stating size, material, shape, and slope with plan and profile and HGL calculations. |
| <u>NA</u> <u>      </u> | Existing and proposed drainage easements and widths shown with sufficient detail. A cross sectional detail must be provided that shows appropriate lining and reinforcement.  |
| <u>NA</u> <u>      </u> | Location and detail of existing, proposed, and future block wall openings. Minimum size is 16" x 48". Wrought iron gate is required for flows > 10 cfs.   |
| <u>NA</u> <u>      </u> | Location and detail of flood walls illustrating depth of flow, proposed grouting height, etc.   |

REFERENCE:

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### III. DRAINAGE PLAN (Continued)

Yes No

- NA Perimeter retaining wall locations. All existing and proposed walls (retaining screen and flood) must be shown with adjacent ground elevations. Flood walls with 8-inch concrete masonry unit.
- NA Building and/or lot numbers.
- NA Alignment of all existing, proposed, or future Regional Facilities adjacent to the site.
- X Limits of existing floodplain based on current FIRM or best available information; limits of proposed floodplains based on best available information.
- NA For areas in Zone A, AE, AH, and AO, base flood elevations (BFEs) must be shown for each lot; BFEs may be listed on each lot, or in a table. Finish floor elevations must be a minimum of 18 inches above BFE.
- NA Appropriately elevated "humps" 6 inches above the 100 year water surface elevation at site accesses where the intent is to protect the site from the  $Q_{100}$  flows.
- NA Street slopes for perimeter and interior streets. The minimum slope is 0.4 percent.

### IV. HYDROLOGIC ANALYSIS

Yes No

- X Appropriate soil information and Soils Map for existing and future conditions with subbasins and property delineated.
- X Input and output information for existing conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
- X Input and output information for future conditions from computer models (HEC-1 or TR-55). The flow routing diagram must be provided with HEC-1 models.
- X Use of correct precipitation values in and around the McCarran Airport rainfall area.
- X A discussion in the text of the hydrologic analysis justifying subbasin boundaries and cutoffs, supporting assumptions, and calculations.
- X A summary table of stormwater flows showing basin area,  $Q_{10}$  and  $Q_{100}$  for both individual basins and combined basin flows, where applicable. **NOTE: Utilized 200-yr design storm.**
- NA Copies of supporting technical information referenced from a previously approved study and a statement accepting these results.
- X On-site facilities must perpetuate flows through or around the site without significantly impacting adjacent property owners in accordance with current Nevada Drainage Law.

REFERENCE:

STANDARD FORM 2

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### V. HYDRAULIC ANALYSIS

Yes No

X

Flow split calculations and supporting documentation or reference for the method of flow split calculations used.

NA

Normal depth street flow calculations and cross section diagrams for all interior and perimeter streets. Provide "d x v" products for the  $Q_{100}$  and  $Q_{10}$  flows representing the worst case for interior and all perimeter streets.  $Q_{100} d \times v \leq 8$ .  $Q_{10} d \times v \leq 6$  and 12 foot dry lane for rights-of-way  $\geq 80$  feet. Calculations must be labeled by street name as indicated on the Grading Plan.

NA

A summary table of interior and exterior street capacity calculations showing the street name,  $Q_{100}$  flow, slope, depth of flow, velocity and depth times velocity product and streets needing to meet 12 foot dry lane criteria.

NA

Appropriate hydraulic calculations for block wall openings assuming a 50 percent vertical clogging factor. (Assume the lower half of the opening is plugged.)

NA

Appropriate hydraulic calculations at drainage easement entrance and discharge locations to set finish floor elevations. Hydraulic calculations must include submerged weir, superelevation and tee intersection losses, where appropriate.

NA

Provide necessary freeboard requirements to set the finished floor elevations of all proposed buildings, 2 x depth of flow or depth of flow plus 18 inches of freeboard, whichever is less. The minimum requirement is 6 inches above adjacent upstream top of curb. Buildings adjacent to drainage easements must always be provided with 18 inches of freeboard above the  $Q_{100}$  weir height or flow depth, which ever is greater.

X

A complete water surface profile analysis (HEC-2, HEC-RAS, etc.) for channel flows and FEMA Zone A flood zones.

- Field survey data.
- Input and output information.
- Plotted cross-sections based on survey with proper encroachments.
- A map showing the location of the cross-sections.
- Analysis of both sub and super-critical flow segments.
- A summary table and a discussion of the results in the text of the report.

NA

Provide a 50 percent clogging factor in the capacity calculation for drop inlets.

X

Hydraulic calculations for culverts and storm drains. D-Load calculations must be provided for storm drain pipes in public rights-of-way, including headwater pool inundation.

NA

The mitigation of nuisance water, both during construction and in the fully developed condition, must be addressed.

REFERENCE:

STANDARD FORM 2