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Archuleta School District 50JT

K-8 School Due Diligence

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SGM Project 2025-345.001

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1.0 Executive Summary

The purpose of this Feasibility Study is to complement and supplement the work that the Archuleta County School Board and RTA Architects have completed prior to this study. The school board seeks to evaluate the feasibility of three locations that could house a new K-8 campus.

A new school site must find the right balance of available space, community location, student population location, and engineering factors that could significantly impact construction costs. This study is intended to evaluate the latter.

All three sites have the potential to become a campus for a new school, but each site has its benefits and disadvantages. Overall, the Vista site appears to have the best balance for engineering challenges and availability of site infrastructure.

Further study and cost evaluation of high-cost items such as access, utilities, and geotechnical considerations are recommended before making a final decision determining which site should be selected for further design.

The following site concerns were compared as part of this report, which were evaluated by discipline in the report. They are summarized in this summary as follows:

1. Site Considerations
2. Transportation Considerations
3. Drainage Considerations
4. Foundation Considerations
5. Utility Considerations

The Trujillo site was reviewed and is included in this report but it was ruled out as warranting further investigation due to a greater number of challenges. The elements evaluated in this report are summarized in the table below for consideration:

1.1 Site Considerations

Vista Site				High School Site		
	Area	Findings	Cost	Area	Findings	Cost
1.A Lot Size	36.7 ac		N/A	40+ ac		N/A
1.B Property Slopes & Earthwork	20.5 ac < 5% Slope	Mostly Gentile (5%) slopes.	$250 K - $750 K	5 ac < 5% Slope	Gentile (0-5%) and very steep (10%-30%). Locations over 33% should not be built on. Much of the undeveloped property has steep slopes that may be built upon; however, this will require significant cut or fill. A site plan would be required to understand the full impact of earthwork costs on the site	$500 K - $2M
1.C Developable Area	17 ac	This area is large enough for a school building, school bus and parent loading and unloading, parking areas, play areas, storm detention areas, and a large track and field area.	N/A	8 ac	This area is more difficult to fit all the required and desired school facilities without significant site excavation, and removal of existing baseball or softball fields.	NN/A
1.D Relocation of Existing Facilities	0 ac	None	$0	2 ac - 4 ac	Yes One or two softball fields	$850 K - $ 2M
1.E Wetlands on the Property*	6.4 ac	A large wetland and drainage basin is located on the property. Future development as advised to avoid impacts to Wetlands over 0.1 acres. Mitigation is $360k/acre lost	$0	0.5 ac	Wetlands are in the drainage south of the high school and west of the bus barn. This wetland runs though the best area identified for school development. Impacts to this wetland will require mitigation. The stream and drainage will need to be included in the design.	$200 k

* Action Item: Formal wetland delineation must be performed in the spring or summer months.

1.2 Transportation Considerations

	Vista Site		High School Site	
	Findings	Cost	Findings	Cost
2.A Intersection Signaling	Possible signal at Hwy 160 & Vista Blvd.*	$400K	Change 8th St. signal timing from 60 sec. to 90 sec.	$30k
2.B Roadway Improvements	1. Acceleration & deceleration lanes at Hwy 160 2. Four turning lanes on Vista Blvd. & Park Ave.	$2M	1. Turning lane @ 8th. & Apache 2. 800' of School loop road widening & sidewalk Improvements	$1.6M
2.C Pedestrian Access	Pedestrian infrastructure to the site in a ½ - 1 mile radius of the site is lacking.	N/A	Pedestrian infrastructure within a ½ to 1 mile radius of the site is sufficient when the school loop road is widened and sidewalks on it are built.	N/A $0

* Action Item: More evaluation is required to determine If a traffic signal is warranted. A preliminary signal warrant review was performed. The analysis found that the projected delay at the southbound approach and volumes may meet the criteria to warrant a signal. Additional traffic data collection & analysis at this intersection is required.

1.3 Drainage Considerations

	Vista Site		High School Site	
	Findings	Cost	Findings	Cost
Stream Mitigation	No stream / drainage mitigation is anticipated. Proposed site can avoid wetlands and stream channels on property.	$0 - $100 k	A stream / drainage exists south of the high school and west of the bus barn. Current conceptual plans show a building near this channel. This stream would require mitigation or avoidance in the design. Culverts or bridges may be required for access across the stream.	$500 K - $2M

1.4 Foundation Considerations

	Vista Site		High School Site	
	Findings	Cost	Findings	Cost
Foundation Considerations*	Shallow Foundations and Slab on Grade may be possible.	$ 2M - $2.8M	Deep Foundations and Grade Beams are probable.	$2.8M - $5.6M

* Note: A higher-level conceptual site plan & more geotechnical investigation would be required prior to final determination of the foundation systems required for each site.

1.5 Utility Considerations

	Vista Site		High School Site	
	Improvements	Cost	Improvements	Cost
5.A Sewer Improvements	Two connection options exist: 1. 600 feet of sewer and upgrade Pump Station #21 to handle added capacity. 2. New on-site pump station and 800 feet of sewer.	$800K - $1.5M $1.5M	1500' Sewer Service Extension	$300K
5.B Water Improvements	Domestic supply adequate Fire Flow demands may require water main upgrades	$200k $240K	Domestic supply adequate Fire Flow demands are likely adequate.	$120K $0
5.C Other Utilities	Available	N/A	Available	N/A

1.6 Estimate of Costs

An estimate of costs, with a weighted average of the importance of these issues, is presented below for consideration:

Considered Items	Vista Site Weighted Rating	Vista Site Cost Range ($, Thousands)		High School Site Weighted Rating	High School Site Cost Range ($, Thousands)	
1.A Lot Size	0			0		
1.B Property Slopes & Earthwork	4.5	750	250	1.5	2000	500
1.C Developable Area	3	-	-	1	-	-
1.D Relocation of Existing Facilities	8	-	-	2	2000	800
1.E Wetlands on the Property	2	180	0	2	360	180
2.A Intersection Signaling	1.5	400	400	4.5	30	30
2.B Roadway Improvements	3	2500	2500	4.5	1600	1600
2.C Pedestrian Access	1	-	-	2	-	-
3. Stream Mitigation	6	100	0	2	7000	5000
4. Foundation Considerations	6	4000	2000	4	5000	4000
5.A Sewer Improvements	2	1500	800	3	300	300
5.B Water Improvements	2	240	200	3	120	100
5.C Other Utilities	3	-	-	3	-	-
TOTAL	42	$ 9,670	$ 6,150	32.5	$ 18,410	$ 12,510

1.7 Executive Summary

The Vista property is generally a good fit for a K-8 school but will require significant road and access improvements. The High School site has some usable undeveloped areas that could be used in the development of a K-8 school building. However, development of this property has a lot of challenges.

The undeveloped region of the High School property lacks space for all needed facilities. Development in the area may require extensive excavation, have site grading challenges, and may need retaining walls. To accommodate all necessary school facilities, school development on this property will probably require the demolition of existing recreational fields. Lastly, the High School property may require the re-routing of a large drainage. All these challenges will come with higher development costs and potentially the loss of existing school & community facilities.

Not all development items can be quantified for exact comparison, or with much precision. More detailed concept plans and other action items, as noted in the memo, would be needed for more precise comparisons of the two properties. However, given the current understanding of the comparable items, as identified in the report and discussed in the memo, we view the Vista site as a more favorable location for the development of a new K-8 School. The location overall has more buildable area and would be expected to cost millions of dollars less than the development of the High School property.

2.0 Introduction

SGM has prepared this report for RTA and Archuleta School District 50JT to assist in the due diligence evaluation of multiple potential sites for a new K-8 school.

Currently, there are multiple factors in favor of providing a new school to the students of Archuleta County. The existing elementary school currently has issues with circulation for students being dropped off. Additionally, the building is older and needs to be updated.

The current middle school is in a difficult location in town. Students at the middle school need to cross Highway 160 to access the fields for playing and sports. The school also has issues with bus circulation.

2.1 Master Plan Design Criteria

The school district has identified the following board decision criteria for evaluation during the master plan process.

- Safety and Security
- Fiscally Responsible
- High Quality Learning Environments
- Flexibility of Facilities to accommodate future needs
- Supported by the community
- Aligns with district Mission/Goals/Outcomes
- Supports a broad range of student activities and needs.

2.2 Site Introduction

SGM conducted a general evaluation of the High School, Trujillo, and Vista properties to make a well-informed decision on the development potential for the proposed elementary and middle schools for Archuleta School District 50JT.

2.2.1 Vista Site

The Vista parcel consists of a mix of wetland meadows and ponderosa pine woodlands. The property is adjacent to Vista Blvd. and Park Ave. Typical access to the property is from the junction of Hwy 160 and Vista Blvd.

Figure 1: Vista Site Location

2.2.2 High School / Trujillo Site

The High School parcel is mostly school buildings, facilities, and a bus barn. There is a segment of undeveloped land on the property, located on the southwest corner, that is being evaluated for feasibility. This area would be accessed off South 5th St.

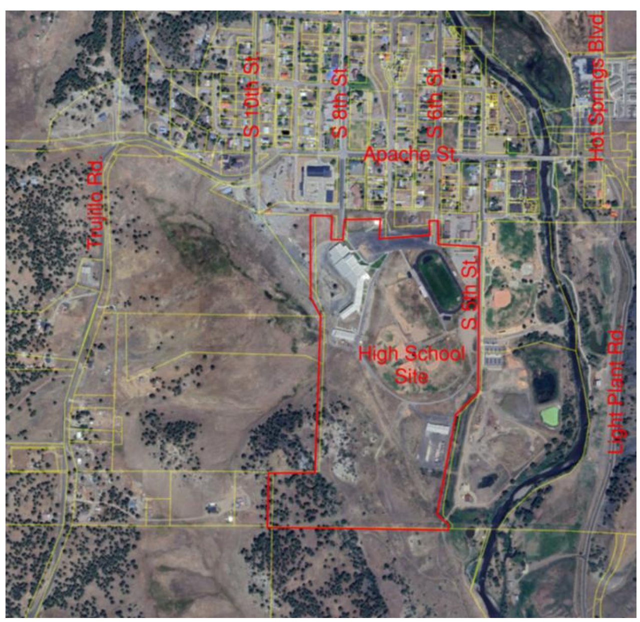


Figure 2: High School / Trujillo Site Location

The Trujillo parcel consists of a mix of wetland and moderately sloping meadows with some ponderosa pine on the western side of the property. The property is adjacent to Trujillo Road.

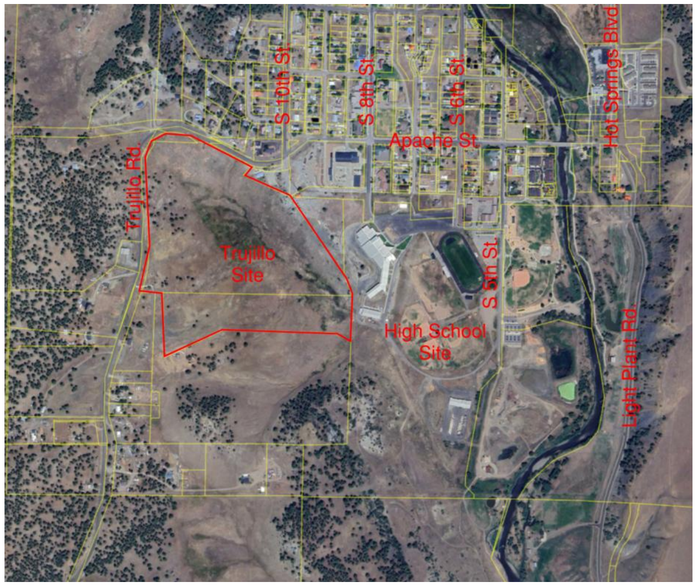


Figure 3: Trujillo Site Location

3.0 Environmental

SGM evaluated the selected parcels for environmental factors that could significantly impact the properties' viability. The following items were evaluated:

- Wetlands and Waters of the US
- Wildlife Review - Endangered species habitat, Migratory Bird impacts, and Colorado Parks and Wildlife Species of Concern
- Historic Uses of concern, such as Hazardous Waste

Due to the nature of the due diligence task, the intention of these studies was preliminary evaluations and may not be comprehensive should the property be selected.

3.1 Vista Site

3.1.1 Wetlands and Waters of the United States and the State of Colorado

SGM conducted a due diligence wetland survey of the project parcel on September 9, 2025, in accordance with the 1987 US Army Corps of Engineers (USACE) Wetland Delineation Manual and the Mountain West Regional Supplement. Wetlands were not formally delineated, but vegetation, soils, and hydrology were evaluated to determine if wetlands were present within the parcel boundaries. Formal wetland delineations should be conducted during the late spring or early summer during runoff to accurately determine wetland boundaries.

Approximately 6.37 acres of the 36.7-acre parcel were identified within the project area, and the approximate boundaries are illustrated below as Figure 4 and in Appendix A. The wetland meadow located on the Vista parcel has a surface connection to the reservoir located southwest of the project area. Therefore, wetlands on the Vista parcel are under the jurisdiction of the US Army Corps of Engineers and would require permitting any proposed disturbances.

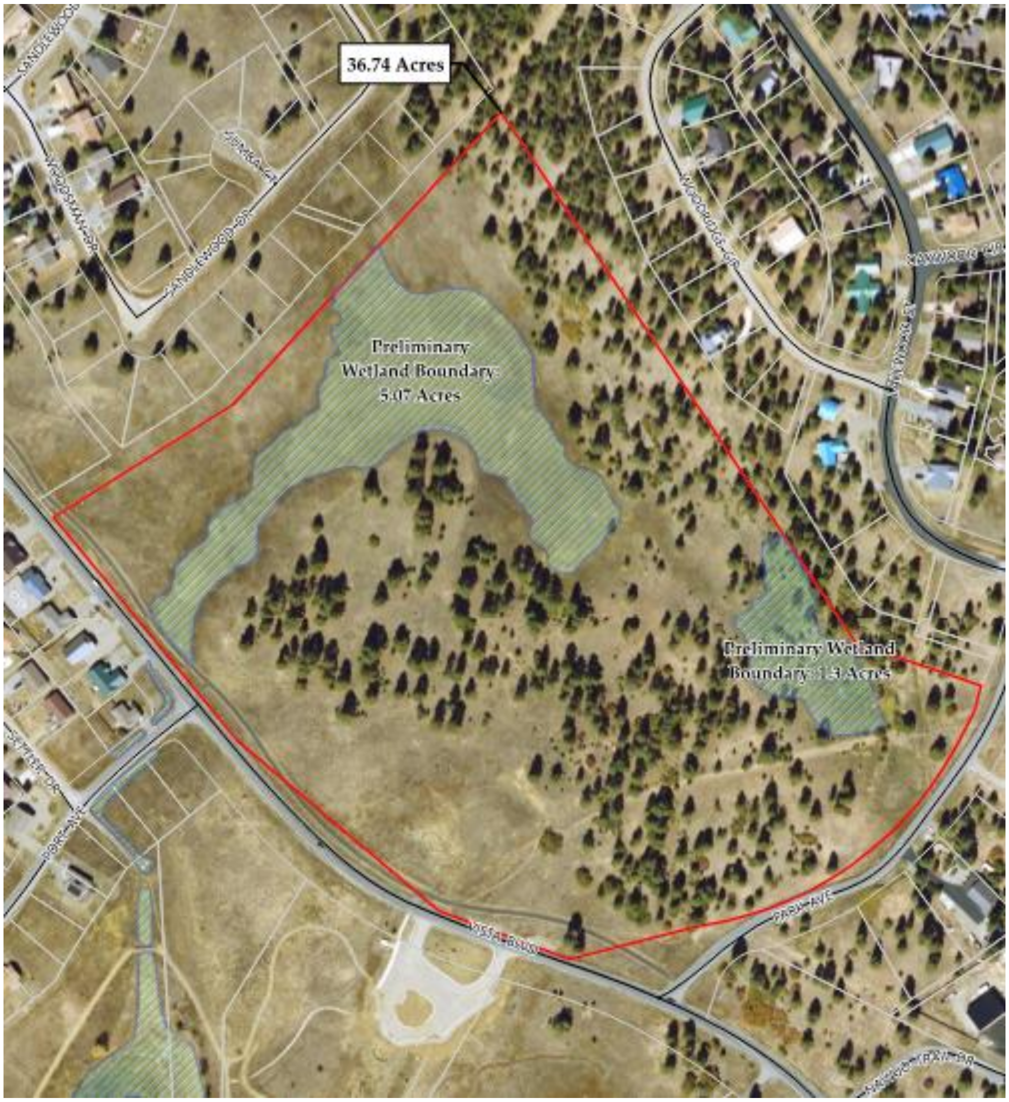


Figure 4: Vista Site Wetland

Due to drought conditions, vegetation within the project area was in very poor condition for September. However, there was sufficient plant material to determine the presence of wetlands on the Vista parcel. Wetland vegetation was dominated by Baltic Rush (Juncus balticus) and a rush species (Carex spp). Both are common wetland plant species in Southwest Colorado.

Soil samples were color scored within and adjacent to wetland areas. Samples in wetlands met the Army Corps hydric soil color criteria. Review of NRCS soil survey maps identified Tottles clay loam in wetland areas, which is on the national hydric soil list, and testing confirmed this within the project area. Saturated soils or surface inundations were lacking for almost the entire site, which is not unusual in September. However, soil saturation and inundation were observed adjacent to the Vista Blvd culvert as well as the southeast corner of the parcel, where water seeps from the hillside. Oxidized root channels, which are a secondary indicator of wetland hydrology, were identified throughout the wetland areas.

Wetlands on the Vista parcel occur in natural depressions and subsurface seeps, likely receiving water during spring runoff. As mentioned previously, formal wetland delineations should be completed during spring runoff.

3.1.2 Wildlife

3.1.2.1 Endangered Species

SGM evaluated eight federally listed species for potential impacts resulting from this project. The US Fish and Wildlife Service (USFWS) Threatened and Endangered species list for the project area (USFWS Information for Planning and Consultation (IPaC) website) was reviewed on August 27, 2025. The USFWS identified the following species as potentially occurring in the vicinity of the Vista parcel.

- Canada lynx (Lynx canadensis),
- Gray Wolf (Canis lupus),
- New Mexico Jumping Mouse (Zapus hudsonius luteus),
- Colorado Pikeminnow (Ptychocheilus lucius),
- Razorback Sucker (Xyrauchen texanus),
- Monarch Butterfly (Danaus plexippus),
- Silverspot Butterfly (Speyeria nokomis nokomis), and
- Suckley’s Cuckoo Bumble Bee (Bombus suckleyi)

Canada Lynx

Canada lynx occupy boreal, sub-boreal, and western montane forests (Ruediger et al. 2000), as well as mesic coniferous forests that have cold, snowy winters and provide a prey base of snowshoe hare. In the western United States, they are associated with subalpine fir, Engelmann spruce, mesic Lodgepole pine, and Aspen cover types when mixed with subalpine fir habitat types. The primary suitable Canada lynx habitat in Colorado is found roughly between 10,000 feet and 12,000 feet in elevation. Lower montane forests are likely important for movement and dispersal.

The Vista parcel is surrounded by residential and commercial development on all sides in a semi-rural/suburban environment. Construction of a new school complex would not meaningfully impact the abundance of prey species or affect effective Primary or Secondary habitats, including important foraging areas, denning habitats, or linkage areas. Therefore, this project is not anticipated to have meaningful direct, indirect, or cumulative impacts on lynx, nor is it expected to measurably affect lynx habitats or distributions in the greater area. This project would have ***No Effect*** on the Canada lynx or their Critical Habitat(s).

Gray Wolf

The Gray Wolf, being a keystone predator, is considered an integral component of the ecosystems to which it typically belongs. The wide range of habitats in which wolves can thrive reflects their adaptability as a species and includes temperate forests, mountains, tundra, taiga, and grasslands. Gray wolves hunt in packs, targeting larger prey, such as deer, elk, and moose. In 2021, Gray wolves were documented as reproducing and thus continuously occupying habitat in Colorado. In 2022, the USFWS listed the Gray wolf as Endangered in Colorado. Critical habitat for this species is outside of Colorado.

USFWS guidance states that lone, dispersing gray wolves may be present throughout the state of Colorado. The project area is within a semi-rural suburban environment. Though there has been recent documented wolf activity in the San Juan Mountains, the project would have no activities that would significantly affect the ability of wolves to disperse through the area or impact prey populations. This project would have ***No Effect*** on the Gray wolf or their ability to forage, disperse, or reproduce in the greater area.

New Mexico Meadow Jumping Mouse

The New Mexico Jumping mouse lives in densely vegetated riparian areas along streams from southern Colorado and central New Mexico to eastern Arizona. It has exceptionally specialized habitat requirements, including tall and dense herbaceous vegetation composed of sedges and forbs associated with perennial flowing water. The proposed action may impact wetlands, but it does not have perennial flowing water, and the herbaceous wetland found within the project area is not a good match for the jumping mouse's preferred habitat. Therefore, we anticipate that this project will have No Effect on the New Mexico Meadow Jumping Mouse or their habitats.

Colorado Pike Minnow and Razorback Sucker

The USFWS identified the Colorado pikeminnow and razorback sucker as potentially at-risk from this project. These species occur at lower elevations, in larger rivers. The project is not water-dependent, which results in additional depletions from the San Juan River watershed or near potentially occupied habitats, and it would have no direct impact on the federally listed fish species. Given these factors, this project warrants a determination of ***No Effect*** for the listed Colorado River endangered fish species and their Critical Habitats.

Monarch butterfly

Candidate species are not afforded full protection under the ESA; however, the USFWS encourages their consideration in environmental planning, and the USFWS regulatory guidance indicates that Candidate species should be treated similarly to Proposed Species with regard to inter-agency consultation requirements. Informal consultation is requested when a provisional "is likely to jeopardize" determination is reached for a Candidate species (USFWS 1998).

Adult monarch butterflies feed (gather nectar) from a variety of flowering plant species. However, the monarch butterfly only lays eggs, and larvae only feed on milkweeds (*Asclepias* spp.). No milkweed plants were observed within the project area, and no monarch caterpillars or butterflies were observed during the site investigation.

The proposed action is not likely to jeopardize this Candidate species, as the project may affect individuals but is not expected to alter the species' overall range and life history patterns. USFWS consultation is not required by ESA for Candidate species where an action is not likely to jeopardize the species' existence.

Silverspot butterfly

Primary threats to the Silverspot butterfly include habitat loss and fragmentation, climate change, incompatible livestock grazing, and human impacts on wetlands and their associated hydrology. The butterfly requires moist open meadows with vegetation for shelter. Butterfly larvae feed exclusively on the bog violet (*Viola nephrophylla*). There are wetlands within the project area, and there is potential for bog violets to be present. September is well outside the flowering period for the bog violet, which is required for positive identification. Therefore, bog violet surveys should be conducted early in the growing season. No determination of the project's potential impact on the Silverspot butterfly can be made at this time.

Suckley's Cuckoo Bumble Bee

This species is relatively rare, even though it has historically been found throughout much of western North America, ranging from Arizona to northern Canada, and as far east as Newfoundland. This species is an obligate social parasite of social bumble bees in the genus *Bombus*. Cuckoo bumble bee females emerge from hibernation in the spring and usurp the nest of a suitable host colony, where host workers provision their young. Suckley's cuckoo bumble bee is described as a semi-specialist parasite and is confirmed to usurp nests of Western bumble bees (*Bombus occidentalis*) and Nevada bumble bees (*Bombus nevadensis*), with other potential hosts in the subgenus *Bombus* throughout the extent of its range. The species has been collected in various habitat types from 6,000 to 10,500 feet in elevation.

The project area is within the geographic range for this species. The project area does support wildflowers and cultivars suitable for *Bombus* species foraging. Because of the likelihood of potential direct, indirect, and cumulative impacts to this species, its host species, and host species foraging plants, this project likely warrants a determination of ***Not Likely to Jeopardize*** the Proposed Endangered Suckley's cuckoo bumble bee.

3.1.2.2 **Migratory Bird Treaty Act**

The Migratory Bird Treaty Act (MBTA) focuses on regulating the "taking" of migratory birds and introduced the concept of "take" to federal law. Take (defined at 50 CFR 10.12) is "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt" any of the foregoing can be intentional or unintentional and occur through several means".

The Vista parcel consists of a mix of wetland meadows and ponderosa pine woodlands. Nesting season is generally considered to fall between April 1st and August 31st. It is recommended that tree removal and clearing and grubbing portions of the parcels for construction occur outside of the nesting season prior to construction. If tree and vegetation removal is to occur inside that window, nesting bird surveys need to be completed prior to construction. If nesting birds are found within the timing window, protective buffers and associated timing restrictions will need to be implemented potentially delaying construction in some portions of the project area.

3.1.2.3 **Colorado Parks and Wildlife GIS Database Review**

SGM reviewed Colorado Parks and Wildlife (CPW) online GIS database for potential wildlife conflicts with the proposed action.

Elk

The Vista parcel overlaps with elk winter range. In addition, CPW identifies elk highway crossing areas and winter concentration areas on the south side of US 160, which is near the project area. Though the Vista parcel is effectively surrounded by residential and commercial development, SGM recommends consultation with CPW to determine if any mitigation strategies may be appropriate.

Mule Deer

The project area overlaps with mule deer winter range. Though the Vista parcel is effectively surrounded by residential and commercial development, SGM recommends consultation with CPW to determine if any mitigation strategies may be appropriate.

Black Bear

Based on CPW mapping, the project area is within mapped black bear and human conflict areas. Because of the proximity of bear conflict areas, it is recommended that bear proof trash contains be utilized within the project area.

Birds of Prey

CPW does not currently map an active eagle or other bird of prey nests in the vicinity of the project area.

3.1.3 Hazardous Waste

The summaries of hazardous waste potential are based on pedestrian site reconnaissance of both parcels, limited to an observation of surface conditions only. The site survey was supplemented by a standard historical database research and review of each parcel. The assessment utilizes some of the approach and standards of Phase I Environmental Site Assessment (ESA), but is more limited in scope and provides only initial findings suitable for a due diligence review and comparison of known conditions on each parcel.

The pedestrian survey of the Vista Site was conducted by SGM’s Andy Antipas on September 9, 2025. Critical observations include the following:

- There are no areas of the parcel that display soil staining, contaminated surface water, stunted vegetation suggestive of soil contamination, or any surface waste containing potentially hazardous materials.

- A review of current and historical aerial photographs indicates that the site has been undeveloped land since 1937, with stable surface vegetation and soils. There is no evidence in historical imagery of any surface-disturbing activities that could create hazardous materials or conditions that are now obscured below ground surface.
- There is no evidence of uncontrolled stormwater discharge onto the property from adjoining properties. There are saturated soils on the site (see 3.1.1) and the parcel is surrounded by residences on the upgradient north and east edges. However, the parcel and surrounding properties are included within the municipal sewer service area of the Pagosa Area Water and Sanitation District, and there is no evidence that surface saturation on the site is being supplied or supplemented by septic tanks or leach fields.

In addition to the pedestrian survey, Federal and State regulatory records and databases were reviewed to identify use, generation, storage, treatment, disposal, or releases of hazardous materials or chemicals that may impact the parcel. Environmental Risk Information Services, Inc (ERIS) was contracted to provide the database search; complete results of the database search are available upon request. Critical findings based on review of the ERIS database reports include the following:

- There are no records from the parcel

This matches the observations and evidence provided by the pedestrian survey and the aerial imagery.

- There is a single reporting site within 0.25-mile of the parcel

This is currently the site of a propane station offering direct customer sales. There are no records of spills, accidents, or enforcement actions undertaken by the current business.

Prior to the current propane business, Site 1 was part of a mining claim held by Sunetha Anticline, a uranium and vanadium mining. The mining claim record is derived from the USGS Mineral Resources Data System; the record is anonymous and provides only extremely limited information. However, the claim apparently was prospected but never put into production. There is no record of compliance issues or enforcement concerns, and no additional data is available. The claim is now largely covered by graded and graveled parking/storage areas for the propane business.

The mining claim (now propane station) is separated from the Vista Site by US Highway 160, as well as several minor frontage roads and local roadways. The graveled surface provides a barrier to any remnant ore or ore-derived dust in the shallow subsurface. The road network provides a barrier between any possible mobilized contamination/dust from the mining claim and the Vista Site. There is no appreciable risk of contamination to the Vista Site from this mining claim. This can be viewed as Site 1 in Appendix B There are two reporting locations just beyond the 0.25-mile buffer around the parcel

Both of these sites are waste tire registrants, listed as generators of waste tires rather than disposers. The generation of waste tires does not create mobile waste or vapor risks; tires are transported to registered disposal facilities. Both these sites are listed as being in compliance with State requirements and do not present a risk of contamination to the Vista Site. This can be viewed as Sites 2 and 3 in Appendix B.

3.1.4 Vista Site Environmental Summary

SGM's survey of the Vista parcel identified a large wetland meadow, as well as a hillside wetland, as illustrated in Figure 2. Wetlands under federal jurisdiction are protected under Section 404 of the Clean Water Act (CWA) administered by USACE. Formal wetland delineations in accordance with USACE guidelines should be completed during the late spring or early summer during runoff.

The USACE reviews and authorizes impacts to wetlands under federal jurisdiction. The size and nature of the wetland impact will determine which CWA permit is applicable. Typically, permanent wetland impacts up to ½ acre in size are authorized under one of 59 different nationwide CWA permits. Wetland impacts over 1/10 acre in size require compensatory mitigation, which can take several forms, including wetland construction or purchasing wetland credits at a mitigation bank. Projects with wetland impacts greater than ½ acre would be reviewed under a Section 404 individual permit, which is a more detailed, expensive, and time-consuming process.

SGM reviewed the USFWS and CPW online wildlife databases to determine which species could potentially occur in the project area, whether they would be affected by school construction, and which species require further onsite investigations. At Vista parcel, SGM recommends surveys for bog violets in June or early July. If present, consultation with the USFWS may be necessary to determine potential impacts to the Silverspot butterfly. SGM also recommends consulting with CPW to determine if school construction may affect elk or mule deer in the vicinity of the project area.

There are no identifiable environmental conditions or hazardous waste materials on the Vista Site, nor is there any evidence of conditions in the vicinity that could discharge mobilized waste or vapor onto the Vista Site.

3.2 High School / Trujillo Site

3.2.1 Wetlands and Waters of the United States and the State of Colorado

SGM conducted a due diligence wetland survey of the project parcels on September 9, 2025, in accordance with the 1987 US Army Corps of Engineers (USACE) Wetland Delineation Manual and the Mountain West Regional Supplement. Wetlands were not formally delineated, but vegetation, soils, and hydrology were evaluated to determine if wetlands were present within the parcel boundaries. Formal wetland delineations should be conducted during the late spring or early summer during runoff to accurately determine wetland boundaries as well as to determine if wetlands on this site have a surface connection to the San Juan River, which will determine if the USACE or Colorado Department of Health and Environment's (CDPHE) wetland program will have jurisdiction.

Approximately 10.04 acres of the 52.1+ acre parcel were identified within the project area, and the approximate boundaries are illustrated in Figure 5 and Appendix C. The majority of the wetlands were located on the Trujillo property but continued across the high school property.

Figure 5: HS/Trujillo Site Wetland

Due to the drought conditions, vegetation within the project area was in very poor condition for September. However, there was sufficient plant material to determine that wetlands begin two-thirds of the way up the slope towards Trujillo Road, where water likely emerges/seeps from the hillside. The wetland proceeds downslope towards the southern end of the high school building complex, draining into a sizable naturally occurring swale. Wetland vegetation was dominated by Baltic Rush (*Juncus balticus*) and a spike rush species (*Eleocharis spp*). Both are common wetland plant species in Southwest Colorado.

Several soil samples were color-scored and met USACE hydric soil color criteria. The review of NRCS soil survey maps indicates that much of the area identified as wetlands is mapped as Tottles clay loam, which is on the national hydric soil list and was confirmed in the field. Saturated soil or surface inundation was lacking for almost the entire site, which is not unusual in September. However, oxidized root channels were present within wetland areas, serving as a secondary indicator of wetland hydrology. As mentioned previously, formal wetland delineations should be completed during spring runoff.

The naturally occurring swale empties into what appears to be a channelized / manmade drainage swale that continues south towards the San Juan River. The manmade channel appears to end approximately 650 feet from additional wetlands that connect to the San Juan River west and south of the school bus maintenance facility. There is extensive surface disturbance near the end of the manmade channel west and south of the bus maintenance facility. This consists of dirt piles that seem to have been in place for many years due to the growth of woody vegetation like rabbit brush.

A review of Google Earth aerial imagery from before the construction of the bus maintenance facility in 2015 shows that the manmade channel extended beyond its current terminus and connected to the wetlands adjacent to the San Juan River. After the construction of the bus maintenance facility, the channel is no longer visible on Google Earth imagery. To determine if the State of Colorado or the USACE has jurisdiction over the wetlands on the Trujillo/HS parcels, it is important to ascertain whether the wetlands have a direct surface connection to the San Juan River. It is possible that during spring runoff, water sheet flows beyond the current end of the manmade channel and reaches the wetlands adjacent to the San Juan River. If the water discharged from the manmade channel does not reach the wetlands adjacent to the river, CDPHE would have jurisdiction.

3.2.2 Wildlife

3.2.2.1 **Endangered Species**

SGM evaluated eleven federally listed species for potential impacts resulting from this project. The US Fish and Wildlife Service (USFWS) Threatened and Endangered species list for the project area (USFWS Information for Planning and Consultation (IPaC) website was reviewed on August 27, 2025. Based on this analysis, the USFWS identified the following species as potentially occurring in the vicinity of the High School / Trujillo Parel.

- Gray Wolf (*Canis lupus*),
- New Mexico Jumping Mouse (*Zapus hudsonius luteus*),
- Mexican Spotted Owl (Strix occidentalis lucida),
- Southwest Willow Flycatcher (*Empidonax traillii extimus*),
- Yellow-billed Cuckoo (*Coccyzus americanus*),
- Colorado Pikeminnow (*Ptychocheilus lucius*),
- Razorback Sucker (*Xyrauchen texanus*),
- Monarch Butterfly (*Danaus plexippus*),
- Silverspot Butterfly (*Speyeria nokomis nokomis*),
- Suckley’s Cuckoo Bumble Bee (*Bombus suckleyi*), and
- Pagosa Skyrocket (*Ipomopsis polyantha*).

Gray Wolf

The Gray Wolf, being a keystone predator, is considered an integral component of the ecosystems to which it typically belongs. The wide range of habitats in which wolves can thrive reflects their adaptability as a species and includes temperate forests, mountains, tundra, taiga, and grasslands. Gray wolves hunt in packs, targeting larger prey, such as deer, elk, and moose. In 2021, gray wolves were documented as reproducing and thus continuously occupying habitat in Colorado. In 2022, the USFWS listed the gray wolf as Endangered in Colorado. Critical habitat for this species is outside of Colorado.

USFWS guidance states that lone, dispersing gray wolves may be present throughout the state of Colorado. The project area is adjacent to a well-developed suburban environment. Though there has been recent documented wolf activity in the San Juan Mountains, the project would have no activities that would significantly affect the ability of wolves to disperse through the area or impact prey populations. This project would have ***No Effect*** on the gray wolf or their ability to forage, disperse, or reproduce in the greater area.

New Mexico Meadow Jumping Mouse

The New Mexico Jumping mouse lives in densely vegetated riparian areas along streams from southern Colorado and central New Mexico to eastern Arizona. It has exceptionally specialized habitat requirements, including tall and dense herbaceous vegetation composed of sedges and forbs associated with perennial flowing water. The proposed action may impact wetlands, but it does not have perennial flowing water, and the herbaceous wetland found within the project area is not a good match for the jumping mouse's preferred habitat. Therefore, we anticipate that this project will have No Effect on the New Mexico Meadow Jumping Mouse or their habitats. The project is located outside of any designated Critical Habitat.

Mexican Spotted Owl

Mexican spotted owl occurs in a variety of habitats in southern Colorado, including deep shaded canyons with a closed canopy of Douglas-fir (*Pseudotsuga menziesii), ponderosa pine,* and other understory shrubby species. They also occur in old-growth mixed conifer stands, usually on north-facing slopes and in canyons, or in deep, well-shaded sandstone canyons with ledges for roosting and nesting. The project area does not support habitat for the Mexican spotted owl and is not proximal to potential habitats. The project area is many miles of Critical Habitat. This project would therefore have ***No Effect*** on the Mexican spotted owl or its Critical Habitat.

Southwestern Willow Flycatcher

Southwestern willow flycatchers require dense riparian habitats with standing water and saturated soils, typically below 8,500 feet of elevation. The project area does not contain dense riparian habitats. Because the project would not directly or indirectly impact habitats and is relatively far from potentially occupied habitats, there are no anticipated direct, indirect, or cumulative impacts to Southwestern willow flycatchers. We are anticipating that this project will have No Effect on the Southwestern willow flycatchers or their Critical Habitat(s).

Yellow-billed Cuckoo

This species occurs in dense riparian habitats with cottonwood (*Populus* spp.) overstories and dense understory shrubs near rivers. The project area is within the general range of the yellow-billed cuckoo, but does not contain habitats that meet the species' foraging and nesting needs. Therefore, a determination of ***No Effect*** is warranted for the yellow-billed cuckoo.

Colorado Pike Minnow and Razorback Sucker

The USFWS identified the Colorado pikeminnow and razorback sucker as potentially at-risk from this project. These species occur at lower elevations, in larger rivers. The project is not water-dependent, which results in additional depletions from the San Juan River watershed or near potentially occupied habitats, and it would have no direct impact on the federally listed fish species. Given these factors, this project warrants a determination of ***No Effect*** for the listed Colorado River endangered fish species and their Critical Habitats.

Monarch butterfly

Candidate species are not afforded full protection under the ESA; however, the USFWS encourages their consideration in environmental planning, and the USFWS regulatory guidance indicates that Candidate species should be treated similarly to Proposed Species with regard to inter-agency consultation requirements. Informal consultation is requested when a provisional "is likely to jeopardize" determination is reached for a Candidate species (USFWS 1998). Adult monarch butterflies feed (gather nectar) from a variety of flowering plant species. However, the monarch butterfly only lays eggs, and larvae only feed on milkweeds (*Asclepias* spp.). No milkweed plants were observed within the project area, and no monarch caterpillars or butterflies were observed during the site investigation.

The proposed action is not likely to jeopardize this Candidate species, as the project may affect individuals but is not expected to alter the species' overall range and life history patterns. USFWS consultation is not required by ESA for Candidate species where an action is not likely to jeopardize the species' existence.

Silverspot butterfly

Primary threats to the Silverspot butterfly are habitat loss and fragmentation, climate change, incompatible livestock grazing, and human impacts to wetlands and associated hydrology. The butterfly requires moist open meadows with vegetation for shelter. Butterfly larvae feed exclusively on the bog violet (*Viola nephrophylla*). There are wetlands within the project area, and there is potential for bog violets to be present. September is well outside the flowering period for the bog violet, which is required for positive identification. Therefore, bog violet surveys should be conducted early in the growing season. No determination of the project's potential impact on the Silverspot butterfly can be made at this time.

Suckley's Cuckoo Bumble Bee

This species is relatively rare, even though it has historically been found throughout much of western North America, ranging from Arizona to northern Canada, and as far east as Newfoundland. This species is an obligate social parasite of social bumble bees in the genus

Bombus. Cuckoo bumble bee females emerge from hibernation in the spring and usurp the nest of a suitable host colony, where host workers provision their young. Suckley's cuckoo bumble bee is described as a semi-specialist parasite and is confirmed to usurp nests of Western bumble bees (*Bombus occidentalis*) and Nevada bumble bees (*Bombus nevadensis*), with other potential hosts in the subgenus *Bombus* throughout the extent of its range. The species has been collected in various habitat types from 6 to 10,500 feet in elevation.

The project area is within the geographic range for this species. The project area does support wildflowers and cultivars suitable for *Bombus* species foraging. Because of the likelihood of potential direct, indirect, and cumulative impacts to this species, its host species, and host species foraging plants, this project likely warrants a determination of ***Not Likely to Jeopardize*** the Proposed Endangered Suckley's cuckoo bumble bee.

Pagosa Skyrocket

Pagosa Skyrocket is a herbaceous plant in the phlox family, grows between 12 and 24 inches high with clusters of white or light pink flowers, and it flowers in June or July. There are two known populations in the vicinity of Pagosa Springs. The plant grows on soils derived from Mancos Shale in open grasslands and on the edges of ponderosa pine and Rocky Mountain juniper forests. The plant appears to prefer dry, disturbed sites, and there are portions of the study area that meet that description. Therefore, surveys for Pagosa Skyrocket should be conducted during June or July. No determination of the project's potential impact to Pagosa Skyrocket can be made at this time.

3.2.2.2 **Migratory Bird Treaty Act**

The Migratory Bird Treaty Act (MBTA) focuses on regulating the "taking" of migratory birds and introduced the concept of "take" to federal law. Take (defined at 50 CFR 10.12) is "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt" any of the foregoing, which can be intentional or unintentional and occur through several means.

The majority of the Trujillo and adjacent high school parcels consist of herbaceous vegetation with trees and shrubs on the steeper and drier hillsides. Nesting season is generally considered to fall between April 1^{st} and August 31^{st}. It is recommended that tree removal, clearing, and grubbing of portions of the parcels occur outside the nesting season before construction. If tree and vegetation removal occurs inside that active nesting window, nesting bird surveys need to be completed before construction. If nesting birds are found within the timing window, protective buffers and associated timing restrictions will need to be implemented, potentially delaying construction in some portions of the project area.

3.2.2.3 **Colorado Parks and Wildlife GIS Database Review**

SGM reviewed the Colorado Parks and Wildlife (CPW) online GIS database for potential wildlife conflicts with the proposed action.

Elk

The project area overlaps with elk winter range and winter concentration areas. With the presence of the high school, bus maintenance facility, athletic facilities, and a contractor's equipment storage yard, it is unlikely that the proposed development would result in additional impacts to elk. However, SGM recommends consultation with CPW.

Mule Deer

The project area overlaps with the mule deer winter range. CPW also maps mule deer migration corridors east, south, and west of the project area. With the presence of the high school, bus maintenance facility, athletic facilities, and a contractor's equipment storage yard, it is unlikely that the proposed development would result in additional impacts to mule deer. However, SGM recommends consultation with CPW.

Black Bear

Based on CPW mapping, the project area is within the mapped black bear and human conflict areas. Due to the proximity of bear conflict areas, it is recommended to use bear-proof trash containers within the project area.

Birds of Prey

CPW does not currently map an active eagle or other bird of prey nests in the vicinity of the project area.

3.2.3 Hazardous Waste

The summaries of hazardous waste potential are based on pedestrian site reconnaissance of both parcels, limited to an observation of surface conditions only. A standard historical database research and review of each parcel supplemented the site survey. The assessment utilizes some of the approaches and standards of Phase I Environmental Site Assessment (ESA), but is more limited in scope and provides only initial findings suitable for a due diligence review and comparison of known conditions on each parcel.

The pedestrian survey of the High School / Trujillo site was conducted by SGM's Andy Antipas on September 9, 2025. Critical observations include the following:

- There are no areas of the site that display soil staining, contaminated surface water, stunted vegetation suggestive of soil contamination, or any surface waste containing potentially hazardous materials.
- A review of current and historical aerial photographs indicates that the site has been undeveloped land since 1937, with the exception of the existing high school facility in the northeastern portion of the investigation area. In 1937, an informal unpaved road is visible crossing the site from north to south, but it was abandoned sometime before 1952. Other than in immediate proximity to the high school, there has been no surface disturbance that would remove the existing stable surface vegetation and soils. There is no evidence in historical imagery that any surface-disturbing activities in the undeveloped areas of the site could create hazardous materials or conditions now obscured below the ground surface.

- There is no evidence of uncontrolled stormwater discharge onto the property from adjoining properties. There are saturated soils on the Trujillo parcel (see 3.2.1) that appear to be created from seepage of shallow groundwater, and there is low-density residential development surrounding the site on the upgradient north and west edges. The area on the north boundary of the site is within the service area of the Pagosa Springs Sanitation General Improvement District, and these residences are assumed to be on sanitary sewer. However, the residences on the west edge are outside the service area and are presumably using septic systems. There is a potential that some component of the water and saturation on the Trujillo parcel is derived from septic tanks and/or leach fields.

In addition to the pedestrian survey, Federal and State regulatory records and databases were reviewed to identify use, generation, storage, treatment, disposal, or releases of hazardous materials or chemicals that may impact the parcel. Environmental Risk Information Services, Inc. (ERIS) was contracted to provide the database search; complete results are available upon request. Critical findings based on review of the ERIS database reports include the following:

- There is a single record from the parcel

The high school maintenance facility, according to available records, has a single aboveground storage tank for diesel fuel. The tank has an automatic leak detection system. There is no record of any leak or other enforcement action or issue associated with the tank. This can be viewed as Site 1 in Appendix D

- There are eight reporting sites within 0.25 miles of the parcel

These locations can be viewed as Sites 2-9 in Appendix D

Sites 2, 4, 5, and 8 are all downgradient of the HS/Trujillo site, and do not represent a risk to the proposed development area. Sites 3, 6, 7, and 9 are addressed in greater detail below.

Site 3: This is a series of records for the property at 1041 County Road 500. Now the site of a hauling facility for Waste Management of NM, it has formerly been referred to as the Trujillo Landfill, the Pagosa Landfill, or the L&M Landfill. There is no evidence of landfill activity on site based on aerial imagery, and the facility appears to have always operated as a hauling facility. There have been repeated reports of leaking garbage trucks, improperly stored hazardous materials (batteries), and the discharge of unknown waste. The most recent report was in 1999. No inspection or enforcement action is recorded in the available records.

Site 6: This is a demolition project at 626 S. 8th Street, completed in 2017. The site is now occupied by a modern modular home. There is no further information available, but there is no further risk presented by this site, based on the modern vintage of the structure now present.

Site 7: This is an office and equipment yard for La Plata Electric Association, located at 603 S. 8th Street. The site contains a single underground storage tank containing gasoline fuel for the use of the business, not for retail sale. There is no record of any spill or leakage associated with the tank, and the site is in compliance with all applicable inspection/operation requirements.

There is a significant amount of stored maintenance equipment and material on the property, which could include transformers that contain polychlorinated biphenyls (PCBs) for cooling and lubrication. PCBs are insoluble in water but can volatilize at low rates and create a vapor hazard to the surrounding vicinity. There is no record of spills, discharge, or enforcement/compliance actions at this site.

PCB-free transformer oil is now available and widely used, and all the transformers at the site are likely PCB-free. SGM recommends that La Plata Electric Association be contacted about the potential volatile hazardous materials storage at their yard, and what safety measures are in place to reduce the risk of off-site release.

Site 9: This is a repeat record for the hauling facility operated by Waste Management (see Site 3). It is listed on the record review because of the nature of the business; however, this specific site is not listed as a generator or disposal facility for any tracked hazardous waste.

3.2.4 High School/Trujillo Parcel Environmental Summary

SGM's due diligence survey of the High School / Trujillo site identified a large hillslope wetland that flows into what appears to be an ephemeral stream channel. The preliminary wetland area is illustrated in Figure 2. This wetland and ephemeral channel drain into a manmade channel that heads south towards wetlands adjacent to the San Juan River. SGM recommends that formal wetland delineations take place in the late spring or early summer during runoff to determine if there is a surface connection between the wetland and the San Juan River.

Wetlands under federal jurisdiction are protected under Section 404 of the Clean Water Act (CWA) and are administered by USACE. The USACE reviews and authorizes impacts to wetlands under federal jurisdiction. The size and nature of the wetland impact will determine which CWA permit is applicable. Typically, permanent wetland impacts up to ½ acre in size are authorized under one of 59 different nationwide CWA permits. Wetland impacts over 1/10 acre in size require compensatory mitigation, which can take a couple of forms, including wetland construction or purchasing wetland credits at a mitigation bank that services the project area. Projects with wetland impacts greater than ½ acre would be reviewed under a Section 404 individual permit, which is a more detailed, expensive, and time-consuming process.

Wetlands that fall under the State of Colorado's Dredge and Fill program are administered by the Colorado Department of Health and Environment (CDPHE). CDPHE's wetland regulations are to go into full effect during January of 2026. It is anticipated that the state's program will parallel the USACE program with minor variations. In addition, the state will be charging applicants for wetland permit authorizations. The state has not published final details of its program at this time.

SGM reviewed USFWS and CPW online wildlife databases and determined what species could potentially occur in the project area, and if they would be affected by school construction, and what species require further onsite investigations. At the Trujillo/HS parcel, SGM recommends surveys for bog violets and Pagosa skyrocket in June or early July. If either plant is present, consultation with the USFWS will likely be necessary to determine potential impacts to the Silverspot butterfly or Pagosa skyrocket. SGM also recommends consulting with CPW to determine if school construction may affect elk or mule deer habitat in the vicinity of the project area.

There are no identifiable environmental conditions or hazardous waste materials on the High School / Trujillo site itself. There are two facilities of concern within 0.25 miles of the property: the hauling facility on the west boundary at 1041 County Road 500, and the electrical cooperative storage yard on the north boundary at 603 S. 8th Street. The electrical cooperative has no records of concern, but it may contain hazardous waste with the potential for volatilization. The hauling facility has reports of uncontained spills, but none within the last 20 years, and there is no record of formal enforcement. The risk to the HS/Trujillo Site from these sites is low.

3.3 Environmental Summary

Both sites evaluated identify large areas of wetlands that must be delineated in the spring. Disturbing wetlands of areas over 0.1 acres would require compensatory mitigation from a regulatory agency, which can be performed but has large cost impacts to the project.

Newly created wetlands must have water rights secured to supply them and must be monitored multiple times a year for five years until the plants are well-established. Wetland replacement ratios are determined by the USACE during permit review on a project-specific basis and are typically replaced at ratios greater than 1:1. Wetland Banks, such as the Animas River Mitigation Bank, serve Pagosa Springs and can sell credits for this mitigation. Because the two sites under consideration are located outside of the Animas River Basin, the USACE typically requires a 3 to 1 replacement ratio. The current price range for constructing wetlands in the Animas River Mitigation Bank is $120,000 per acre replaced, or $360,000 per acre destroyed.

In addition to the costs associated with construction, the applicant is responsible for monitoring the created wetland for a minimum of 5 years and reporting its status to the ACOE or CDPHE annually. If necessary, the applicant would be required to replant dead or dying wetland vegetation, as well as ensure there is adequate hydrology to support the vegetation. As such, it is ideal to consider future development that avoids or minimizes wetland impacts to the greatest extent possible.

Both sites may have Wildlife and Species of Concern. They will require follow-up surveys and potential consultations with the US Fish and Wildlife Service, as well as Colorado Parks and Wildlife to understand the impacts on the proposed action fully and potentially mitigate impacts to sensitive wildlife or vegetation.

Neither site raised preliminary concerns regarding hazardous materials on or near the sites, but the selected property and site area should still undergo a more thorough Phase 1 Environmental Site Assessment.

4.0 Traffic

This Traffic Analysis is generally prepared using the guidelines for a Colorado Department of Transportation (CDOT) Level Two Auxiliary Turn Lane Assessment (TLA). The analysis is being completed to provide a feasibility analysis for the Vista and High School / Trujillo sites shown in Figure 6 and Figure 7.

Figure 6: Vista Site Location Map

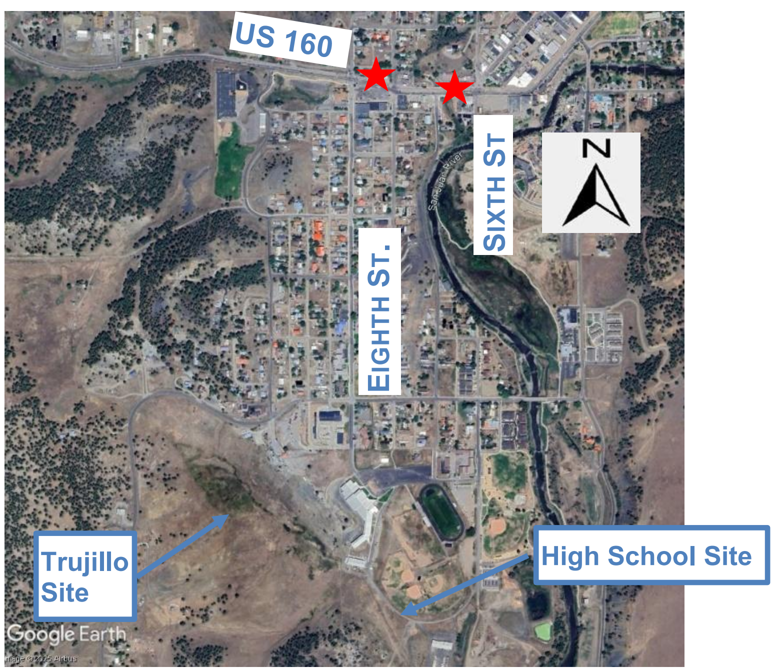


Figure 7: High School / Trujillo Site

4.1 Methodology and Assumptions

2025 Baseline Traffic Volumes

SGM Traffic Counts were performed on Thursday, September 4, 2025, from 6:30 AM – 9:30 AM and 2:30 PM – 5:30 PM. Counts were performed at the US 160 intersections with Vista Boulevard, 8th Street, and 6th Street. See Appendix E.

Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation Manual, 12th Edition, trip generation rates were used to develop design-hour traffic volumes for the proposed Elementary School (ITE Code 520) and Middle School (ITE Code 522) sites. Volumes were developed using the 2029-30 student populations provided on the *Demographic Study and Enrollment Forecast* by Western Demographics Inc, dated February 14, 2025.

Trip Distribution

Distribution rates were determined by using the Student Distribution from the *ASD Facilities Master Plan, MPAC#4* presentation by RTA, dated 4/21/2025. Trip assignments are conservative in nature, applying volumes at the designated intersections without consideration to potential out-of-direction travel (e.g., another destination following a school drop-off or avoidance of a congested area) that may occur. That percentage of out-of-direction travel will not affect the performance of the nearby intersection with any significance, considering the scope of this analysis.

Trip Reductions

A trip reduction factor is not used for this analysis; bus ridership percentages are generally accounted for in the ITE Trip Generation Manual, and data meshes well with Archuleta School District information.

Design Hour Volume

Design hourly rates and distribution for the school uses are based on the ITE Code guidance for each land use. The design hour volume (DHV) calculated in this study is based on the peak hour of the trip generators for the land use. The DHV used in this study is estimated to be the 30th highest hourly volume of the design year.

Analysis Years

Operational analysis of Baseline traffic (2025) and 5-year traffic (2030) will be completed.

<u>2025 Traffic (Baseline)</u> – 2025 traffic volumes with existing school sites.

<u>2030 HS/Trujillo Site</u> – 2025 traffic factored to 2030 by applying a per-year growth rate derived from CDOT's 20-year factor (1.22) and accounting for the addition of Elementary and Middle School at the High School site and including the 2025 High School site traffic.

2030 Vista Site – 2025 traffic factored to 2030 by applying a per-year growth rate derived from CDOT's 20-year factor (1.27). Accounting for the addition of Elementary and Middle School at the Vista Drive site.

Operational Assessment Methodology

The intersections are modeled applying the DHV traffic scenarios in Synchro and analyzed using the HCM 6th Edition methodology. Intersection analysis was performed using the Synchro 11 analysis package to estimate the capacity of the intersection. The Measures of Effectiveness (MOEs) that are compared for this study include LOS (level of service), delay, and 95th percentile queue length. See Tables for a description and delay interval of each LOS grade for unsignalized and signalized intersections. The queue length reported is based upon an average of ten 60-minute Simtraffic modeling runs. For intersections, the HCM measures level of service in terms of seconds of delay per vehicle. The traffic modeling (Synchro/SimTraffic) results are presented in Appendix F.

TABLE 1 - LEVEL OF SERVICE (LOS) CRITERIA UNSIGNALIZED INTERSECTION (HCM, 2016)

Level of Service		Delay (seconds)
A	Highly Desirable	< 10.0
B	Desirable	10.1 to 15
C	Acceptable	15.1 to 25
D	Acceptable in Urban Areas	25.1 to 35
E	Unacceptable	35.1 to 50
F	Unacceptable	> 50.1

TABLE 2 - LEVEL OF SERVICE (LOS) CRITERIA SIGNALIZED INTERSECTION (HCM, 2016)

Level of Service		Delay (seconds)
A	Highly Desirable	< 10.0
B	Desirable	10.1 to 20
C	Acceptable	20.1 to 35
D	Acceptable in Urban Areas	35.1 to 55
E	Unacceptable	55.1 to 80
F	Unacceptable	> 80.1

The "overall" intersection level of service at a signalized or unsignalized intersection corresponds with the average delay experienced on the minor street approaches and the uncontrolled major street movements. The unconflicted major street through movements are considered to have no delay. Because most intersection movements are major street movements with no delay, the overall intersection results in a LOS with less delay than the minor street approaches, and the conflicting major street movements (left turns) experience. A figure describing the Level of Service is presented in Figure 8.

LOS	Unsignalized Intersections	Signalized Intersections
A	No delays at intersections with continuous flow of traffic. High frequency of gaps available for turning traffic. No observable queues. *AVERAGE VEHICLE DELAY OF 0-10 SECONDS.*	No vehicle waits longer than one signal indication. *AVERAGE VEHICLE DELAY OF 0-10 SECONDS.*
B	Similar to LOS A, with slightly longer average delays. *AVERAGE VEHICLE DELAY OF 10-15 SECONDS.*	On a rare occasion, vehicles wait through more than one signal indication. *AVERAGE VEHICLE DELAY OF 10-20 SECONDS.*
C	Moderate delays at intersections with satisfactory to good traffic flow. Light congestion; infrequent backups on critical approaches. *AVERAGE VEHICLE DELAY OF 15-25 SECONDS.*	Intermittently, vehicles wait through more than one signal indication, occasionally backups may develop, traffic flow still stable and acceptable. *AVERAGE VEHICLE DELAY OF 20-35 SECONDS.*
D	Probability of delays along every approach. Significant congestion on critical approaches, but intersection functional. Moderate queues observed. *AVERAGE VEHICLE DELAY OF 25-35 SECONDS.*	Delays at intersections may become extensive, but enough cycles with lower demand occur to permit periodic clearance, preventing excessive backups. *AVERAGE VEHICLE DELAY OF 35-55 SECONDS.*
E	Heavy traffic flow condition. Heavy delays probable. Very limited available gaps for cross-street traffic or main street turning traffic. Limit of stable flow. *AVERAGE VEHICLE DELAY OF 35-50 SECONDS.*	Very long queues may create lengthy delays. *AVERAGE VEHICLE DELAY OF 55-80 SECONDS.*
F	Unstable traffic flow. Heavy congestion. Traffic moves in forced flow condition. Average delays greater than one minute highly probable. *AVERAGE VEHICLE DELAY OF MORE THAN 50 SECONDS.*	Backups from locations downstream restrict or prevent movement of vehicles out of approach creating a "gridlock" condition. *AVERAGE VEHICLE DELAY OF MORE THAN 80 SECONDS.*

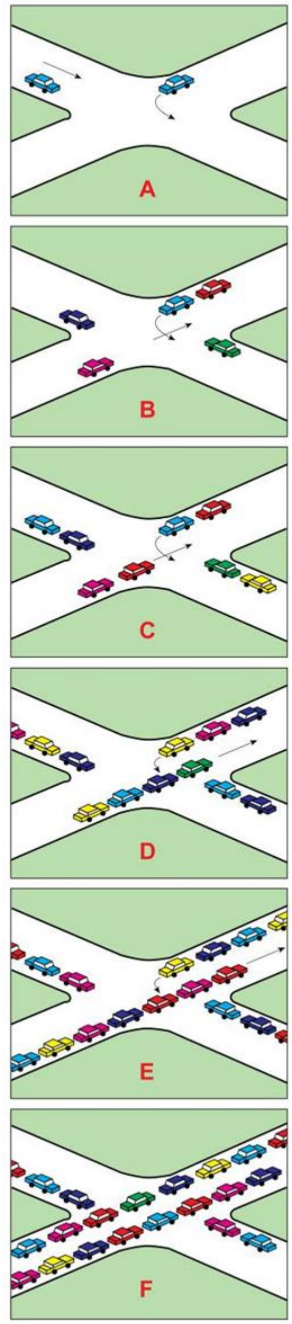


Figure 8: Intersection Level of Service Diagram

Level Of Service is also a measure of driver discomfort, fuel consumption, and lost travel time. In general, CDOT considers the overall intersection operation of LOS “D” or better acceptable during the peak hours. The goal is to also provide a similar LOS for each controlled intersection movement and/or approach.

4.2 2025 Baseline

4.2.1 Existing Roadways and Intersections

4.2.1.1 Vista Site

US 160

US 160 is a three (3) lane roadway classified by CDOT as a Non-Rural Arterial (NR-A) at the Vista Drive intersection, with a posted speed limit of 45 mph westbound (WB). It changes to 55 mph just to the west, and a 55-mph posted speed limit in the eastbound (EB) direction. The segment contains a through lane in each direction and a center turn lane / painted median. The AADT is estimated at 17,000.

Vista Boulevard

Vista Boulevard is a two (2) lane local roadway with a posted speed limit of 30 mph. Intersection consists of a single-lane southbound approach and an eastbound left-turn lane. Meadows Drive intersection is 450 feet to the east, with a center median between Vista Boulevard and Meadows Drive (westbound left).

4.2.1.2 HS / Trujillo Site

US 160

US 160 is generally a three (3) lane roadway classified by CDOT as a Non-Rural Arterial (NR-C) between the 6th St and 8th St intersections, with a posted speed limit of 25 mph in each direction. The segment contains a through lane and a bike lane in each direction, with parking on the south side of the highway. The AADT is estimated at 14,000.

5th Street

5th Street is a 30-foot wide, two (2) lane local roadway, with a sidewalk on the east side and a posted speed limit of 25 mph. The side-street Stop-controlled intersection consists of a one-lane approach (left/right) for the northbound approach to Apache. The road currently serves the Town Park area and the spur that serves the District Bus Barn, and it is planned to serve the proposed HS/Trujillo site.

6th Street

6th Street is a 24-foot wide, two (2) lane local roadway with intermittent sidewalk and a posted speed limit of 25 mph. The approach to US 160 is a side-street stop-controlled intersection that consists of a one-lane approach (left/right) for the northbound approach. The US 160 eastbound approach is three-lane (left, thru, right), and the westbound approach is two-lane (left, thru/right).

8th Street

8th Street is a 24 ft wide, two (2) lane local roadway with scattered on-street parking areas, sidewalk on both sides, and a posted speed limit of 25 mph. The signalized intersection with US 160 consists of a two-lane approach (left, thru/right) for both the northbound and southbound approaches. The eastbound approach is one-lane (thru/right) and the westbound approach is two-lane (thru, left).

Apache Street

Apache Street is a 24 ft wide, two (2) lane local roadway with a sidewalk on the north side, and a posted speed limit of 25 mph. The intersections at 5th, 6th, and 8th are uncontrolled, with stop control on the side streets. All approaches are single lane.

4.2.1.3 **Baseline Intersection Volumes**

The full table containing all movements for each intersection is included in Appendix FE.

4.2.2 Auxiliary Turn Lane Assessment

Auxiliary turn lane requirements for access to Colorado State Highways are determined using the State Highway Access Code and based on the projected DHVs, the speed limit, and geometry of the highway adjacent to the access, and the classification of the highway. The analysis for the 2025 Baseline scenario is provided below to understand the existing traffic volumes, warrant thresholds met, and existing auxiliary lanes.

TABLE 3 – 2025 BASELINE LANE REQUIREMENTS

US 160 Intersection	Auxiliary Turn Lane	Posted Speed (mph)	Warrant Threshold (vph)	DHV (vph)	Warrant Met?	Existing Lane[1]
6th Street NR-C	EB Right	25	50	36	N	
	WB Left	25	25	33	Y	50 ft + taper[1]
8th Street NR-C	EB Right	25	50	143	Y	100 ft + taper[1]
	WB Left	25	25	45	Y	100 ft + taper[1]
	NB Left	25	25	251	Y	260 ft + taper
Vista Blvd NR-A	WB Right	45	25	76	Y	None
	EB Left	55	10	45	Y	500 ft + taper
	SB Left	30	25	112	Y	None

[1] Based on US 160 Plans currently under construction

4.3 2030 Traffic – Vista Site

The 2030 Vista traffic volumes are applied. The full table containing all movements for each intersection is included in Appendix F.

4.3.1 Auxiliary Turn Lane Assessment

The analysis for the 2030 Vista scenario is provided below to understand the projected traffic volumes, additional warrant thresholds met, and adequacy of the existing auxiliary lanes and stop-controlled intersection approaches.

TABLE 4 – 2030 VISTA SITE LANE REQUIREMENTS

Intersection	Auxiliary Turn Lane	Posted Speed (mph)	Warrant Threshold(vph)	DHV (vph)	Warrant Met?	Existing Lane[1]	**Projected Mitigation**
160 - Vista NR-A	WB Right	45	25	**157**	Y	None	**435 ft (inc. taper)**
	SB Right	55	50	**94**	Y	None	**960 ft (inc. taper)**
	EB Left	45	10	113	Y	500 ft + taper	
	SB Left	25	25	**213**	Y	None	**250 ft + 90 ft (taper)**
Vista - School	NB Right	25	50	**274**	-		**100 ft + 90 ft (taper)**
	SB Left	25	25	121	-		**100 ft + 90 ft (taper)**
	WB Left	-		**235**			**100 ft two-lane exit**
	WB Right	-		**103**			
Vista - Park	SB Left	25		**83**			**100 ft + 90 ft (taper)**

4.3.2 Operational Assessment

The primary impact consists of the WB right turns (157) and SB left turns (213) during the AM design hour at the US 160 / Vista Boulevard intersection. The same movements are affected during the PM design hour to a lesser extent. The volumes for the WB right trigger the warrant for a right turn deceleration lane. The SB left at the approach to US 160 is needed to improve the overall delay (LOS F) at the approach. The design hour volume results in a delay of over 100 seconds for the left turn movement, while the 95th percentile queue length is approximately 8 to 9 vehicles (180 ft).

The SB left from Vista to the School entry and to Park exceeded the warrant threshold and requires deceleration lanes, as does the NB right at the School entry. The School exit should be configured as a two-lane approach for a minimum of 100 ft to facilitate left and right turns concurrently.

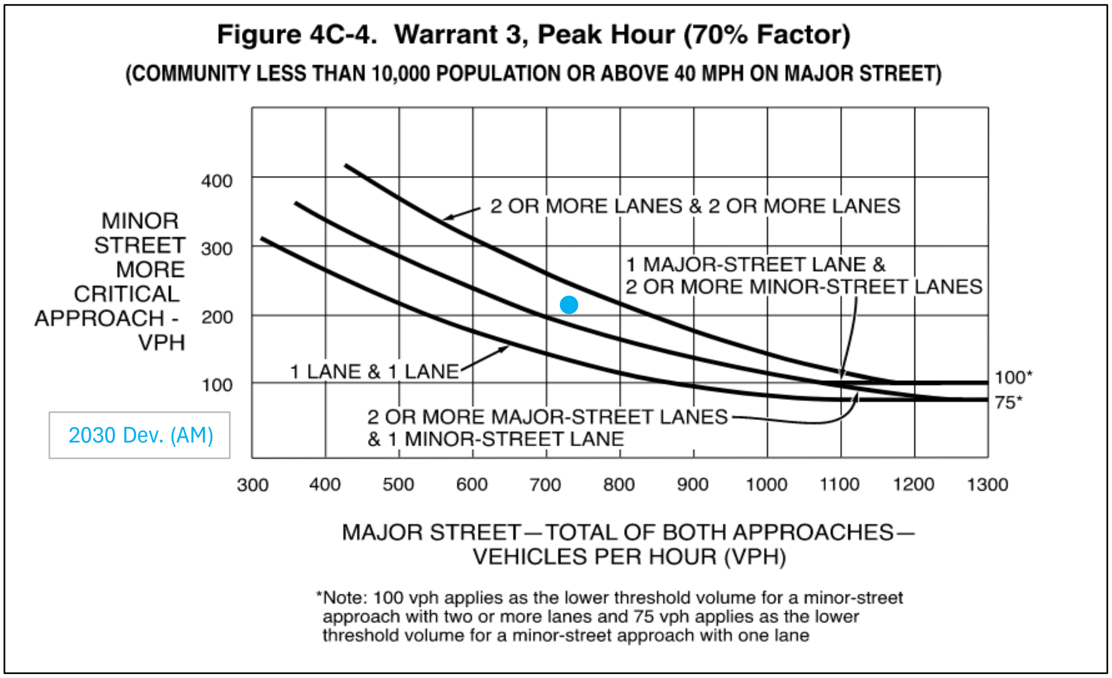
All other single lane approach movements operate at LOS C or better. The results of the operational assessment are provided in Appendix F.

4.3.3 Traffic Signal Warrant Assessment

A cursory signal warrant assessment was completed for the Vista Boulevard approach to US 160. The Manual on Uniform Traffic Control Devices (MUTCD) defines criteria to evaluate traffic volumes and the potential need for a traffic signal based on the criteria presented below:

1, Eight-Hour Vehicular Volume
2, Four-Hour Vehicular Volume
3, Peak Hour
4, Pedestrian Volume
5, School Crossing
6, Coordinated Signal System
7, Crash Experience
8, Roadway Network

This analysis reviewed the Peak Hour criteria and found that the projected delay at the SB approach and volumes may meet the Peak Hour Volume Warrant criteria. Assessing the remaining volume criteria requires additional traffic data collection beyond the scope of this analysis. Further study should be completed in coordination with CDOT.



				1	2	3	
	Peak-Hour Volumes			Time Stopped Delay	Minor St. Vol	Total Entering Volume	Meets Cond. A
	Major	Minor	Total				
	2030						
VISTA	723	213	936	4.5	100	800	YES
	Legend:		Meets Threshold:		---		

Figure 9: Peak Hour Volume Turn Warrant criteria

4.3.4 Pedestrian Assessment

The existing sidewalk infrastructure in the Vista area within a ½ to 1 mile radius of the proposed site is generally lacking. Capital investment to expand multimodal infrastructure would be recommended to provide the same level of accessibility provided around the downtown site. The green lines represent potential routes in Figure 3 (~10,000 linear feet). Specific improvements for the final location and crossings would need to be studied and implemented. The scope of this study does not consider the effect the relocation of the Elementary and Middle Schools to the Vista site would impact the bus system efficiency or cost. It is possible these capital improvements are outside the scope of the School District to construct but should be a stakeholder in the community for these investments to be built.

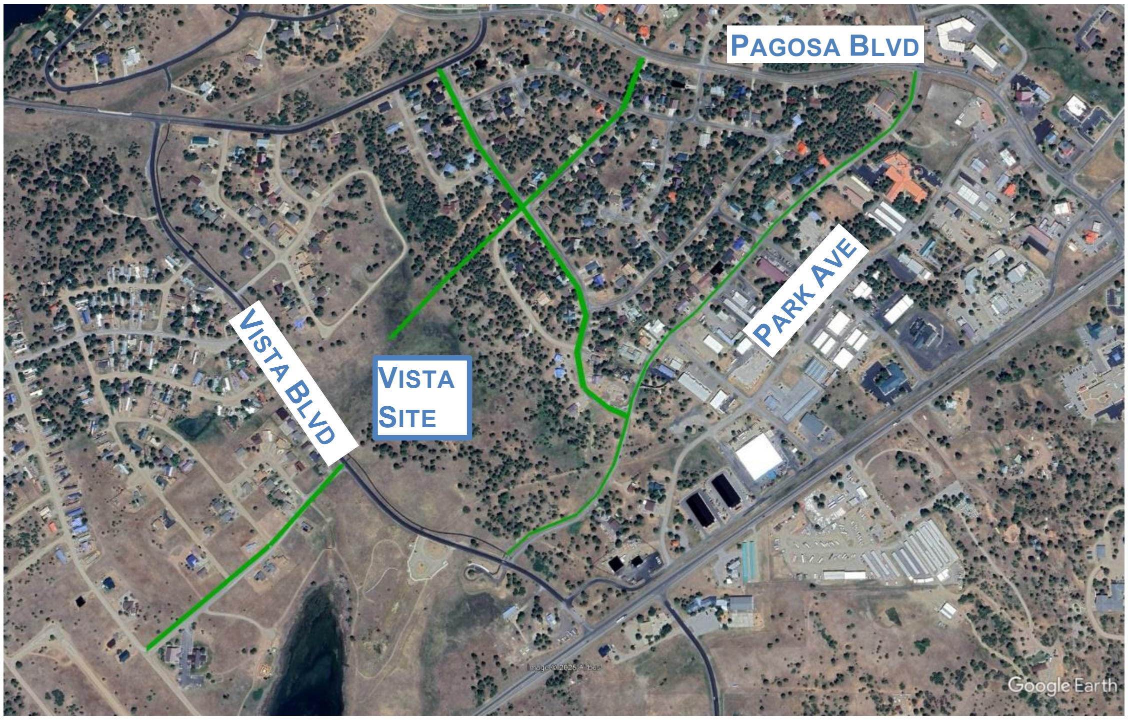


Figure 10: Vista Site Potential Pedestrian Routes

4.4 2030 Traffic – High School / Trujillo Site

The 2030 HS / Trujillo Site traffic volumes are applied. The full table containing all movements for each intersection is included in Appendix E.

4.4.1 Auxiliary Turn Lane Assessment

The analysis for the 2030 HS / Trujillo scenario is provided below to understand the projected traffic volumes, additional warrant thresholds met, and adequacy of the existing auxiliary lanes and stop-controlled intersection approaches.

TABLE 5 – 2030 HS / TRUJILLO SITE LANE REQUIREMENTS

Intersection	Auxiliary Turn Lane	Posted Speed (mph)	Warrant Threshold (vph)	DHV (vph)	Warrant Met?	Existing Lane[1]	**Projected Mitigation**
160 - 6th NR-C	EB Right	25	50	38	N		
	WB Left	25	25	39	Y	50 ft + taper[1]	
160 - 8th NR-C	EB Right	25	50	**405**	Y	660 ft[1] (to 10th)	**None – See Ops**
	WB Left	25	25	47	Y	100 ft + taper[1]	
	NB Left	25	25	**495**	Y	290 ft + taper	**None – See Ops**
8th - Apache	SB Right	25		27		Single Lane Approach	
	SB Left	25		**291**			**Add Left Turn 200 ft + taper**
	WB Right	25		**340**			
	NB Thru	25		106			
5th - Apache	NB Left	25		**340**		Single Lane Approach	**None – See Ops**
	EB Right	25		**291**			
	WB Left	25		32			
5th spur	Proposed School Access Road (800 ft)					14 ft width	**24 ft + sidewalk**

[1] Based on US 160 Plans currently under construction

4.4.2 Operational Assessment

The primary traffic impact consists of the EB right turns (405) and NB left turns (495) during the AM design hour at the US 160 / 8th Street intersection. A portion of the NB lefts may be directed toward downtown as right turns to other destinations, but is not considered in this analysis. The same movements are affected during the PM design hour to a lesser extent.

The modeling based on the currently under construction (US 160) and existing (8th Street) lane configurations show the EB right (LOS C) and NB Left (LOS D) will operate at acceptable conditions assuming a signal cycle length of 90 seconds (current 60 seconds). Projected 95th percentile queue lengths will remain within the provided storage lengths for each movement.

Analysis of the town roadway network shows a need for the addition of an 8th St SB left at the approach to Apache to provide an acceptable LOS D. All other single lane approach movements at the two-way stop-controlled intersections operate at LOS C or better. The results of the operational assessment are provided in Appendix F.

4.4.3 Pedestrian Assessment

There is existing sidewalk infrastructure in the downtown area within a ½ mile radius of the proposed site, and buses will generally service areas beyond this radius. US 160 bisects the community approximately ¾ mile north of the site, limiting potential student walkers who must cross it. The existing sidewalk/trail system along 8th Street, Apache, River, and 5th Street corridors provides adequate access for pedestrians. Specific improvements for crossings would need to be studied and implemented.

4.5 State Highway Access Permit Evaluation

Based on the State Highway Access Code, an access permit is required when a change (Δ) of greater than 20% occurs at an access to a state highway. The design hour access volumes are presented in Table 6. A new access permit would be required for each proposed site at the intersection with US 160.

TABLE 6 – ACCESS VOLUMES, BY LOCATION

Location	Scenario	AM	% Δ	PM	% Δ
US 160 - 8th	School	551	199%	290	149%
	Background	557		590	
US 160 - Vista	School	330	233%	173	173%
	Background	247		238	

4.6 Traffic Summary

The two sites were compared to understand the differences in existing roadway and pedestrian infrastructure that currently serve and are required to serve the relocation of the Elementary and Middle School to each site. Both sites will require a new State Highway Access Permit.

The Vista site will require substantial infrastructure improvements to provide similar accessibility for vehicles and pedestrians as compared to the HS/Trujillo site. CDOT will be involved with the intersection designs with US 160 and Vista Boulevard, which will add design and construction complexity to the improvements. These include the mitigations listed on Table 4:

- Three extra turn lanes on US 160.
- Three turn lanes at the Vista School from Vista Blvd and/or Park Ave.
- One turn lane at Park Ave.
- Sidewalk connections and improvements to adjacent neighborhoods
- A traffic signal at SH 160 and Vista Boulevard could be warranted. A higher-Level traffic study will be required to make that determination.

The High School / Trujillo site has the advantage that the existing infrastructure in the downtown area and around the current High School provides a significant foundation for the relocated facilities. Improvements recommended are listed on Table 5 and include:

- Left turn lane at 8th & Apache.
- Widening the Access loop road of the High School property with road and sidewalk improvements.
- Changing the signal timing on 160 to a longer traffic cycle to reduce wait times.

Note that use of the HS/Trujillo property was assumed to be accessed from 5th Street, not 8th Street. If that property is considered, the traffic analysis may need to be revisited based on other potential access routes.

Preliminary costs associated with both sites are estimated in Appendix G. The Vista site traffic improvements are estimated at $2.5 million. Capital improvements for off-site pedestrian access to the project site is estimated at $1 million and is excluded from this cost estimate. The High School / Trujillo Site is estimated at $1.6 million in traffic improvements.

5.0 Civil Evaluation

SGM conducted a general evaluation of the Vista Property, High School, and the Trujillo properties to make a well-informed decision on the development potential of the proposed elementary and middle schools for Archuleta School District 50JT. The review was conducted using the best available practices, existing site reports, and public information that SGM could obtain. The Trujillo property, while adjacent to the High School Site, was considered separately due to the setting and access location.

The civil section of this report details SGM's analysis and professional opinions on the site's overall developability. It reviews topography and site layouts, zoning, stormwater management and drainage, access to required utilities, geotechnical/structural considerations, and other development constraints identified by SGM.

5.1 Vista Site

5.1.1 Topography / Site Setting

The Vista site topography, natural drainage channels, and mapped wetlands are presented in Figure 11 and the site is described in depth below.

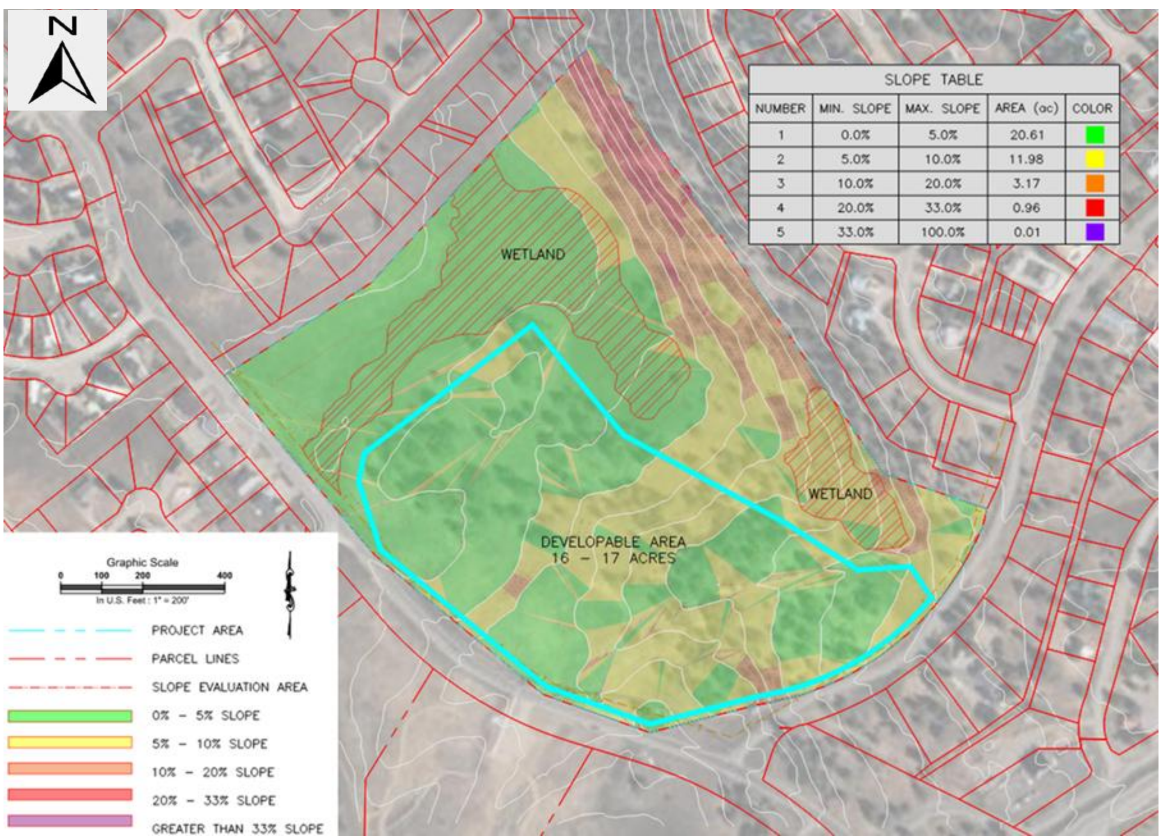


Figure 11: Vista Site Topography, Wetlands, & Drainage

The Vista property contains a large natural drainage on the north and northeastern portions. This area supports the wetlands delineated in 3.1.1. This same wetland area also receives runoff from an off-site contributing basin located northwest of the Vista property boundary. Developing wetlands brings financial and site impacts to the project, and is not recommended. However, this area provides a unique and valuable ecological space that could create a distinctive educational setting.

The property to the south of the wetland and drainage areas has a gradual slope, declining at approximately a 5% to 6% grade from southeast to northwest. This area is relatively free of major drainage and offers less challenging terrain for developing the school building, driving aisles, parking lots, and other necessary facilities.

While any large, flat building footprint will introduce localized grading challenges, this area has potential for efficient site development by working with the natural topography. Figure 11 above highlights approximately 17-19 acres, which are generally favorable for the construction of a school campus.

5.1.2 Zoning Code Requirements

The Vista site falls within the PUD zone of Archuleta County. A school appears to be an appropriate land use under the PUD overlay zone and its underlying zoning. As such, this parcel will have to be reviewed under the Archuleta County Land Use Code.

5.1.3 Stormwater & Drainage

5.1.3.1 Code Requirements

Archuleta County requires a detailed drainage study to be prepared for the development to identify and guide the drainage needs for the property. This development will need to provide detention facilities to store the difference between the one hundred (100) year historic storm runoff and the one hundred (100) year developed storm runoff. This site has off-site runon that will also need to be analyzed and addressed for the development of the property.

5.1.3.1 Flood Plain Mapping

The Federal Emergency Management Agency (FEMA) Flood Plain Map is presented in Figure 12. The property is classified as Zone X and has no mapped flood hazard in the vicinity.

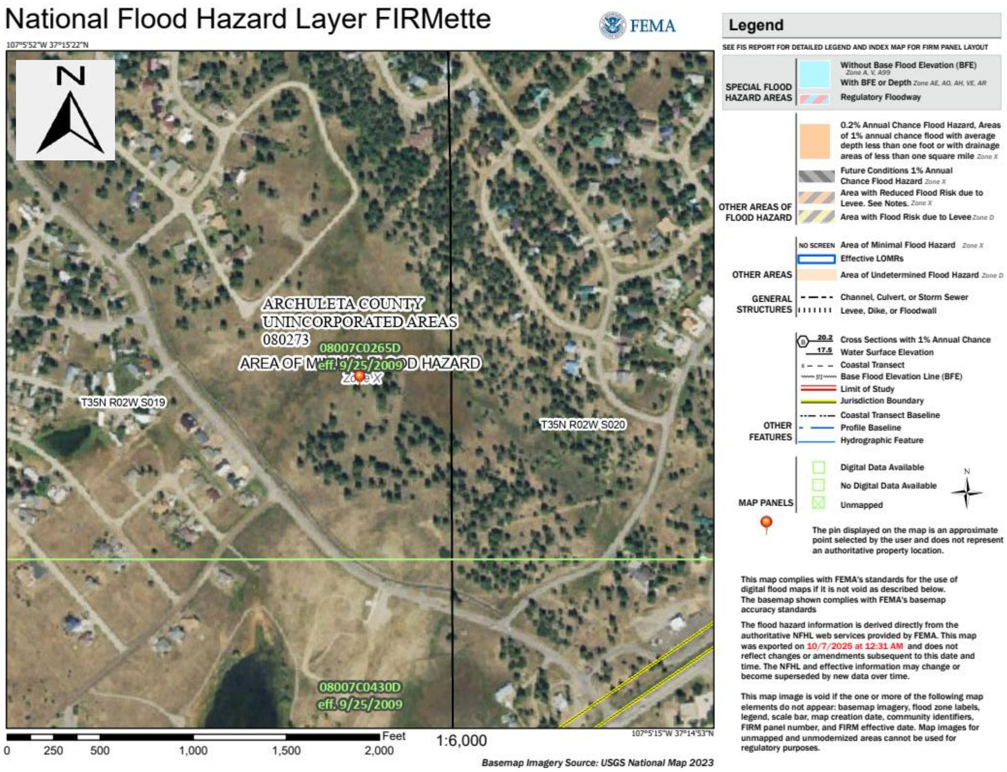


Figure 12: Vista Flood Plain Mapping (Source: FEMA FIRMette)

5.1.3.1 Existing Drainage Conditions

The property has multiple off-site drainage channels that will need to be accounted for in its development. Figure 13, illustrates the locations of off-site drainage entering the property. These off-site drainage basins will need to be evaluated in a future drainage report. Currently, off-site runoff passes through the property and runs through existing culverts located on Vista Blvd. The largest storm channel flows west through a culvert, under Vista Blvd., and into the front yards of two homes just west of the Vista property. This drainage channel will require further investigation to assess its adequacy.

In addition to the existing drainage channels on site, a large low-lying catchment basin exists along the northwestern portion of the property, likely ponding seasonal runoff and large storm events. This area will need to be evaluated in the future site-focused drainage report.

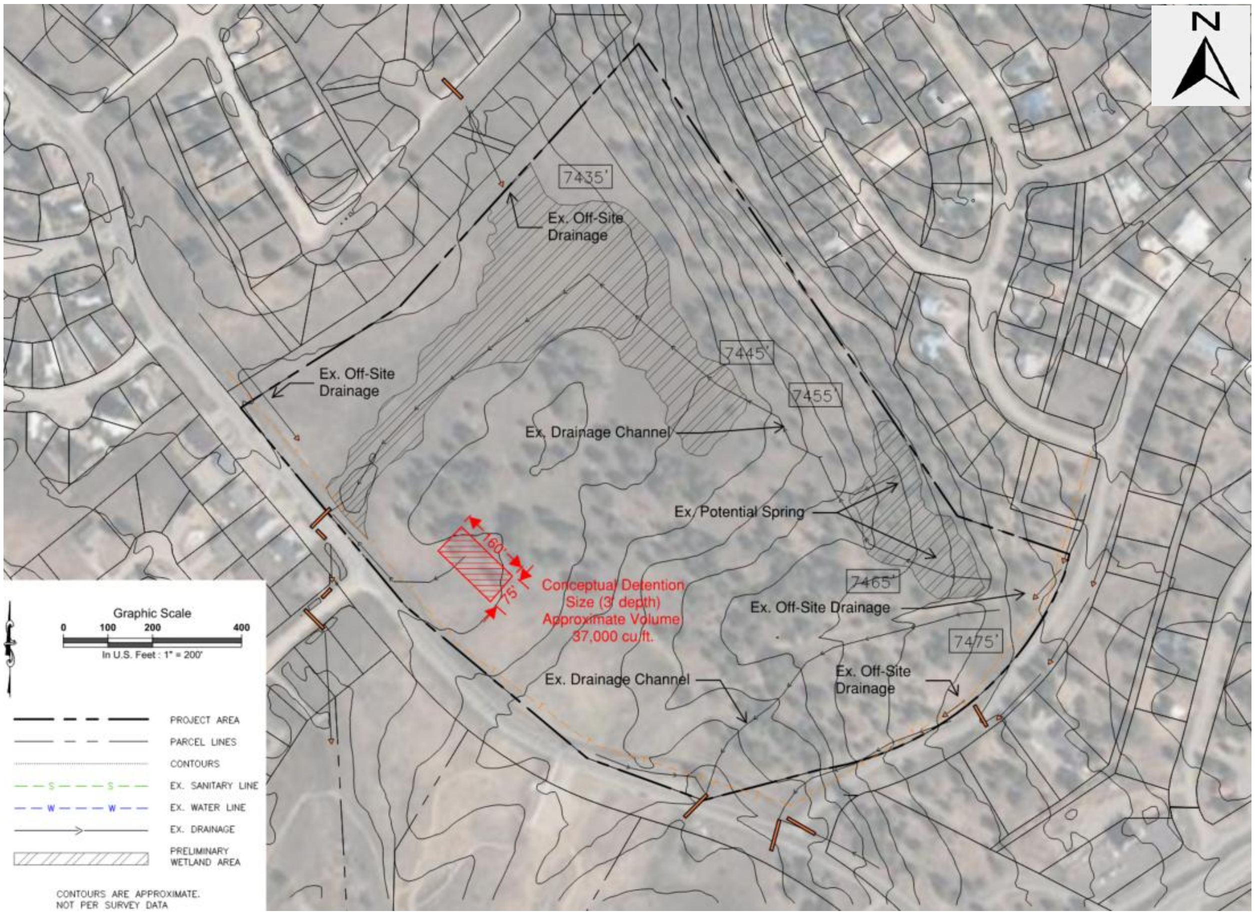


Figure 13: Vista On-site and off-site drainage

5.1.3.2 **Proposed Drainage Considerations**

Based on a review of the site, SGM has identified the following as critical considerations for future evaluation.

- There is potential for downstream flooding from the northwestern culvert of the property. Given the current outlet location of the culvert, there is an inherent risk of stormwater flooding homes just west of the vista property, and this will need to be evaluated in a drainage report. Additionally, this culvert will likely serve as the outlet for any stormwater collected by the proposed development. Any planned development will need to assess the impacts and flooding downstream, considering both proposed and existing conditions, and identify solutions for mitigating those impacts.
- The overall capacity of the existing culverts will need to be modeled, given existing basin conditions and proposed development conditions.
- The ponded catchment basin will need to be analyzed for its overall risk of flooding and its impact on neighboring properties and proposed facilities and buildings.

5.1.3.3 Detention Volume & Area

SGM performed a conceptual analysis of required stormwater detention using the rational method and a preliminary concept plan. It is expected that the development will need space for about 37,000 cubic feet of detention. The area possibly required for the site is provided below in Figure 13.

A detailed drainage report will be required for the final selected site and site plan to meet the County Code. This conceptual volume has been prepared to guide conceptual layouts and site plans. This detention volume is not an official valuation for required detention. A detailed drainage report prepared by a licensed professional engineer will be needed to identify final detention requirements for the planned development.

5.1.3.4 Vista Drainage Summary

Overall, the drainage on the vista site appears feasible, and the proposed development should accommodate the required detention size. However, this development will require further drainage analysis to review potential drainage problems, which will increase future consulting costs. There may also be requirements to develop additional culverts across Vista Blvd, depending on findings from a comprehensive drainage investigation. Any need for outlet structures or new culverts will increase development costs.

5.1.4 Utilities

5.1.4.1 Utility Investigation Methodology & Quality

SGM reviewed the utilities for the Vista site using data collected from requested utility districts and 811 utility requests for engineering records. Additionally, some utility information has been identified by visual observation on site or via Google Earth. In total, the utility data prepared for this report is an ASCE Quality Level D.

5.1.4.2 Sanitary Sewer

The Vista site is within the Pagosa Area Water and Sewer District (PAWSD) and would be subject to sewer connection with this district. A pressurized force main runs the frontage of the property along Vista Blvd. Additionally, a gravity sewer for the Pagosa Lakes subdivision is just west of Vista Blvd. and runs west along Port Ave.

The proposed development may have more than one option for connection:

- The development may need a lift station to connect to existing infrastructure.
- The development may be able to connect to a gravity main along Port Ave.

SGM could not identify which option is viable or will be mandated by PAWSD. A model of available capacity for existing infrastructure would need to be run to identify the extent of required sewer improvements, and that is outside the scope of this report. A model by PAWSD will be a requirement for future development of the site. A map of the sanitary sewer is provided as Figure 14.

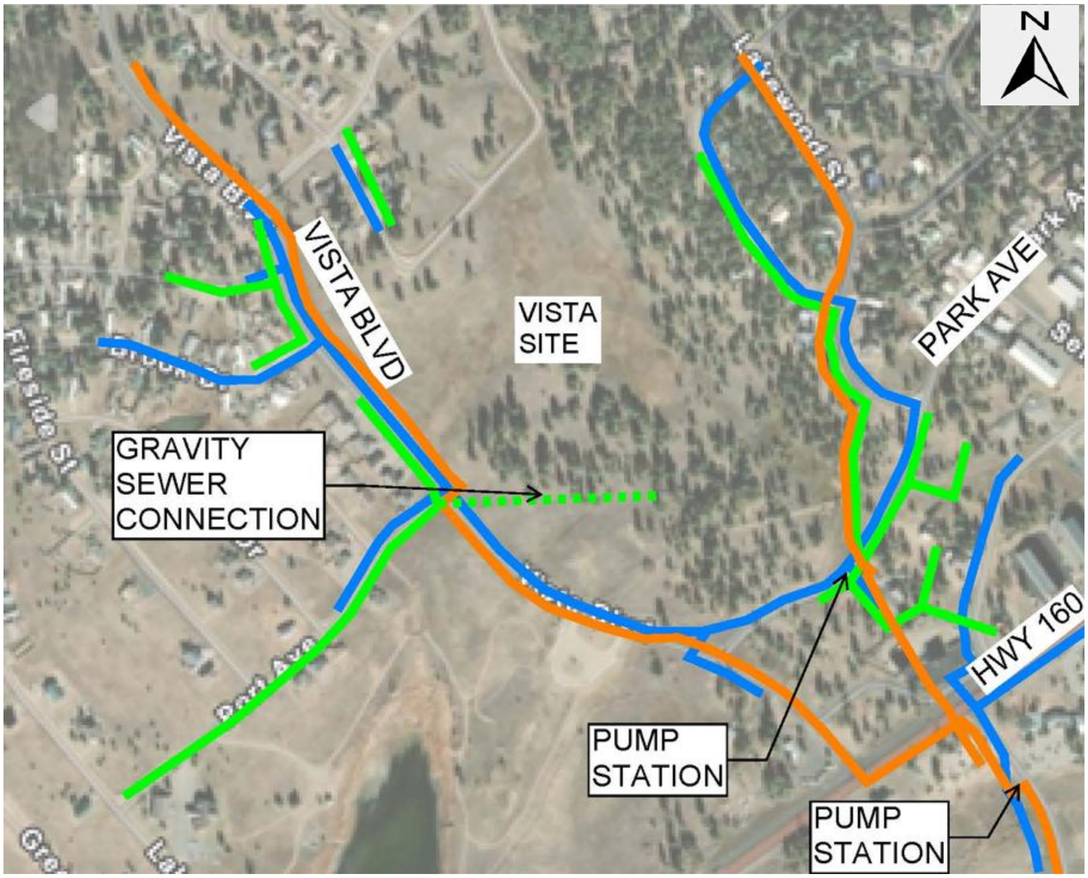


Figure 14: Pagosa Area Water & San District: Vista Sewer & Water Map

5.1.4.3 **Drinking Water**

The Vista site is within the PAWSD and would be subject to water connection with this district. An existing 8" water line runs the length of the right-of-way of Vista Blvd. Additionally, a 12" water main runs on the southeast side of the property along Park Ave. Pressures in the area have been identified as 60 – 65 psi near the vista site.

A flow model will need to be run to verify if the available water main can handle the required capacity of the development. SGM's initial impressions are that the system is likely adequate for handling a school's needs. Existing fire flow capacity will need to be verified with PAWSD, and building size and building ratings will need to be confirmed before analysis. This modeling is outside the scope of this report, but it will need further review in the development process.

5.1.4.4 **Power**

The Vista site is within the La Plata Electrical Association (LPEA) and would be subject to connection within this association. LPEA did not provide any GIS or Subsurface Utility information during the request for information window for the Vista Site. However, there is existing infrastructure adjacent to the Vista Property. Underground power runs to homes of all sizes on the property, and an overhead power line runs adjacent to US 160.

5.1.4.5 **Gas**

GIS data or maps for gas utilities were provided to SGM during its 811 requests for utility information. However, the information provided by Xcel Energy was not interpretable because the information was crudely shared from a phone screenshot. A gas marker was seen during SGM's site visit. Gas utilities are near the northwest corner of the property.

5.1.4.6 **Telecommunications & Fiber Optic**

Telecommunications and Fiber Optic cable are located on the north side of Vista Blvd. and run the entire length of the Vista site frontage. Service is also available along Park Ave. Services are provided by Quest or Lumen/Centurylink.

5.1.5 Geotechnical / Structural Evaluation

Trautner Geotech performed a feasibility geotechnical engineering study of both the Vista and HS /Trujillo Sites (Project # 58704GE) dated March 7, 2025.

This study marks the beginning of a process involving the geotechnical engineer and aims to provide a broad overview and feasibility study of the geotechnical design considerations for the site. Once a site is selected, a more detailed geotechnical investigation shall be performed to provide design-level geotechnical recommendations that will inform the building foundation design. A copy of the geotechnical report is provided as Appendix H. SGM reviewed the report, considering structural aspects for possible foundation systems on the property.

The primary recommendations from the geotechnical study that affect the building foundation are the feasibility of using shallow foundations (vs a deep foundation system) and the feasibility of using a slab-on-grade floor (vs a structural floor spanning between stem walls or grade beams).

Trautner Geotech performed two (2) borings named TB-6 and TB-7 at the Vista Site, as presented in Figure 15.

TB-6 is located on the south side of the Vista Lot, and TB-7 is located on the north end, closer to the wetland area. The upper-layer clay soils have high swell pressures with depths to shallow formational material varying from 2-½ ft at TB-6 to 5 feet at TB-7. The geotechnical report does not recommend supporting the foundation on the upper clay soil layer, so for this site, shallow foundations would need to bear on the shallow formational material. It appears that shallow foundations would likely be feasible for this site, and slab-on-grade floors isolated from structural foundation walls would be most feasible in the south portion of the lot (the area adjacent to TB-6).

Shallow foundations and slab-on-grade floors are likely to be more cost-effective than deep foundations and structural floor systems. Shallow foundation types, if suitable, would likely be continuous stem walls and footings supporting walls with spread footings at columns and point loads. Compacted structural fill below footings would likely be required, with depths and fill material determined by the Geotechnical Engineer. Slab-on-grade floors would likely consist of 4- to 6-inch-thick reinforced concrete slabs on a compacted aggregate base course and compacted structural fill. The foundations could support a multistory building up to three stories without concern.

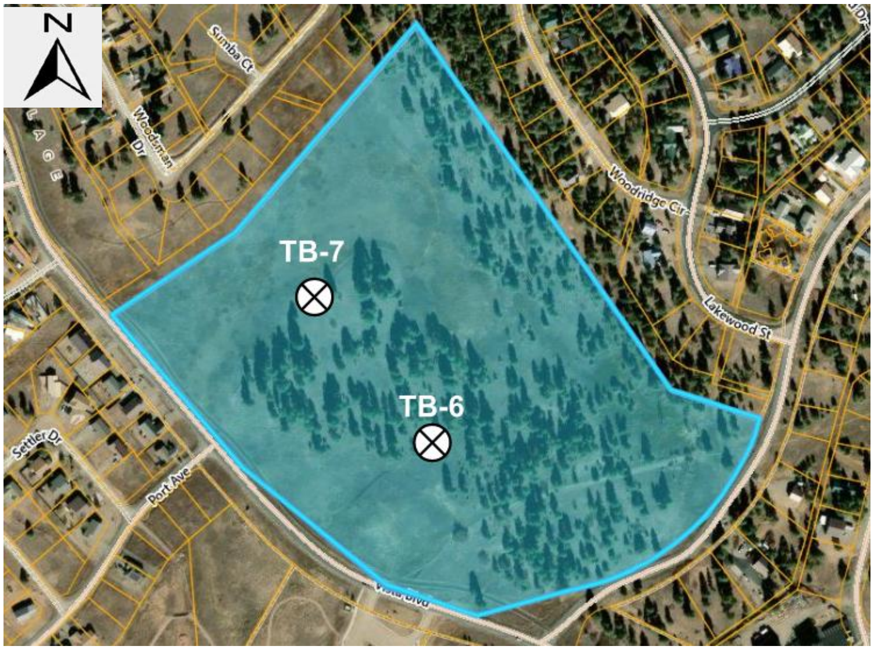


Figure 15: Geotechnical Engineering Study Boring Location Map

Deep foundations would likely consist of continuous concrete grade beams supporting structural walls, along with concrete pile caps at columns and point loads, all supported by drilled or driven deep foundation elements. Deep foundation elements that may be suitable include drilled concrete piles or micropiles, driven steel piles, helical piles, and others. Structural floor systems would likely consist of either 8- to 10-inch thick structural slab-on-grade floors or 3- to 5-inch thick concrete floors on metal decks, supported by steel bar joists and wide flange beams over a crawl space.

Deep soil improvements with shallow foundations may be appropriate as an alternative to deep foundations and structural floors. Soil improvement alternatives may include compaction-grouting, rammed aggregate piers, deep over-excavation and structural fill placement, and others. Further investigation and refinement of the geotechnical recommendations for each site should be conducted to understand further the foundation types that will be needed.

5.1.6 Vista Site Summary

The property overall has potential as a suitable site for the development of a new K-8 school. The property has approximately 17 to 19 acres of land, which aren't encumbered by steep slopes, drainage courses, or wetlands. The developable area is gently sloped and accessible to two main roads.

Stormwater management is required for new development, but there is available space to provide this facility. Adjacent stormwater management elements may require consideration as they flow onto the property.

The main roads have all available utilities. Sanitary sewer is available but requires further research with PAWSD to determine if a lift station is required versus a gravity sewer connection. Lift stations can add project costs of $500,000 to $800,000, but that expense would have to be evaluated more thoroughly against any gravity sewer extension.

Given the swell potential of the upper soils, footprints of the buildings, parking areas, and other facilities may require over excavation and backfill to prepare the soils for construction adequately. Over-excavation can present both logistical and financial challenges to a project, particularly when material export is required.

However, the lower soils appear to be suitable for use with shallow foundations and slab on grade construction, which would be a cost savings compared to deep pile systems. The foundation system will tolerate higher loads, making a 2 or 3-story building feasible and evaluable with the concept's design.

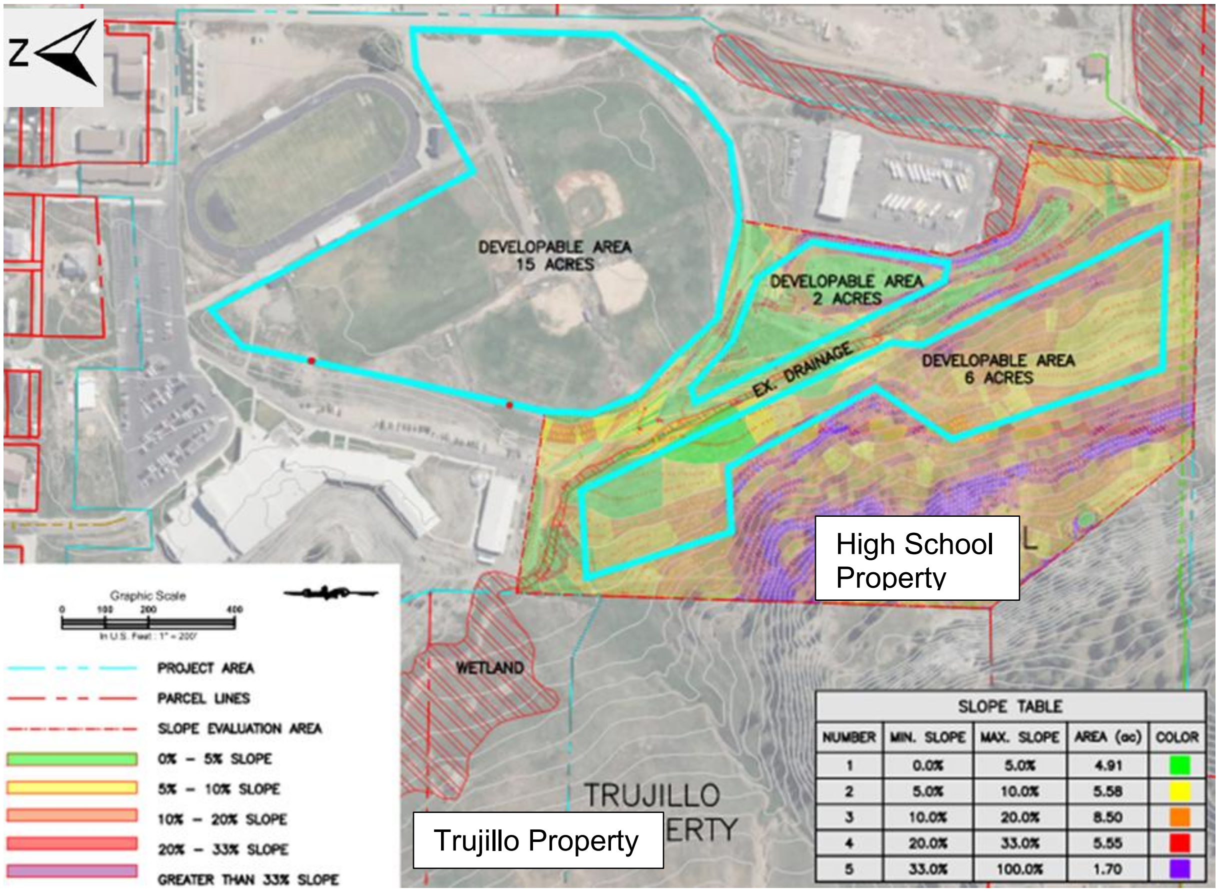
Careful and coordinated planning between the design and engineering teams is essential to manage earthwork expenses during the initial phases of concept development. This approach would help minimize material export costs and ensure that excess cut material is utilized on-site for constructing flatter athletic fields and playgrounds, where swell potential is less concerning. Concepts utilizing identified site constraints are provided in section Error! Reference source not found..

5.2 High School Site

The High School site and Trujillo property are adjacent and may be utilized together for a new K-8 campus. However, each site has different civil engineering-focused characteristics and is reviewed separately in the following sections.

5.2.1 Topography / Site Setting

The High School site topography, natural drainage channels, and mapped wetlands are presented in Figure 16 and the site is described in depth below. Two separate areas are discussed: the undeveloped Southwest Corner and the Sports Fields.



NUMBER	MIN. SLOPE	MAX. SLOPE	AREA (ac)	COLOR
1	0.0%	5.0%	4.91	
2	5.0%	10.0%	5.58	
3	10.0%	20.0%	8.50	
4	20.0%	33.0%	5.55	
5	33.0%	100.0%	1.70	

Figure 16: High School Site Topography, Wetlands & Drainage

5.2.1.1 Southwest Corner

The High School property has available land for development, but there are challenges in many areas. There is a major drainage channel that traverses the property, running from the far end of the existing high school structure to the southeast corner. This feature bisects much of the undeveloped, flatter terrain, limiting usable area.

The channel has wetlands, but due to prior development, the drainage has been straightened and isolated. As such, the wetlands within the site aren't a large area, comprising only half an acre.

The southwest corner of the property is defined by variable terrain, with slopes ranging from 10% to over 30% in localized areas. This extensive hillside terminates near the existing drainage channel, just west of the district bus barn. Developing this steep area will require large cuts and fills, as well as creative use of space in the concept development phase. Any project in this area of the site would likely require extra design coordination, retaining wall design and construction, and comprehensive soil stabilization measures, resulting in increased complexity and cost.

In the southwest corner, SGM estimates that only 6 to 8 acres are developable. While this area holds potential, it is not an ideal location and would require significant material excavation. The drainage may need to be relocated or rerouted to create a more singular occupiable space for a larger building footprint.

Critically, this acreage is insufficient to accommodate a two-story school building along with all desired and required ancillary facilities, including parking lots, playgrounds, and athletic fields. To fit the full programming considered in the Master Plan, existing facilities, such as the baseball fields to the east, would likely need to be repurposed for essential infrastructure like parking, drainage systems, or other core facilities.

Developing this area would necessitate extensive over-excavation due to the required grading for building footprints and parking areas. Over-excavation presents project challenges and costs, primarily related to material export. Site balancing may not be feasible, making the identification of an on-site or off-site location for excess cut material a probable requirement.

5.2.1.2 **Sports Fields**

The most favorable terrain is located in the heart of the property, currently occupied by the football and baseball fields, just southeast of the high school. This location is exceptionally flat, lacks major drainage channels, and presents a viable option for site layout.

Developing this 15-acre area could significantly minimize project costs related to excavation, foundation work, and utility development. The total available acreage is sufficient to support the school building, parking, drainage, and other facility needs. However, this option requires the permanent loss or relocation of some or all existing recreational facilities currently utilized by both the high school and the broader Pagosa community.

5.2.2 Zoning Code Requirements

The high school property zone will not affect or hinder the development of the project. The current zone of the property is Public/Quasi-public and is the appropriate zoning for a school campus. Additionally, the development of the school would be subject to courtesy review by the Town of Pagosa Springs. No planning challenges would be expected for this location.

5.2.3 Stormwater & Drainage

5.2.3.1 **Code Requirements**

The Town of Pagosa Springs requires a detailed drainage study to be prepared for the development to identify and guide the drainage needs for the property. This development will need to provide detention facilities to store the difference between the one hundred (100) year historic storm runoff and the one hundred (100) year developed storm runoff. This site has off-site runoff that will also need to be analyzed and addressed for the development of the property.

5.2.3.1 **Flood Plain Mapping**

The Federal Emergency Management Agency (FEMA) Flood Plain Map is presented in Figure 17. The property is in proximity to the San Juan River but in Zone X outside of the mapped floodplain.

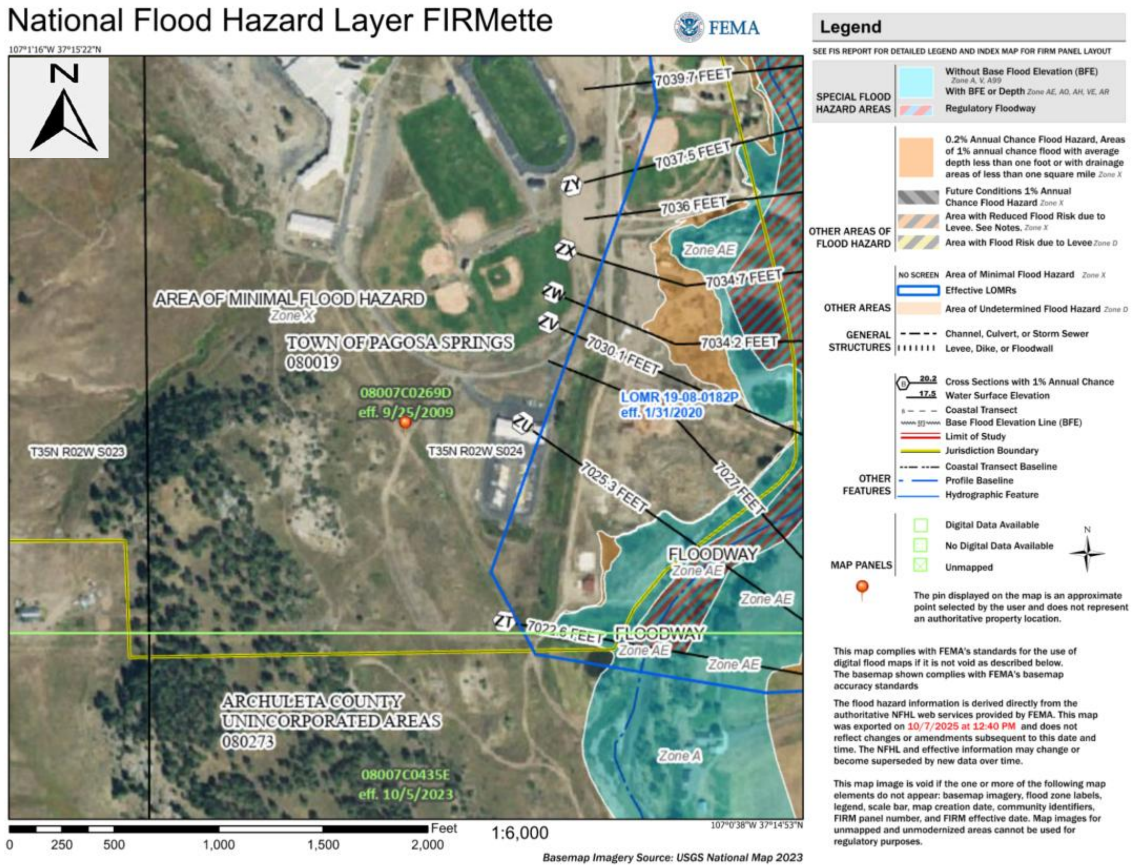


Figure 17: High School / Trujillo Flood Plain Mapping (Source: FEMA FIRMette)

5.2.3.2 **Existing Drainage Conditions**

The property has one major drainage running through a possible development area. Figure 18 Illustrates the locations of off-site drainage entering the property. These off-site drainage basins will need to be evaluated in a future drainage report. Currently, off-site conveyance passes through the property to an existing outlet structure at the far southeast corner.

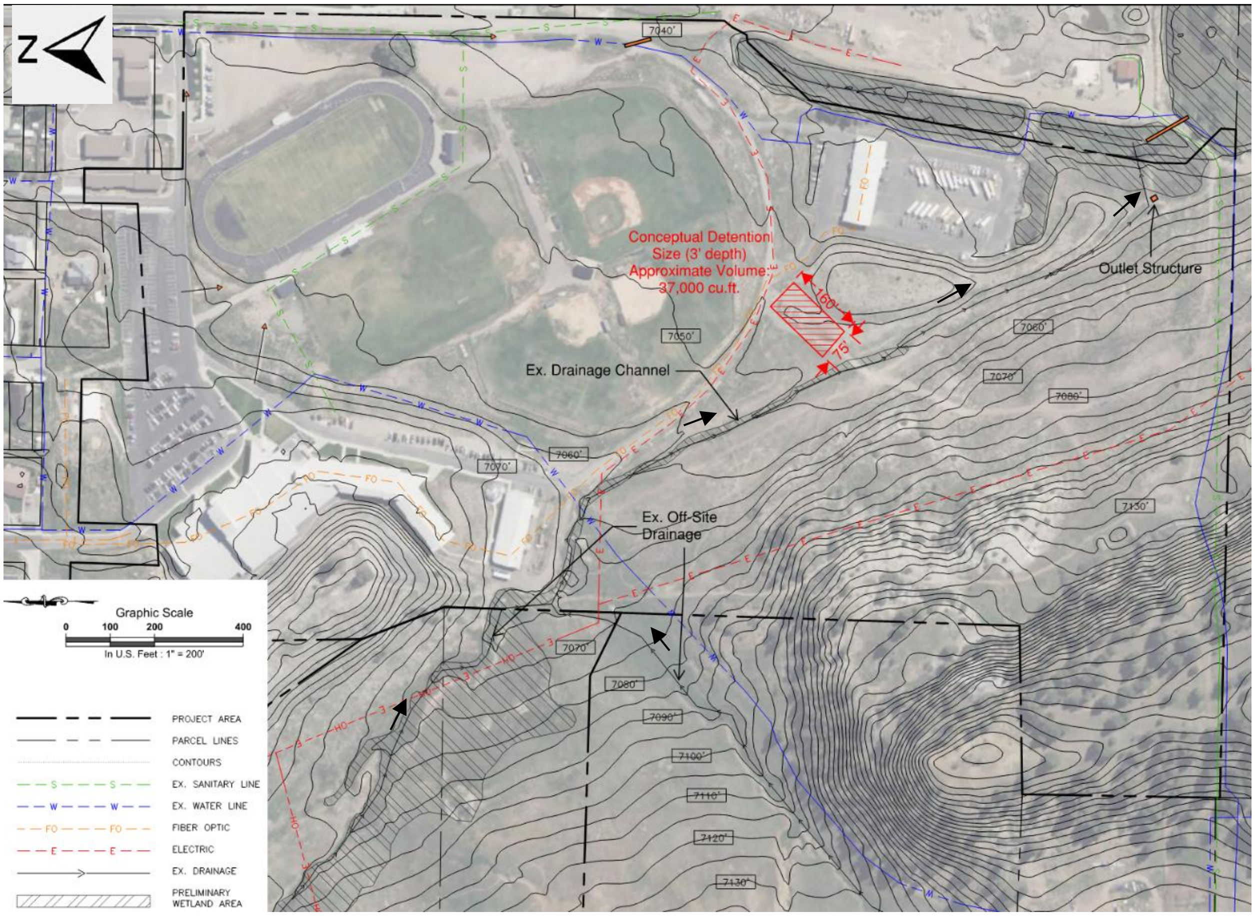


Figure 18: High School Off-Site & On-Site Drainage

5.2.3.3 **Proposed Drainage Considerations**

Based on a review of the site, SGM has identified the following as critical considerations in future evaluation of the site:

- If school development is planned on the southwest corner of the property, the development will probably need to break up detention structures in order to fit in its entirety, the required volume of detention. Multiple detention facilities will add costs for design and construction.
- The overall capacity and hydrology of the existing drainage basin will need to be evaluated.
- The ponded catchment basin will need to be analyzed for its overall risk of flooding and its impact on neighboring properties and proposed facilities and buildings.

5.2.3.4 **Detention Volume & Area**

SGM performed a conceptual analysis of required dentation using the rational method and a preliminary concept plan. It is expected that the development will need the same space as noted for the vista site, 37,000 cubic feet of detention. The area, if it were located in one area, is illustrated in Figure 18.

A detailed drainage report will be required for the final selected site to meet the Town Code. This conceptual volume has been prepared to guide conceptual layouts and site plans. This detention volume is not an official valuation for required detention. A detailed drainage report prepared by a licensed professional engineer will be needed to identify final detention requirements for the planned development.

5.2.3.5 **High School Drainage Summary**

Overall, the drainage on the High School site appears feasible but will require a more thorough review. Depending on the location of the proposed development, creative solutions may need to be provided to accommodate the necessary stormwater detention. Relocating drainages may be a design concept to evaluate further, creating a more cohesive functional space for the project.

If the Sports Fields are used on the campus, drainage improvements may be necessary because the site's topography is so flat that it may lead to unintended ponding or a lack of available facilities.

This development will also require off-site basin analysis to review potential drainage problems along the existing drainage channel.

5.2.4 Utilities

5.2.4.1 **Utility Investigation Methodology & Quality**

SGM has reviewed the utilities for the site using data collected from requested utility districts and 811 utility requests for engineering records. Additionally, some utility information has been identified by visual observation on site or via Google Earth. In total, the utility data prepared for this report is of ASCE Quality level D.

5.2.4.2 **Sanitary Sewer**

The High School site is within the Pagosa Sanitary Sewer General Improvement District (PSSGID) and would be subject to sewer connection with this district. An 8" gravity main runs along the east side of S 5th Street and could be connected to by the school development. A map of the available sewer is presented as Figure 19.

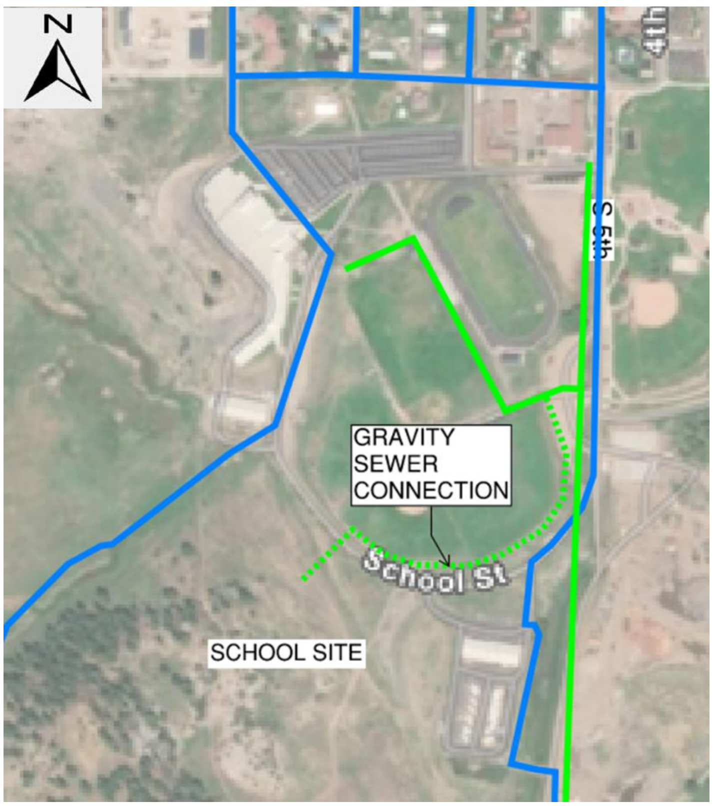


Figure 19: Pagosa Sanitary Sewer General Improvement District – High School Sanitary Sewer Map

5.2.4.3 **Drinking Water**

The High School site is within the PAWSD and would be subject to water connection with this district. An existing 8" water line runs through the property and currently services the high school. Additionally, a 12" water main runs on the south side of the property. Pressures in the area will vary depending on the water line. Based on information provided to SGM, it appears that pressures will generally be high in this area. A water map of the region is provided in Figure 20.

A flow model will need to be run to verify if the available water main can handle the required capacity of the development. SGM’s initial impressions are that the system is probably adequate for handling a school's needs. Existing fire flow capacity will need to be verified with PAWSD, and building size and building ratings will need to be confirmed before analysis. This modeling is outside of the scope of this report, but will need to be reviewed further into the development process.

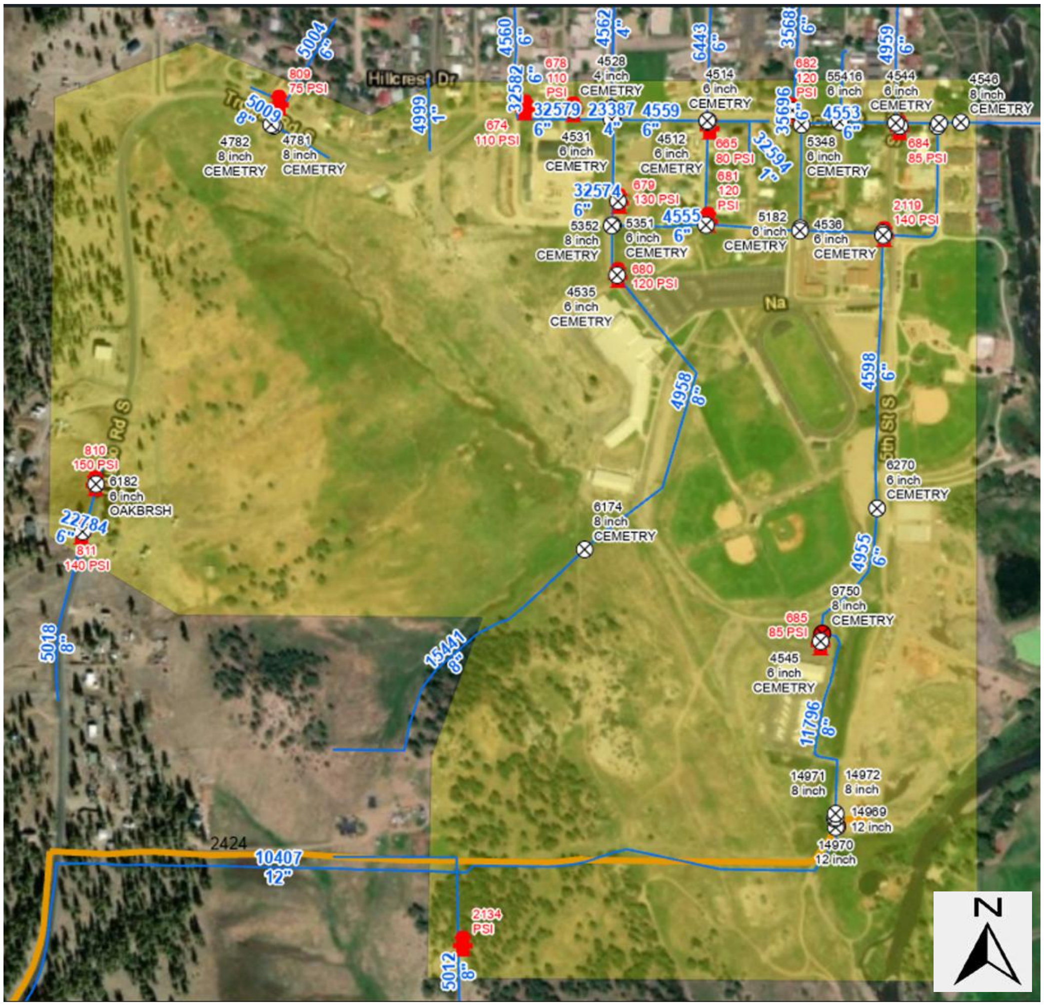


Figure 20: Pagosa Area Water & San District: High School Water Map

5.2.4.4 **Power**

The High School site is within the La Plata Electrical Association (LPEA) and would be subject to connection within this association. The LPEA utility map provided is shown in Figure 21.

An existing overhead power line provided power to a large junction distribution system on the west side of the High School / Trujillo property. This area then has underground electric running in several branches heading south and east on the property.

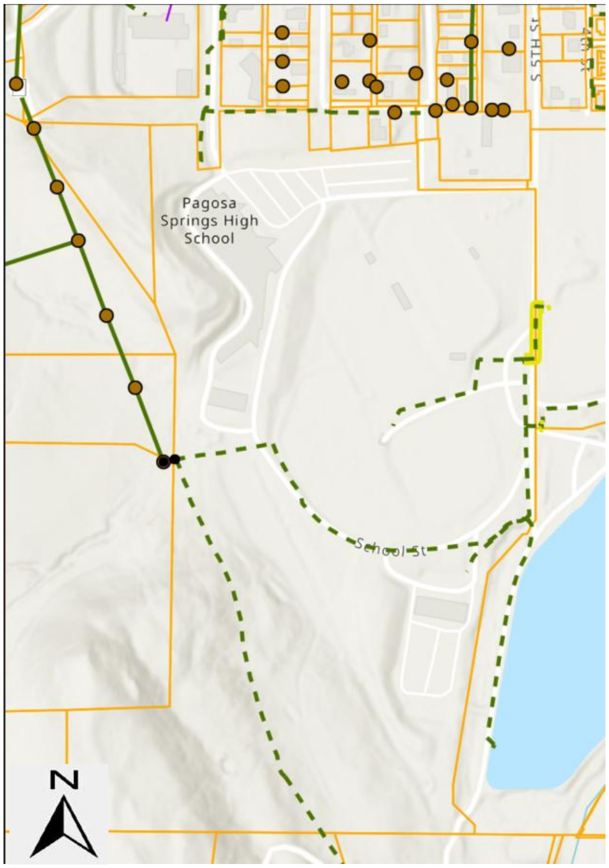


Figure 21: High School Site LPEA Electrical Power Map

5.2.4.5 Gas

GIS data or maps for gas utilities have been provided to SGM during its 811 requests for utility information, but the information is not clear, and Xcel Energy may or may not have gas facilities in the Vicinity. Gas marker flags were seen along the School St. Access Road during SGM's site visit.

5.2.4.6 Telecommunications & Fiber Optic

Telecommunications and fiber optic cables are located along the School St. Access Road and run all the way to the bus barn. Services are provided by Quest from Lumen / Centurylink and by Pierce.

5.2.5 Geotechnical / Structural Evaluation

Trautner Geotech produced a feasibility geotechnical engineering study of both the Vista and HS /Trujillo Sites (project # 58704GE) dated March 7, 2025.

This study marks the beginning of a process in geotechnical engineering aimed at providing a broad overview and feasibility study of the geotechnical design considerations for the site. Once a site is selected, a more detailed geotechnical investigation shall be performed to provide design-level geotechnical recommendations that will inform the building foundation design. A copy of the geotechnical report is provided as Appendix H. SGM reviewed the report, considering structural aspects for possible foundation systems on the property.

The primary recommendations from the geotechnical study that affect the building foundation are the feasibility of using shallow foundations (vs a deep foundation system) and the feasibility of using a slab-on-grade floor (vs a structural floor spanning between stem walls or grade beams).

Trautner Geotech performed three (3) borings named TB-1 through TB-3 at the High School Site, as presented in Figure 22.

Figure 22: Geotechnical Engineering Study - High School/Trujillo Site Boring Location Map

The soil at TB-1 is located at the edge of an area that was formerly utilized for a sewage treatment lagoon and has since been backfilled. The soil encountered consisted of 10-½ feet of man-placed fill over dense cobbles. The geotechnical report indicates that soils in the vicinity of TB-1 (where the former treatment lagoon was, the southeast corner of the parcel) are not suitable for a shallow foundation system or a slab-on-grade floor. Deep foundations would be the only foundation type appropriate for this area.

Boring locations TB-2 and TB-3 are situated near the bus maintenance facility. The upper-layer clay soil encountered exhibits very high swell pressures and variable conditions, with depths to formational material ranging from 4-½ ft at TB-3 to 12 feet at TB-2.

The geotechnical report does not recommend supporting the foundation on the upper clay soil layer, so in areas where the formational material is less than 7 feet below the adjacent grade, shallow foundation systems with a structural floor are likely viable options. However, the depth of the formational material may likely be much greater than 7 feet in areas of the building footprint, in which case a deep foundation system would be appropriate. Further investigation is needed in this area to determine whether a shallow foundation is appropriate.

Given the swell potential of the upper soils, footprints of the parking areas and sidewalks may require over excavation and backfill to adequately prepare the soils for construction. Over-excavation can present both logistical and financial challenges to a project, particularly when material export is required.

Shallow foundations and slab-on-grade floors are likely to be more cost-effective than deep foundations and structural floor systems. Shallow foundation types, if suitable, would likely be continuous stem walls and footings supporting walls with spread footings at columns and point loads. Compacted structural fill below footings would likely be required, with depths and fill material determined by the Geotechnical Engineer. Slab-on-grade floors would likely consist of 4- to 6-inch-thick reinforced concrete slabs on a compacted aggregate base course and compacted structural fill.

Deep foundations would likely consist of continuous concrete grade beams supporting structural walls and concrete pile caps at columns, as well as point loads supported by drilled or driven deep foundation elements. Deep foundation elements that may be suitable include drilled concrete piles or micropiles, driven steel piles, helical piles, and others. Structural floor systems would likely consist of either 8- to 10-inch-thick structural slab-on-grade floors or 3- to 5-inch-thick concrete floors on metal decks, supported by steel bar joists and wide flange beams over a crawl space.

Deep soil improvements with shallow foundations may be appropriate as an alternative to deep foundations and structural floors. Soil improvement alternatives may include compaction-grouting, rammed aggregate piers, deep over-excavation and structural fill placement, and others. Further investigation and refinement of the geotechnical recommendations for each site should be conducted to further understand the foundation types that will be needed.

5.2.6 High School Site Summary

Overall, the property has potential as a suitable site for the development of a new K-8 school, but it has challenges.

The southwest corner of the property has approximately 8 acres of land that aren't encumbered by steep slopes, and is bisected by a drainage feature that may be able to be relocated. There are wetlands on site, but the area is only 0.5 acres, making it financially feasible to mitigate any impacts. Other areas of the site have variable terrain, with slopes ranging from 10% to over 30% in localized areas, necessitating creative use of space, retaining walls, and earthwork to utilize this land effectively.

The sports fields comprise approximately 15 acres and are flat, but sacrifice the amenity and its proximity to the High School. As such, the use of these spaces should be thoughtfully considered, and these facilities would need to be relocated to other locations.

Due to the site constraints, stormwater management could require multiple stormwater detention ponds, which adds complexity to the design but has minimal impact on construction costs. Adjacent stormwater management elements may require consideration as they flow onto the property.

The High School site has excellent availability to utilities, and no constraints are expected to connect the new building to existing utility infrastructure.

Given the swell potential of the upper soils, footprints of the parking areas and sidewalks may require over excavation and backfill to adequately prepare the soils for construction. Over-excavation can present both logistical and financial challenges to a project, particularly when material export is required.

The upper soils were measured in locations that weren't near any potential building sites, so further investigation can help determine if the upper swell soils are still over 7 feet thick. If the upper swell soils are very thick, deep foundation systems, grade beams, and suspended floor may be a consideration for this site. Condensing the building footprint to a taller structure could improve the use of space and reduce foundation costs.

5.3 Trujillo Site

The High School site and Trujillo property are adjacent and may be utilized together for a new K-8 campus. However, each site has different civil engineering-focused characteristics and hence, is reviewed separately in the following sections.

5.3.1 Topography / Site Setting

The Trujillo site topography, natural drainage channels, and mapped wetlands are presented in Figure 23 and the site is described in depth below. The site may be best accessed from Trujillo Road.

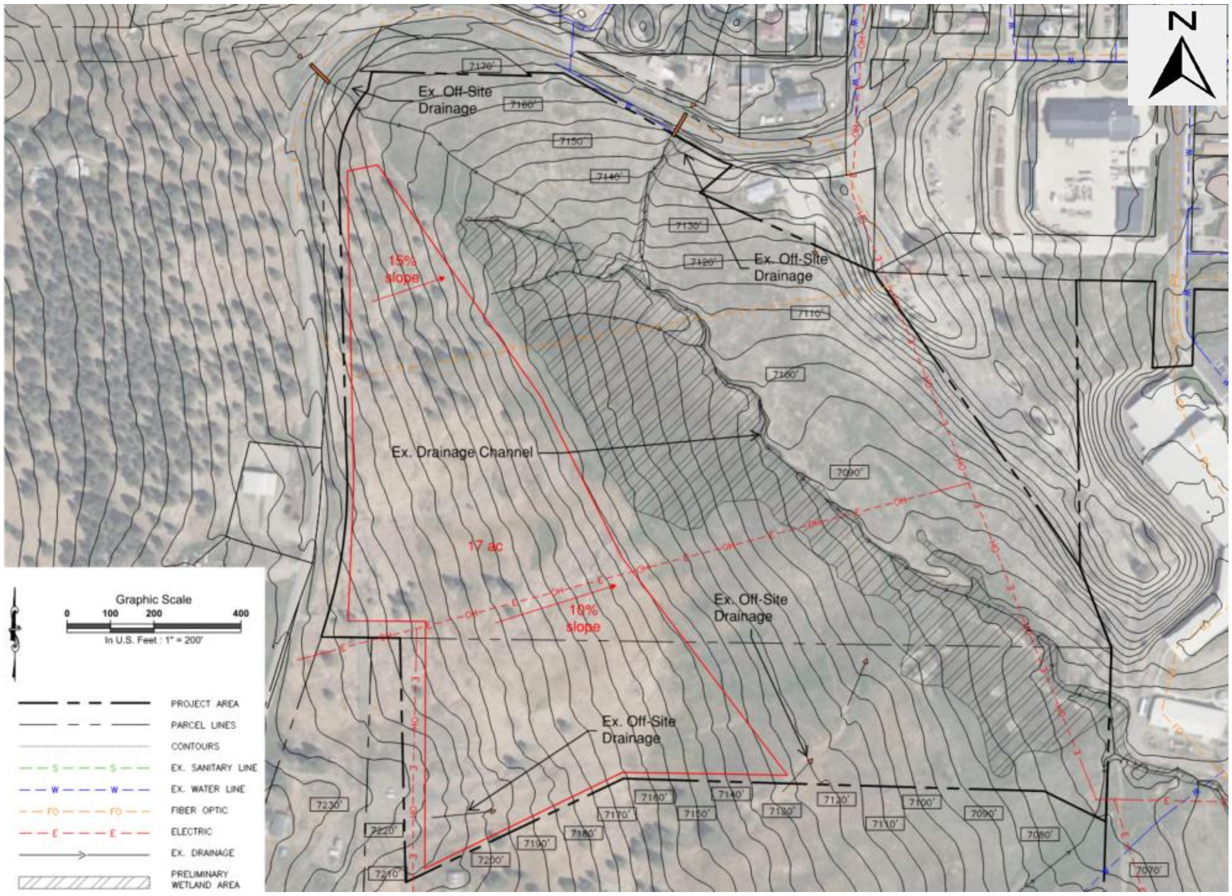


Figure 23: Trujillo Site Topography, Wetlands, & Drainage

The Trujillo property contains a large natural drainage which traverses the site from the northern corner to the southeast. The area supports the 10 acres of wetlands delineated in 3.2.1. This same wetland area also receives runoff from the west and north. Developing wetlands brings financial and site impacts to the project and is not recommended. However, this area could provide a unique and valuable ecological space, creating a distinctive educational setting.

The property to the south of the wetlands has a consistent slope of 10 percent and is over 17 acres. The area is relatively free of major drainageways. Steeper slopes would present challenges with development and would introduce the need for walls, stepped slabs, and terracing to work with the topography and minimize cuts and fills across the site.

5.3.2 Zoning Code Requirements

The Trujillo property is within the Town of Pagosa Springs and has two parcels with different zoning. The northern parcel is zoned Town residential – Low Density (R-6). The southern parcel is zoned Rural Transition (R-T). The property with R-6 zoning does not permit schools or educational facilities in the code, so the property would need to be rezoned. For example, R-T zoning permits a school as an approved use.

5.3.3 Stormwater & Drainage

5.3.3.1 **Code Requirements**

The code requirements are unchanged from the High School Site, see section **5.2.3.1**.

5.3.3.2 **Flood Plain Mapping**

Flood Plain mapping is presented in the High School Site, see section **5.2.3.1**. The property is uphill from the High School site, and is located in Zone X outside of the mapped flood plain.

5.3.3.3 **Trujillo Drainage Summary**

Similar to the High School Site, the property has a major drainage running across it. Off-site drainage would also need to be considered for the impacts on any future building site. Stormwater detention and future drainage considerations remain unchanged from the High School site in Section **5.2.3.3.**

5.3.4 Utilities

5.3.4.1 **Utility Investigation Methodology & Quality**

SGM has reviewed the utilities for the site using data collected from requested utility districts and 811 utility requests for engineering records. Additionally, some utility information has been identified by visual observation on site or via Google Earth. In total, the utility data prepared for this report is ASCE Quality level D.

The 811 record data provided by the utility providers was often biased to the High School Site, so limited information may be provided

5.3.4.2 **Sanitary Sewer**

The Trujillo site is within the Pagosa Sanitary Sewer General Improvement District (PSSGID) and would be subject to sewer connection with this district—an 8” gravity main runs along the east side of S 5th Street. Depending on building placement, the Trujillo property would require 3,000 feet to 4,000 feet of sewer extension to connect to the gravity sewer on South 5th Street. The sewer map of the area provided by the utility is presented in Figure 24.

Figure 24: Pagosa Sanitary Sewer General Improvement District – Trujillo Site Sanitary Sewer Map

5.3.4.3 **Drinking Water**

The Trujillo site is within the PAWSD and would be subject to water connection with this district. 8-inch water lines serve the High School to the west and Trujillo Road to the north, and an 8-inch water line serves portions of Trujillo Road to the south. Approximately 2,400 feet of Trujillo Road have no water service connection. If this property were to be used as a school site, the water line would need to be extended to serve the building and likely require connecting the loop between at least two points in the system. An exhibit of the available water service is presented in Figure 25.

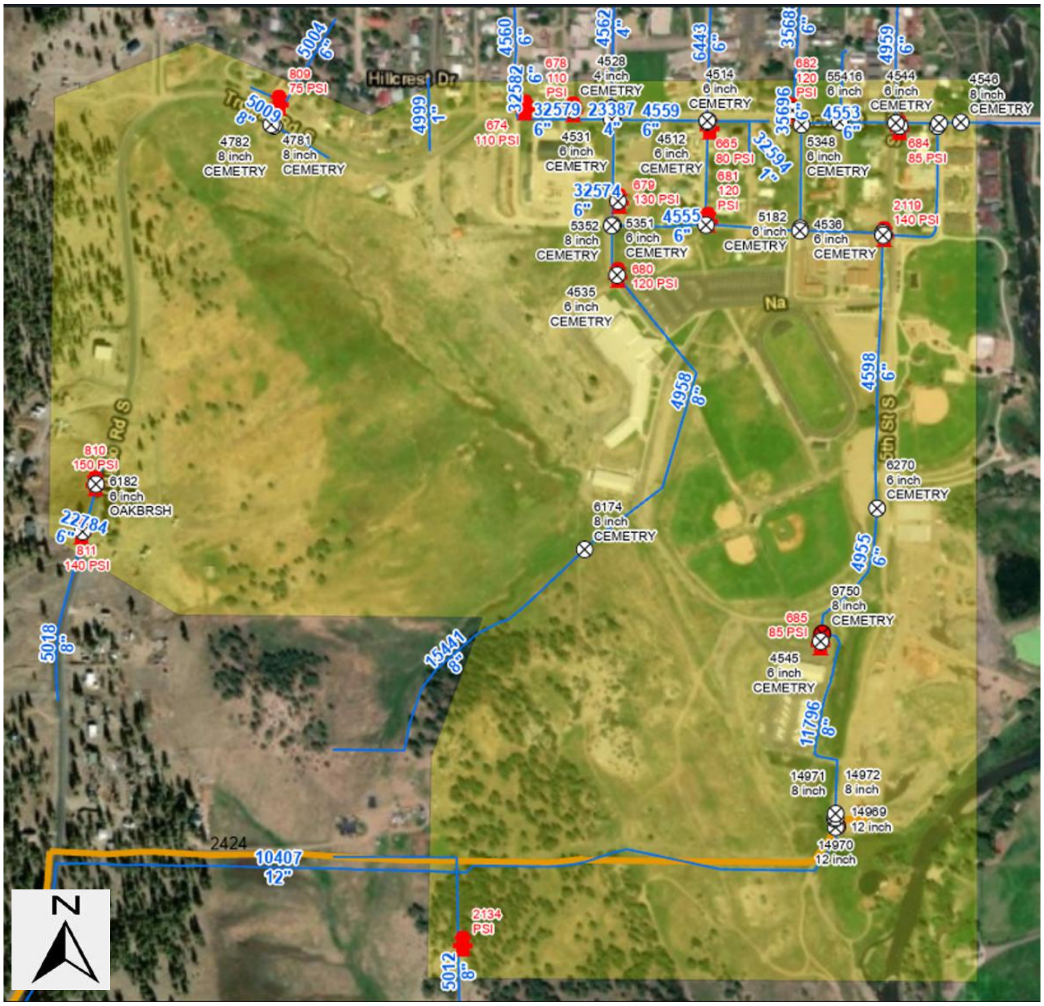


Figure 25: Pagosa Area Water & San District: Trujillo Rd Water Map

A flow model will need to be run to verify if the available water main can handle the required capacity of the development. SGM's initial impressions are that the system is probably adequate for handling a school's needs. Existing fire flow capacity will need to be verified with PAWSD, and building size and building ratings will need to be confirmed before analysis. This modeling is outside the scope of this report, but it will need further review in the development process.

5.3.4.4 **Power**

The Trujillo site is within the LPEA and would be subject to connection within this association. The LPEA utility map provided is shown in Figure 26.

An existing overhead power line provided power to a large junction distribution system on the east side of the Trujillo property. This area has an electric crossing through the middle of the property. Power is available, but may need to be relocated.

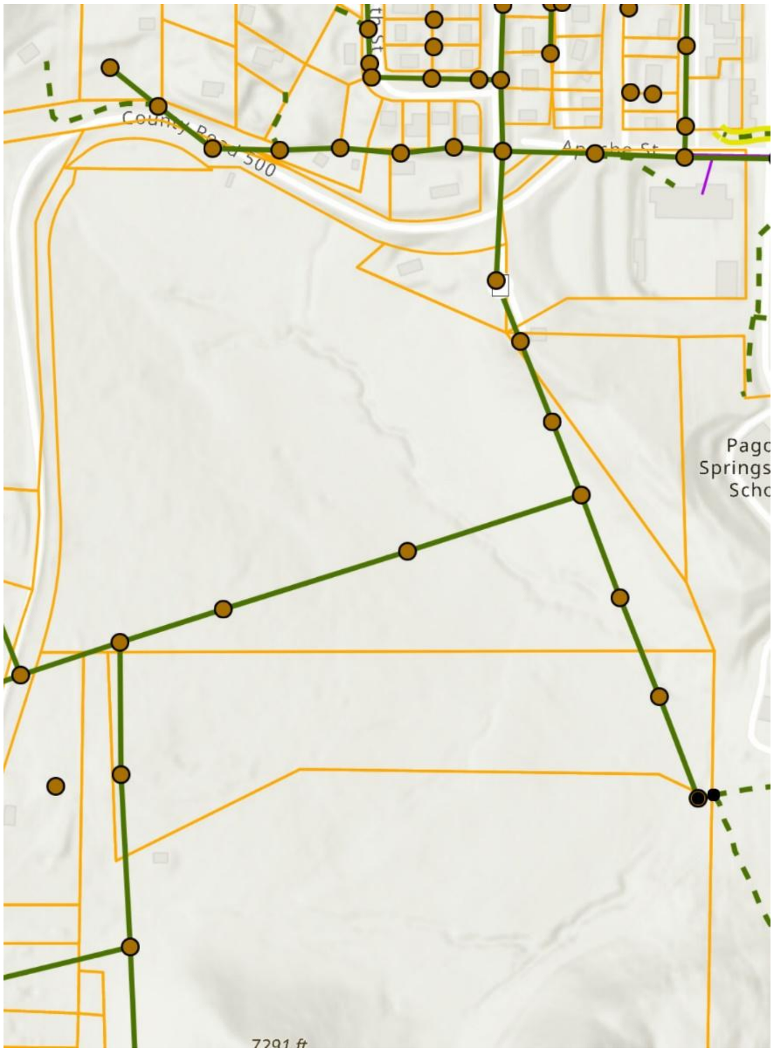


Figure 26: High School Site LPEA Electrical Power Map

Gas

GIS data or maps for gas utilities may have been provided to SGM during its 811 requests for utility information, but the information is not clearly labeled. Xcel Energy may not have gas facilities in the vicinity, and an extension may be required.

5.3.4.5 **Telecommunications & Fiber Optic**

Telecommunications are located along Trujillo Road and cross the site with the electric service on the property. Services are provided by Quest from Lumen / Centurylink. Pierce provides a Fiber Optic line to the existing high school and bus barn east of the site, but an extension for the utility may be needed.

5.3.5 Geotechnical / Structural Evaluation

Trautner Geotech produced a feasibility geotechnical engineering study of both the Vista and HS /Trujillo Sites (project # 58704GE) dated March 7, 2025.

This study marks the beginning of a process in geotechnical engineering aimed at providing a broad overview and feasibility study of the geotechnical design considerations for the site. Once a site is selected, a more detailed geotechnical investigation shall be performed to provide design-level geotechnical recommendations that will inform the building foundation design. A copy of the geotechnical report is provided as Appendix H. SGM reviewed the report, considering structural aspects for possible foundation systems on the property.

The primary recommendations from the geotechnical study that affect the building foundation are the feasibility of using shallow foundations (vs a deep foundation system) and the feasibility of using a slab-on-grade floor (vs a structural floor spanning between stem walls or grade beams).

Trautner Geotech performed two (2) borings named TB-4 and TB-5 at the Trujillo Site, as presented in Figure 27.

Figure 27: Geotechnical Engineering Study - High School/Trujillo Site Boring Location Map

TB-4 and TB-5 are located in the wetland areas at the Trujillo Site, and the soil encountered consists of very high swell pressures and variable soil conditions with depths to formational material varying from 4-½ ft at TB-4 to 6 feet at TB-5. This area appears to have shallower formational material than TB-2 and TB-3 from the High School Site, and thus, this area is more likely to allow for a shallow foundation and potentially a slab-on-grade floor isolated from the building's structural foundation walls.

Shallow foundations and slab-on-grade floors are likely to be more cost-effective than deep foundations and structural floor systems. Shallow foundation types, if suitable, would likely be continuous stem walls and footings supporting walls with spread footings at columns and point loads. Compacted structural fill below footings would likely be required, with depths and fill material determined by the Geotechnical Engineer. Slab-on-grade floors would likely consist of

4- to 6-inch-thick reinforced concrete slabs on a compacted aggregate base course and compacted structural fill.

Deep foundations would likely be continuous concrete grade beams supporting structural walls and concrete pile caps at columns and point loads supported by drilled or driven deep foundation elements. Deep foundation elements that may be suitable include drilled concrete piles or micropiles, driven steel piles, helical piles, and others. Structural floor systems would likely consist of either 8- to 10-inch thick structural slab on grade floors or 3- to 5-inch thick concrete floors on metal deck supported by steel bar joists and wide flange beams over a crawl space.

Deep soil improvements with shallow foundations may be appropriate as an alternative to deep foundations and structural floors. Soil improvement alternatives may include compaction-grouting, rammed aggregate piers, deep over-excavation and structural fill placement, and others. Further investigation and refinement of the geotechnical recommendations for each site should be conducted to further understand the foundation types that will be needed.

5.3.6 Trujillo Site Summary

The property overall has potential as a site for development of a new K-8 school, but it has a number of challenges.

The property has approximately 17 acres of land, encumbered by 10-15 percent slopes, with an additional 10 acres of wetlands and a drainage feature. These steep slopes would require creative use of space, retaining walls, and earthwork to utilize this land. These elements can add cost to a project.

The larger of the two parcels is not currently zoned for a school and would require effort to rezone. This is administrative but typically possible, so it adds a task and effort for the design team to perform.

Stormwater management is required for new development, but there is available space to provide this facility. Adjacent stormwater management elements may require consideration as they flow onto the property.

Electric and Fiber serve the Trujillo site. However, sewer service may need to be constructed and extended for 3,000 feet, while the water main may require more than 2,400 feet of extension. Gas may need to be extended 2,400 feet to the property as well. Power may need to be relocated if it interferes with the best location for the building. If this site is to be considered, these utility challenges must be more deeply investigated to understand the full cost impact of selecting the site. Preliminary estimates expect the sewer extension to cost $450,000 and the water extension about $360,000.

The site's geological suitability is questionable. The reporting on this site was performed with a focus on the wetland areas, which should be avoided impacting. The site may be suitable for removing swell clay from the upper layers of soil and using shallow foundations and slab-on-grade construction, which could result in cost savings. Bedrock may be encountered, potentially adding some construction costs, but it could be less expensive than pile foundations.

Given the swell potential of the upper soils, footprints of the parking areas and sidewalks may require over excavation and backfill to adequately prepare the soils for construction. Over-excavation can present both logistical and financial challenges to a project, particularly when material export is required.

The upper soils were measured in locations that weren't near any potential building sites, so further investigation can help determine the thickness of the upper swell-prone soils where the building could be located.

6.0 Summary

All three sites have the potential to become a campus for a new school, but each site has its benefits and disadvantages. These are narrated for consideration and then summarized in a table below:

6.1 Vista Site

The Vista property is generally a good fit for a K-8 school, but will require significant access improvements and a potentially expensive sewer connection. A more detailed traffic study focused on Hwy 160 signaling warrants, and the finalized concept plan will be required before identifying the total extent of access improvements. Additionally, a water and sewer model will be required to evaluate feasible connections for the school.

The site offers enough developable area to accommodate the size of the needed building, parking, access routes, and other school facilities required for a K-8 campus. A moderate to gentle slope in the developable area will reduce overall earthwork expenses compared to the High School or Trujillo sites.

Evidence of a large wetland exists on the property and will need to be officially delineated before the final site plan is approved. It is recommended to avoid development in wetland areas and provide a setback from all wetlands. Significant drainage into this area would be expected during spring runoff or large storms. A more detailed drainage report of on-site and off-site runoff will be required for the site and building layout.

Lastly, of the three sites evaluated, it has the highest potential for a shallow foundation. A more detailed geotechnical investigation into the location of a finalized building will be required to determine if a shallow foundation is warranted.

6.2 High School Site

The High School site has some usable, undeveloped areas that are generally conducive to the development of a K-8 school building. However, the undeveloped areas lack overall space for all desired facilities without demolishing existing recreational fields or requiring extensive excavation, site grading, and retaining walls.

The site is located close to existing water lines, gravity sewer, and other utilities needed for the school building. Of the three sites evaluated, the high school site will probably require the least utility and road access improvements. A more improved access road will be required, and the addition of a turning lane on 8th Street will be warranted. This will be significantly less street improvement than required for the Vista property.

A drainage runs through much of the undeveloped region of the property and will need to be avoided or rerouted with any site plan. Some of the drainage may be considered a wetland and will need to be officially delineated during spring runoff. Additionally, a drainage report will need to be prepared before setting building elevations or developing a final site plan.

Lastly, there is not enough data to identify the required foundation system at the high school site. Borehole data in the geotechnical report offers an inconclusive image of the requirements for a shallow or deep foundation system. More site-specific geotechnical investigations for building will be required.

6.3 Trujillo Site

The Trujillo site will require significant utility extensions compared to the Vista or High School sites. More extensive and expensive access improvements would be anticipated in comparison to the high school property. Additionally, the potential requirement for extensive cuts for some school facilities could be cost-prohibitive. More geotechnical information would be required to know the depths of bedrock and soils.

The property in general grades at a mildly steep slope of 10%-15% to a drainage running through the middle of the property. Much of the drainage area in the center of the property is preliminarily identified as a wetland and not a good location for development. The most developable region of the property still faces challenges due to mild slopes. Development of this nature will probably require significant earthwork and retaining walls for access roads, parking lots, buildings, and other facilities. Additionally, large flat fields would be difficult to construct and would require significantly more cost than the other two properties.

The geotechnical report did not investigate the most developable region on the property. More building site-specific geotechnical investigation will be required to identify the expected foundation for this site and the depths of bedrock.

Overall, this property will probably be the most challenging to develop of the three sites.

6.4 Site Comparison Table

A table to present the conditions and issues of each site is presented below. Note that Costs are crudely estimated at this time and will warrant finer evaluation once a site is selected.

TABLE 7: SITE COMPARISON TABLE

	Vista Site	High School Site	Trujillo Site
Property Acres	36.7	40+	38.5
Developable Acres	17	8 / 15	17
Wetland Acres	6.37	0.5	10.04
Wildlife Impacts	Site Study recommended for Species of Concern, CPW Consult recommended for large game	Site Study recommended for Species of Concern, CPW Consult recommended for large game	Site Study recommended for Species of Concern, CPW Consult recommended for large game
Hazardous Waste Concerns	None	None	None
Traffic Impacts	High Impact: Road widening & turn lanes on Vista Blvd. & Park Ave; Acceleration & deceleration lanes for HWY 160; Possible Traffic Signal on HWY 160; Sidewalk extensions from neighborhoods; Highway Access Permit.	Lower Impact: One turn lane on 8th. Widening access and sidewalks from the high school loop road.	Lower Impact: Probably two turn lanes with possible road widening along Trujillo Rd. Improvements are speculative, access Improvements for the Trujillo access was not studied.
Cost of Traffic Improvements	2.5M	1.6M	Not evaluated
Slopes on Site	Gentile (5%)	Gentile (0-5%) and also very steep (10%-30%)	Mildly Steep (10-15%)
Earthwork Expenses	$250 - $750 K	$500 - $2M	$500 - $2M
Site Zoning	PUD (County) More extensive community comments & entitlement process are expected.	Public/Quasi-Public (Town of Pagosa Springs) Use by Right in this zone. Only administrative courtesy comments are expected.	Town Residential Low-Density & Rural Transition (Town of Pagosa Springs) A rezoning application is expected as a requirement for the development of this site.
Drainage Improvements	Yes, standard	Yes, standard Requires relocation of stream	Yes, standard

	Vista Site	High School Site	Trujillo Site
Site detriments	Only one sports field is needed. Wetland & impoundment setbacks.	Potential Loss of recreational fields; Potential for major earthwork & retaining walls. Not as much area for all school facilities without the loss of existing recreational facilities. Some potential wetland impacts are possible.	Wetland & impoundment setbacks. Retaining walls are required; the Terrain is not well-suited for flat play areas or fields.
Utility Improvements required	Sanitary Sewer: May need a lift station	Sanitary Sewer: Approximately 1000-foot extension. Water is close, but will need further modeling.	Sanitary Sewer: 3,000-4,000 foot extension; Water: 2,400-foot extension; Power crossing site may need to be relocated. Gas may need a 2,400-foot extension. Telecommunications may need to be relocated. Fiber optic may need to be extended.
Rough Utility Improvement Costs	$800K - $1.5M	$300K	$1.2M+
Foundation System Projected	Shallow Foundations and Slab on Grade may be possible	Deep Foundations and Grade Beams are probable	Shallow Foundations and Slab on Grade may be possible. Further investigation is required to confirm

6.5 Conclusion & Recommendations

Each site offers its advantages, disadvantages, and unknowns. It is SGM's opinion that the Vista site may offer the best site location for a complete K-8 school. However, it may or may not be more expensive to develop than the High School or Trujillo property. Much more detailed planning and design would be needed to make that evaluation.

At the Vista site, a more targeted traffic evaluation will be required to verify if traffic signaling is warranted at the junction of Vista Blvd. and Hwy 160. Also, detailed sewer models would be needed to identify requirements for sewer connection. A more complete conceptual plan needs to be prepared to evaluate the overall expected excavation and building placement. Lastly, a more detailed geotechnical investigation in the building's region would be required before confidently evaluating foundation requirements.

At the High School site, a more complete conceptual plan needs to be prepared to evaluate the overall expected excavation and building placement. A more detailed geotechnical investigation in the building's region would be required before confidently evaluating foundation requirements.

At the Trujillo site, a more complete conceptual plan needs to be prepared to evaluate the overall expected excavation and building placement. A more detailed geotechnical investigation in the building's region would be required before confidently evaluating foundation requirements.

Overall, all sites are developable, but the Vista and High School sites are better suited for a school. Both Vista and High School need more detailed design information to give a better comparison of developmental costs. The Vista site offers more space for school facilities and drop-off areas without eliminating existing facilities.

Not all development items can be quantified for exact comparison, or with much precision. The sense of place of a community from a public building can often outweigh the technical pros and cons of a site, and that is a limitation of engineering judgement for site selection.

More detailed concept plans and other action items, as discussed above in various sections, would be needed for more precise comparisons of the two properties. However, given the current understanding of the comparable items, as identified in the report and discussed in the memo, we view the Vista site as a more favorable location for the development of a new K-8 School. The location overall has more buildable area and would be expected to cost millions of dollars less than the development of the High School property.

Appendix A

Environmental – Vista Site Wetland Map

SGM
1970 E. 3rd Ave. Suite 205
Durango, CO 81301
970.385.2340
www.sgm-inc.com

Figure 1

Site Visit Points - Vista Blvd Site

Archuleta School District

Date: 9/29/2025	Job No. 2025-345	Map by: CMB	Checked by: AA
Coordinate System: NAD 1983 UTM Zone 13N		Scale: 1:2,400	
Data Sources: NAIP (Imagery), Archuleta County (Parcels)			
File: J:\Projects_Replica\2025\2025-345-ArchuletaFeasibilityStu\GIS\APRXs\ArchuletaSchoolDistrict_Wetlands\ArchuletaSchoolDistrict_Wetlands.aprx			

The information displayed above is intended for general planning purposes. Refer to legal documentation/data sources for descriptions/locations.

0 200 400 Feet

1 inch = 200 feet

N

Appendix B

Environmental – Vista Site Hazardous Materials Search

Map: 0.25 Mile Radius

Order Number: 25090400993

Address: Vista Blvd and Park Ave, Pagosa Springs, CO

- Project Property
- Buffer Outline
- Sites with Higher Elevation
- Sites with Same Elevation
- Sites with Lower Elevation
- Sites with Unknown Elevation
- Areas with Higher Elevation
- Areas with Same Elevation
- Areas with Lower Elevation
- Areas with Unknown Elevation
- Freeways; Highways
- Traffic Circle; Ramp
- Major & Minor Arterial
- Traffic Circle; Ramp
- Local Road
- Rail
- State
- Country
- National Wetland
- Indian Reserve Land
- 100 Year Flood Zone
- 500 Year Flood Zone
- FWS Special Designation Areas
- National Priorities List (Active, Delisted, Proposed, Institutional Control)

Source: © 2021 ESRI StreetMap Premium

Appendix C

Environmental – HS / Trujillo Wetland Map

SGM
1970 E. 3rd Ave. Suite 205
Durango, CO 81301
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www.sgm-inc.com

Figure 2

Site Visit Points- Highschool Site

Archuleta School District

Date: 9/29/2025	Job No. 2025-345	Map by: CMB	Checked by: AA
Coordinate System: NAD 1983 UTM Zone 13N		Scale: 1:4,200	
Data Sources: NAIP (Imagery), Archuleta County (Parcels)			
File: J:\Projects_Replica\2025\2025-345-ArchuletaFeasibilityStu\GIS\APRXs\ArchuletaSchoolDistrict_Wetlands\ArchuletaSchoolDistrict_Wetlands.aprx			

The information displayed above is intended for general planning purposes. Refer to legal documentation/data sources for descriptions/locations.

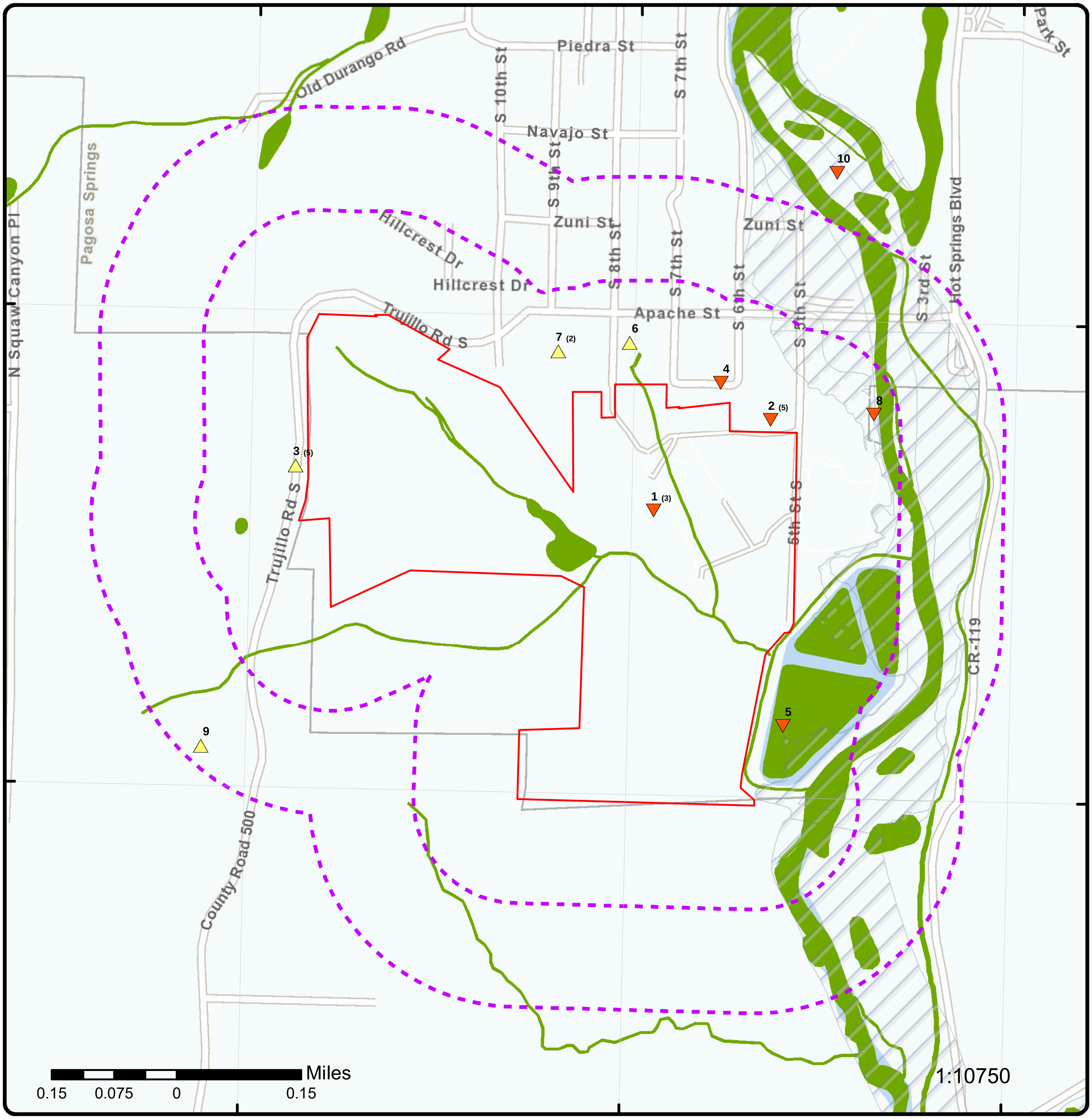
0 350 700 Feet

1 inch = 350 feet

N

Appendix D

Environmental – High School / Trujillo Property Hazardous Materials Search

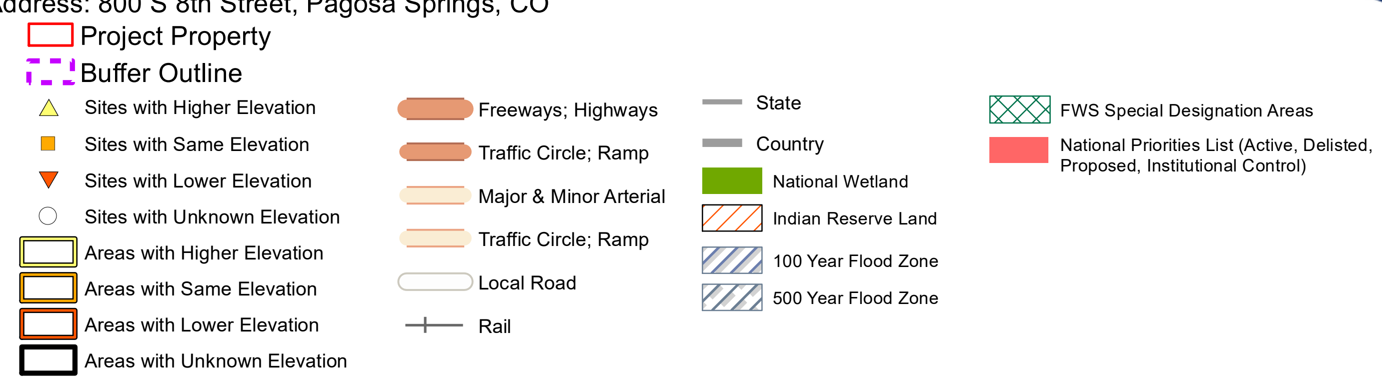


Map: 0.25 Mile Radius

Order Number: 25090400992

Address: 800 S 8th Street, Pagosa Springs, CO

ERIS



Source: © 2021 ESRI StreetMap Premium

Appendix E

Traffic – Data Summary

Appendix E - TRAFFIC DATA SUMMARY

2030 Total Traffic

		Southbound				Westbound				Northbound				Eastbound				
US 160 - 8th	AM	R	T	L	U	R	T	L	U	R	T	L	U	R	T	L	U	Total
	School	0	12	0	0	0	0	0	0	0	10	244	0	286	0	0	0	551
	Background	24	33	7	0	7	401	47	0	80	26	251	0	120	549	9	0	1555
	Total	**24**	**44**	**7**	**0**	**7**	**401**	**47**	**0**	**80**	**36**	**495**	**0**	**405**	**549**	**9**	**0**	**2107**
	PM	R	T	L	U	R	T	L	U	R	T	L	U	R	T	L	U	Total
	School	0	5	0	0	0	0	0	0	0	6	148	0	130	0	0	0	290
	Background	27	8	7	0	5	664	43	0	54	37	297	0	150	552	15	0	1860
	Total	**27**	**14**	**7**	**0**	**5**	**664**	**43**	**0**	**54**	**43**	**446**	**0**	**280**	**552**	**15**	**0**	**2150**
		Southbound				Westbound				Northbound				Eastbound				
5th-Apache (ES/MS Access)	AM	R	T	L	U	R	T	L	U	R	T	L	U	R	T	L	U	Total
	School	0	0	0	0	0	0	32	0	27	0	291	0	340	0	0	0	690
	Background																	0
	Total	**0**	**0**	**0**	**0**	**0**	**0**	**32**	**0**	**27**	**0**	**291**	**0**	**340**	**0**	**0**	**0**	**690**
	PM	R	T	L	U	R	T	L	U	R	T	L	U	R	T	L	U	Total
	School	0	0	0	0	0	0	0	0	17	0	176	0	155	0	15	0	362
	Background																	0
	Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**17**	**0**	**176**	**0**	**155**	**0**	**15**	**0**	**362**
		Southbound				Westbound				Northbound				Eastbound				
8th-Apache	AM	R	T	L	U	R	T	L	U	R	T	L	U	R	T	L	U	Total
	School	0	0	340	0	291	0	0	0	0	0	0	0	0	0	0	0	631
	Background		123					12		10	106							250
	Total	**0**	**123**	**340**	**0**	**291**	**0**	**12**	**0**	**10**	**106**	**0**	**0**	**0**	**0**	**0**	**0**	**881**
	PM	R	T	L	U	R	T	L	U	R	T	L	U	R	T	L	U	Total
	School	0	0	155	0	176	0	0	0	0	0	0	0	0	0	0	0	331
	Background		17					2		3	34							56
	Total	**0**	**17**	**155**	**0**	**176**	**0**	**2**	**0**	**3**	**34**	**0**	**0**	**0**	**0**	**0**	**0**	**388**
		Westbound				Northbound				Eastbound								
US 160 - 6th	AM		T	L	U	R	L		U	R	T		U					Total
	School			10		10												20
	Background		444	29		23	11			38	635							1179
	Total		**444**	**39**		**33**	**11**			**38**	**635**							**1199**
	PM		T	L	U	R	T		U	R	T		U					Total
	School			6		6												12
	Background		716	35		33	17			35	584							1419
	Total		**716**	**41**		**39**	**17**			**35**	**584**							**1431**

Trip Generation
ITE Trip Generation, 12th Edition

Land Use	Number of Units	ITE Code	Weekday Rate	AM Rate	AM Entering	AM Exiting	PM Rate	PM Entering	PM Exiting	Weekday Traffic	AM IN	AM OUT	PM IN	PM OUT
			Design Hour Rates							Weekday Design Hour Traffic				
Elementary School	504	520	2.27	0.74	0.40	0.34	0.44	0.20	0.24	1,144	201	172	102	120
7:45 - 3:15											373		222	
Middle School	480	522	2.09	0.75	0.41	0.35	0.34	0.16	0.18	1,003	194	166	78	85
8:00 - 3:25											360		163	
High School	397	525	1.94	0.53	0.36	0.31	0.15	0.05	0.10	770	143	123	20	40
8:15 - 3:45											266		60	
TOTAL TRIPS:										**2,917**	**538**	**461**	**200**	**245**
											999		**445**	
ELEM + MIDDLE TRIPS:										**2,147**	**395**	**338**	**180**	**205**
											733		**385**	

ITE Ttrip Generation Manual, 12th Edition	ITE Code	Basis of Rate	Time Period Used Above	AM IN	AM OUT	PM IN	PM OUT
				Weekday Design Hour Distribution			
Elementary School	520	*Average*	*Peak Hour Generator*	54%	46%	46%	54%
Middle School	522	*Average*	*Peak Hour Generator*	54%	46%	48%	52%
High School	525	*Average*	*Peak Hour Generator*	68%	32%	33%	67%

Enrollment Forecast by School – Figure 16 shows the forecasts at the individual schools for the next five years. In general, school enrollments will remain level.

Figure 16 –Enrollment Forecast by School – Five-year Forecast

Level	Year	School	K	1	2	3	4	5	6	7	8	9	10	11	12	Totals
ES	SY2025-26	Pagosa_Peak_Open_Sch	16	15	14	21	13									79
ES	SY2026-27	Pagosa_Peak_Open_Sch	14	17	13	14	21									79
ES	SY2027-28	Pagosa_Peak_Open_Sch	15	15	14	13	14									71
ES	SY2028-29	Pagosa_Peak_Open_Sch	14	16	13	14	13									70
ES	SY2029-30	Pagosa_Peak_Open_Sch	14	16	13	12	14									69
ES	SY2025-26	Pagosa_Springs_ES	98	81	120	108	118									525
ES	SY2026-27	Pagosa_Springs_ES	84	104	84	125	107									504
ES	SY2027-28	Pagosa_Springs_ES	89	94	109	90	126									508
ES	SY2028-29	Pagosa_Springs_ES	85	101	98	115	91									490
ES	SY2029-30	Pagosa_Springs_ES	82	99	104	103	116									504
MS	SY2025-26	Pagosa_Peak_Open_Sch_MS						4	16	5	9					34
MS	SY2026-27	Pagosa_Peak_Open_Sch_MS						10	2	14	5					31
MS	SY2027-28	Pagosa_Peak_Open_Sch_MS						17	8	0	15					40
MS	SY2028-29	Pagosa_Peak_Open_Sch_MS						11	15	6	0					32
MS	SY2029-30	Pagosa_Peak_Open_Sch_MS						9	9	14	6					38
MS	SY2025-26	PAGOSA_SPRINGS_MS						97	117	131	119					464
MS	SY2026-27	PAGOSA_SPRINGS_MS						118	97	126	131					472
MS	SY2027-28	PAGOSA_SPRINGS_MS						111	121	109	127					468
MS	SY2028-29	PAGOSA_SPRINGS_MS						130	113	132	110					485
MS	SY2029-30	PAGOSA_SPRINGS_MS						94	131	123	132					480
SHS	SY2025-26	San Juan HS										6	14	10	18	48
SHS	SY2026-27	San Juan HS										6	14	10	19	49
SHS	SY2027-28	San Juan HS										6	14	10	20	50
SHS	SY2028-29	San Juan HS										6	14	10	20	50
SHS	SY2029-30	San Juan HS										6	15	10	21	52
SHS	SY2025-26	Pagosa Springs HS										121	118	107	78	424
SHS	SY2026-27	Pagosa Springs HS										119	106	105	86	416
SHS	SY2027-28	Pagosa Springs HS										128	105	95	85	413
SHS	SY2028-29	Pagosa Springs HS										134	115	95	74	418
SHS	SY2029-30	Pagosa Springs HS										101	120	103	73	397

Western Demographics, Inc. 10 *February 14, 2025*

STUDENTS

Origin	ES	%	MS	%	∑%	HS	%
Lake Hatcher	35	*5%*	25	*7%*	*6%*	34	*8%*
Uptown	331	*50%*	161	*47%*	*49%*	193	*47%*
Downtown	129	*20%*	68	*20%*	*20%*	76	*18%*
Aspen Springs	114	*17%*	59	*17%*	*17%*	71	*17%*
New Mexico	48	*7%*	33	*10%*	*8%*	41	*10%*
	657	*100%*	346	*100%*		415	*100%*
			524				

524 Superintendents student pop. From infinite campus

Directional Orientation

Destination	Downtown	TT (min)	Uptown	TT (min)
	WEST	17	N (no 160)	12
	WEST	12	N (no 160)	5
	N (no 160)	4	EAST	9
	WEST	21	WEST	10
	S (no 160)	52	EAST	62

		ES	MS
BUS			
	AM	*118*	*90*
		18%	*17%*
	PM	*198*	*112*
		30%	*21%*
PARENT			
	AM	*423*	*433*
		64%	*83%*
	PM	*411*	*343*
		63%	*65%*
TOTAL			
	AM	*541*	*523*
	PM	*609*	*455*
		82%	*100%*
		93%	*87%*
	AM TRIPS	1082	1046
	PM TRIPS	1218	910

Re: Bus Ridership

David Steadman <dsteadman@pagosa.k12.co.us>
To Rick Holt; brian@rtaarchitects.com; lisascott5680@icloud.com; doug@rtaarchitects.com
Thu 8/7/2025 11:25 AM

If there are problems with how this message is displayed, click here to view it in a web browser.
Click here to download pictures. To help protect your privacy, Outlook prevented automatic download of some pictures in this message.

Caution! This message was sent from outside your organization. Block sender

Good Afternoon

You all were requesting to find out how many students are being driven by their parents and how many ride the bus. For the morning ridership at the Elementary School it is on average 118 and on the way home the average will be 198. Which means that the parents would be averaging 423 in the mornings and 343 in the afternoons.

For the Middle School the morning averages 90 Students and the afternoons is 112 students. This means that the parents would be averaging 433 in the morning and 411 in the afternoons.

I hope this helps and if you all have any other questions please let me know.

2030 School Distribution

US 160 - 8th St		Southbound				Westbound				Northbound				Eastbound					395	338	733	
Origin	AM	R	T	L	U	R	T	L	U	R	T	L	U	R	T	L	U	Total	IN	OUT		
Lake Hatcher												20		24				44	24	20	6% WEST	"West" traffic uses 8th to make left out
Uptown												166		194				360	194	166	49% WEST	"West" traffic uses 8th to make left out
Downtown			12								10							22	78	66	20% N (no 160)	***30% N Thru*** 40% S 5th to 8th 30% S Walk ***50% N thru uses 6th***
Aspen Springs												58		68				126	68	58	17% WEST	"West" traffic uses 8th to make left out
New Mexico																		0	32	27	8% S (no 160)	100% S from Light Plant Rd through 5th-Apache
TOTAL		0	12	0	0	0	0	0	0	0	10	244	0	286	0	0	0	551	395	338	573	Error
																			180	205	385	
Origin	PM	R	T	L	U	R	T	L	U	R	T	L	U	R	T	L	U	Total	IN	OUT		
Lake Hatcher												12		11				23	11	12	6% WEST	"West" traffic uses 8th to make left out
Uptown												101		88				189	88	101	49% WEST	"West" traffic uses 8th to make left out
Downtown			5								6							11	35	40	20% N (no 160)	***30% N Thru*** 40% S 5th to 8th 30% S Walk ***50% N thru uses 6th***
Aspen Springs												35		31				66	31	35	17% WEST	"West" traffic uses 8th to make left out
New Mexico																		0	15	17	8% S (no 160)	100% S from Light Plant Rd through 5th-Apache
		0	5	0	0	0	0	0	0	0	6	148	0	130	0	0	0	290	180	205	301	Error
5th-Apache (ES		Southbound				Westbound				Northbound				Eastbound					395	338	733	
Origin	AM	R	T	L	U	R	T	L	U	R	T	L	U	R	T	L	U	Total	IN	OUT		
Lake Hatcher												20		24				44	24	20	6% WEST	"West" traffic uses 8th to make left out
Uptown												166		194				360	194	166	49% WEST	"West" traffic uses 8th to make left out
Downtown												46		54				101	78	66	20% N (no 160)	30% N Thru 40% S 5th to 8th 30% S Walk 50%
Aspen Springs												58		68				126	68	58	17% WEST	"West" traffic uses 8th to make left out
New Mexico										27						32		59	32	27	8% S (no 160)	100% S from Light Plant Rd through 5th-Apache
		0	0	0	0	0	0	0	0	27	0	291	0	340	0	32	0	690	395	338	690	Checks
																			180	205	385	
Origin	PM	R	T	L	U	R	T	L	U	R	T	L	U	R	T	L	U	Total	IN	OUT		
Lake Hatcher												12		11				23	11	12	6% WEST	"West" traffic uses 8th to make left out
Uptown												101		88				189	88	101	49% WEST	"West" traffic uses 8th to make left out
Downtown												28		25				53	35	40	20% N (no 160)	30% N Thru 40% S 5th to 8th 30% S Walk
Aspen Springs												35		31				66	31	35	17% WEST	"West" traffic uses 8th to make left out
New Mexico										17						15		31	15	17	8% S (no 160)	100% S from Light Plant Rd through 5th-Apache
		0	0	0	0	0	0	0	0	17	0	176	0	155	0	15	0	362	180	205	362	Checks
8th-Apache		Southbound				Westbound				Northbound				Eastbound					395	338	733	
Origin	AM	R	T	L	U	R	T	L	U	R	T	L	U	R	T	L	U	Total	IN	OUT		
Lake Hatcher				24		20												44	24	20	6% WEST	"West" traffic uses 8th to make left out
Uptown				194		166												360	194	166	49% WEST	"West" traffic uses 8th to make left out
Downtown				54		46												101	78	66	20% N (no 160)	30% N Thru 40% S 5th to 8th 30% S Walk
Aspen Springs				68		58												126	68	58	17% WEST	"West" traffic uses 8th to make left out
New Mexico																		0	32	27	8% S (no 160)	100% S from Light Plant Rd through 5th-Apache
		0	0	340	0	291	0	0	0	0	0	0	0	0	0	0	0	631	395	338	631	Checks
																			180	205	385	
Origin	PM	R	T	L	U	R	T	L	U	R	T	L	U	R	T	L	U	Total	IN	OUT		
Lake Hatcher				11		12												23	11	12	6% WEST	"West" traffic uses 8th to make left out
Uptown				88		101												189	88	101	49% WEST	"West" traffic uses 8th to make left out
Downtown				25		28												53	35	40	20% N (no 160)	30% N Thru 40% S 5th to 8th 30% S Walk
Aspen Springs				31		35												66	31	35	17% WEST	"West" traffic uses 8th to make left out
New Mexico																		0	15	17	8% S (no 160)	100% S from Light Plant Rd through 5th-Apache
		0	0	155	0	176	0	0	0	0	0	0	0	0	0	0	0	331	180	205	331	Checks

	AM	PM	
6th and Apach WBR	10	6	***50% of "Downtown" oriented 8th St through traffic***
6th and US 160 NBR	10	6	

2030 School Distribution

S 160 - Vista Blv		Southbound					Westbound					Eastbound						395	338		
Origin	**AM**	**R**	**L**	**U**	**I**	**O**	**R**	**T**	**U**	**I**	**O**	**T**	**L**	**U**	**I**	**O**	**Total**	**IN**	**OUT**		
Lake Hatcher																	0				6% N (no 160)
Uptown																	0				49% N (no 160)
Downtown			66				78										144	78	66		20% EAST
Aspen Springs		58											68				126	68	58		17% WEST
New Mexico			27				32										59	32	27		8% EAST
TOTAL		58	94	0	0	0	109	0	0	0	0	0	68	0	0	0	330	178	152	330	Checks

																		180	205		
Origin	**PM**	**R**	**L**	**U**	**I**	**O**	**R**	**T**	**U**	**I**	**O**	**T**	**L**	**U**	**I**	**O**	**Total**	**IN**	**OUT**		
Lake Hatcher																	0				6% N (no 160)
Uptown																	0				49% N (no 160)
Downtown			40				35										76	35	40		20% EAST
Aspen Springs		35											31				66	31	35		17% WEST
New Mexico			17				15										31	15	17		8% EAST
		35	57	0	0	0	50	0	0	0	0	0	31	0	0	0	173	81	92	173	Checks

Blvd - School A			Westbound						Southbound					Northbound				395	338				
Origin	**AM**	**R**	**L**		**I**	**O**		**T**	**L**	**I**	**O**	**T**	**R**		**I**	**O**	**Total**	**IN**	**OUT**				
Lake Hatcher		20							24								44	24	20		6% N (no 160)	100% N	
Uptown		83	83						97				97				360	194	166		49% N (no 160)	50% N	50% E (via F
Downtown			66										78				144	78	66		20% EAST		
Aspen Springs			58										68				126	68	58		17% WEST		
New Mexico			27										32				59	32	27		8% EAST		
		103	235	0	0	0	0	0	121	0	0	0	274	0	0	0	733	395	338	733	Checks		

																		180	205				
Origin	**PM**	**R**	**L**		**I**	**O**		**T**	**L**	**I**	**O**	**T**	**R**		**I**	**O**	**Total**	**IN**	**OUT**				
Lake Hatcher		12							11								23	11	12		6% N (no 160)	100% N	
Uptown		50	50						44				44				189	88	101		49% N (no 160)	50% N	50% E (via F
Downtown			40										35				76	35	40		20% EAST		
Aspen Springs			35										31				66	31	35		17% WEST		
New Mexico			17										15				31	15	17		8% EAST		
		63	142	0	0	0	0	0	55	0	0	0	125	0	0	0	385	180	205	385	Checks		

Study Name Archuleta - 6th St
Start Date Thursday, September 04, 2025 6:30 AM
End Date Thursday, September 04, 2025 5:45 PM
Site Code

Report Summary

		Westbound					Northbound					Eastbound							Crosswalk	
Time Period	Class.	T	L	U	I	O	R	L	U	I	O	R	T	U	I	O	Total		destria	Total
Peak 1	Lights	398	27	0	425	596	21	10	0	31	62	35	575	0	610	408	1066	E	0	0
Specified Period	%	94%	96%	0%	94%	95%	95%	100%	0%	97%	97%	97%	95%	0%	95%	94%	95%		0%	
6:30 AM - 9:45 AM	Buses	3	0	0	3	8	1	0	0	1	1	1	7	0	8	3	12	S	2	2
One Hour Peak	%	1%	0%	0%	1%	1%	5%	0%	0%	3%	2%	3%	1%	0%	1%	1%	1%		100%	
7:30 AM - 8:30 AM	Trucks	21	1	0	22	22	0	0	0	0	1	0	22	0	22	21	44	W	0	0
	%	5%	4%	0%	5%	4%	0%	0%	0%	0%	2%	0%	4%	0%	3%	5%	4%		0%	
	Total	**422**	**28**	**0**	**450**	**626**	**22**	**10**	**0**	**32**	**64**	**36**	**604**	**0**	**640**	**432**	**1122**		**2**	**2**
	PHF	0.82	0.64	0	0.81	0.89	0.79	0.62	0	0.73	0.76	0.6	0.89	0	0.87	0.82	0.88			
	Approach %				40%	56%				3%	6%				57%	39%				
Peak 2	Lights	650	33	0	683	560	26	16	0	42	66	33	534	0	567	666	1292	E	0	0
Specified Period	%	95%	100%	0%	96%	95%	84%	100%	0%	89%	100%	100%	96%	0%	96%	96%	96%		0%	
2:30 PM - 5:45 PM	Buses	4	0	0	4	8	5	0	0	5	0	0	3	0	3	4	12	S	14	14
One Hour Peak	%	1%	0%	0%	1%	1%	16%	0%	0%	11%	0%	0%	1%	0%	1%	1%	1%		100%	
3:15 PM - 4:15 PM	Trucks	27	0	0	27	19	0	0	0	0	0	0	19	0	19	27	46	W	0	0
	%	4%	0%	0%	4%	3%	0%	0%	0%	0%	0%	0%	3%	0%	3%	4%	3%		0%	
	Total	**681**	**33**	**0**	**714**	**587**	**31**	**16**	**0**	**47**	**66**	**33**	**556**	**0**	**589**	**697**	**1350**		**14**	**14**
	PHF	0.97	0.75	0	0.95	0.96	0.65	0.5	0	0.73	0.66	0.59	0.96	0	0.93	0.97	0.95			
	Approach %				53%	43%				3%	5%				44%	52%				

CATEGORY NR-C - Non-Rural Arterial
Auxiliary Lane Requirements

(4) Auxiliary turn lanes shall be installed according to the criteria below.
(a) A left turn lane with storage length plus taper length is required for any access with a projected peak hour left ingress turning volume greater than 25 vph. If the posted speed is greater than 40 mph, a deceleration lane and taper is required for any access with a projected peak hour left ingress turning volume greater than 10 vph. The taper length will be included within the deceleration length.
(b) A right turn lane with storage length plus taper length is required for any access with a projected peak hour right ingress turning volume greater than 50 vph. If the posted speed is greater than 40 mph, a right turn deceleration lane and taper is required for any access with a projected peak hour right ingress turning volume greater than 25 vph. The taper length will be included within the deceleration length.
(c) The issuing authority or Department may require an auxiliary lane when it is specifically identified and documented that the lane is necessary to prevent or correct an operational or safety condition, or as determined by section 3.5.

Study Name	Archuleta - 6th St
Start Date	Thursday, September 04, 2025 6:30 AM
End Date	Thursday, September 04, 2025 5:45 PM
Site Code	

2030 Volumes (factored)

5-yr factor
1.0509691

		Westbound					Northbound					Eastbound							Crosswalk	
Time Period	**Class.**	**T**	**L**	**U**	**I**	**O**	**R**	**L**	**U**	**I**	**O**	**R**	**T**	**U**	**I**	**O**	**Total**		**destria**	**Total**
Peak 1	Lights	398	27	0	425	596	21	10	0	31	62	35	575	0	610	408	1066	E	0	0
Specified Period	%	90%	92%	0%	90%	91%	91%	95%	0%	92%	92%	93%	91%	0%	91%	90%	90%		0%	
6:30 AM - 9:45 AM	Buses	3	0	0	3	8	1	0	0	1	1	1	7	0	8	3	12	S	2	2
One Hour Peak	%	1%	0%	0%	1%	1%	4%	0%	0%	3%	1%	3%	1%	0%	1%	1%	1%		100%	
7:30 AM - 8:30 AM	Trucks	21	1	0	22	22	0	0	0	0	1	0	22	0	22	21	44	W	0	0
	%	5%	3%	0%	5%	3%	0%	0%	0%	0%	1%	0%	3%	0%	3%	5%	4%		0%	
	Total	***443.5***	***29.43***	***0***	***472.9***	***657.9***	***23.12***	***10.51***	***0***	***33.63***	***67.26***	***37.83***	***634.8***	***0***	***672.6***	***454***	***1179***		**2**	**2**
	PHF	0.82	0.64	0	0.81	0.89	0.79	0.62	0	0.73	0.76	0.6	0.89	0	0.87	0.82	0.88			
	Approach %				40%	56%				3%	6%				57%	39%				
Peak 2	Lights	650	33	0	683	560	26	16	0	42	66	33	534	0	567	666	1292	E	0	0
Specified Period	%	91%	95%	0%	91%	91%	80%	95%	0%	85%	95%	95%	91%	0%	92%	91%	91%		0%	
2:30 PM - 5:45 PM	Buses	4	0	0	4	8	5	0	0	5	0	0	3	0	3	4	12	S	14	14
One Hour Peak	%	1%	0%	0%	1%	1%	15%	0%	0%	10%	0%	0%	1%	0%	0%	1%	1%		100%	
3:15 PM - 4:15 PM	Trucks	27	0	0	27	19	0	0	0	0	0	0	19	0	19	27	46	W	0	0
	%	4%	0%	0%	4%	3%	0%	0%	0%	0%	0%	0%	3%	0%	3%	4%	3%		0%	
	Total	***715.7***	***34.68***	***0***	***750.4***	***616.9***	***32.58***	***16.82***	***0***	***49.4***	***69.36***	***34.68***	***584.3***	***0***	***619***	***732.5***	***1419***		**14**	**14**
	PHF	0.97	0.75	0	0.95	0.96	0.65	0.5	0	0.73	0.66	0.59	0.96	0	0.93	0.97	0.95			
	Approach %				53%	43%				3%	5%				44%	52%				

CATEGORY NR-C - Non-Rural Arterial
Auxiliary Lane Requirements

(4) **Auxiliary turn lanes shall be installed according to the criteria below.**
(a) A left turn lane with storage length plus taper length is required for any access with a projected peak hour left ingress turning volume greater than 25 vph. If the posted speed is greater than 40 mph, a deceleration lane and taper is required for any access with a projected peak hour left ingress turning volume greater than 10 vph. The taper length will be included within the deceleration length.
(b) A right turn lane with storage length plus taper length is required for any access with a projected peak hour right ingress turning volume greater than 50 vph. If the posted speed is greater than 40 mph, a right turn deceleration lane and taper is required for any access with a projected peak hour right ingress turning volume greater than 25 vph. The taper length will be included within the deceleration length.
(c) The issuing authority or Department may require an auxiliary lane when it is specifically identified and documented that the lane is necessary to prevent or correct an operational or safety condition, or as determined by section 3.5.

Study Name Archuleta - 8th St
Start Date Thursday, September 04, 2025 6:30 AM
End Date Thursday, September 04, 2025 5:45 PM
Site Code

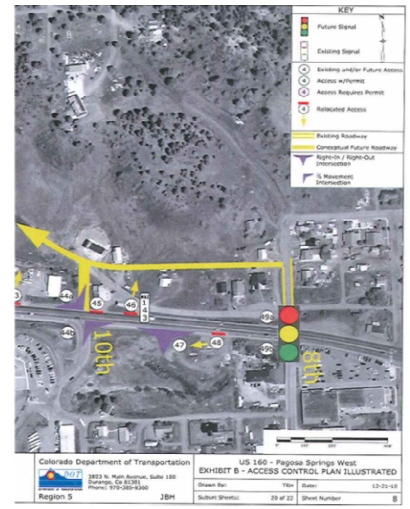
Report Summary

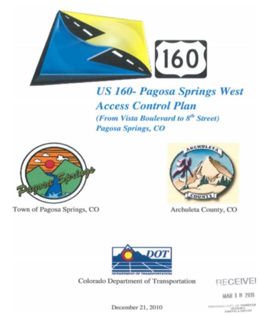
Time Period	Class.	Southbound						Westbound						Northbound						Eastbound							Crosswalk		
		R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	Total		destria	Total
Peak 1	Lights	22	31	6	0	59	37	6	357	45	0	408	575	73	23	237	0	333	189	113	496	8	0	617	616	1417	N	0	0
Specified Period	%	96%	100%	86%	0%	97%	90%	86%	93%	100%	0%	94%	95%	96%	92%	99%	0%	98%	99%	99%	95%	89%	0%	96%	96%	96%		0%	
6:30 AM - 9:45 AM	Buses	1	0	0	0	1	1	0	2	0	0	2	8	0	0	0	0	0	1	1	8	1	0	10	3	13	E	1	1
One Hour Peak	%	4%	0%	0%	0%	2%	2%	0%	1%	0%	0%	0%	1%	0%	0%	0%	0%	0%	1%	1%	2%	11%	0%	2%	0%	1%		100%	
7:30 AM - 8:30 AM	Trucks	0	0	1	0	1	3	1	23	0	0	24	22	3	2	2	0	7	0	0	18	0	0	18	25	50	S	0	0
	%	0%	0%	14%	0%	2%	7%	14%	6%	0%	0%	6%	4%	4%	8%	1%	0%	2%	0%	0%	3%	0%	0%	3%	4%	3%		0%	
	Total	**23**	**31**	**7**	**0**	**61**	**41**	**7**	**382**	**45**	**0**	**434**	**605**	**76**	**25**	**239**	**0**	**340**	**190**	**114**	**522**	**9**	**0**	**645**	**644**	**1480**	W	0	0
	PHF	0.57	0.55	0.88	0	0.59	0.85	0.44	0.79	0.75	0	0.8	0.86	0.76	0.69	0.76	0	0.75	0.77	0.84	0.87	0.56	0	0.89	0.77	0.91		0%	
	Approach %					4%	3%					29%	41%					23%	13%					44%	44%			**1**	**1**
Peak 2	Lights	25	8	7	0	40	52	5	610	40	0	655	560	50	34	275	0	359	188	140	503	13	0	656	910	1710	N	1	1
Specified Period	%	96%	100%	100%	0%	98%	96%	100%	97%	98%	0%	97%	96%	98%	97%	97%	0%	97%	98%	98%	96%	93%	0%	96%	97%	97%		100%	
2:30 PM - 5:45 PM	Buses	1	0	0	0	1	1	0	3	0	0	3	3	1	0	6	0	7	1	1	2	1	0	4	10	15	E	0	0
One Hour Peak	%	4%	0%	0%	0%	2%	2%	0%	0%	0%	0%	0%	1%	2%	0%	2%	0%	2%	1%	1%	0%	7%	0%	1%	1%	1%		0%	
3:15 PM - 4:15 PM	Trucks	0	0	0	0	0	1	0	19	1	0	20	20	0	1	2	0	3	3	2	20	0	0	22	21	45	S	6	6
	%	0%	0%	0%	0%	0%	2%	0%	3%	2%	0%	3%	3%	0%	3%	1%	0%	1%	2%	1%	4%	0%	0%	3%	2%	3%		100%	
	Total	**26**	**8**	**7**	**0**	**41**	**54**	**5**	**632**	**41**	**0**	**678**	**583**	**51**	**35**	**283**	**0**	**369**	**192**	**143**	**525**	**14**	**0**	**682**	**941**	**1770**	W	6	6
	PHF	0.72	0.5	0.44	0	0.79	0.75	0.62	0.94	0.85	0	0.94	0.92	0.64	0.62	0.73	0	0.82	0.91	0.87	0.97	0.58	0	0.97	0.92	0.98		100%	
	Approach %					2%	3%					38%	33%					21%	11%					39%	53%			**13**	**13**

CATEGORY NR-C - Non-Rural Arterial
Auxiliary Lane Requirements

(4) Auxiliary turn lanes shall be installed according to the criteria below
(a) A left turn lane with storage length plus taper length is required f
peak hour left ingress turning volume greater than 25 vph. If the posted s
deceleration lane and taper is required for any access with a projected p
volume greater than 10 vph. The taper length will be included within the
(b) A right turn lane with storage length plus taper length is required
projected peak hour right ingress turning volume greater than 50 vph. If t

than 40 mph, a right turn deceleration lane and taper is required for any a
hour right ingress turning volume greater than 25 vph. The taper length w
deceleration length.
(c) The issuing authority or Department may require an auxiliary lan
identified and documented that the lane is necessary to prevent or correc
condition, or as determined by section 3.5.





Study Name Archuleta - 8th St
Start Date Thursday, September 04, 2025 6:30 AM
End Date Thursday, September 04, 2025 5:45 PM
Site Code

2030 Volumes (factored)

5-yr factor
1.0509691

		Southbound						Westbound						Northbound						Eastbound								Crosswalk	
Time Period	Class.	R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	Total		destria	Total
Peak 1	Lights	22	31	6	0	59	37	6	357	45	0	408	575	73	23	237	0	333	189	113	496	8	0	617	616	1417	N	0	0
Specified Period	%	91%	95%	82%	0%	92%	86%	82%	89%	95%	0%	89%	90%	91%	88%	94%	0%	93%	95%	94%	90%	85%	0%	91%	91%	91%		0%	
6:30 AM - 9:45 AM	Buses	1	0	0	0	1	1	0	2	0	0	2	8	0	0	0	0	0	1	1	8	1	0	10	3	13	E	1	1
One Hour Peak	%	4%	0%	0%	0%	2%	2%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	1%	1%	1%	11%	0%	1%	0%	1%		100%	
7:30 AM - 8:30 AM	Trucks	0	0	1	0	1	3	1	23	0	0	24	22	3	2	2	0	7	0	0	18	0	0	18	25	50	S	0	0
	%	0%	0%	14%	0%	2%	7%	14%	6%	0%	0%	5%	3%	4%	8%	1%	0%	2%	0%	0%	3%	0%	0%	3%	4%	3%		0%	
	Total	***24.17***	***32.58***	***7.36***	***0.00***	***64.11***	***43.09***	***7.357***	***401.5***	***47.29***	***0***	***456.1***	***635.8***	***79.87***	***26.27***	***251.2***	***0***	***357.3***	***199.7***	***119.8***	***548.6***	***9.459***	***0***	***677.9***	***676.8***	***1555***	W	0	0
	PHF	0.57	0.55	0.88	0	0.59	0.85	0.44	0.79	0.75	0	0.8	0.86	0.76	0.69	0.76	0	0.75	0.77	0.84	0.87	0.56	0	0.89	0.77	0.91		0%	
	Approach %					4%	3%					29%	41%					23%	13%					44%	44%			**1**	**1**
Peak 2	Lights	25	8	7	0	40	52	5	610	40	0	655	560	50	34	275	0	359	188	140	503	13	0	656	910	1710	N	1	1
Specified Period	%	91%	95%	95%	0%	93%	92%	95%	92%	93%	0%	92%	91%	93%	92%	92%	0%	93%	93%	93%	91%	88%	0%	92%	92%	92%		100%	
2:30 PM - 5:45 PM	Buses	1	0	0	0	1	1	0	3	0	0	3	3	1	0	6	0	7	1	1	2	1	0	4	10	15	E	0	0
One Hour Peak	%	4%	0%	0%	0%	2%	2%	0%	0%	0%	0%	0%	0%	2%	0%	2%	0%	2%	0%	1%	0%	7%	0%	1%	1%	1%		0%	
3:15 PM - 4:15 PM	Trucks	0	0	0	0	0	1	0	19	1	0	20	20	0	1	2	0	3	3	2	20	0	0	22	21	45	S	6	6
	%	0%	0%	0%	0%	0%	2%	0%	3%	2%	0%	3%	3%	0%	3%	1%	0%	1%	1%	1%	4%	0%	0%	3%	2%	2%		100%	
	Total	***27.33***	***8.408***	***7.357***	***0***	***43.09***	***56.75***	***5.255***	***664.2***	***43.09***	***0***	***712.6***	***612.7***	***53.6***	***36.78***	***297.4***	***0***	***387.8***	***201.8***	***150.3***	***551.8***	***14.71***	***0***	***716.8***	***989***	***1860***	W	6	6
	PHF	0.72	0.5	0.44	0	0.79	0.75	0.62	0.94	0.85	0	0.94	0.92	0.64	0.62	0.73	0	0.82	0.91	0.87	0.97	0.58	0	0.97	0.92	0.98		100%	
	Approach %					2%	3%					38%	33%					21%	11%					39%	53%			**13**	**13**

Study Name Archuleta - Vista BLVD
Start Date Thursday, September 04, 2025 6:30 AM
End Date Thursday, September 04, 2025 5:30 PM
Site Code

Report Summary

		Southbound					Westbound					Eastbound							Crosswalk	
Time Period	Class.	BR	HL	U	I	O	HR	T	U	I	O	T	BL	U	I	O	Total		edestria	Total
Peak 1	Lights	32	110	0	142	86	45	182	0	227	558	448	41	0	489	214	858	N	0	0
Specified Period	%	94%	98%	0%	97%	99%	100%	86%	0%	88%	96%	96%	98%	0%	96%	87%	94%		0%	
6:30 AM - 9:30 AM	Buses	0	1	0	1	0	0	1	0	1	2	1	0	0	1	1	3	NE	0	0
One Hour Peak	%	0%	1%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%	
7:15 AM - 8:15 AM	Trucks	2	1	0	3	1	0	29	0	29	21	20	1	0	21	31	53	SW	0	0
	%	6%	1%	0%	2%	1%	0%	14%	0%	11%	4%	4%	2%	0%	4%	13%	6%		0%	
	Total	**34**	**112**	**0**	**146**	**87**	**45**	**212**	**0**	**257**	**581**	**469**	**42**	**0**	**511**	**246**	**914**		**0**	**0**
	PHF	0.77	0.7	0	0.76	0.6	0.56	0.8	0	0.75	0.86	0.92	0.66	0	0.93	0.81	0.89			
	Approach %				16%	10%				28%	64%				56%	27%				
Peak 2	Lights	61	41	0	102	120	75	451	0	526	338	297	45	0	342	512	970	N	0	0
Specified Period	%	98%	100%	0%	99%	99%	99%	96%	0%	96%	94%	94%	100%	0%	94%	96%	96%		0%	
2:30 PM - 5:30 PM	Buses	1	0	0	1	1	1	3	0	4	2	2	0	0	2	4	7	NE	0	0
One Hour Peak	%	2%	0%	0%	1%	1%	1%	1%	0%	1%	1%	1%	0%	0%	1%	1%	1%		0%	
3:45 PM - 4:45 PM	Trucks	0	0	0	0	0	0	18	0	18	18	18	0	0	18	18	36	SW	0	0
	%	0%	0%	0%	0%	0%	0%	4%	0%	3%	5%	6%	0%	0%	5%	3%	4%		0%	
	Total	**62**	**41**	**0**	**103**	**121**	**76**	**472**	**0**	**548**	**358**	**317**	**45**	**0**	**362**	**534**	**1013**		**0**	**0**
	PHF	0.82	0.73	0	0.89	0.92	0.9	0.9	0	0.91	0.81	0.83	0.87	0	0.85	0.93	0.92			
	Approach %				10%	12%				54%	35%				36%	53%				

CATEGORY NR-A - Non-Rural Principal Highway

Auxiliary Lane Requirements

(7) Auxiliary turn lanes shall be installed according to the criteria below.

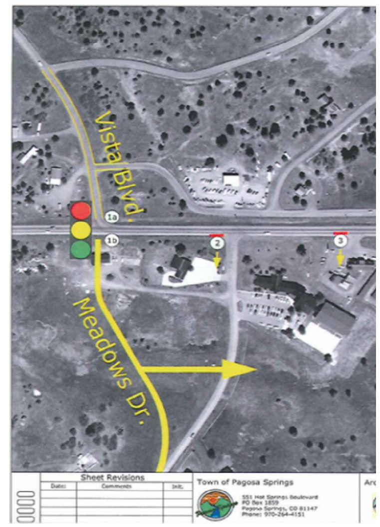
(a) A left turn deceleration lane and taper with storage length is required for any access with a projected peak hour ingress turning volume greater than 10 vph. The taper length will be included within the required deceleration length.

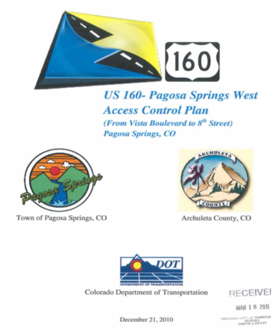
(b) A right turn deceleration lane and taper is required for any access with a projected peak hour ingress turning volume greater than 25 vph. The taper length will be included within the required deceleration length.

(c) Right turn acceleration lane and taper is required for any access with a projected peak hour right turning volume greater than 50 vph when the posted speed on the highway is greater than 40 mph. The taper length will be included within the required acceleration length. A right turn acceleration lane may also be required at signalized intersections if a free-right turn is needed to maintain an appropriate level of service.

(d) Right turn deceleration and acceleration lanes are generally not required on roadways with three or more travel lanes in the direction of the right turn except as provided in subsection 3.5.

(e) A left turn acceleration lane may be required if it would be a benefit to the safety and operation of the roadway or as determined by subsection 3.5. A left turn acceleration lane is generally not required where: the posted speed is less than 45 mph, or the intersection is signalized, or the acceleration lane would interfere with the left turn ingress movements to any other access.





Study Name Archuleta - Vista BLVD
Start Date Thursday, September 04, 2025 6:30 AM
End Date Thursday, September 04, 2025 5:30 PM
Site Code

2030 Volumes (factored)

			Southbound					Westbound					Eastbound							Crosswalk	
	Time Period	Class.	BR	HL	U	I	O	HR	T	U	I	O	T	BL	U	I	O	Total		destria	Total
	Peak 1	Lights	32	110	0	142	86	45	182	0	227	558	448	41	0	489	214	858	N	0	0
	Specified Period	%	89%	93%	0%	92%	93%	94%	81%	0%	83%	90%	90%	92%	0%	90%	82%	88%		0%	
	6:30 AM - 9:30 AM	Buses	0	1	0	1	0	0	1	0	1	2	1	0	0	1	1	3	NE	0	0
	One Hour Peak	%	0%	1%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%	
	7:15 AM - 8:15 AM	Trucks	2	1	0	3	1	0	29	0	29	21	20	1	0	21	31	53	SW	0	0
5-yr factor		%	6%	1%	0%	2%	1%	0%	13%	0%	11%	3%	4%	2%	0%	4%	12%	5%		0%	
1.0615756		***Total***	***36.09***	***118.9***	***0***	***155***	***92.36***	***47.77***	***225.1***	***0***	***272.8***	***616.8***	***497.9***	***44.59***	***0***	***542.5***	***261.1***	***970.3***		**0**	**0**
		PHF	0.77	0.7	0	0.76	0.6	0.56	0.8	0	0.75	0.86	0.92	0.66	0	0.93	0.81	0.89			
		Approach %				16%	10%				28%	64%				56%	27%				
	Peak 2	Lights	61	41	0	102	120	75	451	0	526	338	297	45	0	342	512	970	N	0	0
	Specified Period	%	93%	94%	0%	93%	93%	93%	90%	0%	90%	89%	88%	94%	0%	89%	90%	90%		0%	
	2:30 PM - 5:30 PM	Buses	1	0	0	1	1	1	3	0	4	2	2	0	0	2	4	7	NE	0	0
	One Hour Peak	%	2%	0%	0%	1%	1%	1%	1%	0%	1%	1%	1%	0%	0%	1%	1%	1%		0%	
	3:45 PM - 4:45 PM	Trucks	0	0	0	0	0	0	18	0	18	18	18	0	0	18	18	36	SW	0	0
		%	0%	0%	0%	0%	0%	0%	4%	0%	3%	5%	5%	0%	0%	5%	3%	3%		0%	
		Total	***65.82***	***43.52***	***0***	***109.3***	***128.5***	***80.68***	***501.1***	***0***	***581.7***	***380***	***336.5***	***47.77***	***0***	***384.3***	***566.9***	***1075***		**0**	**0**
		PHF	0.82	0.73	0	0.89	0.92	0.9	0.9	0	0.91	0.81	0.83	0.87	0	0.85	0.93	0.92			
		Approach %				10%	12%				54%	35%				36%	53%				

CATEGORY NR-A - Non-Rural Principal Highway

Auxiliary Lane Requirements

(7) Auxiliary turn lanes shall be installed according to the criteria below.

(a) A left turn deceleration lane and taper with storage length is required for any access with a projected peak hour ingress turning volume greater than 10 vph. The taper length will be included within the required deceleration length.

(b) A right turn deceleration lane and taper is required for any access with a projected peak hour ingress turning volume greater than 25 vph. The taper length will be included within the required deceleration length.

(c) Right turn acceleration lane and taper is required for any access with a projected peak hour right turning volume greater than 50 vph when the posted speed on the highway is greater than 40 mph. The taper length will be included within the required acceleration length. A right turn acceleration lane may also be required at signalized intersections if a free-right turn is needed to maintain an appropriate level of service.

(d) Right turn deceleration and acceleration lanes are generally not required on roadways with three or more travel lanes in the direction of the right turn except as provided in subsection 3.5.

(e) A left turn acceleration lane may be required if it would be a benefit to the safety and operation of the roadway or as determined by subsection 3.5. A left turn acceleration lane is generally not required where: the posted speed is less than 45 mph, or the intersection is signalized, or the acceleration lane would interfere with the left turn ingress movements to any other access.

Appendix F

Traffic – Traffic Model Results (Synchro/SimTraffic)

HCM 6th Signalized Intersection Summary
3: 8th St & US 160

10/01/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	549	405	47	401	7	495	36	80	7	44	24
Future Volume (veh/h)	9	549	405	47	401	7	495	36	80	7	44	24
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	10	597	440	51	436	8	538	39	87	8	48	26
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	422	755	702	163	1517	28	491	171	381	57	32	31
Arrive On Green	0.00	0.40	0.44	0.00	0.43	0.46	0.22	0.33	0.37	0.06	0.02	0.02
Sat Flow, veh/h	1781	1870	1585	1781	3570	65	1781	515	1149	166	1624	1585
Grp Volume(v), veh/h	10	597	440	51	217	227	538	0	126	56	0	26
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1777	1859	1781	0	1664	1791	0	1585
Q Serve(g_s), s	0.1	21.5	16.5	0.1	6.1	6.1	17.0	0.0	4.1	0.8	0.0	1.3
Cycle Q Clear(g_c), s	0.1	21.5	16.5	0.1	6.1	6.1	17.0	0.0	4.1	2.3	0.0	1.3
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.69	0.14		1.00
Lane Grp Cap(c), veh/h	422	755	702	163	755	790	491	0	552	158	0	31
V/C Ratio(X)	0.02	0.79	0.63	0.31	0.29	0.29	1.10	0.00	0.23	0.35	0.00	0.84
Avail Cap(c_a), veh/h	466	755	702	184	755	790	491	0	801	466	0	310
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.5	20.1	16.5	31.2	14.5	14.4	28.0	0.0	17.8	37.8	0.0	37.5
Incr Delay (d2), s/veh	0.0	8.3	4.2	1.1	1.0	0.9	69.3	0.0	0.2	1.3	0.0	42.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	10.4	6.3	0.9	2.5	2.6	18.5	0.0	1.5	1.0	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.5	28.4	20.7	32.3	15.4	15.3	97.3	0.0	18.0	39.2	0.0	80.1
LnGrp LOS	B	C	C	C	B	B	F	A	B	D	A	F
Approach Vol, veh/h		1047			495			664			82	
Approach Delay, s/veh		25.0			17.1			82.2			52.1	
Approach LOS		C			B			F			D	
Timer - Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.3	38.0		32.5	4.7	39.6	24.0	8.5				
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	4.0	34.0		40.0	5.0	33.0	20.0	18.0				
Max Q Clear Time (g_c+I1), s	3.1	24.5		6.1	3.1	9.1	20.0	4.3				
Green Ext Time (p_c), s	0.0	4.0		0.8	0.0	2.7	0.0	0.2				
Intersection Summary												
HCM 6th Ctrl Delay			40.9									
HCM 6th LOS			D									

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	584	35	41	716	0	0
Future Vol, veh/h	584	35	41	716	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	50	-	0	175
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	635	38	45	778	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	673	0	1522	654
Stage 1	-	-	-	-	654	-
Stage 2	-	-	-	-	868	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	918	-	130	467
Stage 1	-	-	-	-	517	-
Stage 2	-	-	-	-	411	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	918	-	124	467
Mov Cap-2 Maneuver	-	-	-	-	124	-
Stage 1	-	-	-	-	517	-
Stage 2	-	-	-	-	391	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	-	918	-
HCM Lane V/C Ratio	-	-	-	-	0.049	-
HCM Control Delay (s)	0	0	-	-	9.1	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	-	0.2	-

Intersection	
Int Delay, s/veh	18.9

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	213	94	113	498	225	157
Future Vol, veh/h	213	94	113	498	225	157
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	200	0	0	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	232	102	123	541	245	171

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1032	245	416	0	-	0
Stage 1	245	-	-	-	-	-
Stage 2	787	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	258	794	1143	-	-	-
Stage 1	796	-	-	-	-	-
Stage 2	449	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 230	794	1143	-	-	-
Mov Cap-2 Maneuver	~ 230	-	-	-	-	-
Stage 1	710	-	-	-	-	-
Stage 2	449	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	76.9	1.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SELn2	SWT	SWR
Capacity (veh/h)	1143	-	230	794	-	-
HCM Lane V/C Ratio	0.107	-	1.007	0.129	-	-
HCM Control Delay (s)	8.5	-	106.4	10.2	-	-
HCM Lane LOS	A	-	F	B	-	-
HCM 95th %tile Q(veh)	0.4	-	9.4	0.4	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection												
Int Delay, s/veh	13.3											
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations												
Traffic Vol, veh/h	10	20	5	10	20	291	5	106	10	340	123	0
Future Vol, veh/h	10	20	5	10	20	291	5	106	10	340	123	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	22	5	11	22	316	5	115	11	370	134	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	338	0	0	27	0	0	316	407	25	312	251	180
Stage 1	-	-	-	-	-	-	47	47	-	202	202	-
Stage 2	-	-	-	-	-	-	269	360	-	110	49	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1221	-	-	1587	-	-	637	533	1051	641	652	863
Stage 1	-	-	-	-	-	-	967	856	-	800	734	-
Stage 2	-	-	-	-	-	-	737	626	-	895	854	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1221	-	-	1587	-	-	527	523	1051	520	640	863
Mov Cap-2 Maneuver	-	-	-	-	-	-	527	523	-	520	640	-
Stage 1	-	-	-	-	-	-	958	848	-	793	727	-
Stage 2	-	-	-	-	-	-	596	620	-	759	846	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.3	0.2	13.7	23.2
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	546	1221	-	-	1587	-	-	520	640
HCM Lane V/C Ratio	0.241	0.009	-	-	0.007	-	-	0.711	0.209
HCM Control Delay (s)	13.7	8	0	-	7.3	0	-	27.2	12.1
HCM Lane LOS	B	A	A	-	A	A	-	D	B
HCM 95th %tile Q(veh)	0.9	0	-	-	0	-	-	5.7	0.8

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	360	0	0	304	10	2	4	2	23	2	13
Future Vol, veh/h	10	360	0	0	304	10	2	4	2	23	2	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	391	0	0	330	11	2	4	2	25	2	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	341	0	0	391	0	0	757	754	391	752	749	336
Stage 1	-	-	-	-	-	-	413	413	-	336	336	-
Stage 2	-	-	-	-	-	-	344	341	-	416	413	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1218	-	-	1168	-	-	324	338	658	327	341	706
Stage 1	-	-	-	-	-	-	616	594	-	678	642	-
Stage 2	-	-	-	-	-	-	671	639	-	614	594	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1218	-	-	1168	-	-	313	334	658	320	337	706
Mov Cap-2 Maneuver	-	-	-	-	-	-	313	334	-	320	337	-
Stage 1	-	-	-	-	-	-	609	587	-	670	642	-
Stage 2	-	-	-	-	-	-	655	639	-	600	587	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	14.9	15.2
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	374	1218	-	-	1168	-	-	395
HCM Lane V/C Ratio	0.023	0.009	-	-	-	-	-	0.105
HCM Control Delay (s)	14.9	8	0	-	0	-	-	15.2
HCM Lane LOS	B	A	A	-	A	-	-	C
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.3

Intersection	
Int Delay, s/veh	8.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	20	340	32	20	2	291	2	27	10	10	2
Future Vol, veh/h	2	20	340	32	20	2	291	2	27	10	10	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	22	370	35	22	2	316	2	29	11	11	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	24	0	0	392	0	0	311	305	207	320	489	23
Stage 1	-	-	-	-	-	-	211	211	-	93	93	-
Stage 2	-	-	-	-	-	-	100	94	-	227	396	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1591	-	-	1167	-	-	642	608	833	633	480	1054
Stage 1	-	-	-	-	-	-	791	728	-	914	818	-
Stage 2	-	-	-	-	-	-	906	817	-	776	604	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1591	-	-	1167	-	-	614	589	833	594	465	1054
Mov Cap-2 Maneuver	-	-	-	-	-	-	614	589	-	594	465	-
Stage 1	-	-	-	-	-	-	789	727	-	912	793	-
Stage 2	-	-	-	-	-	-	865	792	-	745	603	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	4.8	17.6	11.9
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	628	1591	-	-	1167	-	-	547
HCM Lane V/C Ratio	0.554	0.001	-	-	0.03	-	-	0.044
HCM Control Delay (s)	17.6	7.3	0	-	8.2	0	-	11.9
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	3.4	0	-	-	0.1	-	-	0.1

Intersection						
Int Delay, s/veh	7.7					

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations		↑	↑		Y	
Traffic Vol, veh/h	0	251	92	0	235	103
Future Vol, veh/h	0	251	92	0	235	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	273	100	0	255	112

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	373	100
Stage 1	-	-	-	-	100	-
Stage 2	-	-	-	-	273	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	0	-	-	0	628	956
Stage 1	0	-	-	0	924	-
Stage 2	0	-	-	0	773	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	628	956
Mov Cap-2 Maneuver	-	-	-	-	628	-
Stage 1	-	-	-	-	924	-
Stage 2	-	-	-	-	773	-

Approach	SE	NW	SW
HCM Control Delay, s	0	0	15.6
HCM LOS			C

Minor Lane/Major Mvmt	NWT	SET	SWLn1
Capacity (veh/h)	-	-	701
HCM Lane V/C Ratio	-	-	0.524
HCM Control Delay (s)	-	-	15.6
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	3.1

Intersection	
Int Delay, s/veh	3.2

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	83	307	92	0	25	97
Future Vol, veh/h	83	307	92	0	25	97
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	90	334	100	0	27	105

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	100	0	-	0	614	100
Stage 1	-	-	-	-	100	-
Stage 2	-	-	-	-	514	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1493	-	-	0	455	956
Stage 1	-	-	-	0	924	-
Stage 2	-	-	-	0	600	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1493	-	-	-	428	956
Mov Cap-2 Maneuver	-	-	-	-	428	-
Stage 1	-	-	-	-	869	-
Stage 2	-	-	-	-	600	-

Approach	SE	NW	SW
HCM Control Delay, s	1.6	0	10.7
HCM LOS			B

Minor Lane/Major Mvmt	NWT	SEL	SET	SWLn1
Capacity (veh/h)	-	1493	-	763
HCM Lane V/C Ratio	-	0.06	-	0.174
HCM Control Delay (s)	-	7.6	-	10.7
HCM Lane LOS	-	A	-	B
HCM 95th %tile Q(veh)	-	0.2	-	0.6

Summary of All Intervals

Run Number	1	2	3	4	5	6	7
Start Time	6:57	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:00	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	63	63	63	63	63	63	63
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	4457	4563	4403	4484	4344	4392	4520
Vehs Exited	4453	4564	4398	4453	4332	4385	4530
Starting Vehs	116	124	112	111	115	114	125
Ending Vehs	120	123	117	142	127	121	115
Travel Distance (mi)	3028	3116	2994	3034	2977	2993	3098
Travel Time (hr)	126.2	133.1	128.1	128.2	126.4	126.7	133.4
Total Delay (hr)	19.0	22.9	21.8	20.6	20.5	20.4	23.5
Total Stops	3056	3357	3296	3171	3150	3258	3407
Fuel Used (gal)	100.4	105.0	100.5	101.4	99.1	100.3	104.1

Summary of All Intervals

Run Number	8	9	10	Avg
Start Time	6:57	6:57	6:57	6:57
End Time	8:00	8:00	8:00	8:00
Total Time (min)	63	63	63	63
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	4477	4535	4521	4470
Vehs Exited	4478	4530	4503	4462
Starting Vehs	126	137	107	112
Ending Vehs	125	142	125	119
Travel Distance (mi)	3065	3084	3087	3048
Travel Time (hr)	130.9	132.3	131.4	129.7
Total Delay (hr)	22.2	22.8	22.1	21.6
Total Stops	3287	3413	3339	3272
Fuel Used (gal)	102.9	103.6	104.1	102.1

Interval #0 Information Seeding

Start Time	6:57
End Time	7:00
Total Time (min)	3

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	6	7
Vehs Entered	4457	4563	4403	4484	4344	4392	4520
Vehs Exited	4453	4564	4398	4453	4332	4385	4530
Starting Vehs	116	124	112	111	115	114	125
Ending Vehs	120	123	117	142	127	121	115
Travel Distance (mi)	3028	3116	2994	3034	2977	2993	3098
Travel Time (hr)	126.2	133.1	128.1	128.2	126.4	126.7	133.4
Total Delay (hr)	19.0	22.9	21.8	20.6	20.5	20.4	23.5
Total Stops	3056	3357	3296	3171	3150	3258	3407
Fuel Used (gal)	100.4	105.0	100.5	101.4	99.1	100.3	104.1

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	8	9	10	Avg
Vehs Entered	4477	4535	4521	4470
Vehs Exited	4478	4530	4503	4462
Starting Vehs	126	137	107	112
Ending Vehs	125	142	125	119
Travel Distance (mi)	3065	3084	3087	3048
Travel Time (hr)	130.9	132.3	131.4	129.7
Total Delay (hr)	22.2	22.8	22.1	21.6
Total Stops	3287	3413	3339	3272
Fuel Used (gal)	102.9	103.6	104.1	102.1

3: Performance by movement

7: Performance by movement

10: Performance by movement

11: Performance by movement

12: Performance by movement

15: Performance by movement

19: Performance by movement

22: Performance by movement

24: Performance by movement

Total Network Performance

Intersection: 3: US 160 & 8th St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	TR	L	TR	LT	R
Maximum Queue (ft)	88	297	104	67	104	119	283	352	85	37
Average Queue (ft)	8	164	57	27	49	53	211	95	36	16
95th Queue (ft)	49	262	93	55	89	97	307	298	72	40
Link Distance (ft)		1346			728	728		2941	488	488
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	100		675	200			260			
Storage Blk Time (%)		18					6	0		
Queuing Penalty (veh)		74					7	0		

Intersection: 7: US 160 & 8th St

Movement	EB	WB	WB
Directions Served	TR	L	T
Maximum Queue (ft)	16	47	21
Average Queue (ft)	1	16	1
95th Queue (ft)	9	44	17
Link Distance (ft)	728		859
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		50	
Storage Blk Time (%)		0	
Queuing Penalty (veh)		3	

Intersection: 10: US 160 & Vista

Movement	SE	SE	NE	SW
Directions Served	L	R	L	TR
Maximum Queue (ft)	204	151	70	33
Average Queue (ft)	98	39	30	3
95th Queue (ft)	178	96	60	16
Link Distance (ft)		570	2374	1805
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	200			
Storage Blk Time (%)	2			
Queuing Penalty (veh)	2			

Intersection: 11: 8th & Apache

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	L	TR
Maximum Queue (ft)	35	38	80	188	82
Average Queue (ft)	5	6	43	78	41
95th Queue (ft)	23	24	68	137	67
Link Distance (ft)	571	714	707	2941	2941
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 12: 6th & Apache

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	37	31	40
Average Queue (ft)	4	7	22
95th Queue (ft)	24	28	46
Link Distance (ft)	714	439	2795
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 15: 5th & Apache

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	23	56	150	34
Average Queue (ft)	2	13	66	15
95th Queue (ft)	14	43	109	40
Link Distance (ft)	366	951	1721	528
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 19: School Entry

Movement	SE	NW
Directions Served	LT	TR
Maximum Queue (ft)	141	15
Average Queue (ft)	44	2
95th Queue (ft)	102	11
Link Distance (ft)	266	513
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 22: Vista & Park

Movement	SW
Directions Served	LR
Maximum Queue (ft)	143
Average Queue (ft)	71
95th Queue (ft)	115
Link Distance (ft)	281
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 24: School Exit

Movement	SE	SW
Directions Served	LT	LR
Maximum Queue (ft)	47	76
Average Queue (ft)	7	39
95th Queue (ft)	32	61
Link Distance (ft)	513	462
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 86

Appendix G

Traffic – Preliminary Cost Estimate

ORDER OF MAGNITUDE EOPC

ASD - Vista Site Road Improvements

SGM Project No. 2025-345 **Prepared By:** **Dan Cokley**

Date Prepared: **10/2/2025** **Reviewed By:**

Project Description & Assumptions:

Aux Lane / Location	Length	**12** ft Width	Paved Area (sf)
US 160 WB Right	**435**	ft (inc. taper) (16 ft width)	**6960**
US 160 SB Right (Accel)	**960**	ft (inc. taper) (16 ft width)	**15360**
Vista (@ US 160) SB Left	**250**	ft + 90 ft (taper)	**3000**
Vista (@ School) NB Right	**100**	ft + 90 ft (taper)	**1200**
Vista (@ School) SB Left	**100**	ft + 90 ft (taper)	**1200**
Vista (@ Park) SB Left	**100**	ft + 90 ft (taper)	**1200**

Calculations Based on the Following:

28920 sf of roadway area — 15% Muck Ex assumption for roadway 2 ft depth

5 in. HMA

12 in. Class 6 ABC

1 Vista / US 160 Traffic Signal - Not included in Total EOPC

10000 lf 4" Concrete Sidewalk (6 ft wide, inc. ABC) - Not included in Total EOPC

Item Description	Unit	Quantity	Unit Cost	Total Cost
Pavement Removal	SY	111	$20	$2,223
Roadway Grading	SY	3,213	$100	$321,333
Muck Excavation	CY	321	$75	$24,100
ABC Class 6	TON	2,262	$75	$169,616
HMA (SX) (75) (PG 58-28)	TON	1,019	$225	$229,168

Total Accounted Roadway Construction Items **$746,000** **(a)**

Total EOPC with other project costs and contingency (next page) **$2,045,000**

Item Description	*Unit*	*Quantity*	*Unit Cost*	*Total Cost*
Vista / US 160 Traffic Signal	*LS*	*1*	*$300,000*	*$375,000*
4" Concrete Sidewalk	*SY*	*6,667*	*$125*	*$1,040,000*
		Contingency	*25%*	

Total with Traffic Signal and Pedestrian Improvements *$3,460,000*

ORDER OF MAGNITUDE EOPC

ASD - Vista Site Road Improvements

Other Project Costs Established as a % of Total Acounted Construction Items

	Total Accounted Construction Items		**$746,000**	**(a)**
	% Range	**% Used**		
Contingencies	15% - 30% of (a) Default = 25%	25%	$186,500	(b)
Erosion Control (Temp + Perm)	6% - 10% of (a+b) Default = 6%	7%	$65,275	(c)
Drainage/Water/Sewer	3% - 10% of (a+b) Default = 6%	10%	$99,778	(d)
Signing and Striping	1% - 5% of (Σ a – d) Default = 5%	5%	$54,878	(e)
Construction Signing & Traffic Control	5% - 25% of (Σ a – e) Default = 20%	20%	$230,486	(f)
Mobilization	4% - 10% of (Σ a – f) Default = 7%	12%	$165,950	(g)
Total of Construction Items	(a+b+c+d+e+f+g)		**$1,548,866**	**(h)**
Force Account - Utilities	1% - 2% of (h) Default = 2%	0%	$0	(i)
Force Account - Misc.	10% - 15% of (h) Default = 12%	0%	$0	(j)
Subtotal of Construction Cost	(h+i+j)		**$1,548,866**	**(k)**
Total Construction Engineering	10% - 25% of (k) Default = 20%	15.0%	$232,330	
Total Preliminary Engineering	10% - 15% of (k) Default = 12%	12.0%	$185,864	
Total Preliminary Survey	10% - 15% of (k) Default = 12%	5%	$77,443	
Right of Way / Utilities	Project Dependent	Not Included		
Total EOPC with other project costs and contingency			**$2,045,000**	

ORDER OF MAGNITUDE EOPC
ASD - HS / Trujillo Site Road Improvements

SGM Project No. 2025-345 **Prepared By:** **Dan Cokley**

Date Prepared: **10/2/2025** **Reviewed By:**

Project Description & Assumptions:

Aux Lane / Location	Length	**12** ft Width	Paved Area (sf)
8th (@ Apache) SB Left	**200** ft + 90 ft (taper)		**2400**
5th St / School Access	**800** ft (24 ft width)		**19200**

Calculations Based on the Following:

21600	sf of roadway area	15%	Muck Ex assumption for roadway 2 ft depth
8	in. Concrete	80%	
5	in. HMA	20%	
12	in. Class 6 ABC		
300	lf Curb & Gutter		
300	lf 4" Concrete Sidewalk (6 ft wide, inc. ABC)		
	Signal Timing Adjustment		

Item Description	Unit	Quantity	Unit Cost	Total Cost
Pavement Removal	SY	1,200	$35	$42,000
Roadway Grading	SY	1,200	$100	$120,000
Muck Excavation	CY	120	$75	$9,000
ABC Class 6	TON	1,469	$75	$110,160
HMA (SX) (75) (PG 58-28)	TON	720	$225	$162,068
Concrete Pavement (8")	SY	213	$250	$53,333
Concrete Sidewalk (4")	SY	200	$125	$25,000
Curb and Gutter	LF	300	$65	$19,500

Total Accounted Roadway Construction Items	**$541,000**	**(a)**

Total EOPC with other project costs and contingency	**$1,631,000**

ORDER OF MAGNITUDE EOPC

ASD - HS / Trujillo Site Road Improvements

Other Project Costs Established as a % of Total Acounted Construction Items

	Total Accounted Construction Items		**$541,000**	**(a)**
	% Range	**% Used**		
Contingencies	15% - 30% of (a) Default = 25%	25%	$135,250	(b)
Erosion Control (Temp + Perm)	6% - 10% of (a+b) Default = 6%	7%	$47,338	(c)
Drainage/Water/Sewer	3% - 10% of (a+b) Default = 6%	10%	$72,359	(d)
Signing and Striping	1% - 5% of (Σ a – d) Default = 5%	5%	$39,797	(e)
Construction Signing & Traffic Control	5% - 25% of (Σ a – e) Default = 20%	20%	$167,149	(f)
Mobilization	4% - 10% of (Σ a – f) Default = 7%	12%	$120,347	(g)
Total of Construction Items	(a+b+c+d+e+f+g)		**$1,123,239**	**(h)**
Signal Timing Adjustment	% of (h)	10%	$112,324	(i)
Force Account - Misc.	10% - 15% of (h) Default = 12%	0%	$0	(j)
Subtotal of Construction Cost	(h+i+j)		**$1,235,563**	**(k)**
Total Construction Engineering	10% - 25% of (k) Default = 20%	15.0%	$185,334	
Total Preliminary Engineering	10% - 15% of (k) Default = 12%	12.0%	$148,268	
Total Preliminary Survey	10% - 15% of (k) Default = 12%	5%	$61,778	
Right of Way / Utilities	Project Dependent	Not Included		
Total EOPC with other project costs and contingency			**$1,631,000**	

Appendix H

Geotechnical Report

TRAUTNER GEOTECH LLC

FEASIBILITY GEOTECHNICAL ENGINEERING STUDY
ARCHULETA COUNTY SCHOOL PROJECTS
EXISTING PAGOSA SPRINGS HIGH SCHOOL CAMPUS AND VISTA BOULEVARD SITE
PAGOSA SPRINGS, COLORADO

March 7, 2025

PREPARED FOR:

Brian Calhoun AIA, LEED AP
RTA Architects
brian@rtaarchitects.com
PROJECT NO. 58704GE

Table of Contents

1.0 REPORT INTRODUCTION

This report presents our feasibility level geotechnical engineering recommendations for the potential new school facility sites to be located at the existing Pagosa Springs High School Campus and/or along Vista Boulevard in Pagosa Springs, Colorado. This report was requested by Brian Calhoun of RTA Architects and was prepared in accordance with our proposal dated December 30, 2024, Proposal No. 24466P.

As outlined within our proposal for services for this project the client is responsible for appropriate distribution of this report to other design professionals and/or governmental agencies unless specific arrangements have been made with us for distribution.

This geotechnical engineering report is the beginning of a process involving the geotechnical engineering consultant on any project. It is imperative that the geotechnical engineer be consulted throughout the design and construction process to verify the implementation of the geotechnical engineering recommendations provided in this report. Often the design has not been started or has only been initiated at the time of the preparation of the geotechnical engineering study. Changes in the proposed design must be communicated to the geotechnical engineer so that we have the opportunity to tailor our recommendations as needed based on the proposed site development and structure design.

All recommendations provided within this report must be followed in order to achieve the intended performance of the foundation system and other components that are supported by the site soil.

1.1 Scope of Project

Architectural details and grading plans were not available at the time of this report. We understand the Archuleta County School District, in conjunction with RTA Architects, is evaluating multiple potential sites for future School District facilities. The locations and scope of the proposed construction are unknown at this time and the locations of our field exploration were broad and general in nature. Our field exploration concentrated on multiple locations adjacent to the existing Pagosa Springs High School campus and another site along Vista Boulevard on the west side of Pagosa Springs.

This report provides feasibility level geotechnical engineering design considerations which may be used by members of the development team for this site, but does not provide design level geotechnical engineering recommendations, foundation design or design of structure components. We should be contacted to perform additional site-specific geotechnical engineering studies in order to provide geotechnical engineering design level parameters.

2.0 FIELD STUDY

2.1 Site Description and Geomorphology - High School Site

The project site adjacent to the existing Pagosa Springs High School spans from the south end of South 5th Street adjacent to the Archuleta County School Bus Facility and up to the west-northwest past the high school building up a drainage towards County Road 500. The approximate project area is provided in the schematic below; however, our subsurface exploration was limited to five boring locations throughout the south and west sides of the project area as specified by RTA.

The southeast portion of the site adjacent to South 5th Street was formerly utilized for sewage treatment lagoon which has been backfilled. Historical aerial imagery indicates that the lagoon just east of the bus maintenance facility was likely filled in about 2011 but was likely inactive for several years before it was filled. The area is currently used for general storage of equipment and miscellaneous fill materials. From the end of South 5th Street the ground surface generally slopes up to the west. Exposed shale formational material was observed west of the bus maintenance building. The area west of the existing high school building is a drainage that appears to be at the transition between the Mancos Shale and Dakota Sandstone formations. Shale is exposed on the slope surface east of the drainage and sandstone is exposed west of the drainage. A site schematic showing the property limits is provided in Section 2.3 below.

2.2 Site Description and Geomorphology - Vista Boulevard Site

The Vista Boulevard site consists of an approximate 37 acre parcel on the north-northeast side of the road. The ground surface is gently rolling with scattered Ponderosa Pine trees between grassy meadow areas. A site schematic showing the property limits is provided in Section 2.3 below.

2.3 Subsurface Soil and Water Conditions

We advanced five test borings at the high school site and two borings at the Vista Boulevard site. The locations of the borings were identified by RTA. A schematic showing the approximate boring locations is provided below as Figure 3 and 4. The logs of the soils encountered in our test borings are presented in Appendix A.

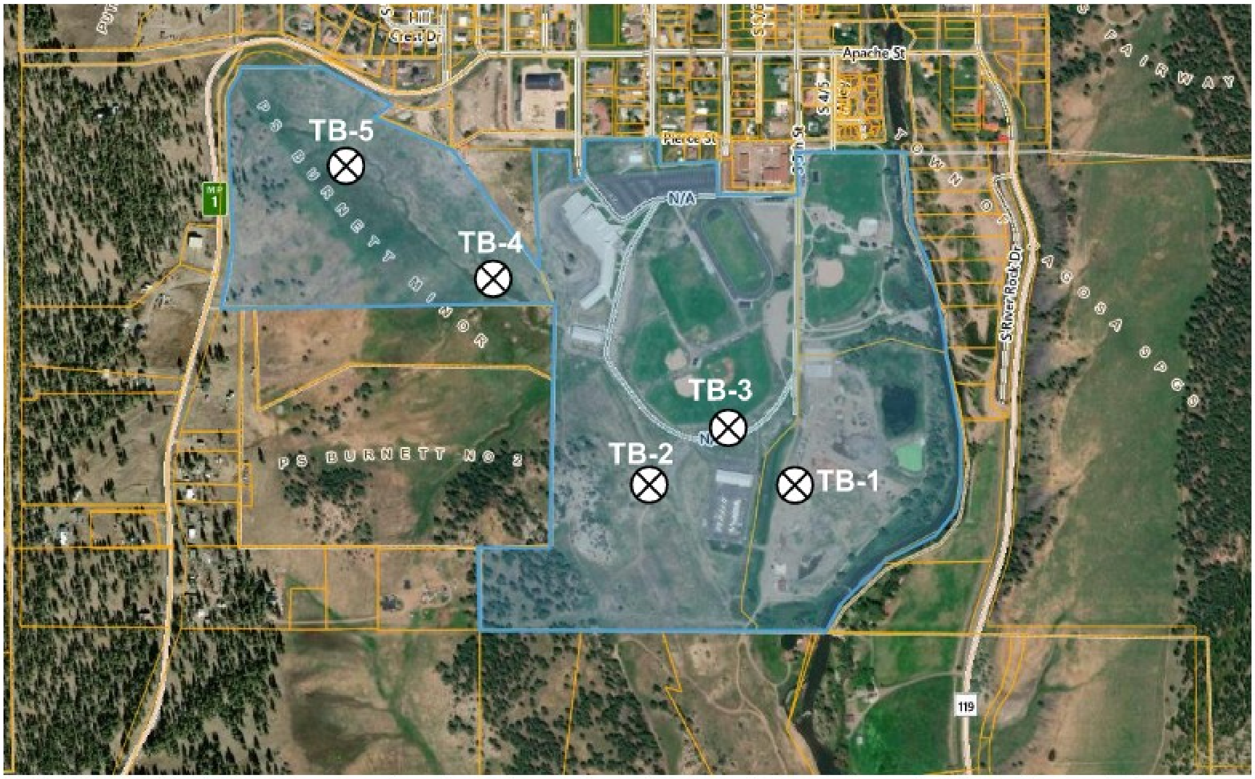


Figure 1: High School project area locations of exploratory borings. Adapted from Archuleta County GIS.

The schematic presented above was prepared using notes and field measurements obtained during our field exploration and is intended to show the approximate test boring locations for reference purposes only.

The subsurface conditions encountered in our test borings at the high school are described below.

The soils encountered in TB-1 consisted of about 10½ feet of man-placed fill consisting of lean clay with sand, gravel and scattered organics overlying very dense, clayey gravel with sand and cobbles (GC) until practical auger drilling refusal was encountered in the dense cobbles.

The soils encountered in TB-2 consisted of about 12 feet of lean clay with sand (CL) overlying clayey gravel with sand and cobbles until practical auger drilling refusal was encountered on either cobbles or sandstone formation at 15 feet.

The soils encountered in TB-3 consisted of about 4½ feet of very stiff CL overlying fractured sandstone formation until practical auger drilling refusal was encountered at 7 feet.

The soils encountered in TB-4 consisted of about 4½ feet of very stiff CL overlying fractured sandstone formation to about 9 feet where very hard sandstone was encountered until practical auger drilling refusal was encountered at10 feet.

The soils encountered in TB-5 consisted of about 3½ feet of very stiff CL overlying clayey gravel with sand and cobbles (GC) to a depth of about 6 feet. Beneath the GC soils hard to very hard shale formation was encountered to about 14 feet where sandstone was encountered until practical auger drilling refusal at 15 feet.

Free subsurface water was encountered at a depth of approximatley 8½ feet in TB-1 and 11 feet in TB-5 during drilling. We suspect that the subsurface water elevation and soil moisture conditions will be influenced by snow melt and/or precipitation and local irrigation.

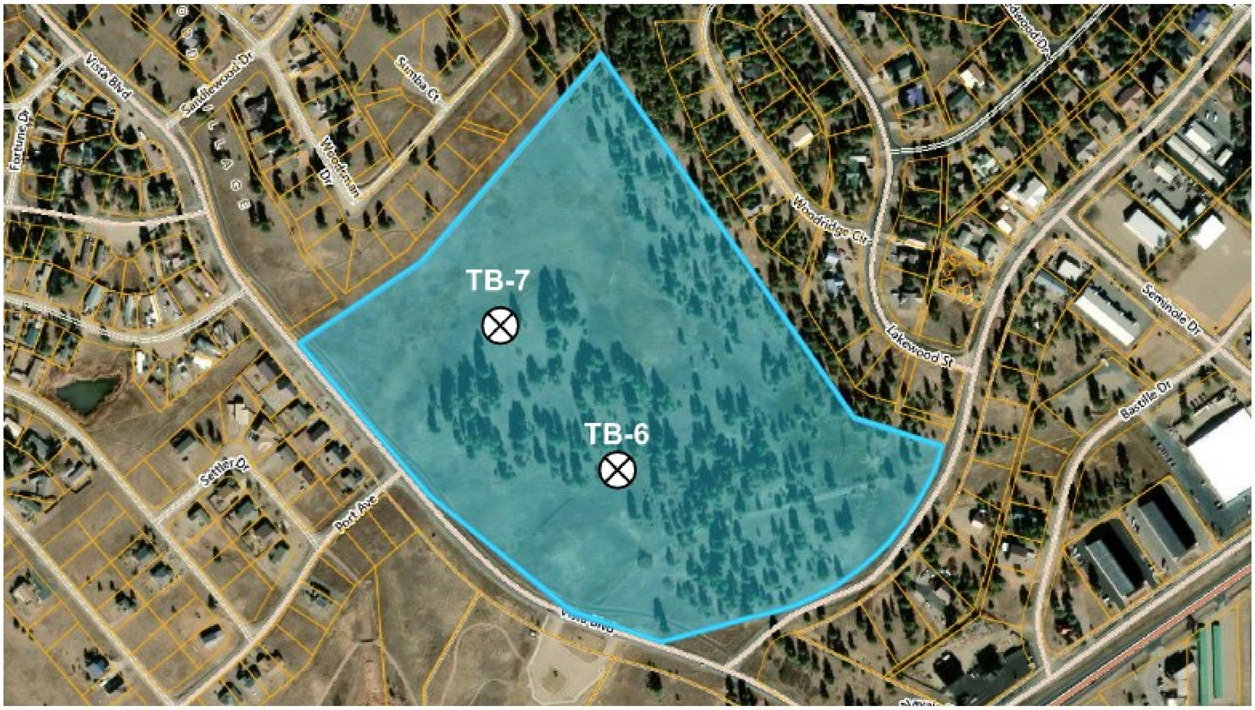


Figure 2: Vista Boulevard locations of exploratory borings. Adapted from Archuleta County GIS.

The subsurface conditions encountered at the Vista Boulevard site consisted of about 2½ to 5 feet of very stiff lean clay (CL) overlying hard to very hard shale formation to about 14 feet. TB-6 was terminated in the shale formation. Sandstone formation was encountered beneath the shale at about 14 feet in TB-7 until practical auger drilling refusal at about 15½ feet.

The logs of the subsurface soil conditions encountered in our test borings are presented in Appendix A. The logs present our interpretation of the subsurface conditions encountered in the test borings at the time of our field work. Subsurface soil and water conditions are often variable across relatively short distances. It is likely that variable subsurface soil and water conditions will be encountered during construction. Laboratory soil classifications of samples obtained may differ from field classifications.

3.0 LABORATORY STUDY

The laboratory study included tests to estimate the strength, swell and consolidation potential of the soils tested. We performed the following tests on select samples obtained from the test borings. The laboratory test results are provided in Appendix B.

- Moisture Content and Dry Density
- Sieve Analysis (Gradation)

- Atterberg Limits, Liquid Limit, Plastic Limit and Plasticity Index
- Swell Consolidation Tests

A synopsis of some of our laboratory data for some of the samples tested is tabulated below.

Sample Designation	Percent Passing #200 Sieve	Atterberg Limits LL/PI	Moisture Content (percent)	Dry Density (pcf)	Estimated Load-Back Swell Pressure (psf)	Swell or Consolidation Potential (%)
TB-1 @ 4' (High School)	-	-	10.3	120.0	6,360*	4.2 (% under 500 psf load)
TB-1 @ 5-9' (High School)	54.5	40/22	16.5	-	-	-
TB-2 @ 2' (High School)	-	-	15.1	110.9	7,200	8.6 (% under 100 psf load)
TB-3 @ 2' (High School)			14.4	114.0	9,950	12.5 (% under 100 psf load)
TB-3 @ 0-4' (High School)	78.2	57/24	19.2	-	-	-
TB-4 @ 2' (High School)	-	-	15.0	108.2	6,060	7.1 (% under 500 psf load)
TB-7 @ 2' (Vista Blvd)	-	-	10.9	112.6	5,000	8.5 (% under 100 psf load)
TB-7 @ 0-2' (Vista Blvd)	93.2	29/10	18.2	-	-	-
TB-7 @ 4.5' (Vista Blvd)	-	-	12.4	114.0	6,720	4.2 (% under 500 psf load)

Notes:

1. We determine the swell pressure as measured in our laboratory using the graphically estimated load-back swell pressure method.
2. * = Swell-Consolidation test performed on remolded sample due to rock content. Test results should be considered an estimate only of the swell or consolidation potential at the density and moisture content indicated.

4.0 FOUNDATION SYSTEM CONSIDERATIONS

The commentary provided in this section is intended to provide feasibility level recommendations that may be utilized to assess the potential challenges associated with the development of this project site. Our commentary is based on our limited field study, laboratory study and our experience with similar subsurface soil conditions. Design level geotechnical engineering recommendations are beyond the scope of this study. Once final building envelopes and plans are proposed, we recommend a design level geotechnical engineering study be completed for the school project.

There are two general types of foundation system concepts, “shallow” and “deep”, with the designation being based on the depth of support of the system. More common deep foundation system concepts include driven piles, drilled piers and steel helical piers. Shallow foundation system concepts include mats or rafts, and conventional spread footings with stem walls. There are numerous similar foundation design concepts, but the concepts listed above are of the more common types used in western Colorado.

4.1 Shallow Foundation System Considerations

There are numerous types of shallow foundation systems and variants of each type. The most common shallow foundation design concepts which have been used in western Colorado include spread footings, and mat (or raft) foundation systems.

The integrity and long-term performance of each type of system is influenced by the quality of workmanship which is implemented during construction. It is imperative that all excavation and fill placement operations be conducted by qualified personnel using appropriate equipment and techniques to provide suitable support conditions for the foundation systems.

4.1.1 Spread Footing Commentary

Conventional spread footing and stem wall foundation systems have been used successfully in western Colorado for most residential and many commercial applications. The spread footing foundation system consists of a footing which dissipates, or spreads, the loads imposed from the stem wall (or beam) from the structure above.

The soil samples tested in our test borings at both sites had relatively high swell pressures and swell potentials. The owner or developer must understand if the swell pressure generated by the expansive soil on this site exceeds the minimum dead load which is imposed by the spread footing or other structural components, and the expansive site soils become wetted, uplift of the foundation system and other structural components is highly likely. It must be understood that our subsurface exploration was very limited and did not consider proposed cut depths or building footprints at either site. More detailed site investigations must be completed once conceptual building locations and grading plans are developed. Additional discussion for each site is provided below.

4.1.2 Spread Footing Concepts - High School Site

We performed limited subsurface exploration in multiple distinct areas at the high school campus site. The different locations are discussed individually below. The soil samples tested in our test borings had relatively high swell pressures and swell potentials. The samples tested showed measured swell pressures that ranged from about 6,000 up to 10,000 pounds per square foot and swell potential magnitudes between 4.2 and 12.5 percent under surcharge loads between 100 and 500 pounds per square foot. The owner or developer must understand if the swell pressure generated by the expansive soil on this site exceeds the minimum dead load which is imposed by the spread footing or other structural components, and the expansive site soils become wetted, uplift of the foundation system and other structural components is highly likely. In general, we do not recommend placement of shallow foundations on the clay soils or existing fill soils in this area; however, careful orientation of structures may allow for support of shallow foundation systems on shallow formational materials.

The lower area in the vicinity of TB-1 is the location of a former sewage lagoon. Our exploratory boring appears to be located near the edge of the former lagoon and fill depths of 10 feet or more should be anticipated. Due to the thickness of the fill and unknown means and methods of placement, shallow foundation systems are not recommended in this area. Deep foundation concepts are discussed below which may be appropriate for this area.

We advanced two borings (TB-2 and TB-3) in the area adjacent to the bus maintenance facility. This area was characterized by very high swell pressures and variable soil conditions. The depth to formation ranged from about 4½ feet in TB-3 up to a depth of 12 feet or more at TB-2. Due to the expansive soil conditions encountered across much of the project area, a shallow foundation system is not recommended in areas where the swell pressures are likely to exceed the loads from the structures above. It may be possible to orient the structure(s) in areas where the soil horizon is thinner which may allow support of shallow foundation systems on the hard formational material. However, additional exploration would be necessary to determine the extent and depths of the formation across building footprints to determine if this is feasible. Based on the laboratory test data, we recommend that a shallow foundation system be avoided that is supported by the site clay soils. We also do not recommend support of structures on variable bearing materials such as soil and formation due to the potential for differential performance. Deep foundation system design concepts which include isolation of shallow components including floor systems from shallow soils are less likely to experience post-construction movement due to volume changes in the site soil.

We advanced two borings (TB-4 and TB-5) in the drainage above and west of the existing high school. The shallow clay soils showed very high swell pressures and swell potentials; however, the depth to formational material was found to be relatively shallow in this area. Our borings encountered formational shale and/or sandstone at depths of about 4½ to 6 feet below the adjacent ground surface. Formational material was also observed at the ground surface on the east and west margins of this area. We do not recommend placement of shallow foundation system components on the upper clay soils. Support should be provided by the underlying formational material. This may require excavation below anticipated design depths in some locations.

4.1.3 Spread Footing Concepts - Vista Boulevard Site

We performed limited subsurface exploration in multiple distinct areas at the Vista Boulevard site. The soil samples tested in our test borings had relatively high swell pressures and swell potentials. The samples tested showed measured swell pressures that ranged from about 5,000 up to 6,700 pounds per square foot and swell potential magnitudes between 4.2 and 8.5 percent under surcharge loads between 100 and 500 pounds per square foot. Shallow shale formational material was encountered in both borings at depths ranging from 2½ to 5 feet. In general, we do not recommend placement of shallow foundations on the clay soils or existing fill soils in this area; however, careful orientation of structures may allow for support of shallow foundation systems on shallow formational materials.

4.2 Deep Foundation System Considerations

Due to the expansive soil conditions and fill in some areas, we recommend a deep foundation system for support of the proposed structures unless they can be supported by formational materials as discussed in Section 4.1 above.

Deep Foundation System Concepts Discussed below include:

- Driven Piles
- Drilled Piers
- Micropiles
- Helical Piers

Four common deep foundation design concepts include driven piles, drilled piers, micropiles and helical piers. Piles are typically driven into the ground until the appropriate set criteria or end bearing elevation is attained. Steel "H-Piles" and steel "Pipe Piles" are common pile types which have been installed in western Colorado. Drilled piers are advanced using drilling equipment to establish the appropriate end bearing support elevation and consist of a steel-reinforced concrete pier column. Micropiles consist of a high tensile strength threaded steel bar that is inserted into a relatively small-diameter hole drilled with air hammer drilling equipment. The steel reinforcement bar is then grouted in place. Helical piers consist of a square or round galvanized steel shaft with a cutting head of varying diameters that are screwed into the soil mantle. The helical piers will work in compression supporting the foundation loads. The installation torque of each helical pier is measured and typically correlates to a calculated load capacity. The deep foundation system is often capped with a grade beam or similar structural component which is intended to distribute the imposed structural loads to each deep foundation system component.

Since the support elevation of any deep foundation system is at depths where the support materials are not typically influenced by climatic conditions, these systems are less susceptible to movement associated with either the swelling of expansive support materials, or consolidation of soft, wet materials.

Regardless of the type of deep foundation system concept utilized, the system design must include provisions to isolate and structurally support and building components, including flatwork, that may be influenced by volume changes within the site soil. Grade beams are utilized with most deep foundation system design concepts to facilitate isolation and structural support of various building elements. Grade beams, and any other horizontal component of a deep foundation system must be isolated from the support soil with void forms, or similar concept.

4.2.1 Driven Piles

Based on our subsurface exploration we feel that a driven pile foundation system may be a viable option for the lower high school site in the vicinity of TB-1. Driven piles will need to be driven into the formational shale material that likely lies beneath the clayey gravel with cobbles and will act as an end/tip bearing deep foundation system. However, additional subsurface exploration would be required to determine design parameters.

4.2.2 Drilled Piers

Drilled pier foundation systems are typically drilled to depth of minimum embedment into competent formational bedrock material. Friction piers supported within the soil mantel are also possible, but less common. Drilled piers may be a viable foundation alterative; however, additional site-specific subsurface exploration would be required to determine design parameters. This option may be viable for any of the sites except the lower site at the high school in the vicinity of TB-1. We anticipate refusal of the drilling equipment in this area due to the dense cobble soils prior to encountering the shale formation that likely lies beneath.

4.2.3 Micropiles

Micropile foundation systems are commonly used deep foundation systems utilized in the surrounding area and can be easily advanced through the dense cobbles and boulders. Micropiles also do not rely on end bearing for capacity; therefore, competent formational material is not a requirement. Micropiles may be a viable foundation alterative; however, additional site-specific subsurface exploration would be required to determine design parameters. Micropiles may be viable at any of the conceptual sites at the high school or Vista Boulevard.

4.2.4 Helical Piers

Helical piers are difficult to advance where there is a prevalence of large cobbles and boulders such as in the vicinity of TB-1. They are also not typically feasible where shallow hard formational material is encountered. The helical piers would likely "spin out" or reach their design torque values at too shallow of a depth limiting their depth and lateral capacity. Site specific subsurface exploration and test helical piers would be recommended prior to final design considerations.

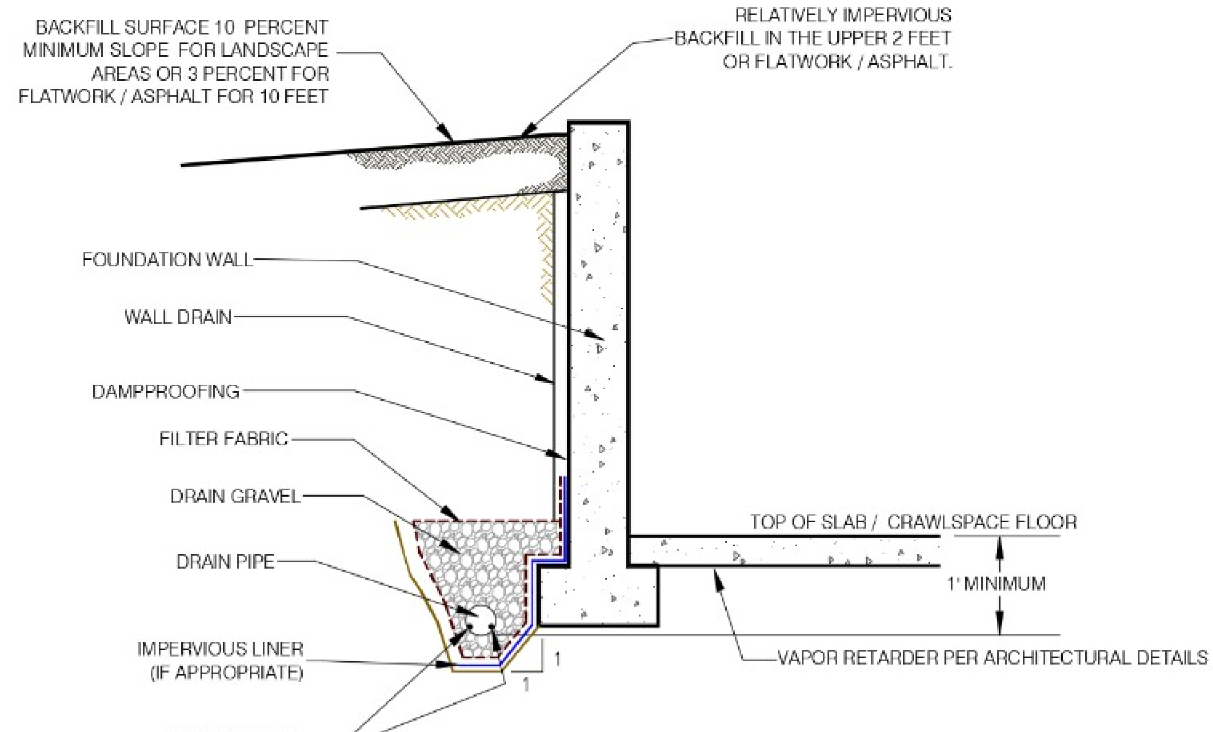
5.0 RETAINING STRUCTURES

We assume that laterally loaded walls will be constructed as part of this site development. Lateral loads will be imposed on the retaining structures by the adjacent soils and, in some cases, surcharge loads on the retained soils. The loads imposed by the soil are commonly referred to as lateral earth pressures. The magnitude of the lateral earth pressure forces is partially dependent on the soil strength characteristics, the geometry of the ground surface adjacent to the retaining structure, the subsurface water conditions and on surcharge loads.

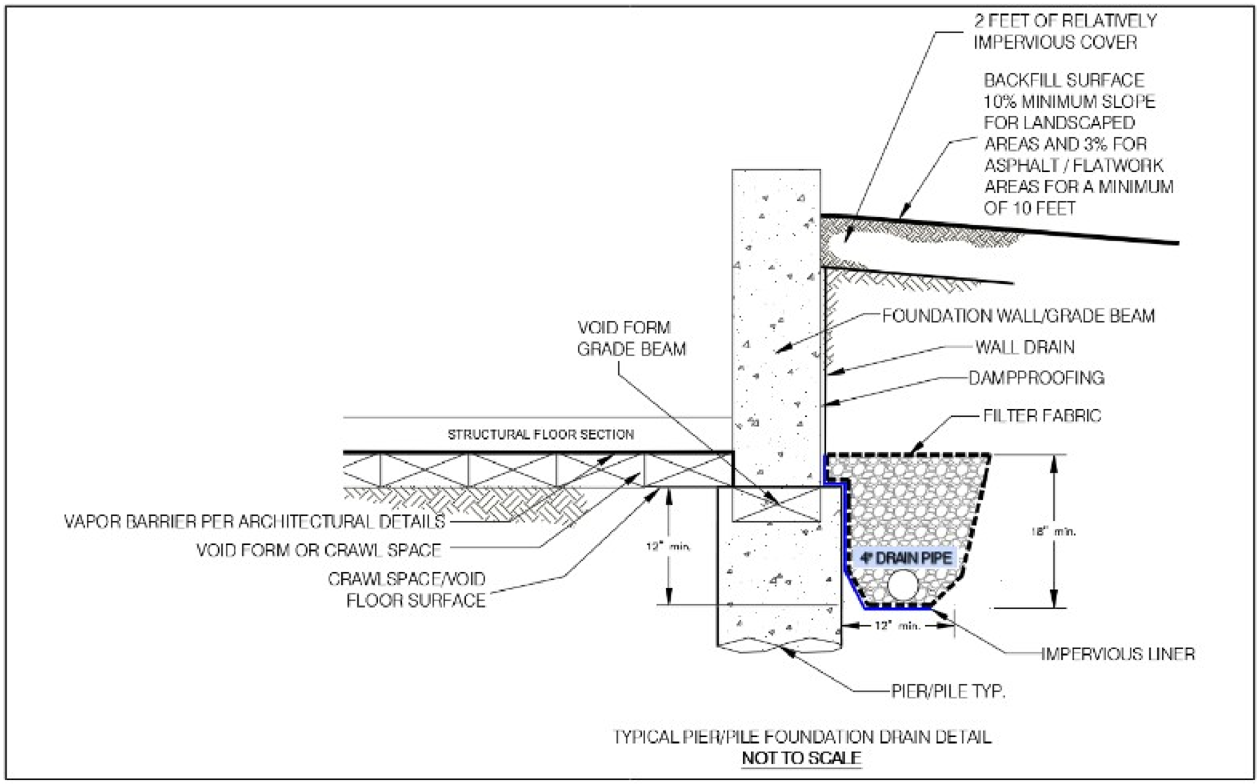
We encountered expansive soils during our subsurface exploration. Lateral earth pressures of the expansive clay soils may exert excessive stress to the retaining structures. In this case, imported granular backfill such as CDOT Class 6 roadbase is recommended for foundation wall backfill. Site-specific analysis of the on-site soils is recommended for each structure to determine the viability of the native soils for use a foundation wall backfill; however, based on our preliminary test data the expansive nature of the site overburden clay soils would likely preclude their use for retaining structure backfill.

6.0 SUBSURFACE DRAIN SYSTEMS

We recommend below-grade construction, such as retaining walls, crawlspace and basement areas, be protected from wetting and hydrostatic pressure buildup by an underdrain and wall drain system. Exterior retaining structures may be constructed with weep holes to allow subsurface water migration through the retaining structures. Topographic conditions on the site may influence the ability to install a subsurface drain system which promotes water flow away from the foundation system. Our recommendations for a typical underdrain system are given below. It should be noted that these systems are not sized to account for large amounts of surface water or concentrated flow. If the client would like more guidance or detailed recommendations for this specific site, please contact us.



TYPICAL SHALLOW FOUNDATION DRAIN DETAIL
NOT TO SCALE



Foundation Drain Detail Notes:

1. DRAIN PIPE - consists of 4-inch perforated PVC, surrounded by a minimum of 4 inches of drain gravel on the top and sides, sloped at 1% minimum to a gravity discharge or sump pit where the water can be removed by pumping. Bottom of pipe at the high point should be a minimum of 12 inches below the top of the floor. The drain pipe perforations should be oriented facing downward in a fashion to create a flow trough for water captured in the drain pipe. Solid drain piping laterals should be extended to the trench drain at 50 foot minimum intervals.
2. DRAIN GRAVEL - consists of minus 2-inch aggregate with less than 50% passing the No. 4 sieve and less than 2 percent passing the No. 200 sieve.
3. FILTER FABRIC - protect drain gravel and drain pipe with Mirafi 140N, or equivalent. Filter fabric should be burrito-wrapped around the entire section of drain gravel.
4. IMPERVIOUS LINER (WHERE APPROPRIATE) - consists of 30 mil, or thicker, PVC liner, or equivalent placed as shown. Protect liner or both sides of liner against puncture per manufacturer's recommendations. Should be provided to limit the potential for water infiltration beneath grade beams and beneath the structure on deep foundation systems. May be appropriate on shallow foundation systems if a landscape drain is utilized. See Section 8 for details.
5. VAPOR RETARDER - should be installed per architectural recommendations.
6. FILTER FABRIC - drain gravel should be protected on all sides with a Mirafi 140N filter fabric, or equivalent.
7. WALL DRAIN - consists of Miradrain 6000, or equivalent. Miradrain 6200 should be used for wall heights greater than 12 feet per the manufacturer's recommendation.

Water often will migrate along utility trench excavations. If the utility trench extends from areas above the site, this trench may be a source for subsurface water within the proposed basement or crawl space. We suggest that the utility trench backfill be thoroughly compacted to help reduce the amount of water migration. The subsurface drain system may be designed to collect subsurface water from the utility trench and fractures within the formational material and direct it to surface discharge points.

7.0 CONCRETE FLATWORK

We anticipate that both interior and exterior concrete flatwork will be considered in the project design. Concrete flatwork is typically lightly loaded and has a limited capability to resist shear forces associated with uplift from swelling soils and/or frost heave or consolidation of soft soils. It is prudent for the design and construction of concrete flatwork on this project to be able to accommodate some movement associated with soil volume changes.

The soil samples tested have a measured swell pressure of up to about 10,000 pounds per square foot and a magnitude swell potential of about 12.5 percent under a 100 pound per square foot surcharge load. Due to the measured swell potential and swell pressure, interior floors supported over a crawl space are less likely to experience movement than are concrete slabs support on grade. The following recommendations are appropriate for garage floor slabs and for interior floor slabs if the owner is willing to accept the risk of potential movement beyond normal tolerances.

7.1 Interior Concrete Slab-on-Grade Floors

Due to the relatively high swell potential of the shallow site soils we do not recommend slab-on-grade floors for interior finished areas. If a floor slab is chosen for unfinished areas it is imperative that interior walls are isolated from the lower level floor slab so that movement of the slab associated with swelling soils does not cause uplift of the interior walls and subsequently upper potions of the structure.

A primary goal in the design and construction of concrete slab-on-grade floors is to reduce the amount of post construction uplift associated with swelling soils, or downward movement due to consolidation of soft soils. A parallel goal is to reduce the potential for damage to the structure associated with any movement of the slab-on-grade which may occur. Based on the subsurface conditions encountered, our recommendations for interior floor slab support are provided below.

- Damage associated with limited movement of interior concrete slab-on-grade floor can be reduced by designing the floors as "floating" slabs. The concrete slabs should not be structurally tied to the foundations or the overlying structure. Interior walls or columns should not be supported on the interior floor slabs.
- Interior walls may be structurally supported from framing above the floor, or interior walls and support columns may be supported on interior portions of the foundation system. Partition walls should be designed and constructed with voids above, and/or below, to allow independent movement of the floor slab via slip joints. The project architect or structural engineer should provide details for isolation of interior walls from slabs-on-grade.
- If the owner chooses to construct the structures with concrete slab-on-grade floors, a relatively common concept is to remove up to about 3 feet of the expansive clay soils beneath slabs and replace with compacted structural fill. Fill placement recommendations are provided in the Construction Considerations section below. This will have a higher risk of slab movement due to soil volume changes than a structurally supported floor.
- The project structural engineer should be contacted to provide steel reinforcement design considerations and control joint for the proposed floor slabs based on the intended use.

The above recommendations will not prevent slab heave if the expansive soils underlying slabs-on-grade become wet. However, the recommendations will reduce the effects if slab heave occurs. All plumbing lines should be pressure tested before backfilling to help reduce the potential for wetting. The only means to completely mitigate the influence of volume changes on the performance of interior floors is to structurally support the floors over a void space. Floors that are suspended by the foundation system will not be influenced by volume changes in the site soils. The suggestions and recommendations presented in this section are intended to help reduce the influence of swelling soils on the performance of the concrete slab-on-grade floors.

7.1.1 Capillary and Vapor Moisture Rise

Capillary and vapor moisture rise through the slab support soil may provide a source for moisture in the concrete slab-on-grade floor. Floor coverings and vapor barriers are not related to the geotechnical engineering practice but may influence the design of floor support systems.

An option to reduce the potential for capillary rise through the floor slab is to place a layer of clean aggregate material, such as washed aggregate for the upper 4 to 6 inches of fill material supporting the concrete slabs. To reduce vapor rise through the floor slab, a moisture barrier such as a 10 mil (or thicker) plastic, or similar impervious geotextile material is often be placed below the floor slab. The material used should conform to ASTM E1745 and should be protected from punctures that will occur during the construction process. The architect, builder and floor covering/adhesive manufacturer should be contacted regarding the appropriate level of protection required for their products.

7.2 Exterior Concrete Flatwork Considerations

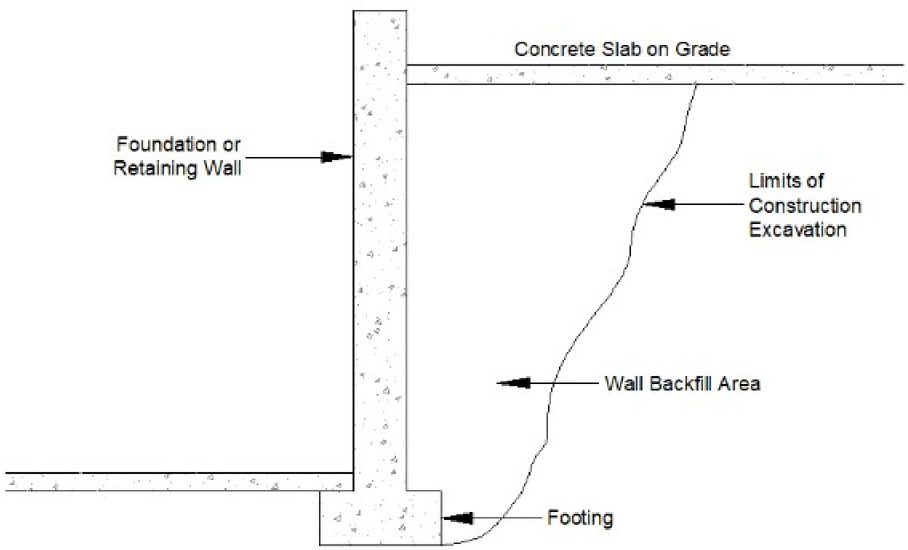
Exterior concrete flatwork includes concrete driveway slabs, aprons, patios, and walkways. The desired performance of exterior flatwork typically varies depending on the proposed use of the site and each owner's individual expectations. As with interior flatwork, exterior flatwork is particularly prone to movement and potential damage due to movement of the support soils. This movement and associated damage may be reduced by following the recommendations discussed under interior flatwork, above. Unlike interior flatwork, exterior flatwork may be exposed to frost heave, particularly on sites where the bearing soils have a high silt content which have a higher susceptibility to frost heave. Our recommendations for support of exterior flatwork are provided below.

- If some movement of exterior flatwork is acceptable, we suggest that the support areas be prepared by scarification, moisture conditioning and re-compaction of about 6 inches of the natural soils followed by placement of at least 12 inches of compacted granular fill material. The scarified material and granular fill materials should be placed as discussed under the Construction Considerations, "Fill Placement Recommendations" section of this report, below.
- It may be prudent to remove silt soils from exterior flatwork support areas where movement of exterior flatwork will adversely affect the project, such as near the interface between the driveway and the interior garage floor slab. If silty soils are encountered, they should be removed to the maximum depth of frost penetration for the area and replaced with granular structural fill such as Class 6 road base.

- It is important that exterior flatwork be separated from exterior column supports, masonry veneer, finishes and siding. No support columns, for the structure or exterior decks, should be placed on exterior concrete unless movement of the columns will not adversely affect the supported structural components. Movement of exterior flatwork may cause damage if it is in contact with portions of the structure exterior.
- Landscaping and landscaping irrigation often provide additional moisture to the soil supporting exterior flatwork. Excessive moisture will promote heave of the flatwork either due to expansive soil, or due to frost action. If movement of exterior slabs is undesirable, we recommend against placement of landscaping that requires irrigation.
- The ground surfaces near exterior flatwork must be sloped away from flatwork to reduce surface water migration to the support soil.
- Exterior flatwork should not be placed on soils prepared for support of landscaping vegetation. Cultivated soils will not provide suitable support for concrete flatwork.

7.3 General Concrete Flatwork Comments

It is relatively common that both interior and exterior concrete flatwork is supported by areas of fill adjacent to either shallow foundation walls or basement retaining walls. A typical sketch of this condition is shown below.



Wall Backfill and Slab Support Schematic

Not to Scale

Settlement of the backfill shown above will create a void and lack of soil support for the portions of the slab over the backfill. Settlement of the fill supporting the concrete flatwork is likely to cause damage to the slab-on-grade. Settlement and associated damage to the concrete flatwork may occur when the backfill is relatively deep, even if the backfill is compacted.

If this condition is likely to exist on this site it may be prudent to design the slab to be structurally supported on the retaining or foundation wall and designed to span to areas away from the backfill area as designed by the project structural engineer. We are available to discuss this with you upon request.

8.0 PAVEMENT CONSIDERATIONS

Based on the subsurface conditions encountered at both sites the shallow site soils likely have relatively low strength parameters for pavement support but are likely suitable with proper design and placement of aggregate support materials. Traffic projections and corresponding 18,000-pound (18k) equivalent single axel load (ESAL) factors were not available at the time of this report. Once detailed traffic loading and pavement alignment has been determined, we can provide a subsurface exploration and laboratory testing program to provide recommended asphalt and aggregate support thickness recommendations.

9.0 CONSTRUCTION CONSIDERATIONS

This section of the report provides comments, considerations and recommendations for aspects of the site construction which may influence or be influenced by the geotechnical engineering considerations discussed above. The information presented below is not intended to discuss all aspects of the site construction conditions and considerations that may be encountered as the project progresses. It should be noted that means and methods of construction are the responsibility of the contractor and not Trautner Geotech. However, if any questions arise as a result of our recommendations presented above, or if unexpected subsurface conditions are encountered during construction we should be contacted immediately.

9.1 Fill Placement Recommendations

There are several references throughout this report regarding both natural soil and compacted structural fill recommendations. The recommendations presented below are appropriate for the fill placement considerations discussed throughout the report above.

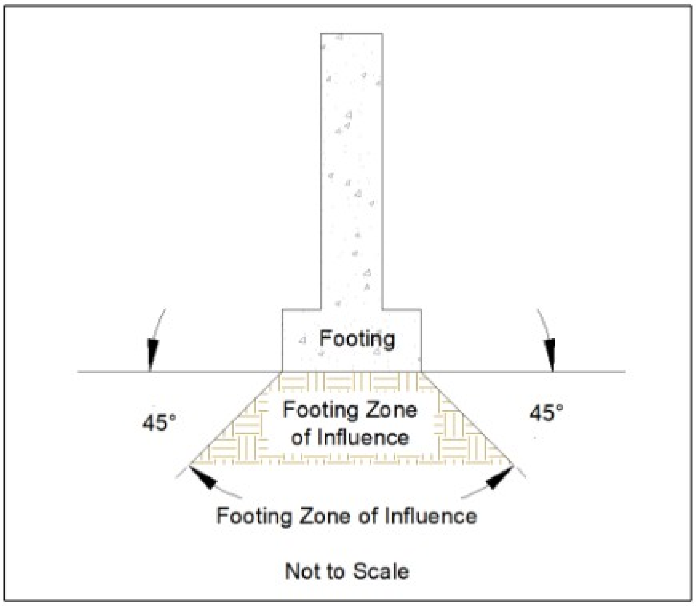
9.1.1 Subgrade Preparation

All areas to receive fill, structural components, or other site improvements should be properly prepared and grubbed at the initiation of the project construction. The grubbing operations should include scarification and removal of organic material and soil. No fill material or concrete should be placed in areas where existing vegetation or fill material exist.

We encountered man-placed fill in one of our test borings. We suspect that man-placed fill and subterranean structures may be encountered as the project construction progresses. All existing fill material should be removed from areas planned for support of structural components. Excavated areas and subterranean voids should be backfilled with properly compacted fill material as discussed below.

9.1.2 Structural Fill Placement

The compacted structural fill should be placed and compacted as discussed in the Construction Considerations, "Fill Placement Recommendations" section of this report, below. The zone of influence of the footing (at elevations close to the bottom of the footing) is often approximated as being between two lines subtended at 45 degree angles from each bottom corner of the footing. The compacted structural fill should extend beyond the zone of influence of the footing as shown in the sketch below.



A general and simple rule to apply to the geometry of the compacted structural fill blanket is that it should extend beyond each edge of the footing a distance which is equal to the fill thickness.

9.1.3 Subgrade Soil Stabilization

We suspect that soft, yielding soil conditions may be encountered at various locations on the project site during construction. This material may be challenging to compact in preparation for placement of overlying fill material. We have provided two general categories of concepts to stabilize these soils to provide a suitable substrate for placement and compaction of overlying compacted fill. These include:

- Mechanical Stabilization; using soil and/or geotextile materials, and,
- Chemical Stabilization; using dry Portland cement.

Mechanical stabilization of soil often includes placement of aggregate material and/or larger cobbles (3-4 inch size) into an area where the soils are yielding. Our general recommendations for mechanical stabilization are provided below; however, we should be consulted on a site-specific basis for any stabilization recommendations.

- Over-excavate these soft areas by about 8 to 12 inches, (or more, if needed).
- Lightly proof compact the exposed soil, typically with non-vibratory methods.
- Place a layer of woven geosynthetic or geogrid-type material, such as or Mirafi BXG120 or Tensar TX140 geogrid, followed by placement of a “clean crushed aggregate” material with a nominal maximum size of 3 inches and not more than about

5 percent passing the #4 sieve.

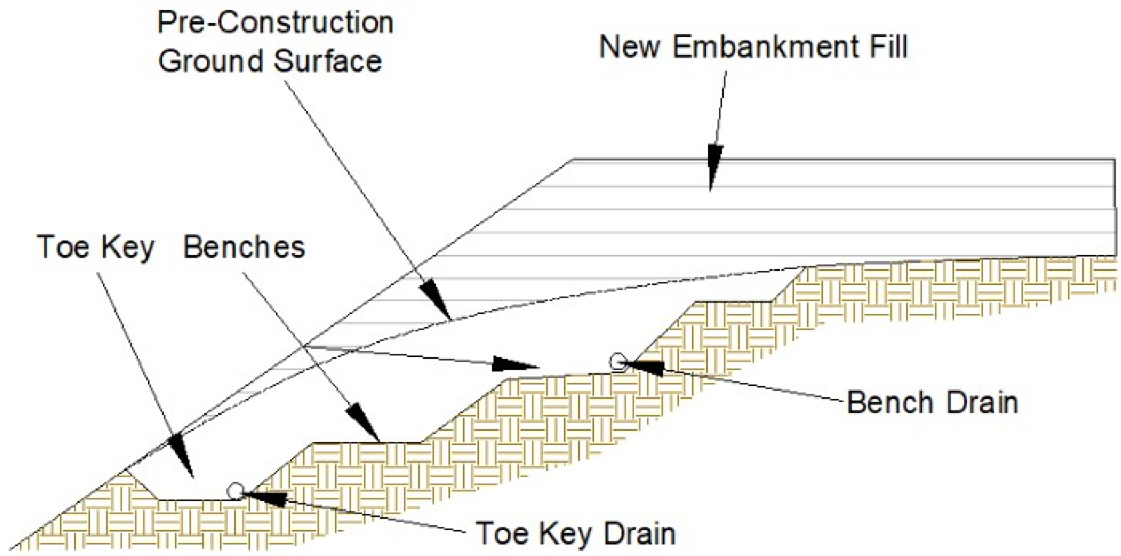
- This clean crushed aggregate material should then be consolidated with a plate-type compactor. A less robust fabric, such as a non-woven geofabric, (such as Mirafi 140N) is placed on top of this aggregate layer followed by placement and compaction of the overlying fill material.
- For sites with extremely soft conditions, it may be necessary to increase the clean aggregate layer to about 18 to 24 inches and place an intermediate layer of geogrid at mid-height of this layer.

Chemical stabilization using Portland cement is effective for most soils. Generally, this technique is more suitable for isolated soft areas. Our general recommendations are provided below.

- Portland cement powder may be placed on the surface of the soft yielding material and subsequently mixed into the soil. The effectiveness of this technique is partially dependent upon the thoroughness of the mixing.
- The application rate of the Portland cement need not be more than 10 percent of the total soil volume.
- After mixing, the material should be allowed to "rest" for about two of more hours prior to compaction. The treated material will often yield some during initial compaction but will generally increase in rigidity as the process of hydration begins takes place.
- If yielding under compaction is excessive, the material should be allowed "cure" additionally prior to continued compaction effort being applied.

9.1.2 Embankment Fill on Slopes

Embankment fill placed on slopes must be placed in areas that have been properly prepared prior to placement of the fill material. The fill should be placed in a toe key and benches constructed into the slope. The toe key and bench drains shown below should be placed to reduce the potential for water accumulation in the embankment fill and in the soils adjacent to the embankment fill. The placement of these drains is more critical on larger fill areas, areas where subsurface water exists and in areas where the slopes are marginally stable. The concept is shown below.



Toe Key and Bench Drain
Concept Schematic

Not to Scale

Our general recommendations for construction embankment fill on slopes are provided below.

- The width of the toe key should be at least one-fourth of the height of the fill. The elevation difference between each bench, width, and geometry of each bench is not critical; however, the elevation difference between each lift should not exceed about 3 to 4 feet.
- The benches should be of sufficient width to allow for placement of horizontal lifts of fill material; therefore, the size of the compaction equipment used will influence the bench widths.
- Embankment fill material thicker than 5 feet should be analyzed on a site-specific basis. The fill mass may impose significant loads on, and influence the stability of the underlying slope. We suggest that no fill slopes steeper than two and one-half to one (2½:1, horizontal to vertical) be constructed unless a slope stability analysis of the site is conducted.
- The toe key and bench drains may consist of a perforated pipe which is surrounded by a free draining material which is wrapped by a geotextile filter fabric. The pipe should be surrounded by 4 to 6 cubic feet of free draining material per lineal foot of drain pipe.

9.1.3 Fill Placement Recommendations

This report references both structural fill and natural soil fill. Structural fill is generally intended to indicate CDOT Class 6 road base, or equivalent engineered products such as Class 2 aggregate or Class 1 structural fill. We are available to discuss alternative engineered soil products for their intended use. Natural soil fill is intended to indicate soils excavated from the project site. Our recommendations for placement of fill soils as described for different uses in various sections of this report are provided below.

Fill Location/Type	Suitable Soil Type	Minimum Compaction (Modified Proctor - ASTM D1557)
Beneath Footings/Foundations	Structural Fill[1]	90%
Interior Slab Areas	Structural Fill[1]	90%
Embankment Fill	Processed Natural Soil or Structural Fill	90%
Foundation Wall Backfill - Pavement/Slab Areas	Structural Fill	90%
Foundation Wall Backfill - Landscape Areas	Structural Fill	90%
Pavement Areas Supporting Traffic Loads	Structural Fill[1]	95%

Fill Placement Notes:

1. See individual recommendation sections above for recommended fill thicknesses.
2. Natural subgrade beneath interior/exterior slabs, foundations, embankments and pavement areas should be scarified to a depth of about 8 inches and recompacted to 90% of the maximum Modified Proctor dry density at a moisture content between optimum and about 2 percent above optimum soil moisture content prior to placement of any structural fill or processed natural soil fill.
3. Care should be taken not to overcompact the fill or use large equipment near retaining structures since this may cause excessive lateral pressure on the structures. Consult the project structural engineer for backfill adjacent to retaining structures.
4. Some settlement of deep wall backfill should be expected, even if the material is placed correctly and could result in distress to facilities constructed on the backfill. Grading above the wall should be able to account for some settlement.
5. Fills should be placed and compacted in thin horizontal lifts. The thickness of the lift will be controlled by the required compaction level, material type and compaction equipment used. We typically recommend a maximum fill lift thickness of 6 inches for hand operated equipment and 8 to 10 inches for larger equipment.
6. Any natural soil used for any fill purpose should be free of all deleterious material, such as organic material and construction debris. Natural soil fill includes excavated and replaced material or in-place scarified material.
7. The proposed fill materials should be moisture conditioned to between about optimum and about 2 percent above optimum soil moisture content.
8. Moisture conditioning of clay or silt soils may require many hours of processing. If possible, water should be added and thoroughly mixed into fine grained soil such as clay or silt the day prior to use of the material. This technique will allow for development of a

more uniform moisture content and will allow for better compaction of the moisture conditioned materials.

9. The maximum recommended rock size for natural soil fill is about 3 inches. This may require on-site screening or crushing if larger rocks are present. We must be contacted if it is desired to utilize rock greater than 3 inches for fill materials.
10. Clean aggregate fill, if appropriate for the site soil conditions, must not be placed in lifts exceeding 8 inches and each lift should be thoroughly vibrated, preferably with a plate-type vibratory compactor prior to placing overlying lifts of material or structural components. We should be contacted prior to the use of clean aggregate fill materials to evaluate their suitability for use on this project.

9.1.4 Deep Fill Considerations

Deep fills, in excess of approximately 3 feet, should be avoided where possible. Fill soils will settle over time, even when placed properly per the recommendations contained in this report. Even fills placed to our minimum recommended requirements will tend to settle an estimated 1 to 3 percent. Engineered fills will tend to settle less and more rapidly than natural soil fills, especially where clay soils are present. Fill settlement will result in distress and damage to the structures they are intended to support. There are methods to reduce the effects of deep fill settlement such as surcharge loading and surveyed monitoring programs; however, there is a significant time period of monitoring required for this to be successful. A more reliable method is to support structural components with deep foundation systems bearing below the fill envelope. We can provide additional guidance regarding deep fills up on request.

9.2 Excavation Considerations

Unless a specific classification is performed, the site soils should be considered as an Occupational Safety and Health Administration (OSHA) Type C soil and should be sloped and/or benched according to the current OSHA regulations. Excavations should be sloped and benched to prevent wall collapse. Any soil can release suddenly and cave unexpectedly from excavation walls, particularly if the soils is very moist, or if fractures within the soil are present. Daily observations of the excavations should be conducted by OSHA competent site personnel to assess safety considerations. If water is encountered during construction, it may be necessary to dewater excavations to provide for suitable working conditions.

We encountered formational material in our test borings. We suspect that it may be difficult to excavate this material using conventional techniques. If blasting is planned it must be conducted strategically to reduce the effect of the blasting on the support characteristics of the site materials and the stability of adjacent slopes. We typically recommend that where possible blasting be avoided, however blasting is often needed to aid in the excavation of the site to develop the desired footing support elevations. It is typical to have about 2 to 3 feet of loose angular clasts of rock, commonly called “shot-rock” below the desired bottom of excavation elevations. This material is not suitable for support of structural components and should be removed and replaced with compacted structural fill in areas proposed for support of structural components.

If possible, excavations should be constructed to allow for water flow from the excavation the event of precipitation during construction. If this is not possible it may be necessary to remove water from snowmelt or precipitation from the foundation excavations to help reduce the influence of this water on the soil support conditions and the site construction characteristics.

9.2.1 Excavation Cut Slopes

We anticipate that some permanent excavation cut slopes may be included in the site development. Temporary cut slopes should not exceed 5 feet in height and should not be steeper than about 1:1 (horizontal to vertical) for most soils. Permanent cut slopes greater than 5 feet or steeper than 2½:1 must be analyzed on a site-specific basis.

9.3 Utility Considerations

Subsurface utility trenches will be constructed as part of the site development. Utility line backfill often becomes a conduit for post construction water migration. If utility line trenches approach the proposed project site from above, water migrating along the utility line and/or backfill may have direct access to the portions of the proposed structure where the utility line penetrations are made through the foundation system. The foundation soils in the vicinity of the utility line penetration may be influenced by the additional subsurface water. There are a few options to help mitigate water migration along utility line backfill. Backfill bulkheads constructed with high clay content soils and/or placement of subsurface drains to promote utility line water discharge away from the foundation support soil.

Some movement of all structural components is normal and expected. The amount of movement may be greater on sites with problematic soil conditions. Utility line penetrations through any walls or floor slabs should be sleeved so that movement of the walls or slabs does not induce movement or stress in the utility line. Utility connections should be flexible to allow for some movement of the floor slab.

9.4 Exterior Grading and Drainage Comments

The following recommendations should be following during construction and maintained for the life of the structure with regards to exterior grading and surface drainage.

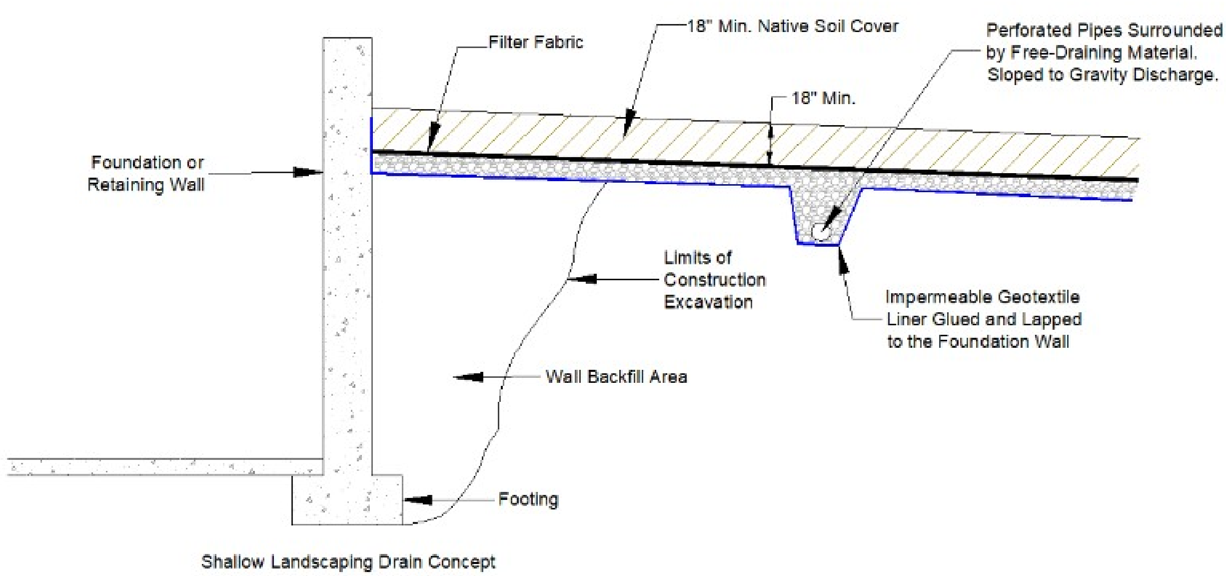
- The ground surface adjacent to the structure should be sloped to promote water flow away from the foundation system and flatwork.
- Snow storage areas should not be located in areas which will allow for snowmelt water access to support soils for the foundation system or flatwork.
- The project civil engineer, architect or builder should develop a drainage scheme for the site. We typically recommend the ground surface surrounding the exterior of the building be sloped to drain away from the foundation in all directions. We recommend a minimum slope of 12 inches in the first 10 feet in unpaved areas and a minimum slope of 3 inches in the first 10 feet in paved areas.
- Water flow from the roof of the structure should be captured and directed away from the structure. If the roof water is collected in an eave gutter system, or similar, the discharge points of the system must be located away from areas where the water will have access to the foundation backfill or any structure support soils. If downspouts are used, provisions should be made to either collect or direct the water away from the structure.

- Care should be taken to not direct water onto adjacent property or to areas that would negatively influence existing structures or improvements.

9.5 Landscaping Considerations

We recommend against construction of landscaping which requires excessive irrigation. Generally landscaping which uses abundant water requires that the landscaping contractor install topsoil which will retain moisture. The topsoil is often placed in flattened areas near the structure to further trap water and reduce water migration from away from the landscaped areas. Unfortunately, almost all aspects of landscape construction and development of lush vegetation are contrary to the establishment of a relatively dry area adjacent to the foundation walls. Excess water from landscaped areas near the structure can migrate to the foundation system or flatwork support soils, which can result in volume changes in these soils.

A relatively common concept used to collect and subsequently reduce the amount of excess irrigation water is to glue or attach an impermeable geotextile fabric or heavy mill plastic to the foundation wall and extend it below the topsoil which is used to establish the landscape vegetation. A thin layer of sand or gravel can be placed on top of the geotextile material to both protect the geotextile from punctures and to serve as a medium to promote water migration to the collection trench and perforated pipe. The landscape architect or contractor should be contacted for additional information regarding specific construction considerations for this concept which is shown in the sketch below.



Shallow Landscaping Drain Concept

Not to Scale

A free draining aggregate or sand may be placed in the collection trench around the perforated pipe. The perforated pipe should be graded to allow for positive flow of excess irrigation water away from the structure or other area where additional subsurface water is undesired. Preferably the geotextile material should extend at least 10 or more feet from the foundation system.

Care should be taken to not place exterior flatwork such as sidewalks or driveways on soils that have been tilled and prepared for landscaping. Tilled soils will settle which can cause damage to the overlying flatwork. Tilled soils placed on sloped areas often "creep" down-slope. Any structure or structural component placed on this material will move down-slope with the tilled soil and may become damaged.

9.6 Soil Sulfate and Corrosion Issues

The requested scope of our services did not include assessment of the chemical constituents of corrosion potential of the site soils. Most soils in southwest Colorado are not typically corrosive to concrete. There has not been a history of damage to concrete due to sulfate corrosion in the area.

We are available to perform soluble sulfate content tests to assess the corrosion potential of the soils on concrete if desired.

9.7 Radon Issues

The requested scope of service of this report did not include assessment of the site soils for radon production. Many soils and formational materials in western Colorado produce Radon gas. The structure should be appropriately ventilated to reduce the accumulation of Radon gas in the structure. Several Federal Government agencies including the Environmental Protection Agency (EPA) have information and guidelines available for Radon considerations and home construction. If a radon survey of the site soils is desired, please contact us.

9.8 Mold and Other Biological Contaminants

Our services do not include determining the presence, prevention or possibility of mold or other biological contaminants developing in the future. If the client is concerned about mold or other biological contaminants, a professional in this special field of practice should be consulted.

10.0 CONSTRUCTION MONITORING AND TESTING

Engineering observation of subgrade bearing conditions, compaction testing of fill material and testing of foundation concrete are equally important tasks that should be performed by the geotechnical engineering consultant during construction. We should be contacted during the construction phase of the project and/or if any questions or comments arise as a result of the information presented below. It is common for unforeseen, or otherwise variable subsurface soil and water conditions to be encountered during construction. As discussed in our proposal for our services, it is imperative that we be contacted during the foundation excavation stage of the project to verify that the conditions encountered in our field exploration were representative of those encountered during construction. Our general recommendations for construction monitoring and testing are provided below.

- Consultation with design professionals during the design phases: This is important to ensure that the intentions of our recommendations are properly incorporated in the design, and that any changes in the design concept properly consider geotechnical aspects.

- Grading Plan Review: A grading plan was not available for our review at the time of this report. A grading plan with finished floor elevations for the proposed construction should be prepared by a civil engineer licensed in the State of Colorado. Trautner Geotech should be provided with grading plans once they are complete to determine if our recommendations based on the assumed bearing elevations are appropriate.
- Observation and monitoring during construction: A representative of the Geotechnical engineer from our firm should observe the foundation excavation, earthwork, and foundation phases of the work to determine that subsurface conditions are compatible with those used in the analysis and design and our recommendations have been properly implemented. Placement of backfill should be observed and tested to judge whether the proper placement conditions have been achieved. Compaction tests should be performed on each lift of material placed in areas proposed for support of structural components.
- We recommend a representative of the geotechnical engineer observe the drain and dampproofing phases of the work to judge whether our recommendations have been properly implemented.
- If asphaltic concrete is placed for driveways or aprons near the structure we are available to provide testing of these materials during placement.

11.0 LIMITATIONS

This study has been conducted based on the geotechnical engineering standards of care in this area at the time this report was prepared. We make no warranty as to the recommendations contained in this report, either expressed or implied. The information presented in this report is based on our understanding of the proposed construction that was provided to us and on the data obtained from our field and laboratory studies. Our recommendations are based on limited field and laboratory sampling and testing. Unexpected subsurface conditions encountered during construction may alter our recommendations. We should be contacted during construction to observe the exposed subsurface soil conditions to provide comments and verification of our recommendations.

The recommendations presented above are intended to be used only for this project site and the proposed construction which was provided to us. The recommendations presented above are not suitable for adjacent project sites, or for proposed construction that is different than that outlined for this study.

This report provides geotechnical engineering design parameters but does not provide foundation design or design of structure components. The project architect, designer or structural engineer must be contacted to provide a design based on the information presented in this report.

This report should not be considered, nor used as a bidding document. Contractors reviewing this report must draw their own conclusions regarding site specific construction techniques (means and methods) to be used on this project.

This report does not provide an environmental assessment, nor does it provide environmental recommendations such as those relating to Radon or mold considerations. If recommendation relative to these or other environmental topics are needed, an environmental specialist should be contacted.

The findings of this report are valid as of the present date. However, changes in the conditions of the property can occur with the passage of time. The changes may be due to natural processes or to the works of man, on the project site or adjacent properties. In addition, changes in applicable or appropriate standards can occur, whether they result from legislation or the broadening of knowledge. Therefore, the recommendations presented in this report should not be relied upon after a period of two years from the issue date without our review.

We are available to review and tailor our recommendations as the project progresses and additional information which may influence our recommendations becomes available.

Please contact us if you have any questions, or if we may be of additional service.

Respectfully,
TRAUTNER GEOTECH

Jason A. Deem, P.G.
Principal Geologist

Reviewed by,

COLORADO LICENSED
THOMAS RICHARD HARRISON
PE0047810
03-07-25
PROFESSIONAL ENGINEER

Tom R. Harrison P.E.
Principal Geotechnical Engineer

APPENDIX A

Field Study Results

TRAUTNER GEOTECH LLC

Field Engineer : Jacob Vaughn
Hole Diameter : 4" Solid
Drilling Method : Continuous Flight Auger
Sampling Method : Mod. California Sampler
Date Drilled : 01/28/2025
Total Depth (approx.) : 10.5 feet
Location : See Figure in Report

LOG OF BORING TB-1

Archuleta County School District
Pagosa Springs, Colorado
Brian Calhoun AIA, LEED AP
rta Architects

58704GE

Sample Type: Mod. California Sampler; Standard Split Spoon; Bag Sample

Water Level: Water Level During Drilling; Water Level After Drilling

Depth in feet	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Water Level	REMARKS
0	LEAN CLAY WITH SAND AND GRAVELS MAN PLACED FILL; few organics, few cobbles, very stiff to stiff, slightly moist to very wet, brown.	CL		Bag Sample (0–2)			
2				Mod. California Sampler (2–3)	14/6, 16/6		
4				Mod. California Sampler (4–5)	5/6, 5/6		
5				Bag Sample (5–9)			
8.5						▽	Water measured at 8.5 feet after drilling.
9				Standard Split Spoon (9–10.5)	29/6, 4/6, 6/6		Very wet at 9.5 feet during drilling.
10.5	CLAYEY GRAVEL WITH SAND AND COBBLE; very dense, wet, brown.	GC					Man placed fill (old lagoon) to approximately 10.5 feet.

Practical auger drilling refusal in cobble at 11.5 feet.

LOG OF BORING TB-2

TRAUTNER GEOTECH LLC

Field Engineer : Jacob Vaughn
Hole Diameter : 4" Solid
Drilling Method : Continuous Flight Auger
Sampling Method : Mod. California Sampler
Date Drilled : 01/28/2025
Total Depth (approx.) : 15 feet
Location : See Figure in Report

Archuleta County School District
Pagosa Springs, Colorado
Brian Calhoun AIA, LEED AP
rta Architects

58704GE

Sample Type: Mod. California Sampler; Standard Split Spoon; Bag Sample

Water Level: Water Level During Drilling; Water Level After Drilling

Depth in feet	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Water Level	REMARKS
0	LEAN CLAY WITH SAND; few organics, very stiff to hard to stiff, slightly moist, brown.	CL		Bag Sample (0–2)			
2				Mod. California Sampler (2–3)	16/6 24/6		
3				Bag Sample (3–4)			Minor caliche depostits observed from 3 to 12 feet.
4				Mod. California Sampler (4–5)	12/6 19/6		
8							Stiff from 8 to 12 feet.
9				Standard Split Spoon (9–10.5)	7/6 4/6 10/6		
12	CLAYEY GRAVEL WITH SAND AND COBBLE; medium dense to very dense, moist, brown.	GC					Possible weathered sandstone formation from 12 feet.
14				Standard Split Spoon (14–14.7)	26/6 15/1 bounce		Very dense from 14 feet.
15	Practical auger drilling refusal on boulder or sandstone formation at 15 feet.						

TRAUTNER GEOTECH LLC

Field Engineer : Jacob Vaughn
Hole Diameter : 4" Solid
Drilling Method : Continuous Flight Auger
Sampling Method : Mod. California Sampler
Date Drilled : 01/28/2025
Total Depth (approx.) : 7 feet
Location : See Figure in Report

LOG OF BORING TB-3

Archuleta County School District
Pagosa Springs, Colorado
Brian Calhoun AIA, LEED AP
rta Architects

58704GE

Sample Type: Mod. California Sampler; Standard Split Spoon; Bag Sample

Water Level: Water Level During Drilling; Water Level After Drilling

Depth in feet	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Water Level	REMARKS
0	LEAN CLAY WITH SAND AND ORGANICS; very stiff, slightly moist, brown.	CL		Bag Sample (0–2)			
2				Mod. California Sampler (2–3)	8/6 11/6		
3				Bag Sample (3–4)			
4				Mod. California Sampler (4–5)	15/6 32/6		
4.5	FRACTURED SANDSTONE FORMATION; hard, dry, brown.	SS					
7	Practical auger drilling refusal in sandstone formation or boulder at 7 feet.						

LOG OF BORING TB-4

TRAUTNER GEOTECH LLC

Field Engineer : Jacob Vaughn
Hole Diameter : 4" Solid
Drilling Method : Continuous Flight Auger
Sampling Method : Mod. California Sampler
Date Drilled : 01/31/2025
Total Depth (approx.) : 10 feet
Location : See Figure in Report

Archuleta County School District
Pagosa Springs, Colorado
Brian Calhoun AIA, LEED AP
rta Architects

58704GE

Sample Type
- Mod. California Sampler
- Standard Split Spoon
- Bag Sample

Water Level
- ▼ Water Level During Drilling
- ▽ Water Level After Drilling

Depth in feet	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Water Level	REMARKS
0 – 4.5	LEAN CLAY WITH ORGANICS; slightly sandy, very stiff, slightly moist to moist, brown.	CL		Bag Sample (0–2); Mod. California Sampler (2–3)	10/6, 12/6		
				Mod. California Sampler (4–5)	19/6, 17/6		
4.5 – 9	VERY WEATHERED-FRACTURED SANDSTONE FORMATION; very stiff to hard, moist, brown.	SS		Bag Sample (5–9)			
9 – 10	SANDSTONE FORMATION; very hard, dry, brown to grey.			Standard Split Spoon (9)	15/1 bounce		

Practical auger drilling refusal in sandstone formation at 10 feet.

TRAUTNER GEOTECH LLC

Field Engineer : Jacob Vaughn
Hole Diameter : 4" Solid
Drilling Method : Continuous Flight Auger
Sampling Method : Mod. California Sampler
Date Drilled : 01/31/2025
Total Depth (approx.) : 15 feet
Location : See Figure in Report

LOG OF BORING TB-5

Archuleta County School District
Pagosa Springs, Colorado
Brian Calhoun AIA, LEED AP
rta Architects

58704GE

Sample Type: Mod. California Sampler; Standard Split Spoon; Bag Sample

Water Level: Water Level During Drilling; Water Level After Drilling

Depth in feet	DESCRIPTION	USCS	Samples	Blow Count	Water Level	REMARKS
0					Water Level After Drilling	
0–3.5	LEAN CLAY WITH ORGANICS; slightly sandy, very stiff, slightly moist to moist, brown.	CL	Bag Sample (0–2); Mod. California Sampler (2–3); Bag Sample (3–4)	12/6 14/6		Water level to top of boring after drilling.
3.5–6	CLAYEY GRAVEL WITH SAND AND COBBLE; medium dense, very moist, brown to grey.	GC	Mod. California Sampler (4.5–5.5)	6/6 6/6		Sandstone and shale fragments in GC from 3.5 to 6 feet.
6–14	SHALE FORMATION; very hard, dry to wet, grey.	SH	Standard Split Spoon (9.5–10)	30/2	Water Level During Drilling (11)	Wet from 11 feet.
14–15	SANDSTONE FORMATION; very hard, dry, brown.	SS	Standard Split Spoon (14.5–15)	20/0 bounce		

Practical auger drilling refusal at 15 feet in sandstone formation.

LOG OF BORING TB-6

TRAUTNER GEOTECH LLC

Field Engineer	: Jacob Vaughn
Hole Diameter	: 4" Solid
Drilling Method	: Continuous Flight Auger
Sampling Method	: Mod. California Sampler
Date Drilled	: 01/31/2025
Total Depth (approx.)	: 9 feet
Location	: See Figure in Report

Archuleta County School District
Pagosa Springs, Colorado
Brian Calhoun AIA, LEED AP
rta Architects

58704GE

Sample Type
- Mod. California Sampler
- Standard Split Spoon
- Bag Sample

Water Level
- ▼ Water Level During Drilling
- ▽ Water Level After Drilling

Depth in feet	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Water Level	REMARKS
0	LEAN CLAY WITH ORGANICS; slightly sandy, few gravels, very stiff, slightly moist, brown.	CL		Bag Sample (0–2)			
2				Mod. California Sampler (2–3)	16/6		
2.5	SHALE FORMATION; very hard, dry, brown.	SH			51/6		
3				Bag Sample (3–4)			
4				Mod. California Sampler (4–4.5)	52/6		
9	Boring terminated at 9 feet in shale formation.						

TRAUTNER GEOTECH LLC

Field Engineer	: Jacob Vaughn
Hole Diameter	: 4" Solid
Drilling Method	: Continuous Flight Auger
Sampling Method	: Mod. California Sampler
Date Drilled	: 01/31/2025
Total Depth (approx.)	: 15.5 feet
Location	: See Figure in Report

LOG OF BORING TB-7

Archuleta County School District
Pagosa Springs, Colorado
Brian Calhoun AIA, LEED AP
rta Architects

58704GE

Sample Type
- Mod. California Sampler
- Standard Split Spoon
- Bag Sample

Water Level
- Water Level During Drilling
- Water Level After Drilling

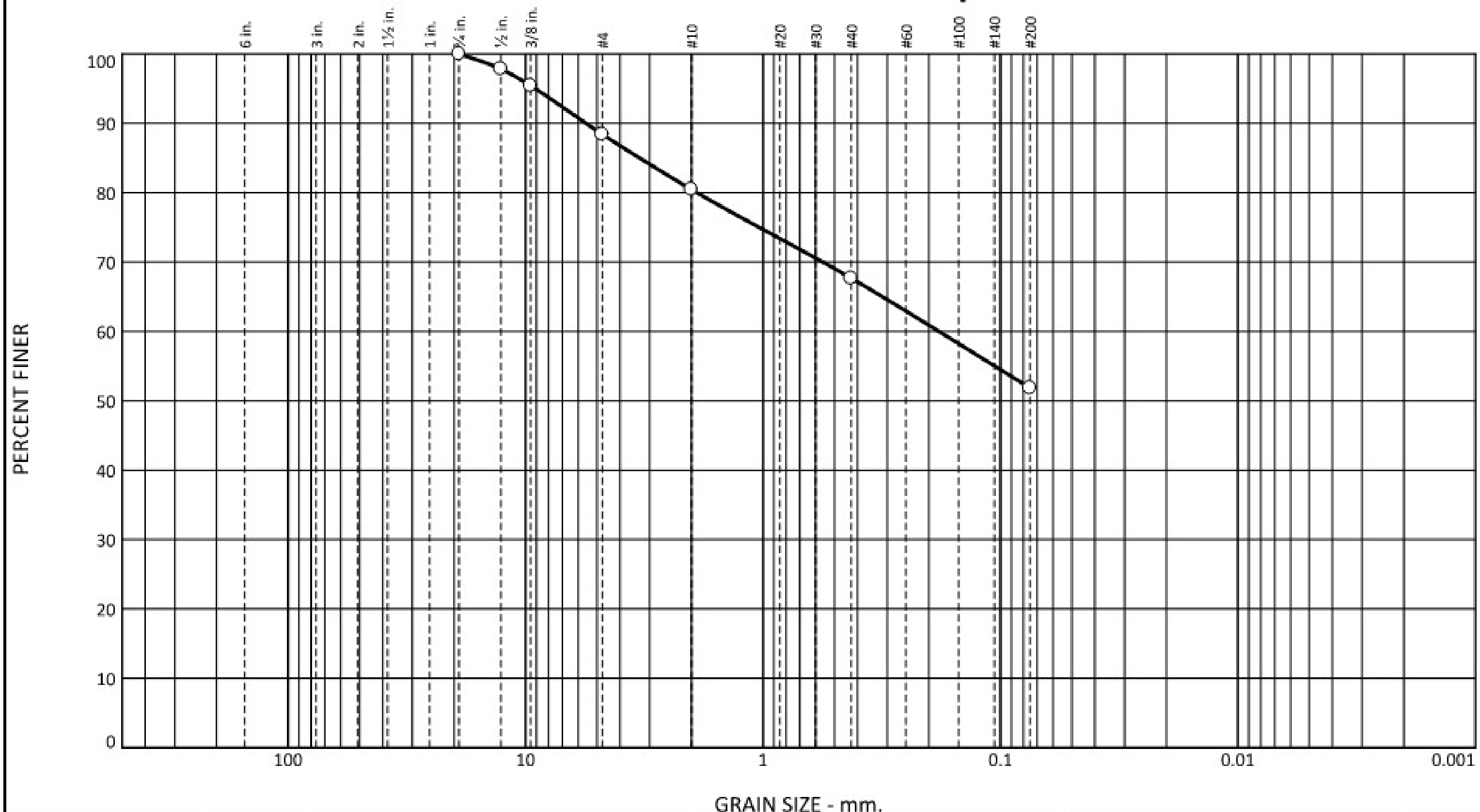
Depth in feet	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Water Level	REMARKS
0–2	LEAN CLAY WITH ORGANICS; slightly sandy, few gravels, very stiff, slightly moist, brown.	CL		Bag Sample			
2–3				Mod. California Sampler	10/6 12/6		
4.5–5.5				Mod. California Sampler	22/6 45/6		
5	SHALE FORMATION; very hard to hard, dry to moist, brown.	SH					
8							Hard and moist from 8 to 14 feet.
9.5–11				Standard Split Spoon	14/6 16/6 22/6		
14	SANDSTONE FORMATION; very hard, dry, brown.	SS					

Practical auger refusal at 15.5 feet in sanstone formation.

APPENDIX B

Laboratory Test Results

Particle Size Distribution Report



% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
		Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
0.0	0.0	0.0	11.6	8.0	5.7	5.7	6.1	8.4		54.5		

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	97.8		
3/8"	95.4		
#4	88.4		
#10	80.4		
#40	67.7		
#200	51.8		

* (no specification provided)

Soil Description

CL - sandy lean clay

Atterberg Limits

PL= 18 LL= 40 PI= 22

Coefficients

D_{90}= 5.5799 D_{85}= 3.3171 D_{60}= 0.1816
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(8)

Remarks

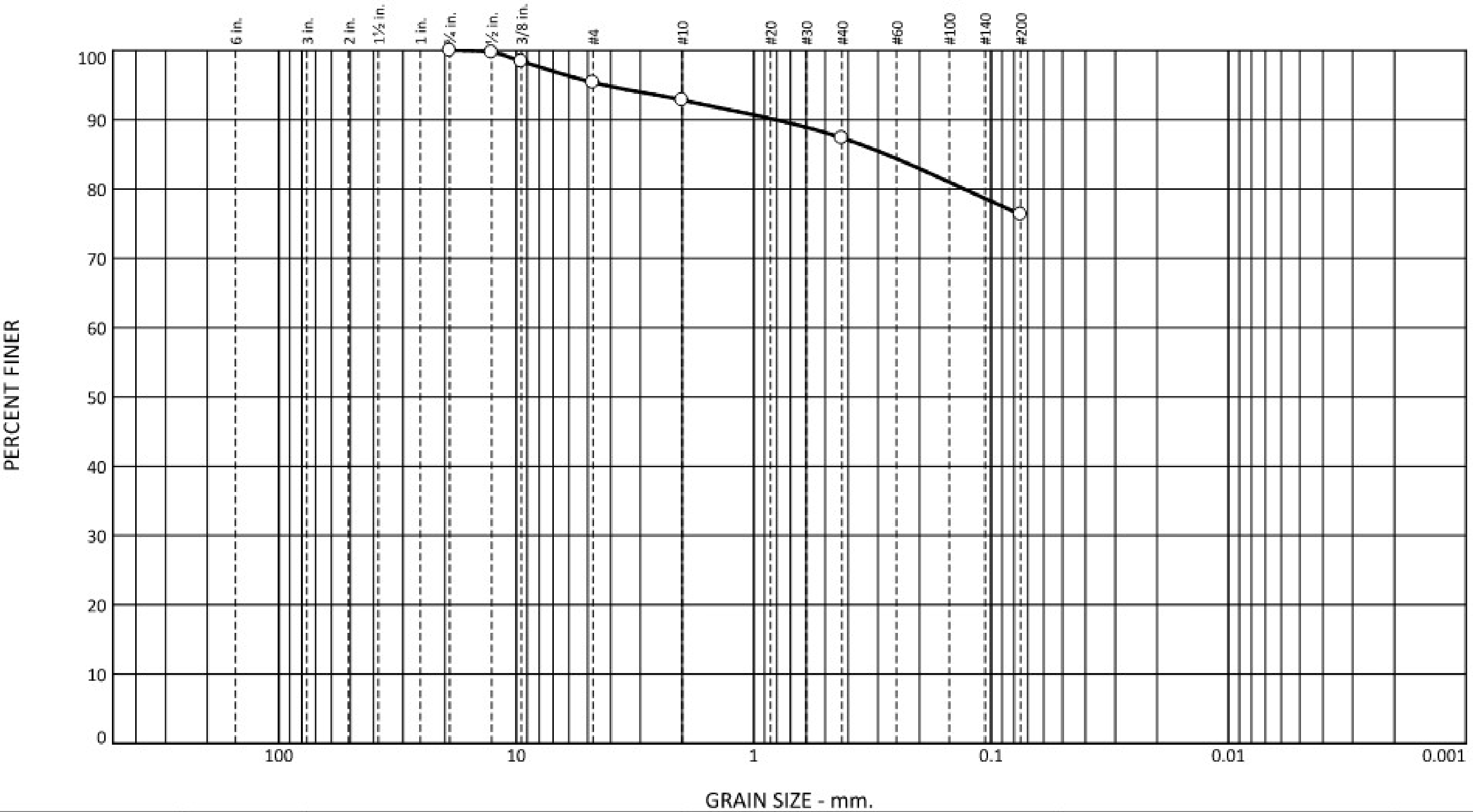
Source of Sample: Test Boring #1 **Depth:** 5' - 9'
Sample Number: 13350-D **Date:** 1/31/2025

TRAUTNER GEOTECH LLC

Client: Brian Calhoun AIA, RTA Architects
Project: Archuleta County School District Project
Project No: 58704GE **Figure** B.1

Tested By: N. Granda **Checked By:** G. Jadrych

Particle Size Distribution Report



% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
		Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
0.0	0.0	0.0	4.6	2.6	2.1	2.6	3.7	6.2	78.2			

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	99.7		
3/8"	98.4		
#4	95.4		
#10	92.8		
#40	87.4		
#200	76.3		

* (no specification provided)

Soil Description

MH - elastic silt with sand

Atterberg Limits

PL= 33 LL= 57 PI= 24

Coefficients

D_{90}= 0.8106 D_{85}= 0.2774 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= MH AASHTO= A-7-5(20)

Remarks

Source of Sample: Test Boring #3 **Depth:** 0' - 4'
Sample Number: 13350-L

Date: 1/31/2025

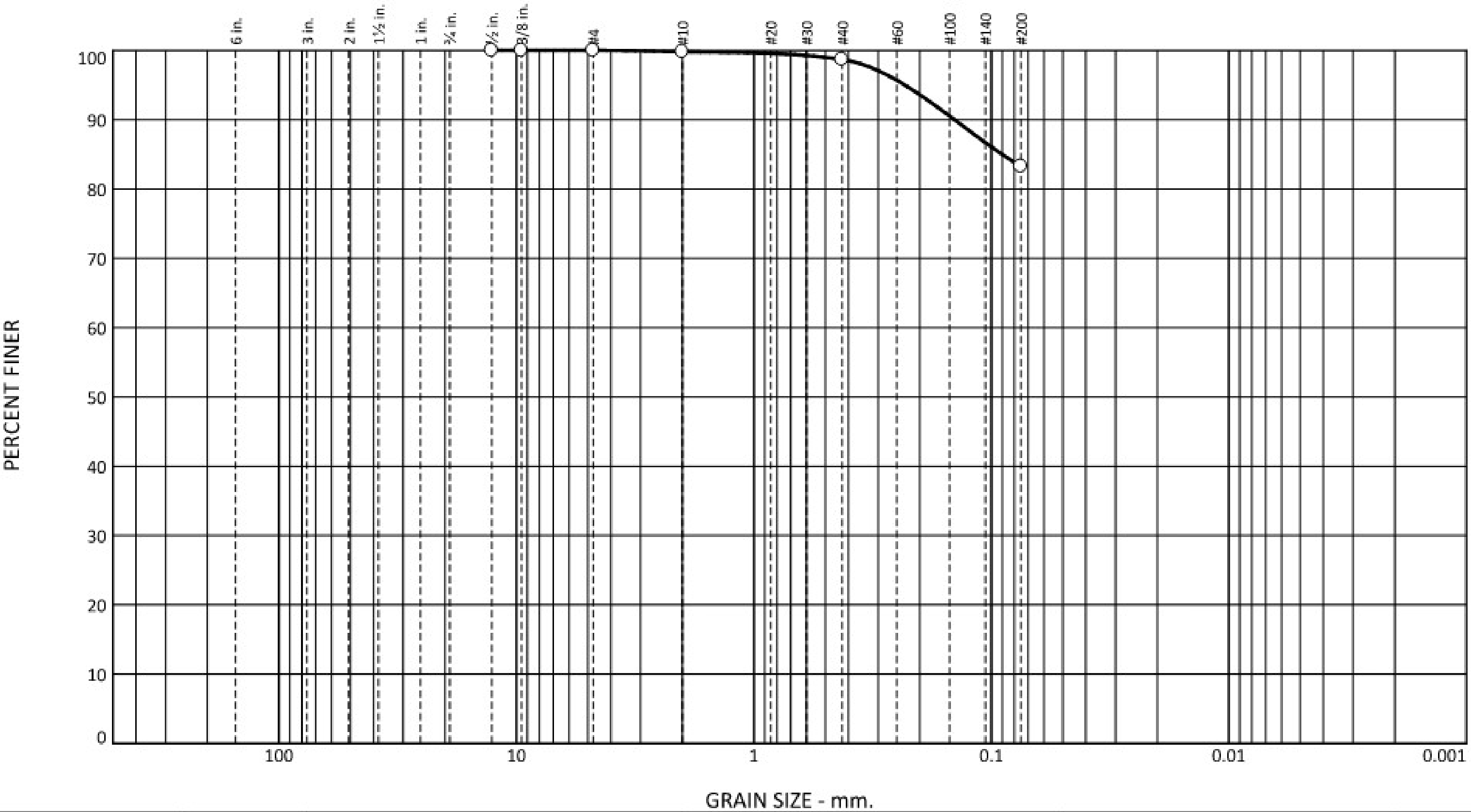
TRAUTNER GEOTECH LLC

Client: Brian Calhoun AIA, RTA Architects
Project: Archuleta County School District Project

Project No: 58704GE **Figure** B.2

Tested By: N. Ellis **Checked By:** J. Vaughn

Particle Size Distribution Report



% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
		Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
0.0	0.0	0.0	0.0	0.2	0.2	0.6	3.3	9.6	86.1			

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
3/8"	100.0		
#4	100.0		
#10	99.8		
#40	98.7		
#200	83.2		

* (no specification provided)

Soil Description

CH - fat clay with sand

Atterberg Limits

PL= 23 LL= 54 PI= 31

Coefficients

D_{90}= 0.1430 D_{85}= 0.0902 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(27)

Remarks

Source of Sample: Test Boring #4 **Depth:** 0' - 2'
Sample Number: 13350-P

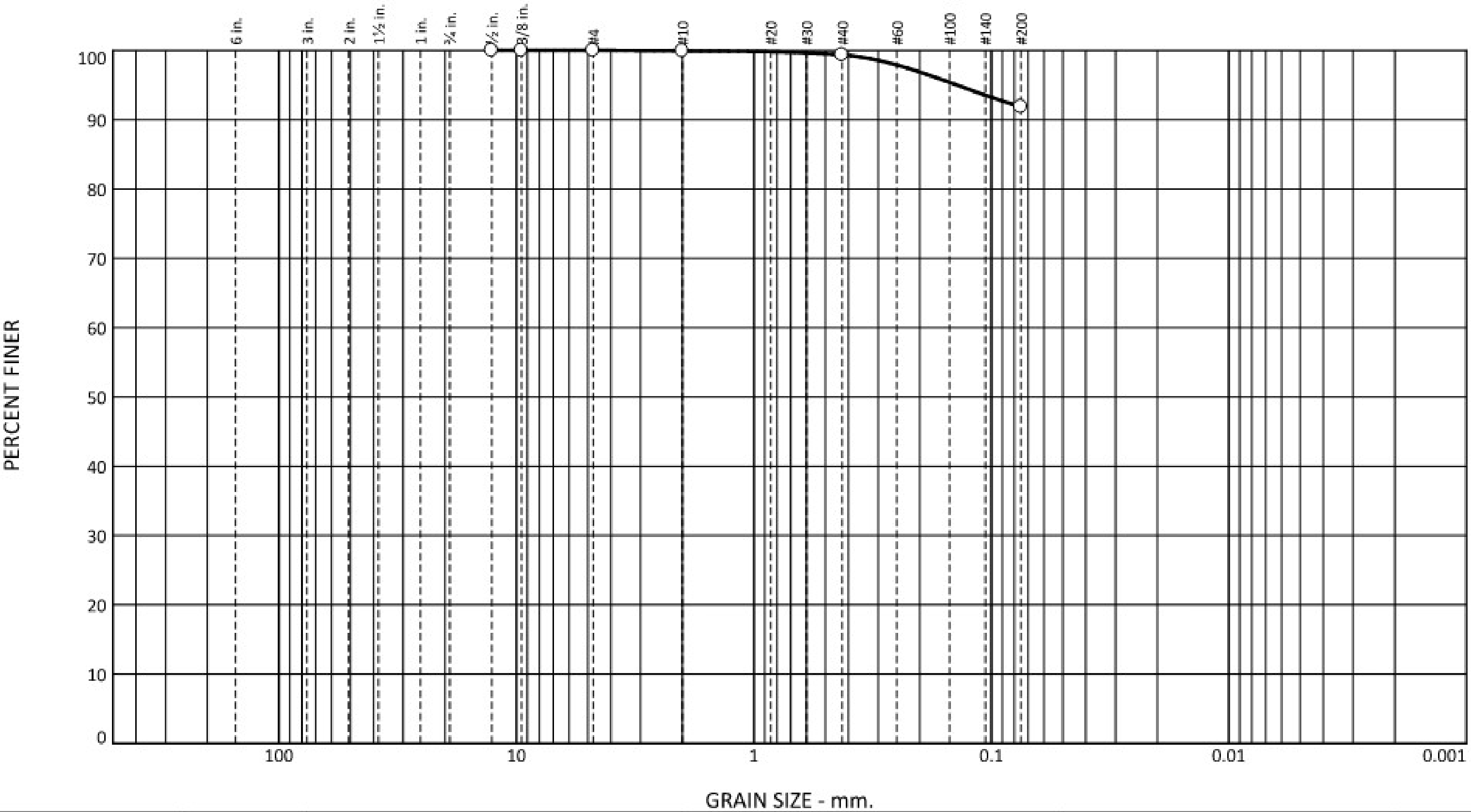
Date: 1/31/2025

TRAUTNER GEOTECH LLC

Client: Brian Calhoun AIA, RTA Architects
Project: Archuleta County School District Project
Project No: 58704GE **Figure** B.3

Tested By: N. Granda **Checked By:** N. Ellis

Particle Size Distribution Report



% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
		Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
0.0	0.0	0.0	0.0	0.1	0.1	0.3	1.6	4.7	93.2			

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
3/8"	100.0		
#4	100.0		
#10	99.9		
#40	99.3		
#200	91.9		

* (no specification provided)

Soil Description

CL - lean clay

Atterberg Limits

PL= 19 LL= 29 PI= 10

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-4(8)

Remarks

Source of Sample: Test Boring #7 **Depth:** 0' - 2'
Sample Number: 13350-DA

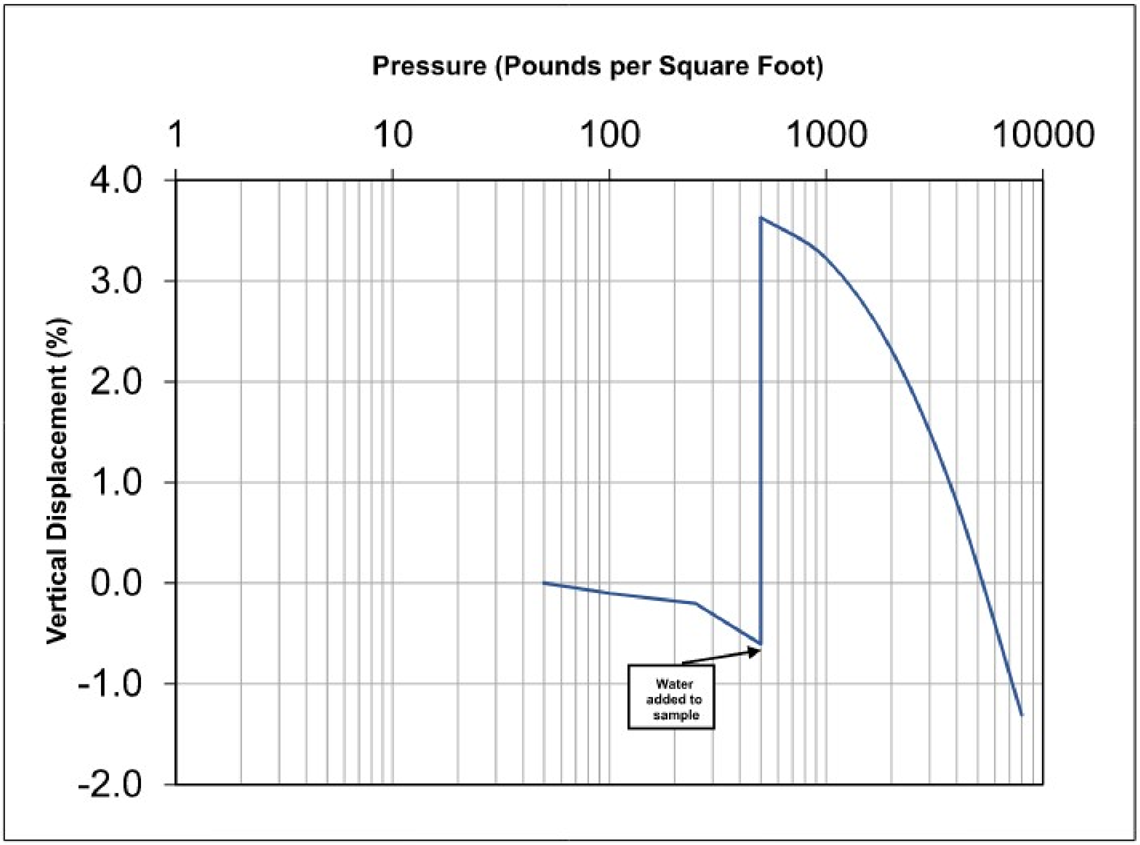
Date: 1/31/2025

TRAUTNER GEOTECH LLC

Client: Brian Calhoun AIA, RTA Architects
Project: Archuleta County School District Project
Project No: 58704GE **Figure** B.4

Tested By: N. Granda **Checked By:** N. Ellis

SWELL - CONSOLIDATION TEST

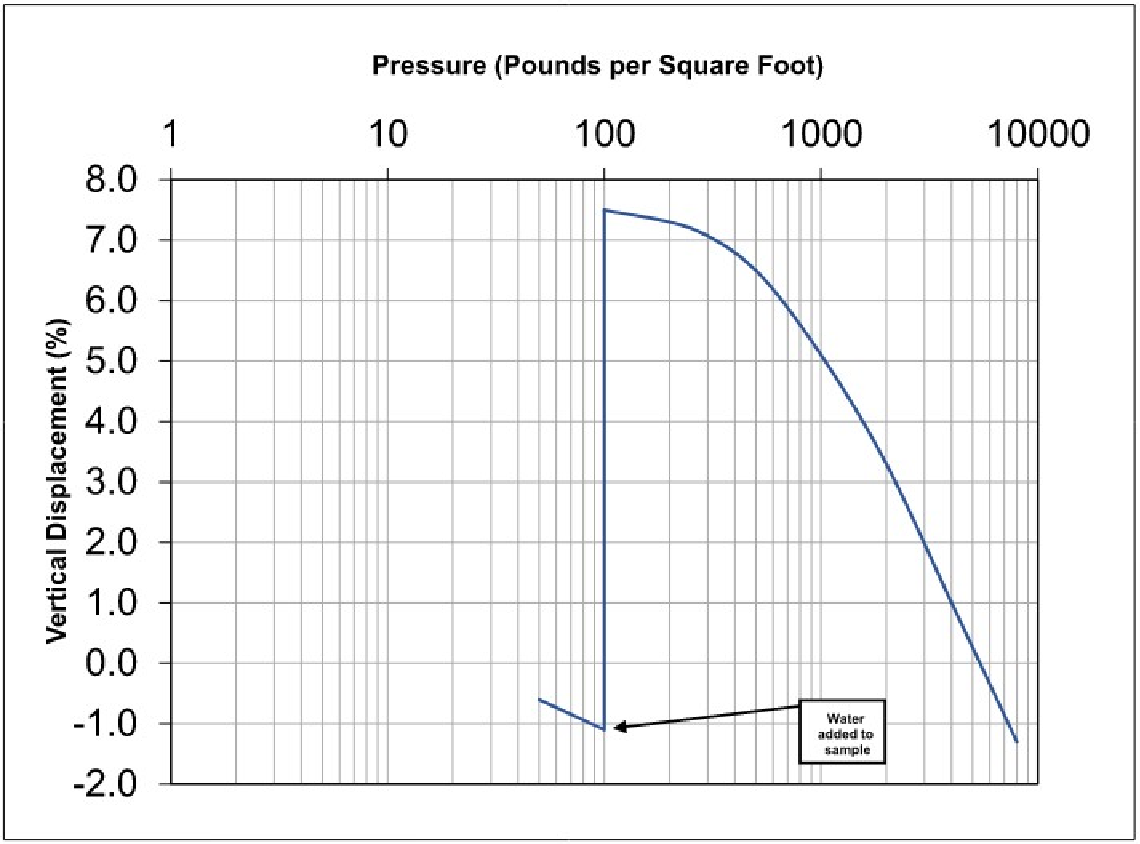


SUMMARY OF TEST RESULTS		
Sample Source:	TB-1 @ 4'	
Visual Soil Description:	CL	
Swell Potential (%)	4.2%	
Estimated Load-Back Swell Pressure (lb/ft²):	6,360	
	Initial	**Final**
Moisture Content (%):	10.3	15.4
Dry Density (lb/ft^3):	120.0	120.8
Height (in.):	0.992	0.979
Diameter (in.):	1.94	1.94

Note: Remolded Sample; Molded from the portion of sample passing a #10 sieve. Consolidated under 500 PSF prior to initiating load sequence and wetting. Initial values represent the conditions under 50 PSF following the pre-consolidation under 500 PSF.

Project Number:	58704 GE
Sample ID:	13350-C
Figure:	B.5

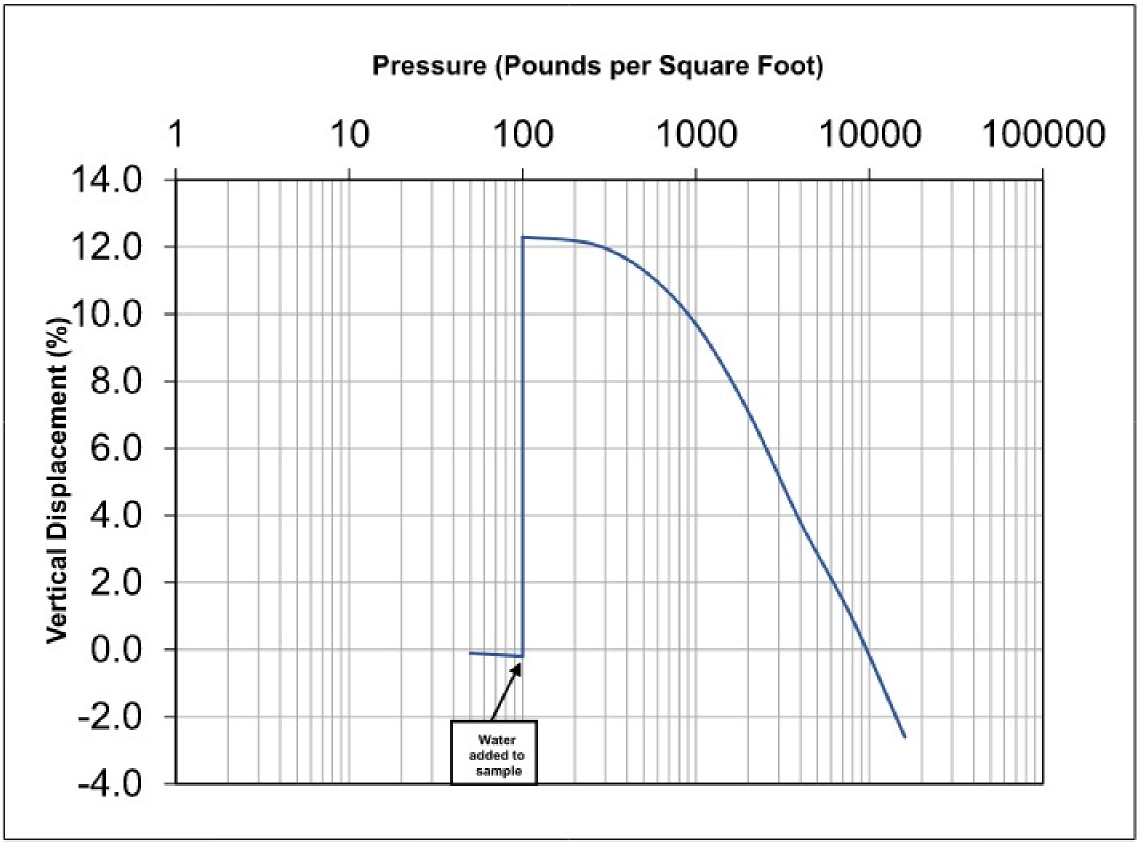
SWELL - CONSOLIDATION TEST



SUMMARY OF TEST RESULTS		
Sample Source:	TB-2 @ 2'	
Visual Soil Description:	CL	
Swell Potential (%)	8.6%	
Estimated Load-Back Swell Pressure (lb/ft^2):	7,200	
	Initial	Final
Moisture Content (%):	15.1	20.8
Dry Density (lb/ft^3):	110.9	112.2
Height (in.):	1.000	0.987
Diameter (in.):	1.94	1.94

Project Number:	58704GE
Sample ID:	13350-O
Figure:	B.6

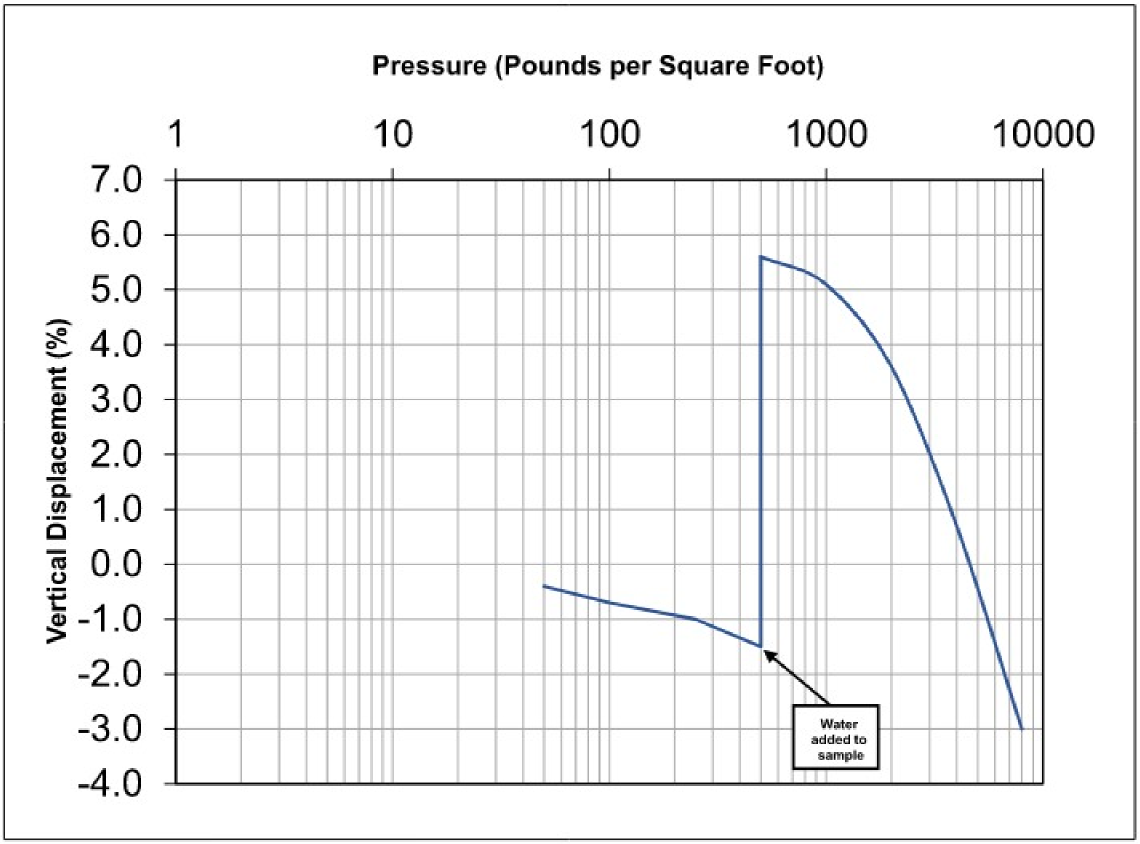
SWELL - CONSOLIDATION TEST



SUMMARY OF TEST RESULTS		
Sample Source:	TB-3 @ 2'	
Visual Soil Description:	CL	
Swell Potential (%)	12.5%	
Estimated Load-Back Swell Pressure (lb/ft^2):	9,950	
	Initial	Final
Moisture Content (%):	14.4	19.9
Dry Density (lb/ft^3):	114.0	117.7
Height (in.):	1.000	0.974
Diameter (in.):	1.94	1.94

Project Number:	58704 GE
Sample ID:	13350-M
Figure:	B.7

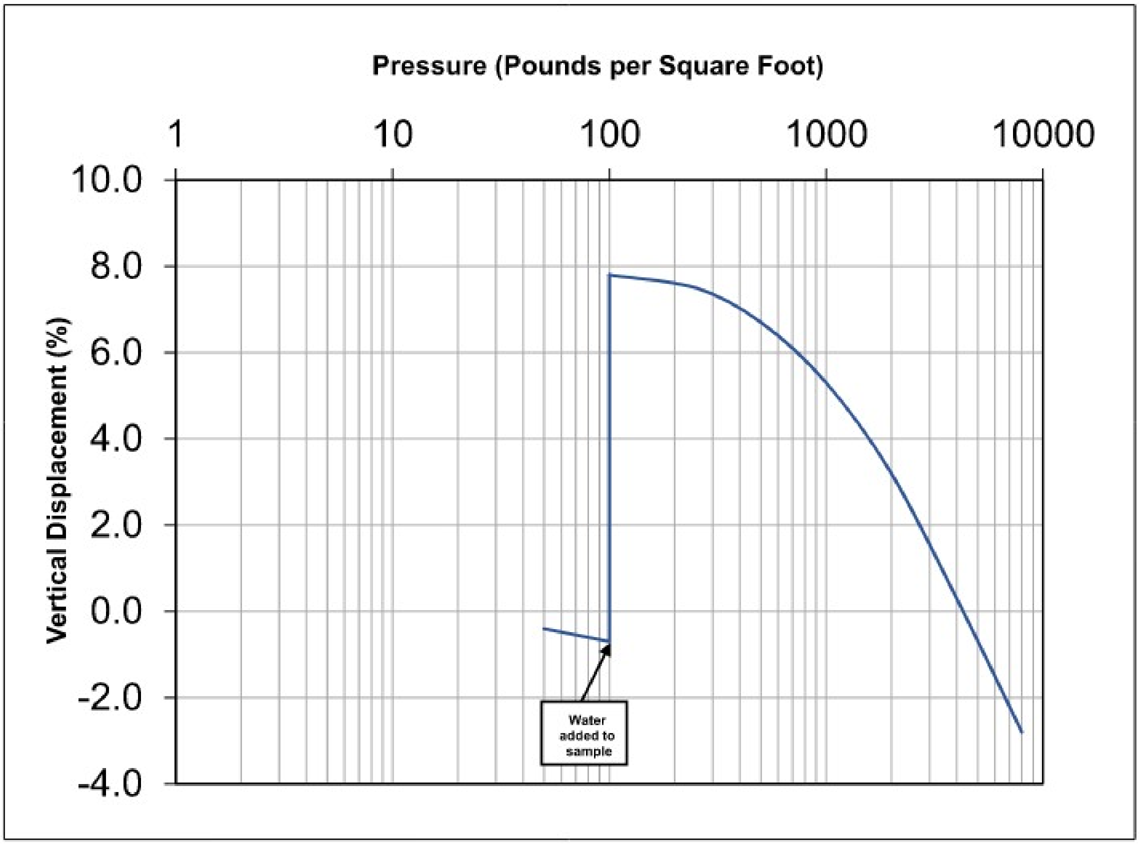
SWELL - CONSOLIDATION TEST



SUMMARY OF TEST RESULTS		
Sample Source:	TB-4 @ 2'	
Visual Soil Description:	CL	
Swell Potential (%)	7.1%	
Estimated Load-Back Swell Pressure (lb/ft^2):	6,060	
	Initial	Final
Moisture Content (%):	15.0	22.4
Dry Density (lb/ft^3):	108.2	110.7
Height (in.):	1.000	0.970
Diameter (in.):	1.94	1.94

Project Number:	58704GE
Sample ID:	13350-Q
Figure:	B.8

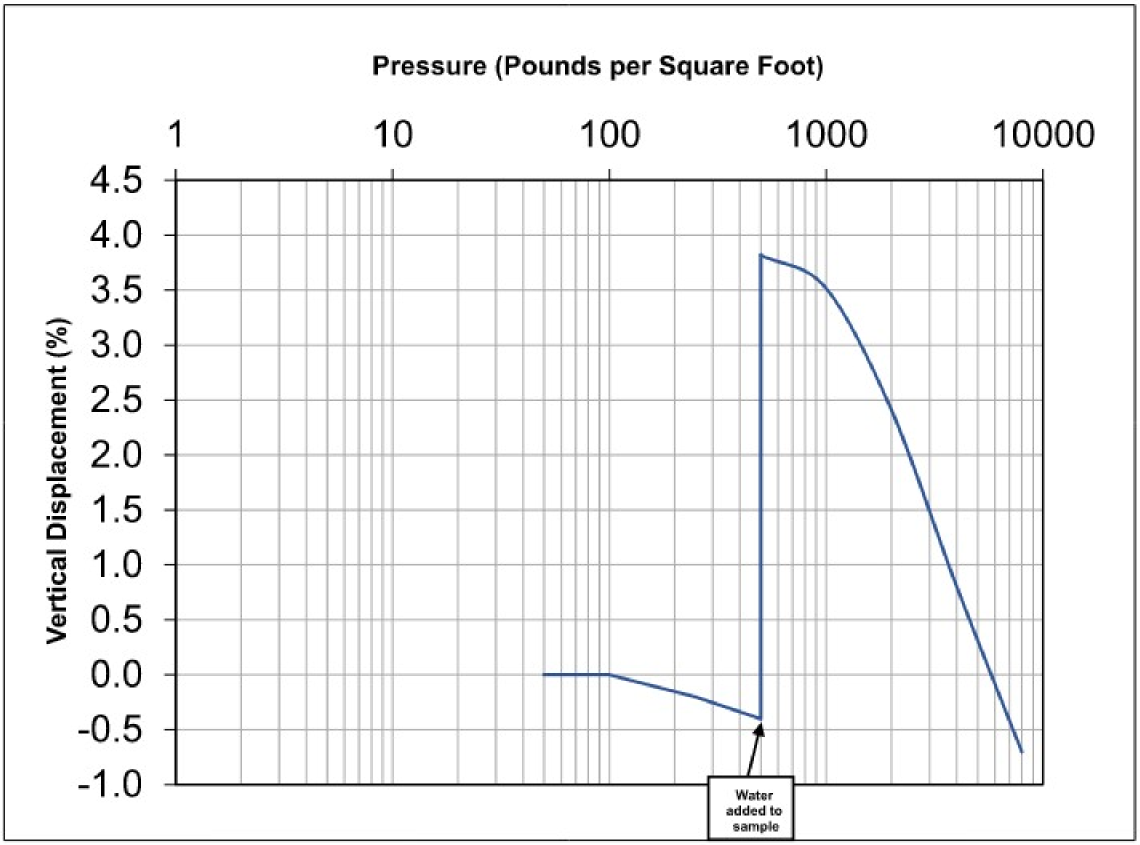
SWELL - CONSOLIDATION TEST



SUMMARY OF TEST RESULTS		
Sample Source:	TB-7 @ 2'	
Visual Soil Description:	CL	
Swell Potential (%)	8.5%	
Estimated Load-Back Swell Pressure (lb/ft^2):	5,000	
	Initial	Final
Moisture Content (%):	10.9	19.1
Dry Density (lb/ft^3):	112.6	113.1
Height (in.):	1.000	0.972
Diameter (in.):	1.94	1.94

Project Number:	58704 GE
Sample ID:	13350-EA
Figure:	B.9

SWELL - CONSOLIDATION TEST



SUMMARY OF TEST RESULTS		
Sample Source:	TB-7 @ 4 1/2'	
Visual Soil Description:	SH	
Swell Potential (%)	4.2%	
Estimated Load-Back Swell Pressure (lb/ft²):	6,720	
	Initial	**Final**
Moisture Content (%):	12.4	18.7
Dry Density (lb/ft^3):	114.0	115.2
Height (in.):	0.995	0.988
Diameter (in.):	1.94	1.94

Note: Remolded Sample; Molded from the portion of sample passing a #10 sieve. Consolidated under 500 PSF prior to initiating load sequence and wetting. Initial values represent the conditions under 50 PSF following the pre-consolidation under 500 PSF.

Project Number:	58704 GE
Sample ID:	13350-FA
Figure:	B.10