



TRENCHLESS CONSTRUCTION



SUMMARY

KUE's senior members bring over 80 years of combined experience in Trenchless Design and Construction and are supported by a strong technical staff. Paul Wilkinson was the former general manager of Euro-Iseki and has personally overseen the installation of over 30 miles of microtunneling projects. Todd Kilduff has worked on the design side of hundreds of trenchless projects and has managed the construction of half a dozen trenchless projects utilizing all methodologies for new installations. KUE has been involved in designing over 200 Trenchless Projects since 2014 utilizing auger boring, microtunneling, HDD, hand tunneling and pipe ramming methodologies.

KEY PROJECTS

PROJECT NAME	CLIENT	METHOD	LENGTH / DIA.	LOCATION	YEAR
Thornton Water Pipeline - Work Package 1	Thornton Water	Auger Bore / MTBM	(10) Tunnels @ 58" DIA	Thornton, CO	2020
York Street Pump Station	Springfield Water & Sewer Commission	MTBM	(2) 220 LF @ 48" (1) 220 LF @ 115.5"	Springfield, MA	2020
CATSKILL AQUEDUCT PHASE II	VILLAGE OF KIRYAS JOEL	PIPE RAM / MTBM	(7) 22 - 138 LF @ 42"	KIRYAS JOEL, NY	2020
 <p>KUE was retained by the contractor for phase II of the Catskill Aqueduct project in Kiryas Joel, NY. Phase II of the project involves the installation of 7 tunnels with 42-inch casing utilizing jack and bore methodology. Lengths for each drive range from 22 LF up to 138 LF with ground conditions consisting of mostly silty-sand gravel with potential cobbles. KUE's role on the project is to perform Tunnel Design Calculations and put together a Thrust Resistance package to sustain pipe jacking operations. The project is active and expected to be completed by summer 2020.</p>					
MVP - Gauley River Crossing	Mountain Valley Pipeline	MTBM	344 LF @ 50" DIA	Summerville, WV	2020
Miller Sanitary & Reuse Pipelines	City of Lafayette	Auger Bore	(2) 100 LF @ 24" (1) 100 LF @ 30"	Lafayette, CO	2020
CR 17 Taft Ave Widening Project	City of Berthoud	Guided Auger Bore	270 LF @ 66" 105 LF @ 36"	Berthoud, CO	2020
Cherry Creek Interceptor	Parker Water & Sanitation Dist.	TBM	(5) Tunnels Ranging 70 - 367 LF @ 66"	Parker, CO	2020
Muggins Gulch Pre-bid	CDOT	Pipe Canopy	218 LF @ 11' DIA	Larimer County, CO	2019
29th Street Benson Park	City of Loveland	Pipe Ram	156 LF @ 36"	Loveland, CO	2019
Stroh Road Interceptor Project	City of Parker	Auger Bore	110 LF @ 42"	Parker, CO	2019
Chelford City Diversion Package 1	City of Houston	MTBM	(3) Tunnels Ranging 1436 - 1610 LF @ 60"	Houston, TX	2019
Dwars Kill & Blanch Ave	City & County of Denver	Pipe Ram	330 LF @ 42" 365 LF @ 42"	Norwood, NJ	2019
56TH & PICADILLY PIPELINE	AURORA WATER	MTBM	958 LF @ 48"	AURORA, CO	2019
 <p>Due to the continued growth and development in the areas around Denver International Airport, a 48-inch OD waterline is being installed 958 LF beneath E-470 in Aurora, Colorado. KUE was hired by the contractor to design both the launch and reception shafts for the 48-inch Akkerman MTBM as well as perform axial, external loading, pipe integrity and thrust resistance calculations. KUE was also retained as a backfill expert and has performed calculations for buoyancy and estimated stresses on the carrier pipe due to flotation during installation. The project is active and expected to be completed by summer 2020.</p>					

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KEY PROJECTS (CONTINUED)

PROJECT NAME	OWNER	METHOD	LENGTH/DIA	LOCATION	YEAR
Wilson & 8th Basin Stormwater Outfall	City of Greeley	Hand Mining	96 LF @ 42"	Loveland, CO	2019
Hidden Valley Water District Connection	Evergreen Metro District	HDD	271 LF @ 10"	Evergreen, CO	2019
First Creek Interceptor	City of Aurora	Pipe Ram	207 LF @ 42"	Aurora, CO	2019
Apple Valley Waterline Relocation	City of Lyons	Pipe Ram	110 LF @ 36"	Lyons, CO	2019
	KUE was involved with performing engineering calculations for the installation of two separate 42-inch OD steel cased drives being advanced via guided auger boring technology beneath a county roadway just outside Lyons, CO. The two crossings passed through weathered bedrock material that consists of mostly weathered claystone that exhibited properties closer to soil than rock. The 42-inch OD steel pipes were analyzed for eccentric and transverse external loading. Specifically, KUE estimated a reasonable eccentricity and the associated axial load capacity, buckling and deflection of the pipes for the drive. The project was completely successfully on-time and in-budget.				
Fore Broadband Fiber Build	Douglas County DPW	HDD	7600 LF @ 2" 8200 LF @ 1"	Denver, CO	2019
Lima & Paris Alley	Aurora Water	Pipe Ram	(3) 150 LF @ 12"	Denver, CO	2019
Town of Lyon Eastern Corridor Utility	Town of Lyons	Pipe Ram	140 LF @ 24" 160 LF @ 24"	Lyons, CO	2019
The Aurora Highlands	Aerotropolis Area Coordinating Metropolitan District	Guided Auger Bore	161 LF @ 42" 262 LF @ 48"	Aurora, CO	2019
Blanch Ave Bore Project	Rockland Electric Company	Auger Bore	89 LF @ 30"	Norwood, NJ	2019
NYS DOT I-84 & I-684 Utilities	New York State Dept. of Transportation	HDD	(12) 100 LF @ 3.5-4.5"	Westchester, NY	2019
Culverts for 15.66 & 16.34	Delaware County	Guided Jack & Bore	270 LF @ 66" 105 LF @ 36"	Delaware Co., PA	2019
W. 13th Ave & Delaware Street Sewers	City & County of Denver	Auger Bore	41 LF @ 30" 100 LF @ 30"	Denver, CO	2019
Northwater Utility Connections	Denver Water	Auger Bore	90 LF @ 18" 55, 90 & 210 LF @ 36"	Denver, CO	2019
	Denver Water is constructing a new state-of-the-art raw water treatment plant capable of treating up to 75 MGD at Ralston Reservoir. Ancillary work included several new pipelines to deliver water supply. KUE was retained by the Contractor to provide engineering support for four 18 to 36 inch trenchless crossings beneath existing roads and utilities advanced by auger boring methods. KUE prepared Pre-con submittals consisting of axial & external load estimates, carrier pipe tie-down & grouting, trenchless construction workplans and excavation support designs for launch and reception shafts. The project is currently under construction.				
Clinton Street Sewer Improvements	City of Baltimore	MTBM	(7) Tunnels Ranging from 60-332 LF @ 20"	Baltimore, MD	2019
Resilient St. Vrain 2B Waterline	City of Longmont	Auger Bore	220 LF @ 30" 120 LF @ 30"	Longmont, CO	2019
Hwy 6 & 50 Sewer Extension	City of Grand Junction	Auger Bore	270 LF @ 36" 100 LF @ 36"	Fruita, CO	2019
Port - PL6 Stormwater Storage Tank	Cambridge Department of Public Works	MTBM	195 LF @ 70"	Cambridge, MA	2018
	In efforts to relieve excessive flooding in Cambridge, MA neighborhoods, the city is constructing new sewers and storm water storage facilities. Some of these sewers are founded deep within Weight of Hammer Boston Blue Clay. KUE was retained by the Contractor to analyze a 63-inch diameter microtunnel extending 200 linear feet below an active subway line. KUE provide pre-con submittals consisting of axial loading, settlement and disturbance analysis, and developed a microtunneling workplan for jacking the composite casing pipe. The project was completed successfully.				
Hidden Meadows Offsite Improvements	Town of Somers	HDD	481 LF @ 18"	Somers, NY	2018
36" & 84" Stormwater Sewer Line	City & County of Denver	MTBM	216 LF @ 84" 212 LF @ 36"	Denver, CO	2018

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Upham Brook Trunk Sewer	County of Henrico	EPB TBM	(6) Tunnels Ranging from 82 LF to 620 LF @ 72"	Henrico, VA	2018
Suncor Commerce City Refinery	Suncor Energy	MTBM	60 LF @ 30"	Commerce City, CO	2018
52nd & Milwaukee	Denver Water	Auger Bore	239 LF @ 12"	Denver, CO	2018
LOCKWOOD ROAD 36" PIPE RAM	EXXON MOBIL CORP.	PIPE RAM	550 LF @ 36"	BILLINGS, MT	2018
	Exxon-Mobile was installing a new wastewater sewer line beneath two active railways. KUE was retained by the Contractor to assess the feasibility of pipe ramming a 36-inch steel casing 350 linear feet versus utilizing a more traditional auger boring method. KUE performed engineering analysis on each method consisting of geotechnical review, axial and external loadings on the casing, excavation support and provided recommendations for completing a pilot tube guided pipe ram. The project was completed successfully.				
Federal Boulevard Storm Sewer Tunnel	City of Lakewood	Pipe Jacked TBM	75 LF @ 67"	Denver, CO	2018
Lowry Superfund Site	City of Aurora	Auger Bore	160 LF @ 20" 86 LF @ 12" 50 LF @ 12"	Aurora, CO	2018
Western Transmission Main	MCUA	MTBM	360 LF @ 60"	Piscataway, NJ	2018
I-29 Segment 2 Sanitary Sewer	IDOT	Pipe Jacked TBM	(2) 520 LF @ 88" 153 LF @ 74" 161 LF @ 74"	Sioux City, IA	2018
Little Dry Creek	City of Westminster	Auger Bore	122 LF @ 36" 210 LF @ 48"	Westminster, CO	2018
Vista Village	City of Vista	MTBM	387 LF @ 50"	Vista, CA	2018
Dodson Industrial Park Phase 5	District of Kansas City	Pipe Jack	(2) 90 LF @ 30" 280 LF @ 48" 360 LF @ 48"	Blue River, MO	2018
Northwater Treatment Plant	Denver Water	Hand Tunnel	60 LF @ 66"	Golden, CO	2018
TRAMPAS DAM	SANTA MARGARITA WATER DISTRICT	MTBM	688 LF @ 63"	MISSION VIEJO, CA	2018
 TOP PROJECT	KUE was retained by the Construction Manager to provide CM support of an approximate 700 linear foot, 63-inch diameter microtunnel beneath an earth embankment dam. KUE reviewed contractor submittals and provided recommendations and construction oversight in the field. During construction, several issues arose during tunneling that KUE documented and provided guidance on. KUE's efforts directly resulted in no claims being presented to the Owner and the project being completed successfully.				
JM Shafer Raw Waterline	Tri-State Generation & Transmission Association	Auger Bore	195 LF @ 36" 450 LF @ 36"	Fort Lupton, CO	2017
Par 1212 – PWC System Improvements	Metro Wastewater Reclamation District	TBM	570 LF @ 48" 315 LF @ 66"	Denver, CO	2017
Globeville Landing Outfall Outfall Phase 3	City & County of Denver	Twin MTBM	(2) 500 LF @ 102"	Denver, CO	2017
Vinton Water & Wastewater System Improv.	City of Vinton	Pipe Jack	150 LF @ 36" 350 LF @ 36"	Vinton, TX	2017
Lake McIntosh Reservoir Pipe Replacement	Bureau of Reclamation	Digger Shield & Hand Tunnel	166 LF @ 60"	Longmont, CO	2017
Canal WTP Transmission Waterline Tunnel	El Paso Water	TBM	570 LF @ 48" 315 LF @ 66"	El Paso, TX	2017
Colfax & Lansing Storm Sewer Improvements	City of Aurora	TBM	94 LF @ 42"	Aurora, CO	2017
Larimer County US 36 Culverts	CDOT	Auger Bore	130 LF @ 65" 90 LF @ 44" 92 LF @ 65"	Pinewood Springs, CO	2017
Conduit 16	Denver Water	MTBM	56 LF @ 102"	Golden, CO	2017

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Ashcroft Interceptor	City of Greeley	Auger Bore	320 LF @ 36"	Greeley, CO	2017
Water Intake Screen, Pipe & Caisson D/B	Borough of Midland	MTBM	110 LF @ 30"	Beaver Co., PA	2017
The Foundry Utility Improvements	City of Loveland	Guided Pipe Ram	100 LF @ 36"	Loveland, CO	2017
29th Street Culvert Improvements	City of Loveland	Guided Pipe Ram	156 LF @ 36"	Loveland, CO	2017
Catskill Aqueduct Connection	Village of Kiryas Joel	SBU	150 LF @ 36"	Kiryas Joel, NY	2016
	KUE was engaged by the Prime Contractor to provide Trenchless consultation for advancing a 150 linear foot, 36-inch diameter tunnel within rock as well as designing the excavation support systems for the launch and reception shafts. KUE evaluated the rock conditions and reviewed multiple trenchless technologies including microtunneling, HDD and auger boring as potential methods. Ultimately, an auger boring method utilizing a Robbins small boring unit (SBU) was adopted and utilized for the project. During construction, KUE oversaw the shaft and tunnel construction and supported the contractor by providing a geotechnical instrumentation program for settlement monitoring.				
W. Jewell Ave 12-Inch Main Extension	Denver Water	Auger Bore	30 LF @ 36"	Denver, CO	2016
1st St. and Garfield Ave. Storm Sewer	City of Wellington	Auger Bore/Pipe Ram	224 LF @ 48"	Wellington, CO	2016
WISE Water Connection	Stonegate Village Metro District	MTBM	647 LF @ 36"	Parker, CO	2016
Maline S.S. Interceptor Tunnel	MSD	TBM	100 LF @ 120"	St. Louis Co., MO	2016
Ridgegate Happy Canyon Observation Wells	City of Parker	MTBM	290 LF @ 54" 222 LF @ 54"	Parker, CO	2016
PSE&G, Bergen-Linden Corridor	PSE&G	MTBM	468 LF @ 60"	Bayonne, NJ	2016
Taft Auger Bore Installations	Town of Berthod	Auger Bore	280 LF @ 30" 55 LF @ 30"	Berthod, CO	2016
SH 119 Auger Bore	Left Hand Water District	Auger Bore	60 LF @ 36"	Weld Co., CO	2016
20" Main Installation at 40th & Blake St.	Denver Water	MTBM	400 LF @ 36"	Denver, CO	2015
	KUE was engaged by the tunneling contractor to prepare pre-construction submittals for a 408 linear foot, 36-inch diameter microtunnel. KUE designed the SOE for the launch and reception shafts, performed axial load estimates for the steel casing pipe, backfill grouting submittals and settlement estimates from the tunneling operations. Additionally, KUE procured the microtunneling system from Iseki Polytech for the Contractor. KUE also monitored operations during construction.				
Lafayette-Louisville Boundary Drainage Improv.	Urban Drainage & Flood Control District	Tunnel Shield & Hand Tunnel	104 LF @ 72"	Louisville, CO	2015
Little Dry Creek – Xanthia St. to Yosemite St.	Southeast Metro Stormwater Authority	Auger Bore	130 LF @ 82.5"	Denver, CO	2015
Conduit 309	Denver Water	Auger Bore	57 LF @ 42"	Denver, CO	2015
Bergen Basin Sewer Reconstruction	NYC Environmental Protection Agency	MTBM	(2) 350 LF @ 36" 550 LF @ 54"	Brooklyn, NY	2015
	KUE was engaged by the tunneling contractor to provide preconstruction engineering submittals. KUE evaluated the ground conditions and performed estimates on axial loading for three tunnels, one 36-inch and two dual 54-inch tunnels underneath the Belt Parkway in Rockaway, NY. KUE also reviewed the microtunneling operations and developed a workplan and contingency plan for the contractor.				
37th & Smith Rd.	Denver Water	Auger Bore	206 LF @ 22"	Denver, CO	2015
Johnstown Highway 60 Undercrossings	Weld County	Auger Bore	180 LF @ 30"	Johnstown, CO	2015