




SUPPORT OF EXCAVATION



SUMMARY

Kilduff Underground Engineering, Inc. (KUE), offers extensive experience in the design and construction of deep excavations, construction shafts and earth retaining systems. Our company has designed dozens of shafts, retaining structures and deep excavations to facilitate tunnel installations as well as excavation support systems for open cut utilities, building foundations and slope retention. Todd Kilduff has been involved with the design and construction of over 75 deep excavations throughout his career including a 40-foot diameter shaft over 100 feet deep for a subway station in New York City. KUE has the experience to offer unique support solutions such as jet grouting, secant piles and braced excavations that have proven to provide substantial cost savings to the contractor in the field.

KEY PROJECTS

PROJECT NAME	OWNER	TYPE	SIZE	LOCATION	YEAR
IMTT Shafts Conceptual Design	International Matex	Circular Secant Piles w. Jet Grout Plugs	30' (DIA) x 80' (H)	New Orleans, LA	2019
State Road A1A	St. Johns County	Steel Sheting w. Soldier Pile & Lagging SOE	6' (W) x 18' (D)	Sarasota, FL	2019
CONDUIT 16 CENTRAL	DENVER WATER	DESIGN OF SOLDIER PILE SOE SYSTEM	295' (L) x 28' (W) x 19' (H)	GOLDEN, CO	2019
	KUE designed two separate but similar excavation support systems for the project. The first shaft was the McIntyre Vault Structure and the other was referred to as the Van Bibber Vault Structure. Each vault consisted of a 30-foot excavation extending about 22 feet to subgrade. KUE designed a drilled soldier pile system to retain the ground at the property right of way at McIntyre and to retain the existing Conduit 22 at the Van Bibber location. The soldier piles were designed as cantilevered systems keyed into claystone bedrock and were sized to support a 20+ foot cut. Lagging between the piles consisted of steel roadplates. KUE performed earth pressure calculations, developed shop drawings and prepared an engineering submittal provided to the Owner.				
9th Avenue	NYC DDC	Soldier Pile & Timber Lagging w. Internal Bracing	17' (L) x 10' (W) x 14' (H)	Westchester, NY	2019
HWR 669C Jack & Bore	NYC DDC	Soldier Piles w/ Steel Plate Lagging & Walers	16' (L) x 10' (W) x 20' (H)	Norwood, NJ	2019
Clinton Street	City of Baltimore	Soldier Pile w/ Lagging & Pre-Cast Concrete Segments	(1) 50' x 40' Wet Well Pump Station (3) 40' (L) x 14' (W) x 20' (H) Launch Shafts (4) 9' (D) x 20' (H) Reception Shafts	Delaware Co., PA	2019
20TH AVENUE	NYC DDC	DESIGN OF SOLDIER PILE SOE W. STEEL BULKHEAD	17' (L) x 10' (W) x 14' (H)	QUEENS, NY	2018
	KUE designed a deep soldier pile and timber lagging shaft to make repairs to an existing RCP sewer. The shaft dimensions were approximately 40 feet x 12 feet wide and 38 feet deep. KUE calculated earth pressure and surcharge loading, and accommodated the shaft to be built around several existing utilities. The shaft was below the groundwater table and relied upon a deep well dewatering system to keep the excavation dry.				
Large Valve Replacement	City of Aurora	Trench Box	10' (L) x 10' (W) x 12' (H) & 12' (L) x 8' (W) x 9.5 (H)	Aurora, CO	2018
Exxon Pipe Ram	Exxon Mobil	Trench Box, Steel Plates & Sheet Piles	(1) 64' (L) x 14' (W) x 12' (H) Launch Shaft (1) 56' (L) x 20' (W) x 10' (H) Launch Shaft (1) 8' (L) x 8' (W) x 14' (H) Reception Shaft	Billings, MT	2018
Northwater Tunnel	Denver Water	Trench Box	12' (L) x 20' (W) x 20' (H)	Golden, CO	2018
WTP CANAL	EL PASO WATER	LINER PLATE	35.5' (DIA) x 29.3' (H)	EL PASO, TX	2017
	Utilizing a Liner Plate System provided by DSI, KUE designed a 40 foot diameter Launch Shaft that extended 30 feet below the ground surface. KUE provided a check of the liner plate system and detailed the entrance block through the liner plate and reaction block to sustain pipe jacking operations. On the reception side KUE confirmed the Liner Plate design and detailed the entrance eye to accommodate a 72-inch TBM. The shafts were advanced through silty sand with cobbles and boulders.				

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KEY PROJECTS (CONTINUED)

PROJECT NAME	OWNER	TYPE	SIZE	LOCATION	YEAR
Sack Creek	City of Thornton	Trench Box w. Road Plate	37' (L) x 15' (W) x 25' (D) Launch Shaft 25' (L) x 15' (W) x 30' (D) Reception Shaft	Thornton, CO	2017
CONDUIT 16 - HWY 93, MAINLINE & HWY 58 & SPURLINE	DENVER WATER	TRENCH BOX	8 Shafts at 4 Locations	GOLDEN, CO	2017
	KUE designed eight composite Launch & Reception shafts to facilitate a 10-foot diameter tunnel to convey water from the Ralston Reservoir to the Moffat Water Treatment Plant in Lakewood, CO. The shafts ranged in depths from 30 to 60 feet with the upper portion through soft ground and the lower portions within clastone bedrock. KUE performed earth pressure and surcharge loading calculations to design a support system through alluvial sands and gravels and performed a rock block wedge analysis utilizing Rocscience Unwedge © software to design a shotcrete, wire mesh and rock dowel support system within the bedrock.				
Hess 1 Conveyance Project	Parker Water & Sanitation District	Trench Box	(3) Shafts Measuring 24' (L) x 12' (W) x 24' (D)	Parker, CO	2017
Little Dry Creek	City of Westminster	Slide Rail	40' (L) x 14' (W) x 25' (D) 20' (L) x 14' (W) x 25' (D)	Westminster, CO	2017
The Foundry	City of Loveland	Trench Box w. Road Plate	40' (L) x 20' (W) x 15' (D) Launch Shaft 20' (L) x 20' (W) x 20' (D) Reception Shaft	Loveland, CO	2017
EDISON PUMP STATION	MIDDLESEX COUNTY UTILITIES AUTHORITY	DESIGN OF SHEET PILE W/ TIE-BACKS	5' (L) x 5' (W) x 45' (D)	EDISON, NJ	2016
	The new pump station required temporary support to facilitate a 40-foot x 30-foot pump station. KUE designed a sheet pile wall supported with Sting-Ray mechanical anchors on a 5-foot x 5-foot pattern that extended to a depth of 45-feet. The SOE was designed to accommodate a 66-inch RCP that needed to remain active during the construction. KUE designed and incorporated the underpinning of the active sewer into the SOE system and detailed the construction sequence for installing the SOE. The excavation was designed utilizing a deep well dewatering system provided by Moretrench.				
Ridgegate WISE Water Line	Stonegate Village Metro District	Trench Box w. Sheet Pile	40' (L) x 14' (W) x 25' (D) Launch Shaft 20' (L) x 14' (W) x 25' (D) Reception Shaft	Parker, CO	2016
WISE Connection Interceptor	Stonegate Village Metro District	Trench Box w. Sheet Pile	40' (L) x 14' (W) x 28' (D)	Parker, CO	2016
CATSKILL AQUEDUCT	VILLAGE OF KIRYAS JOEL	DESIGN LAUNCH & RECEPTION SHAFTS	40' (L) x 14' (W) x 27' (D) Launch Shaft 20' (L) x 14' (W) x 27' (D) Reception Shaft	CATSKILL, NY	2016
	KUE designed Launch & Reception Shafts to facilitate tunneling operations. The launch shaft was 40-feet by 14-feet and extended to a depth of 27-feet. The Reception shaft was 20-feet by 14-feet and extended to a depth of 27-feet. The Reception Shaft was 20-feet by 14-feet and extended to similar depths. The shafts were supported with trench boxes for the upper 10-feet through glacial soil and KUE designed a shotcrete and rock dowel system to support the shafts in highly jointed granite rock. KUE performed earth pressure and surcharge loading calculations to verify the trench boxes and designed the rock support utilizing Rocscience Unwedge © software and shotcrete.				
Pugsley Creek Interceptor Sewer	NYCDEP	Design of Conceptual Trench Excavation Support	500' (L) x 20' (W) x 25' (D)	Queens, NY	2016
SH 119 Auger Bore	Left Hand Water District	Design of Trench Box	40' (L) x 14' (W) x 20' (D)	Loveland, CO	2016
MALINE INTERCEPTOR SEWER	METROPOLITAN ST. LOUIS SEWER DISTRICT	DESIGN OF CMP SHAFTS	(7) 10' ID Shafts at 18'-38' (D)	ST. LOUIS, MO	2016
	KUE designed seven separate shafts with a diameter of 10-foot ID to accommodate concrete manhole risers from the interceptor sewer. The shafts extended to depths ranging from 18 to 38-feet within soft clay soils. KUE designed the shafts with corrugated metal pipe (CMP) and 4,000 psi concrete about 12-inches thick. The shafts were designed water tight and a suitable plug was included to counteract uplift pressures. The CMP support provided substantial cost savings and schedule benefits to the project.				
Tarrytown Force Main	County of Westchester	Design of Trench Excavation Support	40' (L) x 12' (W) x 20' (D)	Tarrytown, NY	2015
Posidon Resources Desalination Project	San Diego County Water Authority	Review & Analysis of Failed MTBM Launch Shaft	30' (DIA) x 90' (D)	Carlsbad, CA	2014