

FINAL  
UTILITY REPORT  
THE HOUCK ESTATE  
MONTBELLO DRIVE SANITARY SEWER  
SPECIAL IMPROVEMENT DISTRICT  
COLORADO SPRINGS, COLORADO



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PREPARED FOR:

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INTRODUCTION

Purpose

The purpose of this report is to supply final utility information for the northern parcel of the Houck Estate which is located generally east of Nevada Avenue, north of Austin Bluffs Parkway, west of Academy Boulevard and south of Pulpit Rock. The Montebello Drive Sanitary Sewer Improvement District will be formed to construct a sanitary sewerline to service the northern portion of the Houck Estate which is unable to obtain service from existing systems.

Scope

The northern portion of the Houck Estate is a proposed 670 acre development with an approved Master Plan on file at the City of Colorado Springs. This Final Utility Report documents the sanitary sewer and waterline requirements to support the land uses shown on the Master Plan.

The approved Master Plan shows the extension of Montebello Drive west through the Houck Estate from Garden Ranch Estates which is located east of the Houck Estate. Because the proposed Montebello Drive is located along a drainageway, about 395 acres of the northern portion of the Houck Estates are tributary to the proposed drive alignment (see Exhibit A, Drexel Barrell Drawing Number 1C642 in the back cover). In addition, about 240 acres west of the Houck Estates are tributary to the proposed outfall sewer. The University of Colorado owns most of this offsite property.

EXISTING CONDITIONS

The basin to be served within the Houck Estate is undeveloped and in its natural state. Vegetation and slope of the ground varies considerably across this site. For the most part, the proposed Montebello Drive will follow a drainageway through the property. The drainageway, which slopes from east to west, is the low point of sloping land from both the north and south. Vegetation is a mix of field grasses, brush and coniferous trees. Bedrock outcrops are evident in some areas adjacent to the drainageways. The land west of the Houck Estate along the proposed sewerline corridor to Nevada Avenue is also undeveloped. Grass predominates in the lower reaches west of the Houck Estate to Nevada Avenue.

An existing 20" waterline runs generally north and south just inside the eastern property line of the Houck Estate. This waterline connects to the 16" water in Academy Boulevard on the north, 12" water in Montbello Drive to the east and the 24" water in Austin Bluffs Parkway on the south. Approximately halfway between Nevada Avenue and the Houck Estate, the existing 8" Northfield waterline runs north and south. This Northfield line also ties into the 24" water at Austin Bluffs Parkway and an existing 12" water just north of Pulpit Rock Park.

No sanitary sewer exists within the Houck Estate site or on the undeveloped area to the west. The surrounding subdivisions to the north and east do have sanitary sewer which can service the northeast and southeast portions of the Houck Estate. These two small areas are not included in the Montbello Drive sewer line service area. The remaining central portion of the site is unable to utilize the surrounding existing sewer systems due to the fact that it is lower in elevation. Consequently, the Montbello Drive sanitary sewerline must outfall to the existing 48" interceptor sewer along Monument Creek approximately 6000' to the west of Houck Estate.

## UTILITY DESIGN

### GENERAL

Water, storm and sanitary sewer lines will follow the proposed Montbello Drive alignment through the site to the west boundary of the Houck Estate. West of the Houck Estate where no street is proposed, water and sanitary sewer will continue in an easement across the private properties to their respective connection and outfall points as described below.

### WATER

The proposed water shall be a 16" main as recommended in the Black & Veatch report on water distribution for the City of Colorado Springs in 1984. The scope of that report far exceeds the limits of this special improvement district, therefore the 16" main is accepted as a design criteria without further study on the part of Drexel Barrell. The 16" main will tap the existing 20" main at the Montbello Drive crossing. The 16" main will extend through the Houck Estate and approximately 2200 feet further west to tie into the existing 8" Northfield waterline. Estimated total water length is approximately 6850 feet. Initially, no further improvements are recommended. However, as the majority of the Houck Estate is developed and as dictated by water demands, the 8" main may need to be replaced with additional 16" watermain from the tee with the 16" south to the existing 24" water at Austin

Bluffs Parkway. This additional future extension of the 16" main is recommended in the Black and Veatch report.

The remainder of the water network necessary to serve the various areas of development throughout the Houck Estate will be designed at a later date as the concepts and site plans for the individual parcels become better defined.

#### ONSITE SANITARY SEWER

As mentioned above, the contributory area for the Houck Estate sanitary sewerline is estimated at 395 acres. Although not included in this study, the remainder of the Houck Estate development will direct wastewater to existing sanitary sewers on the north and southeast in adjacent subdivisions. The City of Colorado Springs Wastewater Division has confirmed the capacity of these surrounding systems to accept the additional flows. Sanitary sewage flows for the sewerline were estimated from proposed land uses according to the approved Houck Estate Master Plan, assuming complete buildout. While residential use covers the largest amount of area with varying degrees of density, research and development, school/park, neighborhood facilities and open space areas are also included. The sewerline sizing is based upon peak flow using the latest City of Colorado Springs Design Criteria (See Exhibit B), with the exception of the school/park and neighborhood facilities areas which used special assumptions.

The school/park and neighborhood facilities parcels shown on the Master Plan could provide a wide variety in land use and development size and hence contributing sewer flows. For this report, the following assumptions were made to estimate sewer flows for these two areas. The Colorado Springs School District No. 11 has suggested the school would probably be an elementary school with an estimated enrollment of 600 to 700. As a result, the school flow was estimated using 750 students at 25 gallons per day per student with a peak factor of 2. The neighborhood facilities area flows were calculated using commercial development type flows as a conservative, worst case measure.

The total length of the Montbello Drive sewer line from the upper basin terminal manhole through the Houck Estate is estimated at approximately 5,000 feet. Design grade of the sewer over this length varies from 1% to over 5%. Based upon peak flow estimates of 464 gpm (1+/-cfs) and utilizing 75% of pipe sectional area, a 10" pipe with minimum grade of 0.8% is required onsite. This size is based on total basin flow as concentrated at the west property line of the Houck Estate. In the upper portions of the basin where the contributing areas are still relatively small, lesser grades or a smaller pipe may be used.

## OFFSITE SANITARY SEWER

As mentioned previously, there are approximately 240 acres of undeveloped land west of the Houck Estate tributary to the outfall sanitary sewerline. Following the water main, the sewer outfall continues west beyond the end of Montbello Drive and the Houck Estate border. From the western border of the Houck Estate, the outfall sanitary sewer line will continue generally west across University of Colorado property to intersect Nevada Avenue just north of the Four Diamonds Sports Complex. After crossing under the abandoned Atchinson, Topeka and Santa Fe Railroad bed and Nevada Avenue the sewer weaves through an existing apartment complex in Monument Meadows Subdivision ultimately connecting to the existing 48" Monument Interceptor Sewer located just east of Monument Creek and Interstate 25 (See Exhibit C). The following discussion summarizes additional potential sanitary sewer flows from the area west of the Houck Estate.

Assuming development of the 240 acres under the current Estate - Residential zoning, the entire tributary area would add 160 gpm (0.4 cfs) to the peak flow from the Houck Estates. Despite the fact some the area may be unbuildable due to steep slopes or rock cliffs, the entire 240 acres was used to calculate the flows. This method compensates for any possible density transfer from the open space (unbuildable) area to other areas. With the additional flows from the entire basin and using the same criteria as above, the combination of pipe sizes and grades required for a total peak flow west of Houck Estates of 624 gpm are either a 12" pipe with a minimum grade of 0.5% or a 10" pipe with a minimum grade of 1.4%.

Easements already exist for the sewer construction through the apartment complex based upon a previous design of the North Suburban Relief by Orr/Nichols & Associates Inc. All easements or right-of-way necessary for construction across the University of Colorado and other property will need to be obtained by the City of Colorado Springs prior to construction. This alignment through University property generally follows that shown on the City of Colorado Springs Wastewater Master Plan for future construction of a 12" sewer to the Monument Interceptor.

## SUMMARY

The existing 20" watermain on the east edge of the Houck Estate will be the point of origination for the new 16" watermain. This main will follow the alignment of the proposed extension of Montbello Drive through the Houck Estate. Montbello Drive terminates at the west edge of the Houck Estate. However, the waterline will continue westerly across the University of Colorado property to connect to the existing 8" Northfield waterline. This main size and alignment are based upon the recommendations of the Black & Veatch water distribution study. This 16" water main will provide a basis for the remainder of the water infrastructure throughout the Houck Estate to be designed at a future date.

A sanitary sewerline is proposed for construction through the Houck Estate along the Montbello Drive extension. The outfall line will continue west, beyond the Houck Estate, through University of Colorado property and tie in to the Monument Interceptor Sewer located west of Nevada Avenue. This outfall is in accordance with the City of Colorado Springs Wastewater Master Plan. All calculations used to estimate sewage flow and size the sanitary sewer line are in accordance with the latest City of Colorado Springs Wastewater Design Criteria.

Respectfully Submitted,



Barbara Weiss Turner P.E.  
Drexel Barrell

EXHIBIT B

E 3745C

Basin MONTBELLO DRIVE

HYDROLOGICAL BASIN WORKSHEET  
FOR COLLECTION SYSTEM ANALYSIS

Sheet 1 of 1

Sub Basin TOTAL OUTFALL

Land Use	Acres	U/A <sup>a</sup>	Units <sup>b</sup>	P/U <sup>c</sup>	Population <sup>d</sup>	Peak <sup>e</sup>	GPCD <sup>f</sup> (GPAD)	GPDS
Single Family	<u>135.3</u>	<u>VARIES</u>	<u>349.3</u>	2.9	<u>1013</u>	} <u>2.3</u>	65	<u>249,217</u>
Multi-Family	<u>47.9</u>	<u>VARIES</u>	<u>344</u>	1.9	<u>654</u>			
Commercial	<u>3.7</u>	*****	*****	*****	*****	*****	2600	<u>9,620</u>
Industrial	<u>55.3</u>	*****	*****	*****	*****	*****	4000	<u>221,200</u>
Undevelopable	<u>143</u>	*****	*****	*****	*****	*****	(500)	<u>71,500</u>
I/I Flows	<u>395</u>	*****	*****	*****	*****	*****	200 <sup>h</sup>	<u>79,000</u>
Unplanned collect	<u>12</u>	*****	*****	*****	<u>750</u>	*****	25 4500 <sup>i</sup>	<u>37,500</u>
TOTAL PEAK FLOW . . . . .								<u>668,037</u> GPD
								<u>1.03</u> CPS
								464 gpm

<sup>a</sup>U/A = Units Per Acre

<sup>b</sup>Units = Acres X U/A

<sup>c</sup>P/U = Persons Per Unit

<sup>d</sup>Population = Units X P/U

<sup>e</sup>Peak = Peaking Factor From Table 3-2

<sup>f</sup>GPCD = Gallons Per Capita Per Day, GPAD = Gallons Per Acre Per Day

<sup>g</sup>GPAD = Gallons Per Day = Population X 65, or GPD = Acres X GPAD

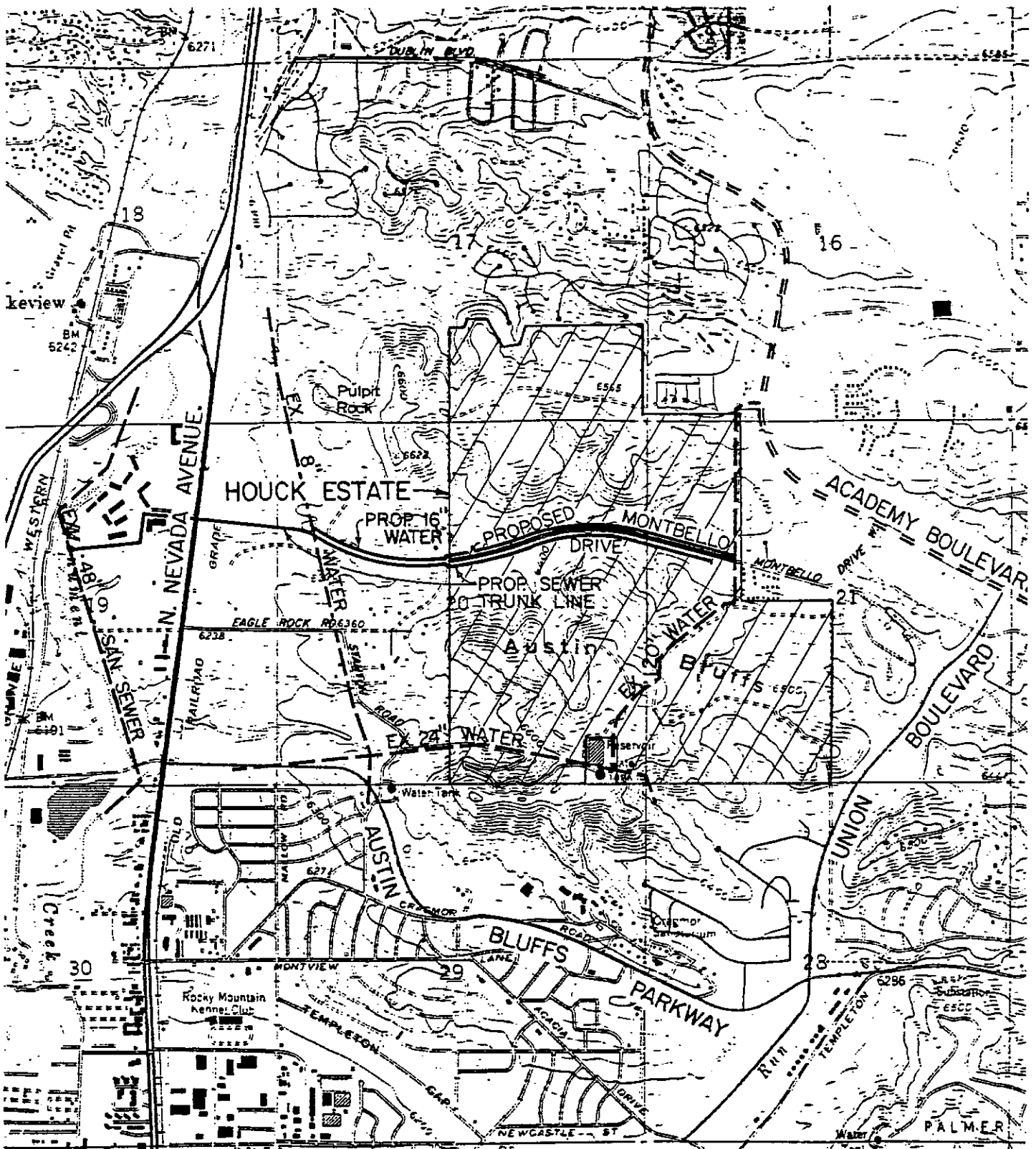
<sup>h</sup>200 GPAD - Newly developing basins with low potential for infiltration problems due to groundwater.

<sup>i</sup>500 GPAD - Subbasins with known I/I problems and older areas of the system.

For unplanned areas of 100 acres or less use 4500 GPAD.

For areas greater than 100 acres utilize the land use mix method.





SCALE 1" = 2000'

EXHIBIT C  
 MONTEBELLO DRIVE SANITARY SEWER  
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