

Checklist of

Guidelines for Subdivision Design With Consideration For Topography and The Storm Drainage System

The District, in reviewing proposed development regarding drainage, requires a preliminary drainage report be submitted with all tentative maps, including vesting maps. The drainage report shall, as a minimum, include the following information:

- 1. topographical contours equal to or better than those available from the District shown on a plan of the street layout.
- 2. proposed inlet boundaries for all proposed inlets shall be shown with corresponding areas that fit the maps proposed street layout, highlighting the adjustments or variation from the boundaries shown on the Storm Drainage Master Plan. Any comments identifying the purpose of the deviation would be helpful.
- 3. preference should be given by the design engineer to streets being placed to follow the topography of the site. This would apply to the upstream and downstream ends of the subdivision to allow for continuous flow from and to adjacent parcels. Should the layout not follow existing topography the report shall provide a brief explanation of the need for the deviation and how the adjoining parcels can adapt without an unreasonable burden.
- 4. brief description of the pre-project storm flow path within proposed development and adjoining lands and how the development or subdivision

will alter the storm flow from and to adjacent parcels. The description must include how flow patterns fit with existing adjacent parcels in their current condition and what the storm flow patterns will be once undeveloped parcels develop in the future.

- 5. provide a major storm analysis including:
 - a. identify contributing upland areas.
 - b. identify the streets that will pass the major storm event and review the street capacity and whether it has sufficient geometry to handle the major storm event flow. Include the type of curb and building set back proposed. FMFCD is not looking for detailed calculations except where major storm flows appear probable and the street geometry appears restricted.
 - c. designate locations of upstream attenuation, as FMFCD recognizes attenuation can significantly reduce the major storm flow and such attenuation is critical storage in the prevention of flood damages.

- 6. location of Master Plan facilities within the proposed street layout including all necessary pipeline easements. Should the proposed alignment require connection to the mainline storm drainage system upstream of the Master Planned location, the District's Master Planning staff should be contacted so that they can confirm the hydraulic condition of the storm drainage system is adequate. Easements are discouraged as FMFCD has experienced unresolved issues with developers placing structures within easements in error.

- 7. any area where there is the intention to fill and grade the site contrary to existing topography (deferential exceeding 1' to 2') including identifying locations of proposed retaining walls

- 8. Should any extensions of non-Master Plan facilities be proposed to the storm drain:
 - d. at the upstream end of the FMFCD pipeline collection system:
 - i. the pipeline extension can not be longer than 300 feet (not reducing the time of concentration that is critical to peak flows in the hydrology).
 - ii. the time of concentration should not be reduced by more than 10%.
 - iii. in order to avoid very low velocities in the pipeline extensions, a minimum area of 10.0 acres is required to the first junction (mainline excluding only laterals) and a minimum pipeline slope of 0.0015 (15") shall be maintained.
 - e. at any location:
 - i. a minimum velocity of 2.0 ft/s shall be maintained in all pipelines.

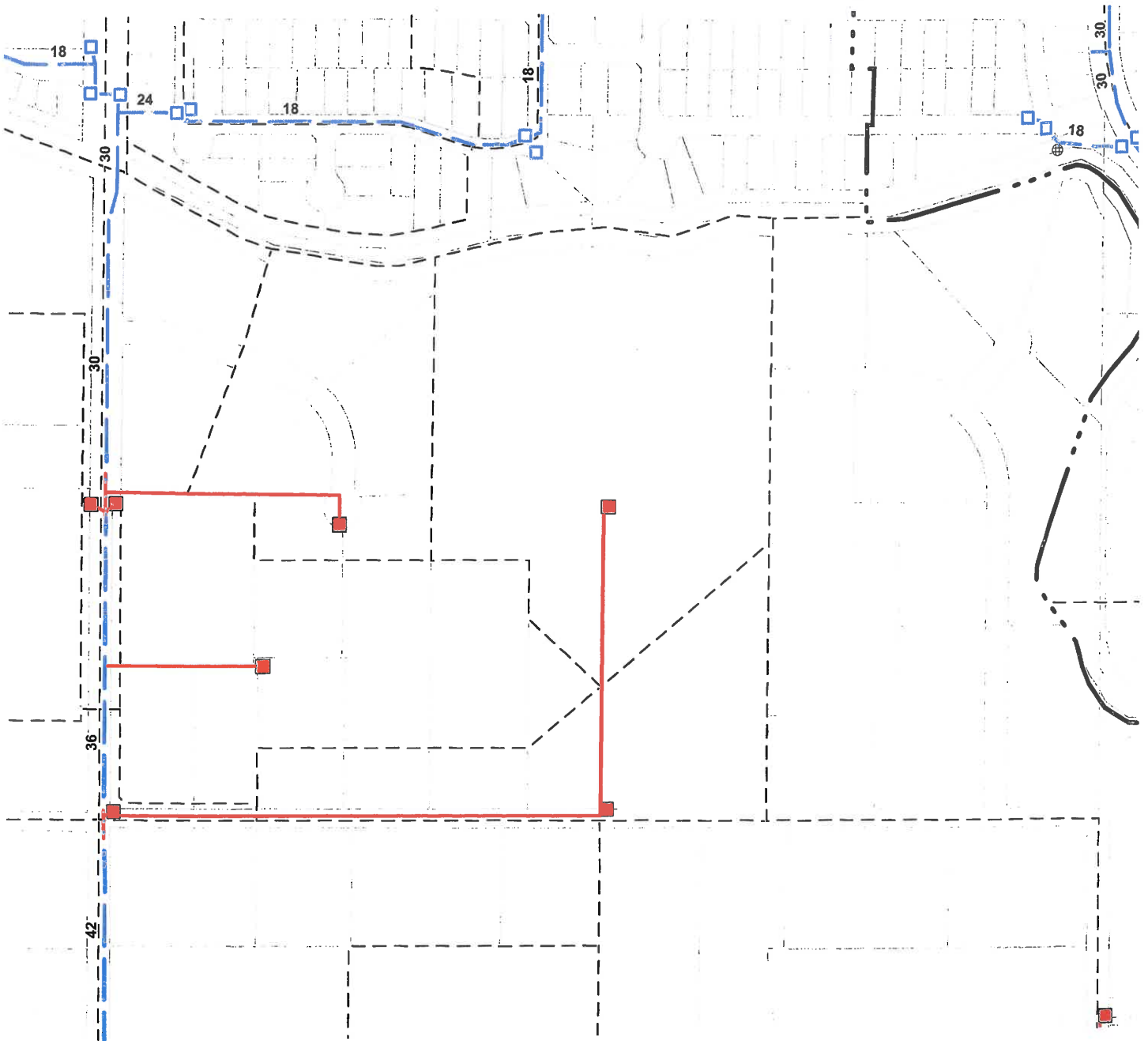
A grading plan with more detail may be necessary with the preliminary drainage report to demonstrate that the extension requirements can be met.

DRAINAGE REPORT FOR TRACT 0000





Original inlet boundaries shown on sheet 1 of 3 of Exhibit No. 1 have been adjusted to fit the maps' proposed street layout as shown on sheet 2 of 3 of Exhibit No. 1. A stub street to the west would be necessary based on the Master Plan inlet boundary and on existing topography (refer to the topography shown sheet 2 of 3 of Exhibit No. 1). However, to avoid potential conflicts with complaints from the neighbors negotiating a street dead-ending into their parcel, this subdivision will be regraded such that the low point along the west boundary will be filled and a retaining wall added (as shown on sheet 2 of 3 of Exhibit No. 1) to direct drainage to the east and then south.

The major storm path is as shown on attached sheet 2 of 3 of Exhibit No. 1. There is currently 62.0 acres as shown on sheet 2 of 3 of Exhibit No. 1 flowing thru the tract including the subdivision which produces 34 cfs (see attached calculations). Based on the street configuration shown on sheet 3 of 3 of Exhibit No. 1 the finished floors will need be 1.66' above the gutter (see attached calculations).

NOTE:
THIS MAP IS SCHEMATIC
DISTANCES ARE APPROXIMATE.



LEGEND

-  Existing Master Plan Facilities
-  Future Master Plan Facilities
-  Inlet Boundary
-  Drainage Area Boundary

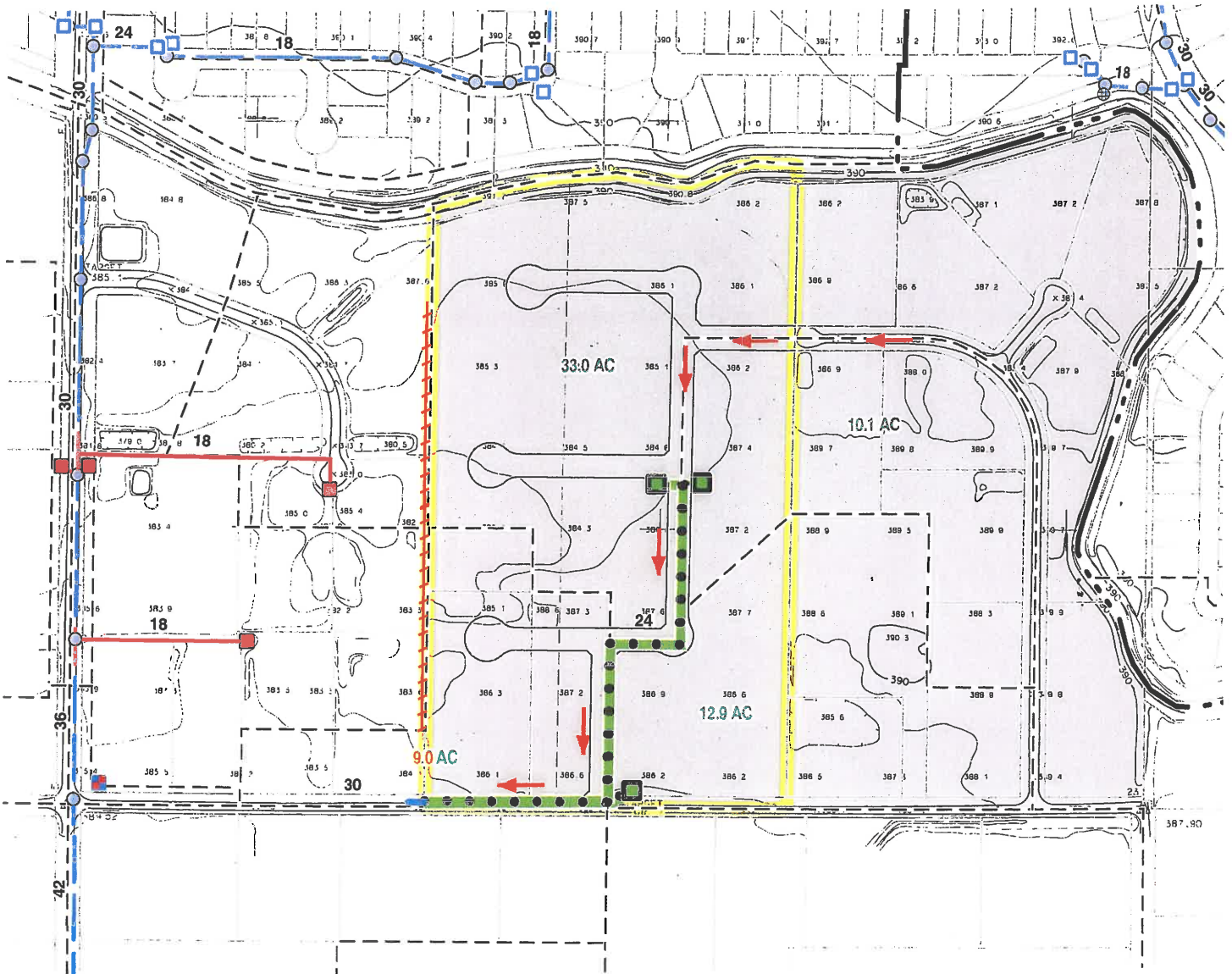


1" = 400'



EXHIBIT NO. 1 SHEET 1 OF 3 FRESNO METROPOLITAN FLOOD CONTROL DISTRICT

**NOTE:
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LEGEND

- Master Plan Facilities To Be Constructed By Developer
-Pipeline (Size Shown) & Inlet.
- Optional Master Plan Facilities To Be Constructed By Developer
-Pipeline (Size Shown) & Inlet.
- Existing Master Plan Facilities
- Future Master Plan Facilities
- Inlet Boundary (Area Shown)
- Drainage Area Boundary
- Major Storm Path
- Area Contributing To Major Storm
- Tract 0000
- Maximum 4' Retaining Wall

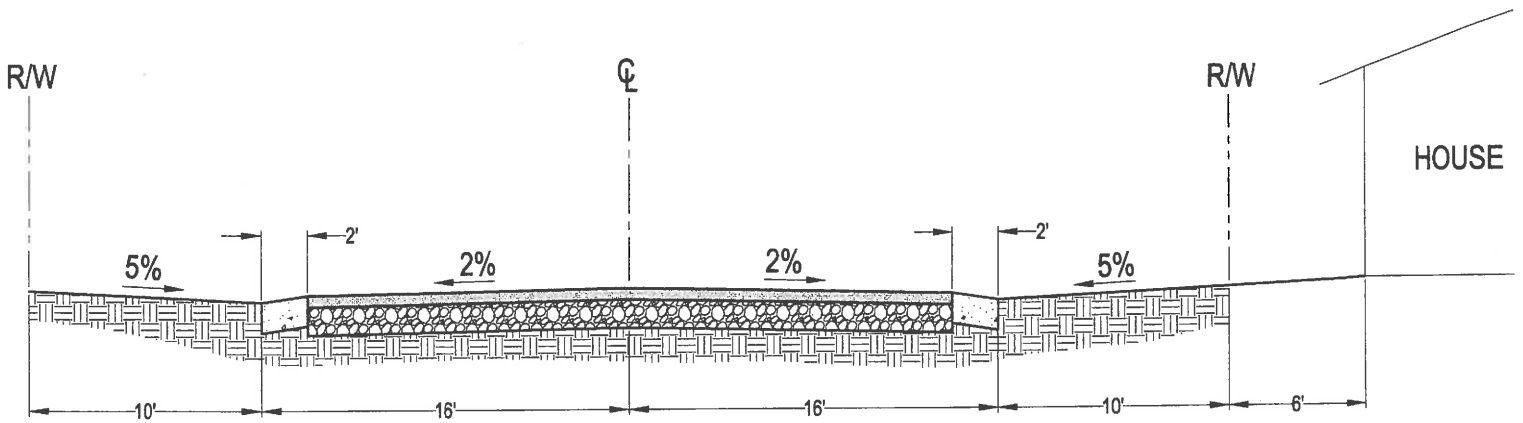


1" = 400'



EXHIBIT NO. 1 SHEET 2 OF 3 FRESNO METROPOLITAN FLOOD CONTROL DISTRICT

NOTE:
THIS DRAWING IS SCHEMATIC,
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STREET CONFIGURATION
Not to Scale

EXHIBIT NO. 1
Sheet 3 of 3



FRESNO METROPOLITAN FLOOD CONTROL DISTRICT

Worksheet for FULL

Results

Critical Depth	0.48	ft
Critical Slope	0.01034	ft/ft
Velocity	1.50	ft/s
Velocity Head	0.04	ft
Specific Energy	0.70	ft
Froude Number	0.42	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.66	ft
Critical Depth	0.48	ft
Channel Slope	0.00150	ft/ft
Critical Slope	0.01034	ft/ft