

**Drainage Reports**

**Abbreviated Water & Sewer Need Reports**

**Water Study**

**Wastewater Study**

**Stormwater Waiver Application**

# SEWER CAPACITY REPORT

## Silverstone Parcel "G"

Single-Family Duplex Homes & Townhomes  
SWC Pinnacle Peak Rd. & Miller Road  
Scottsdale, AZ

Prepared For:



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EXPIRES 9/30/2017

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9-PP-2017



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## 1. INTRODUCTION

### 1.1 SUMMARY OF PROPOSED DEVELOPMENT:

Proposed development consists of a maximum of sixty (60) duplex units and one-hundred twenty-four (124) townhomes fronting on forty-six (46) feet wide internal vehicular tracts. The purpose of this sewer capacity design report is to provide analysis of the impact that this development will have on the City's sewer system.

### 1.2 LEGAL DESCRIPTION:

The subject property consists of a parcel of land located at the SWC of Pinnacle Peak Road and Miller Road in Scottsdale, AZ. It is located in a portion of Section 14, Township 4 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona.

- Arizona Parcel ID numbers APN: **212-03-599**
- Parcel "G" of the "Map of Dedication and Parcel Map for Silverstone at Pinnacle Peak" recorded in Book 883, page 17 per Maricopa County Recorder.
- Parcel "G" contains 23.73 net acres as shown on the ALTA/NSPS Land Title Survey prepared by Alliance Land Surveying, LLC dated March 13, 2017.

The site is further bound by 74<sup>th</sup> Street to the west and residentially developed Silverstone Parcel "H" to the south.

Refer to **FIGURE 1 - Vicinity Map** for the project's location with respect to major cross streets.

### 1.3 EXISTING AND PROPOSED SITE ZONING AND LAND USES:

Parcel G is zoned R-5 PCD (Multiple-Family Residential District) per Zoning Ordinance No. 3651, Zoning Case 15-ZN-2005, 13-UP-2005 and subject to Stipulations as determined in Ordinance No. 3651. Per the ordinance, 258 single family residential units are allowed in the entire 23.73-acre Parcel G (10.87 units per acre). A maximum of 184 units are proposed for the parcel (7.75 units per net acre). Zoning will remain R-5 PCD

### 1.4 REFERENCES:

The project falls within Mixed-Use Neighborhoods conceptual land use district of the City's General Plan.

## 2. DESIGN DOCUMENTATION

### 2.1 DESIGN COMPLIANCE:

The analysis of the proposed and existing sewer system is done in compliance with Chapter 7 – Wastewater of the City of Scottsdale 2010 update of the Design Standards & Policies Manual (DS&PM). Design flow calculations for the on-site system will be based on the recommendations in Section 7-1.403 of the DS&PM.

### 3. EXISTING CONDITIONS

#### 3.1 EXISTING ZONING & LAND USE:

Land ownership, as defined by ALTA/NSPS Land Title Survey by Alliance Land Surveying, LLC dated 03/13/2017 includes 1,033,641 Sq. Ft. (23.73 acres) of undeveloped land. City of Scottsdale zoning map designates this parcel as R-5 PCD.

#### 3.2 EXISTING TOPOGRAPHY, VEGETATION AND LANDFORM FEATURES:

The parcel is currently natural desert, sloping approximately 3% - 4% from northeast to southwest with approximately 40' of fall. There is an existing ditch within a 50' Landscape Setback and Drainage Easement along the northerly property line. This ditch captures City of Scottsdale identified greater than 50-cfs flows from the north and ultimately discharges to the Rawhide Wash just west of Silverstone Parcel "F". Approximately along the 50' setback line is an existing flood wall associated with the channel. There is an existing ditch within a 30' Landscape Setback and Drainage Easement along the easterly property line constructed with the Miller Road improvements. A Flood Wall also existing along this ditch.

There are no apparent rock outcroppings or wetlands that would pose design or construction problems. All areas of the site to be disturbed shall be revegetated to a natural condition subject to city Development Review Board approval.

Refer to **FIGURE 2** for an aerial of the overall project existing conditions.

#### 3.3 EXISTING UTILITIES:

##### Sanitary: City of Scottsdale (QC 44-45)

- Pinnacle Peak Road: An 8" VCP Sanitary sewer main is approximately 24' south of the Pinnacle Peak Road Centerline. A manhole is located near the center of the north property line of the subject site. Depth to invert is approximately 8'. There are no apparent sewer leads to the site.
- 74<sup>th</sup> Street: An 8" PVC Sanitary sewer line commences approximately 300' south of the northerly property line of the subject parcel with a manhole, depth to invert of approximately 10', and runs approximately 8' west of the centerline of 74<sup>th</sup> Street. An 8" PVC stub is provided to the site; approximate depth is 10'. Two additional 8" stubs are provided to the site, one from a manhole approximately 530 feet south of the above manhole, and one near the southerly boundary of the subject lot, approximate depth is 10'.
- Miller Road: An 8" VCP Sanitary sewer main commences approximately 150' south and 18' west of the intersection of Pinnacle Peak and Miller Roads with a manhole, depth to invert of approximately 11'; there is a lateral to the east, serving the existing development. The line continues southerly to Williams Drive. No service stubs are apparent to the site

Refer to **FIGURE 3** for the City quarter section map (QS 44-45)

## 4. PROPOSED CONDITIONS

### 4.1 SITE PLAN:

The property is proposed to be developed with new lot configurations into 184 duplex and townhome units. Development will include 24' wide paved roads with rolled curbs and gated entrances from Miller Road. Refer to **FIGURE 4** for the proposed site plan.

### 4.2 PROPOSED SEWER SYSTEM:

This project will include 8" PVC main pipe at a minimum slope of 0.53% to maintain access to the public sewer(s). Four (4) foot diameter manholes will be used at all main terminations and changes in pipe direction. Five (5) foot diameter manholes will be used if sewer depth exceeds ten (10) feet.

Refer to **APPENDIX II** for Preliminary Utility plans.

### 4.3 MAINTENANCE RESPONSIBILITIES:

The on-site sewer line for the proposed development will be public and located within rights-of-way or tracts to the City of Scottsdale. Therefore, the on-site and off-site sanitary sewer will be maintained by the City.

## 5. SANITARY SYSTEM COMPUTATIONS

### 5.1. SEWER FLOW DEMANDS:

DS&PM, Chapter 7 – Wastewater specifies that for residential uses, sanitary sewer lines 8 to 12 inches in diameter will be designed using 100 gallons per capita per day (gpdpc) and a peaking factor of 4. Residential densities are to assume 2.5 persons per dwelling unit (du).

Therefore, the average proposed design flow is:

Duplex Units (North half of parcel):

60 units x 2.5 persons/du x 100 gpdpc = **15,000 gpd (Average)**

Peak Flow: 15,000 gpd x 4 = **60,000 gpd (Peak)**

Townhome Units (South half of parcel):

124 units x 2.5 persons/du x 100 gpdpc = **31,000 gpd (Average)**

Peak Flow: 31,000 gpd x 4 = **124,000 gpd (Peak)**

Combined flow to 74<sup>th</sup> Street:

184 units x 2.5 persons/du x 100 gpdpc = **46,000 gpd (Average)**

Peak Flow: 46,000 gpd x 4 = **184,000 gpd (Peak)**

### 5.2. VARIANCE FROM STATED DESIGN FLOWS:

Stated design flows for the on-site system will be used as recommended.

### 5.3. SEWER SYSTEM ANALYSIS (Off-Site):

The offsite system constructed for Silverstone in 74<sup>th</sup> street is an 8" PVC main. At the tie-in point, the sewer slope is approximately 3% flowing to the south.

Parcel G was approved for 10.87 units per acre. The subject site plan is proposed to be developed at 7.84 units per acre. Therefore, the offsite system can handle the flows for Parcel G.

### 5.4. DEMAND FACTORS:

DS&PM requires a peak factor of 4. Refer to Section 5.1 above for calculations.

### 5.5. SEWER CAPACITY CALCULATIONS

Minimum on-site sewer slope will be 0.53%. The sewer capacities have been calculated using FlowMaster V8i. Refer to **APPENDIX I** for pipe calculation output. The capacity of an 8" sewer line at 7/10 full is approximately **476,018 gpd**. This is sufficient for the proposed total average flows of 15,000 gpd (north system) and 31,000 gpd (south system) and peak flow capacities of 60,000 gpd and 124,000 gpd respectively.

## 6. SUMMARY

### 6.1 SUMMARY OF PROPOSED IMPROVEMENTS:

- The proposed wastewater improvement was designed based on the current City of Scottsdale's design standards and policies.
- The existing sanitary main being tied into is capable of supporting the projected average and peak flows for the development.

### 6.2 PROJECT SCHEDULE:

As a residential development, the infrastructure is proposed to be constructed in a single phase to accommodate dwelling unit growth. The dwelling units may be phased based on consumer demand.

## 7 SUPPORTING MAPS

### 7.1 UTILITY PLANS

Refer to **APPENDIX II** for Preliminary Utility Plan.

## 8 REFERENCES

1. *COS QS Sewer Plan number 44-45*
2. *City of Scottsdale Design Standards & Policies Manual, 2010 (Chapter 7 – Wastewater)*



PROJECT VICINITY

North Scottsdale

FIGURE 1  
VICINITY MAP

N Miller Rd & E Pinnacle Peak Rd

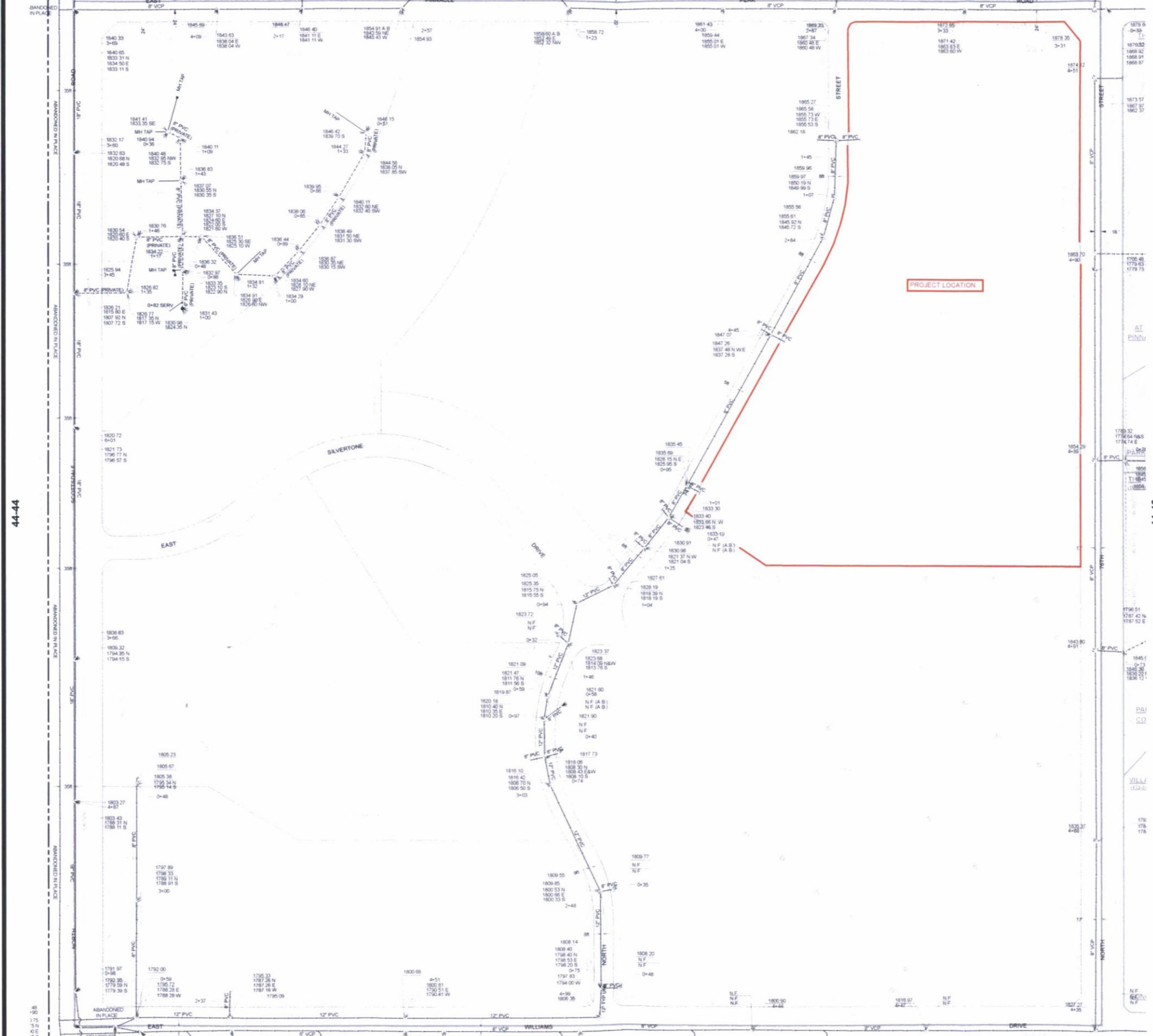
PROJECT LOCATION



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FIGURE 2  
AERIAL

NOTICE  
 IT IS PROVIDED FOR OFFICIAL RECORD ONLY. THE CITY OF SCOTTSDALE DOES NOT WARRANT ITS ACCURACY, COMPLETENESS OR SUITABILITY FOR ANY PURPOSE. IT SHOULD NOT BE RELIED UPON WITHOUT FIELD VERIFICATION.  
 THE CITY OF SCOTTSDALE



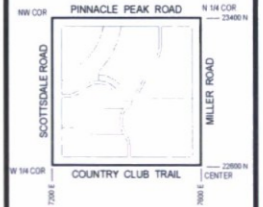
44-44

THE SECTION LINE BEARING AND DISTANCES ARE BASED ON THE CITY OF SCOTTSDALE GPS SURVEY OF SEPTEMBER 1991. BEARINGS ARE IN NAD 83 GRID AND DISTANCES ARE FLATTENED TO GROUND. WHERE NO CORNER WAS FOUND THE DIMENSIONS ARE GIVEN TO CALCULATED SECTION CORNERS AND ARE NOTED AS CALCULATED ON THE MAP.

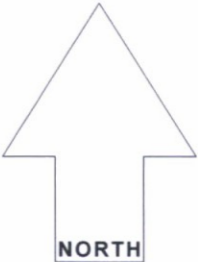
**LEGEND:**

- Cleanout
- Lift Station
- Manhole
- Non-GPS Point
- Plug
- Sewer Service Point
- Sewer Tap Point
- Sewer Valve
- Treatment Plant
- Sewer Main - Gravity
- Sewer Main - Force
- Sewer Main - Private

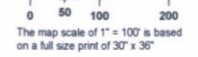
**VICINITY MAP**



44-46



SCALE: 1" = 100'



The map scale of 1" = 100' is based on a full size print of 30" x 36"

**SEWER**  
 QUARTER SECTION MAP

**44-45**

NW 1/4 SEC. 14 T4N R4E

FIGURE 3



# *APPENDIX I*

## *Calculations*

## Calculation for Capacity of 8 inch sewer 7tenths full at 0.53%

### Project Description

Friction Method                      Manning Formula  
Solve For                                Discharge

### Input Data

Roughness Coefficient                      0.013  
Channel Slope                                0.00530    ft/ft  
Normal Depth                                5.60    in  
Diameter                                        8.00    in

### Results

Discharge                                      476018.50    gal/day  
Flow Area                                      0.26    ft<sup>2</sup>  
Wetted Perimeter                              1.32    ft  
Hydraulic Radius                              2.37    in  
Top Width                                      0.61    ft  
Critical Depth                                0.41    ft  
Percent Full                                    70.0    %  
Critical Slope                                0.00790    ft/ft  
Velocity                                        2.82    ft/s  
Velocity Head                                0.12    ft  
Specific Energy                                0.59    ft  
Froude Number                                0.76  
Maximum Discharge                            0.95    ft<sup>3</sup>/s  
Discharge Full                                568558.39    gal/day  
Slope Full                                      0.00372    ft/ft  
Flow Type                                      SubCritical

### GVF Input Data

Downstream Depth                            0.00    in  
Length                                        0.00    ft  
Number Of Steps                                0

### GVF Output Data

Upstream Depth                                0.00    in  
Profile Description  
Profile Headloss                                0.00    ft  
Average End Depth Over Rise                0.00    %  
Normal Depth Over Rise                        70.00    %  
Downstream Velocity                            Infinity    ft/s

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## Calculation for Capacity of 8 inch sewer 7tenths full at 0.53%

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### GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	5.60	in
Critical Depth	0.41	ft
Channel Slope	0.00530	ft/ft
Critical Slope	0.00790	ft/ft



## *APPENDIX II*

# *Preliminary Utility Plan*