

TECHNICAL MEMORANDUM



City of Daly City Wastewater Collection System Hydraulic Modeling Support

SUBJECT: Sanitary Sewer Capacity Evaluation for JUHSD Precise Plan
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REVIEWED BY: Gisa Ju, Woodard & Curran, CA PE No. 31823
DATE: October 27, 2021
REFERENCE: 0011352.00, Subtask 1.12

This Technical Memorandum (TM) summarizes the evaluation of the potential sanitary sewer capacity impact of proposed development associated with the Precise Plan for the Jefferson Union High School District (JUHSD) site on Serramonte Boulevard. The evaluation used the City's sanitary sewer hydraulic model developed as part of the 2009 North San Mateo County Sanitation District's (NSMCSD, District) Collection System Evaluation/Assurance, Management and Improvement Plan (2009 Collection System Evaluation) and updated in 2015 for the Collection System Model Update and Flow Impact Study for Proposed Serramonte Center Expansion (2015 Model Update).

The proposed development is located at 699 Serramonte Boulevard on parcel 091-211-230. The first phase of the JUHSD project included 122 units of faculty and staff housing, which was evaluated in October 2019¹. The sewer improvements identified in that phase of the project have since been constructed. The expanded development will include removal of existing buildings and construction of new high density residential and mixed-use development. The location of the proposed development and the downstream sewers are shown in **Figure 1**. Flow from the proposed development site discharges to the City's 10-inch sewer in Serramonte Boulevard and then continues north through the Serramonte Center development crossing the I-280 freeway to Junipero Serra Boulevard and north along Junipero Serra Boulevard. From there, the trunk sewers flow west and north to the NSMCSD wastewater treatment plant (WWTP). The proposed development would contribute flow to the trunk sewers requiring capacity improvements identified for the Serramonte Center area in the 2015 Model Update.

1. MODEL INPUT

1.1 Sewer Network

This analysis used the City's existing model of the trunk sewer network that was updated in 2015. However, some pipe improvements and updates for recent developments have been added to the model since that time as part of other sewer capacity evaluations. The JUHSD faculty and staff housing previously evaluated included the relocation of the existing 8-inch pipe segment currently running through the development area. The relocated pipe is a 10-inch sewer, which connects to the existing sewer in Serramonte Boulevard at MH-C10-030. The proposed development also includes the re-routing of sewers further upstream to MH-C10-040, as well as routing some of the flow from the development via a new 10-inch sewer from MH-C10-042 to Callan Boulevard and then along Callan Boulevard to connect to MH-D10-032 at Serramonte Boulevard. The existing sewer in Campus Drive between MH-C10-042 and MH-C10-040 would be abandoned, as there are no lateral connections to that pipe. These changes were incorporated for evaluation in this study, as shown in **Figure 2**.

¹ Woodard & Curran, Technical Memorandum, Sanitary Sewer Capacity Evaluation for JUHSD Faculty and Staff Housing, October 25, 2019.

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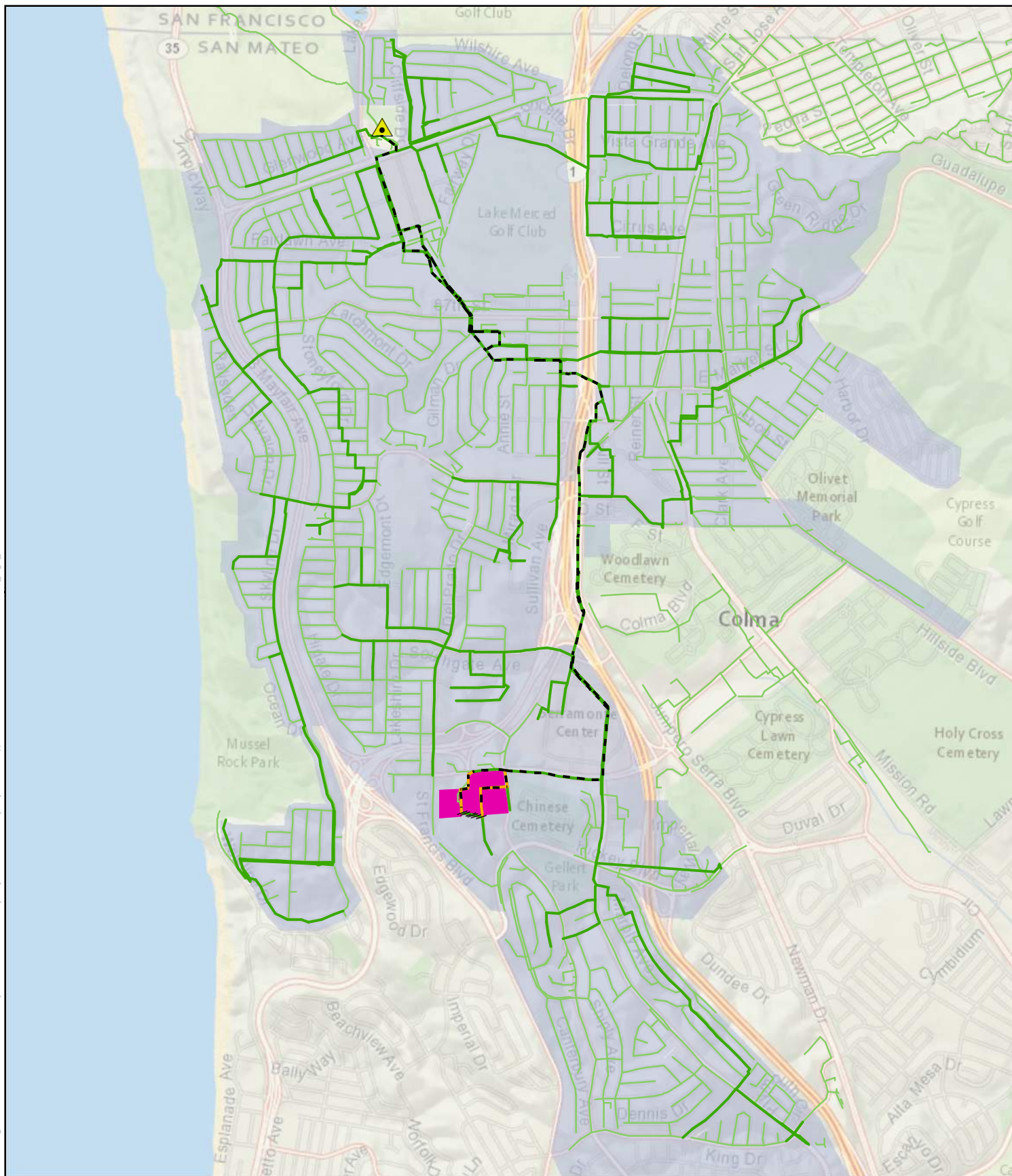


Figure 1: Proposed Development Location

JUHSD Precise Plan Development
Daly City, CA

Legend

- Wastewater Treatment Plant
- Pipes downstream of development
- Pipes rerouted or added to model
- Modeled pipes
- To be abandoned
- Unmodeled Pipes
- Proposed Development
- Service Area

0 0.125 0.25 0.5 Miles



Project #: 0011352.00
Map Created: May 2021

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Figure 2: Development Site

JUHSD Precise Plan Development
Daly City, CA

Legend

- Nodes added to model
- Modeled nodes
- Pipes downstream of proposed development
- Modeled pipes
- Pipes rerouted or added to model
- To be abandoned
- S-048C Subcatchments

0 50 100 200
Feet



Project #: 0011352
Map Created: May 2021

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1.2 Sewer Loads

The 2015 Model Update evaluated the sewer system under two planning scenarios: Existing and Future. The Existing Scenario was considered to represent 2015 flows, and the Future Scenario was developed to represent 2030 conditions by incorporating future residential and commercial projects that would potentially be implemented between 2015 and 2030. The 2015 Model Update identified a potential future development at the parcel identified in this study. This potential future development, identified as “Serramonte Del Rey” in the 2015 study, was projected to include 175 multi-family residential uses units. At the time, this development was intended to represent the future JUHSD housing, so it was removed and replaced with the updated 122 units of JUHSD Faculty and Staff housing as part of the first phase of this proposed development.

The proposed development includes 1,113 units of apartments and 25,827 square feet of mixed-use development on 5 new parcels (labeled B through F) on the JUHSD site. The proposed development includes both residential and non-residential loads. The residential loads were estimated based on an apartment unit flow factor of 170 gallons per day (gpd) per dwelling unit (DU), as used in the 2015 Model Update. The non-residential loads were estimated based on a non-residential unit flow factor for general commercial, retail, and offices uses of 0.1 gpd per square foot (sq ft) of building floor space. The development quantities and estimated base wastewater flow (BWF) sewer load from the development are shown in **Table 1** below.

Table 1: Average BWF Sewer Load for the Proposed Development

Development Parcel	Type	Amount	Unit	Rate	Flow (gpd)	Flow (MGD)
Parcel B	Apartment	201	DU	170 gpd/DU	34,170	0.0342
	Mixed-Use	24,427	sq.ft	0.1 gpd/ sq.ft	2,443	0.0024
Parcel C	Apartment	100	DU	170 gpd/DU	17,000	0.0170
	Preschool	1,400	sq.ft	0.1 gpd/ sq.ft	140	0.0001
Parcel D	Apartment	240	DU	170 gpd/DU	40,800	0.0408
Parcel E	Apartment	240	DU	170 gpd/DU	40,800	0.0408
Parcel F	Apartment	332	DU	170 gpd/DU	56,440	0.0564

The proposed development is located in model subcatchment S-048, as shown in **Figure 2**. The existing loads for the subcatchment were determined based on average water billing data from 2012 to 2015 for each parcel. The existing loading for parcel 091-211-230 was determined to be 204 gpd or (.000204 mgd). This existing loading is assumed to be replaced by the proposed development.

For this study, the subcatchment was split into eight different subcatchments discharging to the revised manholes and pipe segments in the model network (**Figure 2**). The JUHSD Faculty and Staff Housing development is part of subcatchment S-048A, and the proposed new development parcels are included as subcatchments S-048B through S-048F. Subcatchment S-048G represents the area upstream of the JUHSD site along Campus Drive, and subcatchment S-048H is the area north of Serramonte Boulevard that is also tributary to the Serramonte Boulevard sewer. The updated average BWF loading for these subcatchments are shown in **Table 2**.

1.3 Design Flow Parameters

System capacity was evaluated based on the ability of the sanitary sewer system to convey future peak wet weather flow (PWWF) under design storm conditions. The analysis for this study used the same diurnal curves for residential and non-residential flows, as well as the same rainfall-dependent inflow and infiltration (RDI/I) for this area applied to the 5-year return period design event, as used in the 2009 Collection System Evaluation and 2015 Model Update.

Table 2: Average BWF Sewer Loads for Modeled Subcatchments

Subcatchment	Load Manhole/Pipe	Residential Flow (mgd)	Non-residential Flow (mgd)	Total Flow (mgd)
S-048A (JUHSD Faculty and Staff Housing)	JUHSD_SSMH_03	0.02074	0.00046	0.02120
S-048B (Parcel B)	MH-C10-031	0.03417	0.00244	0.03661
S-048C (Parcel C)	Pipe between JUHSD_SSMH_17 and 16	0.01700	0.00014	0.01714
S-048D (Parcel D)	JUHSD_SSMH_17	0.04080	0	0.04080
S-048E (Parcel E)	JUHSD_SSMH_17	0.04080	0	0.04080
S-048F (Parcel F)	JUHSD_SSMH_08	0.05644	0	0.05644
S-048G	MH-C10-044	0.04120	0.00611	0.04731
S-048H	MH-C10-030	0.02446	0	0.02446

2. MODEL RESULTS

The model was run for PWWF conditions including the proposed development and the proposed sewers. The model results were evaluated to identify any predicted surcharge under design PWWF in the sewers downstream of the proposed development. The results indicated that the development would not cause any capacity deficiencies in the rerouted sewers or in the sewers on Serramonte Boulevard downstream of the development, as shown in the model profiles of the re-routed and upsized 10-inch sewer in West Drive, North Drive, and Entry Drive to Serramonte Boulevard (**Figure 3**); the proposed new sewer in East Drive, North Drive, and Callan Boulevard to Serramonte Boulevard (**Figures 4 and 5**); and the existing 10-inch sewer in Serramonte Boulevard (**Figure 6**). (Note: the most downstream segments in the sewer in Serramonte Boulevard are surcharged due to backup from the Serramonte Center trunk sewers, discussed below.)

However, as noted previously, the development flows would contribute to capacity deficient sewers in the Serramonte Center and the 21-inch trunk sewer crossing highway I-280 to Junipero Serra Boulevard (**Figure 7**). The figure indicates sewers predicted to be surcharged due to “throttle” conditions (peak flow exceeding full pipe capacity) and those surcharged due to backwater from downstream throttle conditions. **Figure 8** shows the same profile without the proposed new development but including the previously evaluated JUHSD Faculty and Staff Housing. **Figure 9** and **Figure 10** show model profiles of the parallel 12/15-inch sewers through the Serramonte Center, indicating significant predicted surcharge in these sewers under design PWWF conditions both with and without the proposed additional development. The model results indicate that the additional JUHSD Precise Plan development would raise the hydraulic gradeline in the Serramonte Center trunk sewers by about 10 inches, including predicting a possible overflow at MH-D09-009, as shown in **Figure 9**.

The solution to the surcharge issues in the 12-, 15-, and 21-inch sewers in the Serramonte Center, as recommended in the 2009 Collection System Evaluation, is a 30-inch relief sewer parallel to the 21-inch sewer crossing highway I-280. Therefore, since the JUHSD development contributes flow to the capacity-deficient sewers that would be relieved by this project, it should contribute a proportional fair share of the new 30-inch relief sewer. The fair share contribution should be based on the JUHSD development flows relative to the additional capacity needed for the new I-280 crossing as determined by the Department of Water and Wastewater Resources.

Figure 3: Model Profile MH-C10-040 to MH-C10-030 with JUHSD Precise Plan Development

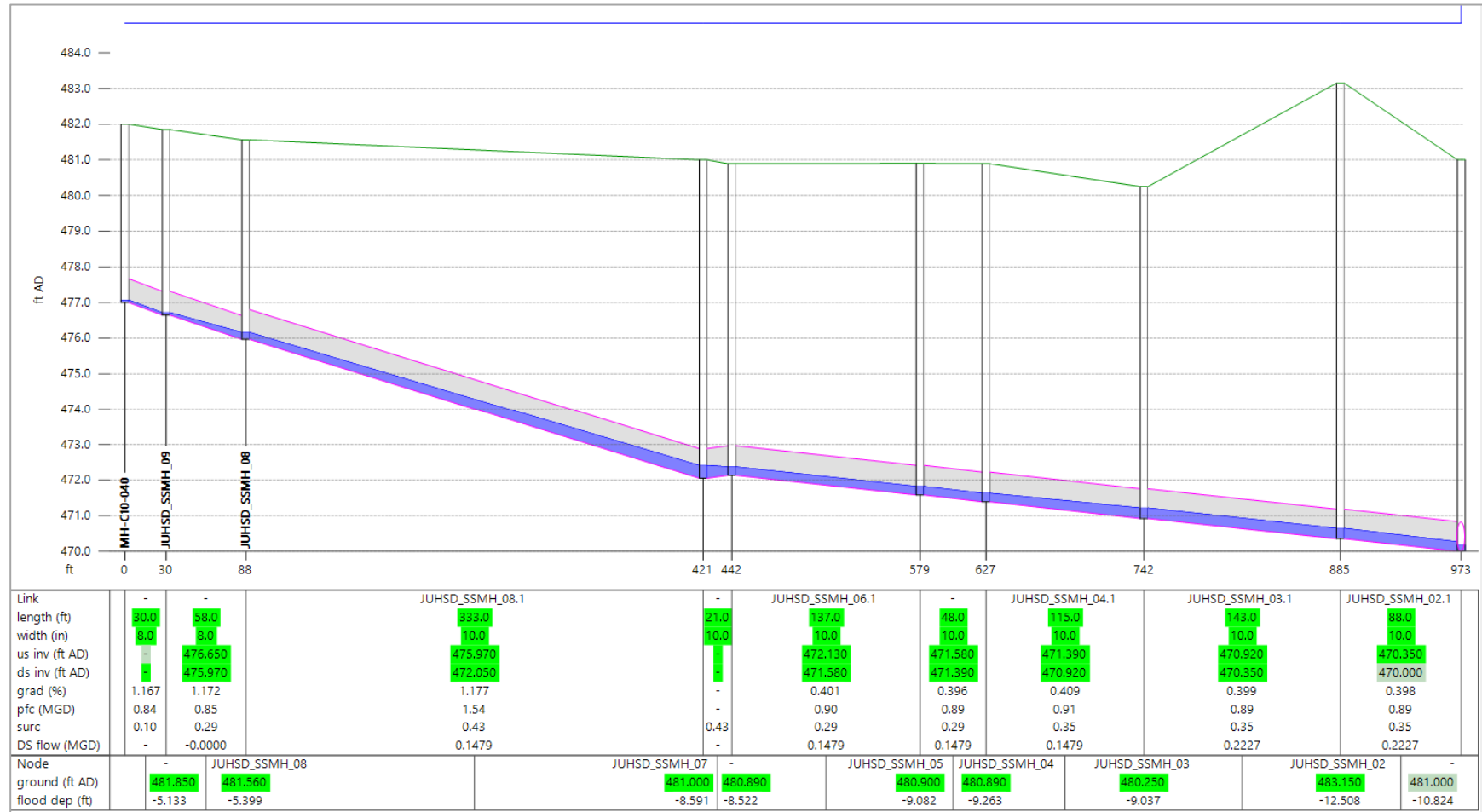


Figure 4: Model Profile MH-C10-042 to JUHSD_SSMH_15 with JUHSD Precise Plan Development

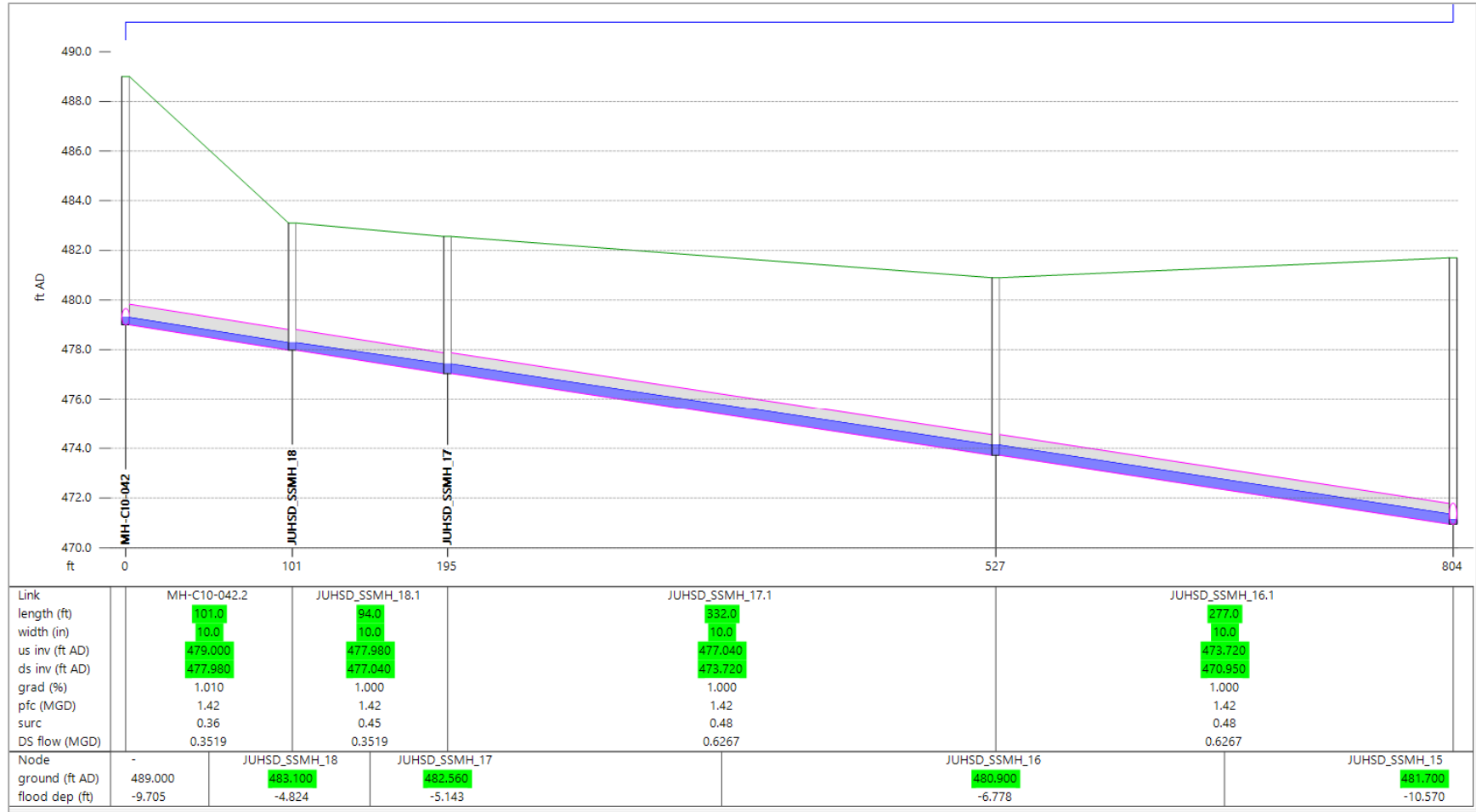


Figure 5: Model Profile JUHSD_SSMH_15 to MH-D10-032 with JUHSD Precise Plan Development

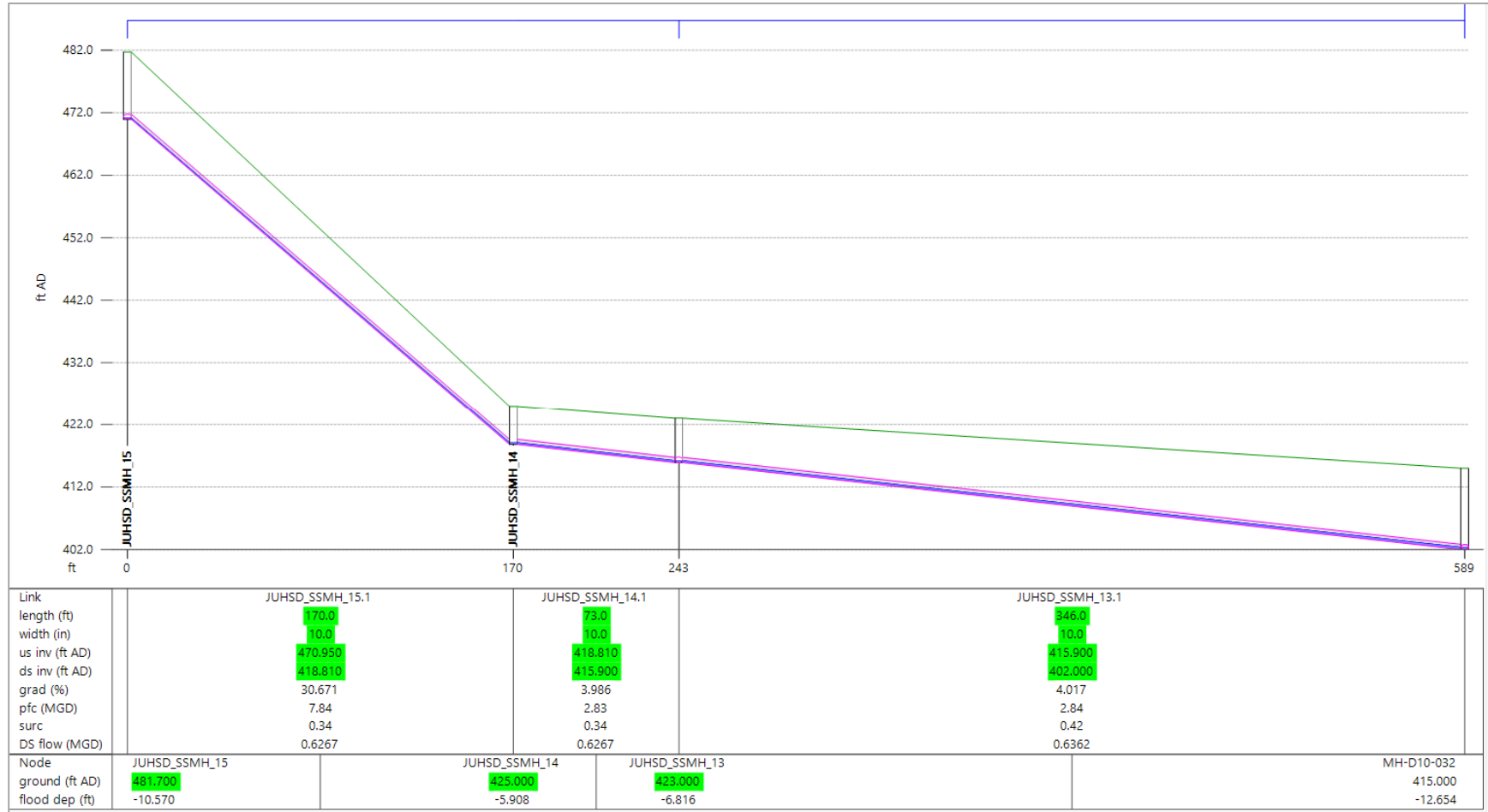


Figure 6: Model Profile of Serramonte Boulevard MH-C10-030 to MH-D10-009 with JUHSD Precise Plan Development

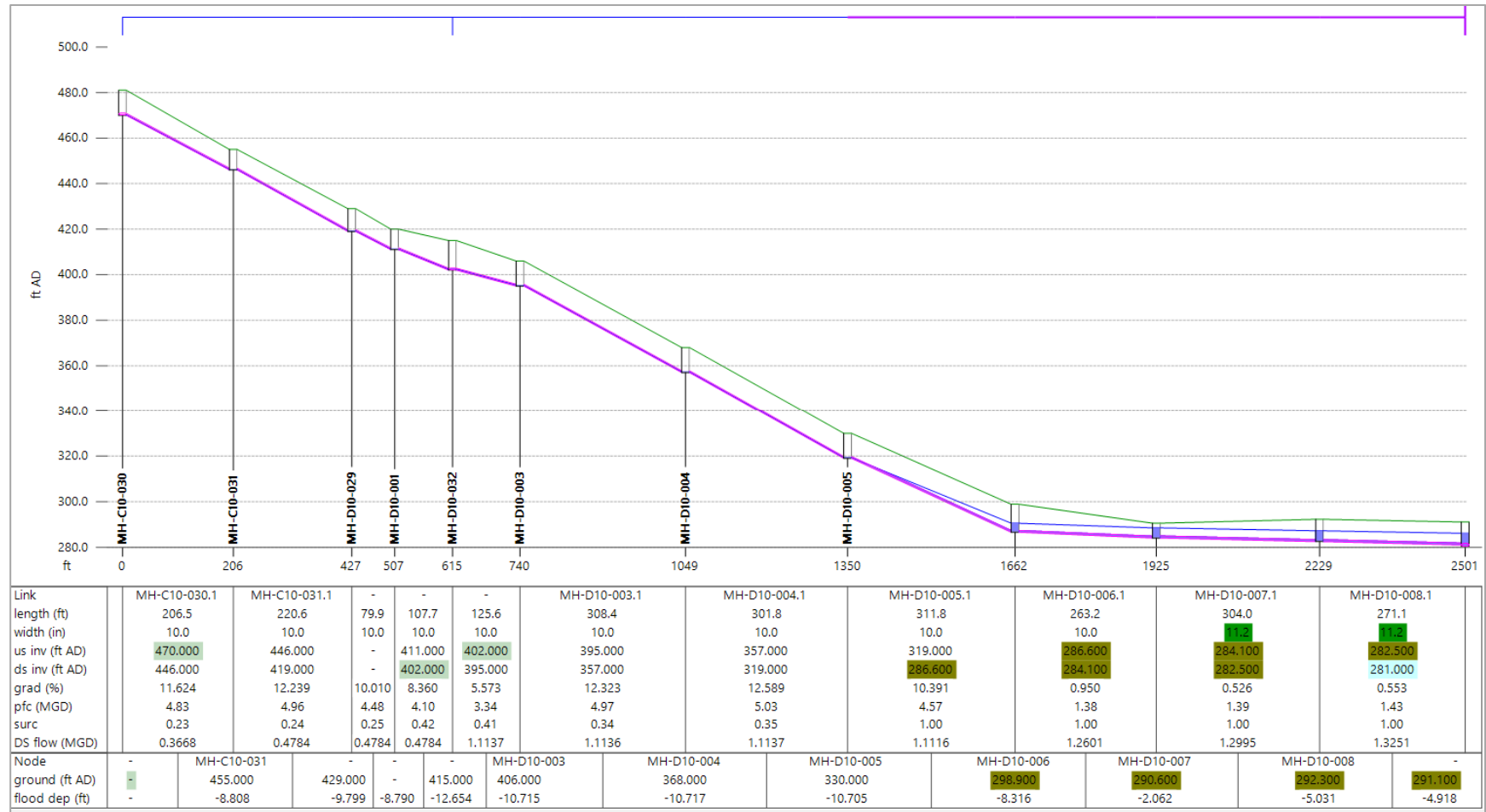


Figure 7: Model Profile of Downstream 21-inch Sewer MH-D10-009 to MH-D08-019 with JUHSD Precise Plan Development

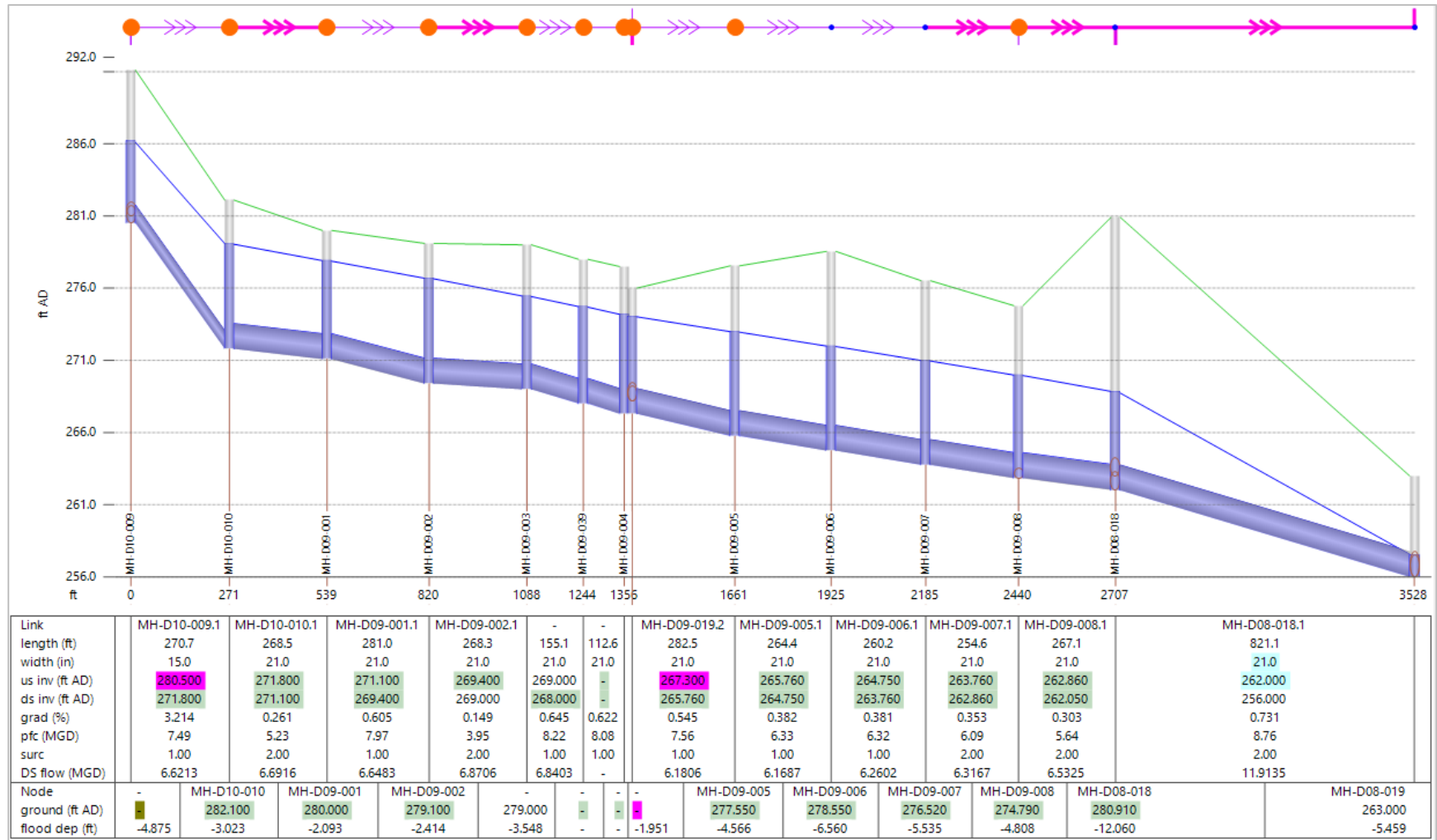


Figure 8: Model Profile of Downstream 21-inch Sewer MH-D10-009 to MH-D08-019 with JUHSD Faculty & Staff Housing Only

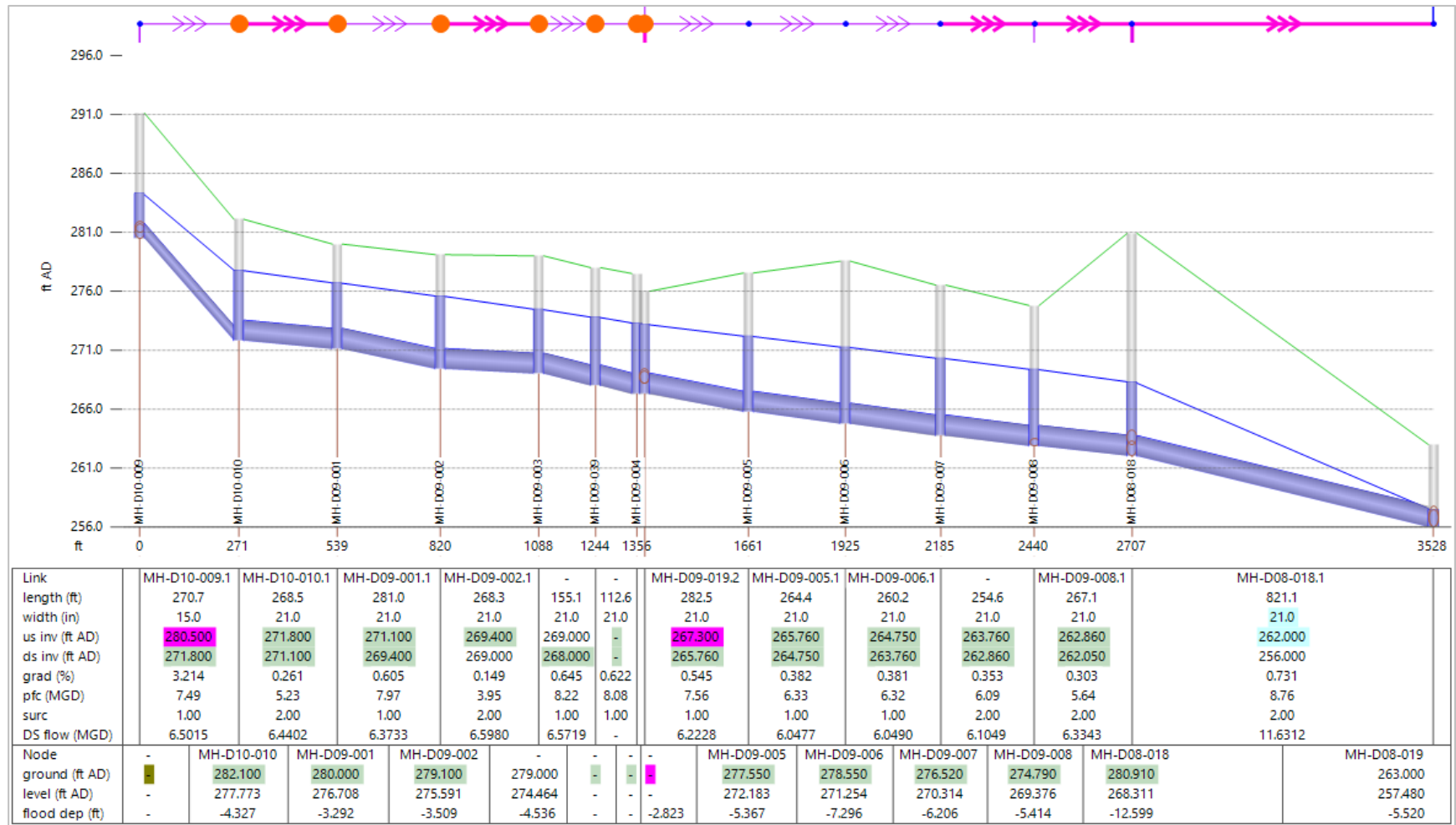


Figure 9: Model Profile of Downstream 12/15-inch Sewer MH-D10-045 to MH-D08-019 with JUHSD Precise Plan Development

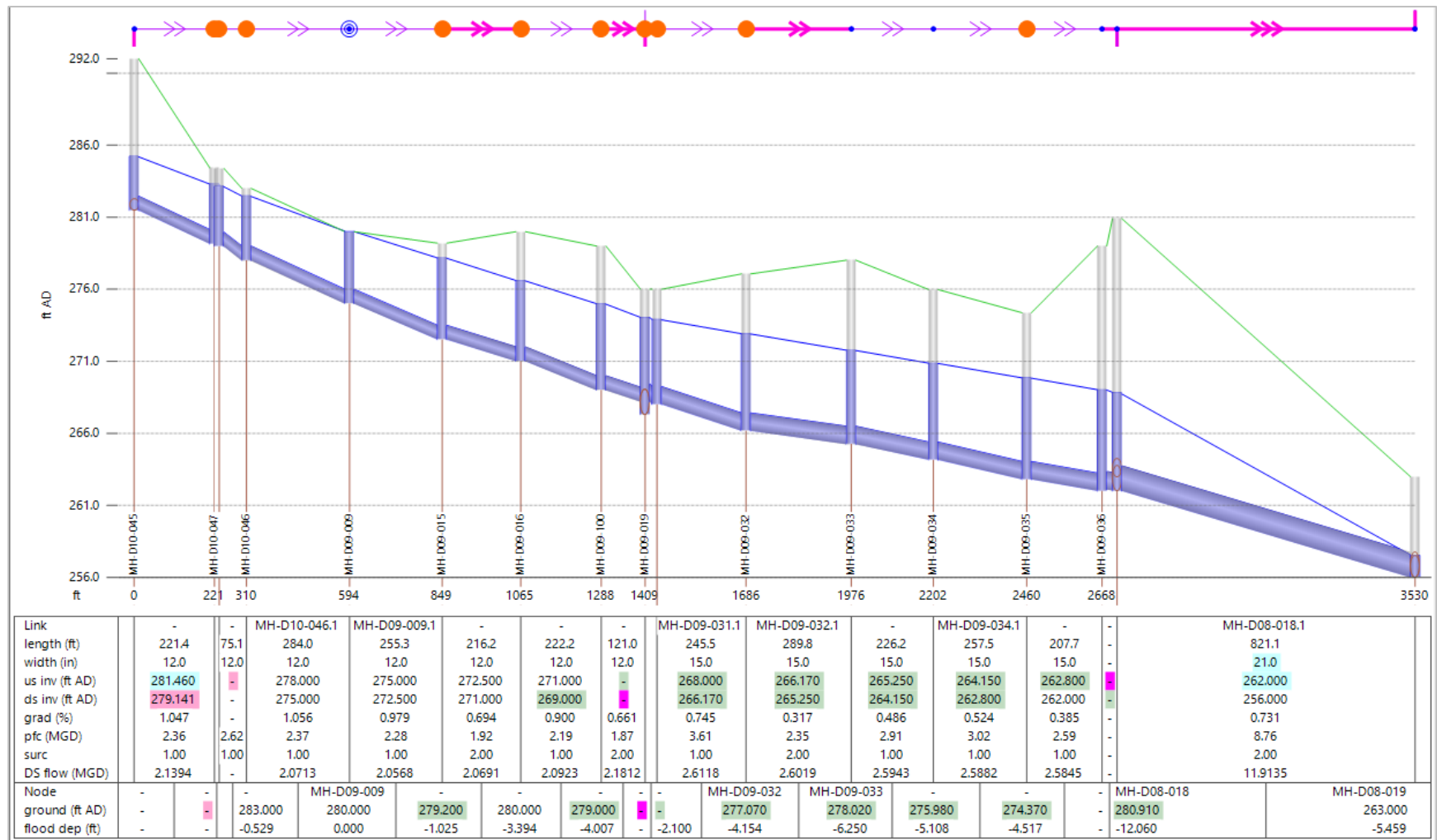


Figure 10: Model Profile of Downstream 12/15-inch Sewer MH-D10-045 to MH-D08-019 with JUHSD Faculty & Staff Housing Only

