Introduction

- Basics of preparing a land development submittal for the County
  - Recommendations
  - Avoiding common errors
  - Resources available
Greg Carlton

Submittal and Report Format
Flood Control – General Submittal Requirements
County Planning and Development Services (PDS)
Webpage: https://www.sandiegocounty.gov/pds/

Land Development

NEW! You can now schedule an appointment online with Land Development counter staff for the following appointment types:
- Grading Permit Application Submittal
- Grading Permit Issuance

Click! to SCHEDULE

Land Development Appointments

The Land Development Division provides engineering and review services for construction and development projects throughout the unincorporated areas of San Diego County.

The DPW Land Development Website hosts additional information related to processes under their ultimate authority.

FINAL MAP
Final Map & Parcel Map Appendix
Final Map & Parcel Map Initial Submittal Checklist 2012
Final Map Processing (Major Subdivisions)
Final Map Processing (Minor Subdivisions)
Map Check BPR® Booklet

FINAL ENGINEERING
Financially Responsible Form
Grading Plan Application
Grading Plan Checklist
Grading Plan Cost Estimate Template (2017)
Grading Plan Notes
Grading Plan Requirements
Improvement Plan & Grading Plan Conceptual Design Plan Application Meeting Request Form
Flood Control

FLOOD AFTER FIRE
Erosion Control Homeowners Assistance Center and More

Flood Control Functions
The Flood Control Section is responsible for the maintenance of existing stormwater drainage facilities, construction of new district facilities, flood warning, hydrologic data collection and assuring private development projects meet flood control objectives and compliance with Federal Emergency Management Association (FEMA) guidelines. It provides staff support for the Flood Control Commission, drafts and reviews state and local regulations and provides FEMA and County Flood Plain Map information, technical reports, public and private land development studies and standards for support of private development. It also receives drainage complaints and provides information and appropriate actions. For questions about general Flood Control issues, please call (619) 694-2112.

DPW Flood Control is supported by the: Flood Control District, Flood Control District Advisory Commission Public Meetings and Info, Flood Control District Contact Numbers.
Flood Control is responsible for maintenance of stormwater drainage facilities, developing and reviewing hydrologic and hydraulic studies and associated mapping, and ensuring compliance with sound floodplain management practices.
Technical Manuals

- Hydrology Manual
  - [https://www.sandiegocounty.gov/content/sdc/dpw/flood/hydrologymanual.html](https://www.sandiegocounty.gov/content/sdc/dpw/flood/hydrologymanual.html)

- Hydraulic Design Manual
  - [https://www.sandiegocounty.gov/content/sdc/dpw/flood/drainage.html](https://www.sandiegocounty.gov/content/sdc/dpw/flood/drainage.html)
Acceptable Software Programs:

- For Culverts: HY-8 or HEC-RAS
- For Channels: HEC-RAS
- Detention Facilities (Routing): HEC-HMS, RatHydro and SDUH (Rick Engineering)
- Storm Drains: WSPGW
DRAINAGE STUDY

FOR

ORCHARD RUN UNITS 1-3
MOUNTAIN VALLEY, INC.
VALLEY CENTER, COUNTY OF SAN DIEGO, CA

OWNER:

VIL VALLEY CENTER RANCH, LLC
C/O TOUCHSTONE COMMUNITIES
9500 Mira Mesa Blvd, Suite 120
San Diego, CA 92131
858.560.4134

Prepared By:

TOUCHSTONE COMMUNITIES
9500 Mira Mesa Blvd, Suite 120
San Diego, CA 92131
858.560.4134

Prepared Date: 11/20/2018
Revisions:
Common Submittal Issues

- Report does not include plans and vice-verse.

- Submittal does not include data files.

- Report does not include hydrology and/or hydraulic modeling work maps, or are illegible and missing information (i.e. contours, flowlines, elevations).
Vicky Zhang
County and FEMA Floodplain
There are 2 sets of floodplain mapping – FEMA and County. Both need to be checked, and the more restrictive governs.

- County model – HEC-2 model
- HEC-2 model request through Flood Control staff
- County floodplain superseded FEMA floodplain – check with Flood Control Staff
How to Obtain County of San Diego Floodplains

- [www.sangis.org](http://www.sangis.org)
- Regional Data Warehouse – Hydrology –
  - Floodplain_100_year_CN – County Floodplain
  - Floodway_100_year_CN – County Floodway
  - Flood_Plain – FEMA
  - Topo data is available
# SanGIS/SANDAG GIS Data Warehouse

San Diego's Regional GIS Data Source

Visit the SANDAG/SanGIS Regional GIS Data Warehouse [Open Data Portal](#)

## GIS Data Categories

*Click a category link to view the available downloads.*

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<tr>
<th>Address</th>
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Available Downloads

Use the browser back button to return to this list from an open PDF.

Click Shapefile link to download the ZIP file.

**Metadata PDF**
- Elev_Grid_10m.pdf
- Elev_Grid_30m.pdf
- Topo_1999_2Ft_SD.pdf
- Topo_1999_5Ft_SD.pdf
- TOPO_200.pdf
- Topo_2014_2Ft_Carlsbad.pdf
- Topo_2014_2Ft_DeLuz.pdf
- Topo_2014_2Ft_ElCajon.pdf
- Topo_2014_2Ft_Escondido.pdf
- Topo_2014_2Ft_Jamul.pdf
- Topo_2014_2Ft_LaJolla.pdf
- Topo_2014_2Ft_MargaritaPeak.pdf
- Topo_2014_2Ft_NationalCity.pdf
- Topo_2014_2Ft_NWPendleton.pdf
- Topo_2014_2Ft_OceansideNorth.pdf
- Topo_2014_2Ft_PowayLaMesa.pdf
- Topo_2014_2Ft_SanMarcos.pdf
- Topo_2014_2Ft_SanPasqual.pdf
- Topo_2014_2Ft_Tijuana.pdf
- Topo_2014_2Ft_ValleyCenter.pdf
- Topo_2015_5Ft_JamulDulzura.pdf
- Topo_2015_5Ft_Julian.pdf
- Topo_2015_5Ft_MountainEmpire.pdf
- Topo_2015_5Ft_PalaPauma.pdf
- Topo_40.pdf

**Shapefile ZIP Download**
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- Elev_Grid_30m.zip
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 Metadata PDF
COASTLINE.pdf
Floodplain_100_Year_CN.pdf
Floodway_100_Year_CN.pdf
Flood_Panel.pdf
Flood_Plain.pdf
FLOWLINES.pdf
FLOWLINES_CARTO.pdf
Groundwater_Basins.pdf
Harbor_Bay.pdf
Hydrologic_Basins.pdf
HYD_303D_FACILITIES_COMBINED.pdf
HYD_303D_WATERS_LINE.pdf
HYD_303D_WATERS_POLY.pdf
HYD_BMP_CN.PDF
HYD_DAM.pdf
Hyd_Isopluvials.pdf
HYD_PDP.pdf
HYD_RMA_SURVEY_ZONE.pdf
HYD_TSUNAMI_INUNDATION_AREA.pdf
HYD_TSUNAMI_INUNDATION_LINE.pdf
HYD_WPP_DRAINAGE_BASINS.pdf
HYD_WPP_INVENTORY.pdf
ISOPLUVIALS_85TH_PERCENT.pdf
Lagoons.pdf
Lakes.pdf

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HYD_WPP_INVENTORY.zip
ISOPLUVIALS_85TH_PERCENT.zip
Lagoons.zip
Lakes.zip
County of San Diego Floodplains
Survey Records System

- [https://srs.sandiegocounty.gov/](https://srs.sandiegocounty.gov/)
  - County of San Diego Floodplain Maps
  - Flood Control Easements
  - Flood Control Facilities
THIS IS TO CERTIFY THAT THE DRAINAGE EASEMENTS AND
A EASEMENT FOR ACCESS TO MAINTAIN DRAINAGE FACILITIES
AS SHOWN ON THIS MAP DEDICATED TO THE SAN DIEGO COUNTY
FLOOD CONTROL DISTRICT ARE HEREBY ACCEPTED BY THE
UNDERSIGNED OFFICER OR AGENT ON BEHALF OF THE BOARD
OF DIRECTORS OF THE SAN DIEGO COUNTY FLOOD CONTROL
DISTRICT PURSUANT TO AUTHORITY CONFERRED BY RESOLUTION
OF SAID BOARD OF DIRECTORS ADOPTED ON MARCH 18, 1969
AND THE DISTRICT CONSENTS TO THE RECORDATION THEREOF
BY ITS DULY AUTHORIZED OFFICER. THE ACCEPTANCE OF
THESE EASEMENTS SHALL IN NO EVENT BE CONSTRUED AS
ACCEPTANCE OF RESPONSIBILITY FOR MAINTAINING STREET
PAVEMENT, CURBS OR GUTTERS.

SAN DIEGO COUNTY FLOOD CONTROL DISTRICT.

BY: But Ellis DATED: 3/18/77

BOUNDARY OF SUBDIVISION

14. DRAINAGE ACCESS EASEMENT TO COUNTY OF SAN DIEGO FLOOD
CONTROL DISTRICT PER DOC. NO. 76-431537
RECORDED DEC. 23, 1976
Overview

- Flood Damage Prevention Ordinance
- Other County Ordinances
- County Standards
- County Hydrology Manual
- County Hydraulic Design Manual
- Hydraulic Analyses
- No-Rise Analyses
- Map Revisions (CLOMR/LOMR)
- Flood Control Review
- Borrego Springs Regulations
- Won’t cover everything, just frequently misunderstood or overlooked areas
Flood Damage Prevention Ordinance (FDPO)

- Based upon Federal Regulation in 44 CFR 59.1-65
- Required by NFIP to be community
  - Availability of flood insurance
  - Availability of disaster/emergency funds
- Original versions date back to the 1970’s, when first FP/FW mapping


Section 811
FDPO — County and FEMA Mapping

- 2 Sets of floodplain mapping that differ
  - County
  - FEMA
- Always check both
- All requirements apply to both

SEC. 811.301. LANDS TO WHICH THIS ORDINANCE APPLIES.

This ordinance shall apply to all areas of special flood hazards within the jurisdiction of the County of San Diego that are shown on a County flood plain or alluvial fan map, FIRM, Flood Insurance Study, or FBFM.

SEC. 811.302. BASIS FOR ESTABLISHING THE AREAS OF SPECIAL FLOOD HAZARD.

In case of conflict(s) between the County flood plain maps, County alluvial fan maps, FIRM, Flood Insurance Study, or FBFM, the more stringent of restrictions shall prevail and be deemed to govern.
FDPO - Permit

- **Anything** done in the floodplain needs a permit & must comply with regulations

SEC. 811.303. COMPLIANCE.

No structure or land shall hereafter be constructed, located, extended, converted, or altered without full compliance with the terms of this ordinance and other applicable regulations.

SEC. 811.401. DEVELOPMENT PERMIT.

A development permit shall be obtained before new construction, substantial improvements, or development begins within any area of special flood hazards. Application for a development

SEC. 811.201. DEFINITIONS.

(i) "Development" means any man-made change to improved or unimproved real estate in an area of special flood hazard, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, storage of equipment or materials, or placement of manufactured homes which may increase flood depths, velocity or the area of inundation or result in a flood hazard as the result of collapse, flotation or other effect of the impact of flood waters on or as a result of the development activities.

- Some work is exempt from Zoning or Building permits, but not exempt from FDPO required permit.
FDPO

- All work needs a permit including:
  - Sand Mines
  - Schools
  - Utilities
  - Other jurisdictions
  - State projects including Caltrans
  - County projects
  - Mobile home parks
- The only work that doesn’t are federal projects.
All development in the floodplain must include modified hydraulic analyses to determine the impacts of the proposed work.

SEC. 811.401. DEVELOPMENT PERMIT.

(a) Plans in duplicate, drawn to scale, showing:

(4) Base flood elevation before and after permitted work within the area where the work is performed and all adjacent areas where the base flood elevation is changed in any way as a result of the work;

(e) Location of 100-year flood plain and floodway lines, both before and after proposed development.

All analyses need to follow the FEMA MT-2 methodology (starting with effective model and ending with proposed, discussed later).
FDPO — Map Revision

- If the required analyses show changes or differences between the effective model and the pre or post model, a CLOMR and LOMR are required.

SEC. 811.503. STANDARDS FOR SUBDIVISIONS AND COMMENCEMENT OF DEVELOPMENT.

(b) All new construction, substantial improvements, and placement of a structure in an area of special flood hazard that will change the base flood elevation, base flood depth or flood plain boundary shall only be commenced in accordance with the following requirements:

1. Submit a completed application for a development permit, including but not limited to plans and specifications for the project to the Flood Plain Administrator;

2. Prior to the commencement of any grading activities, obtain a Conditional Letters of Map Revision from FEMA; and

3. Prior to the issuance of a certificate of occupancy or the completion of any development for which a certificate of occupancy is not required, obtain a Letter of Map Revision from FEMA.

- Even if mapping is currently incorrect, or doesn’t reflect the existing condition of the site (doesn’t invalidate the requirements)
**FDPO - Vegetation**

- If a project modifies a channel area, the vegetation level reflected in the approved modeling would need to either:
  - Represent unmaintained vegetation in equilibrium, or
  - Represent a lower level of vegetation due to maintenance. This would require a reasonable, recorded maintenance agreement

**SEC. 811.403. DUTIES AND RESPONSIBILITIES OF THE FLOOD PLAIN ADMINISTRATOR.**

(c) Whenever a watercourse is to be altered or relocated:

(3) Require that the flood carrying capacity of the altered or relocated portion of said watercourse is maintained. The Watercourse Ordinance provides the basis for regulation.

- Further discussion to follow
Anything done in FW needs no-rise

**SEC. 811.506. FLOODWAYS.**

(a) No encroachments, structures, fill, new construction, substantial improvements, additions, development, storage or placement of vehicles, debris or other materials, or other uses which may increase flood depths or interfere with flood flows to any degree are allowed unless certification by a registered professional engineer is provided to the Flood Plain Administrator through a "No Rise" Certification demonstrating that the proposed use shall not result in any increase in flood levels or the volume or velocity of flood flows during the occurrence of the base flood discharge.

No rise means zero rise. Usually acceptable to 1 hundredth (HEC-RAS standard output)

Certification needs to demonstrate no-rise – using analyses

Analyses may not be necessary for smaller items, based upon project specific review

- Posts/piers
- Flagpoles
- Certain fences
- Work at-grade

Detailed discussion to follow
Other Ordinances

- DPW Flood Control administers the FDPO
- Other ordinances with FP/FW considerations administered by PDS:
  - Resource Protection Ordinance (RPO)
  - Grading/Watercourse Ordinance
  - Zoning Ordinance
County Standards

- Hydrology Manual
- Hydraulic Design Manual
- Public Road Standards
- Private Road Standards

- Standards must be followed or a Design Exception would need to be approved
  - Reviewed and signed by the Director of DPW
  - Must include detailed alternatives analyses
  - Usually for minor unavoidable issues (i.e. HGL not 1’ below grade and locking manhole cover used)
Hydrology Manual

- Originally published in 1973
- Revised on multiple occasions
- Current version 2003
- Revision process (Technical Advisory Committee) currently ongoing

San Diego County
Hydrology Manual

Prepared by the County of San Diego
Department of Public Works
Flood Control Section
June 2003
Hydrology Manual - Method

- Required Hydrology Methodology
  - MRM below 1 square mile
  - NRCS above 1 square mile

### 2.3 Selection of Hydrologic Method and Design Criteria

Design Method – The choice of method to determine flows (discharge) shall be based on the size of the watershed area. For an area 0 to approximately 1 square mile the Rational Method or the Modified Rational Method shall be used. For watershed areas larger than 1 square mile the NRCS hydrologic method shall be used. Please check with the governing agency for any variations to these guidelines.

- If transition happens on the project site (design points above and below), follow transition procedure in Section 4.4
County’s MRM includes “initial area” Tc calculations

“Initial areas” must be included and their length needs to be limited to the values in Table 3-2

Table 3-2

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*See Table 3-1 for more detailed description*
County’s NRCS method has several parts that are unique to our manual:
- Nested storm
- Precipitation Zone Number (PZN) adjustment
- County Isopluvial Maps

Software that can follow County’s NRCS methodology:
- HEC-1, HEC-HMS (preferred when hydrograph is required)
- County’s SDUH program (preferred when hydrograph is not required – very simple).

Software that can’t follow County’s NRCS methodology:
- FLO-2D
- SWMM
Hydrology Manual - SWMM

- Hydrology Manual
  - Requires Rational method for watersheds less than one square mile in size.
  - Requires National Resources Conservation Service (NRCS) curvilinear unit hydrograph.
  - Requires use of NRCS Lag Time

- SWMM Methodology
  - Does not perform rational method calculations.
  - Uses sets of triangular unit hydrographs as optional input.
  - Does not utilize lag time.
Three different methods for computing infiltration loss on the pervious areas of a subcatchment are available in SWMM. They are the Horton, Green-Ampt and Curve Number models. There is no general agreement on which model is best. The Horton model has a long history of use in dynamic simulations, the Green-Ampt model is more physically-based, and the Curve Number model is derived from (but not the same as) the well-known SCS Curve Number method used in simplified runoff models.
Current update:

- Remove isopluvial maps, and intensity equation. Replaced by NOAA Atlas 14 data
- One unified software to update/include:
  - SDUH
  - RatHydro
  - Nested storm derivation (HEC-HMS input) using NOAA data
- Minor revision
Hydraulic Design Manual

- Originally published in 1969
- Revised on multiple occasions
- Current version 2014
Hydraulic Design Manual - Tailwater

- Tailwater
  - Free outfall = soffit
  - FW if FW present
  - If no FW, FP
  - If no FP, 100-year WSEL

3.3.5 Downstream Control (Tailwater) Elevation

For free outfalls, the initial water surface elevation (tailwater) shall be assumed to be equivalent to the soffit elevation. For outfalls into other drainage facilities, a drainage channel, reservoir, or detention facility, the initial water surface elevation shall be set at the 100-year water surface elevation calculated for the channel or described on the appropriate Flood Insurance Rate Map (FIRM) or County floodplain map at the location of the outfall. In cases where the storm drain

Control WSEL Elevations

Where there is a mapped floodplain or floodway shown on the applicable FIRM or County floodplain map for the watercourse, the 100 year tailwater WSEL elevation shall be the floodway elevation; or, if there is no floodway, the base flood elevation shown on the FIRM or County floodplain map plus 1.00 foot. The increase in control WSEL depth is to allow for the future increase in flood elevations due to encroachment into the floodplain.
Hydraulic Design Manual - Losses

- Manhole losses in WSPGW (FCE reviewed projects, discussion to follow)
  - Need to be checked for compliance with Manual
    - Equation 3-18
      \[ H_L = K \frac{v_o^2}{2g} \]
    - Using input from table 3-11
  - Separate, additional calculations
Projects that impact existing or proposed channels either:

- Use \( n=0.15 \) for the impacted areas
- Provide an acceptable, reasonable maintenance agreement to be officially recorded.
- Demonstrate that there are nearby areas that were disturbed, now have established unmaintained vegetation in equilibrium, and that vegetation can be documented and represents an \( n \) value other than 0.15.

5.3.7 Freeboard

of safety when designing open channels. Freeboard shall be calculated using the maximum Manning roughness coefficient expected during the lifetime of the channel. Unless other information justifies a lower roughness value, the design engineer may assume the maximum lifetime channel roughness to be \( n=0.150 \).

Same information contained in multiple sections
Hydraulic Design Manual – “n”

- Background
Hydraulic Design Manual – “n”

- If a maintenance agreement is proposed to reduce “n”
  - Clarified early – no conflicting environmental constraints
    - Jurisdictional areas
    - Environmental mitigation areas
Any fence proposed that would be placed within a floodway, that would not be parallel to the direction of flow would need to be designed to ensure that it would not obstruct peak flows. Acceptable designs need to demonstrate that the proposed fence will: fail due to a force less than that of the site specific 1% annual chance peak flow, and; be tethered or anchored in such a way to ensure that the failed portions would not be swept downstream, or impede flow.
Fences in floodways

“Breakaway fencing” requires:

- Detailed analyses of the site specific force
- Detailed design and calculations of material failure (breakaway)
- No rise certification
Hydraulic Design Manual – Detention Basins

• Water quality volume can’t be included in peak flow attenuation analyses

• Peak flow design and analyses not include volume or outlets below the lowest above ground outlet
  • No infiltration, underdrain, or volume in voids used

• Hydromodification volume not considered water quality and can utilize peak flow storage volume.
Hydraulic Analyses

- Hundreds of submittals a year
- Many common issues
- Overview of some of the more frequent/important issues
Hydraulic Analyses - Tailwater

- Always tailwater, unless free outfall, or justifiable assumption
  - Floodway/floodplain – use BFE
  - If connecting to existing system, analyses need to extend downstream to outlet
  - If discharging to a basin, 100-yr WSEL
  - If discharging to an unmapped channel, do a normal depth XS
Hydraulic Analyses — Ineffective Flow

- Ineffective flow areas
  - When used properly, limits flowing area to only areas where there would be flow
  - When used improperly can unjustifiably raise pre project condition BFE’s and inaccurately demonstrate lesser project impacts
Hydraulic Analyses — Ineffective Flow

- Ineffective flow areas
  - HEC-RAS Users Manual
  - CR=1
  - ER from table

Table 6-1: Ranges of Expansion Ratios

<table>
<thead>
<tr>
<th>nob / nc</th>
<th>b/B = 0.10 S = 1 ft/mile</th>
<th>nob / nc</th>
<th>b/B = 0.10 S = 5 ft/mile</th>
<th>nob / nc</th>
<th>b/B = 0.10 S = 10 ft/mile</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.4 – 3.6</td>
<td>2</td>
<td>1.3 – 3.0</td>
<td>4</td>
<td>1.2 – 2.1</td>
</tr>
<tr>
<td>2</td>
<td>1.0 – 2.5</td>
<td>3</td>
<td>0.8 – 2.0</td>
<td>5</td>
<td>0.8 – 2.0</td>
</tr>
<tr>
<td>3</td>
<td>1.0 – 2.2</td>
<td>4</td>
<td>0.8 – 2.0</td>
<td>6</td>
<td>0.8 – 2.0</td>
</tr>
</tbody>
</table>

- Figure 6-11: Cross Section Locations at a Bridge or Culvert
Hydraulic Analyses — Ineffective Flow

- Ineffective flow areas
  - For clarity and review purposes, best to show them on the workmap(s)
Hydraulic Analyses - Levees

- Potential Levees
  - Lower ground beyond high ground
Hydraulic Analyses - Levees

- Potential Levees
  - Lower ground beyond high ground:
    - Map as inundated, or:
    - Certify high ground as levee
    - Certified levees require County maintenance
Hydraulic Analyses - Flowrates

- Flowrates for mapping and design:
  - Effective FEMA flowrate
    - Used for no-rise analyses and map revision (CLOMR/LOMR)
  - County Hydrology Manual (HM) flowrate
    - Used for design of storm drain, bridges, channels, culverts, etc., and in areas where development is proposed on channel banks
  - Many projects require both
  - FEMA flowrates are usually lower than HM flowrates, sometimes much lower.
Hydraulic Analyses – 2D

- Use of 2-D modeling
  - Has not been a project in the county to date that has warranted the need for a 2-D analysis.
  - If it were allowed due to need, HEC-RAS 5.x would be preferable to proprietary software.
  - Best to check with reviewing authority (LD, FCE, CIP, Building Dept...) prior to initiating any non-standard analyses.
No-Rise Analyses

- To check for rise, comparison is between pre and post encroached (floodway) models
- Zero rise (to hundredth in HEC-RAS)
- Only difference between pre and post models should be the work proposed in FW (all other portions identical)
- Report needs to include table including effective, pre and post FW elevations for all XS
No-Rise Analyses

- Strategies:
  - Offset obstruction – increase conveyance in FW
  - Breakaway fence
  - Keep everything out of FW except minimal items (at grade, piers...)
  - Locate minor items in the conveyance shadow

Excerpt from FEMA IS-9
No-Rise Analyses

Floodway Revision

If an entire section of mapping is entirely on a project site, it may be possible to process a floodway revision with increases (rises), if

- Increase or widening of the floodway is entirely contained on site
- There are no structures negatively impacted
Limits to the use of CLOMR-F/LOMR-F

Original intent to allow recognition for projects so small (like single residential structures) they could not be included on the FIRM maps due to scale limitations
Map Revisions (CLOMR/LOMR)

- Limits to the use of CLOMR-F/LOMR-F
  - County guidance:
    - Lots less than 5 ac
    - Amount of fill necessary to raise single residential structure
    - Not in FW
    - Not in area of alluvial fan flooding
    - May be used for other (non-residential) projects meeting all other criteria if changes to FP are less than 5% of the FIRM map scale
Map Revisions (CLOMR/LOMR) - Models

- Must be based upon the model progression as described in the MT-2 instructions (from effective to post project)
- Must include a detailed table comparing all models’ FP and FW results at all XS
- Corrected effective model cannot include man made changes since the time of the effective model
- Furthest up and downstream cross sections (at a minimum) need to be identical to (unchanged from) the effective model
  - Can add additional unchanged XS upstream to achieve tie-in
  - Can revert to effective sections (or portions of) anywhere offsite (don’t need to fix others’ problems)
- FW encroachment stations cannot be widened into IFA
Map Revisions (CLOMR/LOMR) - Fees

- FEMA fee, County deposit:
  - CLOMR
    - $4,616 County
    - $6,750 FEMA
  - LOMR
    - $4,616 County
    - $8,250 FEMA

- Total fees for CLOMR and LOMR $24,232
Map Revisions (CLOMR/LOMR)

- Sometimes implied that County should “just sign form”
- “That’s what other jurisdictions do”
- County legal responsibility to review and certify:
  - Submittal meets all of the community’s floodplain management requirements
  - Permits have been issued for all existing development on site
  - All necessary Federal, State and local permits have been obtained
  - The land or structures removed from the SFHA will be reasonably safe from flooding*
  - No structures are located in areas that would be impacted by increased base flood elevation*
  - The carrying capacity of any altered watercourse would be maintained (n)*

*These determinations can’t be made until the analyses are accurate and free from errors
Flood Control Review

• Flood Control Engineering reviews the following:
  • Map revision requests
  • No-rise analyses
  • Any projects:
    • With floodplain (County or FEMA) on the site
    • With a Flood Control easement on site
    • That propose a new Flood Control maintained facility
    • That propose to tie into a Flood Control maintained facility
    • When PDS LD requests FC involvement

• All other projects drainage issues reviewed by PDS LD staff
Flood Control Review

Software accepted for analyses when FC review required:

- Open channel flow: HEC-RAS
- Hydrology (NRCS): HEC-HMS, HEC-1, SDUH
- Culverts: HY-8, HEC-RAS
- Storm drain: WSPGW
Flood Control Review

- During review FCE staff need to verify that all work onsite since the time of the original mapping (70’s-80’s depending on location) was permitted

- Options for projects with existing work onsite
  - Establish permit history
  - Establish that work was present before the mapping
  - Restore site to condition at original mapping
  - Permit unpermitted work

- The County becomes aware of potential violations by citizen reports and during permit reviews
Borrego Springs

- Nearly entire valley is mapped floodplain
- Mapped in 1989
- Alluvial fan flooding, Zone AO (depth, velocity)
- Terminus wash (riverine) Zone A
Nearly entire valley is “active” alluvial fan (pink)
Borrego Springs

• Extensive history of costly flooding on a regular basis
Borrego Springs

- Regulations for development on alluvial fans make the standard (riverine style) process difficult:
  - Structures need to be elevated (not all)
  - If obstructions proposed (i.e. fill, fence/wall), impacts need to be determined (normally done with analyses)
  - For analyses to be used, need to be approved by FEMA (CLOMR/LOMR)
  - Can only be approved by FEMA in alluvial areas if major structural improvements included
    - Channels
    - Levees
    - Sedimentation basins
    - Very, very costly
  - Deterministic models (HEC-RAS, FLO-2D) not allowed on “active” alluvial fan areas
Development requirements coordinated with FEMA

- Lots less than 1 acre:
  - No obstruction to flow
  - Structures raised on piers (flow through) not fill

- Lots between 1 and 5 acres
  - Fill or other obstructions may be allowed based upon site specific review

- Lots above 5 acres
  - Analyses would be required
Borrego Springs

- Additional information
  - Anything constructed prior to 1989 considered “grandfathered”
  - Manufactured homes can easily satisfy the pier requirements
  - Fences based upon acceptable breakaway designs allowed
  - Development in the conveyance shadow allowed
  - Ground mount solar allowed with minimal requirements
  - Any structures in the mapped floodplain with a federally backed mortgage would require flood insurance (no LOMA or LOMR-F)
Mehdi Khalili

Elevation Certificates
Elevation Certificate

Common Errors

<table>
<thead>
<tr>
<th>SECTION A – PROPERTY INFORMATION</th>
<th>FOR INSURANCE COMPANY USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1. Building Owner’s Name</td>
<td>Policy Number:</td>
</tr>
<tr>
<td></td>
<td>Company NAIC Number:</td>
</tr>
<tr>
<td></td>
<td>ZIP Code</td>
</tr>
<tr>
<td>A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.</td>
<td></td>
</tr>
<tr>
<td>A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)</td>
<td></td>
</tr>
</tbody>
</table>

Either A2 of A3 must be completed, with City, State, and Zip

Either A2 or A3 must be completed, with City, State, and Zip

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.)

A5. Latitude/Longitude: Lat. ______________ Long. ______________ Horizontal Datum: [ ] NAD 1927 [ ] NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.
Elevation Certificate
Common Errors

- Diagram # missing or incorrect:

A7. Building Diagram Number

A8. For a building with a crawlspace or enclosure(s):
   - Square footage of crawlspace or enclosure(s) ______________ sq ft
   - Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade ______________
   - Total net area of flood openings in A8.b ______________ sq in
   - Engineered flood openings? □ Yes □ No

   If there are engineered flood openings, attach the certification from the engineer or the ICC Evaluation Service

A9. For a building with an attached garage:
   - Square footage of attached garage ______________ sq ft
   - Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade ______________
   - Total net area of flood openings in A9.b ______________ sq in
   - Engineered flood openings? □ Yes □ No

   If there are engineered flood openings, attach the certification from the engineer or the ICC Evaluation Service
Elevation Certificate
Common Errors

- Missing or incorrect NFIP community name or number in Section B1:

<table>
<thead>
<tr>
<th>Incorrect</th>
<th>Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of El Cajon 060289</td>
<td>San Diego County 060284</td>
</tr>
<tr>
<td>San Diego County</td>
<td></td>
</tr>
<tr>
<td>060284</td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
</tbody>
</table>
Elevation Certificate
Common Errors

- Map/panel number not in correct format in Section B4:

<table>
<thead>
<tr>
<th>Incorrect</th>
<th>Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>1129</td>
<td></td>
</tr>
<tr>
<td>C1129</td>
<td>06073C1129</td>
</tr>
<tr>
<td>o6073C</td>
<td></td>
</tr>
<tr>
<td>Blank</td>
<td></td>
</tr>
</tbody>
</table>

SECTION B – FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

<table>
<thead>
<tr>
<th>B1. NFIP Community Name &amp; Community Number</th>
<th>B2. County Name</th>
<th>B3. State</th>
</tr>
</thead>
<tbody>
<tr>
<td>B4. Map/Panel Number</td>
<td>B5. Suffix</td>
<td>B6. FIRM Index Date</td>
</tr>
</tbody>
</table>
Elevation Certificate

Common Errors

- Incorrect source of BFE in section B10, when BFE obtained from County topographic maps:

<table>
<thead>
<tr>
<th>Incorrect</th>
<th>Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Community Determined” box checked.</td>
<td>Check the “Other/Source:” box and type: “County 200 scale topo map”.</td>
</tr>
</tbody>
</table>
Elevation Certificate

Common Errors

<table>
<thead>
<tr>
<th>C1. Building elevations are based on:</th>
<th>☐ Construction Drawings*</th>
<th>☐ Building Under Construction*</th>
<th>☐ Finished Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>*A new Elevation Certificate will be required when construction of the building is complete.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Benchmark Utilized:</td>
</tr>
<tr>
<td>Indicate elevation datum used for the elevations in items a) through h) below.</td>
</tr>
<tr>
<td>Datum used for building elevations must be the same as that used for the BFE.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Measurement Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>Top of bottom floor (including basement, crawlspace, or enclosure floor)</td>
<td>☐ feet ☐ meters</td>
</tr>
<tr>
<td>b)</td>
<td>Top of the next higher floor</td>
<td>☐ feet ☐ meters</td>
</tr>
<tr>
<td>c)</td>
<td>Bottom of the lowest horizontal structural member (V Zones only)</td>
<td>☐ feet ☐ meters</td>
</tr>
<tr>
<td>d)</td>
<td>Attached garage (top of slab)</td>
<td>☐ feet ☐ meters</td>
</tr>
<tr>
<td>e)</td>
<td>Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)</td>
<td>☐ feet ☐ meters</td>
</tr>
<tr>
<td>f)</td>
<td>Lowest adjacent (finished) grade next to building (LAG)</td>
<td>☐ feet ☐ meters</td>
</tr>
<tr>
<td>g)</td>
<td>Highest adjacent (finished) grade next to building (HAG)</td>
<td>☐ feet ☐ meters</td>
</tr>
<tr>
<td>h)</td>
<td>Lowest adjacent grade at lowest elevation of deck or stairs, including structural support</td>
<td>☐ feet ☐ meters</td>
</tr>
</tbody>
</table>

Items a), f) and g) must always have a number. If items b) - e) are not relevant, enter "N/A"
Elevation Certificate

Common Errors

• Elevations missing; or have discrepancy/error.

• Section C2(e): list the elevation and describe type of equipment and location in Comments (same page under Section D) e.g. furnaces, hot water heaters, heat pumps, air conditioners, and elevators and their associated equipment.
Elevation Certificate

Common Errors

<table>
<thead>
<tr>
<th>Certifier's Name</th>
<th>License Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td></td>
</tr>
<tr>
<td>Company Name</td>
<td></td>
</tr>
<tr>
<td>Address</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>State</td>
</tr>
<tr>
<td>Signature</td>
<td>Date</td>
</tr>
</tbody>
</table>

Copy all pages of this Elevation Certificate and all attachments for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments (including type of equipment and location, per C2(e), if applicable)
Elevation Certificate
Common Errors

- If in zone A or AO without BFE, Section E must be completed.
Elevation Certificate
Common Errors

SECTION F – PROPERTY OWNER (OR OWNER’S REPRESENTATIVE) CERTIFICATION

The property owner or owner’s authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. The statements in Sections A, B, and E are correct to the best of my knowledge.

<table>
<thead>
<tr>
<th>Property Owner or Owner’s Authorized Representative’s Name</th>
<th>Complete Section F is there if no BFE and Section E is used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>City</td>
</tr>
<tr>
<td>Signature</td>
<td>Date</td>
</tr>
</tbody>
</table>

Comments
### Elevation Certificate

#### Common Errors

**SECTION G – COMMUNITY INFORMATION (OPTIONAL)**

The local official who is authorized by law or ordinance to administer the community’s floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters.

**G1.** The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)

**G2.** A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.

**G3.** The following information (Items G4–G10) is provided for community floodplain management purposes.

<table>
<thead>
<tr>
<th>G4. Permit Number</th>
<th>G5. Date Permit issued</th>
<th>G6. Date Certificate of Compliance/Occupancy issued</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**G7.** This permit has been issued for:

- [ ] New Construction
- [ ] Substantial Improvement

**G8.** Elevation of as-built lowest floor (including basement) of the building: __________ feet __________ meters Datum __________

**G9.** BFE or (in Zone AO) depth of flooding at the building site: __________ feet __________ meters Datum __________

**G10.** Community’s design flood elevation: __________ feet __________ meters Datum __________

<table>
<thead>
<tr>
<th>Local Official’s Name</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Complete and sign if G1, G2, G8, or G9 are checked.

**Community Name**

**Telephone**

**Signature**

**Date**

**Comments (including type of equipment and location, par C2(a), if applicable)**
Counter issues

- Flood Control review should always be done first.
- The current owner must bring property into compliance even if work was done by previous owner.
- If the FEMA floodplain map is incorrect, a LOMR should be completed to make corrections to the map.
Matt Schmid

Facilities Proposed for Flood Control District Maintenance
General Facility Criteria for Flood Control Maintenance Acceptance

  - Analysis using FEMA approved software
  - Material, sizing, alignment and depth requirements
  - Flood Control performs a more detailed review to ensure criteria is met

- Include unobstructed, improved legal access to facility inlets/outlets and junction structures that maintenance equipment and vehicles can safely traverse.

- Funding Mechanism for Maintenance (Community Facilities District, Assessment District, Maintenance Agreement, etc.)
Plan Review Tips for Facilities

- Clearly identify label public/private facilities
- Install cleanouts at R/W lines to clearly identify separation between public and private facilities
- Show all access easements to maintain facilities
- Provide structural cross-sections for maintenance access roads to be able to withstand heavy equipment and erosion (DG is not preferred unless there is minimal slope and/or no flows crossing over the road.
- Access to all Basin components are required
- Provide rip-rap sizing and footprint dimensions for all public/CFD facilities including basins
Greg Carlton

Substantial Improvement / Substantial Damage (SISD)
Substantial Improvement / Substantial Damage

https://www.fema.gov/media-library/assets/documents/18562

Substantial Improvement/Substantial Damage Desk Reference

FEMA P-758 / May 2010
**SI / SD Definitions**

**Substantial Improvement (SI)** means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure (or smaller percentage if established by the community) before the start of construction of the improvement. This includes structures that have incurred “substantial damage” regardless of the actual repair work performed.

**Substantial Damage (SD)** means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred. Work on structures that are determined to be substantially damaged is considered to be a substantial improvement, regardless of the actual repair work performed.
SI / SD Determinations

https://www.fema.gov/media-library/assets/documents

Substantial Improvement/Substantial Damage Desk Reference

FEMA P-758 / May 2010

Substantial Damage Estimator (SDE) User Manual and Field Workbook

Using the SDE Tool to Perform Substantial Damage Determinations

FEMA P-784 / Tool Version 3.0 / August 2017
**FEMA Floodplain Substantial Improvement Intake Form**

This checklist should assist in the determination of permitting of improvements of a single residential structure which is partially or completely located within the FEMA or County floodplains. Documented supporting evidence is required to justify all answers. Check the boxes appropriately for Yes (Y) or No (N).

1. **Y** **N**
   - **YES**, continue to #2
   - **NO**. This structure was built after the County adopted FEMA’s flood maps and is considered Post-FIRM. It must comply with NFIP regulations, which will likely involve filing a Letter of Map Change with FEMA through a Registered Professional Engineer or Land Surveyor.

2. **Y** **N**
   - **YES**, continue to #3
   - **NO**. This structure is Pre-FIRM. It existed before the County joined NFIP and adopted FEMA’s mapped floodplains. Is the structure registered as historic and the proposed improvements do not alter its historic status?

3. **Y** **N**
   - **YES**, this structure is not subject to Substantial Improvements Determination and the proposed project may be permitted.
   - **NO**, continue to #4.
   - **YES**, this structure is not subject to Substantial Improvements Determination and the proposed project may be permitted.

4. **Y** **N**
   - The improvements proposed on this structure are subject to substantial improvements determination. The owner should acquire an official estimate of all proposed improvements from a Licensed Contractor including costs based on the local going rate for labor (voluntary or hired), and the undiscounted price of all materials (purchased or donated). Refer to list at end of document for details on what costs are to be included.

5. **Y** **N**
   - **YES**, the County floodplain official confirms that the estimated cost of proposed improvements is significantly less or more than 50% of the “market value” of the structure?
   - **NO**, there has been a licensed professional appraiser determine the structure’s market value. (Continue to #6.)
Common SI / SD Determination

Issues:

• Cost estimate does not include quantities (lump sum amounts)

• Cost estimate for proposed work includes items not allowed (i.e. outside improvements, plans and permitting, debris removal, carpeting)

• Cost estimate for current value (actual cash value) does not include depreciation

• Cost estimate for current value includes land value (not allowed)
Rand Allan (Sara Agahi)

One Rain data & data requests
When in doubt, ask...

Flood Control Engineering

Ramona Flooding
2015