

pipe routing sheet updated

Unresolved.
Pipe routing summary
(pipe run 28)
indicates 36" RCP.
Revise accordingly.

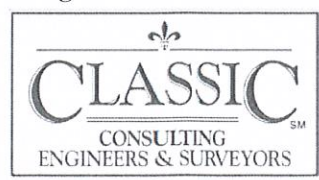
Total In-flow:	$Q_5 = 36 \text{ cfs}, Q_{100} = 155 \text{ cfs}$
Pond Design Release:	$Q_5 = 0.6 \text{ cfs}, Q_{100} = 64 \text{ cfs}$
Pre-development Release:	$Q_5 = 19 \text{ cfs}, Q_{100} = 105 \text{ cfs}$

Filing 13E Storm Facilities

Design Point 24 ($Q_5 = 6 \text{ cfs}$ and $Q_{100} = 22 \text{ cfs}$) collects developed flows from Basin DD1. At this location a 15' Type R at-grade inlet will be installed to collect ($Q_5 = 6 \text{ cfs}$ and $Q_{100} = 15 \text{ cfs}$) and ($Q_5 = 0 \text{ cfs}$ and $Q_{100} = 7 \text{ cfs}$) will flow-by. This facility is designed to maintain the required street capacity at this location.

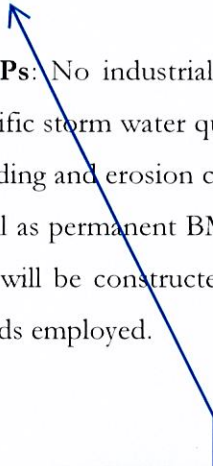
Design Point 25 ($Q_5 = 3 \text{ cfs}$ and $Q_{100} = 16 \text{ cfs}$) and **Design Point 26** ($Q_5 = 3 \text{ cfs}$ and $Q_{100} = 10 \text{ cfs}$) then collect developed flows from Basins DD2, EE and the flow-by from Design Point 24. At this sump condition, a 10' and a 5' Type R sump inlets, respectively, will be installed to completely collect both the 5-year and 100-year developed flows. These flows will have a maximum ponding depth of 1.0' and then be conveyed via a 30" RCP storm sewer to the natural channel, where a rip rap dissipater will be installed to minimize sediment transfer and erosion. The total flow within the pipe at this location is given by **Pipe Run 28** ($Q_5 = 12 \text{ cfs}$ and $Q_{100} = 38 \text{ cfs}$). The emergency overflow route at this location is via a natural swale between two lots within a drainage easement and then directly into the natural channel.

Design Point 27 ($Q_5 = 7 \text{ cfs}$ and $Q_{100} = 23 \text{ cfs}$) and **Design Point 28** ($Q_5 = 6 \text{ cfs}$ and $Q_{100} = 18 \text{ cfs}$) collect developed flows from Basins FF, GG and HH within sump conditions. 10' Type R sump inlets will be installed at both Design Point 27 and 28. Both the 5-year and 100-year flows at these locations will be fully collected and then conveyed via a 36" RCP storm sewer in a westerly direction within Londonderry Drive. The maximum ponding at these locations will be 1.0' and then the flows will travel around the corner directly into Londonderry Drive where the emergency overflow will head towards Design Point 31. **Design Point 29** ($Q_5 = 6 \text{ cfs}$ and $Q_{100} = 15 \text{ cfs}$) and **Design Point 30** ($Q_5 = 1 \text{ cfs}$ and $Q_{100} = 3 \text{ cfs}$) collect developed flows from Basins II, KK and JJ within sump conditions. A 10' Type R sump inlet will be installed at Design Point 29 and a 5' Type R sump inlet will be installed at Design Point 30. Both the 5-year and 100-year flows at these locations will be fully collected and then conveyed via a 30" RCP storm sewer into Londonderry Drive. These flows then combine with the upstream flows previously mentioned and are conveyed via a 36" RCP system within Londonderry Drive and then directly into the Detention Pond D. The total flow within the pipe at this location is given by **Pipe Run 35** ($Q_5 = 18 \text{ cfs}$ and $Q_{100} = 53 \text{ cfs}$). The maximum ponding at these locations will be 1.0' and then the flows will travel around the corner directly into Londonderry Drive where the emergency overflow will head towards Design Point 31.



This site adheres to this **Four Step Process** as follows:

1. **Employ Runoff Reduction Practices:** Proposed impervious areas (roof tops, patios) will sheet flow across landscaped yards and through open space areas to slow runoff and increase time of concentration prior to being conveyed to the proposed public streets. This will minimize directly connected impervious areas within the project site.
2. **Stabilize Drainageways:** After developed flows utilize the runoff reduction practices through the front yards, these flows will travel via curb and gutter within the public streets and eventually public storm systems. These collected flows are then routed directly to the full-spectrum detention facility on-site (Pond D). Where developed flows are not able to be routed to public streets (rear yards), sheet flows will travel towards the natural drainage channel within the open space corridor (Tract A). This corridor will be protected with rip-rap and erosion control matting as required to reduce velocities to erosive levels.
3. **Provide Water Quality Capture Volume (WQCV):** Runoff from this development will be treated through capture and slow release of the WQCV in the proposed full-spectrum permanent Extended Detention Basin (Pond D) designed per current El Paso County drainage criteria.
4. **Consider need for Industrial and Commercial BMPs:** No industrial or commercial uses are proposed within this development. However, a site specific storm water quality and erosion control plan and narrative has been submitted along with the grading and erosion control plan. Details such as site specific source control construction BMP's as well as permanent BMP's were detailed in this plan and narrative to protect receiving waters. BMP's will be constructed and maintained as the development has been graded and erosion control methods employed.



Address the western
half of the subdivision
that is going into
existing pond C.



See revised

Worksheet for Beckham Street

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.02330	ft/ft
Diameter	2.00	ft
Discharge	15.00	ft ³ /s

Label each individual pipe calculation with the associated pipe run. We will review these calculations upon re-submittal.

Results

Normal Depth	0.92	ft
Flow Area	1.41	ft ²
Wetted Perimeter	2.99	ft
Hydraulic Radius	0.47	ft
Top Width	1.99	ft
Critical Depth	1.40	ft
Percent Full	46.1	%
Critical Slope	0.00632	ft/ft
Velocity	10.60	ft/s
Velocity Head	1.75	ft
Specific Energy	2.67	ft
Froude Number	2.22	
Maximum Discharge	37.14	ft ³ /s
Discharge Full	34.53	ft ³ /s
Slope Full	0.00440	ft/ft
Flow Type	SuperCritical	

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
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	46.10	%
Downstream Velocity	Infinity	ft/s