



Feasibility Study

ERA Project #W22013.00

Prepared for:

City of Wheaton

August 31, **2022**

Table of Contents

Introduction	2
Study Area.....	2
Channel History	2
Existing Conditions	4
Channel Assessment	5
Creekside Drive to Stonebridge Trail	5
Stonebridge Trail to Wheaton Sanitary District	5
Channel Morphology	6
Feasibility	10
Permit Requirements	11
U.S. Army Corps of Engineers:.....	11
Illinois Interagency Wetlands Policy Act:	12
Illinois Department of Natural Resources	12
Federal Emergency Management Agency Floodplain Regulations	12
IDNR-OWR Floodplain/Floodway Regulations	13
DuPage County.....	13
City of Wheaton Stormwater Regulations	13
Funding Sources	14
Conclusion	15
Appendices	17

Introduction

Springbrook #1, a tributary to the West Branch DuPage River, has experienced repeated sedimentation over time as a result of historic alterations to hydrology. In response to these issues, the City of Wheaton (City) has retained Engineering Resource Associates, Inc. (ERA) to evaluate a section of the stream, determine the feasibility of meandering Springbrook #1 through the Streams Lakes area to decrease the need for further dredging due to accumulated sediments, and to identify potential future projects to stabilize the banks and improve water quality.

Study Area

The Springbrook #1 flows generally east to west within the Streams Lakes residential neighborhood including both single-family and multi-family residences as well as the Illinois Sikh Community Center of Wheaton. The project study limits are the west side of Creekside Drive (upstream) to the Wheaton Sanitary District treatment property (downstream). Stonebridge Lane divides the study area roughly in half as it passes over a narrower section the channel from north to south. The study area is approximately 16.5 acres and is depicted in Figure 1 below.



Figure 1. Springbrook #1 Streams Lakes Area

Channel History

Springbrook #1 is a manmade channel that was created at the turn of the century (circa 1902) and originally called Union Drainage Ditch #1. It was deepened in 1910. The channel is evident in the 1938 aerial below.



Figure 2 1939 Aerial

It was deepened again in 1952, as evident in the 1962 aerial below:



Figure 3 1962 Aerial

The channel was then widened in the Streams Lake Area in 1969 and 1970 to include a large online pond. The widening can be seen here in the aerial image from 1972.



Figure 4 1972 Aerial

The channel has a history of sedimentation issues, but the area with the greatest sedimentation issue is the Streams Lakes area where the channel was widened to create the two lakes (between Creekside Drive and the Wheaton Sanitary District). As the channel flows into the Streams Lakes area, the flow area is increased. This creates a section where the velocity decreases significantly and acts as a sedimentation basin. The City has dredged the Streams Lakes area in 1977, 1982, 1987, 1998, 2009, and 2016.

The City has had several calls for engineering studies to determine if any alternatives to dredging are feasible. These calls for study occurred in 1987, 2009, 2016 and each subsequent year after 2019. A formal engineering study was done in 1987 and provided no solutions to the sedimentation problem besides dredging.

Existing Conditions

The Wheaton Sanitary District has received grant funding to do streambank stabilization through the Wheaton Sanitary District property. The City would like to evaluate the Streams Lakes sections of Springbrook #1 to determine the feasibility of meandering to decrease the need for further dredging due to accumulated sediments, and to identify potential future projects to stabilize the banks and improve water quality.

Channel Assessment

A walk-through inspection along the stream was performed by ERA on March 2, 2022. ERA evaluated the stream and immediate adjacent overbank areas, associated shoreline features and structures, and the downstream end that features a control weir and pedestrian bridge. The water quality and habitat throughout the entire reach are generally poor. ERA utilized a handheld GPS unit (Promark 120 with sub-meter accuracy) to perform the assessment. The following is a summary of each stream reach. Major and minor issues are shown in the .kmz file provided.



Figure 5. Weir at Sikh Temple

Creekside Drive to Stonebridge Trail

This is the uppermost reach of the stream. It is bounded entirely by private properties along the north and south banks where neighborhoods back up to the tributary. This reach of the stream consists only of open water with concrete rubble placed along the banks. The stream banks are experiencing low to moderate erosion across the studied area. Notable issues include undercutting of the banks, washing out of soil surrounding stormwater structures such as outlet end sections, and areas where low elevation has led to wet soils and problems with the maintained turf grass surrounding the area. Some areas of sedimentation were also observed. A wide variety of debris has been dumped in and adjacent to the stream initially for stabilization, but improper placement and inadequate sizing and quantity have led to erosion in a few areas. Vegetation along the banks consists primarily of maintained turf grass lawns but intermittently features landscaped areas, overgrown invasive brush such as buckthorn, and low-quality native buffer that is limited in size due to mowing from adjacent landowners. Some areas of turf shoreline were exhibiting erosion and bare patches. There are bridge crossings at the upstream and downstream ends of the reach that are showing signs of scour on the south banks.

Stonebridge Trail to Wheaton Sanitary District

This reach of the stream crosses under Stonebridge Trail and then enters the Wheaton Sanitary District treatment plant property. Further downstream, the creek ultimately joins the West Branch DuPage River. Stream conditions through this section are exclusively open water lined with concrete rubble in varying amounts. Water quality was unable to be determined at the time of observation due to a mostly frozen surface, though the flowing areas showed accumulation of sediment, trash, and algal growth consistent with unmaintained stagnant water features lacking native buffers or treatment systems. The stream banks appear to be stable, however several areas along the reach were beginning to wash out where not enough stone was placed and the changing water levels have cut around the stone. The shoreline around the Sikh Community Center is the most eroded where

undercutting is causing the shore to slough off into the water and trees are at risk of collapsing into the stream. While the banks here are generally moderately protected, the areas with low concrete placement are experiencing erosion. The downstream end of the site contains a control weir, pedestrian bridge, and a short stretch of stream that is overgrown by non-native invasive brush such as buckthorn. Erosion here is moderate to severe and the area remains channelized from prior development. Vegetation along the banks in this section consists mostly of maintained turf grass as it abuts multi-family residences, but also includes areas of unmanaged brush and low-quality volunteer buffer.

Channel Morphology

A significant aspect to the design is maintaining equilibrium with the hydraulics of the proposed meander as compared to the existing stream reach. Additionally, sediment transport capacity is a key feature to investigate and maintain in the with-development conditions.

In order to design the channel, the flow regime of the Springbrook #1 has to be estimated. The first estimate of bankfull channel geometry was determined by observed surveyed elevations in the field. Top of bank was used to estimate bankfull channel height and width upstream, downstream, and within the limits of the project. The cross sections indicate a bankfull discharge of approximately 240 cfs at the downstream cross section, 256 cfs at the weir cross section, to 777 cfs at Stonebridge and 700 at Creekside Drive at the upstream cross section. This variability is due to the highly widened stream associated with the Streams Lakes section.

Following observed bankfull calculations from surveyed cross sections, bankfull discharge was calculated using various methods outline in Worksheet A-2 from Wildland Hydrology. Cross Section 2 at the weir near the Sikh Temple was used for these calculations as this calculation is typically performed at a riffle and this weir is the feature closest to a riffle that is present within this reach. The bankfull discharge using these methods ranged from 175 to 260 cfs. Please see Table 1 on the following page for further details.

Table 1. Bankfull Velocity & Discharge Estimates*

Bankfull Velocity & Discharge Estimates*			
Input Variables			
Bankfull Riffle Cross-Sectional Area	A _{bkf}	128.50	
Bankfull Riffle Width (toe of slope)	W _{bkf}	29.00	
Bankfull Riffle Width (top of bank)	W _{bkf}	44.00	
D84 at Riffle	D _{ia}	9.00	
Bankfull Slope	S _{bkf}	0.0002	
Gravitational Acceleration	g	32.20	
Drainage Area	DA	3.60	
Output Variables			
Bankfull Riffle Mean Depth	d _{bkf}	2.30	
Wetted Perimeter (Assumes 2:1 bank slope) ~ (2√2*d _{bkf})+W _{bkf}	W _p	35.51	
D ₈₄ (mm) / 304.8	D ₈₄	0.030	
Hydraulic Radius A _{bkf} /W _p	R	3.62	
Relative Roughness R(ft) / D ₈₄ (ft)	R/D ₈₄	122.57	
Shear Velocity u* = (gRS) ^{1/2}	u*	0.13	
Estimation Methods	Equation	Bankfull Velocity (ft/sec)	Bankfull Discharge (cfs)
1. Friction Factor/Relative Roughness	$\bar{u} = [2.83+5.66*\text{Log}\{R/D_{84}\}]u^*$	1.94	248.90
2. Roughness Coefficient: a) Mannings n from Friction Factor/Relative Roughness (Figs. A-28, A-29) n=0.03	$\bar{u} = 1.49*R^{2/3}*S^{1/2}/n$	2.03	260.57
2. Roughness Coefficient: b) Mannings n from Stream Type (Fig. A-30) n=0.033	$\bar{u} = 1.49*R^{2/3}*S^{1/2}/n$	1.84	236.89
2. Roughness Coefficient: c) Mannings n from Jarrett** n=0.39*S ^{0.38} *R ^{-0.16}	$\bar{u} = 1.49*R^{2/3}*S^{1/2}/n$	n/a	n/a
3. Other Methods (HEC-RAS)		1.6	205.60
3. Other Methods (LP3)		1.36	174.76
4. Continuity Equations: a) USGS Gage Data u=Q/A		1.49	191.47
4. Continuity Equations: b) Regional Curves u=Q/A		n/a	n/a
*Rosgen Worksheet A-2.			
** equation applicable to stream types A1, A2, A3, B1, B2, B3, C2 & E3 (not applicable to our stream type)			

To verify the bankfull discharge, the peak discharges for various recurrence intervals were also estimated using log-Pearson Type III (LP3) probability distribution to the annual peak flow data from the Flood Insurance Study of Springbrook #1 (WBSP) Just above confluence with West Branch DuPage River. Based upon the analysis the peak discharge (cfs) for the 2, 1.5 and 1.0 storms is 329.2, 311.8 and 289.4 respectively. Please note that this data is from further downstream than this section of the stream and has a greater tributary area. Additionally, while completing this cross check using stream gage data is ideal in comparison to the data in the FIS, a gage is not currently present on Springbrook #1. See Table 2 and Figure 4 below.

Table 2. Log Pearson Frequency Analysis

DATA SOURCE	RECURRENCE INTERVAL (YEARS)	PERCENT CHANCE	PEAK DISCHARGE (CFS)
FIS DATA	500	0.002	2481
	100	0.01	1760
	50	0.02	1438
	10	0.1	759
EXTRAPOLATED DATA	2	0.5	329.2
	1.5	1	311.8
	1	1	289.4
	0.5	2	254.4

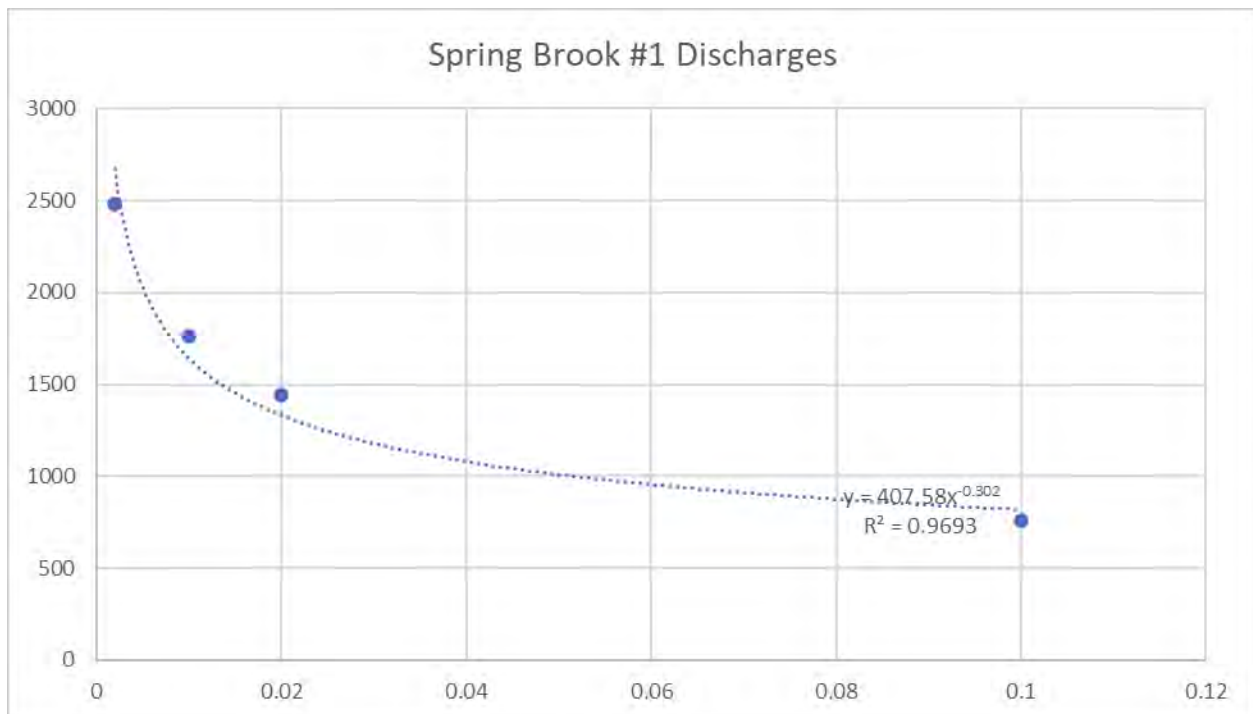


Figure 5. Discharge-Frequency

Historically a gage was present on Springbrook at Wheaton. The U.S. Department of the Interior and U.S. Geological Survey completed a study entitled Estimation of Peak Discharge Quantiles for Selected Annual Exceedance Probabilities in Northeastern Illinois. Below is the observed and urbanization-adjusted annual maximum peak discharge and associated urban fraction and precipitation values at this USGS stream gage. This data indicates a 2-year storm of approximately 175 cfs.

Table 3. Adjusted Annual Maximum Peak Discharges

05540080 SPRINGBROOK AT WHEATON, IL						
Recurrence Intervals	Discharge for given annual exceedance probability, ft ³ /s	At-site, unadjusted for urbanization, EMA, at-site skew	At-site, adjusted for urbanization, EMA, at-site skew	At-site, adjusted for urbanization, EMA, weighted skew: (Qp) _{g,s}	Regional regression: (Qp) _{g,r}	(Qp) _{g,w} : Weighted at-site (Qp) _{g,s} and regional (Qp) _{g,r}
2	0.5	143	171	177	119	174
5	0.2	213	245	252	180	246
10	0.1	274	312	312	225	302
25	0.04	373	422	400	289	383
50	0.02	465	525	476	340	450
100	0.01	575	650	561	393	524
200	0.005	706	801	658	448	603
500	0.002	922	1,050	804	525	718

Source: Over, T.M. , Saito, R.J., Veilleux, A.G., Sharpe, J.B., Soong, D.T., and Ishii, A.L.2021, Estimation of peak discharge quantiles for selected annual exceedance probabilities in northeastern Illinois (ver. 3.0, June 2021): U.S. Geological Survey Scientific Investigations Report 2016-5050, 50 p. with appendix

This data can also be obtained for a more site-specific location utilizing the StreamStats Statistics and Spatial Analysis Tool for Water-Resources Applications by USGS. See Table 4 below:

Table 4. Peak-Flow Statistics Flow Report [Region 2 Peak SIR 2016 5050 V3]

Statistic	Value	Unit	PII	Plu	ASEp
Urban 20-Percent AEP flood	239	ft ³ /s	113	505	47.5
Urban 50-percent AEP flood	163	ft ³ /s	78.9	337	46
Urban 10-percent AEP flood	296	ft ³ /s	136	645	49.6
Urban 4-percent AEP flood	375	ft ³ /s	163	862	53.4
Urban 1-percent AEP flood	501	ft ³ /s	200	1250	59.5
Urban 2-percent AEP flood	437	ft ³ /s	182	1050	56.6

Urban 0.2-percent AEP flood	659	ft ³ /s	242	1800	66
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PII: Prediction Interval- Lower,
 Plu: Prediction Interval- Upper,
 ASEp: Average Standard Error of Prediction,
 SE: Standard Error (other-- see report)

Additional data for future evaluation of the stream can be obtained through installation of a water level logger on one of the structures. This data would be instrumental in determining the location of rock toe and other bank stabilization methods to be installed.

Given the above analysis, it is estimated that the bankfull discharge is in the range of 175 cfs to 250 cfs. A single discharge was not determined as most streams are variable due to storm durations, antecedent moisture conditions, etc. The width of the channel is 44 feet at the upstream limit of the study area (Creekside Drive [Cross Section 4]), is 57 feet at Stone Bridge Trail (Cross Section 3), is 44 feet at the weir near the Sikh Temple, and is 35 feet at the Wheat Sanitary District property line. The stream throughout the Wheaton Sanitary District property is approximately 20 feet wide. The stream width upstream of Creekside drive is also approximately 20 ft.

The slope through the Streams Lakes Section is 0.0002 ft/ft. The proposed creek bed elevation at Creekside Drive per the original plans for the creation of the lakes was 716.9 feet. Therefore, the maximum slope that can be achieved throughout this section is 0.000577 ft/ft.

Feasibility

The purpose of this project is to reduce sedimentation within this reach. To do so, a stream cross section more typical to northeastern Illinois streams of similar sizes should be created through the Streams Lakes section. This will improve sediment transport through this section. The stream bankfull width should be approximately 20 feet with a bankfull depth of approximately 2 feet.

The existing available slope will not allow for a significant velocity increase through the reach. The profile should be adjusted by removing the weir to create a consistent slope from the Wheaton Sanitary District property line to the Creekside Drive bridge. The area immediately downstream of this structure appears to have some scour as the elevation in some locations of Cross Section 4 are at elevation +/- 715 feet. The proposed profile with a 0.057% slope does not allow for meandering without further reducing the slope, therefore the proposed creek should follow the existing alignment. However, backwater habitat areas can be created to improve habitat for fish and macro invertebrates.

To reestablish the stream, dredging of sediment to the lake's original subgrade will need to be completed. Fill will then need to be imported to raise the bed to 18 inches below proposed finished grade elevation. Placement of 18 inches of stream bed material consisting of a combination of sand, gravel and small cobbles (3-4"), is recommended above the subgrade. Rock substrate areas should be incorporated into the proposed stream at Creekside Drive, Stonebridge Trail, and the weir near the Sikh Temple. These would consist of 3-9" cobbles with the scattered boulders. Due to the lack of

slope, riffles can not be created, however these rock substrate areas are beneficial for increasing velocities and creating habitat for fish and mussels with improving dissolved oxygen.

The banks of the proposed stream should be at a 3 horizontal:1 vertical slope and protected with vegetated rock toe consisting of 3 inch to 9 inch round to sub-round river rock planted with native plugs at the base flow water level.

Approximately 5,100 linear feet of concrete rubble will need to be removed from the shoreline. A floodplain terrace should be created from the top of bank of the proposed creek to the existing banks of the lakes. These areas should be planted with wetland and riparian vegetation. The existing banks of the lakes should be vegetated with a low-profile prairie seed mix. These areas will deter geese and reduce fecal coliform in the stream.

Additionally, these improvements are located on private property. According to DuPage County GIS the project is located on five parcels, all owned by separate entities. The Parcel Identification Numbers for these properties include the following: 05-19-400-012 (Alpine Century Co.), 05-19-400-021 (IL Sikh Community); 05-19-400-025 (D&S Maintenance), 05-19-409-043 (Oak Park National Bank 8460) and 05-19-411-055 (D&K Loconti Corbin). These properties will need to be acquired or temporary construction easements and permanent access easements will need to be established within the area of the improvements.

Permit Requirements

The activities associated with the identified improvements are regulated by various agencies and regulations, including: the U.S. Army Corps of Engineers (USACE); the Illinois Interagency Wetland Policy Act; DuPage County; the Illinois Department of Natural Resources Office of Water Resources; the Federal Emergency Management Agency; Kane-DuPage Soil and Water Conservation District (SWCD), and the City of Wheaton.

U.S. Army Corps of Engineers:

Areas under the Corps jurisdiction include navigable waters of the U.S. and most other lakes, rivers, streams, small tributary waterways, natural ponds, and wetlands (bogs, fens, wet meadows, etc.). Ditches excavated in upland areas for the purpose of drainage are not considered jurisdictional waters of the U.S. or wetlands. Section 10 of the Rivers and Harbors Act of 1899 (RHA) authorizes the USACE to regulate structures or work in, over, or under navigable waters of the United States, while Section 404 of the Clean Water Act (CWA) gives the USACE authority to regulate discharges of dredged or fill material in waters of the U.S., including wetlands.

However, on January 9, 2001, in the U.S. Supreme Court Ruling in Solid Waste Agency of North Cook County v. U.S. Army Corps of Engineers, USACE regulatory jurisdiction was restricted under Section 404 of the CWA to navigable waters (i.e. Section 10 of RHA), surface tributaries to such navigable waters, and waters and wetlands that are adjacent to the Section 10 waters and their tributaries. Areas under jurisdiction on the basis of the "Migratory Bird Rule" which extended jurisdiction to include "intrastate waters" that lack a connection to a surface water tributary such as small, isolated waters and wetlands like pocosins, prairie potholes, vernal pools and playa lakes, are excluded.

Wetlands separated from other waters of the U.S. by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent wetlands."

On January 13, 2021, the U.S. Army Corps of Engineers (Corps) published a final rule in the Federal Register (86 FR 2744) announcing the reissuance of 12 existing nationwide permits (NWPs) and four new NWPs, as well as the reissuance of modified NWP general conditions and definitions. The Chicago District of the USACE announced that the Illinois portion of the Chicago District is transitioning from its Regional Permit Program to the NWP Program with the goal of adopting all the NWPs when they are reissued. The NWPs include specific project limitations and conditions to ensure that adverse environmental effects are no more than minimal, and that the aquatic environment is protected. If a proposed project meets the limitations and conditions of a current nationwide permit approved for use in Illinois, the Corps can provide a simplified and expedited review and project authorization. It is anticipated that this project would be permitted under Nationwide permit number 27- Aquatic Habitat Restoration, Enhancement, and Establishment Activities.

Illinois Interagency Wetlands Policy Act:

In 1989, the Illinois Interagency Wetlands Policy Act (IWPA) was enacted to ensure that there is no net loss of the state's existing wetlands or their functional values as a result of state-supported activities. As such, the state regulates both USACE jurisdictional and isolated wetlands. The Illinois Department of Natural Resources (IDNR) administers the IWPA.

The IWPA applies to all state-funded activities except maintenance activities, emergency repair of flood protection structures, fisheries management, road resurfacing, etc. In the event that the project is state-funded, by programs such as IEPA 319h, a permit under the IWPA will be required.

Illinois Department of Natural Resources

The Illinois Department of Natural Resources provides a tool known as EcoCAT (Ecological Compliance Assessment Tool) to allow developers to determine potential impacts to Illinois Natural Area Inventory sites or state-listed threatened or endangered species during site development. This consultation is valid for two years from the termination date, as long as project scope does not change and additional species or natural areas are not identified in the area.

Federal Emergency Management Agency Floodplain Regulations

The Federal Emergency Management Agency (FEMA) developed the National Flood Insurance Program (NFIP) in 1968 to regulate development in the 100-year floodplain or Special Flood Hazard Area (SFHA). FEMA's regulation of development in flood plain areas is considered to be the establishment of minimum requirements. Many communities opt to exceed the minimum FEMA standards in order to increase the level of property protection.

FEMA requires that any development that proposes to change the base flood elevation, base flood velocity, flood boundaries or floodways will require submitting a Letter of Map Revision (LOMR). This process requires submitting a report (MT-2 Application) that contains the hydraulic modeling and engineering plans for review by FEMA. If the project lowers the base flood elevation and reduces

flood velocities, DuPage County has in the past allowed a variance which waives the requirement of obtaining a CLOMR from FEMA prior to construction (a LOMR is still required, but this is submitted after construction). However, if the floodway boundaries need to be re-delineated, then DuPage County will require a CLOMR prior to issuing their permit.

IDNR-OWR Floodplain/Floodway Regulations

The Illinois Department of Natural Resources – Office of Water Resources (IDNR-OWR) administers the NFIP for FEMA for Illinois communities. Northeastern Illinois communities are also subject to additional State of Illinois regulations for designated floodways. IDNR-OWR developed floodway standards and identified the appropriate uses of floodways in accordance with Public Act 93-1049 in 1989. In Northeastern Illinois, IDNR-OWR regulates the floodway and issues floodway permits for construction.

Development within the floodway is strictly limited (no buildings, structures, fences, walls, or anything that blocks flood waters). At-grade trails, bridge crossings, and open-air pavilions (only posts) are appropriate uses and may be permitted within the floodway. Any fill within the floodway requires a re-delineation of the floodway boundary. This process also requires a CLOMR and LOMR.

IDNR-OWR typically grants permission to DuPage County to review and issue a floodway permit. It is recommended that the applicant request IDNR-OWR to delegate their floodway authority to DuPage County in order to minimize the number of government agencies involved in the project.

DuPage County

Per Article IV Section 15-30 of the April 2012 DuPage County Countywide Stormwater and Flood Plain Ordinance (DCSFPO), a stormwater management certification is required. Because the City of Wheaton is a partial waiver community, it would be responsible for issuing DCSFPO compliance certifications. However, DuPage County would be required to review all special management areas (including floodways, floodplains, wetlands, and buffers) and would issue an authorization related to these items.

City of Wheaton Stormwater Regulations

The City of Wheaton is a partial waiver community and has adopted the DCSFPO for regulatory purposes. As partial waiver community, the City is responsible for certifying the stormwater design. However, it is anticipated that DuPage County will be reviewing the floodplain, floodway, wetland, and buffer aspects of the project. It is not anticipated that detention, BMPs, or flood protection would apply to the restoration project.

Floodplain:

Development within the floodplain that creates fill requires compensatory storage volume at a ratio of 1.5:1 cut to fill incrementally from the 0-10 year and 10-100 year floodplain elevations. A majority of fill is anticipated to occur below the normal water level of the lakes and therefore will not require compensatory storage. Any fill above the normal water level of the lakes would require compensatory storage to be provided.

Wetlands:

Both isolated and adjacent wetlands are jurisdictional under the DCSFPO. All wetland determinations and delineations that are conducted in DuPage County are required to use procedures in accordance with the current Federal wetland delineation methodology authorized under Section 404 of the CWA. As such, the above methodology as set forth in the Manual was used. All wetland delineations must be verified by DuPage County or the authorized Ordinance Administrator for all complete waiver communities. The USACE has issued DuPage County Department of Development and Economic Planning a Programmatic General Permit (RP-25), which designates the County as the lead agency to review permits involving wetlands.

Per Section 15-85.E of the DCSFPO all wetlands must be classified as critical or regulatory based on the assessment of certain functions and values.

Development within or affecting critical wetlands under the DCSFPO is prohibited, unless documentation is submitted that conclusively proves that the presence of critical wetlands precludes all economic use of the entire parcel, and that no practicable alternative to wetland modification exists. Mitigation for impacts to critical wetlands is required at a minimum proportional rate of three to one (3:1).

All other wetlands that do not meet any of the functions and values described above are considered regulatory. Development within or affecting a regulatory wetland that is equal to or greater than 0.10 acre shall be prohibited unless documentation is submitted that proves that the proposed development represents the least damaging alternative while still achieving the basic development purpose. Development within or affecting a regulatory wetland less than 0.10 acre does not require the above referenced documentation. Mitigation for impacts to regulatory wetlands is required at a minimum proportional rate of one and a half to one (1.5:1).

Funding Sources***Environmental Protection Agency (EPA)***

In the event that the stream banks are proposed to be stabilized and water quality improvements are anticipated, this project would likely meet the requirements to receive an Environmental Protection Agency (EPA) 319h Grant. However, the project must be identified in an approved watershed plan. DuPage County has prepared watershed plans for numerous creeks throughout the County. We highly recommend contacting the County for inclusion of this project in the appropriate watershed plan.

DuPage River Salt Creek Workgroup (DRSCW)

The DRSCW, a membership-based non-profit organization, provides a collaborative organization for sanitary districts, municipalities, counties, forest preserve districts, and private environmental organizations to improve stream resource quality in the watersheds of the East Branch and West Branch of the DuPage River and the Salt Creek. The DRSCW has been in operation since the

beginning of 2006 and during that time has built a comprehensive data set on water quality, physical features, and aquatic communities (fish and macro-invertebrates) for local streams, including Salt Creek.

The watersheds in the DRSCW program area are listed as impaired by the state of Illinois due primarily to the failure of these streams to support aquatic life as defined by the Illinois EPA. Monitoring and analysis of stream characteristics by DRSCW has shown that point source loading, such as the discharge from treatment plants, is an insufficient explanation for the inability of local streams to support aquatic life. Evidence indicated that man-made modifications to stream corridors and nonpoint source pollution are more likely the cause for the failure of these streams. Additionally, early projects completed by the DRSCW focused on dam removal and documented marked improvements in stream biological health.

The DRSCW and EPA recently agreed to the DRSCW NPDES Special Permit Conditions for Publicly Owned Treatment Works (POTW) National Pollutant Discharge Elimination System (NPDES) permits in the DRSCW program area. Under the proposed conditions, DRSCW member POTWs created the Special Condition Project Fund to finance implementation of priority projects with the understanding that these projects would improve Qualitative Habitat Evaluation Index (QHEI) scores, Macro-Invertebrate Index of Biological Integrity (MIBI) scores, and dissolved oxygen (DO) levels.

Should the project proceed with naturalized bank stabilization and water quality improvements are anticipated, the project may meet the goals of the DRSCW, and they may be able to provide funding for the project through their special permit condition funds.

DuPage County Water Quality Improvement Program

DuPage County developed the Water Quality Improvement Program in 2000. Potential uses for this fund include water quality improvement projects, which would make this project a strong candidate. With this program, DuPage County will fund up to 20% of the total permitting and construction costs. The due date for the next application has not been announced yet; however, applications for 2022 were due early January 2022 so it is assumed that the application for 2023 will be due at roughly the same time of year.

Conclusion

Springbrook #1 is a man-made channel that has been modified significantly throughout history. The Streams Lakes section is especially problematic due to the increased width and low slope of the stream. ERA has evaluated the Streams Lakes sections of Springbrook #1 to determine the feasibility of meandering to decrease the need for further dredging due to accumulated sediments. We have determined that returning this segment of stream to a more typical northeastern Illinois stream cross section is possible. However, the proposed creek should follow the existing alignment as the slope will not allow increased sinuosity. The bankfull width should be approximately 20 feet with a bankfull depth of approximately 2 feet and bank 3:1 bank slope. Numerous water quality and habitat features can be incorporated into the stream and adjacent areas. These include rock substrate areas, backwater habitat areas, floodplain terraces, and wetland and riparian

overbank vegetation. Incorporating these features into the design allows for funding from IEPA, DuPage County and DRSCW. Any modifications to the stream will require permitting from several agencies. The City will need to acquire or establish temporary construction easements and permanent access easements within the area of the improvements on five privately owned properties.

ERA has prepared a Preliminary Engineering Plan that illustrates the proposed stream alignment, instream enhancements and adjacent water quality features. An Engineer's Opinion of Probable Cost for the improvements has also been provided. This plan and estimate may be used to apply for funding from the above referenced agencies and partners.

Appendices

APPENDIX 1

EXISTING CONDITIONS PLAN VIEW & TOPOGRAPHIC INFORMATION



Legend

- X Survey Elevation (Feb 25)
- Contours 1ft (2017)
- Parcels
- Hydrology



0 5 10 20 30 40 Feet

SPRING BROOK

MATCHLINE C

MATCHLINE A

REVISIONS:					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

DRAWN BY: CF
CHECKED BY: EP
APPROVED BY: EP



35701 WEST AVENUE, SUITE 150
WARRENVILLE, ILLINOIS 60555
PHONE (630) 393-3060
FAX (630) 393-2152

10 S. RIVERSIDE PLAZA, SUITE 875
CHICAGO, ILLINOIS 60606
PHONE (312) 474-7841
FAX (312) 474-6099

2416 GALEN DRIVE
CHAMPAIGN, ILLINOIS 61821
PHONE (217) 351-6268
FAX (217) 355-1902

CITY OF WHEATON

TITLE:

EXISTING CONDITIONS

SCALE: 1 inch = 20 feet
DATE: FEB 2022
PROJECT: W22013.00
SHEET: 2 OF 6



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FAX (312) 474-6099

2416 GALEN DRIVE
CHAMPAIGN, ILLINOIS 61821
PHONE (217) 351-6268
FAX (217) 355-1902

CITY OF WHEATON

EXISTING CONDITIONS

SCALE: 1 inch = 20 feet
DATE: FEB 2022
PROJECT: W22013.00
SHEET: 3 OF 6



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CITY OF WHEATON

TITLE:

EXISTING CONDITIONS

SCALE: 1 inch = 20 feet
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PROJECT: W22013.00
SHEET: 4 OF 6



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CITY OF WHEATON

TITLE:

EXISTING CONDITIONS

SCALE: 1 inch = 20 feet

DATE: FEB 2022

PROJECT: W22013.00

SHEET: 5 OF 6



Document Path: F:\GIS\Map County\Wheaton\W22013.00 Stream Lakes Master Exhibit F.mxd User Name: cfouarp Date: 4/26/2022

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CITY OF WHEATON

TITLE:
EXISTING CONDITIONS

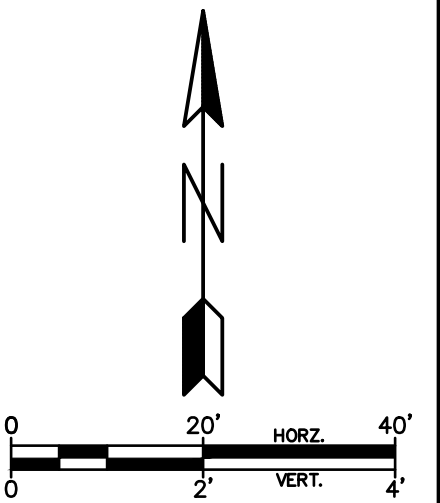
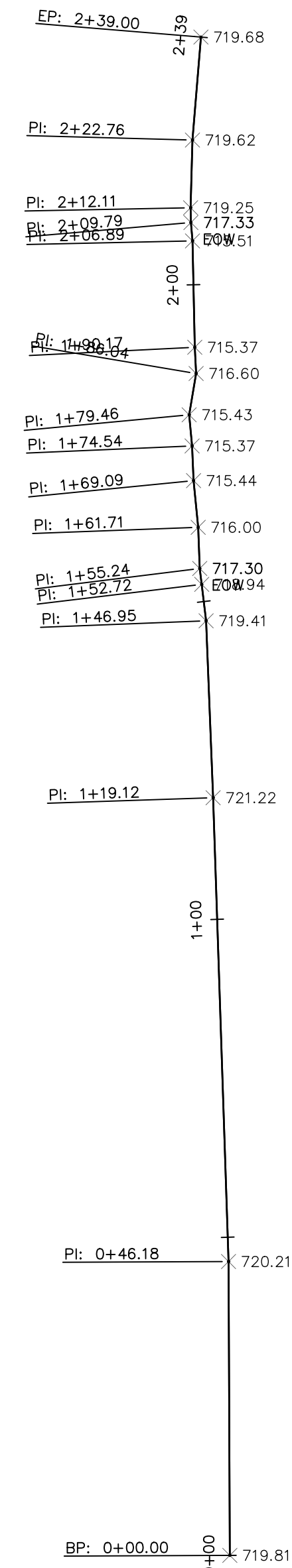
SCALE: 1 inch = 20 feet
DATE: FEB 2022
PROJECT: W22013.00
SHEET: 6 OF 6

APPENDIX 2

EXISTING CONDITIONS CROSS SECTIONS

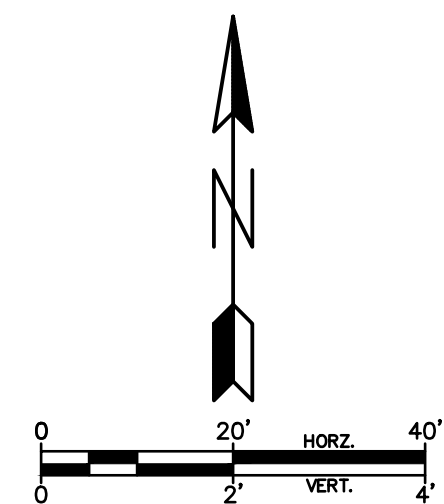
The graph displays the elevation profile of a road. The horizontal axis represents distance in stations, ranging from 0+00 to 2+50. The vertical axis represents elevation in feet, ranging from 712 to 726. A dashed line represents the ground profile, and a solid line represents the proposed road grade. The profile shows a rise from station 0+00 to a peak around station 1+25, followed by a sharp drop to a valley around station 1+75, and then a rise to a plateau around station 2+25. Vertical curve data points are labeled: 719.8 at 0+00, 720.3 at 0+50, 721.0 at 1+00, 719.2 at 1+50, and 715.5 at 2+00.

Station	Elevation (ft)
0+00	719.8
0+50	720.3
1+00	721.0
1+50	719.2
2+00	715.5



The graph illustrates the relationship between the number of iterations (x-axis) and the number of iterations required to reach a solution (y-axis). The x-axis is labeled with values 0+00, 0+50, 1+00, and 1+50. The y-axis is labeled with values 716, 718, 720, 722, 724, 726, and 728. A dashed line represents the data, showing a minimum value of approximately 718 at 0+50 iterations. Specific data points are labeled: 723.2 at 0+00, 718.2 at 0+50, and 721.9 at 1+00.

Iterations (x-axis)	Iterations to Solution (y-axis)
0+00	723.2
0+50	718.2
1+00	721.9



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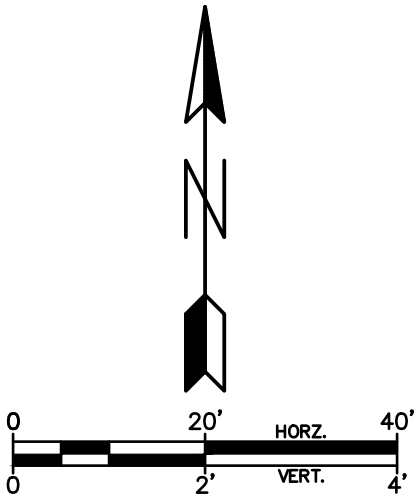
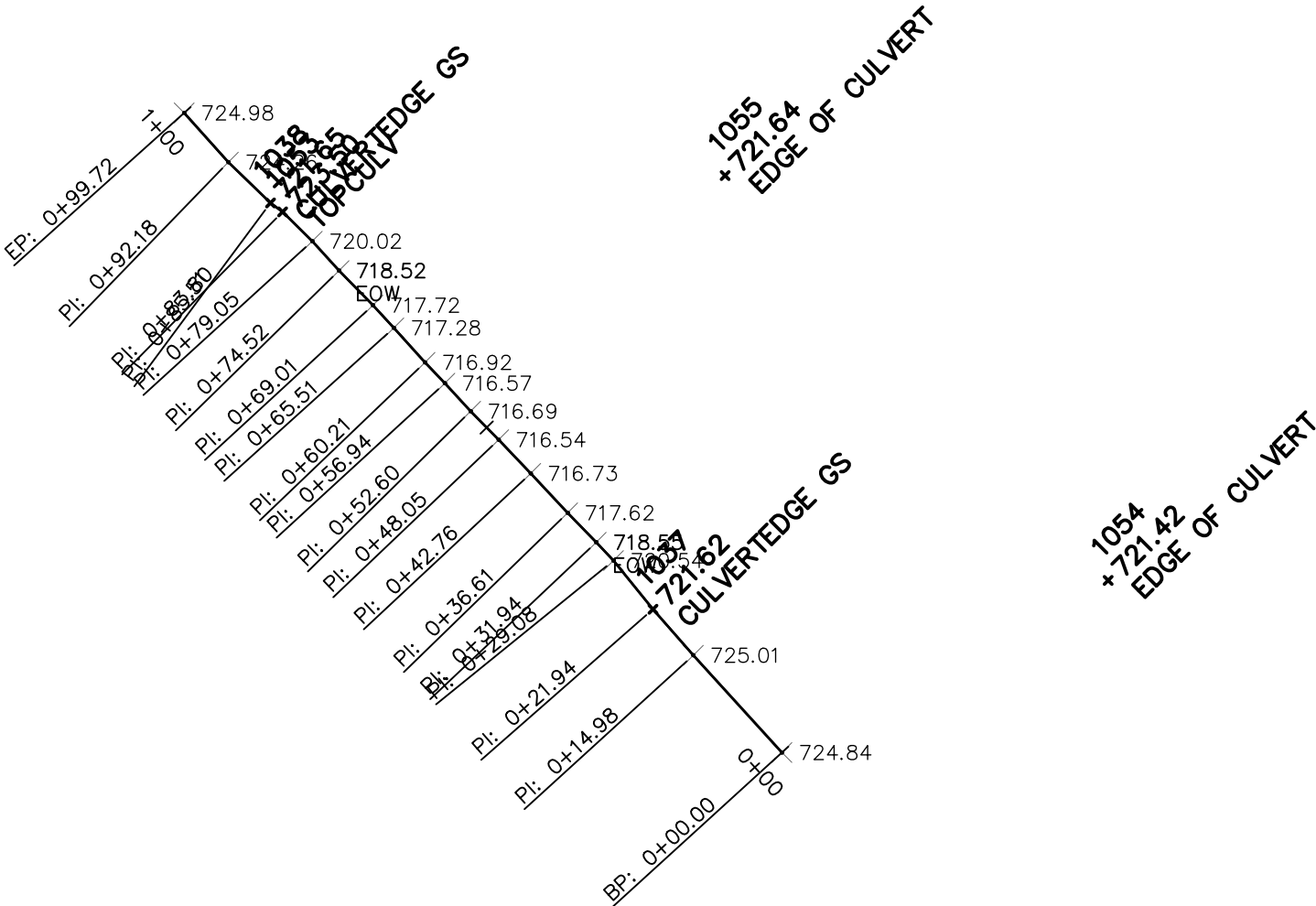
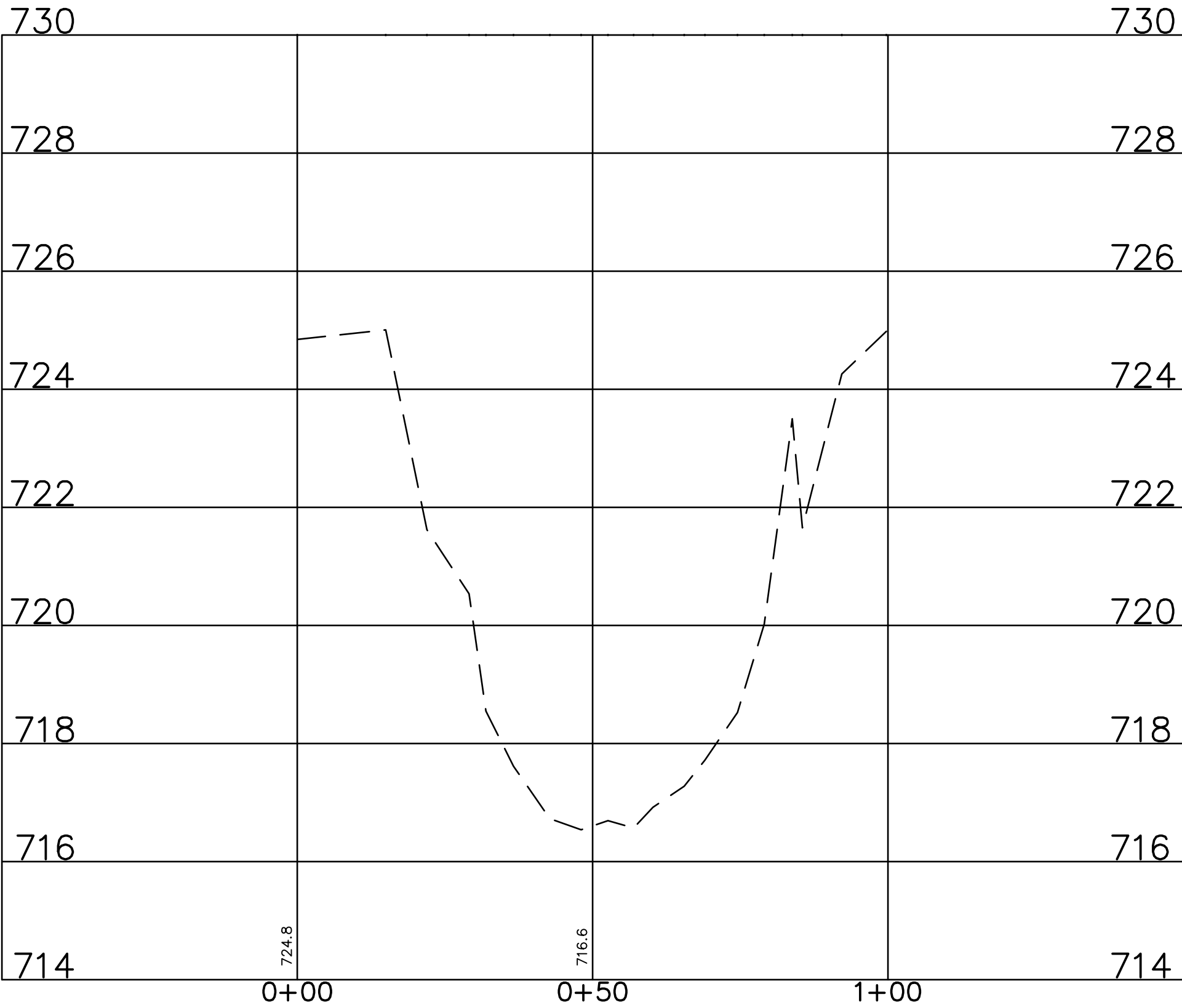
CITY OF WHEATON, ILLINOIS

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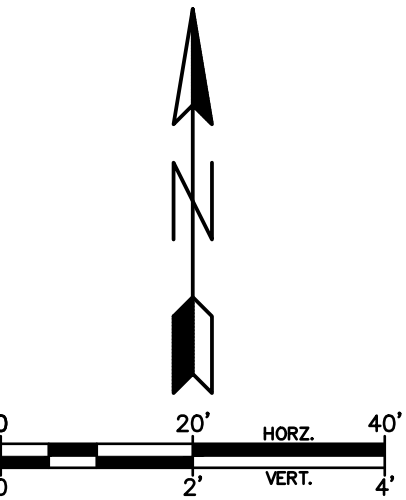
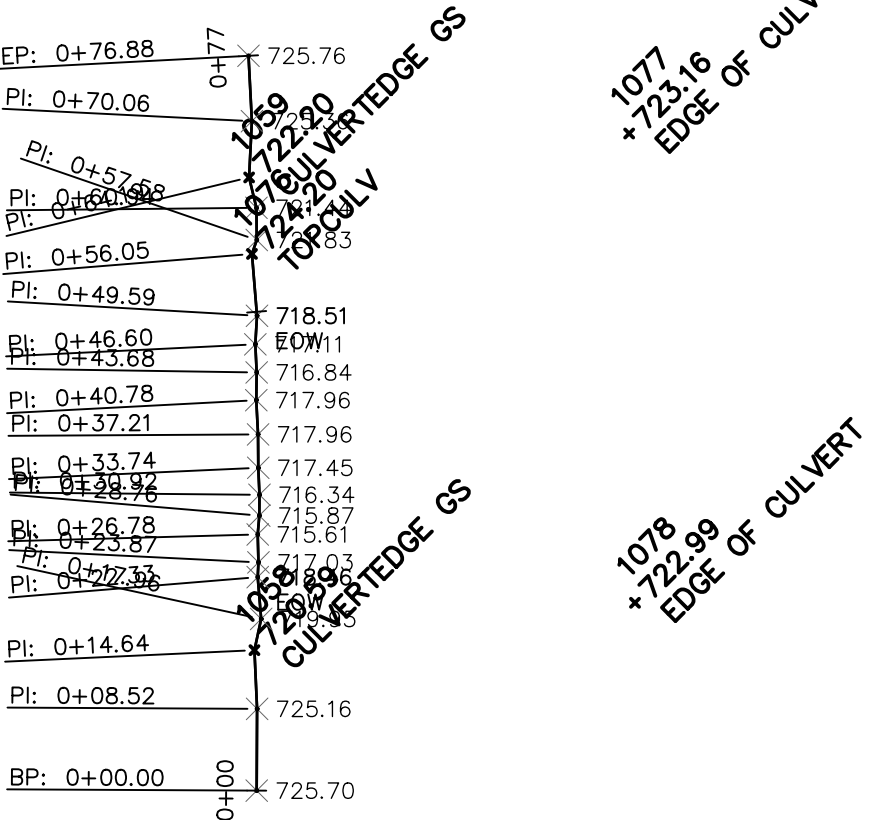
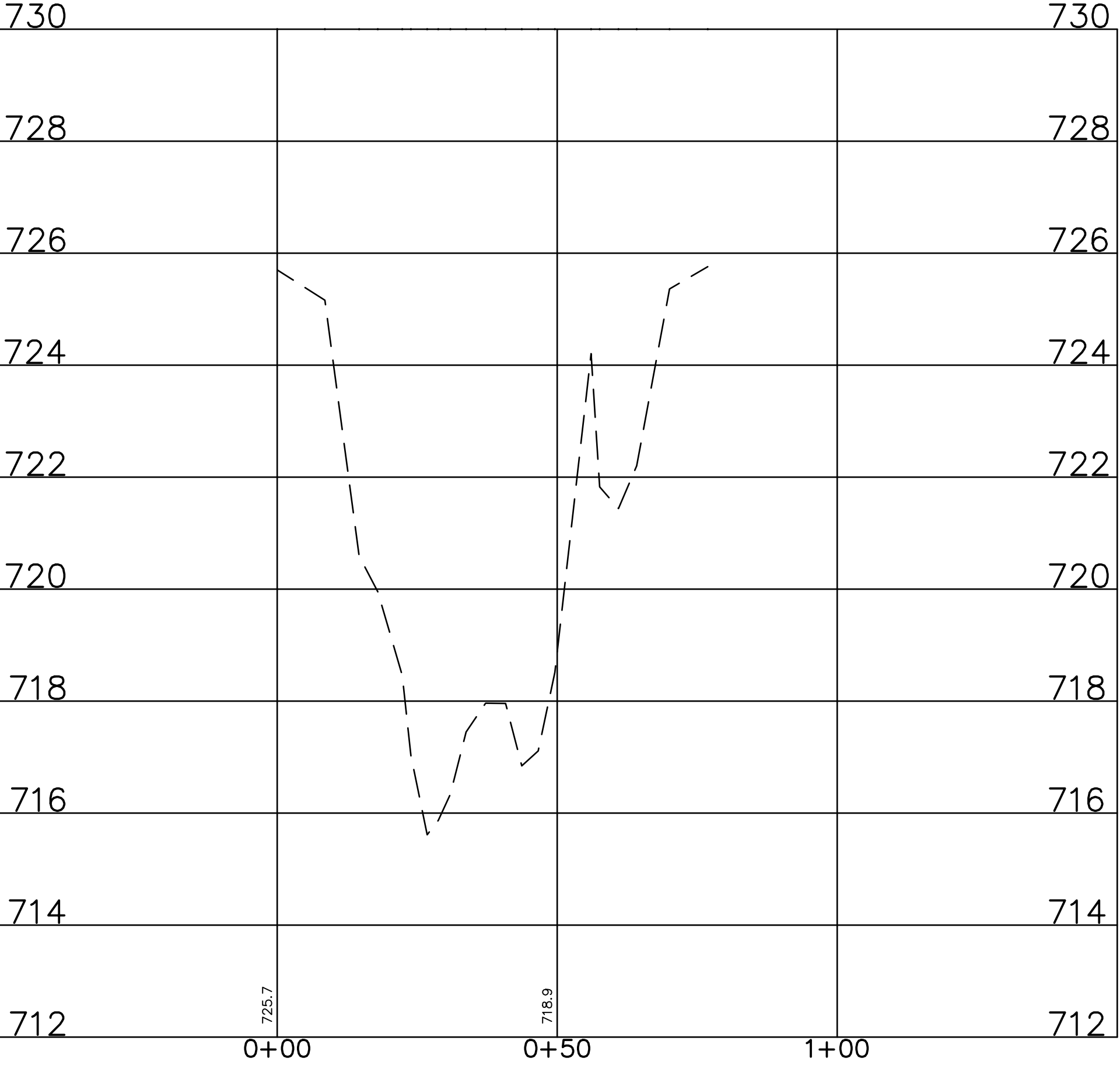
*STREAMS LAKES MEANDER
CROSS SECTIONS*

SCALE: 1"=20'H; 1"=2'V
DATE: April 2022
JOB NO: W22013
SHEET 1 OF 2

Cross Section 3



Cross Section 4



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CITY OF WHEATON, ILLINOIS

TITLE:
**STREAMS LAKES MEANDER
CROSS SECTIONS**

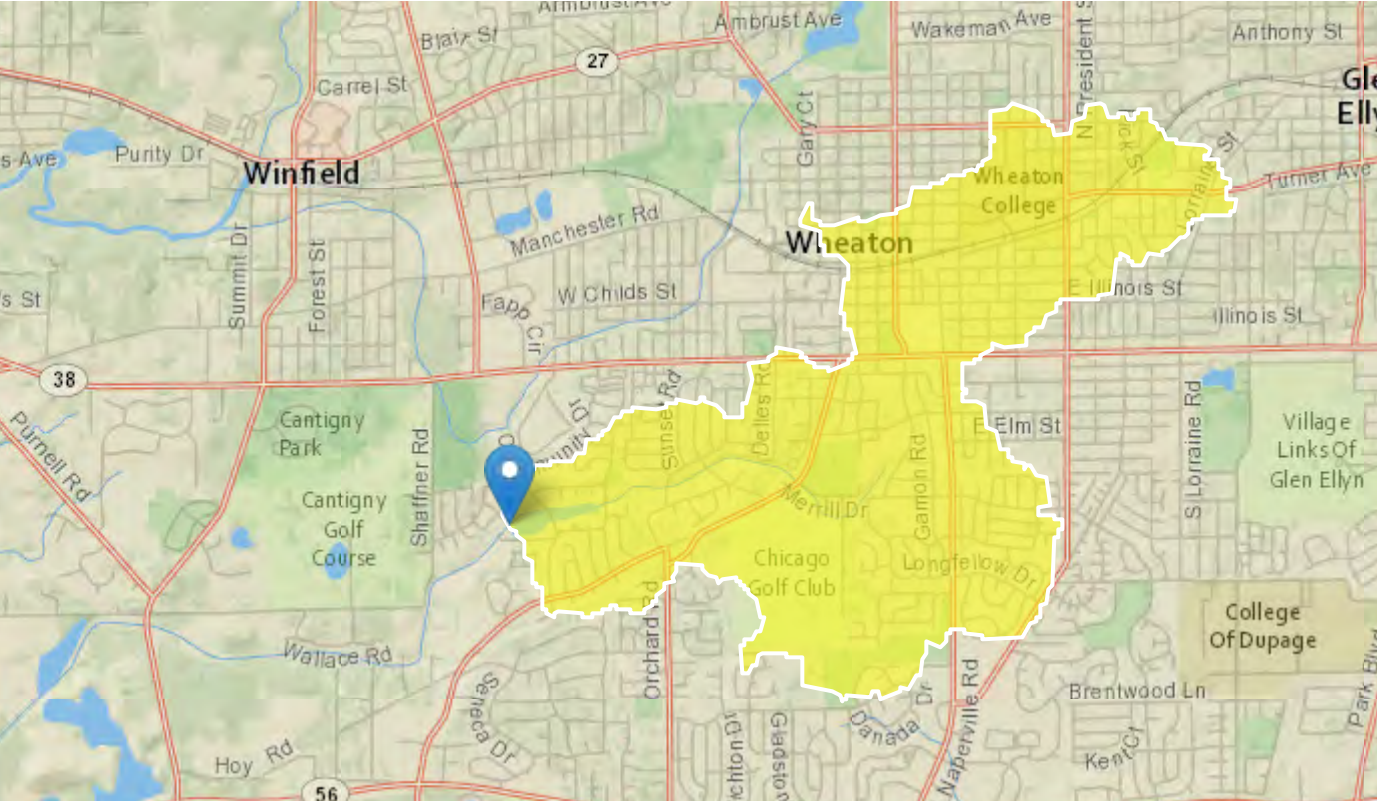
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DATE: April 2022
JOB NO: W22013
SHEET 1 OF 2

APPENDIX 3

USGS STREAMSTATS OUTPUT DATA

Spring Brook #1

Region ID: IL
Workspace ID: IL20220428172325216000
Clicked Point (Latitude, Longitude): 41.84789, -88.13979
Time: 2022-04-28 12:23:48 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	3.6	square miles
FLC11DVLMH	Fraction of drainage area that is in low to high developed land-use classes 22-24 from NLCD 2011	0.818	decimal fraction
FSSURGDC78	Fraction of land area that is in very poorly drained and unknown likely water drainage classes 7 and 8 from SSURGO	0.045	decimal fraction

Parameter Code	Parameter Description	Value	Unit
RELRELF	Basin relief divided by basin perimeter	4.72	feet per mi

Bankfull Statistics Parameters [Interior Plains D Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	3.6	square miles	0.19305	59927.7393

Bankfull Statistics Parameters [Central Lowland P Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	3.6	square miles	0.200772	59927.66594

Bankfull Statistics Parameters [USA Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	3.6	square miles	0.07722	59927.7393

Bankfull Statistics Flow Report [Interior Plains D Bieger 2015]

Statistic	Value	Unit
Bieger_D_channel_width	18.4	ft
Bieger_D_channel_depth	1.91	ft
Bieger_D_channel_cross_sectional_area	39.5	ft^2

Bankfull Statistics Flow Report [Central Lowland P Bieger 2015]

Statistic	Value	Unit
Bieger_P_channel_width	20.9	ft
Bieger_P_channel_depth	2.3	ft
Bieger_P_channel_cross_sectional_area	37.6	ft^2

Bankfull Statistics Flow Report [USA Bieger 2015]

Statistic	Value	Unit
Bieger_USA_channel_width	19.4	ft
Bieger_USA_channel_depth	1.58	ft
Bieger_USA_channel_cross_sectional_area	34.1	ft^2

Bankfull Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
Bieger_D_channel_width	18.4	ft
Bieger_D_channel_depth	1.91	ft
Bieger_D_channel_cross_sectional_area	39.5	ft^2
Bieger_P_channel_width	20.9	ft
Bieger_P_channel_depth	2.3	ft
Bieger_P_channel_cross_sectional_area	37.6	ft^2
Bieger_USA_channel_width	19.4	ft
Bieger_USA_channel_depth	1.58	ft
Bieger_USA_channel_cross_sectional_area	34.1	ft^2

Bankfull Statistics Citations

Bieger, Katrin; Rathjens, Hendrik; Allen, Peter M.; and Arnold, Jeffrey G.,2015, Development and Evaluation of Bankfull Hydraulic Geometry Relationships for the Physiographic Regions of the United States, Publications from USDA-ARS / UNL Faculty, 17p. (https://digitalcommons.unl.edu/usdaarsfacpub/1515?utm_source=digitalcommons.unl.edu%2Fusdaarsfacpub%2F1515&utm_medium=PDF&utm_campaign=PDFCoverSheet)

Peak-Flow Statistics Parameters [Region 2 Peak SIR 2016 5050 V3]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	3.6	square miles	0.0878	1351
FLC11DVLMH	Frac_Lo_Med_Hi_Developed_from_NLCD2011	0.818	decimal fraction	0.0022	0.979
FSSURGDC78	Fraction_SSURGO_Drainage_Classes_7_and_8	0.045	decimal fraction	0	0.256

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
RELRELF	Relative Relief	4.72	feet per mi	0.821	37.2

Peak-Flow Statistics Flow Report [Region 2 Peak SIR 2016 5050 V3]

Pll: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	Pll	Plu	ASEp
Urban 20-Percent AEP flood	239	ft ³ /s	113	505	47.5
Urban 50-percent AEP flood	163	ft ³ /s	78.9	337	46
Urban 10-percent AEP flood	296	ft ³ /s	136	645	49.6
Urban 4-percent AEP flood	375	ft ³ /s	163	862	53.4
Urban 1-percent AEP flood	501	ft ³ /s	200	1250	59.5
Urban 2-percent AEP flood	437	ft ³ /s	182	1050	56.6
Urban 0.2-percent AEP flood	659	ft ³ /s	242	1800	66

Peak-Flow Statistics Citations

Over, T.M. , Saito, R.J., Veilleux, A.G., Sharpe, J.B., Soong, D.T., and Ishii, A.L. 2021, Estimation of peak discharge quantiles for selected annual exceedance probabilities in northeastern Illinois (ver. 3.0, June 2021): U.S. Geological Survey Scientific Investigations Report 2016-5050, 50 p. with appendix (<https://doi.org/10.3133/sir20165050>)

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Application Version: 4.8.1

StreamStats Services Version: 1.2.22

NSS Services Version: 2.1.2

APPENDIX 4

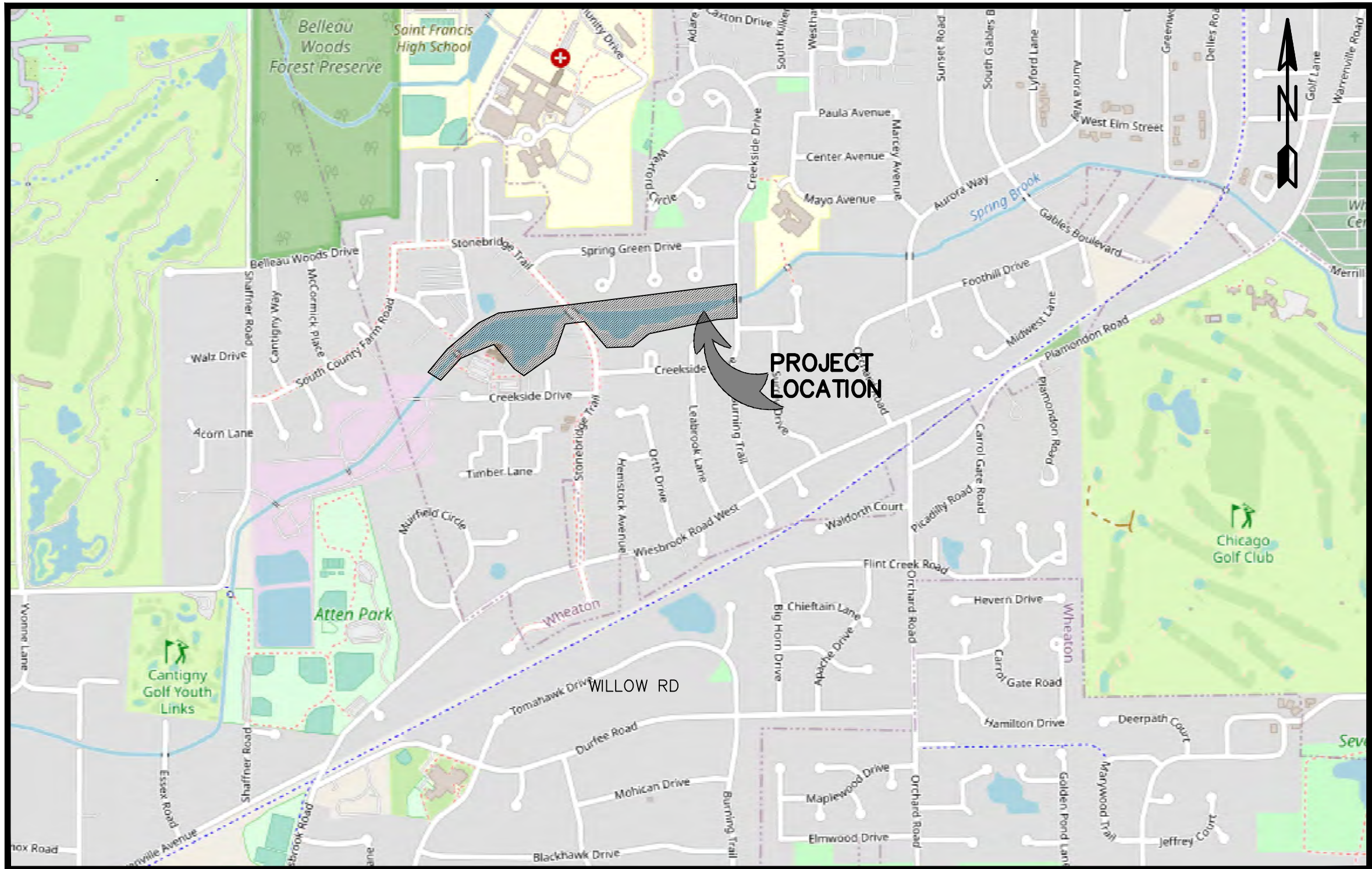
PRELIMINARY ENGINEERING PLANS

SPRINGBROOK #1 STREAMS LAKE MEANDER WHEATON, ILLINOIS

INDEX TO DRAWINGS

- 1. COVER
- 2.-5. PLAN AND PROFILES
- 6.-9. PLANTING PLAN
- 10-25. CROSS SECTIONS
- 26. DETAILS

PREPARED FOR:
CITY OF WHEATON
303 W. WESLEY STREET
WHEATON, ILLINOIS 60187-0727
PHONE: (630) 260-2000



LOCATION MAP

PRELIMINARY
ENGINEERING
PLANS



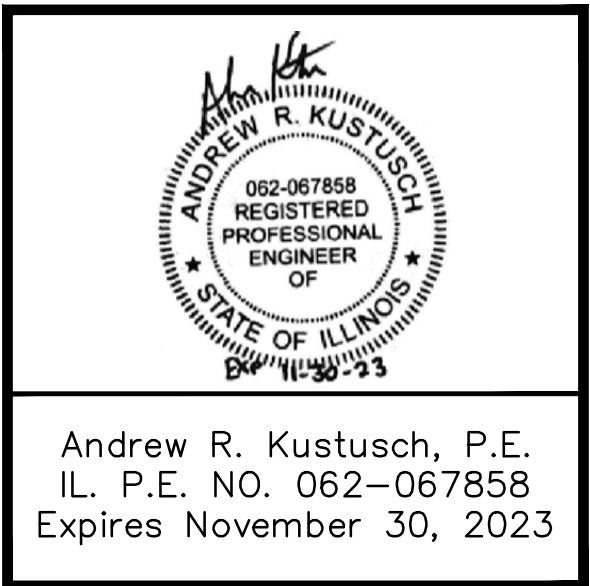
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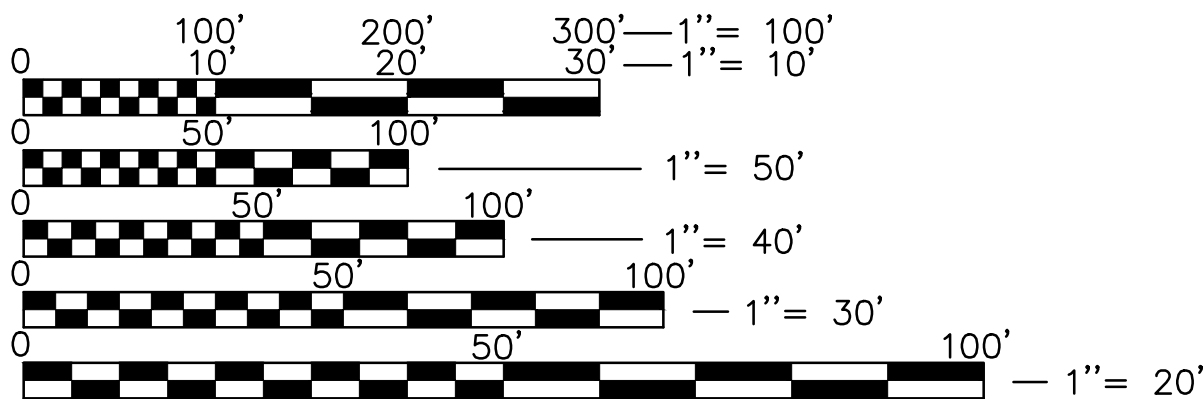
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ORIGINAL SUBMITTAL: AUGUST, 2022



ERA JOB NO.: W22013

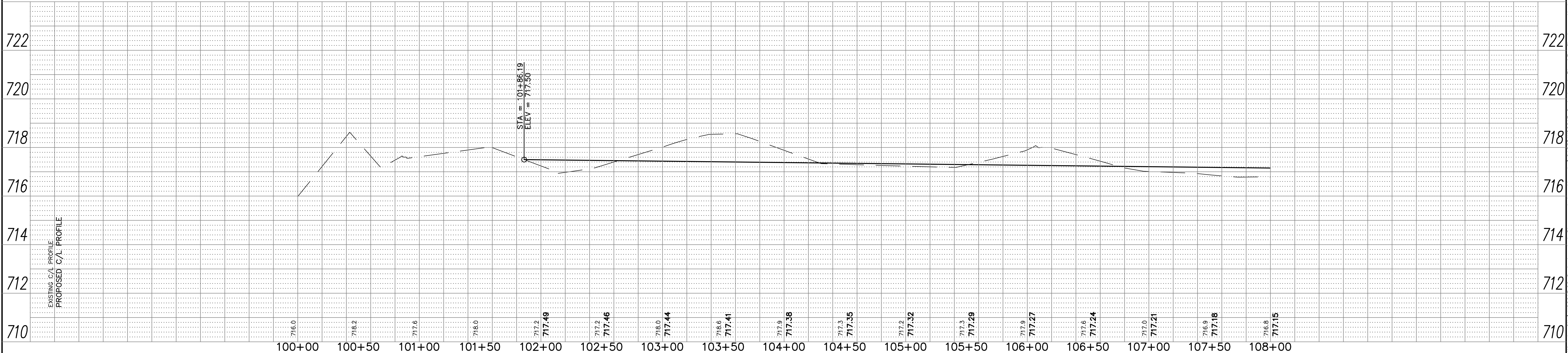
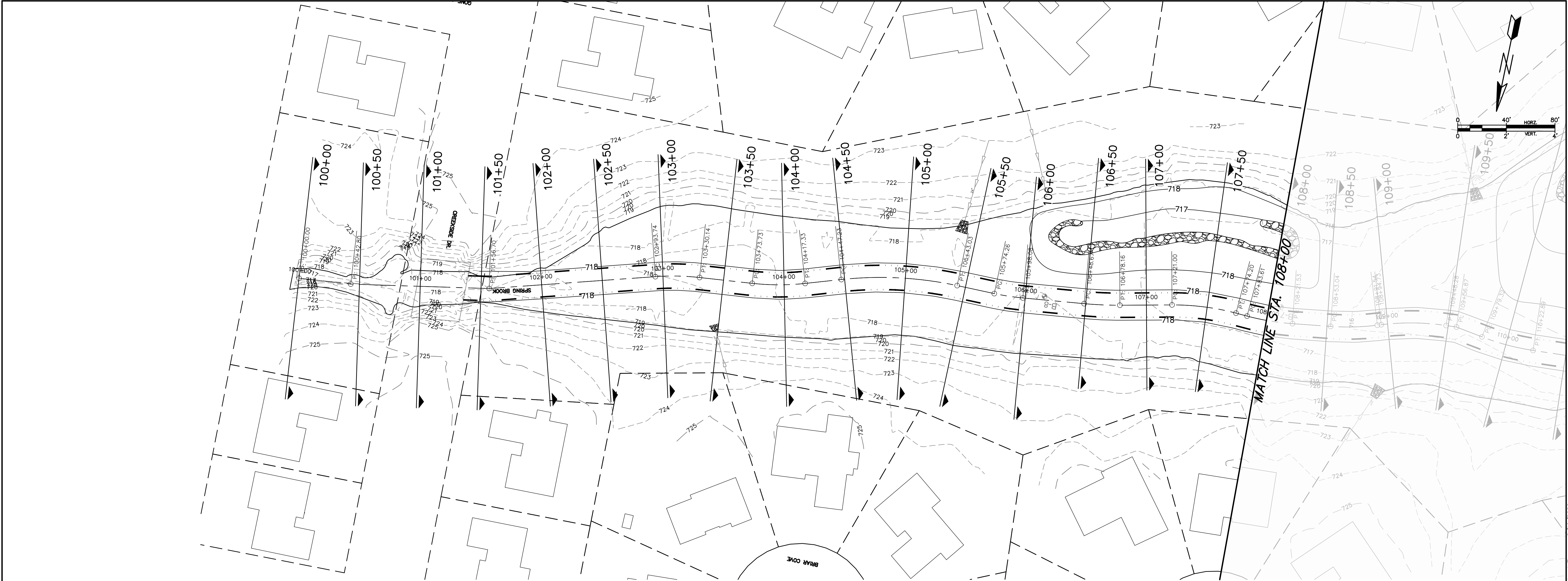


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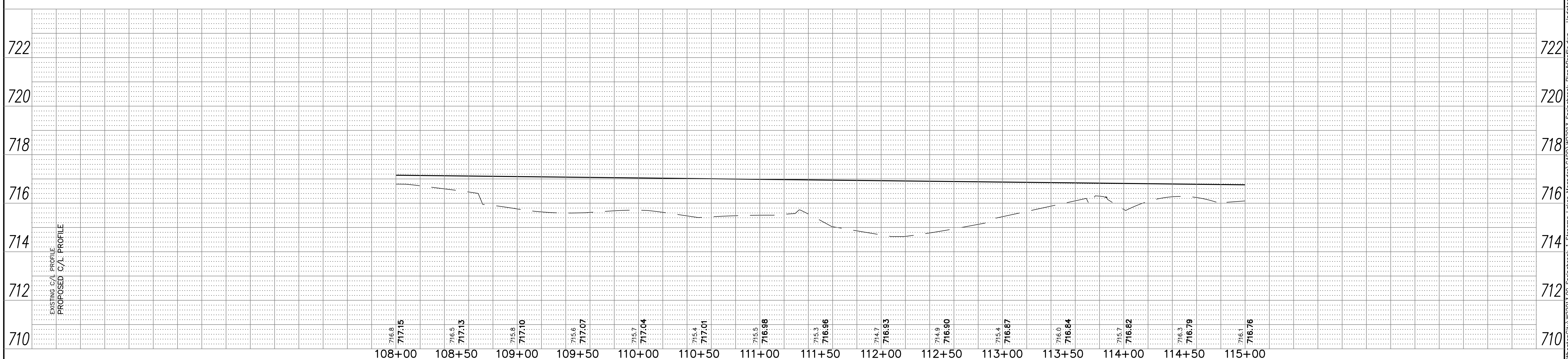
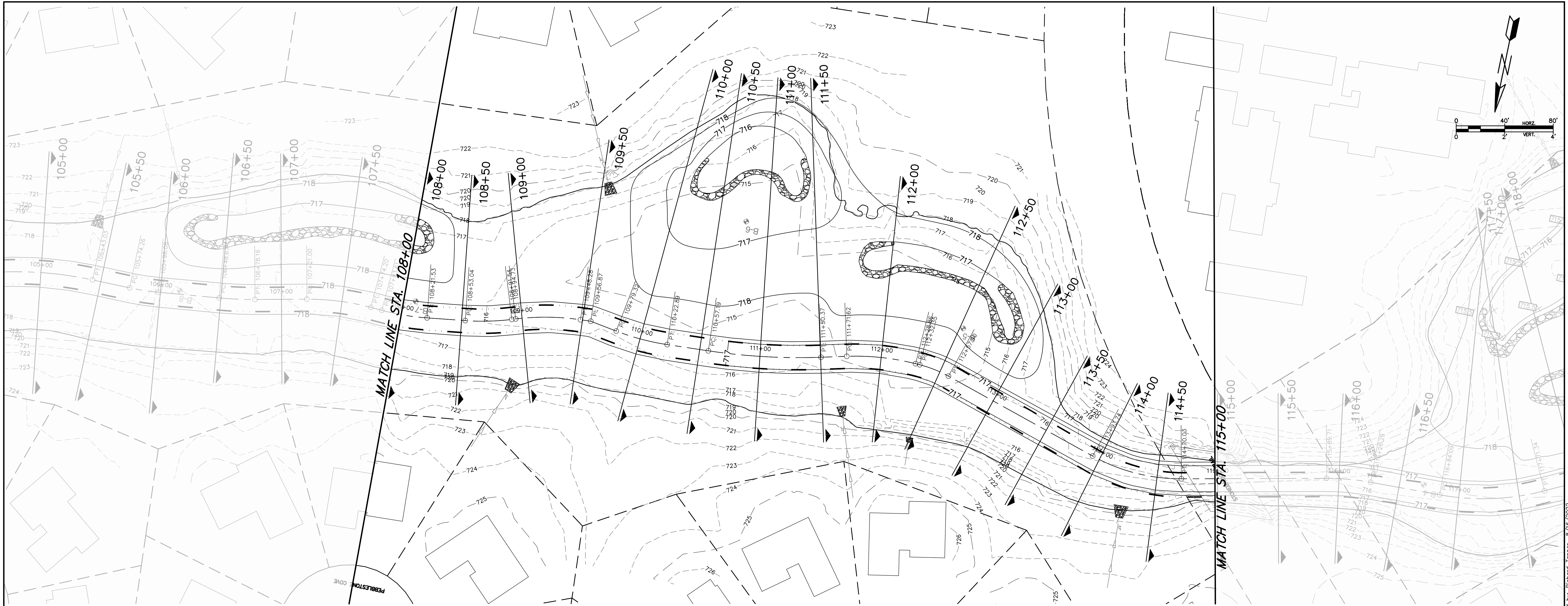
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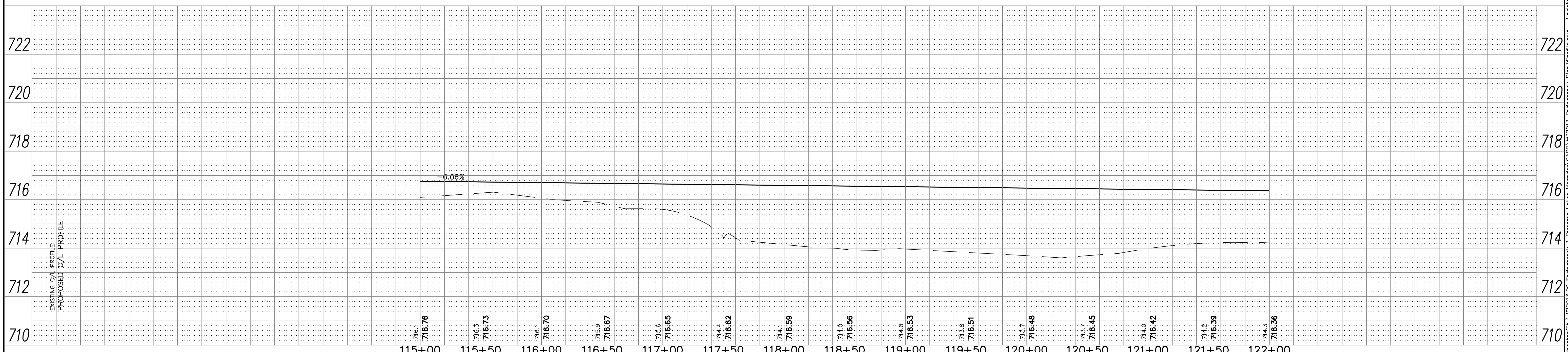
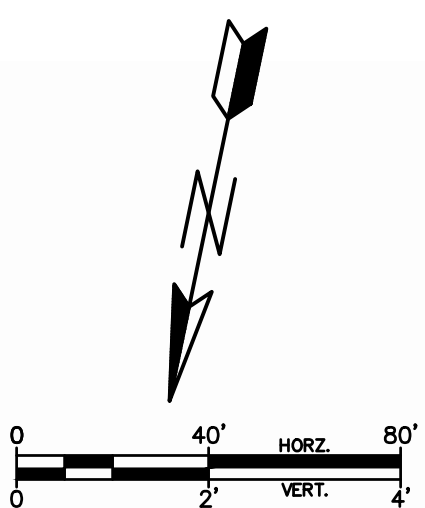
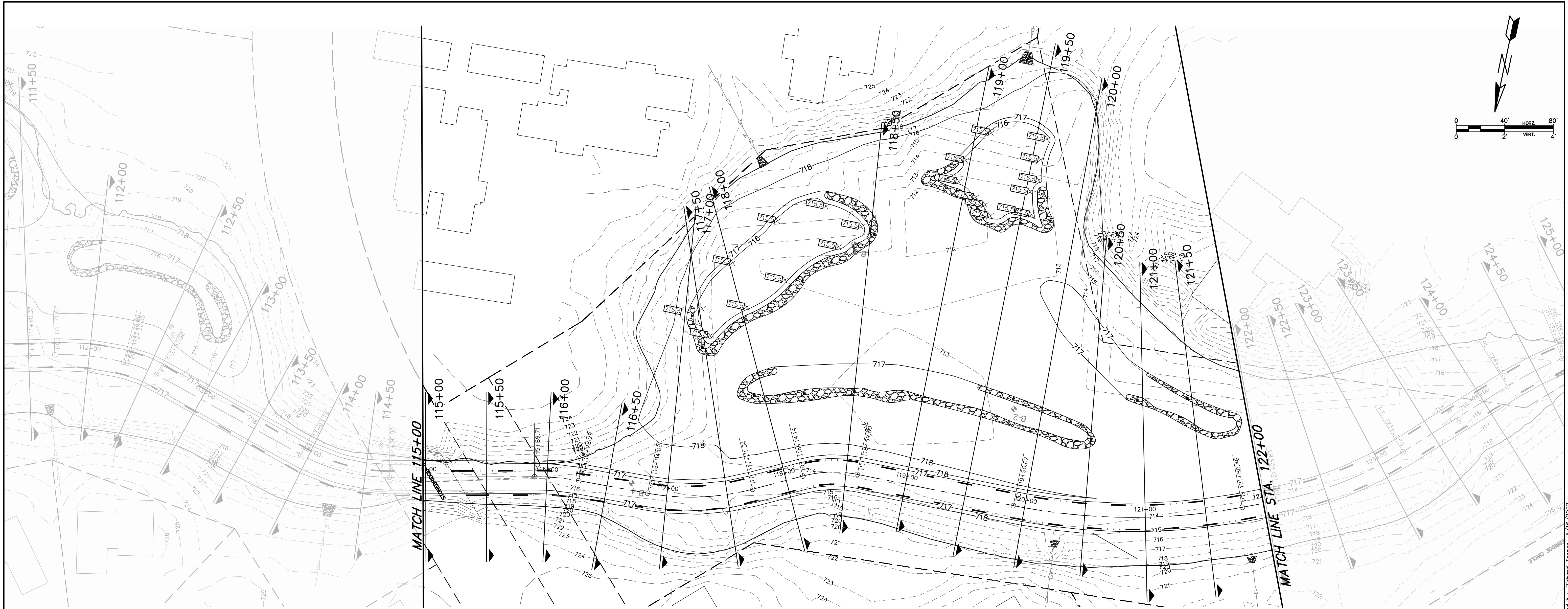
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SCALE: 1"=40'H; 1"=2'V		
DATE: July, 2022		
JOB NO: W20177		
SHEET 2 OF 26		



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DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	CHECKED BY: KA										
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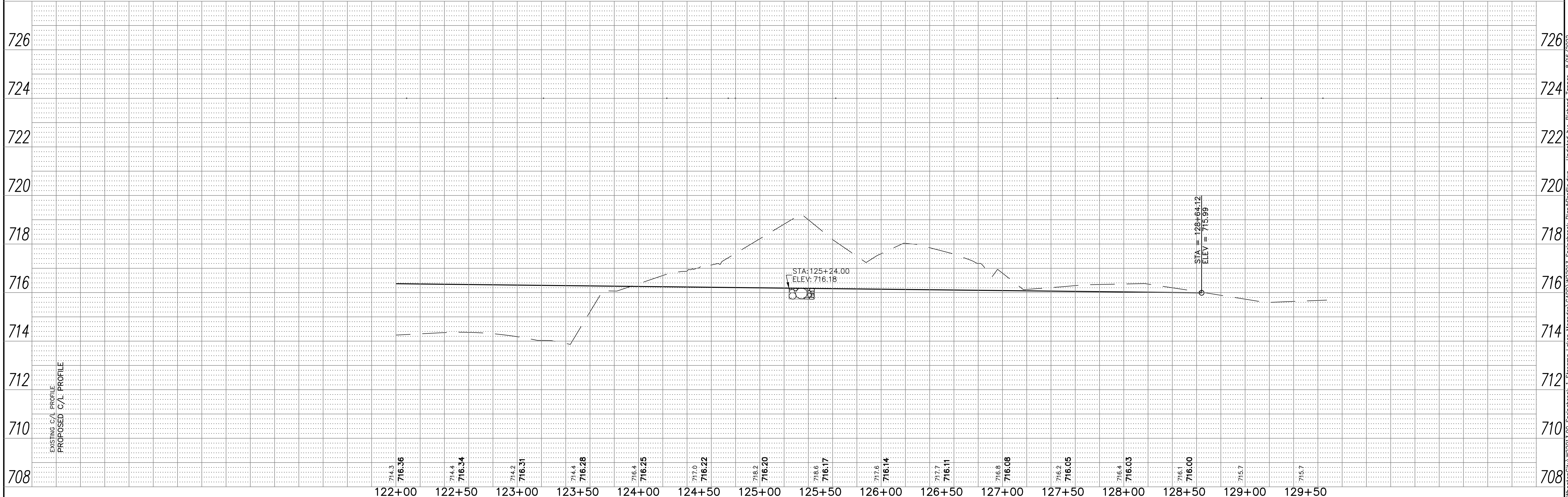
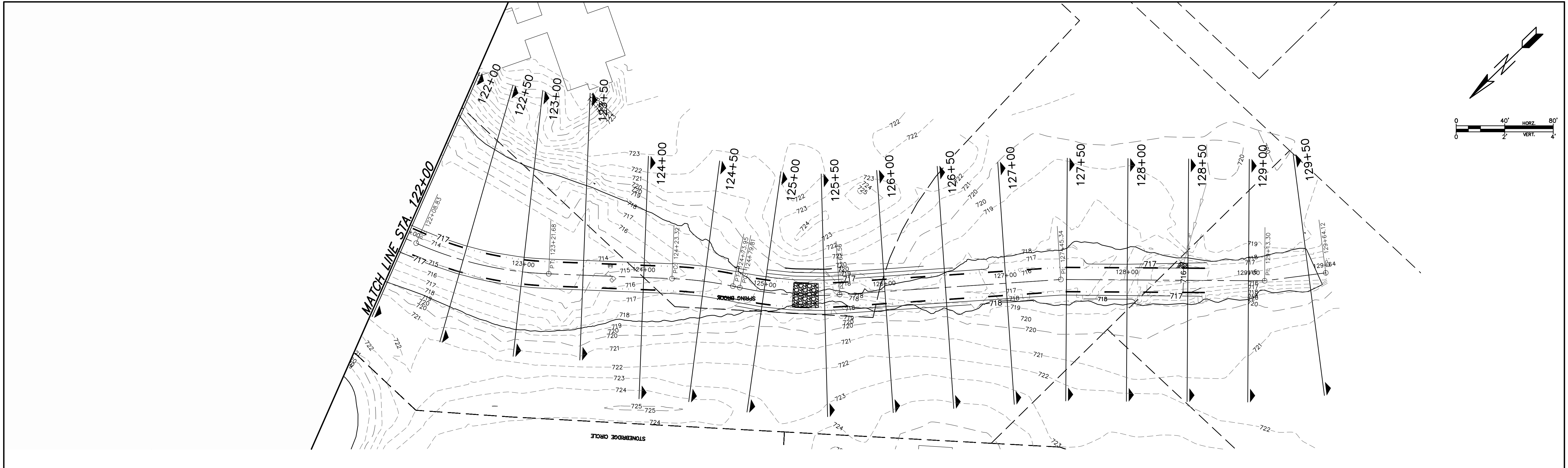
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SPRING BROOK 1 STREAMS LAKE MEANDER WHEATON, ILLINOIS	
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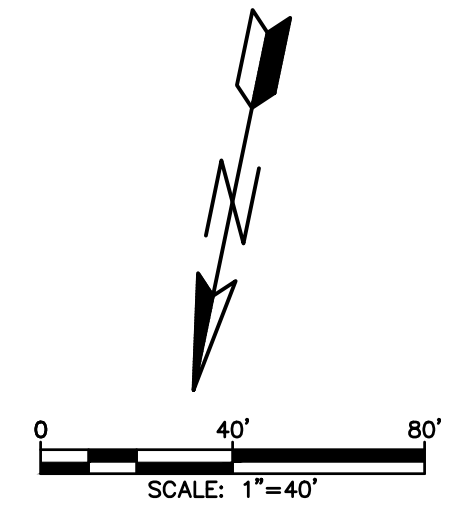
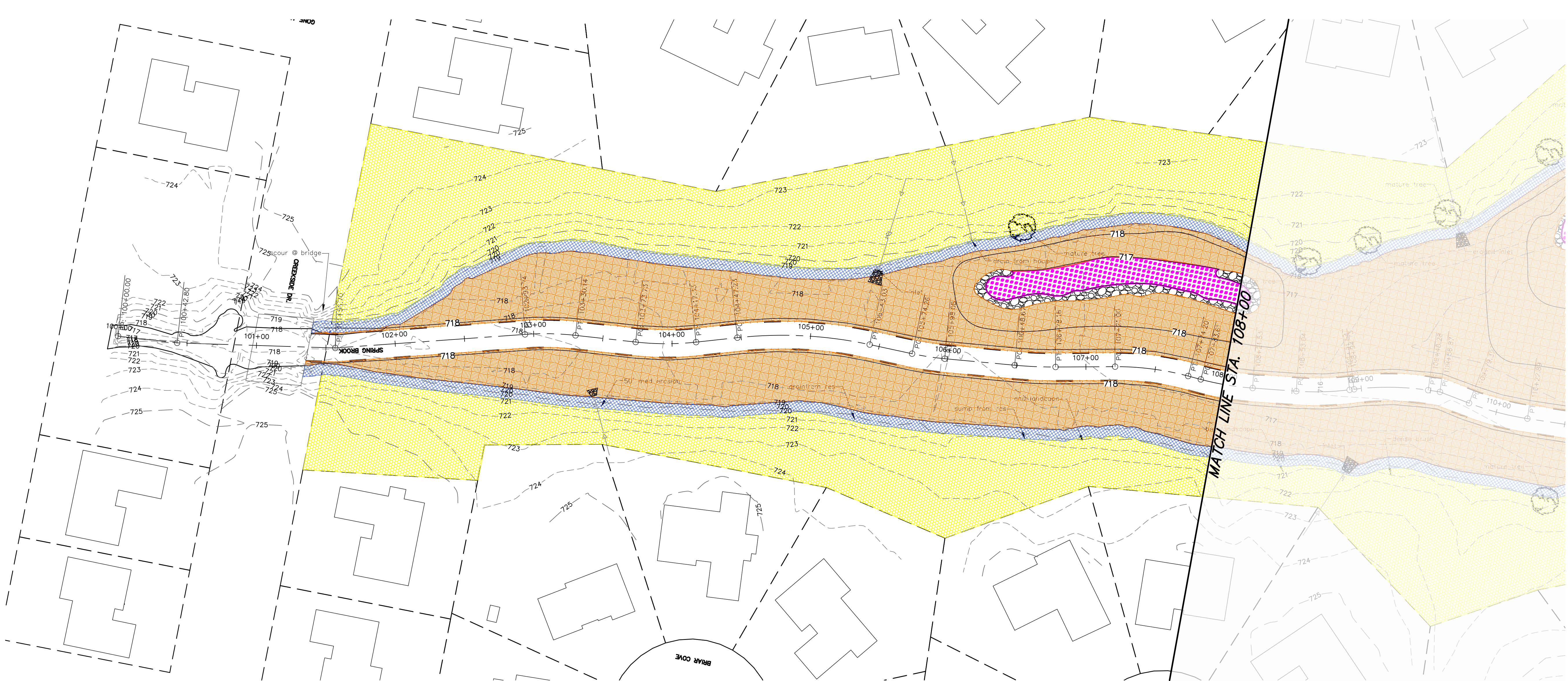
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SHEET 4 OF 26	

Updated by Richard Tanner 8/16/2022
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						APPROVED BY: EP	JOB NO: W20177								
														SHEET 5 OF 26	

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LEGEND

-  LOW PRO EZ PRAIRIE, 5.31 ACRES
-  TOUGH NATIVE SHORELINE, 6.20 ACRES
-  URBAN WETLAND/FLOODPLAIN, 1.46 ACRES
-  EMERGENT PLUGS, 0.61 ACRES
-  RIVER PLUGS, 5375 L.F.

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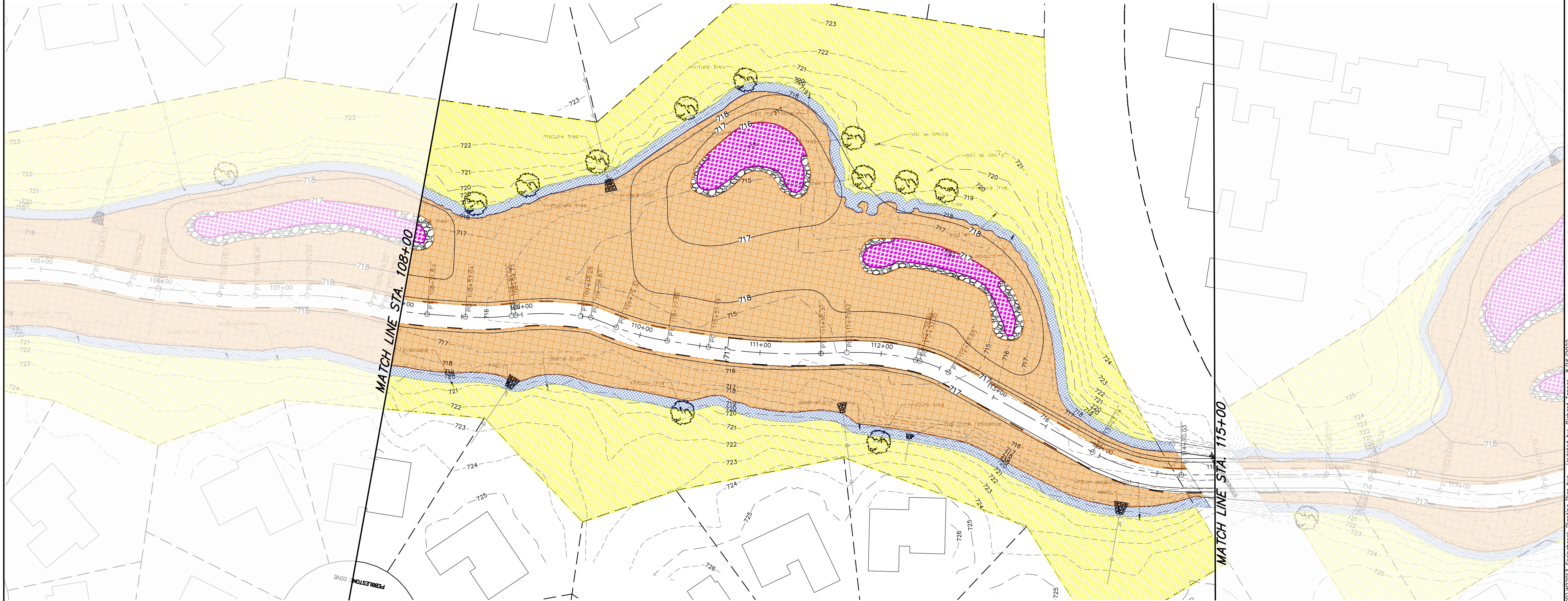
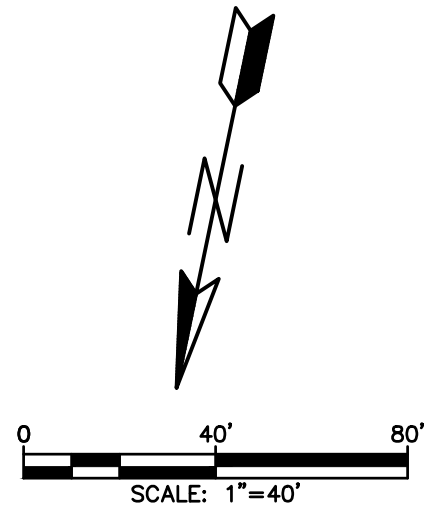
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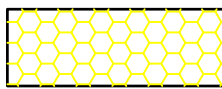
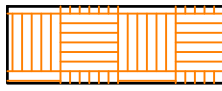



2416 GALEN DRIVE
CHAMPAIGN, ILLINOIS 61821
PHONE (217) 351-6268
FAX (217) 355-1902

SPRING BROOK 1
STREAMS LAKE MEANDER
WHEATON, ILLINOIS

TITLE:		SCALE: 1"=40'H; 1"=2'V
SPRING BROOK PLANTING PLAN STA. 100+00 TO STA. 108+00		DATE: July, 2022
		JOB NO: W20177
		SHEET 6 OF 26



LEGEND

-  LOW PRO EZ PRAIRIE, 5.31 ACRES
-  TOUGH NATIVE SHORELINE, 6.20 ACRES
-  URBAN WETLAND/FLOODPLAIN, 1.46 ACRES
-  EMERGENT PLUGS, 0.61 ACRES
-  RIVER PLUGS, 5375 L.F.

REVISIONS:					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

DRAWN BY: RT
CHECKED BY: KA
APPROVED BY: EP



3S701 WEST AVENUE, SUITE 150
WARRENVILLE, ILLINOIS 60555
PHONE (630) 393-3060
FAX (630) 393-2152

10 S. RIVERSIDE PLAZA, SUITE 875
CHICAGO, ILLINOIS 60606
PHONE (312) 474-7841
FAX (312) 474-6099

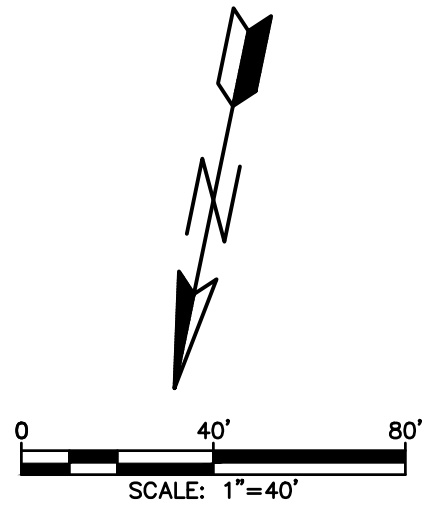
2416 GALEN DRIVE
CHAMPAIGN, ILLINOIS 61821
PHONE (217) 351-6268
FAX (217) 355-1902

SPRING BROOK 1
STREAMS LAKE MEANDER
WHEATON, ILLINOIS

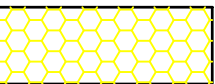
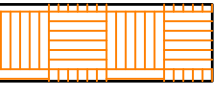
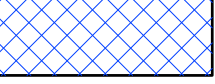


TITLE:
SPRING BROOK
PLANTING PLAN
STA. 108+00 TO STA. 115+00

SCALE: 1"=40'H; 1"=2'V
DATE: July, 2022
JOB NO: W20177
SHEET 7 OF 26

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LEGEND

-  LOW PRO EZ PRAIRIE, 5.31 ACRES
-  TOUGH NATIVE SHORELINE, 6.20 ACRES
-  URBAN WETLAND/FLOODPLAIN, 1.46 ACRES
-  EMERGENT PLUGS, 0.61 ACRES
-  RIVER PLUGS, 5375 L.F.

REVISIONS:					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

DRAWN BY:	RT
CHECKED BY:	KA
APPROVED BY:	EP



35701 WEST AVENUE, SUITE 150
WARRENVILLE, ILLINOIS 60555
PHONE (630) 393-3060
FAX (630) 393-2152

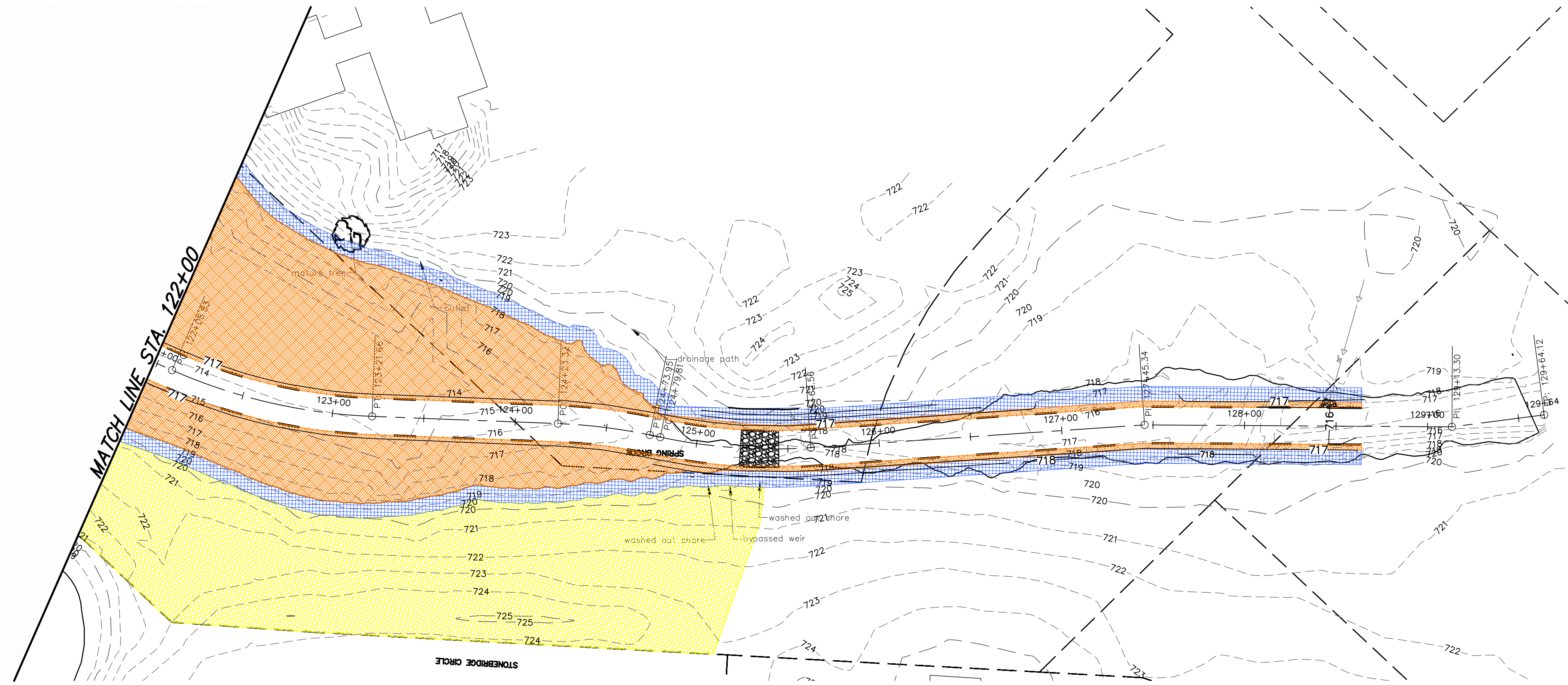
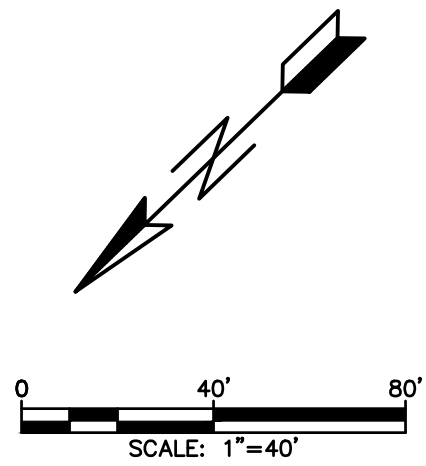
10 S. RIVERSIDE PLAZA , SUITE 875
CHICAGO, ILLINOIS 60606
PHONE (312) 474-7841
FAX (312) 474-6099

2416 GALEN DRIVE
CHAMPAIGN, ILLINOIS 61821
PHONE (217) 351-6268
FAX (217) 355-1902

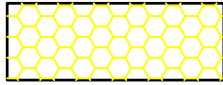
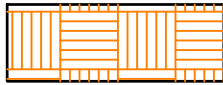
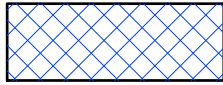
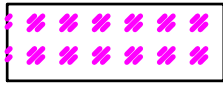
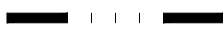
**SPRING BROOK 1
STREAMS LAKE MEANDER
WHEATON, ILLINOIS**

TITLE:	SPRING BROOK PLANTING PLAN STA. 115+00 TO STA. 122+00
	SCALE: 1"=40'H; 1"=2'V
	DATE: July, 2022
	JOB NO: W20177
SHEET 8 of 26	

D:\VEBA Projects\WheatonCity\W2013.00 Springbrook 1 Streams Lakes Meander\CADD\W2013 Springbrook Planting Plan.dwg Updated By: Richard Toner 8/16/2022



LEGEND

-  LOW PRO EZ PRAIRIE, 5.31 ACRES
-  TOUGH NATIVE SHORELINE, 6.20 ACRES
-  URBAN WETLAND/FLOODPLAIN, 1.46 ACRES
-  EMERGENT PLUGS, 0.61 ACRES
-  RIVER PLUGS, 5375 L.F.

REVISIONS:					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

DRAWN BY: RT
CHECKED BY: KA
APPROVED BY: EP



**ENGINEERING
RESOURCE ASSOCIATES**

35701 WEST AVENUE, SUITE 150
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PHONE (630) 393-3060
FAX (630) 393-2152

10 S. RIVERSIDE PLAZA , SUITE 875
CHICAGO, ILLINOIS 60606
PHONE (312) 474-7841
FAX (312) 474-6099

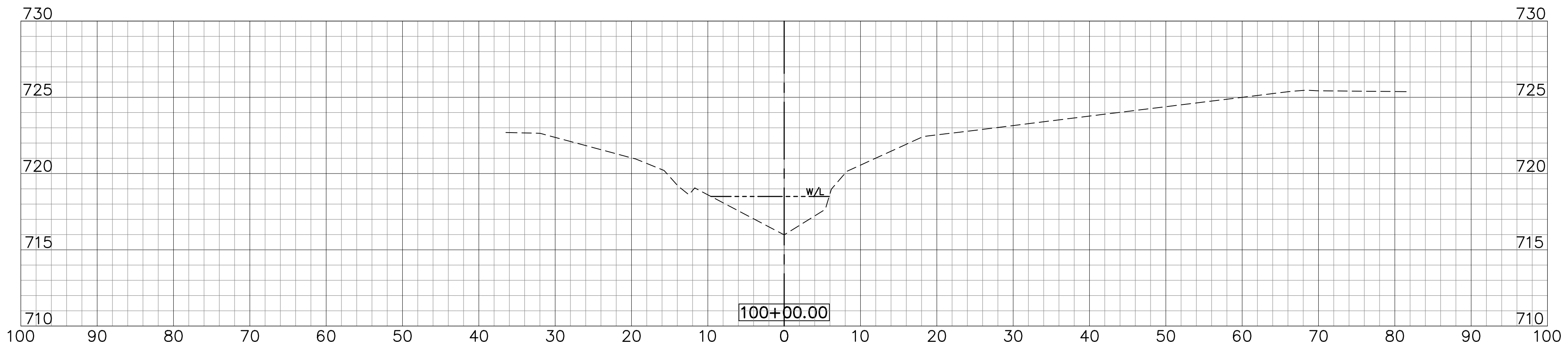
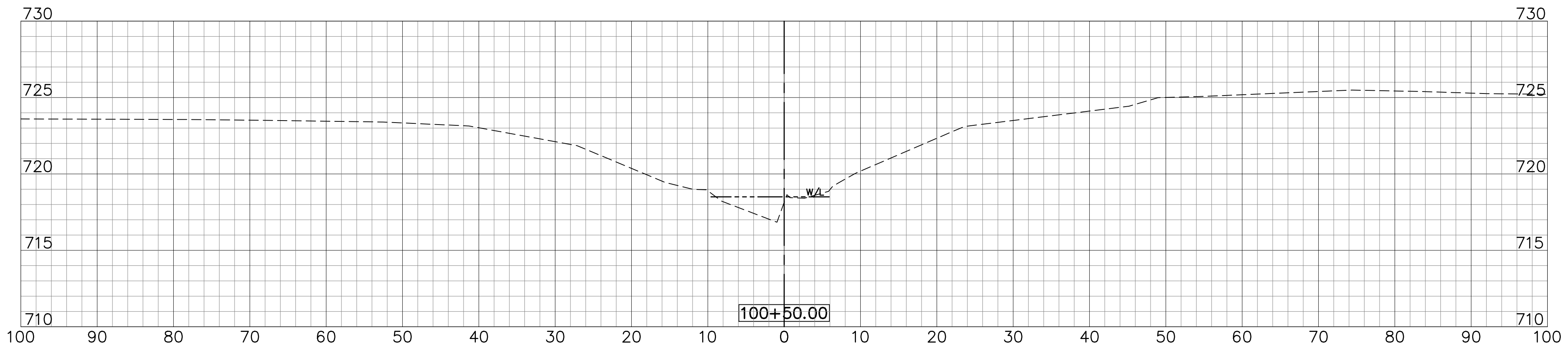
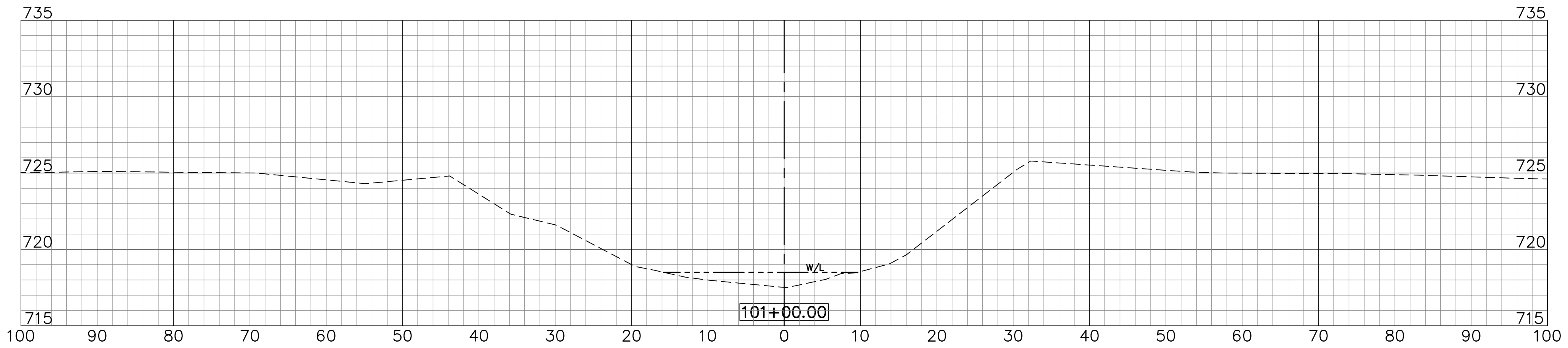
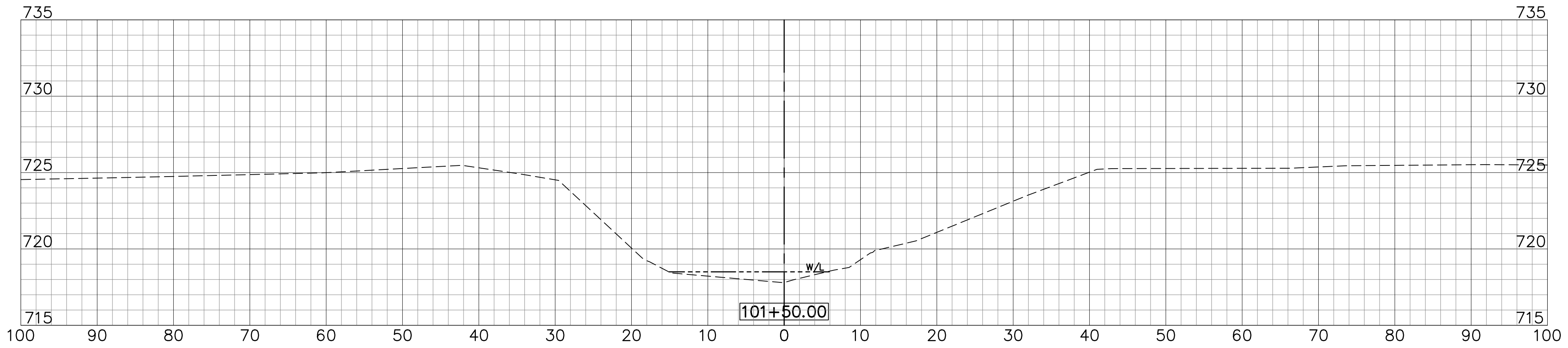
2416 GALEN DRIVE
CHAMPAIGN, ILLINOIS 61821
PHONE (217) 351-6268
FAX (217) 355-1902

**SPRING BROOK 1
STREAMS LAKE MEANDER
WHEATON, ILLINOIS**

**SPRING BROOK
PLANTING PLAN
STA. 122+00 TO STA. 129+67.29**

SCALE: 1"=40'H; 1"=2'V
DATE: July, 2022
JOB NO: W20177
SHEET 9 of 26

D:\KERA Projects\WheatonCity\W2013.00 Springbrook 1\Streams Lakes Meander\CADD\W2013 Springbrook Planting Plan.dwg Updated by: Richard Toner 8/16/2022



REVISIONS:					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

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CHECKED BY: KA
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ENGINEERING
RESOURCE ASSOCIATES

3S701 WEST AVENUE, SUITE 150
WARRENVILLE, ILLINOIS 60555
PHONE (630) 393-3060
FAX (630) 393-2152

10 S. RIVERSIDE PLAZA, SUITE 875
CHICAGO, ILLINOIS 60606
PHONE (312) 474-7841
FAX (312) 474-6099

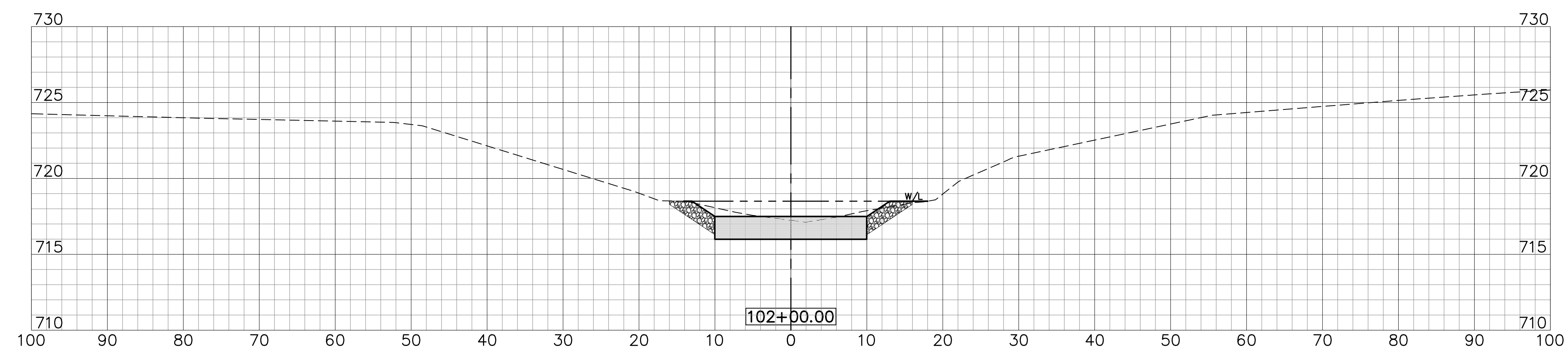
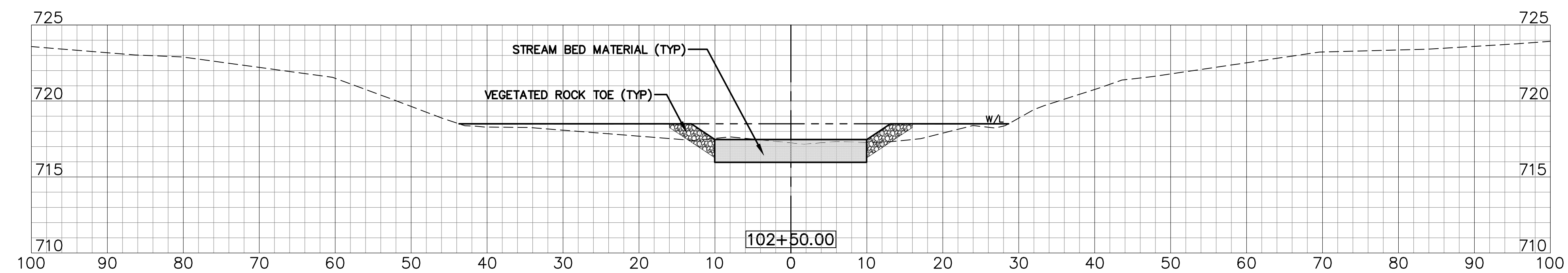
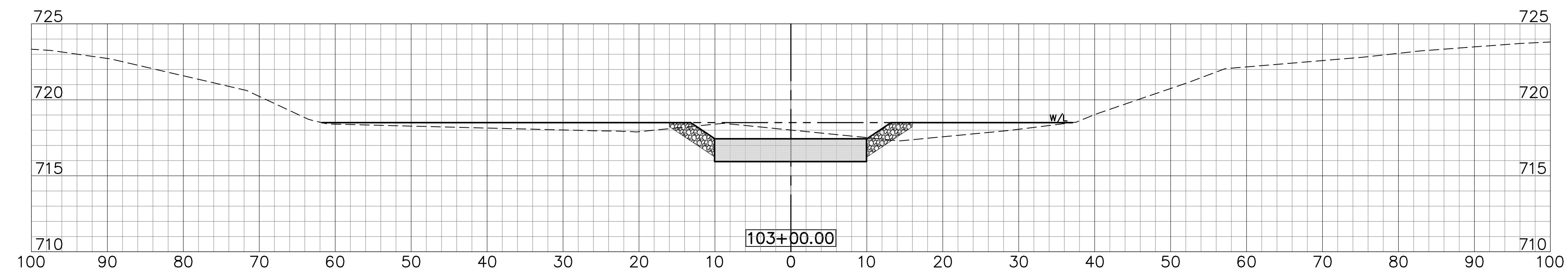
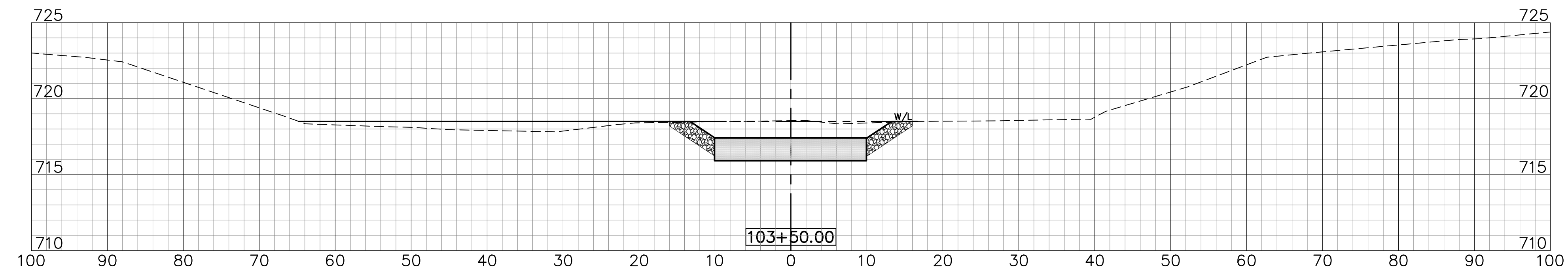
2416 GALEN DRIVE
CHAMPAIGN, ILLINOIS 61821
PHONE (217) 351-6268
FAX (217) 355-1902


**SPRING BROOK 1
STREAMS LAKE MEANDER
WHEATON, ILLINOIS**

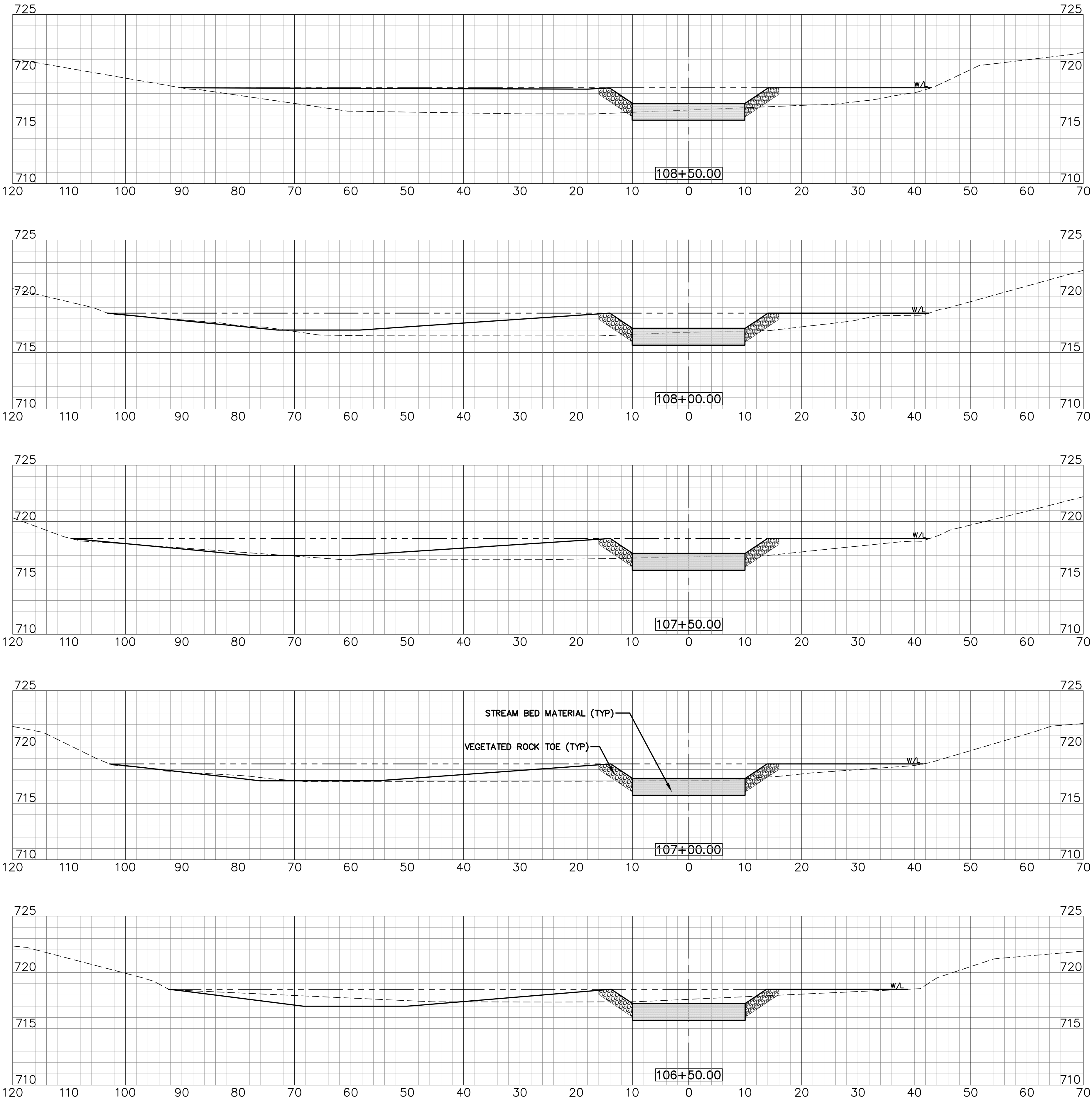
**SPRING BROOK
CROSS SECTIONS
STA. 100+00 TO STA. 101+50**

SCALE: 1"=10'H; 1"=5'V
DATE: July, 2022
JOB NO: W20177
SHEET 10 OF 26

D:\ERA Projects\WheatonCity\W2013.00 Springbrook 1 Streams Lakes Meander\CADD\W2013.00 Springbrook CrossSections.dwg Updated by: Richard Tamer 8/15/2022



REVISIONS:						 ENGINEERING RESOURCE ASSOCIATES	35701 WEST AVENUE, SUITE 150 WARRENVILLE, ILLINOIS 60555 PHONE (630) 393-3060 FAX (630) 393-2152	10 S. RIVERSIDE PLAZA , SUITE 875 CHICAGO, ILLINOIS 60606 PHONE (312) 474-7841 FAX (312) 474-6099	2416 GALEN DRIVE CHAMPAIGN, ILLINOIS 61821 PHONE (217) 351-6268 FAX (217) 355-1902	<i>SPRING BROOK 1 STREAMS LAKE MEANDER WHEATON, ILLINOIS</i>	TITLE: <i>SPRING BROOK CROSS SECTIONS STA. 102+00 TO STA. 103+50</i>	SCALE: 1"=10'H; 1"=5'V DATE: July, 2022 JOB NO: W20177 SHEET 11 OF 26
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION							



REVISIONS:					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

DRAWN BY: RT
CHECKED BY: KA
APPROVED BY: EP



**ENGINEERING
RESOURCE ASSOCIATES**

3S701 WEST AVENUE, SUITE 150
WARRENVILLE, ILLINOIS 60555
PHONE (630) 393-3060
FAX (630) 393-2152

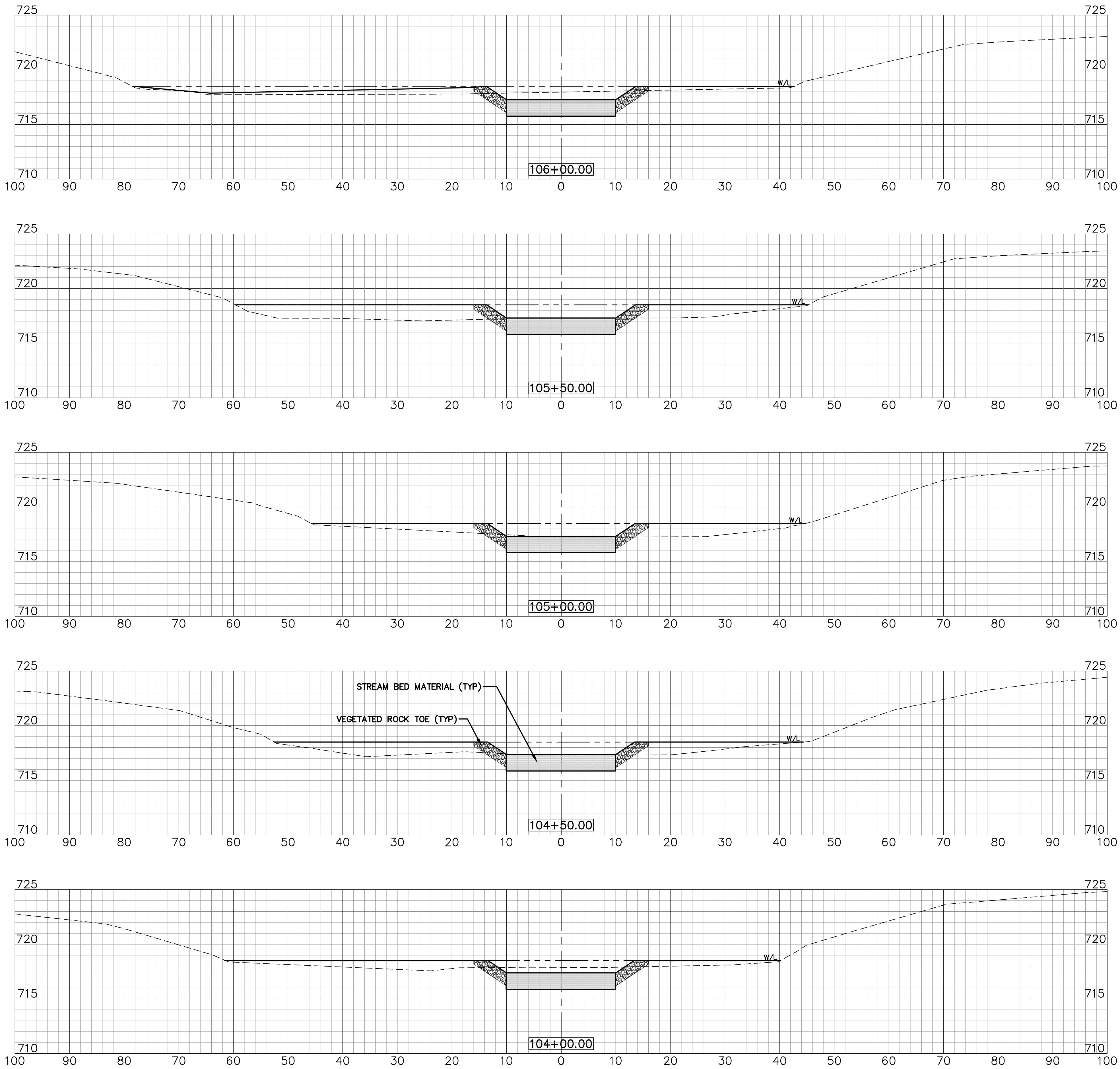
10 S. RIVERSIDE PLAZA, SUITE 875
CHICAGO, ILLINOIS 60606
PHONE (312) 474-7841
FAX (312) 474-6099

2416 GALEN DRIVE
CHAMPAIGN, ILLINOIS 61821
PHONE (217) 351-6268
FAX (217) 355-1902

**SPRING BROOK 1
STREAMS LAKE MEANDER
WHEATON, ILLINOIS**

**SPRING BROOK
CROSS SECTIONS
STA. 106+50 TO STA. 108+50**

SCALE: 1"=10'H; 1"=5'V
DATE: July, 2022
JOB NO: W20177
SHEET 12 OF 26



REVISIONS:					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

DRAWN BY:	RT
CHECKED BY:	KA
APPROVED BY:	EP

**ENGINEERING
RESOURCE ASSOCIATES**

3S701 WEST AVENUE, SUITE 150
WARRENVILLE, ILLINOIS 60555
PHONE (630) 393-3060
FAX (630) 393-2152

10 S. RIVERSIDE PLAZA, SUITE 875
CHICAGO, ILLINOIS 60606
PHONE (312) 474-7841
FAX (312) 474-6099

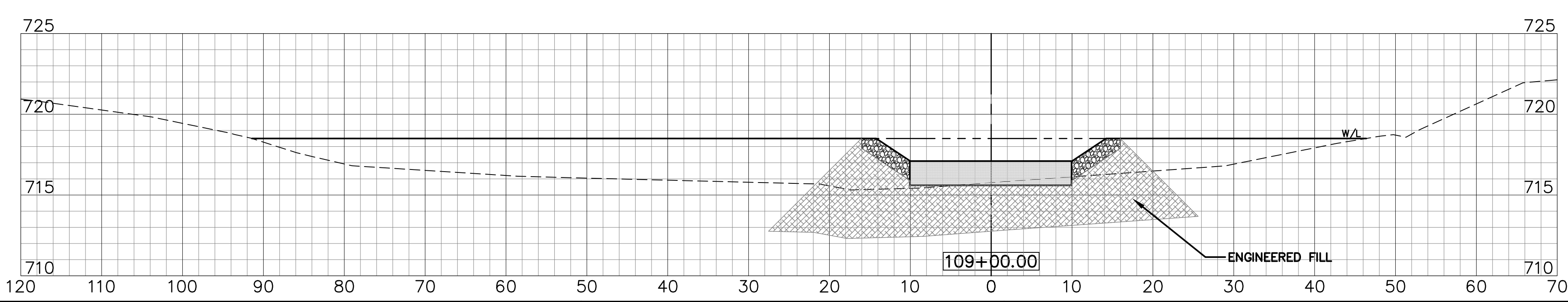
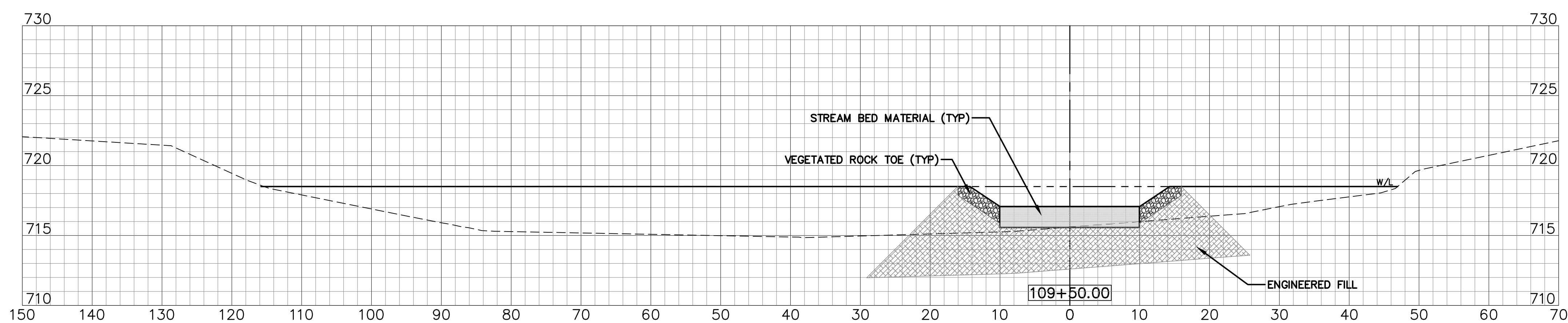
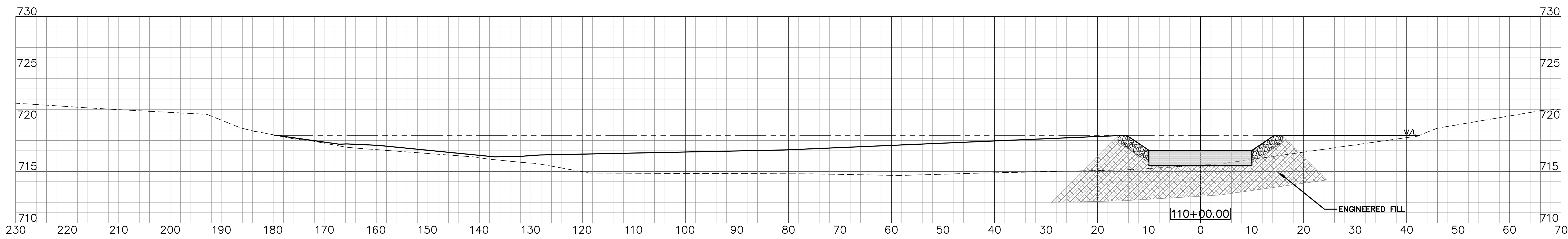
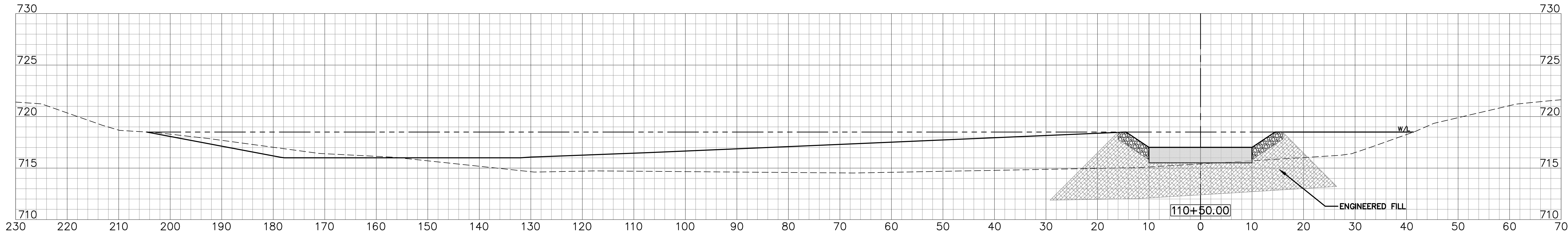
2416 GALEN DRIVE
CHAMPAIGN, ILLINOIS 61821
PHONE (217) 351-6268
FAX (217) 355-1902

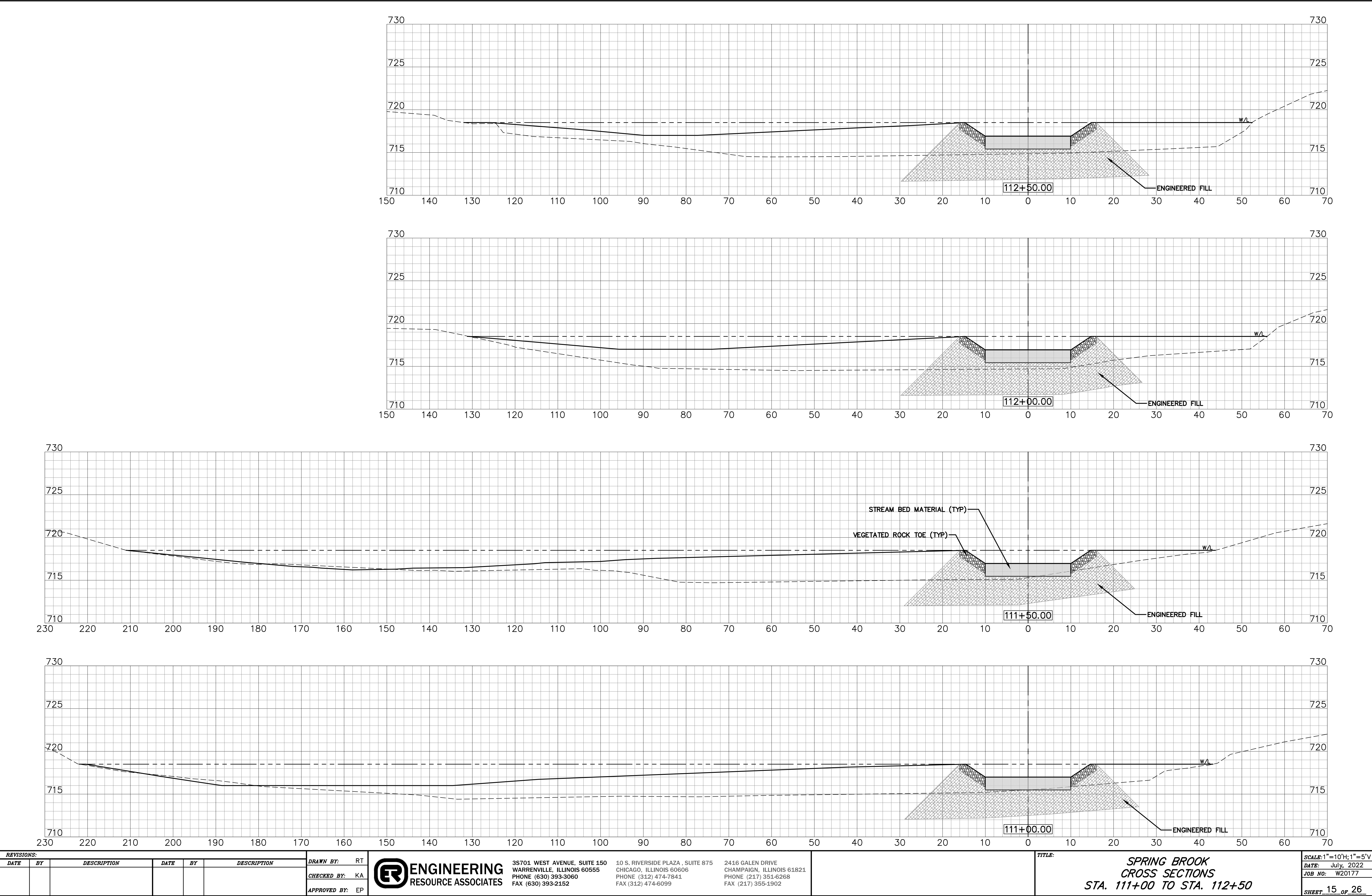
**SPRING BROOK 1
STREAMS LAKE MEANDER
WHEATON, ILLINOIS**

TITLE:

**SPRING BROOK
CROSS SECTIONS
STA. 104+00 TO STA. 106+00**

SCALE: 1"=10'H; 1"=5'V
DATE: July, 2022
JOB NO: W20177
SHEET 13 OF 26





REVISIONS:					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

DRAWN BY:	RT
CHECKED BY:	KA
APPROVED BY:	EP

**ENGINEERING
RESOURCE ASSOCIATES**

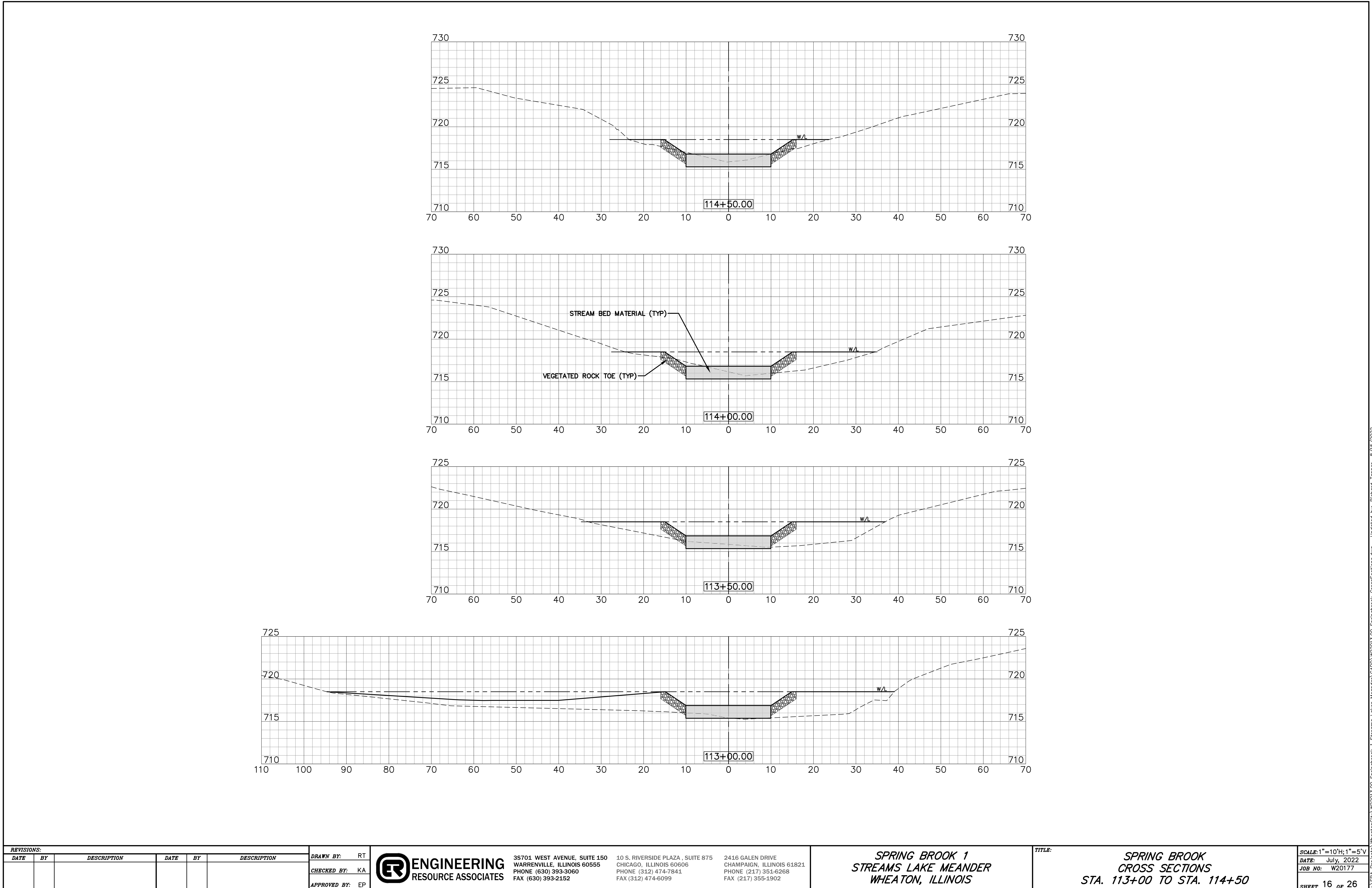
3S701 WEST AVENUE, SUITE 150
WARRENVILLE, ILLINOIS 60555
PHONE (630) 393-3060
FAX (630) 393-2152

10 S. RIVERSIDE PLAZA, SUITE 875
CHICAGO, ILLINOIS 60606
PHONE (312) 474-7841
FAX (312) 474-6099

2416 GALEN DRIVE
CHAMPAIGN, ILLINOIS 61821
PHONE (217) 351-6268
FAX (217) 355-1902

TITLE:
*SPRING BROOK
CROSS SECTIONS
STA. 111+00 TO STA. 112+50*

SCALE: 1"=10'H; 1"=5'V
DATE: July, 2022
JOB NO: W20177
SHEET 15 **OF** 26



REVISIONS:					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

DRAWN BY:	RT
CHECKED BY:	KA
APPROVED BY:	EP



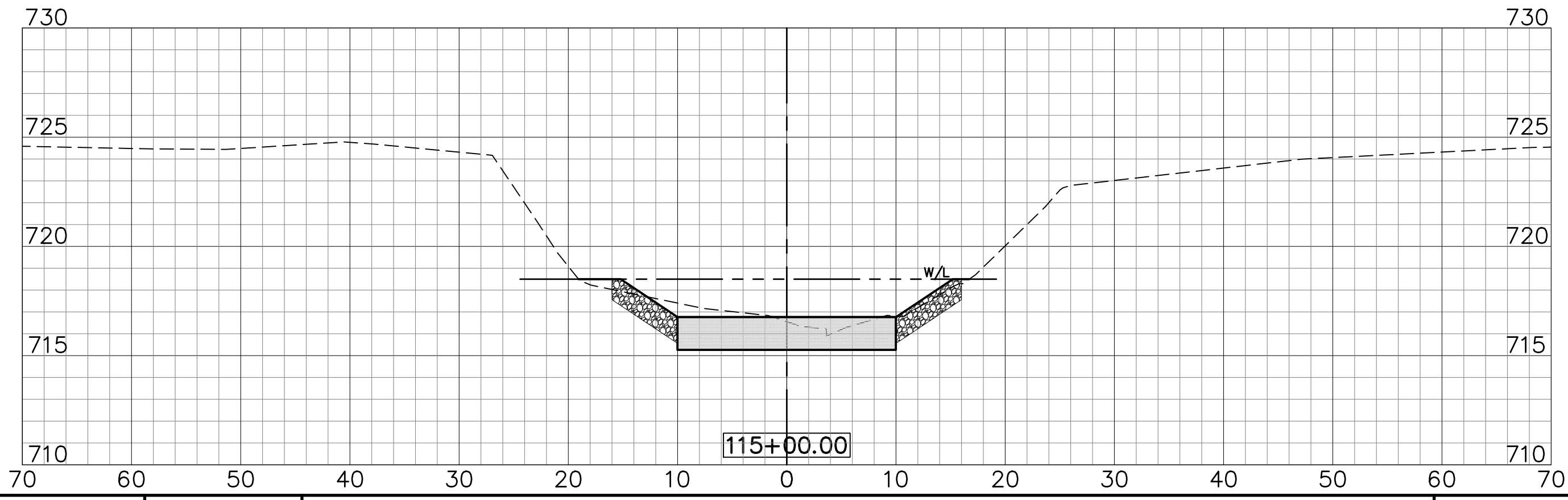
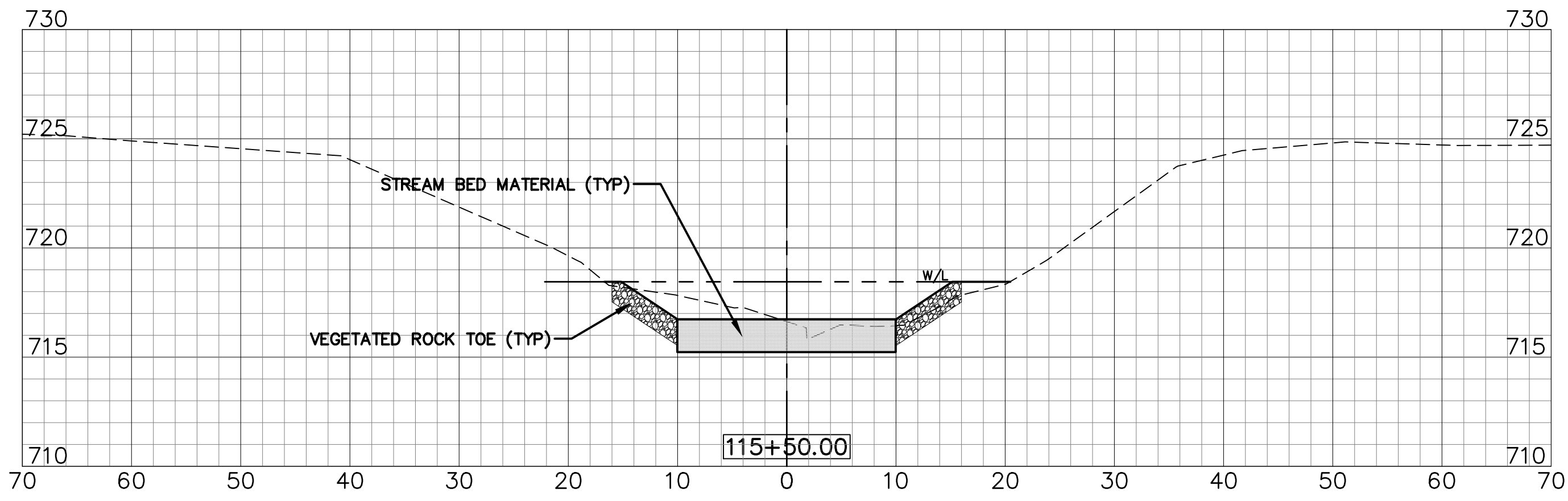
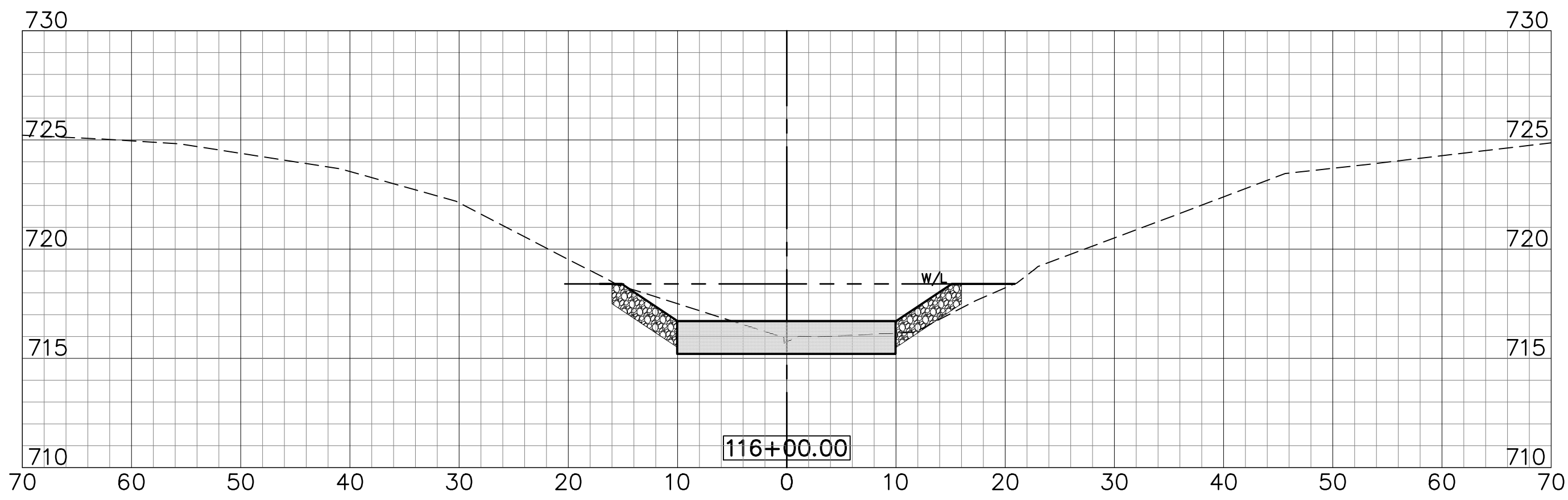
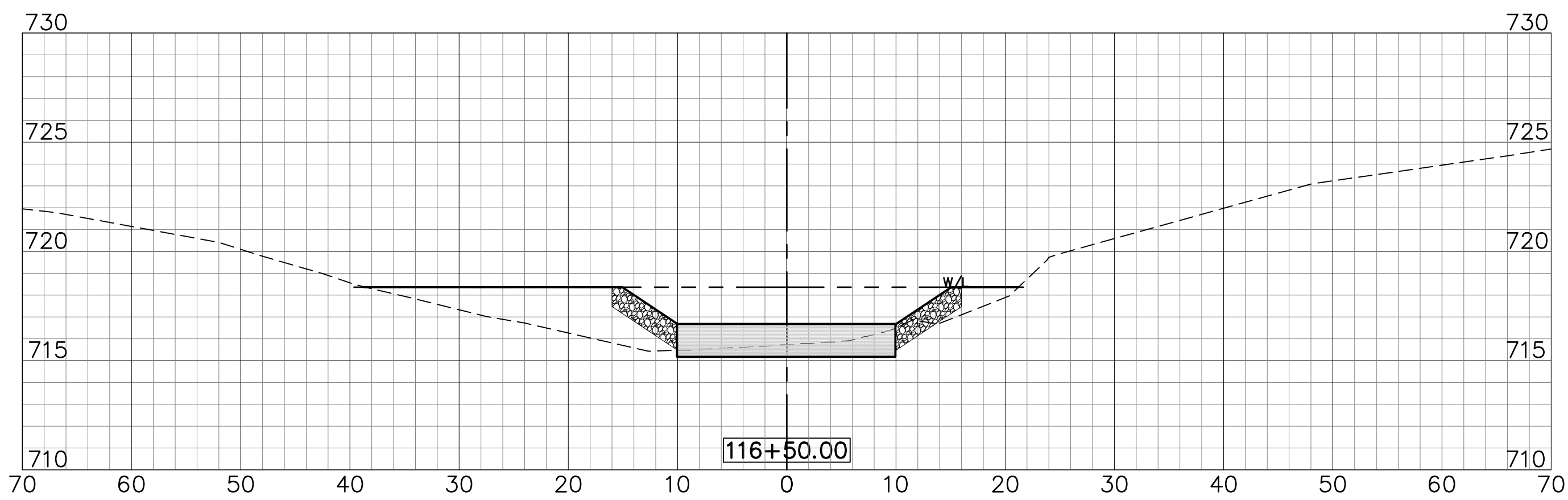
3S701 WEST AVENUE, SUITE 150
WARRENVILLE, ILLINOIS 60555
PHONE (630) 393-3060
FAX (630) 393-2152

10 S. RIVERSIDE PLAZA, SUITE 875
CHICAGO, ILLINOIS 60606
PHONE (312) 474-7841
FAX (312) 474-6099

2416 GALEN DRIVE
CHAMPAIGN, ILLINOIS 61821
PHONE (217) 351-6268
FAX (217) 355-1902

**SPRING BROOK 1
STREAMS LAKE MEANDER
WHEATON, ILLINOIS**

TITLE:	
SPRING BROOK CROSS SECTIONS STA. 113+00 TO STA. 114+50	
SCALE: 1"=10'H; 1"=5'V	
DATE: July, 2022	
JOB NO: W20177	
SHEET 16 OF 26	



REVISIONS:					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

DRAWN BY: RT
CHECKED BY: KA
APPROVED BY: EP



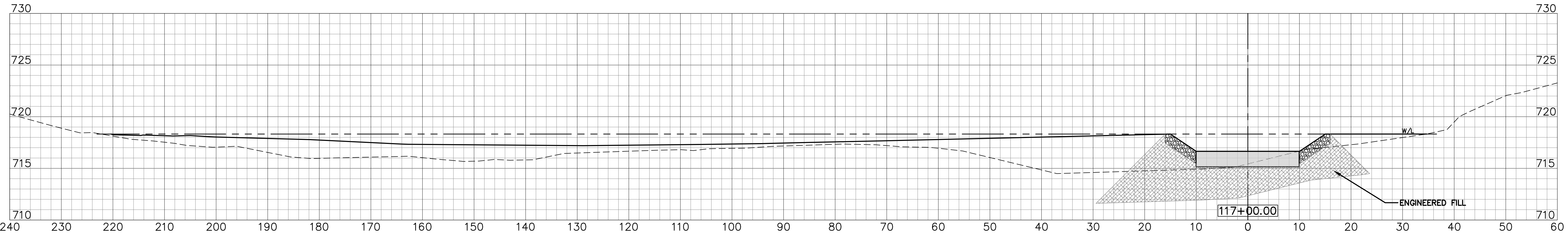
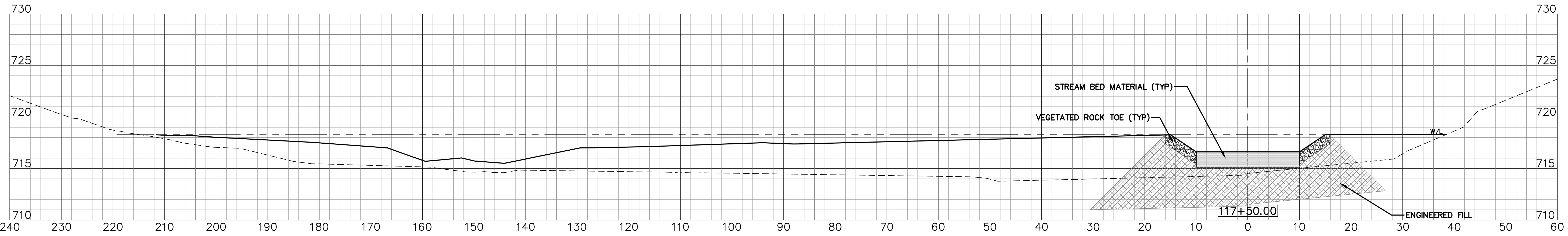
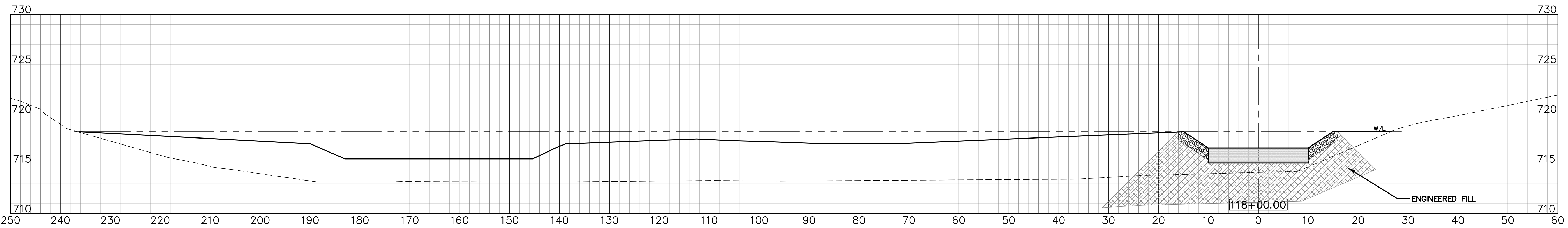
3S701 WEST AVENUE, SUITE 150
WARRENVILLE, ILLINOIS 60555
PHONE (630) 393-3060
FAX (630) 393-2152

10 S. RIVERSIDE PLAZA, SUITE 875
CHICAGO, ILLINOIS 60606
PHONE (312) 474-7841
FAX (312) 474-6099

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CHAMPAIGN, ILLINOIS 61821
PHONE (217) 351-6268
FAX (217) 355-1902

SPRING BROOK 1
STREAMS LAKE MEANDER
WHEATON, ILLINOIS

TITLE:		SCALE: 1"=10'H; 1"=5'V
SPRING BROOK CROSS SECTIONS STA. 115+00 TO STA. 116+50		DATE: July, 2022
		JOB NO: W20177
		SHEET 17 OF 26



REVISIONS:					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

DRAWN BY: RT
CHECKED BY: KA
APPROVED BY: EP



3S701 WEST AVENUE, SUITE 150
WARRENVILLE, ILLINOIS 60555
PHONE (630) 393-3060
FAX (630) 393-2152

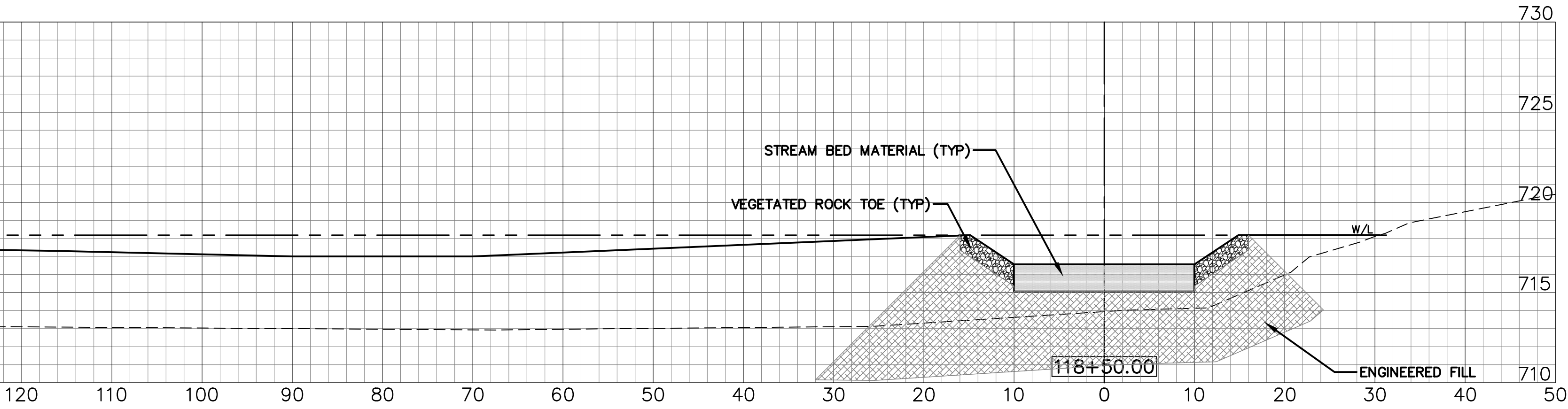
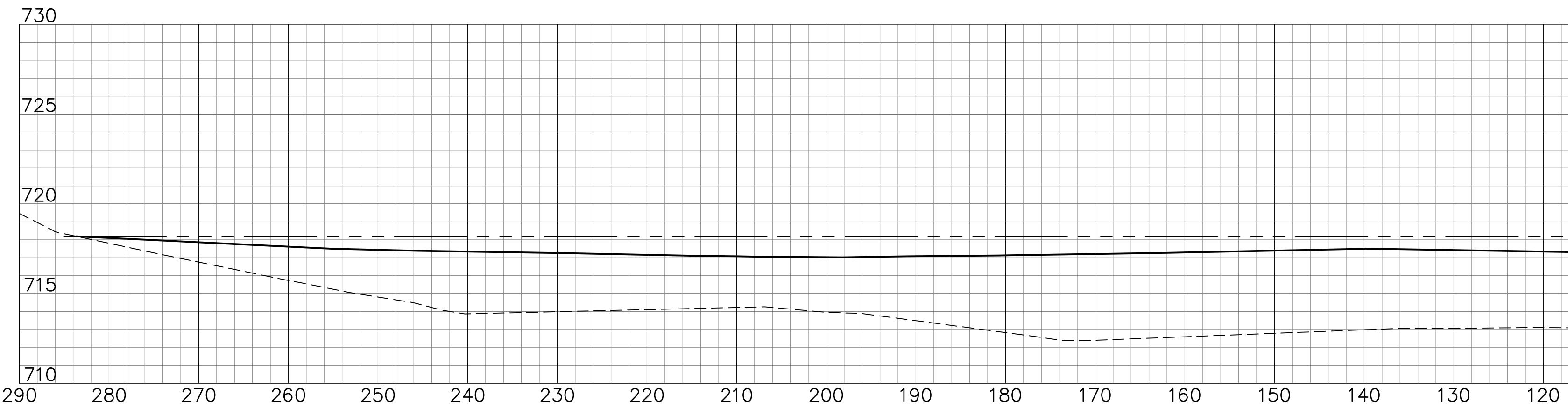
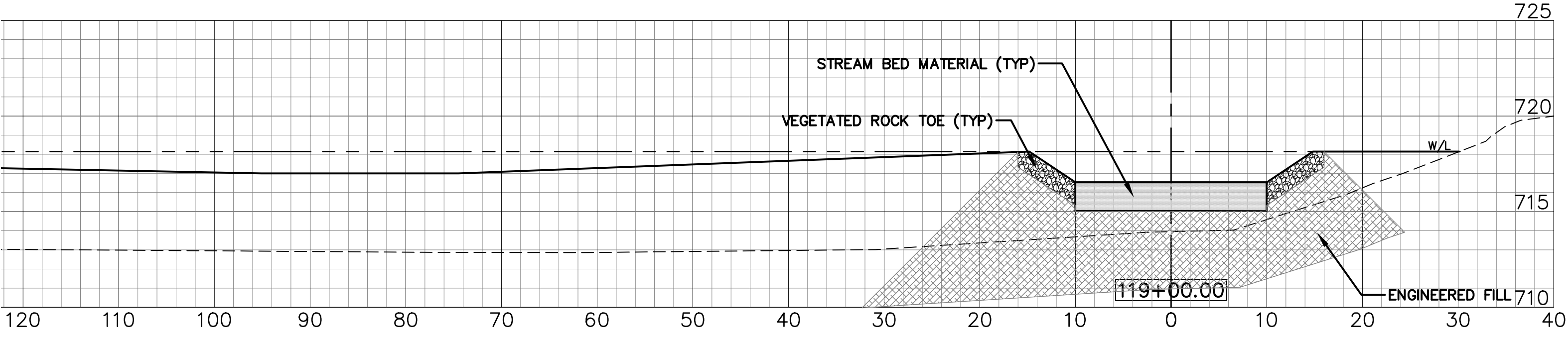
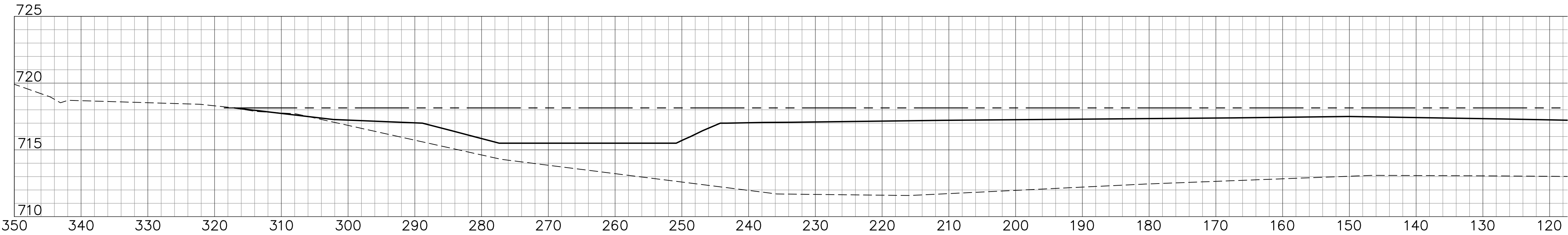
10 S. RIVERSIDE PLAZA, SUITE 875
CHICAGO, ILLINOIS 60606
PHONE (312) 474-7841
FAX (312) 474-6099

2416 GALEN DRIVE
CHAMPAIGN, ILLINOIS 61821
PHONE (217) 351-6268
FAX (217) 355-1902

*SPRING BROOK 1
STREAMS LAKE MEANDER
WHEATON, ILLINOIS*

TITLE: *SPRING BROOK
CROSS SECTIONS
STA. 117+00 TO STA. 118+00*

SCALE: 1"=10'H; 1"=5'V
DATE: July, 2022
JOB NO: W20177
SHEET 18 OF 26



REVISIONS:					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

DRAWN BY: RT
CHECKED BY: KA
APPROVED BY: EP



3S701 WEST AVENUE, SUITE 150
WARRENVILLE, ILLINOIS 60555
PHONE (630) 393-3060
FAX (630) 393-2152

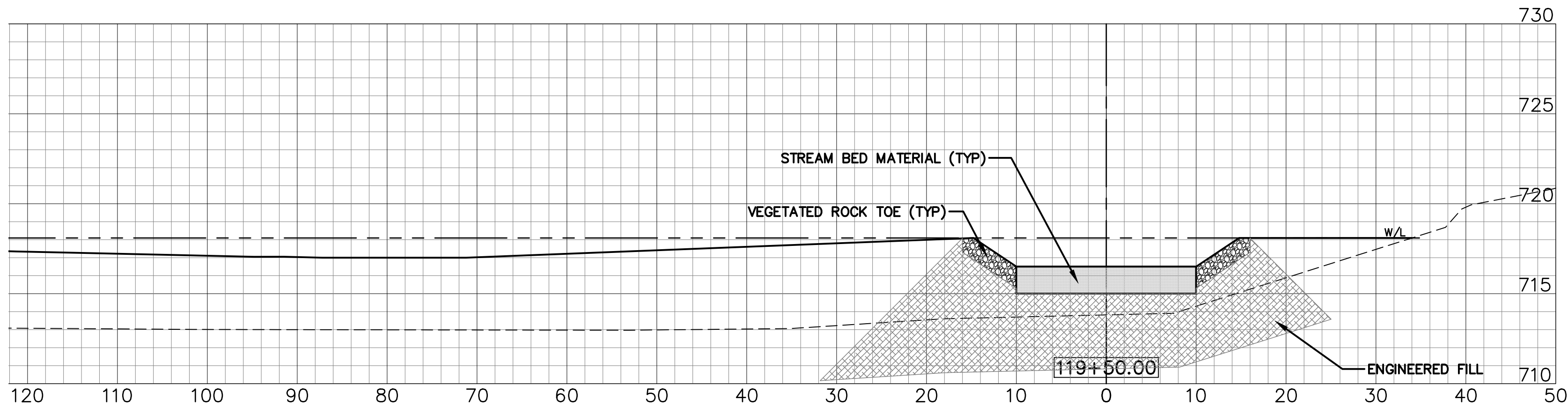
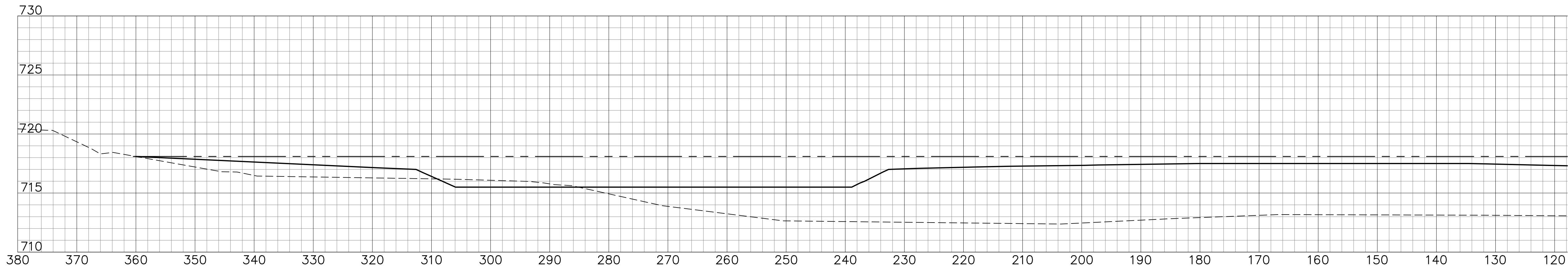
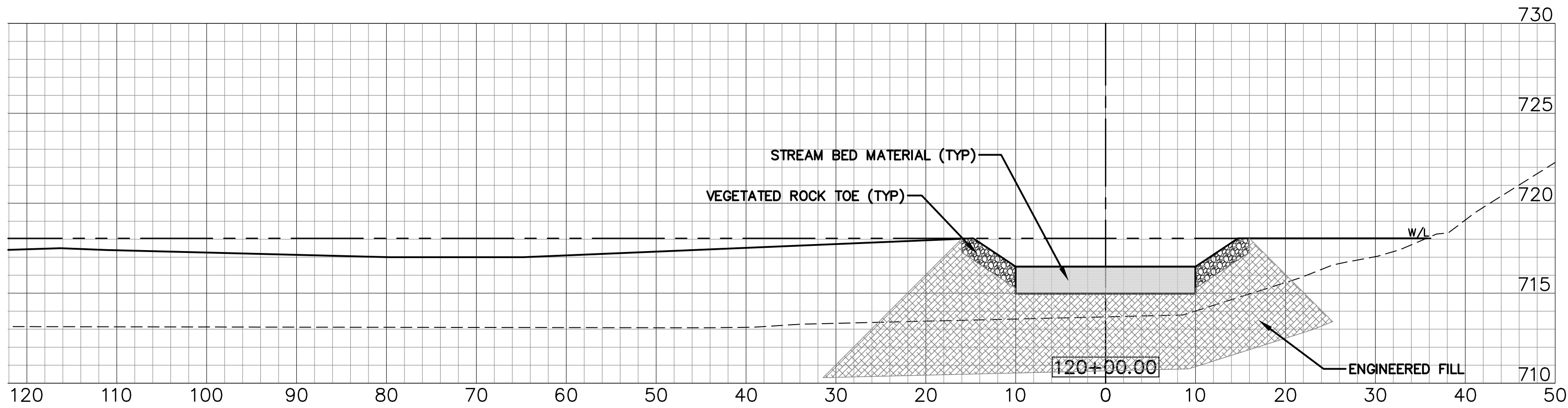
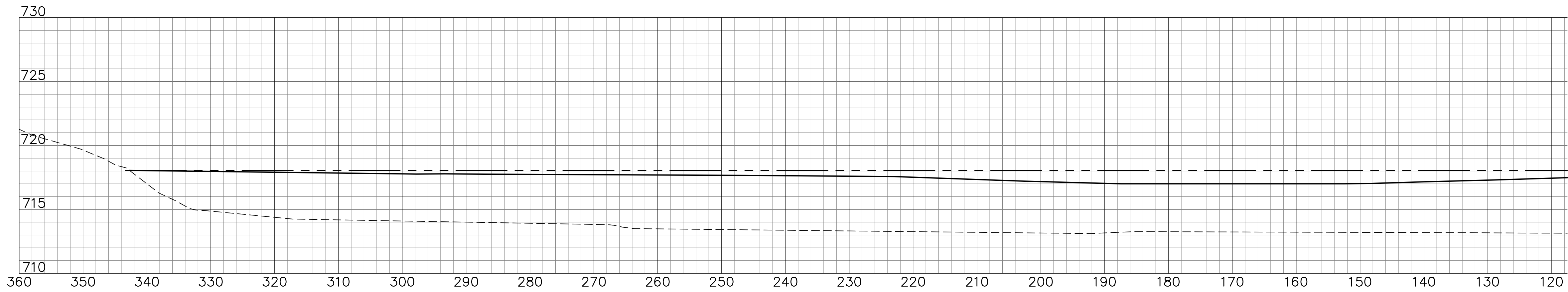
10 S. RIVERSIDE PLAZA, SUITE 875
CHICAGO, ILLINOIS 60606
PHONE (312) 474-7841
FAX (312) 474-6099

2416 GALEN DRIVE
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PHONE (217) 351-6268
FAX (217) 355-1902

**SPRING BROOK 1
STREAMS LAKE MEANDER
WHEATON, ILLINOIS**

TITLE:		SCALE: 1"=10'H; 1"=5'V
SPRING BROOK CROSS SECTIONS STA. 118+50 TO STA. 119+00		DATE: July, 2022
		JOB NO: W20177
		SHEET 19 OF 26

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REVISIONS:					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

DRAWN BY: RT
CHECKED BY: KA
APPROVED BY: EP



3S701 WEST AVENUE, SUITE 150
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FAX (630) 393-2152

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PHONE (312) 474-7841
FAX (312) 474-6099

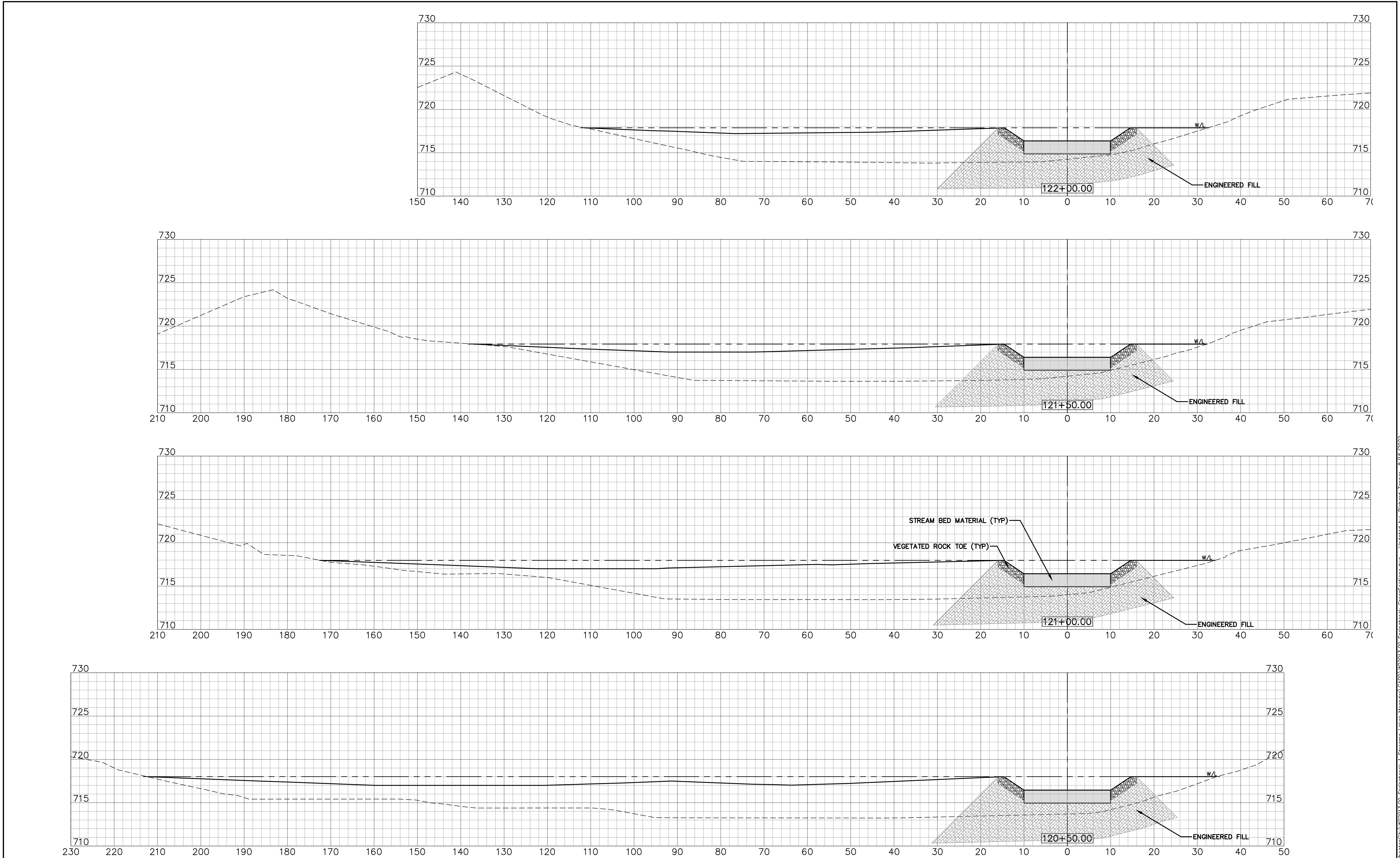
2416 GALEN DRIVE
CHAMPAIGN, ILLINOIS 61821
PHONE (217) 351-6268
FAX (217) 355-1902

SPRING BROOK 1
STREAMS LAKE MEANDER
WHEATON, ILLINOIS

TITLE:

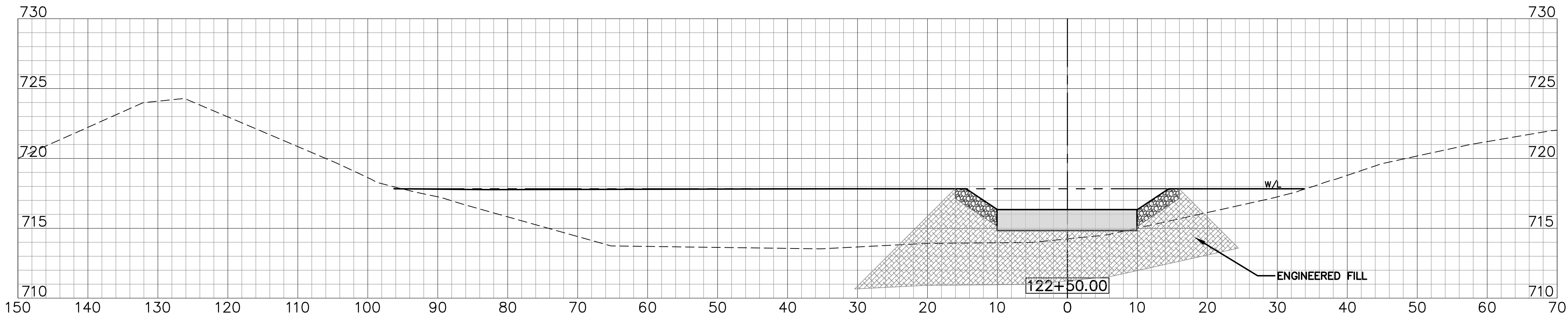
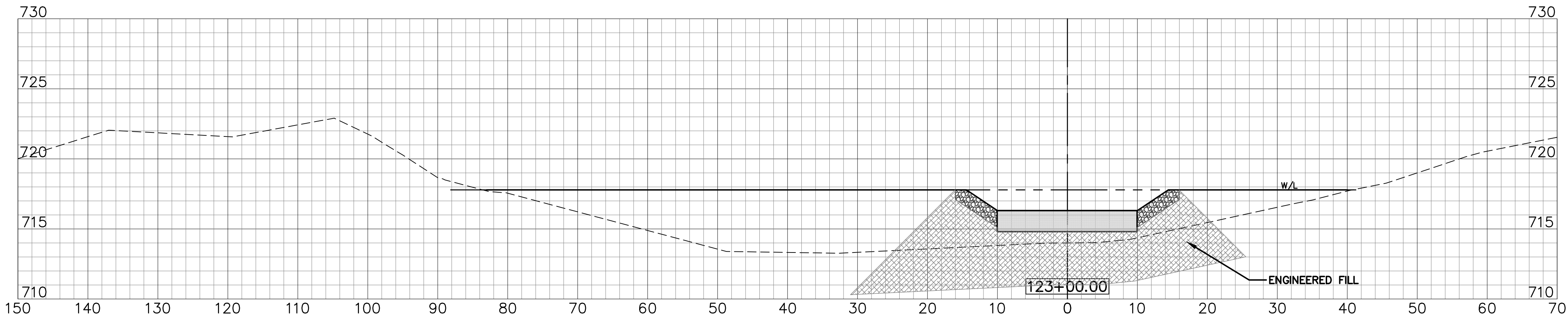
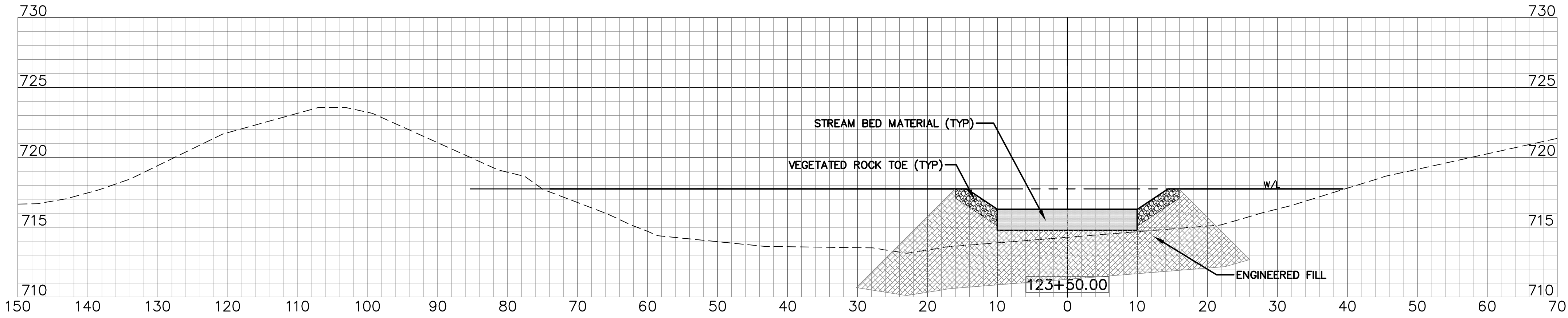
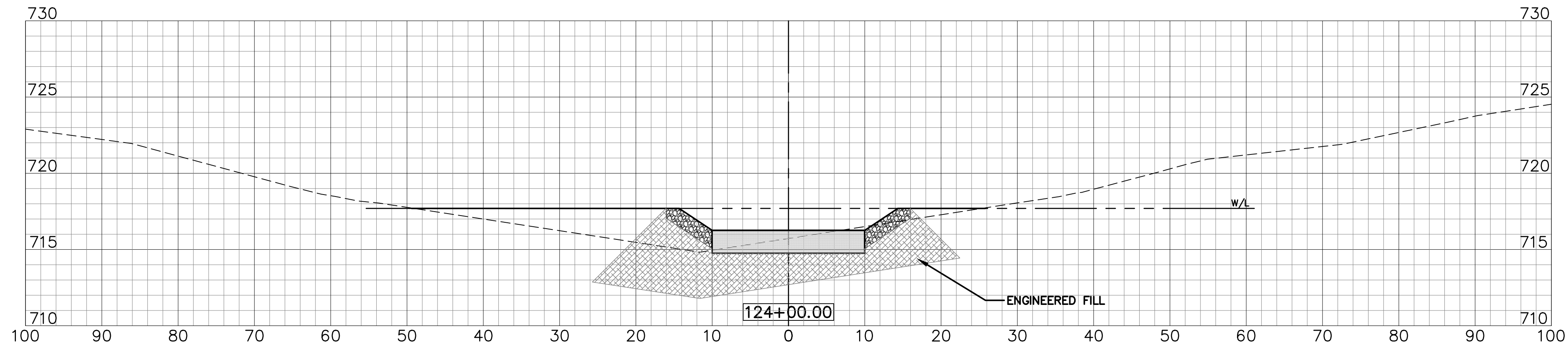
SPRING BROOK
CROSS SECTIONS
STA. 119+50 TO STA. 120+00

SCALE: 1"=10'H; 1"=5'V
DATE: July, 2022
JOB NO: W20177
SHEET 20 OF 26



REVISIONS:						<div>ENGINEERING RESOURCE ASSOCIATES</div>	<div>3S701 WEST AVENUE, SUITE 150 WARRENVILLE, ILLINOIS 60555 PHONE (630) 393-3060 FAX (630) 393-2152</div>	<div>10 S. RIVERSIDE PLAZA , SUITE 875 CHICAGO, ILLINOIS 60606 PHONE (312) 474-7841 FAX (312) 474-6099</div>	<div>2416 GALEN DRIVE CHAMPAIGN, ILLINOIS 61821 PHONE (217) 351-6268 FAX (217) 355-1902</div>	<div>SPRING BROOK 1 STREAMS LAKE MEANDER WHEATON, ILLINOIS</div>	<div>TITLE: SPRING BROOK CROSS SECTIONS STA. 120+50 TO STA. 122+00</div>	SCALE: 1"=10'H; 1"=5'V		
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION							DATE	BY	DESCRIPTION
												July, 2022		
												W20177		
												SHEET 21 OF 26		

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REVISIONS:					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

DRAWN BY: RT
CHECKED BY: KA
APPROVED BY: EP



3S701 WEST AVENUE, SUITE 150
WARRENVILLE, ILLINOIS 60555
PHONE (630) 393-3060
FAX (630) 393-2152

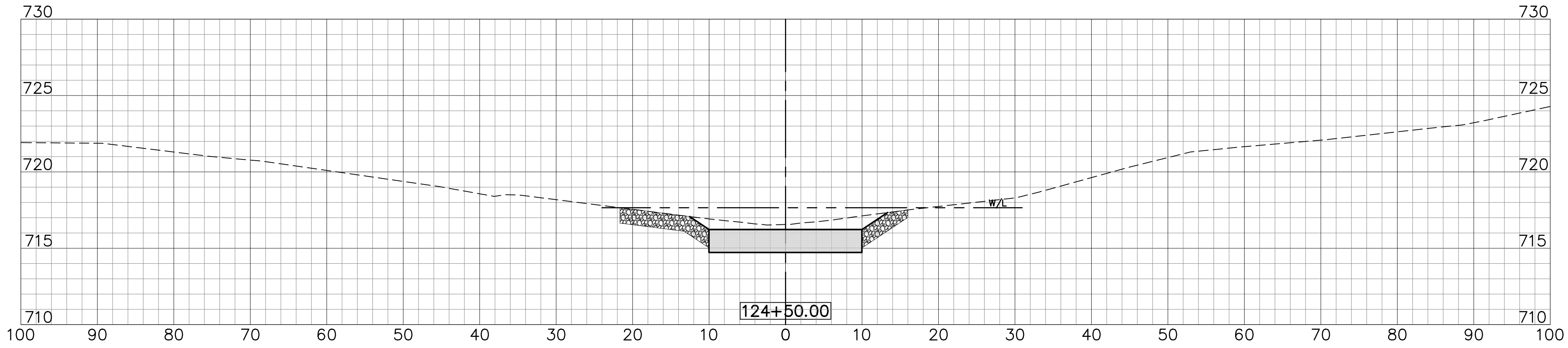
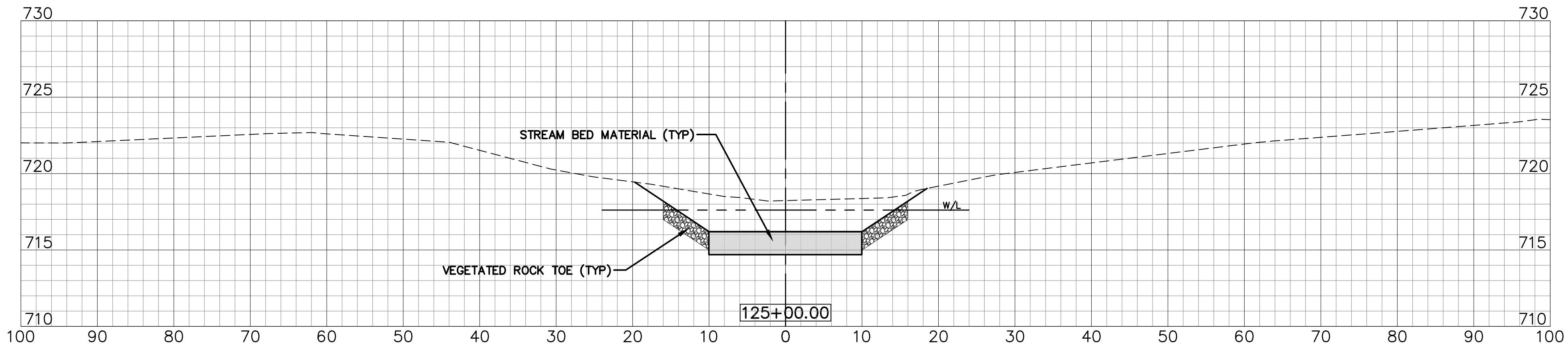
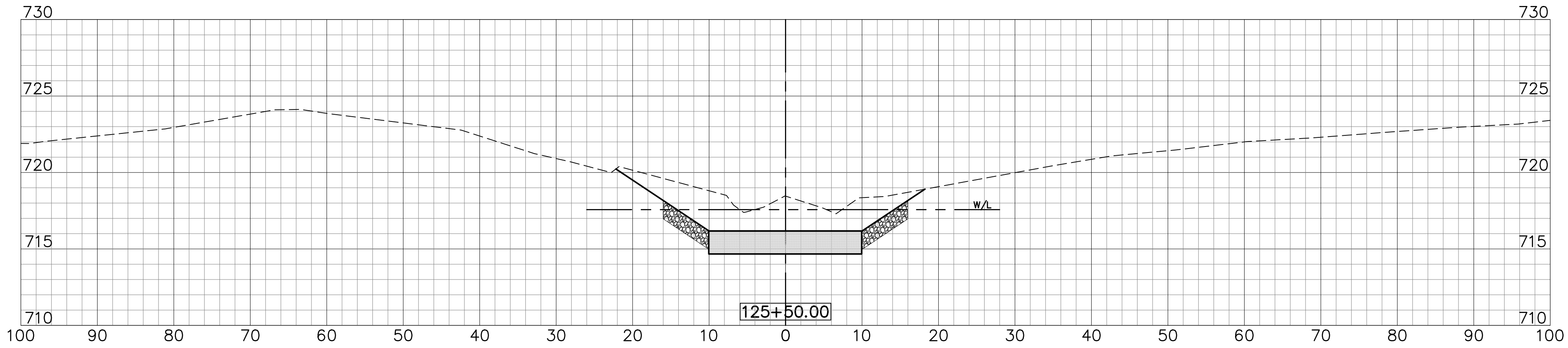
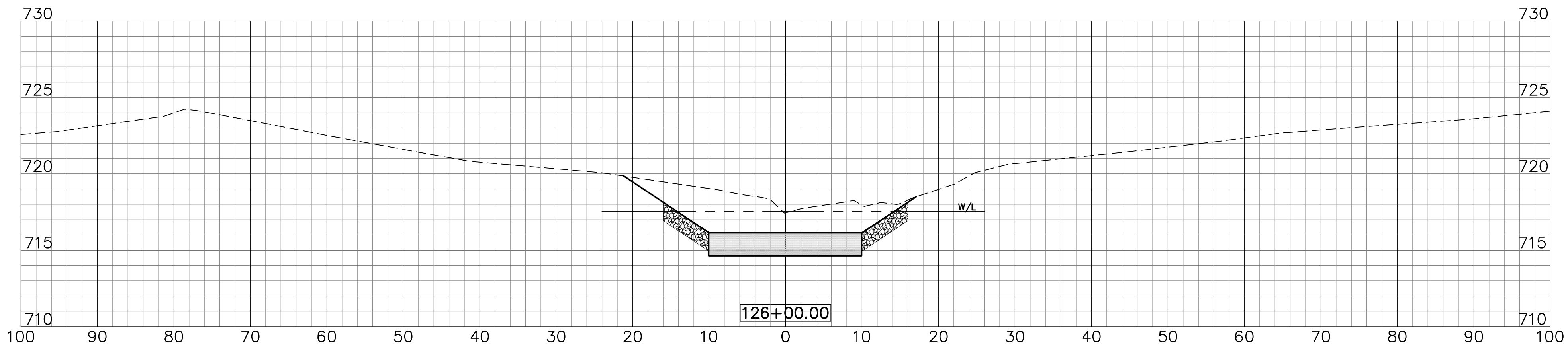
10 S. RIVERSIDE PLAZA, SUITE 875
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FAX (312) 474-6099

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**SPRING BROOK 1
STREAMS LAKE MEANDER
WHEATON, ILLINOIS**

**SPRING BROOK
CROSS SECTIONS
STA. 122+50 TO STA. 123+50**

SCALE: 1"=10'H; 1"=5'V
DATE: July, 2022
JOB NO: W20177
SHEET 22 OF 26



REVISIONS:					
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APPROVED BY: EP



3S701 WEST AVENUE, SUITE 150
WARRENVILLE, ILLINOIS 60555
PHONE (630) 393-3060
FAX (630) 393-2152

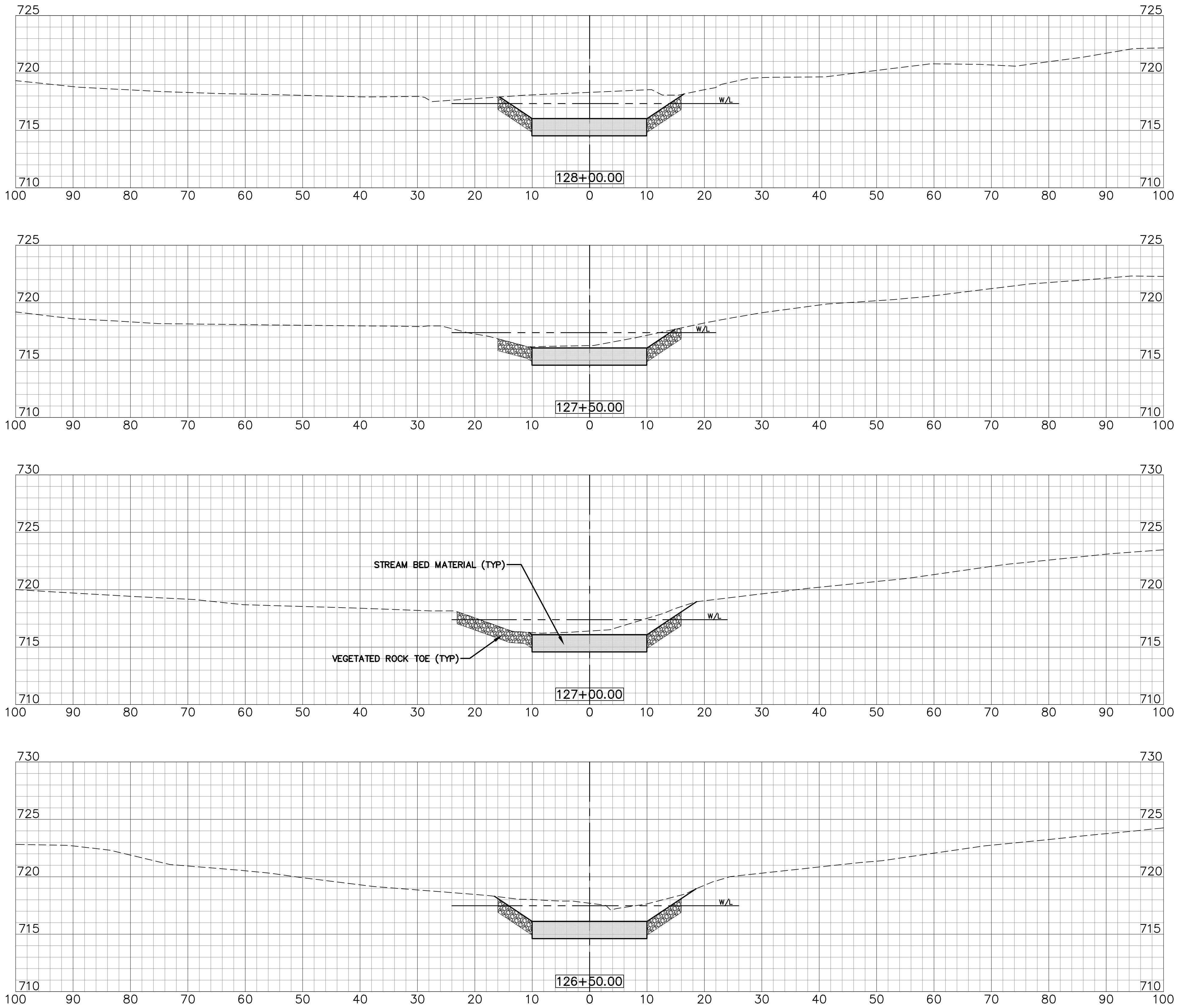
10 S. RIVERSIDE PLAZA, SUITE 875
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**SPRING BROOK 1
STREAMS LAKE MEANDER
WHEATON, ILLINOIS**

**SPRING BROOK
CROSS SECTIONS
STA. 124+50 TO STA. 126+00**

SCALE: 1"=10'H; 1"=5'V
DATE: July, 2022
JOB NO: W20177
SHEET 23 OF 26



REVISIONS:					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

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CHECKED BY:	KA
APPROVED BY:	EP

**ENGINEERING
RESOURCE ASSOCIATES**

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CHICAGO, ILLINOIS 60606
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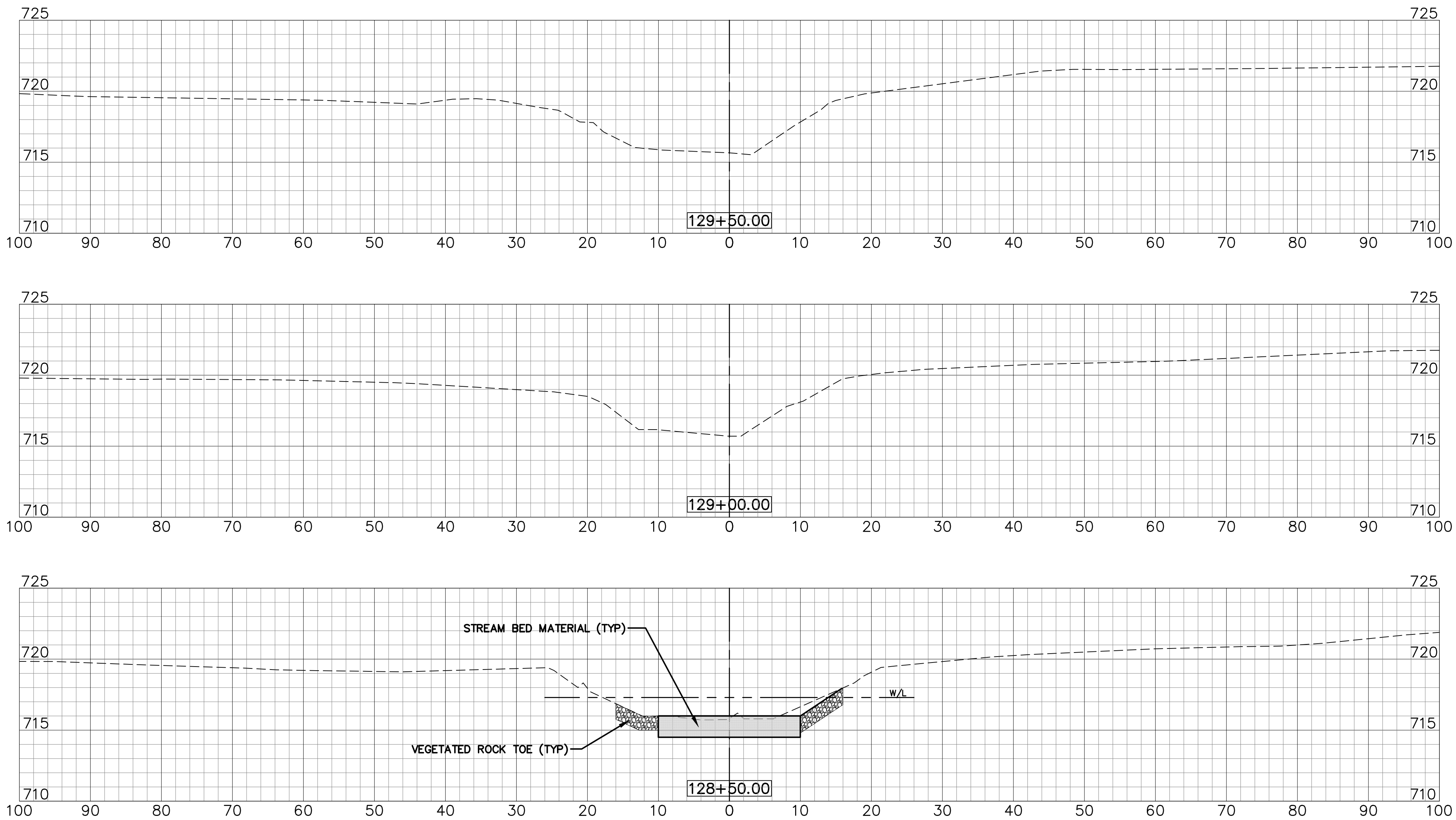
2416 GALEN DRIVE
CHAMPAIGN, ILLINOIS 61821
PHONE (217) 351-6268
FAX (217) 355-1902

**SPRING BROOK 1
STREAMS LAKE MEANDER
WHEATON, ILLINOIS**

**SPRING BROOK
CROSS SECTIONS
STA. 126+50 TO STA. 128+00**

SCALE: 1"=10'H; 1"=5'V
DATE: July, 2022
JOB NO: W20177
SHEET 24 OF 26

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REVISIONS:					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

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APPROVED BY: EP



3S701 WEST AVENUE, SUITE 150
WARRENVILLE, ILLINOIS 60555
PHONE (630) 393-3060
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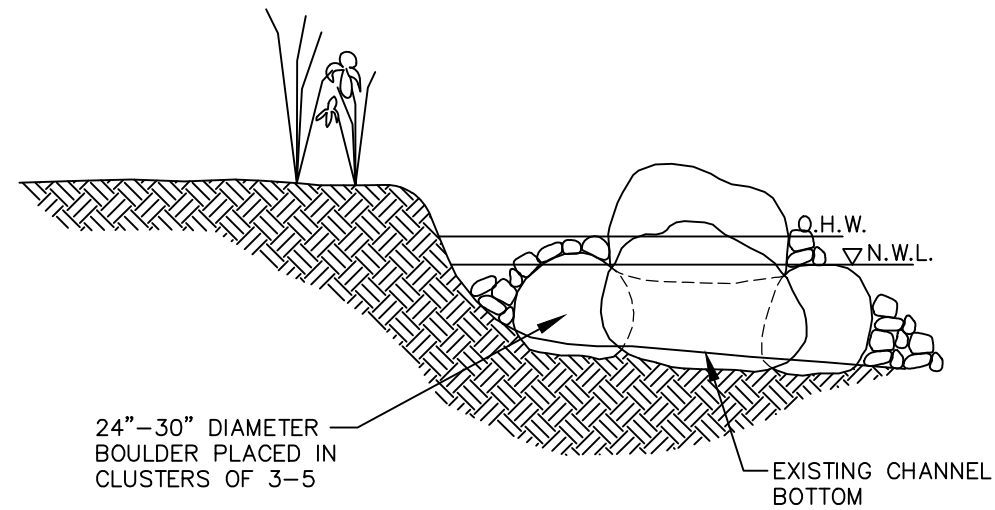
10 S. RIVERSIDE PLAZA, SUITE 875
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SPRING BROOK 1
STREAMS LAKE MEANDER
WHEATON, ILLINOIS

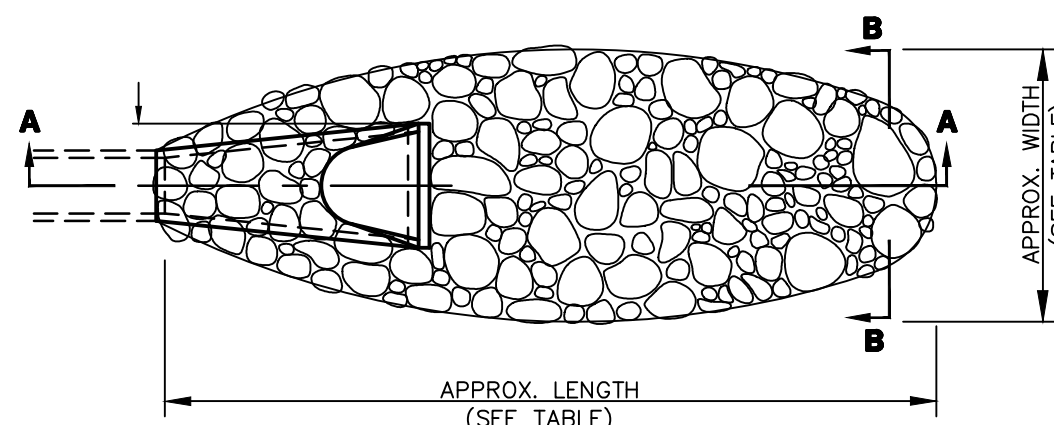
TITLE:
SPRING BROOK
CROSS SECTIONS
STA. 128+50 TO STA. 129+50

SCALE: 1"=10'H; 1"=5'V
DATE: July, 2022
JOB NO: W20177
SHEET 25 OF 26

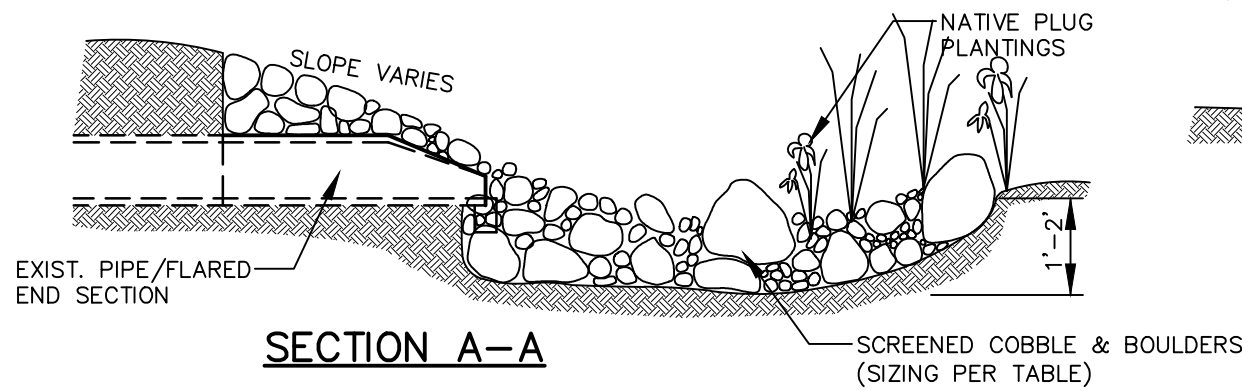


- NOTES:
1. GROUPS OF 4-5 BOULDERS SHALL BE POSITIONED TOGETHER IN A CLUSTER.
 2. BOULDERS SHALL BE PLACED TO REFUSAL.
 3. BOULDER CLUSTERS SHALL BE FIELD LOCATED AND APPROVED BY ENGINEER AND LAND OWNER.
 4. GROUPINGS OF 4 BOULDERS SHALL BE CONSTRUCTED WITH 3 BOULDERS ON CHANNEL BOTTOM TO ACT AS A TRIPOD FOR CAPSTONES AS ILLUSTRATED ABOVE.
 5. THESE GROUPINGS ARE NOT SHOWN ON THE PLAN. THESE SHALL BE PLACED AT THE DIRECTION OF THE ENGINEER.

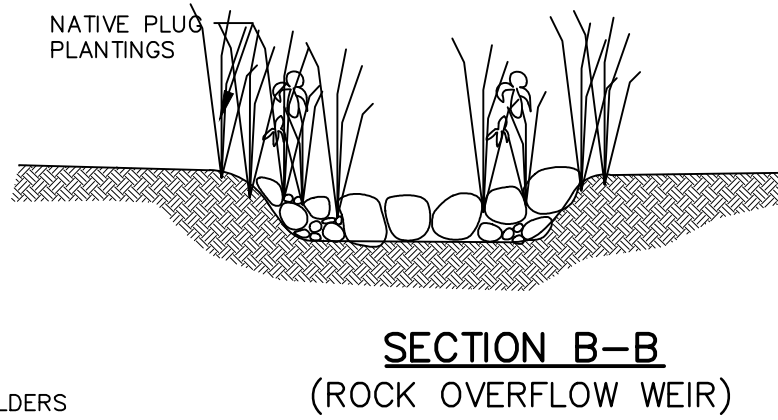
HABITAT BOULDER CLUSTER DETAIL
NOT TO SCALE



PLAN



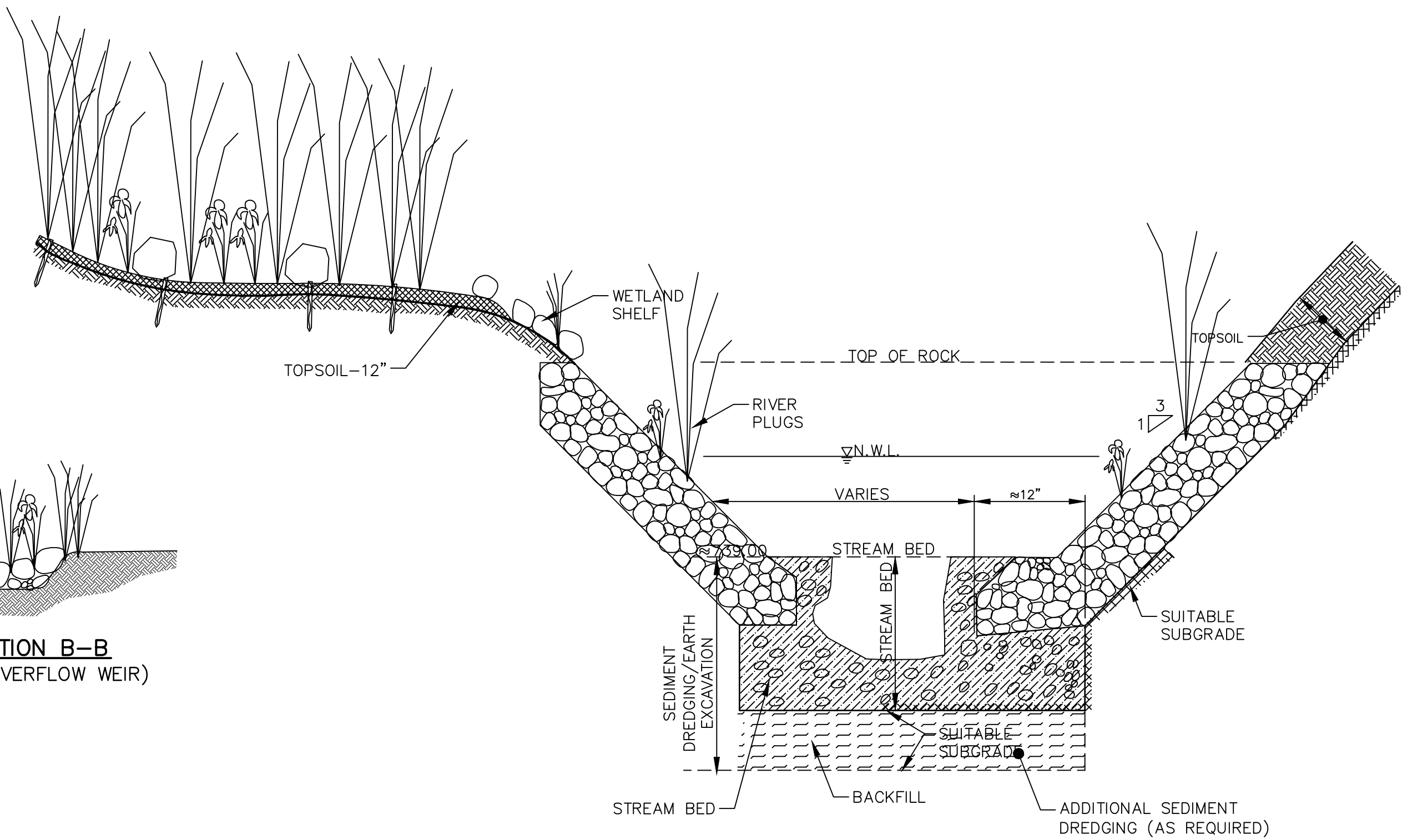
SECTION A-A



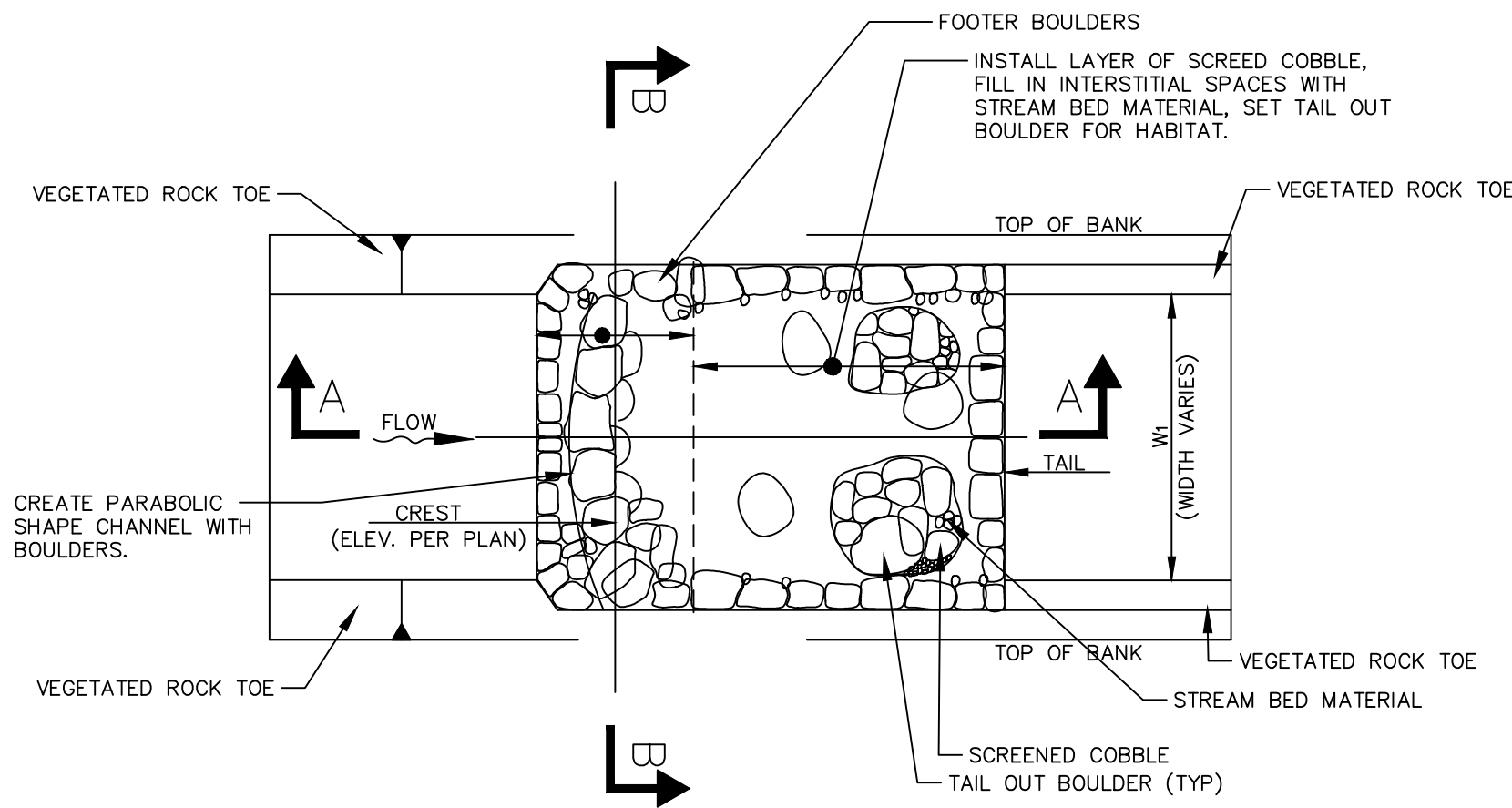
SECTION B-B
(ROCK OVERFLOW WEIR)

NOTE:
ROCK OUTLET PROTECTION SHALL BE CONSTRUCTED FLUSH WITH THE FINISHED GROUND ELEVATION.

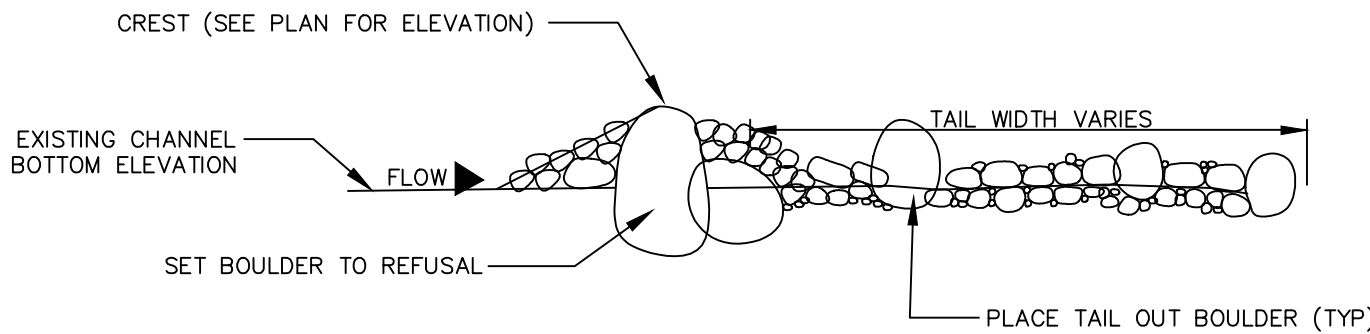
ROCK OUTLET PROTECTION DETAIL
NOT TO SCALE



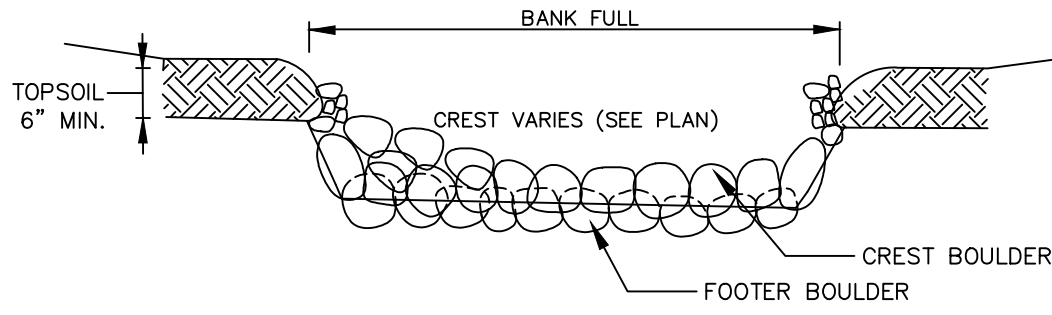
VEGETATED ROCK TOE
NOT TO SCALE



PLAN VIEW



SECTION A-A



SECTION B-B

ROCK SUBSTRATE AREA DETAIL
NOT TO SCALE

REVISIONS:					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

DRAWN BY: RT
CHECKED BY: KA
APPROVED BY: EP



35701 WEST AVENUE, SUITE 150
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FAX (217) 355-1902

**SPRING BROOK 1
STREAMS LAKE MEANDER
WHEATON, ILLINOIS**

TITLE:		SCALE:
BANK STABILIZATION DETAILS		N.T.S.
		DATE: August, 2022
		JOB NO: W20177
		SHEET 26 OF 26

APPENDIX 5

ENGINEER'S OPINION OF PROBABLE COST

Engineers Opinion of Probable Cost
for
Spring Brook 1 Streams Lakes Meander
8/16/2022

No.	Items	Unit	Qty	Unit Price	Total
SITE PREPARATION					
	MOBILIZATION	LS	1.00	\$ 125,000.00	\$ 125,000.00
	TEMPORARY SOIL EROSION & SEDIMENT CONTROL	LS	1.00	\$ 75,000.00	\$ 75,000.00
	WORK ZONE TRAFFIC CONTROL AND PROTECTION	LS	1.00	\$ 20,000.00	\$ 20,000.00
DEMOLITION					
	REMOVE SHORELINE HARDSCAPE (CONCRETE & ROCKS)	SY	3,520.00	\$ 20.00	\$ 70,400.00
	REMOVE WEIR	LS	1.00	\$ 5,000.00	\$ 5,000.00
	TURF GRASS & NON-NATIVE VEGETATION MANGEMENT - HERBICIDING	ACRE	5.31	\$ 2,500.00	\$ 13,275.00
MISCELLANEOUS UNDERGROUND					
	RECONSTRUCT STORM OUTFALL W/ ROCK OUTLET PROTECTION	EACH	15.00	\$ 10,000.00	\$ 150,000.00
EARTHWORK					
	DEWATERING & IN-STREAM WORK PLAN	LS	1.00	\$ 500,000.00	\$ 500,000.00
	SEDIMENT DREDGING & DISPOSAL	CY	3,950.00	\$ 55.00	\$ 217,250.00
	STREAMBANK, CHANNEL, AND WETLAND GRADING	CY	17,326.20	\$ 30.00	\$ 519,786.11
	ENGINEERED FILL (BELOW PROPOSED STREAM)	CY	2,540.74	\$ 40.00	\$ 101,629.63
	TOPSOIL FURNISH AND PLACE	SY	37,074.40	\$ 5.00	\$ 185,372.00
STREAMBANK STABILIZATION					
	STREAM BED MATERIAL, 18"	SY	2,976.46	\$ 35.00	\$ 104,175.94
	VEGETATED ROCK TOE	SY	1,950.00	\$ 50.00	\$ 97,500.00
	ROCK SUBSTRATE AREA	SY	50.00	\$ 65.00	\$ 3,250.00
	HABITAT BOULDERS	EACH	70.00	\$ 150.00	\$ 10,500.00
PERMANENT VEGETATIVE COVER					
	SEED & BLANKET - LOW PRO EZ PRAIRIE MIX	ACRE	5.31	\$ 12,000.00	\$ 63,720.00
	SEED & BLANKET - TOUGH NATIVE SHORELINE MIX	ACRE	6.20	\$ 20,000.00	\$ 124,000.00
	SEED & BLANKET - URBAN WETLAND/FLOODPLAIN MIX	ACRE	1.46	\$ 20,000.00	\$ 29,200.00
	RIVER PLUGS	EACH	5,400.00	\$ 7.00	\$ 37,800.00
	EMERGENT WETLAND PLUGS	EACH	7,350.00	\$ 7.00	\$ 51,450.00
ECOLOGICAL MANAGEMENT					
	ECOLOGICAL MANAGEMENT – YEAR 1	ACRE	12.97	\$ 2,500.00	\$ 32,425.00
	ECOLOGICAL MANAGEMENT – YEAR 2	ACRE	12.97	\$ 2,500.00	\$ 32,425.00
	ECOLOGICAL MANAGEMENT – YEAR 3	ACRE	12.97	\$ 2,500.00	\$ 32,425.00
TOTAL BASE BID PRICE					\$ 2,601,583.69
15% CONTINGENCY					\$ 390,237.55
TOTAL + CONTINGENCY					\$ 2,991,821.24